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ABSTRACTS

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Invited Speaker Abstracts

NEURO CRITICAL CARE: PERIOPERATIVE MANAGEMENT IN NEURO CRITICAL CARE

ESPN7-0514

AVM OR VEIN OF GALEN ANEURYSM
A. Ozanne¹, V. Lambert², M.V. Senat³, P. Durand⁴
¹Le Kremlin Bicêtre hospital- Paris South University- AP HP, Department of Interventional Neuroradiology-, Le Kremlin Bicêtre, France
²Le Kremlin Bicêtre hospital- Paris South University- AP HP, Department of Pediatrics, Le Kremlin Bicêtre, France
³Le Kremlin Bicêtre hospital- Paris South University- AP HP, Department of Obstetrics, Le Kremlin Bicêtre, France
⁴Le Kremlin Bicêtre hospital- Paris South University- AP HP, Department of PICU, Le Kremlin Bicêtre, France

Title: Cardiac failure (CF) cerebral shunt-related: how can we manage these challenging situations in newborns?

We are going to provide a short summary of the perinatal physiopathology of CF associated with cerebral shunt and some advices for hemodynamic management. Vein of Galen aneurysmal malformation (VGAM), remain the most frequent cerebral vascular shunt often recognized at the prenatal diagnosis area. Brain fetal and/or post-delivery MRI should be always performed both to confirm anatomic features and rule out encephalomalacia, the hidden face of this still considered poor disease. Fetal heart US aims to seek usual fetal cardiac failure signs which encourages earlier referring newborn to a trained interventional neuroradiology team. The post-natal dramatically vascular imbalance between the low cerebral vascular resistance through the fistulae and the relative higher systemic vascular impedance that occurred after placental circulation removal, explain the huge superior vena cava (SVC) flow return, and the severe right cardiac overload linked to pulmonary arterial hypertension. The persistence of imbalance of SVC over systemic flow rate account for the life-threatening circulatory failure that often occurs in untreated babies. These situation mandate prompt norepinephrine infusion and keeping the ductus arteriosus open to discharge and prevent right ventricular ischemia, restore both coronary and systemic perfusion in conjunction with respiratory support. It's make no sense to support CF without providing the opportunity of an emergency endovascular shunt occlusion (via arterial route) which remains the cornerstone of the treatment. It was performed before 28 days old in 44 of the 70 newborn (84% overall survival) we took care between 2001 and 2016 in our center for CF (mostly VGAM and a few cases of sinus dural malformations). It was postponed later in 10 others long term survivors and declined in 16 others. Twenty-two patients of the overall population died (31%) and 80% of the long term survivors have a good neurological outcome in our experience. So we can expect a favorable outcome in almost 60% born alive with a neonatal CF shunt-related using a multidisciplinary prenatal diagnosis strategy.
In cases of refractory increased intracranial pressure following traumatic brain injury, select patients may benefit from surgical intervention with craniectomy. There is limited data from randomized controlled trials guiding the use of craniectomy in pediatric patients. We will review the available evidence relevant to craniectomy in pediatric TBI, including indications, appropriate timing of neurosurgical intervention, and survival and longer term neurologic outcome. We will review recent relevant guidelines appropriate to the use of craniectomy in brain injury. Additionally, we will explore the indications for decompressive craniectomy in the case of regional ischemia.
Hemolytic Uremic Syndrome (HUS) is a triad of hemolysis, renal failure and thrombocytopenia often with GI involvement. Historically these were divided into D+ HUS, with diarrhea, and D- HUS. More recently this has been changed to typical and atypical HUS.

Classically typical (D+) HUS has been associated with GI involvement including GI bleeding. This is thought to be usually related to infectious causes of diarrhea and has a relatively good prognostic outcome. Within this population a risk of basal ganglia involvement, hyperglycemia, a need for dialysis, a need for blood transfusions and chronic kidney failure does occur.

In the last decade atypical (D-) HUS has been the point of discussion. This is often related either to factor deficiency or factor excess, complement deficiency or complement perturbation. The medication Eculizumab has been developed to treat this disease. This is a medication that affects by cleaving complement 5 and affecting downstream effects of HUS.

Classically Eculizumab has been used in atypical (D-) HUS but the German experience has shown that it may be effective in D+ or typical HUS as well.

In the German experience patients were treated with supportive care, dialysis, blood transfusions, platelet transfusions, vasopressors and antibiotics and ventilation (with or without plasmapheresis and with or without Eculizumab).

As the diagnosis of atypical HUS evolves over time the use of Eculizumab will increase. Eculizumab has unique risks including complement abnormality causing higher risk of encapsulated organism and sepsis infection. These will be discussed at the conference.
Several processes and interactions across the healthcare system can influence patient clinical outcomes, experience and safety. Pediatric and neonatal critical care units are complex systems and to create an environment of quality improvement and patient safety it is important to engage and support clinicians, individually and as a team, in organizations that have safety and quality as primary goals, putting patients and families at center of the decision-making processes. Quality improvement research embraces the determination of goals, development of protocols, education, execution, measurement and feedback. The foundation is to test the influence of an intervention on a measurable quality gap within the real environment. Several methods can be used and the indicators measurements are driven by the changes intended to be achieved.
Healthcare faces a rapidly increasing complexity. Despite expanding diagnostic and treatment options, chronic conditions and co-morbidities are increasing certainly on the PICU. At the same time the growth rate of healthcare expenditure is unsustainable while the quality of the care falls short of its potential. Value Based Healthcare, outcomes that really matter to patients versus the costs, is becoming a popular direction to aim for. In my presentation I will explain what this concept can mean for the PICU, what the relation is between Value and Quality, and what data is important to capture not only during the stay on the unit, but also after discharge to determine the long term outcome of our treatment and the consequences of possible side-effects or complications of that same treatment. At the same time, we need to strive for a more patient and family engaged care by caregivers who are satisfied with their work themselves and have a positive attitude. So, this means we also need to collect the experience and satisfaction data of patients, family and caregivers. A European PICU Database is still heavily needed.
LONG TERM OUTCOME / HEALTH SERVICES: HEALTH SERVICES RESEARCH AND TECHNOLOGY

ESPN7-0534

HOW TO SET UP A RESEARCH PROGRAM ON PICU SURVIVORS

J. Manning1,2,3

1The University of Nottingham, School of Health Sciences, Nottingham, United Kingdom
2Nottingham University Hospitals NHS Trust, Nottingham Children's Hospital and Neonatal Services, Nottingham, United Kingdom
3Coventry University, Centre for Technology Enabled Health Research, Coventry, United Kingdom

In industrialised nations advances in paediatric critical care provision has resulted in the overwhelming majority of children that experience critical illness surviving. However, survival is for some not without residual impact (physical/psycho-social) which has been attributed to disease-, treatment-, and PICU environment-related traumas. Subsequently, there has been burgeoning interest on the empirical exploration, as well as the development and testing of interventions, in order to understand and optimise the outcomes of PICU survivors (Manning et al. 2016). However, literature that expounds the process of setting up a program of research on PICU survivors is scant.

Therefore, this session will draw on personal insights in setting up and developing a program of research that focuses on survivors of PICU. Specifically the lecture will outline: defining the focus of the program, engaging with experts through experience (children, adolescents and families), and establishing a team. Challenges in setting up a research program will be discussed and solutions suggested. The session will conclude with recommendations for health professionals and academics who are considering setting up a research program on PICU survivors.

Reference:

Non-invasive ventilation (NIV) provides adequate respiratory assistance in patients with acute respiratory failure (ARF); its efficacy in the adult setting is well established, particularly in terms of patient-ventilator interaction. In the paediatric setting, despite several studies demonstrating the efficacy and safety of NIV, less studies have investigated the role of different interfaces, innovative ventilation modes, and sedative strategies on children-ventilator interaction.

The role of NIV in children is supported by positive reports of use in paediatric patients with acute exacerbation of chronic respiratory failure due to restrictive chest wall deformities and neuromuscular diseases but also in children with pneumonia, pulmonary edema, cystic fibrosis, and status asthmaticus.

In most acute settings, NIV is delivered in Pressure Support mode and is administered with different interfaces as the face mask, the total face mask and, in the last years, the helmet.

One of the main factors complicating patient-ventilator interaction in children is probably the higher respiratory frequency. Therefore it is crucial to apply a ventilator setting able to reduce the mechanical inspiratory and expiratory delays, satisfying the shorter demand of children respiratory duty cycle.

The aim of this presentation will be to analyse the most common kinds of asynchronies and their generating process in the pediatric population, the influence of different interfaces as the oronasal mask, the total face mask and the helmet on patient-ventilator interaction. Finally, the advantages observed by comparing PSV and innovative modes triggering and cycling off the ventilator from the EaDi signal (Nava-NIV) will be discussed.
Background

The use of non-invasive ventilation (NIV) has been increasing in paediatric intensive care units (PICU) in the last years. New interfaces have been developed for paediatric patients, like total face mask (TFM) and helmets.

In some cases it is necessary to use nebulized drugs during NIV. Side effects such as unilateral mydriasis have been reported. Some authors do not recommend the use of nebulization with these interfaces.

Objectives

To analyze characteristics of patients receiving aerosol therapy during NIV and to evaluate how safe aerosol therapy is using helmet and TFM interfaces in terms of side effects.

Methods

Prospective study including patients admitted to our PICU requiring NIV (helmet or TFM) between November 2013 and March 2016. Collected data included demographics, clinical and ventilation related information.

152 children were connected to NIV, 61 received nebulized drugs. Characteristics of patients are collected in table 1.

26.3% only received salbutamol and 55.7% received salbutamol and ipratropium together; adrenalin was administrated in 19.7%. No adverse effects were registered.

<table>
<thead>
<tr>
<th></th>
<th>With Aerosol Therapy</th>
<th>Without Aerosol Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>14 (IQR 3.6-36.8)</td>
<td>2.3 (IQR 1.3-6.9)</td>
</tr>
<tr>
<td>Days in PICU</td>
<td>4 (IQR 3-8)</td>
<td>5 (IQR 3-7)</td>
</tr>
<tr>
<td>Hours NIV</td>
<td>37 (IQR 20-65.3)</td>
<td>48 (IQR 26-84)</td>
</tr>
<tr>
<td>Failure NIV (intubation)</td>
<td>0</td>
<td>5.5%</td>
</tr>
<tr>
<td>Helmet</td>
<td>28%</td>
<td>58%</td>
</tr>
<tr>
<td>TFM</td>
<td>72%</td>
<td>42%</td>
</tr>
</tbody>
</table>

*Age, stay in PICU and duration of NIV are expressed as median.
Conclusions/Results

Although side effects with the use of nebulized drugs during NIV have been published, our cases appear to confirm that these effects are an infrequent event.

References (if needed)
The research-to-practice gap has been a concern in nursing practice for a long time. As an applied science, the collaboration of academics and clinical teams provides the foundations to nursing science and practice advancement. It is pivotal to remember that a system is designed to achieve the results that it gets. So, several problems related to nursing workforce quantification and qualification, as well as, economic and social constrains in healthcare can affect the interactions between academy and practice. Participation of clinical staff on academic researche groups, nursing residence programs, clinical post-graduation programs, establishment of guidelines and clinical protocols in collaboration are some strategies. Nursing specialist’s societies can be instruments of such approximation. Engagement, accountability, leadership, collaboration, horizontal relationships and shared governance are fundamental constructs.
INCREASING THE EVIDENCE FOR BASIC NURSING CARE: TBI, ENDOTRACHEAL SUCTION AND NUTRITION

L. Tume

†University of West of England, Faculty of Health & Applied Sciences, Bristol, United Kingdom

Increasing the evidence base for fundamental nursing cares

This lecture will consider why nurses as the primary deliverers of hands on care in the ICU and NICU rarely undertake research into nursing interventions. It will discuss and challenge why this is so and how we can change this through examples of nurses conducting research around some common nursing interventions such as endotracheal suctioning and enteral feeding. It will challenge nurses to consider how clinical questions at the bedside need to be translated into good quality research studies to generate the answers to some of the important clinical questions and increase the evidence base for nursing care in the PICU and NICU.
Awaiting cardiac transplantation (HTx) there are psychological and medical challenges, not only for the child but also for parents, siblings and the medical team in the hospital.

1. **Medical challenges** are ICU-treatment, resuscitation, multi organ failure. Today almost half of pediatric HTx patients are bridged with mechanical circulatory support. In case of life-threatening organ failure, when medical treatment failed, there are different options for mechanical circulatory support:

   a) **Short term:** There are new miniaturized centrifugal or axial pumps, recently proved to be highly efficacious with a low complication rate. They can be used in different kinds of support like ECMO, ECLS or as short term VAD and can be easily installed and allow e-CPR, easy transportation and can be used as “bridge to decision”.

   b) **Long term:** Nowadays more than 30 % pediatric HTx patients are bridged even with long term ventricular assist devices, as consequence of the increasing waiting times of several months.

      - The BerlinHeart EXCOR, a pulsatile paracorporal, pneumatic driven pump for uni- or bi ventricular long term heart support is the onliest device for newborns, infants and children up to 17 kg body weight.

      - For larger children, intracorporal devices (HeartWare, and HeartMate III) offer long term support, with recovery of the organs and mobilization and even the discharge home.

2. **Other challenges** of children awaiting HTx can be the elevated pulmonary resistance with high transpulmonary gradient, or HLA-Antibodies, requiring special therapies including Rituximab, IgG, plasmapheresis.
Setting up an ECMO program requires passionate professionals, resources, administration commitment and collaboration with an experienced ECMO centre.

There are good support documents to help delineating a strategy to set up an ECMO program like ELSO’s Red Book and some papers about this subject (1–3).

A six-step approach has been recommended that includes: Planning, Development, Implementation, Sustaining, Evaluation and Moving Forward (1).

Put in other words, first we have to identify the type of ECMO service that is needed and who is it for. What kind of patients will be treated? Then we must choose the personnel to make the program work. This is the most important aspect. Without fully committed staff it is not possible to have a successful ECMO program. After that, choose your suppliers carefully. This is a complex technique and nothing can fail or not be available when needed. Is crucial to have written protocols and procedures. There are many sources available and the ELSO site can be one of them (www.elso.org). Finally, there must be a quality control policy where mistakes are addressed and reduced to a minimum. Evaluating the program frequently and comparing to other centres is a good way to know if we are working in the right direction.

Close collaboration with an experienced ECMO centre is fundamental when starting a new ECMO program.

References:


Until other technological advanced simulation models are developed, research animal models provide the ideal biosystem to analyze complex interactions between an organism and noxious stimuli. Piglets, lambs and puppies have been used, with a growing interest in Minipigs as the preferred animal. Typically, 2 month-old specimens weigh around 10 kg. Hemorrhagic hypovolemic shock is the most frequently used model. Three goals have been established to maintain a homogenous population: hemorrhage until a certain blood arterial pressure, blood volume, or oxygen debt is achieved. Hemorrhage can be controlled or uncontrolled, with an actively bleeding open injury. Other non-hemorrhagic models include septic shock. These models add a higher inflammatory response over the hemodynamic changes.

A wide range of parameters can be measured and compared from macrohemodynamics to a microvascular point of view: heart rate, blood pressure; cardiac output and derivative calculated parameters; dynamic parameters (pulse pressure and stroke volume variation); pressure-volume loops. Measurement of regional arterial blood flows (renal, mesenteric, carotid, skin) enables end-organ perfusion evaluation. Recording the blood flow through capillary vessels in different mucosae allows to set the focus on the microvascular bed. Glycocalyx and endothelial damage can be assessed with the determination of molecules: sCAM-1, sVCAM-1, TNF-alpha. Post-mortem examination of organs and vessels would add extraordinary information. Moreover, animal models are used to evaluate new methods of hemodynamic monitoring and treatment before presenting their application in children.

In conclusion, infant animal models are an extraordinary valuable support for hemodynamic research.
Background

Prone position (PP) may improve gas exchange and respiratory mechanics in adults as in children.

Objectives

We aimed to evaluate the effect of PP on work of breathing as compared to supine position (SP) in children with severe bronchiolitis requiring non-invasive ventilation.

Methods

Fourteen infants (9 boys) were included after written informed consent (IRB n°2015-A01200-49). Flow, oesophageal pressure (CTO-2 pressure transducer, Gaeltec, Scotland) and airway pressure were simultaneously recorded (Neurovent Inc, Toronto, Canada). Measurements were done 50 minutes after positioning in PP and SP in random order, at 7 cmH2O CPAP. A response to PP was considered when PTPes was lower in PP than in SP. Data are expressed as median (first-third quartiles) and compared using the Wilcoxon two-sample paired sign test or Mann Whitney U test. A p-value below 0.05 was considered significant.

Conclusions/Results

Eight children (57%) were responders to PP and 6 were non-responders. Clinical and biological characteristics at admission were similar between responders and non-responders (table 1).

<table>
<thead>
<tr>
<th></th>
<th>Responders (n=8)</th>
<th>Non-responders (n=6)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (d)</td>
<td>40 [30-63]</td>
<td>24 [17-40]</td>
<td>0.14</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>4415 [3620-4710]</td>
<td>3850 [3460-4315]</td>
<td>0.34</td>
</tr>
<tr>
<td>Venous pH</td>
<td>7.29 [7.23-7.31]</td>
<td>7.30 [7.27-7.34]</td>
<td>0.66</td>
</tr>
<tr>
<td>Venous pCO2 (KPa)</td>
<td>7.65 [7.45-8.56]</td>
<td>7.9 [7.32-8.33]</td>
<td>0.95</td>
</tr>
<tr>
<td>FiO2 (%)</td>
<td>33 [29-36]</td>
<td>28 [25-34]</td>
<td>0.41</td>
</tr>
</tbody>
</table>

PTPes was higher in SP in responders (379 cmH2O/s/min [360-389]) vs non-responders (204cmH2O/s/min [142-284]) (p=0.043). In PP, PTP decreased significantly in responders (227 cmH2O/s/min [158-280], p=0.012) and did not change in non-responders (227 cmH2O/s/min [159-317], p= 0.34).
CONCLUSION: PTPes is higher in SP in responders and decreases significantly with PP. Response to PP seem influenced by the PTPes at baseline. References (if needed)

Trauma is a major cause of mortality and morbidity in children and adolescents, and its patterns differ from country to country. The general main causes for trauma are fallings and road traffic accidents. Hospital admissions and deaths, secondary mostly to paediatric neurological trauma, represent a public health problem. Several studies have been developed all over the world, in order to investigate the epidemiology and distribution of trauma in the paediatric population. Regional paediatric trauma centres were established to optimize the care of injured children. It will be pretended to show the experience of a Portugal Northern area paediatric trauma centre. Special planning and health policies are needed to prevent road accidents and a global education of parents, caregivers and teachers about the correct safety measures that they need to take regarding their children’s environments.
The birth of a premature newborn and the admission to the Neonatal Intensive Care Unit (NICU) usually consists of an unexpected situation that interrupts the fantasies and idealization of the baby that were built up during pregnancy.

The separation induced by the hospitalization of the premature newborn, as the sophisticated environment that it involves in some cases, hemodynamic instability and uncertainties about its survival, may condition the development of parenting.

Nurses in the NICU are in a unique and privileged position to provide support to these parents, making the magic of adapting a place of technical and sophisticated care to the individual needs of both the premature newborn and their parents.

Throughout hospitalization, parenting can be promoted through health education and parental involvement in care, providing for the welcoming of the newborn into the family and community, as well as making sure parents acquire skills to care for the babies' development after discharge from hospital.
Therapeutic hypothermia (HT) is increasingly used in neonates with moderate and severe hypoxic-ischemic encephalopathy (HIE). Physiological changes (body adaptation) during HT and rewarming (RW) lead to potential changes in drug disposition due to changes in pharmacokinetics (PK) and pharmacodynamics (PD) which may result in non-predictable drug action. Moreover disease superimposed on HT might lead to higher PK variability resulting in either insufficient or toxic plasma concentrations of used drugs and potential impact on drug disposition and consequences for long term outcome of asphyxiated neonates. Usually neonates under HT receive different drugs (antimicrobial, anticonvulsive, and analgosedative drugs), and circulatory and ventilatory support. So far the level of evidence for protocolized pharmacotherapy of neonates with HIE based on PK data is limited. PK studies are available on antimicrobials and anticonvulsives by using individual PK models, or population PK studies (anticonvulsive drugs). First results of these studies showed that the systematic introduction of protocolized pharmacotherapy may lead to personalized pharmacotherapy and potentially to validation of treatment parameters (i.e. drug neurotoxicity). Evidence based data on PK of analgesics under HT and RW are reviewed, but data on PK are scarce. Asphyxiated neonates express pain differently due to HIE and in comparison to the non-HT population the nociception may be sensitised under HT also. For future study designs of specific drugs population PK/PD modeling using NONMEM based on quantified PK/PD parameters remains a challenge to optimize pharmacotherapy for this vulnerable population.
Acute Liver Failure (ALF) is defined in children as a multi-systemic disorder in which severe impairment of liver function, with or without encephalopathy, occurs in a child with no recognized underlying chronic liver disease. It is a rare but potentially devastating process that often leads to urgent liver transplantation (LT) when it is believed that liver regeneration is unlikely. Its true incidence in the pediatric population is unknown but ALF accounts for about 10% of all pediatric LT.

Early identification of the cause of ALF is of paramount importance. In some cases, ALF may be reversed with immediate initiation of specific therapies and this is principally the case for metabolic diseases (such as galactosemia, fructosemia, and hereditary tyrosinemia type 1, and Wilson's disease), and of autoimmune hepatitis or acetaminophen-induced-ALF. On the other hand, some diseases not cured with LT (such as leukemia, Reye syndrome and mitochondrial respiratory chain disorders with neurological involvement) are a contraindication to LT. Even more difficult, is the selection of children who may recover spontaneously without LT.

Management requires a multidisciplinary approach and should focus on preventing or treating complications and arranging for early referral to a transplant center. Currently there is no convincing evidence to advocate the use of albumin dialysis (namely, Molecular Adsorbent Recirculating System; MARS®) or bio-artificial devices to improve outcomes in pediatric liver failure. Hepatocyte transplantation may yield promising results in paediatric liver failure.
PHARMACOLOGY: EVIDENCE BASED PHARMACOTHERAPY IN SPECIFIC GROUPS OF CRITICALLY ILL CHILDREN

ESPN7-0505

EXTREME LOW BIRTHWEIGHT INFANTS
K. Allegaert¹
¹Erasmus MC Sophia Childrens Hospital, Pediatric Surgery and Intensive Care, Rotterdam, The Netherlands

Pharmacotherapy aims to attain safe and effective drug prescription, including in preterm infants. This should be based on integrated knowledge concerning the evolving physiological characteristics of the infant who will receive the drug and the pharmacokinetic and pharmacodynamic characteristics of a given drug. Consequently, clinical pharmacology in preterm neonates is as dynamic and diverse as the neonates we have in our units.

Covariates explaining the variability are at least as relevant as the median estimates. Covariates of pharmacokinetics (PK, i.e. concentration-time profiles) can predict the exposure time course reasonably accurate. However, maturational trends are not similar for all maturational changes. This will be illustrated based on the differences between hepatic and renal maturation, and on the impact of pharmacogenetics on drug disposition and effects in early life.

The subsequent link between PK and PD, (i.e. pharmacodynamics, concentration effect profile) remains much less explored. We aim to illustrate the complexity and the need for neonatal clinical pharmacology based on the gap between current and likely best clinical practice for two commonly administered compounds (aminoglycosides for infection and ibuprofen for patent ductus arteriosus) and one new compound (bevacizumab, to treat threshold retinopathy of prematurity).

Finally, when we prescribe specific compounds, we also should take into account issues related to formulations available. In contrast to dedicated ventilations, infusion equipment and incubators for neonates, we still use untailored formulations, containing either very high concentrations of the therapeutic compounds or potential toxic excipients.
Interactive case discussion around pediatric traumatic brain injury

This interactive case discussion centres on the management of a child admitted to PICU with a traumatic brain injury. It is very interactive and will involve the audience with – what would you have done/do? It is based on a real case and will conclude with some learning points.
Survival after out of hospital arrest has been shown to be increased when bystanders perform CPR, and training has been shown to improve technique and willingness to act. Infant resuscitation requires an additional set of skills, and may be more daunting to a layperson, as demonstrated by fewer young children receiving CPR in out of hospital arrests. Parents of infants and small children are a particularly motivated group to obtain CPR skills. We will discuss the available tools and the indications for teaching parents resuscitation skills. Additionally, we will review the available evidence supporting teaching resuscitation skills to parents of infants, especially those at increased risk for out of hospital events.
The diagnosis of acute kidney injury (AKI) is a recent terminology that has substituted for renal failure. Classically AKI is thought to be pre-, intra- and post-renal causes. In Westernized countries the etiology of AKI includes post cardiac surgery, sepsis, trauma, or complications related to a solid organ transplant. In other parts of the world the etiology of AKI may be more related to infectious cause.

A recent paper in the NEJM identified that 25% of children who are admitted to the pediatric critical care units throughout the world have some association of AKI within the first 5-7 days. The diagnosis of AKI does not correlate with the need for renal replacement therapy (RRT).

RRT has changed over time. Historically peritoneal dialysis (PD) and hemodialysis (HD) have been used as the main modalities for RRT. Over the last few decades the use of continuous renal replacement therapy (CRRT) has become more common. In addition, slow low efficiency dialysis (SLED) has been reported.

Classically RRT is used for AKI but it is also used for inborn errors of metabolism and intoxications.

Typically if one is looking for hemodynamic stability then CRRT is superior but if one has a need for maximum solute clearance then HD is preferable.

No controlled data to date has ever demonstrated one modality superior to another for AKI and therefore one has to adapt per their local standard of care for the optimal therapy.

This will be discussed in the presentation.
Scoop and run OR stay and play?

What does it mean? You don’t have to bother with that type of question. At the end you want the best outcome for the child with the best level of care.

Questions are:

Which staff is most competent and qualified for the ride?

Which device do I need to perform the transfer?

Can we establish a relevant time frame for the transfer?

Numerous papers show the importance of a specialized team (Orr and al, Vos and al, Ramnarayan and al, Stroud and al) with the reduction in mortality, the reduction of the length of stay in hospital and the reduction of adverse events during transport.

Stroud and al tried to redefine the concept of golden hour (focus on speed to transfer to ICU), which was never demonstrated. They show that an enhanced monitoring during transfer improves the outcome of patients. Finally Borrows and al examine the time spent at the referring hospital to stabilize patients and its relationship with outcome. Their conclusion is that “scoop and run” can be safely abandoned in interhospital transport.

Finally speed is only one component of a complex system where the skills of the team, the level of equipment are as important as the time frame to arrive in the ICU.
Who Should Lead the Transport? Doctor or Nurse?

There is considerable debate regarding the presence of physicians on transport. It is not a new debate.Traditionally nurses in the United States have led transport teams for more than two decades. Some papers from the beginning of the century addressed the role of nurses as team leaders during transport, both in the US (1–3) and the UK (4,5).

There is little evidence to support that one team composition is better than another one. Most studies find similar results with or without the presence of a doctor during transport.

A recent randomized controlled trial in adults failed to show non-inferiority of nurse vs physician led transport, but results were very similar between the two groups (6).

Team composition largely depends on the organization of healthcare in a particular region. In the south of Europe, for example, transport is mainly physician led. In many countries there are no advanced nurse practitioners (ANP) making it difficult or even impossible for a nurse to lead the transport, as nurses do not have the skills required to take care of a critically ill neonate or child.

The final answer would be that the transport should be led by someone who has the knowledge, skills, training and experience to deal with all aspects of critical care, regardless of their clinical background. The level of care during transport should be the same as the level of care in the intensive care unit. If in a particular unit physicians treat the patients, a physician should lead the transport. If ANPs are looking after patients in the ICU, then they can also lead the transport.

References


Cardiac arrest (CA) is a life-threatening event, associated with high mortality (50-90%) and morbidity. Survivors often have adverse outcome, both short-term and long-term, on different domains; health status and health-related quality of life, emotional and behavioral functioning, and neuropsychological functioning.

Outcome after CA is predicted by various variables:

1) pre-arrest; the child's health status (severity of co-morbidities) and (neuro)psychological functioning prior to the CA, socio-economic status, coping styles of caregivers

2) arrest; e.g. etiology, rhythm (i.e. shockable and non-shockable), type of CPR (i.e. BLS and APLS), quality of CPR, or location of CA (i.e. IHCA or OHCA).

3) post-arrest care and rehabilitation

Prognostication after CA is one of the most challenging tasks. A multimodal prognostication model for children is not yet available.

Follow-up by a multidisciplinary team should be organized as standard of care in PICU. The follow-up program should provide fixed moments of assessment with validated instruments for a comprehensive evaluation of physical and (neuro)psychological outcome.

Standardized prospective collection of critical illness data in children in large multicenter international networks are recommended.
Although it was proven centuries ago that holy-grail treatments do not exist, the tendency to find simple solutions for complex problems remains. As respiratory failure is a complex problem, let us review if high-flow nasal cannula (HFNC) is appropriate for most patients with respiratory failure.

The first paper from Schibler (1) addressing this issue in infants diagnosed with bronchiolitis suggested that the increased use of HFNC reduced the intubation rate in Paediatric Intensive Care Units (PICU). Posterior cohort paediatric studies published showed similar results (2, 3). Interesting papers have evaluated the physiologic response to HFNC, confirming a decrease in the patient’s work of breathing (WOB) (4), and showing that HFNC provides some amount of continuous positive airway pressure (CPAP). In adults, evidence from randomised controlled trials (RCT) showed positive results in preventing re-intubation (5) and reduced mortality in the acute respiratory distress syndrome (ARDS) subgroup (6).

Unfortunately, the latest RCTs in Paediatrics have not shown a reduction in intubation rates in children with pneumonia (7,8), or have shown superiority of CPAP over HFNC in reducing WOB in the PICU (9). The limitations of HFNC for PICU patients with moderate-severe respiratory failure should be highlighted. Nevertheless, recent studies evaluating the efficacy (10) and cost-effectiveness (11) of HFNC in patients with moderate bronchiolitis in emergency rooms or general wards suggest that preventing PICU admissions is probably the biggest strength of HFNC, especially in places where there is a scarcity of an expensive resource like PICU beds.
Background

A common practice to assess enteral feeding ‘tolerance’ is to measure gastric residual volume (GRV) regularly; however evidence supporting this practice is poor.

Objectives

We aimed to compare the impact of this practice on energy target achievement between two European PICUs.

Methods

An observational study in two PICUs. PICU 1 did not routinely measure GRV and PICU 2 did. The primary outcome measure was the predicted energy intake achieved and secondary outcomes were adverse events (VAP, NEC and Gut complications). Cardiac surgical patients were excluded.

Conclusions/Results
43 children were recruited in the GRV site and 41 in the no GRV site (Table 1). 2 VAP cases were diagnosed only in the no GRV site but this was not statistically significant (p=0.160), there was no NEC, but gut complications (vomiting and diarrhoea) were higher in the GRV site. The time to first enteral feed was significantly different between the sites; mean 7.7 hours in GRV site vs 24 hours in no GRV site (p = <0.0001). The predicted energy achievement between sites were not significantly different (Table 1), but in the GRV site, energy delivery was quite variable. Hours of time without feed were higher in the GRV site, with 100% children having feeds stopped on average for 8 – 10 hours per day.

**Conclusions** Despite a lack of difference in predicted energy achievements delivered, there was more consistent achievement of targeted energy goals in the no GRV site, and this improved with PICU LOS. Gut complications were not reduced by measuring GRV.

**References (if needed)**
Laryngotracheal pathology in children oftentimes leads to critical problems which demand a close collaboration between the pediatric otolaryngologist, the pediatric intensivist or neonatologist and the anesthetist. Challenges may occur during the diagnostic endoscopic process, in the course of the surgical intervention, on the post-operative ventilatory support at the PICU/NICU and at the extubation/decannulation procedure. The current presentation will address the current status on the diagnosis and clinical management of children with tracheal stenosis.
Interactive case discussion: the child who is challenging to feed

This interactive case discussion will focus on an infant admitted to the PICU and through this case a number of topics/issues will be discussed interactively with the audience, including when to start enteral feeds, starting parenteral nutrition, the use of trophic feeds, continuous versus intermittent bolus feeding, gastric vs jejunal feeding and the use of gastric residual volume as a marker of feed tolerance. Evidence will be presented in relation to these topics and conclude with a perspective of different practices/opinions gauged from the audience participation in this case.
Data from the Extracorporeal Life Support Organisation Registry suggests the demand for neonatal ECMO is not increasing; however the number of neonatal runs each year remains steady. In this talk we will discuss the current indications, contraindications and outcomes for neonatal respiratory ECMO
WHAT DO WE KNOW ABOUT THE IMPACTS OF DELIRIUM ON NEUROLOGICAL OUTCOME

K. Madden¹
1Boston Children's, Anesthesia-Critical Care, Boston, USA

The high prevalence and burden of delirium has been well studied in the adult ICU population. A recent increase in the tools available to detect signs and symptoms of delirium in pediatric ICU patients has indicated a higher prevalence than previous expected. Recent studies have also identified risk factors associated with delirium in this population. We will review the diagnostic tools available, along with the evidence for delirium prevalence and risk factors in the PICU. We will also review the evidence for association with ICU outcomes and discuss any interventions that might be indicated.
LATE BREAKING ABSTRACT PRESENTATIONS

ESPN7-0430

ESPNIC SURVEY OF ENTERAL FEEDING PRACTICES IN INFANTS WITH CONGENITAL HEART DISEASE IN EUROPE

L. Tume1, R. Balmaks2, E. Da Cruz3, L. Latten4, S. Verbruggen5, F. Valla6
1University of West of England, Faculty of Health and Applied Sciences, Bristol, United Kingdom
2Riga Stradin University- Dept Pediatrics, PICU, Riga, Latvia
3Children's Hospital Colorado, Pediatric Cardiac Intensive care Unit, Denver, USA
4AlderHey Children's Hospital, Dept Dietetics, Liverpool, United Kingdom
5Sophia Children's Hospital, PICU, Rotterdam, The Netherlands
6Hopital Femme Mere Enfant, PICU, Lyon, France

Background

Enteral feeding practices in infants with congenital heart disease (CHD) remains controversial and inconsistent.

Objectives

To describe enteral feeding practices and use of parenteral nutrition in pre and post-operative infants with CHD

Methods

A cross sectional electronic survey in European PICUs adapted from a previously published survey

Conclusions/Results

Results: 55 PICUs caring for children with CHD completed the survey. 49% of units were mixed cardiac and general PICUs. 59% units reported having no dedicated ICU dietitian hours. Most commonly (39%) pre-operative infants on prostaglandin infusion were managed on the NICU and 63% units fed these children enterally. Most (56%) units did not have written guidelines for feeding preoperative children. Most units reported feeding these children with breast milk (77%) by bolus feeding (68%). 20-30% units reported not feeding infants with an umbilical catheter (UAC or UVC) insitu. Postoperatively most units reported that about 75% infants would be fed within 24 hours of surgery, but 54% units did not have any guidelines for feeding post-operatively. 70% units responded they would start PN if EN was not given. 65% units fed these infants mainly by bolus feed. 72% units reported using trophic feeding post-operatively. 66% units fed children on vasoactive support, but 30% stated this depended on the level of support. Table 1 shows a comparison between parameters used to assess the readiness and tolerance of enteral feeding pre and post-operatively.

Conclusions:
There are significant variations in enteral feeding practices across European PICUs for infants with CHD.

Table 1 Comparison of parameters used to assess readiness for enteral feeding in infants pre and post operatively

<table>
<thead>
<tr>
<th>Pre-operative on PGE1</th>
<th>Post-operatively</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum lactate 67.3%</td>
<td>‘Stable’ haemodynamics 87.5%</td>
</tr>
<tr>
<td>Gastric Residual Volume 63.3%</td>
<td>Gastric Residual Volume 66.7%</td>
</tr>
<tr>
<td>Blood gas 51%</td>
<td>Serum Lactate 62.5%</td>
</tr>
<tr>
<td>Diastolic BP 49%</td>
<td>Adequate Systemic BP 58.3%</td>
</tr>
<tr>
<td>Respiratory status 46.9%</td>
<td>Fluid allowance to feed 50%</td>
</tr>
<tr>
<td>Echocardiogram 44.9%</td>
<td>Blood gas 45.8%</td>
</tr>
<tr>
<td>Arterial Oxygen Spo2 30.6%</td>
<td>Echocardiogram 37.5%</td>
</tr>
<tr>
<td>Splanchnic NIRS 16.3%</td>
<td>Abdominal x-rays 27.1%</td>
</tr>
<tr>
<td>Cerebral NIRS 14.3%</td>
<td>Splanchnic NIRS 12.5%</td>
</tr>
<tr>
<td>Abdominal x-rays 12.2%</td>
<td>Cerebral NIRS 10.4%</td>
</tr>
<tr>
<td>Cerebral:Somatic NIRS ratio 6.1%</td>
<td>Cerebral:Somatic NIRS ratio 6.3%</td>
</tr>
</tbody>
</table>

References (if needed)
LATE BREAKING ABSTRACT PRESENTATIONS

ESPN7-0439

RANDOMISED STUDY OF EARLY CONTINUOUS POSITIVE AIRWAYS PRESSURE IN ACUTE RESPIRATORY FAILURE IN CHILDREN WITH IMPAIRED IMMUNITY (SCARF) ISRCTN82853500

M. Peters

1Great Ormond Street Hospital, Paediatric Intensive Care, LONDON, United Kingdom

ABSTRACT TEXT NOT RELEASED

TRANSPORT

ESPN7-0522

NEONATAL TOPICS

A. Doronjiski

1Institute for Children and Youth Care of Vojvodina, Neonatology- PICU&NICU, Novi Sad, Serbia

NEONATAL TOPICS

Transport of the critically ill neonates is a procedure with very high goals. These goals include best outcome for the transported neonate with minor or with no sequels which can impair the development of the child. Neonatal transport is in the majority of countries organized through special teams. The transport team works in a far from ideal conditions that comprise risks for the neonate and medical staff as well. The risk for the neonate is greater if the last longer, is poorly planned and organized and with the inexperienced team. Such transport results with the increased number of unnecessary accidents like endotracheal tube displacement, vascular line displacement, uncontrolled fluid administration, hypothermia, equipment malfunction etc. Those incidents can have serious consequences in neonatal outcome and are connected with higher incidence of intracranial hemorrhages, low blood sugar, prolonged hypoxia and risk for infection.

There is strong recommendation based on the results of numerous studies results that specialized neonatal transport teams are the best solution for neonates born in the facility that cannot provide needed level of care (i.e. for the outborn babies). Neonatal transport organized in such a manner can result with higher survival rate for neonates with low gestational age, lower number of intracranial hemorrhage, can perform special procedures during transport (therapeutic hypothermia, HFOV, NO therapy, ECMO).

There are some special neonatal transports concerning palliative care and transport. Also, there are long haul transports and transport from geographically unfriendly environments that must be considered in contemporary neonatal transport.
RRT is often used in critical illness. RRT not only affects solute clearance (urea, ammonia) but will also cause some degree of medication removal. Classically the things that affect medication removal are volume of distribution, molecular weight, as well as protein binding.

If one looks at the relative solute clearance of HD, PD, CRRT and SLED, HD is far superior. Within HD there is also standard and high flux (efficiency) HD. High flux or high efficiency is related to either a convective clearance added to dialysis, commonly used in Europe but not in North America, or the increased porosity of the membrane and the increased dialysate or fluid turnover.

Common medications used in the ICU may have variable clearance. Agents such as milrinone have very poor clearance and may accumulate over time causing significant vasodilatation and hypotension in patients. Other common medications such as epinephrine, norepinephrine, dopamine and dobutamine are cleared very easily. Therefore decisions on dosage adjustment may be important when starting someone on RRT.

RRT further may change medication clearance. Medications such as vancomycin, as well as aminoglycosides can easily be managed for they can be measured at bedside. Other medication classes such as cephalosporins or meropenems may be more difficult to decide.

One then has to factor in the molecular weight, the protein binding as mentioned and give the “best guess” as a way to adjust dose appropriately in patients with bulky medications. This data will be discussed in the presentation.
Complex systems like healthcare require multimodal strategies to the achievement of the desired goals and promotion of continuous advancement. The implementation science aims to incorporate methods into the traditional clinical research to promote a more effective evidenced based practice (EBP). Interactions between patients, families, clinicians, managers and other actors of the pediatric / neonatal intensive care unit must be considerate during the production and implementation of innovations into practice. Also, patients and families' needs and values must to be the center of effective and safety EBP, and their participation on research teams is a state-of-the-art strategy of improvement. Innovations have some characteristics that influence their application in clinical practice, such as advantage, complexity, compatibility, trialability, and observability, according to Rogers' Diffusion of Innovations Theory. The implementation research takes into account: multiples dimensions of a research problem, healthcare as complex systems, patients and families as time members, time and rate of innovation adoption, and professionals coaching, engagement, accountability and value. Also, the development of pragmatic clinical trials incorporating the sustainable use of the evidence in practice can also accelerate changes in healthcare outcomes.
Septic shock and toxic shock syndrome (TSS) represent acute life-threatening conditions characterized by hypotension refractory to fluid replacement and organ dysfunction resulting from a dysregulated host response to infection. Gram-positive and Gram-negative bacteria cause the majority of septic shock cases, while fungal causes are less frequent. TSS is caused by specific toxin-producing strains of the Gram-positive bacteria *Streptococcus pyogenes* and *Staphylococcus aureus*. Septic shock and TSS develop as a consequence of microbial antigens/toxins triggering a complex, variable and prolonged systemic inflammatory host response. In septic shock, the responses are largely triggered by pathogen associated molecular patterns (PAMPs), such as endotoxin (LPS), lipoproteins, peptidoglycan, flagellin and DNA, which interact with pattern recognition receptors on the immune cells resulting in upregulation of inflammatory gene transcription and initiation of the inflammatory response involving both pro- and anti-inflammatory responses. The same receptors sense endogenous molecules, so called alarmins or damage associated molecular patterns, released from injured cells and tissue. In TSS, the key mediators are the streptococcal and staphylococcal superantigens, which are exotoxins that interact with antigen-presenting cells and T cells in an unconventional manner bypassing the normal rules for antigen processing and presentation; thereby, resulting in massive T cell proliferation and a cytokine storm. In *S. pyogenes* TSS, the HLA class II type of the individual has been shown to be an important host genetic determinant influencing the severity of the outcome. The varying pathogenic mechanisms involved in sepsis/TSS patients underscores the potential for individualized medicine in these patients.
INCIDENCE AND RISK FACTORS FOR CHRONIC KIDNEY DISEASE

V. Stojanovic

1Institute for Child and Youth Health Care of Vojvodina, Intensive Care Unit, NOVI SAD, Serbia

Incidence and risk factors for chronic kidney disease

The consequences of the preterm birth or low birth weight (LBW) on nephrogenesis, the number of nephrons and the long-term kidney function are still unclear and are being examined. The so far collected data indicates that these children have an increase risk of developing a chronic kidney disease (CKD). Also, after the birth, they are exposed to other external stressors which can damage and disturb normal kidney development and cause an extra loss of nephrons. Additional risk factors are hemodynamic instability, nephrotoxic drugs, infections and suboptimal nutrition. Acute kidney injury (AKI) can be a significant risk factor for developing CKD, too. But, until today the exact pathophysiology, incidence, risk factors, and outcomes for the development of CKD in preterm newborns, as well as in the LBW newborns are unknown. According to Brenner's hypothesis, patients with decreased nephron number develop hyperfiltration that results in sodium retention, hypertension, nephron loss, and CKD due to secondary focal segmental glomerulosclerosis. Because the risk of CKD in premature and LBW newborns has not been determined, there are no evidence-based recommendations for screening or management. Some authors suggested after an AKI children should have follow-up within 1 month of hospital discharge, quarterly for two visits, and then annually for two years.
Neonatal acute kidney injury (AKI) and fluid overload are very common conditions in neonatal and paediatric intensive care units, strongly associated with increased risk of mortality. Peritoneal dialysis (PD) is generally considered the optimal dialysis modality for neonates, but in some cases is not feasible or effective. Continuous renal replacement therapy (CRRT) can be used as an adequate alternative or a bridge to PD, even if some technical limitations of traditional machines, not designed specifically for small infants, can make initiation very difficult.

In the last decade new technologies specifically developed for newborns have been implemented in order to enhance the application of CRRT to younger patients. The Cardiac And Renal Pediatric Dialysis Emergency (CARPEDIEM®) is a machine currently available in Europe that can be used to provide various treatment modalities and support for multiple organ dysfunction in neonates and small infants.

Since the first in vivo application of the CARPEDIEM®, done in Vicenza in a newborn of less than 3 kg in 2012, a registry has been instituted with more than 30 patients included to this day. The clinical application of these tools extends the field of neonatal critical-care nephrology, adding new indications for renal replacement in the pediatric population, but generating at the same time many other questions concerning some crucial issues to manage neonatal patients, as anticoagulation and targets for anticoagulation monitoring, vascular access and the optimal timing of CRRT initiation.
The Heartlink ECMO Centre based at University Hospitals Leicester is one of the world's busiest ECMO centres. We are the only UK Paediatric and Neonatal ECMO centre to routinely provide a mobile ECMO service. Since 2010 we have performed over 200 paediatric and neonatal ECMO transfers. In this talk I will describe how and why our Mobile ECMO service evolved, the equipment and personnel considerations when performing Mobile ECMO, and what can go wrong. This will include the first presentation of data from our dataset of the 206 transports we have performed to date.
Acute respiratory distress syndrome (ARDS) represent a heterogeneous and poorly defined condition defined using subjective criteria designed for adults. Until recently, ARDS definitions have been applied to children without consideration for the differences in epidemiology. Differing etiologies, lower mortality, and changing physiology across the age spectrum are some of the issues complicating accurate identification of pediatric ARDS. This lack of specificity contributes to the paucity of positive trials in this field. Biomarkers offer the potential for improved risk stratification and outcome prediction, relative to relying on clinical definitions. In pediatric ARDS, different metrics of oxygenation (such as oxygenation index, OI), metrics of dead space (alveolar dead space fraction, AVDSf), and circulating biomarkers have demonstrated improved mortality prediction. Clinical biomarkers, such as OI and AVDSf, are simple and inexpensive bedside maneuvers which can efficiently improve risk stratification in pediatric ARDS, but offer limited insight into mechanisms or targets for therapy. Circulating biomarkers, including markers of inflammation (interleukin-8), damage-associated molecular patterns (nucleosomes), endothelial dysfunction (angiopoietin 2), lung epithelial dysfunction (soluble receptor for advanced glycation end-products), and markers at the intersection of inflammation and endotheliopathy (soluble thrombomodulin), offer the potential for better appreciation of the mechanisms underlying ARDS, as well as potential targets for therapy. These biomarkers, while more cumbersome to measure, offer the potential for targeted therapy in addition to risk stratification, thus allowing both predictive as well as prognostic enrichment. The future of pediatric ARDS requires improved phenotyping of the syndrome for appropriately individualizing treatments. Biomarkers are integral to that effort.
Plasmapheresis (PP) is commonly used in critical illness. PP can be done by centrifugation or plasma exchange. Centrifugation has been used for decades while plasma exchange has recently become more common.

The equipment used for PP are myriad. They include adaptive CRRT equipment that will have small volumes, e.g. 100 ml or centrifugation systems that have extracorporeal volumes from 200 to 400 ml.

The technical aspects of PP are very similar to HD. One requires a vascular access with blood flows of roughly 3 ml/kg/min that allows for duration of therapy at bedside for 2 to 4 hours. Anticoagulation in PP is often used for citrate anticoagulation requiring attention to plasma calcium.

Indications for PP continue to be debated. In the neurology literature it has been shown that in the myasthenia gravis as well as the Guillain-Barre population PP may be equal to IVIG infusion but may give a shortened duration of the disease state. PP is also used in populations with vasculitic disease such as Wegener’s granulomatosis, lupus, anti-GBM disease and HUS.

In transplant literature PP has been used for cellular apheresis in order to drop the antibodies to minimize the risk of rejection.

PP can either be apheresed against albumin (classical) or fresh frozen plasma. If using pure albumin apheresis then over time patients may become factor deficient resulting in a coagulation defect. Additionally, patients on PP may have immunoglobulin deficiency over time, therefore replacement with immunoglobulin may be necessary.

These techniques and indications will be discussed.
EMERGENCY RE-ADMISSIONS IN CHILDREN WITH COMPLEX CHD

ESPN7-0523

UNEXPECTED DEATHS AND RE-ADMISSIONS POST DISCHARGE IN THE CARDIAC INFANT - WHAT CAN WE DO TO AVOID THEM?

K. Brown¹

¹Great Ormond Street Hospital London, Charles West Division, London, United Kingdom

Our research team undertook a UK based study into post discharge adverse events for infants undergoing interventions for congenital heart disease (CHD).

Systematic review of the literature identified a small number of studies related to patients with complex CHD, in whom adverse outcome was linked to non-Caucasian ethnicity, lower socioeconomic status, co-morbidity, age, complexity and feeding difficulties. There was evidence to suggest that home monitoring programmes are beneficial.

Of 7,976 infants reported within the UK national databases 2005-2010, 333 (4.2%) died post-operatively, leaving 7634 infants, of which 514 (6.7%) experienced either post discharge death or emergency intensive care readmission. Patients at risk of adverse outcome were identified in terms of clinical risk factors known at the time of discharge.

Qualitative analyses involving parents and health professionals identified deficiencies and national variability for: pre discharge training and information, the process of discharge to non-specialist services including documentation, paediatric cardiology follow-up, psychosocial support post discharge, and the processes for accessing help when an infant becomes unwell.

We concluded that national standardization may improve discharge documents, training, and guidance on ‘what is normal’ and ‘signs & symptoms to look for’ including how to respond. Infants with high-risk cardiac diagnoses, neurodevelopmental conditions or LOS >1 month may benefit from discharge via their local hospital. Home monitoring is recommended for hypoplastic left heart, single ventricle or pulmonary atresia. Discussion of post-discharge deaths for infant CHD should occur at a network based multi-disciplinary meeting. Audit is required of outcomes for this stage of the patient journey.
"Your son has brain injuries ..." said the doctor with a casual tone of voice ...

That day my world collapsed!

It was as if I had been carried in an emotional whirlwind of fear, panic, sadness and disappointment, to a stifling room where there was only me and that four-month-old baby, until then my son, but that now, with brain injuries, was a perfect stranger for me!

That night the feeling of loneliness was overwhelming!

I stayed in that room, all night trough, unable to sleep, near that baby with brain injuries, who slept nested in his crib. Later that night, he started to cry. I remained still, unwilling to get up, unwilling to snuggle him up. In my head, the word handicapped passed over and over again.

I just woke up from this dormant state, when a nurse of extraordinary sensibility came to me, sat down in front of me and just asked me: "what has changed?", "Everything!", I replied, "he has brain injuries"

She got up, took that baby, put it in my arms and said: “This baby is the same as yesterday, the day before yesterday, a week ago, four months ago! The only thing that changed is the knowledge that you have about him, nevertheless he is the same!"

That was the wake-up call that I needed. That baby, was my son and in that moment, he needed me! This episode was my turning point.
WHAT IS THE END TIDAL CO2 LEVEL WE SHOULD BE AIMING FOR TO OPTIMISE THE CHANCE OF ROSC?

K. Madden

1Boston Children’s, Anesthesia-Critical care, Boston, USA

The use of end-tidal carbon dioxide measurement during cardio-pulmonary resuscitation has become the standard in pediatric practice. Continuous monitoring in out-of-hospital cardiac arrest has been There is evidence that an end-tidal CO2 measurement >10 mmHg (1.33 kPa) during resuscitation is predictive of return of spontaneous circulation and survival to discharge, as well as favorable neurologic outcome. In addition, the abrupt rise in ETCO2 value has been suggested as a marker of ROSC in patients with an out-of-hospital cardiac arrest. We will review the available evidence on ETOC2 monitoring during and following cardiac arrest and ROSC, and optimal targets in pediatric patients.
Body temperature is a major concern after paediatric cardiac arrest (CA).

First of all, because hyperthermia is common, difficult to treat and clearly associated with a worst neurological prognosis. Therefore strategies to control this deleterious factor should be actively implemented.

On the other hand, it has been suggested that temperatures below normal may contribute to increased survival and a better neurological outcome in this setting, similarly to adult patients with out-of-hospital CA (OHCA) after ventricular fibrillation.

However, no consensus has been reached regarding the optimal target temperature for children - normothermia vs hypothermia. The studies designed to address this matter failed to show the benefits of hypothermia in a convincing manner. Several limitations have been pointed out to explain the lack of statistically significant success in the hypothermia group: underpowered studies, long time to achieve the targeted temperature, short duration of hypothermia and potentially beneficial effects of controlled normothermia.

These controversies are well expressed in the 2015 guidelines of the American Heart Association, which consider two options for infants and children remaining comatose after OHCA – to maintain 5 days of continuous normothermia (36°C to 37.5°C) or 2 days of initial continuous hypothermia (32°C to 34°C) followed by 3 days of continuous normothermia. For in-hospital CA there is insufficient evidence to recommend cooling over normothermia.

What temperature should we aim for after paediatric CA? Until evidence supporting hypothermia is stronger, we should actively and rapidly achieve normothermia. Fever should be aggressively treated.
EPIDEMIOLOGY OF THROMBOSIS IN NEONATAL INTENSIVE CARE UNITS

W. El-naggar1, D. McMillan1, J. Afifi1, S. Mitra1, B. Singh1, O. da Silva2, S. Lee3, P.S. Shah4

1IWK Health Centre, Pediatrics, Halifax, Canada
2University of Western Ontario- London- Ontario, Maternal- Fetal & Newborn Health, Ontario, Canada
3University of Toronto, Pediatrics, Ontario, Canada
4University of Toronto, Pediatrics, Toronto- Ontario, Canada

Background

Thrombosis in the neonatal period is higher than at any other pediatric age group. Understanding the epidemiology can help in improving outcomes.

Objectives

To assess the rate, risk factors, location and management of different types of neonatal thrombosis (NT) in Canadian Neonatal Intensive Care Units (NICUs).

Methods

A retrospective review of newborn infants with all types of thrombosis admitted to NICUs participating in Canadian Neonatal Network between 2013 and 2015. Each patient diagnosed with thrombosis was matched (for gestational age, sex, birth weight and presence of a catheter) with a control without thrombosis to identify NT risk factors.

Conclusions/Results

Of 26027 eligible patients, 376 (1.4%) were diagnosed with NT; 273 (72%) had venous, 83 (22%) arterial and 20 (5.3%) both. Some patients had multiple venous and/or arterial thrombi (total N=451 thrombi). Risk factors of NT in logistic regression analysis were C-section (OR 1.50, 95% CI 1.1, 2.1), being out-born (OR 1.7, 95% CI 1.2, 2.6) and having resuscitation at birth (OR 1.55, 95% CI 1.02, 2.4). Multiple gestation, maternal diabetes, hypertension, chorioamnionitis, prolonged rupture of membranes, Apgars, chest compression or epinephrine at birth were not associated with NT. The majority of venous thrombi were located in the portal vein while the arterial ones were in cerebral arteries (Table 1). The management of NT varied between conservative approach and use of anticoagulants (Table 2).

The rate of NT was 1.4% in Canadian NICUs. C-section, being out-born and having resuscitation at birth were significant risk factors. Management differed according to the type and location of thrombi.
### Table (1): Location of thrombi (N=451)

<table>
<thead>
<tr>
<th>Location</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Venous (N=341)</strong></td>
<td></td>
</tr>
<tr>
<td>Umbilical venous</td>
<td>34 (10)</td>
</tr>
<tr>
<td>Portal</td>
<td>176 (52)</td>
</tr>
<tr>
<td>Renal</td>
<td>10 (3)</td>
</tr>
<tr>
<td>Central venous</td>
<td>26 (8)</td>
</tr>
<tr>
<td>Others</td>
<td>93 (27)</td>
</tr>
<tr>
<td><strong>Arterial (N=110)</strong></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>38 (35)</td>
</tr>
<tr>
<td>Aortic</td>
<td>17 (15)</td>
</tr>
<tr>
<td>Renal</td>
<td>7 (6)</td>
</tr>
<tr>
<td>Others</td>
<td>48 (44)</td>
</tr>
</tbody>
</table>

### Table (2): Frequency of treatment modalities of thrombi

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cerebral</th>
<th>Renal</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative</td>
<td>56</td>
<td>7</td>
<td>346</td>
</tr>
<tr>
<td>Catheter removal</td>
<td>0</td>
<td>&lt;5</td>
<td>73</td>
</tr>
<tr>
<td>Standard heparin</td>
<td>6</td>
<td>&lt;5</td>
<td>93</td>
</tr>
<tr>
<td>Low molecular weight heparin</td>
<td>12</td>
<td>11</td>
<td>205</td>
</tr>
<tr>
<td>Other anticoagulants</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>24</td>
</tr>
<tr>
<td>Other treatment</td>
<td>&lt;5</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Unknown</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>13</td>
</tr>
</tbody>
</table>

*There could be multiple treatment modalities for a single thrombus*

References (if needed)
LONG TERM OUTCOME / HEALTH SERVICES: HEALTH SERVICES RESEARCH AND TECHNOLOGY

ESPN7-0284

DO NOT BURY THE HATCHET: REDUCING PRESCRIPTION ERRORS IN PICU 12 YEARS AFTER THE IMPLEMENTATION OF CPOE

G. Kadmon¹, M. Pinchover², A. Weissbach¹, E. Nahum¹
¹Schneider Children's Medical Center, Pediatric Intensive Care Unit, Petach Tikva, Israel
²Schneider Children's Medical Center, Pharmacology department, Petach Tikva, Israel

Background

Background: Studies have shown that the implementation of computerized physician order entry (CPOE) can reduce medication prescription errors. However, little is known regarding the late impact of CPOE on prescription errors years after the implementation of the computerized system.

Objectives

we aimed to evaluate prescription error prevalence 12 years following CPOE implementation.

Methods

Methods: 2500 prescriptions were analyzed from two time periods (1250 prescription from 2015 and 1250 prescriptions from 2016) in a PICU in which a CPOE with limited clinical decision support system (CDSS) was implemented 12 years ago. Prescription errors were determined by a pediatric intensive care physician and classified to potential adverse drug events (pADE), medication prescription errors (MPE) and rule violations. Prescription errors prevalence was compared to error prevalence in 2007 (determined in a previous study 1-3 years following CPOE implementation). Randomly selected 10% of prescriptions were also analyzed by the PICU pharmacist and the level of agreement was determined by kappa statistic.

Conclusions/Results

Results: Prescription error prevalence increased from 1.4% in 2007 to 3.2% in 2015 (p=0.03). Following revisions of CDSS tools, prescription errors decreased to 1% in 2016 (p<0.0001), pADE's decreased from 2% in 2015 to 0.7% in 2016 (p=0.006) and MPE's decreased from 1% in 2015 to 0.2% in 2016 (p=0.01). The agreement between the two reviewers was almost complete (kappa statistic=0.96).

In conclusion, prescription error prevalence can increase during the years following CPOE implementation and repeat surveillance of prescription errors and their causes is highly advised in order to plan strategies to decrease medication prescription errors.

References (if needed)
LONG TERM OUTCOME / HEALTH SERVICES: HEALTH SERVICES RESEARCH AND TECHNOLOGY

ESPN7-0339

SITUATIONAL AWARENESS IN PICU
S. Astan¹, G. Kalkan¹, O. Aydem², S. Emeksiz¹, G. Ayar³, M.N. İlhan², E. Akkuzu¹
¹Gazi University, Pediatrics, Ankara, Turkey
²Gazi University, Public Health, Ankara, Turkey
³Ankara Children's Hematology Oncology Training and Research Hospital, Pediatrics, Ankara, Turkey

Background
Failure to recognize a deteriorating patient is an important problem in pediatric critical care especially if the care team has junior members as pediatric residents.

Objectives
We hypothesize that the agreement of decisions about anticipation of potential risks and interventions of pediatric intensive care patients among critical care team vary considerably and follow seniority.

Methods
Design: Multi-center prospective observational cohort study.
Setting: All (five) PICUs in the capital city of Turkey.
Patients: Two hundred thirty three children 1 month–18 years old admitted between June 1 and August 30, 2016. Members of critical care team were asked for simple yes or no type 9 questions regarding signs of clinical deterioration for each patient in PICU. The process was repeated at the beginning and at the end of each month for a consecutive period of 3 months. Agreement between the team members’ decisions were assessed with Kappa test and categorical variables were compared using chi-square test.

Conclusions/Results
A total of 1566 surveys were conducted for 233 patients during six visits. The residents irrespective of their seniority failed to agree with the fellows and attendings on most of the critical questions. This condition did not improve at the end of the month. Fellows demonstrate improvement in their agreement with the attendings throughout the month. The rate of the correct answers was highest in attendings and nurses scored higher than residents. Pediatric residents’ rotation in PICUs needs to be re-organized to prevent potential errors in the patient management.

References (if needed)
FACTORS ASSOCIATED TO ESCALATION OF CARE AND COMPLIANCE TO THE BEDSIDEPEWS: A PILOT COHORT STUDY

O. Gawronski¹, C. Parshuram¹, C. Cecchetti¹, G. Scarselletta¹, E. Lovicu¹, L. Martino¹, E. Tiozzo¹, M. Ciofi degli Atti¹, I. Dall’Oglio¹, C. Offidani¹, M. Raponi¹, J.M. Latour¹

¹Bambino Gesù Children’s Hospital, Medical Direction, Rome, Italy

Background

Successful implementation of Pediatric Early Warning Systems and Rapid Response Teams seems to be related to human, social and organizational factors such as healthcare professional’s skills, organizational frameworks, social patterns and local healthcare cultures.

Objectives

To describe factors associated with escalation of care and compliance to the BedsidePEWS in a pediatric tertiary care hospital.

Methods

Pilot cohort study. Patients with at least two consecutive BedsidePEWS≥7 admitted in a patient ward were enrolled. The physician and nurse who cared for those patients at the time of enrollment were surveyed through a questionnaire. Questionnaire items were derived by domains identified through a preliminary qualitative study and literature review on factors associated to escalation of care.

Conclusions/Results

In October 2016 a total of 16 patients with BedsidePEWS≥7 were enrolled, 25% had a chronic disease, 75% had a medical device and in 37% > 10 medications/day administered. Compliance to the BedsidePEWS recomandations was high: 62% was seen within two hours by a physician and 94% were on continuous and hourly monitoring. The RRT was called only for two patients. Nine physicians and 14 nurses responded to the questionnaire. Self efficacy was perceived high for > 50% physicians and nurses; increased workload was reported by 89% of physicians and 64% of nurses. Interprofessional communication and teamwork was reported more positively by physicians than nurses.

Understanding barriers and facilitators to escalation of care may enable hospitals to target interventions to maximize results from the adoption of RRTs and early warning systems.

References (if needed)
RESPIRATORY FAILURE: THE PATIENT AND THE VENTILATOR; A PAS-DE-DEUX?

ESPN7-0027

ULTRASOUND ACCURACY IN CONFIRMING CUFFED ENDOTRACHEAL TUBE POSITION FOR PICU PATIENTS 2016
N. Al-Mashraki1, Sawsan Alyousef2, M. Safii1
1, RIYADH, Saudi Arabia
2KING FAHAD MEDICAL CITY, PICU, RIYADH, Saudi Arabia

Background

Bedside ultrasonography had been used for providing real-time confirmation of proper endotracheal tube placement by distinguishing tracheal VS esophageal Intubation in adult.

The team thought in order to have rapid confirmation of correct ETT depth and avoid Chest X-ray hazards, will use bedside suprasternal US visualization of the temporary filled cuffed ETT with normal saline after checking it’s integrity for all intubated PICU patients (either for recently intubated patients or as a daily assessment for the old intubated patients.

Objectives

To compare the accuracy of assessing cuffed ETT depth by suprasternal US visualization versus Chest X-ray for intubated PICU patients at KFMC.

Methods

Prospective observational study done between October 2014 and March 2016 for a 66 intubated patients less than 15 years old who met predetermined inclusion criteria. Tracheal ultrasound scan and inflation of the cuff with saline was done before chest X-ray without any delay to freshly intubated patients and to the already intubated patients whom need to do chest X-ray for follow up care in the PICU and all were compared with chest X ray to determine ETT position.

Conclusions/Results

Ultrasonography was found to be an easy, feasible, and fast alternative method to determine the optimal position of ETT in the trachea of PICU patients when using saline-filled ETT cuff with sensitivity 91.67% and specificity 83.33 %.

References (if needed)
RESPIRATORY FAILURE: THE PATIENT AND THE VENTILATOR; A PAS-DE-DEUX?

ESPN7-0259

PHYSIOLOGIC EFFECTS OF AEROSOLIZED SURFACTANT USING A BREATH-SYNCHRONIZED MESH NEBULIZER IN SURFACTANT-DEFICIENT RABBITS

R. DiBlasi

1Seattle Children's Hospital, Respiratory Care, Seattle, USA

Background

Surfactant replacement incorporates liquid bolus instillation via endotracheal tube (ETT) or catheter. Aerosolized surfactant delivery has generated conflicting data related to efficacy, attributed to the nebulizer, particle size, breath synchronization and surfactant used.

Objectives

We hypothesized similar effects with instillation and aerosolization with a novel breath-actuated vibrating mesh nebulizer (VMN).

Methods

New Zealand rabbits (1.55 ± 0.19 kg) were sedated, anesthetized, intubated, with saline lavage washout to PaO_2<75 torr on FiO_2 0.5, on assist-control volume guarantee ventilation. Subjects were randomized to receive 108 mg/kg bovine surfactant with instillation via ETT (n=5) or aerosol with a breath-synchronized VMN (Aerogen Pharma, San Mateo, US) (n=5). Gas exchange and ventilation parameters were recorded every 30 minutes for 3 h post administration. Unpaired T-test was used to compare (mean±SD) differences in physiologic outcomes at each interval; P<0.05 was significant.

Conclusions/Results

Oxygenation index (OI) (P=0.91) and ventilation efficiency index (VEI [3800/PIP*rate*PaCO_2]) were similar post-washout (P=0.48) and post-administration for 2h (Figure). Bradycardia with/out hypotension was observed during 3/5 instillations (60%) but not with aerosol. OI, dynamic compliance, pH, PaCO_2, PaO_2, RR, HR and BP were similar between groups at each 30 min interval. PIP was lower (22±0.89 vs 25±1.11; P=0.02) at 3 h and VEI was higher at 2.5 h (P=0.009) and 3 h (P=0.035)(Figure) with aerosol.

Our study is the first to show similar physiologic effects with identical surfactant doses between aerosol and direct instillation, with less hemodynamic compromise with aerosol. Breath-synchronized VMN has potential as a safe, effective and economical alternative to instillation.

References (if needed)
LOW SERUM SELENIUM IS ASSOCIATED WITH THE SEVERITY OF ORGAN FAILURE IN CRITICALLY ILL CHILDREN

U. Flaring¹, O. Rooyackers², M. Broman¹, Å. Norberg², J. Wernerman²

¹Karolinska University Hospital, Pediatric Anaesthesia and Intensive care, Stockholm, Sweden
²Karolinska University Hospital, Perioperative Medicine Huddinge, Stockholm, Sweden

Background

Low concentration of serum selenium is associated with the inflammatory response and multiple organ failure in adult ICU-patients. Critically ill Children are less well characterised.

Objectives

Serum selenium concentration and its possible relation to multiple organ failure as well as glutathione status was investigated in pediatric intensive care (PICU) patients.

Methods

A prospective consecutive cohort of critically ill children (n=100) admitted to the PICU of a tertiary university hospital and an age stratified reference Group of healthy children (n=60) were studied. The concentrations of serum selenium and reduced and total glutathione were determined at admission and at day 5 for patients still in the PICU.

Conclusions/Results

Low concentrations of serum selenium as well as a high-reduced fraction of glutathione (GSH/tGSH) was associated with multiple organ failure (p<0.001 and p<0.01) respectively. A correlation between low serum selenium concentration and high-reduced fraction of glutathione (GSH/tGSH) was also seen (r=-0.19 and p=0.03). The serum selenium concentrations in the pediatric reference Group in a selenium poor area were age dependant with lower concentrations in infants as compared to older children (p<0.001). In conclusion, both serum selenium concentration and high-reduced glutathione (GSH/tGSH) were associated with the development of multiple organ failure. The association low selenium concentration and high-reduced glutathione (GSH/tGSH) favor the hypothesis that selenium is of critical importance for the scavange capacity of glutathione peroxidase.

References (if needed)

IMPACT OF EARLY NUTRITION ON PRETERM BRAIN MATURATION AND INJURY EVALUATED BY MR-IMAGING AT TERM


1Clinic of Neonatology and Follow up- University Hospital Center and University of Lausanne, Department of Women-Mother-Child, Lausanne, Switzerland
2Hospital for Sick Children, Division of Neurology, Toronto, Canada
3Clinic of Neonatology and Follow-up- University Hospital Center and University of Lausanne, Department of Women-Mother-Child, Lausanne, Switzerland
4Institute of Social and Preventive Medicine- Lausanne University Hospital, Biostatistics, Lausanne, Switzerland
5University Hospital Center and University of Lausanne, Departement of Radiology, Lausanne, Switzerland
6University Hospital of Geneva, Division of Development and Growth- Department of Pediatrics, Geneva, Switzerland

Background

Although early nutrition has shown positive effects on neurodevelopment of preterm infants, its impact on brain maturation and injury remain poorly understood.

Objectives

To study the association between early nutritional intake and brain maturation and injury using MRI at term equivalent age (TEA) in very preterm infants.

Methods

Preterm infants <30 weeks were prospectively recruited. Cumulative nutritional intake from day 1 to 14 were collected. A MRI (3T) was performed at TEA and Kidokoro scores were assessed. Associations between nutritional intake, clinical factors and imaging scores were analyzed by uni- and multivariate logistic regression.

Conclusions/Results

We included 42 patients with a median[Q1,Q3] gestational age (GA) of 27.4[26.4,28.4] weeks and birth weight of 890[763,1045]g. The median MRI score was 4 and 75th percentile was 6, separating group 1 (score 0-5, n=27) from group 2 (score 6-12, n=15). In univariate analysis, sepsis, CRIB score and low nutrients intake were associated with a significantly higher risk of having a MR score ≥6 (OR[95%CI] energy: 0.99[0.99-0.99], lipids: 0.89[0.83-0.97], carbohydrates: 0.95[0.91-0.99]). In bivariate models adjusting for sepsis, CRIB score, GA, postnatal steroids and BPD, the association with total energy and lipids intake remained significant. This association was stronger for the gray matter component of the MR score.

Conclusions: Lower energy or lipids intake early in life was associated with higher risk of brain lesions and dysmaturatation at TEA in very preterm infants. Impact on long-term neurodevelopmental outcome needs to be confirmed in further studies.

References (if needed)
Background

In critically ill children, optimal nutritional intake, especially energy and protein intake, may improve their clinical outcomes. However, both the prescription and administration of nutrition support are complex.

Objectives

The objectives of this study were to determine the amount of prescribed and delivered nutrition to critically ill children and the interruptions of nutritional support.

Methods

Critically ill children hospitalized for >24 hours in pediatric intensive care unit and without oral nutritional intake at admission were included. The amounts of energy and protein from nutritional support that were prescribed by physicians and delivered to children were recorded daily until the 10th day of hospitalization, discharge or death. Energy and protein requirements were calculated with the Schofield equation and ASPEN guidelines, respectively. The ratios prescriptions/requirements and delivery/requirements were calculated daily.

Conclusions/Results

We included 199 children with a median length of stay of 7 days [Interquartile range: 4-10]. Nutrition support was introduced in 88% of children, and within 18 hours [7-26] after admission. During the stay, the ratio prescriptions/requirements was 86% [68-114] for energy and only 52% [31-79] for protein. The ratio delivery/requirements was 74% [50-103] for energy and 49% [29-74] for protein. Differences were observed between age groups: infants had higher ratio than older children. Nutritional support was interrupted in 70% of patients for 6 hours [1-14]. Nursing/physiotherapy, extubation and medical procedures caused the main interruptions.

In this group of critically ill children, the administration of nutritional support was satisfactory with limited interruptions while its prescription, especially the prescription of protein, was too low.

References (if needed)
Background

Constipation in critically ill children is often under-diagnosed but its incidence and complications are very frequent and important. We previously developed a constipation risk assessment score in critically ill children (PCRAS) to state constipation risk 48 hours after PICU admission.

Objectives

To validate PCRAS in critically ill children.

Methods

Observational prospective study carried out in a single pediatric center. Constipation was defined as more than 3 days without a bowel movement. PCRAS is based on five parameters: surgical diagnosis, weight, fentanyl dose, epinephrine or norepinephrine requirements and delay in enteral nutrition. A score higher than 6.2 points represents high risk of constipation. All patients admitted to the PICU for >72 hours were included. Exclusion criteria were abdominal disease and absence of signed informed consent.

Conclusions/Results

129 children (56.6% male) with a median of 8 months of age were analyzed. 54.3% of patients were surgical, 75.7% of them after cardiac surgery. ECMO was required in 3.1% of patients and continuous renal replacement therapy in 5.4%. Mortality rate was 6.2%. Constipation incidence was 44.2% (57 patients). PCRAS showed a sensibility of 63.2% (36/57) with a specificity of 95.8% (69/72) to predict constipation. Positive and negative predictive values were 100% (36/36) and 83.1% (69/83) respectively.

PCRAS is a simple and easy score that showed a good capacity to predict constipation in critically ill children but multicenter studies should be carried out to assess external validity.

References (if needed)
NURSING SCIENCE (LONG SCIENTIFIC SESSION): ADVANCING THE NURSING SCIENCE: ACHIEVING EXCELLENCE IN THE FUNDAMENTALS OF PICU/NICU CARE

ESPN7-0236

SYRINGES INFUSION PRESSURE DURING ADMINISTRATION OF RED BLOOD CELLS IN PERIPHERALLY INSERTED CENTRAL CATHETER: INFLUENCE ON LEVEL OF HEMOLYTIC MARKERS

B.M.T. Tanoue1, D.M. Kusahara1, K.C.S.C. Orsi1, M.J. Avena1, A.F.M. Avelar1

1Universidade Federal de São Paulo, Escola Paulista de Enfermagem, São Paulo, Brazil

Background

The hemolysis produced by shear stress caused by infusion pressure during the process of administration of packed red blood cells (RBCs), may causes the release of hemoglobin into plasma, increased haemolysis and potassium levels. The infusion pressure is influenced by the viscosity of blood component, by force applied during the infusion, the internal resistance generated in the catheter, and the size and diameter of the syringe which, the smaller, higher will be the infusion pressures generated. When using the peripherally inserted central catheter (PICC) greater than 10 ml syringes are recommended, to ensure lower pressure in the lumen of the catheter.

Objectives

To verify the influence of PICC and infusion pressure on hemolysis, free hemoglobin (FH) and potassium levels of RBCs according to different sizes of syringes.

Methods

Experimental study developed in nursing lab, with a sample composed by aliquot of RBCs administered randomly in bolus (syringes of 10, 20 and 60ml) for the environment and PICC (1.9Fr, silicone, 30cm of length), three times in each size of syringe.

Conclusions/Results

Eighteen infusions were made with PICC and to environment. Infusions pressures were lower to the environment and higher with PICC. Associations of pressures with FH, hemolysis and potassium levels were statistically significant in all syringe sizes with or without PICC (p<0.01), exception made to potassium level without PICC, that showed no significant variations. Conclusion: Infusion pressure generated by syringes in PICC may influence the hemolytic markers levels.

References (if needed)

NURSING SCIENCE (LONG SCIENTIFIC SESSION): ADVANCING THE NURSING SCIENCE: ACHIEVING EXCELLENCE IN THE FUNDAMENTALS OF PICU/NICU CARE

ESP7-0350

EFFECTS OF TWO DIFFERENT METHODS USED DURING HEEL STICK ON PAIN LEVEL IN NEONATES: BREASTFEEDING, HEEL WARMING

D. Aydin¹, S. Inal²

¹Bandirma Onyedi Eylul University Faculty of Health Sciences, Department of Pediatric Nursing, Bandirma, Turkey
²Istanbul University- Faculty of Health Sciences, Midwifery Department, Istanbul, Turkey

Background

Newborn infants experience acute pain with various medical procedures such as heel stick. Non pharmacological interventions are effective neonatal pain reduction strategies.

Objectives

This study aimed to determine effects of two different methods (breastfeeding (B) and heal warming (HW)) used during heel stick on pain level in healthy term neonates.

Methods

This study was a prospective, randomised controlled trial. The sample of the study consisted of 150 healthy newborns who were brought to the baby room for heel stick and matched the case selection criteria. Fifty neonates were randomly assigned to each groups, breastfeeding and heel warming groups. The study data were obtained using the 'Information Form', 'Neonatal Infant Pain Scale-NIPS' and baby thermal bag.

Conclusions/Results

It was observed that the breastfeeding group cried shorter than the heel heating group and the control group, both groups calmed down in a shorter time than the control group, during and after the procedure pain scores were lowest in the breastfeeding group, followed by the heel heating and control group respectively.

As a result, both breastfeeding and heel heating were found to be effective in reducing pain experienced during heel stick, but breastfeeding was found to be more effective than heel warming.

References (if needed)
ESTIMATING THE EFFECT OF REDUCING NICU LIGHT AND NOISE DURING SKIN-TO-SKIN CONTACT ON MATERNAL ANXIETY

M. Aita¹, R. Stremler², N. Feeley³, A.M. Nuyt⁴
¹University of Montreal, Faculty of Nursing, Montreal, Canada
²University of Toronto, Lawrence S. Bloomberg Faculty of Nursing, Toronto, Canada
³McGill University, Ingram School of Nursing, Montreal, Canada
⁴CHU Sainte-Justine, Neonatology, Montreal, Canada

Background

Skin-to-skin contact [SSC] in the Neonatal Intensive Care Unit [NICU] is advocated as favoring mothers’ psychological outcomes. Yet, light and noise may influence mothers’ outcomes when they are experiencing SSC with their preterm infant in the NICU. Mothers expressed that noise is a disturbing factor during SSC and, sometimes, is impeding them to do SSC. Therefore, a dimmed and quiet environment during SSC may promote its use and maximize its benefits on mothers’ outcomes.

Objectives

A specific purpose of this pilot study was to estimate the effect of reducing NICU light and noise during SSC on maternal anxiety.

Methods

In total, 30 dyads (mothers & 28-32 weeks GA infants) were recruited from a level III NICU in a University Hospital Center and were randomly allocated to an experimental group [EG] (light and noise reduction + SSC, n=15) or to a control group [CG] (only SSC, n=15). Dyads in both groups did 3 SSC periods of 1-hr over a week. It was hypothesized that maternal anxiety would be lower in the EG compared to CG. Anxiety was assessed with the STAI questionnaire and completed by mothers before randomization (baseline) and after each SSC period.

Conclusions/Results

Statistical analysis (mixed model with baseline anxiety scores as a covariate) estimated that there was no significant difference between groups for maternal anxiety at any of the 3 SSC periods. The small sample size may explain findings. Evaluating this intervention with a full-scale RCT is appropriate to guide an optimal SSC practice promoting mothers’ outcomes in the NICU.

References (if needed)
PAEDIATRIC INTENSIVE CARE (PIC) NURSES’ EXPERIENCES OF CARING FOR CHILDREN WHEN CARE CHANGES FROM CURATIVE TO PALLIATIVE OR END-OF-LIFE CARE

J. Spry¹, C. Bradbury-Jones²

¹Birmingham Children's Hospital, Paediatric Intensive Care, Birmingham, United Kingdom
²University of Birmingham, School of Health and Population Sciences, Birmingham, United Kingdom

Background

Little is known about PIC nurses’ experiences of caring for children whose care provision transitions from curative care to palliation and end-of-life care (EOLC).

Objectives

To explore the experiences of PIC nurses caring for children whose treatment transitions from curative to palliative or EOLC.

Methods

Semi-structured interviews were conducted with a purposive, homogenous, sample of six nurses from a 31 bedded, mixed PIC in the UK. The interviews (March-April 2015) were digitally recorded then transcribed verbatim and analysed in-depth using Interpretative Phenomenological Analysis (IPA).

Conclusions/Results

Nurses reflected on their experiences as the patients’ primary care givers (PIC experience 4-5 years). Despite the formation of group themes, huge variance can be found between the nurses’ experiences: every circumstance is different; nurses perceive their role in different ways and have features unique to them as individuals. In addition, the nurses appeared to refer to working with others as part of a team, but what or who constituted the team was ambiguous. Commonality can be found in the focus upon establishing ‘good’ relationships with families and all reported that they were coping and dealing well with the situations they found themselves in.

<table>
<thead>
<tr>
<th>Final Group Themes - summary</th>
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<tr>
<td>Our Unit: Culture &amp; Context - scene setting – where transitions occur</td>
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<td>Being a Nurse: Doing my Job - differences in each nurse’s interpretation of their role</td>
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<tr>
<td>Being Part of the Team - ambiguity about what or who constitutes ‘the team’</td>
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<tr>
<td>Interacting with Families - commonality in focus on the family and establishing “good” relationships</td>
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<td>Naming Distinguishing Features - no situation or event is the same</td>
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<tr>
<td>In the Background: The Personal Self &amp; Me - on face value, the nurses all appear to be coping well</td>
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<td>Being a Nurse: An Individual - adopting a persona and unique re-telling of their experiences</td>
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Caution is advised regarding the transferability of these results. Further analysis and research is required to better understand the complexity of the relationships between each aspect of the nurses’ experiences.
References (if needed)
CARDIAC ICU AND MECHANICAL CIRCULATORY SUPPORT: CARDIAC TRANSPLANT

ESPN7-0106

EARLY POSTOPERATIVE AMPLITUDE-INTEGRATED ELECTROENCEPHALOGRAPHY AS BIOMARKER OF NEW POSTOPERATIVE BRAIN INJURY IN INFANTS WITH SEVERE CONGENITAL HEART DISEASE

L. Noorlag¹, N.H.P. Claessens¹, L.C. Weeke¹, M.C. Toet¹, J.M.P. Breur², M.J.N. Benders¹, F. Groenendaal¹, N.J.G. Jansen¹, L.S. De Vries¹

¹Wilhelmina Children's Hospital- University Medical Centre Utrecht, Department of Neonatology, Utrecht, The Netherlands
²Wilhelmina Children's Hospital- University Medical Centre Utrecht, Department of Paediatric Cardiology, Utrecht, The Netherlands
³Wilhelmina Children's Hospital- University Medical Centre Utrecht, Department of Paediatric Intensive Care, Utrecht, The Netherlands

Background

Infants with severe congenital heart disease (CHD) are at risk for developing brain injury after cardiac surgery. Amplitude-integrated electroencephalography (aEEG) is used for continuous neuromonitoring and may predict new brain injury.

Objectives

To evaluate the most predictive time point of postoperative aEEG on new brain injury in infants who underwent cardiac surgery.

Methods

Nineteen infants with severe CHD (single ventricle [N=7], transposition of great arteries [N=7], and aortic arch obstruction [N=5]), who underwent neonatal cardiac surgery were enrolled. Postoperative aEEG was evaluated for ictal discharges, and background pattern at 5 time points. New brain injury (white matter injury, grey matter infarction, or intraparenchymal haemorrhage) was assessed by comparing pre- and postoperative MRI.

Conclusions/Results

No differences in clinical parameters were present between infants with new brain injury (N=12; 63%) and without new brain injury (N=7; 37%). Postoperatively, time to recover to continuous normal voltage was longer in infants with new injury (median 18 versus 10 hours, p=0.06), and they had a more depressed background pattern compared to infants without new injury, particularly at 12 hours (p=0.02, Figure 1). Burst suppression was only seen in infants with new brain injury. Ictal discharges were seen in two infants (11%) with complicated postoperative course and severe brain injury.

Conclusion: Postoperative aEEG background pattern may predict new brain injury in infants requiring cardiac
surgery for severe CHD.

References (if needed)
CARDIAC ICU AND MECHANICAL CIRCULATORY SUPPORT: CARDIAC TRANSPLANT

ESPN7-0172

SURVIVAL AND LONG TERM FUNCTIONAL OUTCOMES AFTER ECMO-CPR IN CHILDREN

F. Torres¹, J. Sanchez-de-Toledo²
¹Hospital del Mar Barcelona, Pediatric Unit, Barcelona, Spain
²Children’s Hospital of Pittsburgh, Department of Critical Care Medicine, Pittsburgh, USA

Background

Extra-Corporeal Cardiopulmonary Resuscitation (ECPR) has been increasingly used in children undergoing refractory cardiac arrest (CA). ECPR requires significant expertise and is not universally available. For greater adoption of the technique and optimal use, demonstration of benefits is needed.

Objectives

Identify factors related to survival and health-related quality of life in children undergoing ECPR.

Methods

A retrospective cohort (2007-2015) of children undergoing ECPR was analyzed. Patient demographics, cardiac arrest and ECPR details, survival outcomes, and testing data were collected. Survival and health-related quality of life were assessed with PEDSQL and the McMaster Family Assessment Device (MMFAD). Data is presented as median [IQR].

Conclusions/Results

58 consecutive ECPR were included, with 46 (79.3%) related to primary cardiac conditions. Initial cannulation site was central in 19 (32.8%) and peripheral in 39 (67.2%). Survival to decannulation was 45/58 (77.6%); Hospital survival 38/58 (65.5%) and Survival to Follow-up was 36/58 (62.1%). Time to follow-up was 38m [IQR19-52]. Survivors were younger 5.5 months [10 d-19 m] vs. 12 months [0.5 m-5 y], had shorter ECPR times 15 min [11.5 - 28.75] vs 30 min [16.5 - 38.5] but those differences did not reach significance. Those who received therapeutic hypothermia tended to have higher hospital survival (21/28 (75%) vs 16/29 (55%) p 0.08). Overall, follow-up assessments demonstrated good quality of life and family functioning (PEDSQL 84 [76 - 89.5]; McMaster 1.62 [1.33-1.83]).

Use of ECPR was associated with high survival rates and a good health-related quality of life. Larger series are needed to assess whether this technique should be more broadly available.

References (if needed)
RECRUITMENT OF THE SUBLINGUAL MICROCIRCULATION IN CHILDREN WITH EXTRACORPOREAL MEMBRANE OXYGENATION

P.L. Léger1,2, M. Eloi3, J. Rambaud4, R. Carbajal5

1APHP- Trousseau Hospital, PICU, PARIS, France
2INSERM, U1141, Paris, France
3INSERM, PICU, Paris, France
4APHP -Trousseau Hospital, PICU, Paris, France
5APHP - Trousseau Hospital, PICU, PARIS, France

Background

The microcirculatory dysfunctions are prognostic markers of survival and organ failures in critically ill adult patients. In children, the sublingual microcirculation is also impaired in septic shock and severe respiratory failures. We hypothesized that the microcirculation impairments are related to severe respiratory and circulatory failures and could be reversible under extracorporeal membrane oxygenation (ECMO).

Objectives

The aims of the study is 1) Assess the feasibility of the sublingual microcirculation monitoring in children with ECMO 2) Compare the sublingual microcirculation parameters under ECMO between J1 and J3.

Methods

Prospective observational study in a french PICU. The sublingual Microcirculation have been acquired with Microscan® device, Microvision.

Conclusions/Results

Ten children included, mean age 14 ± 5.8 months and mean weight 4.7 ± 4 kg. The mean catecolamine duration was 6.5 ±8.2 days. The mean ECMO duration was 9.4 ± 3.3 days and hospitalization duration was 29.6 ± 20 days. The microvascular flow index (MFI) was significantly improved in the small microvessels (2.1 ± 0.36 at day 1 and 2.5 ± 0.27 at day 3; p = 0.0173) and in the medium microvessels (2.6 ± 0.24 at day 1 and 2.8 ± 0.2 at day 3; p = 0.045). The pH increased between day 1 and day 3 (7.3 ± 0.12 versus 7.4 ± 0.11 ; p = 0.0064).

The microcirculation is impaired in the initial phase of ECMO in children with severe respiratory or circulatory failures and it is partially restored during the early phase of ECMO.

References (if needed)
USE OF SIDESTREAM DARK FIELD IMAGING TO EVALUATE MICROCIRCULATION ON CHILDREN UNDERGOING CARDIAC SURGERY

R. González1, L. Butragueño2, J. López1, J. Urbano1, A.M. Pita2, M. Hervias3, B. Ramírez4, A. Rodríguez5, J.M. Gil-Jaurena6, E. Teigell3, R. Pérez4, J.L. Zunzunegui8, S.N. Fernández1, M. García1, I. Ortiz1, J. López-Herce1
1Gregorio Marañón General University Hospital, Pediatric Intensive Care, Madrid, Spain
2Gregorio Marañón General University Hospital, Pediatric Cardiac Surgery, Madrid, Spain
3Gregorio Marañón General University Hospital, Pediatric Anesthesia, Madrid, Spain
4Gregorio Marañón General University Hospital, Cardiovascular Perfusionist, Madrid, Spain
5Gregorio Marañón General University Hospital, Pediatric Cardiology, Madrid, Spain

Background

Adequate tissue oxygen delivery is a cornerstone in the perioperative management of children undergoing cardiac surgery. Cardiopulmonary bypass (CPB) and hypothermia among other procedures might modify microcirculatory compartment conditioning prognosis. Direct microcirculation evaluation using imaging devices as sidestream dark field (SDF) microscopy has been proposed as a new tool to evaluate microcirculatory perfusion.

Objectives

Asses the capability of SDF to measure changes in microcirculation during cardiac surgery.

Methods

A prospective descriptive study was carried out. Children undergoing cardiac surgery were recruited after informed consent. Sublingual microcirculation was evaluated during anesthetic induction, surgery and before PICU admission using SDF imaging. Simultaneously hemodynamic, respiratory, and laboratory measurements were performed. Clinical (PICU length of stay, need of vasoactive drugs and mechanical ventilation, extracorporeal support and renal replacement therapy) and surgical variables (Aristotle score, CPB time, aortic clamp time, lowest temperature, vasoactive drugs and need of fluids and transfusions) were also recorded.

Conclusions/Results

Microcirculation was evaluated during surgery on 19 patients. Median and (IQR) age and weight were 2.0 years (0.7-6.9) and 13kg (7.6-17.4). Median Aristotle score was 6.3 (6-8). CPB was used in 17 patients with a median duration of 83 minutes (45-122). Median lowest achieved temperature during surgery was 30°C (29-32). PICU stay length was 3 days (2-9) and overall hospital stay length was 8 days (7-22). 73.7% of patients were extubated before admission to PICU. Median vasoactive drug use was 2days (1-8).

Direct evaluation of microcirculation by optical devices might be an useful tool to guide management of children undergoing cardiac surgery.

References (if needed)
PHARMACOLOGY

ESPN7-0244

PHARMACO-STABILITY OF PLASMA-LYTE 148 AND PLASMA-LYTE 148 WITH GLUCOSE 5% WITH FREQUENTLY USED INFUSED THERAPEUTIC AGENTS

S. Hammond1, A. Wignell2, P. Cooling3, D. Barrett3, P. Davies2

1University of Nottingham, Medicine, Nottingham, United Kingdom
2Nottingham Children’s Hospital, Paediatric Critical Care Unit, Nottingham, United Kingdom
3University of Nottingham, Pharmacy, Nottingham, United Kingdom

Background

Plasma-Lyte is a balanced, crystalloid fluid which has been shown to circumvent hyperchloremic metabolic acidosis associated with 0.9% Saline.

Objectives

Physical, chemical, and pH compatibility data is essential if these safer and more effective fluids are to be introduced into clinical practice.

Methods

Adrenaline, Dobutamine, Dopamine, Furosemide, Midazolam, Morphine, and Milrinone were investigated with Plasma-Lyte 148, Plasma-Lyte 148 + 5% Glucose, 0.9% Saline, and 5% Glucose solutions. Chemical compatibility was assessed by High Performance Liquid Chromatography using the Thermo UltiMate 3000 system. Physical compatibility was assessed by checking for colour changes and precipitate formation. pH of the admixtures was recorded using a Fisherbrand Hydrus 3000 pH meter. 6 repeats were carried out for HPLC and 2 for physical compatibility checks and pH measurements, with all admixtures assayed at 0, 2 and 24 hours. Chemical stability was defined as < 5% change in concentration. pH was acceptable if it was between 5 and 9 at all time points.

Conclusions/Results

Table 1 shows which combinations were found to be stable, and which were not. Instability was defined as going outwith the predefined criteria at any time points. All admixtures were physically stable, excluding Midazolam with Plasma-Lyte and Plasma-Lyte + Glucose at 0, 2 and 24 hours.
Conclusion: Morphine, Adrenaline, Dobutamine, Dopamine, and Furosemide are chemically, physically, and pH stable when diluted with PlasmaLyte 148. Morphine, Dobutamine, and Dopamine are stable when diluted with PlasmaLyte 148+5% Dextrose. Of note, only Morphine and Furosemide were compatible with 0.9% Saline and 5% Dextrose.

References (if needed)
Background
Pharmacokinetic (PK) studies in critically ill children are vital to improve the information available for clinical management. However, little is known about the attitudes of children and young people (CYP) towards PK research.

Objectives
To explore CYP attitudes towards PK research and identify barriers/facilitating factors to the conduct of PK studies, with reference to the PIC setting.

Methods
Following ethics approval, CYP (7-18 years) attending Birmingham Children’s Hospital were invited to attend interviews/focus groups, July 2013-July 2014. A vignette of a ‘typical’ PK study was used to promote the discussion. Sessions were digitally recorded, transcribed and analysed using NVivo11 and framework analysis approach.

Conclusions/Results

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Recruitment: n=26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>7-17 years (median 13.5 years)</td>
</tr>
<tr>
<td>Gender</td>
<td>Males: 13, Females: 13</td>
</tr>
<tr>
<td>Medication use</td>
<td>Yes: 11, No: 7, did not disclose: 8</td>
</tr>
<tr>
<td>Hospital experience</td>
<td>Inpatient: 13 (3 PIC admission)</td>
</tr>
<tr>
<td></td>
<td>Outpatient / ED attendance: 9</td>
</tr>
<tr>
<td></td>
<td>No experience: 4</td>
</tr>
<tr>
<td>Research experience</td>
<td>Currently participating / previously participated in research: 9</td>
</tr>
<tr>
<td>Recruited from</td>
<td>Young Person Advisory Group (YPAG) (BCH and National Institute Health Research): 13</td>
</tr>
<tr>
<td></td>
<td>Wellcome Trust Clinical Research Facility (WTCRF): 8</td>
</tr>
<tr>
<td></td>
<td>Paediatric Intensive Care (PIC): 3</td>
</tr>
<tr>
<td></td>
<td>Burns: 2</td>
</tr>
<tr>
<td>Methodology</td>
<td>1:1 interview: 1 participant (at participant’s home)</td>
</tr>
<tr>
<td></td>
<td>1:2 interview 4 (8 participants) (at participants’ homes)</td>
</tr>
<tr>
<td></td>
<td>Focus groups: 3 (4, 9, 4 participants) (in research facilities)</td>
</tr>
</tbody>
</table>
CYP were motivated to participate in PK research for altruistic reasons but were negatively influenced by additional painful procedures (n=17) and not being involved in decision making process (n=21). CYP valued strategies which minimised pain and disruption: use of existing lines/cannulas for blood sampling, ‘research’ information being made available for clinical care, PK sampling alongside routine samples and use of scavenged samples. Overall CYP perceived PIC an appropriate context to conduct PK studies because of analgesia and presence of lines.

Conclusion

The majority of CYP were willing to consider participation in a PK study within PIC, even with no personal benefit, but felt strongly about being actively involved in the decision making process. Strategies which reduce pain and distress are essential.

References (if needed)
CONTINUOUS INFUSION OF VANCOMYCIN IN CRITICALLY ILL CHILDREN: DO WE ACHIEVE THE TARGET?

M. GENUINI¹, M. Oualha², N. Bouazza³, F. Moulin², J.M. Treluyer⁴, F. Lesage², S. Renolleau², S. Benaboud⁴

¹NECKER HOSPITAL, PEDIATRIC INTENSIVE CARE UNIT, MONTROUGE, France
²NECKER HOSPITAL, Pediatric intensive care unit, Paris, France
³Inserm- Cochin-Necker, Unité de Recherche clinique-, Paris, France
⁴Cochin hospital, Clinical Pharmacology, PARIS, France

Background

Intermittent infusion of vancomycin in children is associated with a high between subject pharmacokinetic variability. Continuous infusion of vancomycin (CIV) is an attractive alternative for critically ill children.

Objectives

Describe and evaluate pharmacokinetic of CIV in critically ill children.

Methods

This is a single centre retrospective study including all children admitted in paediatric intensive care unit from January to June 2015, receiving CIV. Clinical and biological data, vancomycin dosing and concentration were recorded. Using a previous published population pharmacokinetic model (1), we derived pharmacokinetics parameters of each patient and described vancomycin concentrations after the loading dose, estimated patient’s Area Under the Curve (AUC0-24h) and calculated a covariate adjusted initial dose for every patient.

Conclusions/Results

We analysed 87 vancomycin concentrations from 28 patients aged from 1 month to 17 years. Median (range) loading dose was 14.8 mg/kg (12-16) followed by a CIV of 44 mg/kg/d (35-61). On their first sample, 16 patients had a concentration < 15 mg/L. On day 1, median (min-max) estimated AUC0-24h was 349 mg/L*h (201, 1001) and 21 patients (75 %) had an AUC0-24h <400.

The median (range) calculated initial daily dose taking into account age, bodyweight and serum creatinin concentration was 53 (36-69) mg/kg/d resulting in a simulated day one AUC0-24h of 409 mg/L*h (341-593) with a theoretical PK target attainment of 57%.

CIV is associated with a large pharmacokinetic between subject variability, using pharmacokinetics tools should be useful to achieve pharmacokinetic target.

References (if needed)

1. Le J. Improved vancomycin dosing in children using AUC exposure. PIDJ avr 2013
PAEDIATRIC CRITICAL CARE TRAINING PROGRAMME FOR PARENTS AND CARERS OF CHILDREN WITH COMPLEX CARE NEEDS

A. Macarthur

ROYAL MANCHESTER CHILDREN'S HOSPITAL, Paediatric Intensive Care, Manchester, United Kingdom

Background

Children with complex care needs, dependent on technology, commonly experience prolonged length of stay in a Paediatric Critical Care Unit. Prolonged exposure to critical care may effect the physical, emotional, social health and wellbeing of the child and family. The opportunity to leave the critical care environment for short periods is valued by parents and children, but often denied due to staffing pressures and lack of training for parents and carers. Parental training is required prior to discharge home.

Objectives

Parents of children dependent on technology, and well enough to leave Paediatric Critical Care for short periods, were invited to discuss their views and experiences in relation to training needs and opportunities. They were asked to identify strategies available that were helpful, and to discuss areas for development that would improve the service for children with complex care needs.

Methods

Parents were invited to a Focus Group Interview. They were encouraged to discuss the opportunities offered to them, in relation to training and assessment, to enable them to escort their children off the unit for short periods, and to care for their children at home. Open ended questions were asked to guide the discussion. Interviews were recorded, and the data was analysed using Thematic Analysis.

Conclusions/Results

A robust Training and Support Programme enables parents to safely and confidently escort their children off the Paediatric Critical Care Unit for short periods, and to prepare for caring for their children at home.

References (if needed)
Background

Several elements composing nursing competency profile have been examined by many authors. Actually managers needed practical and user-friendly instruments that respected specific characteristic of different settings.

Objectives

Aim: The paper aims to describe the development and test of the Nursing Competencies Assessment Tool (NCAT), an indicator framework thought to support nursing professional development. It is argued that the NCAT application method can represent a worthwhile tool to assess nursing competences on novice, advanced beginner, competent and proficient nurses.

Methods

Methods: The presented pilot study exploited a mixed methods approach, including: a literature review to create an indicator framework, self-administered questionnaires submitted to expert nurses, consensus meetings to elaborate the integration program and a final control group comparison. NCAT was before tested in a Pediatric Intensive Care Unit, later we retested NCAT in a pediatric unit with a semi-intensive area.

Conclusions/Results

Results: All indicators have been considered pertinent and relevant by expert nurses. Every nurses found the integration plan easy to understand and useful for their work. The control group comparison emphasized the importance in nurses’ group opinions. Conclusion: The NCAT implementation method represents a reliable and reproducible tool aimed to evaluate nurses’ competence profiles respecting the specific context. Further studies are now needed to evaluate the chance to transfer in a profitable way the emerged indicators in several other adults and pediatrics contexts.

References (if needed)
PAEDIATRIC AND NEONATAL INTENSIVE CARE NURSING

ESPN7-0206

PARENTAL PRESENCE AT CLINICAL BEDSIDE ROUNDS IN NICU OR PICU: A SYSTEMATIC REVIEW

F. Jenken¹, N. Maliepaard², A. Brouwer², A. van den Hoogen¹

¹Wilhelmina Children’s Hospital- University Medical Center Utrecht, Neonatology, Utrecht, The Netherlands
²Clinical Health Sciences- Utrecht University- the Netherlands, Faculty of Medicine, Utrecht, The Netherlands

Background

Parents are most suitable to care for their child. When a child is admitted to a neonatal or pediatric intensive care unit (NICU or PICU), nurses can take over some of the daily care. Family centered care (FCC) is a model of caring for children and their families. It’s a partnership between children, parents and family. Family centered rounds (FCR) is one of the key components of family centered care and is defined as “Interdisciplinary work rounds at the bedside in which the patient and family share in the control of the management plan as well as in the evaluation of the process itself.” FCR improves parent satisfaction by involving parents in clinical decisions regarding their child.

Objectives

To systematically review literature to describe the influence of parental presence at clinical bedside rounds at the NICU or PICU with regard to parent satisfaction.

Methods

This systematic review was conducted according to the guidelines of the PRISMA. Searches were conducted in the following electronic databases: Pubmed, Embase and Cinahl, at February and March 2016. An update of the search was conducted in January 2017.

Conclusions/Results

Six studies with 433 parents, 881 healthcare workers and 411 observed children were included. Parents are positive and more satisfied when they are included at clinical bedside rounds. Healthcare workers has some reservations, overall they are positive to include parents at rounds.

Conclusion: This systematic review shows evidence to improve parents’ satisfaction when present at clinical bedside rounds in NICU or PICU setting.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS

ESPN7-0028

PLACENTAL SYNCYTIN-2 BEARING EXOSOMES PROMOTE IMMUNE-TOLERANCE AGAINST FETUS DURING PREGNANCY
G. Lokossou 1
École Polytechnique d'Abomey Calavi, Génie de Biologie Humaine, Abomey Calavi, Benin

Background

Pregnancy is a unique event in which a foreign fetus survives to full term without apparent rejection by the mother's immune system. Syncytin-2 is a protein derived from human endogenous retrovirus sequences and is an important player in the formation of the placenta. Syncytin-2 is incorporated on the surface of extracellular microvesicles, known as exosomes, which are released from the placenta. Previous studies have suggested that placenta exosomes had the intricate capacity to modulate function of various immune cell types, such as DCs and macrophages.

Objectives

In light of our recent results, we will determine if exosome-associated Syncytin-2 act upon immune cell function and if variation in their levels changes the immunosuppressive function of placenta-derived exosomes.

Methods

Using Jurkat T cell, we demonstrated that synthetic peptide homologous to the sequence of syncytin-2 ISD dimer induced MAP kinases ERK1 and ERK 2 phosphorylation and inhibits TNF-α production after PMA-Ionomycin stimulation. We also showed that (Sync-2-ISD)2 consistently suppressed IL-2, IL-5, IL-6, IFN-g and TNF-α production in PBMC supernatant following stimulation with anti-CD3/CD28 or PMA-Ionomycin after incubation with (Sync-2-ISD)2. We further demonstrated that placental Syncytin-2 bearing exosomes down-regulate TNF-α expression in Jurkat T cell and Th1 cytokines in PBMC. Syncytin-2-depleted trophoblast exosomes were next incubated with PBMC and we demonstrated that syncytin 2 depletion prevent down-modulation of Th1 cytokines.

Conclusions

In conclusion, our data suggested that syncytin-2, in particular (syncytin-2-ISD)2 contributes greatly to prevent fetal allo-rejection by creating a "tolerant" microenvironment characterised by lowering Th1 cytokines.

References (if needed)
VALIDATION OF A NOVEL HOST-RESPONSE DIAGNOSTIC FOR NEONATAL SEPSIS
T.E. Sweeney1, J.L. Wynn2, M. Cernada3, E. Serna4, H.R. Wong5, H.V. Baker6, M. Vento3, P. Khatri1
1Stanford University, Institute for Immunity- Transplantation and Infections, San Francisco, USA
2University of Florida College of Medicine, Pediatrics and Pathology- Immunology and Experimental Medicine, Gainesville- FL, USA
3University and Polytechnic Hospital La Fe, Health Research Institute- Division of Neonatology, Valencia, Spain
4University of Valencia, Central Research Unit-INCLIVA- Faculty of Medicine, Valencia, Spain
5Cincinnati Children’s Hospital Medical Center, Department of Critical Care Medicine, Cincinnati- OH, USA
6University of Florida College of Medicine, Surgery, Gainesville- FL, USA

Background
Neonatal sepsis is difficult to diagnose but can be devastating if left untreated. The consequences of a missed diagnosis leads to substantial antibiotics overuse, with 200 neonates treated with empiric antibiotics for every one case confirmed microbiologically. These unnecessary antibiotics lead to antimicrobial resistance, increased economic costs and altered gut microbiota composition. New diagnostics for neonatal sepsis are thus an urgent unmet need. We published an 11-gene diagnostic test for sepsis (the Sepsis MetaScore) based on immune gene expression in children and adults, but it has not been evaluated in neonates.

Objectives
To validate the diagnostic power of the Sepsis MetaScore in neonates.

Methods
We validated the Sepsis MetaScore using existing data from gene expression microarray-based cohorts of neonates with sepsis. We systematically identified all existing datasets that matched criteria, and then tested the accuracy of the Sepsis MetaScore to diagnose sepsis both alone and in combination with standard diagnostic labs in these retrospective independent validation cohorts.

Conclusions/Results
Three cohorts matched inclusion criteria; they had a total of N=213 control and sepsis samples. The Sepsis MetaScore had an AUC of 0.92-0.93 in all three cohorts. We further showed that, as a diagnostic for sepsis, Sepsis MetaScore outperformed C-reactive protein alone with a significant net reclassification index (0.3-0.69).

Conclusion
The Sepsis MetaScore showed excellent diagnostic accuracy across three separate retrospective cohorts of neonates from three different countries.

References (if needed)
WHOLE EXOME SEQUENCING FOR THE IDENTIFICATION OF PRIMARY IMMUNODEFICIENCIES IN A NATIONAL COHORT OF CHILDREN WITH BACTERIAL SEPSIS

L.J. Schlapbach¹, A. Borghesi², S. Asgari², P. Agyeman³, C. Aebi³, C. Berger⁴, J. Fellay⁵, J. Trueck⁴

¹Paediatric Critical Care Research Group- Mater Research- University of Queensland, Paediatric Intensive Care Unit- Lady Cilento Children’s Hospital, Brisbane, Australia
²School of Life Sciences- École Polytechnique Fédérale de Lausanne EPFL, Global Health Institute- School of Life Sciences- École Polytechnique Fédérale de Lausanne EPFL- and Swiss Institute of Bioinformatics, Lausanne, Switzerland
³Inselspital- Bern University Hospital- Bern- University of Bern, Department of Pediatrics, Bern, Switzerland
⁴University Children’s Hospital Zurich, University Children’s Hospital Zurich, Zurich, Switzerland

Background

Many primary immunodeficiencies (PIDs) are associated with an increased susceptibility to bacterial infection. Larger pediatric sepsis cohorts have not been tested for PIDs. We hypothesized that community-acquired sepsis may represent the first manifestation of an underlying PID.

Objectives

We performed whole exome sequencing (WES) in a national cohort of children with bacterial sepsis.

Methods

Eligible children were previously healthy children admitted to ten large children’s hospitals in Switzerland between 01.09.2011 and 31.12.2015 with community-acquired sepsis caused by S. aureus, S. pneumoniae, S. pyogenes, H. influenzae, or E. coli. Analysis of WES data was restricted to rare variants (<1% and <0.1% MAF for homozygous/hemizygous and heterozygous variants, respectively) in 182 PID genes for which an association with increased susceptibility to bacterial infection has been described in the literature.

Conclusions/Results

A total of 23 rare homozygous/hemizygous variants were found in 23/154 patients (15%). There was a larger number of extremely rare monoallelic variants in genes for which heterozygous mutations have previously been associated with immunodeficiency and susceptibility to bacterial infection. No major differences between infections caused by the different pathogens or sepsis severity and the likelihood of detecting mutations in PID genes were seen.

In conclusion, WES allowed to detect potentially pathogenic variants in previously reported PID genes. While functional confirmation of these variants is pending, the findings suggest that PIDs might be more common than previously thought among apparently healthy children experiencing a first sepsis episode. WES represents a promising approach to diagnose PID in children with sepsis.

References (if needed)
Background

A number of sedation withdrawal tools have been developed for use in children.

Objectives

To review existing withdrawal tools, to explore nurses’ use of a tool and to explore parents’ experiences of sedation withdrawal.

Methods

A mixed methods study in a single tertiary children’s hospital.

Conclusions/Results

Results: 12 cognitive interviews with ward and critical care nurses. 20 parents completed a questionnaire to determine their children's withdrawal signs and 11 of these parents agreed to interview. Nurses decision making around sedation withdrawal (using a tool) were highly variable and a tool did not standardize or simplify the assessment process. The assessment of sedation withdrawal is complex and poses a significant cognitive burden to nurses. Nurses did not always assess the context of the behaviors in relation to changes in drug dosages. Nurses were unable to interpret the meaning of some of these behaviors, because they lacked knowledge of the child’s normal state. Parent’s recognized all 12 withdrawal signs (in the SWS tool) in their children and also identified others, such as, motor and communication disturbances. These behaviors were distressing for parents to witness, as they were perceived as potentially indicating deterioration or neurological damage. Neither validated tools (WAT 1 and SOS) incorporates communication disturbances in their assessment. This may be because they were developed from healthcare professional perspectives, rather than from parent perspectives.

Conclusion: A new approach to withdrawal assessment is needed, which incorporates parental perspectives and focuses on the impact of behaviors in each child rather than the summing of behaviors.

References (if needed)
INTERVENTION FOR PARENTAL PARTICIPATION IN PRETERM INFANT’S POSITIONING FOR NEUROLOGICAL DEVELOPMENT AND PARENTAL SENSITIVITY: A PILOT STUDY

A. Lavallée¹,², M. Aita¹,²
¹Université de Montréal, Nursing Faculty, Montreal, Canada
²CHU Sainte-Justine, Research Center, Montreal, Canada

Background

Parental sensitivity is the process by which parents recognize and interpret their infant’s cues and react by quickly selecting and applying an appropriate response [1]. Parental sensitivity predicts long term attachment security between parents and their child. A secure attachment enhances the child’s development. In the neonatal intensive care unit (NICU), parents face barriers to the development of their sensitivity. Therefore, interventions are needed to promote parental sensitivity in the NICU for parents of preterm infants.

Objectives

Present the theoretical rationale underpinning an educational intervention designed to promote parental participation in their preterm infant’s positioning to enhance parental sensitivity and neurological development of the preterm infant.

Present the protocol of a pilot study to evaluate the feasibility and acceptability of the intervention.

Methods

Following a thorough process based on the Medical Research Council’s recommendations for developing complex interventions, the proposed program is a guided participation intervention based on Als’ synactive theory of development and the parent-child relationship model [1]. Before going through a full randomised controlled trial, this program will undergo a pilot trial to validate the appropriateness of the intervention for the study population and context.

Conclusions/Results

The theoretical rationale of this innovative educational program combining a developmental care intervention, to parental participation, predicts positive effects on parental sensitivity and neurological development of the newborn preterm infant.

References (if needed)

PARENTAL STRESS AND HOSPITAL DISCHARGE READINESS FOLLOWING CONGENITAL HEART SURGERY

1KK Women’s and Children’s Hospital, Children’s Intensive Care Unit, Singapore, Singapore
2Yong Loo Lin School of Medicine National University of Singapore, Alice Lee Centre for Nursing Studies, Singapore, Singapore
3KK Women’s and Children’s Hospital, Cardiothoracic Surgery Service, Singapore, Singapore
4KK Women’s and Children’s Hospital, Cardiology Service, Singapore, Singapore

Background

The peri-operative period of CHD surgery of children can be stressful for parents. However, there is a limited number of studies on the relationships of parental stress and discharge readiness.

Objectives

To determine the relationships between parental stress and hospital discharge readiness in families of children undergoing CHD surgery.

Methods

A prospective study with two-time points (T1, prior to surgery; T2, prior to hospital discharge) has been conducting since May 2016. Inclusion criterion includes parents of children aged 0-18 years undergoing CHD surgery. The enrolled parents were required to complete the Pediatric Inventory for Parents (PIP) and the Readiness for Hospital Discharge Scale (RHDS).

Conclusions/Results

Twenty parents were recruited as at Nov 2016. The median age of children undergoing CHD surgery was 3 years (IQR 0-7 years). There was no difference in PIP scores at T1 (median 117.5, IQR 104.8-130.8) and T2 (median 111.5, IQR 88.3-129.5) (p>0.05). Overall median RHDS score at T2 was 204 (IQR 181.5-230.8). There was significant negative correlation between PIP scores at T1 and RHDS scores at T2 (r=-0.505, p=0.02). Mothers of children who had a previous history of CHD surgery reported a significantly lower PIP scores at T1 (median 95, IQR 81-116) compared to those without (median 120.5, IQR 95-140 (p=0.02). Our preliminary results suggest that an increased in maternal stress prior to the child’s cardiac surgery was related negatively to mother’s perceived discharge readiness.

Assessing maternal stress level prior to the child’s cardiac surgery may be an important component for identifying difficulties in managing discharge preparation.

References (if needed)
INCIDENCE AND RISK FACTORS FOR EARLY SYSTEMIC HYPERTENSION AFTER PAEDIATRIC LIVER TRANSPLANTATION

R. Puce¹, A. Baldo², A. Deep³

¹University of Pavia, Anaesthesia and Intensive Care and Pain Therapy Specialization School, Pavia, Italy
²University of Pavia, Cardiology Specialisation School, Pavia, Italy
³King’s College Hospital, Pediatric Intensive Care, London, United Kingdom

Background

Arterial hypertension is a chronic complication of both adult and paediatric liver transplant (LT). However, it is also observed in the early post-operative period, but not enough is known about it in children.

Objectives

To study the incidence of early hypertension after LT and analyse its characteristics and risk factors in children.

Methods

We analysed medical records of 38 children, that received LT during 2014 at King’s College Hospital of London. We investigated some pre-transplant features (table 1) and recorded blood pressure (BP), heart rate (HR), immunosuppressive drugs protocol and other post-transplant features (table 2) from admission to PICU till day 7th after LT and at follow-up (Days 15, 20, 30th after LT). Hypertensive children were divided into two groups: patients with persistent hypertension (G1-BP > 95th centile for age/height) and patients with normal BP (G2) at follow-up. Univariate analysis identified risk factors for persistent early hypertension.

Table 1. Pre-Liver Transplant characteristics of patients

<table>
<thead>
<tr>
<th></th>
<th>Persistent High Blood Pressure (G1)</th>
<th>Normalised Blood Pressure (G2)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>35.6 ±46.4</td>
<td>62.2±50.8</td>
<td>0.137</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>12.7±9.4</td>
<td>18.7±14.8</td>
<td>0.134</td>
</tr>
<tr>
<td>Male</td>
<td>9 (37.5%)</td>
<td>8 (57.1%)</td>
<td>0.24</td>
</tr>
<tr>
<td>ALF</td>
<td>6 (25%)</td>
<td>0 (0%)</td>
<td>0.041</td>
</tr>
<tr>
<td>Pre-LT Hypertension</td>
<td>2 (8.3%)</td>
<td>0 (0%)</td>
<td>0.267</td>
</tr>
<tr>
<td>Pre-LT use of cardiovascular drugs</td>
<td>9 (37.5%)</td>
<td>5 (35.7%)</td>
<td>0.912</td>
</tr>
<tr>
<td>Pre-LT kidney injury</td>
<td>2 (8.3%)</td>
<td>1 (7.1%)</td>
<td>0.896</td>
</tr>
<tr>
<td>Pre-LT Diabetes Mellitus</td>
<td>1 (4.2%)</td>
<td>0 (0%)</td>
<td>0.439</td>
</tr>
<tr>
<td>Pre-LT hypercholesterolemia</td>
<td>8 (33.3%)</td>
<td>5 (35.7%)</td>
<td>0.881</td>
</tr>
</tbody>
</table>

Note 1) figures are numbers (percentage); 2) * mean ± standard deviation
Conclusions/Results

Conclusions/Results

89.4%(n=34) children had hypertension, of which 67.6%(n=23) were attributed to G1 and 29.41%(n=10) to G2. The incidence of hypertension peaked on Day-3 (figure 1). Tacrolimus along with corticosteroids were predominantly used for immunosuppression. There were no episodes of seizures, any other adverse sequel or death associated with hypertension.

G1 patients were more commonly associated with the following: ALF as etiology (p=0.041), more episodes of bradycardia (p=0.044), longer duration of mechanical ventilation (p=0.011), tacrolimus blood levels >12 mcg/l (p=0.034), multidrugs (corticosteroids+tacrolimus+other drugs different from micophenolate mofetil) immunosuppression (p=0.024).

Figure 1. Daily incidence of hypertension post-LT
In conclusion, early hypertension following paediatric LT is very common, peaks at Day 3 and, when it's persistent, is mainly associated with ALF, high Tacrolimus blood levels and multidrugs immunosuppressive protocols.

References (if needed)
SMALL CUMULATIVE POSITIVE FLUID BALANCE ASSOCIATED WITH INCREASED MORTALITY IN PEDIATRIC INTENSIVE CARE UNIT: PROSPECTIVE COHORT STUDY
R. Rameshkumar, S. Bhanudeep, S. Mahadevan
Jawaharlal Institute of Postgraduate Medical Education and Research JIPMER, Pediatrics, Puducherry, India

Background
Growing evidence suggests that the cumulative positive balance may exert an incremental risk for major morbidity and mortality. The concept of “fluid overload” has been described in the literature using various definitions and the various cut-off for interventions (commonly acceptable is FO% of >10).

Objectives
To compare the all cause 28-day mortality of critically ill children who transfused PRBC versus non-transfused with the same severity.

Methods
The study was conducted in 19 bedded-PICU of a tertiary care institute. Children aged 1-month to 12-year (n=355) with documented in and output for minimum of 24-hour were divided into cumulative positive balance ≤15ml/kg (=FO% of ≤1.5) (n=208) and >15ml/kg (=FO% of >1.5) (n=147). Data of duration of Foley's catheter, ventilation, PICU stay and 28-day mortality were collected prospectively from Jan-2015 to June-2016. Imminent death within 24-hour was excluded.

Conclusions/Results
Median (IQR) age, PRISM-III, Foley’s catheter duration and fluid balance in ≤15ml/kg vs. >15ml/kg group were 12 (3-60) vs. 12 (4-84) months (p=0.88), 16 (14-18) vs. 16 (14-21) (p=0.04), 2 (2-3) vs. 2 (2-4) days (p=0.26) and 11 (8-14) vs. 20 (18-24) ml/kg (p<=0.01). All cause 28-day mortality was higher in >15ml/kg group (28%) as compared to ≤15ml/kg group (17%) (Hazard ratio adjusted to age, sex 1.7, 95%CI 1.1 - 2.7, p=0.019). No difference in median (days) length of ventilation (4, 2-7 vs. 4, 2-7; p=0.64), PICU-stay (5, 3-8 vs. 7, 4-10; p=0.11).

Conclusions: The small cumulative positive fluid balance was associated with increased all cause 28-day mortality in critically ill children.

References (if needed)
COMPARISON OF ORAL IBUPROFEN VERSUS INTRAVENOUS PARACETAMOL FOR CLOSURE OF PATENT DUCTUS ARTERIOSUS IN VERY LOW BIRTH WEIGHT PRETERM INFANTS

M. Cetinkaya¹, H. Bornau², K. Oztarhan²
¹Kanuni Sultan Suleyman Training and Research Hospital-, Neonatology, Istanbul, Turkey
²Kanuni Sultan Suleyman Training and Research Hospital-, Pediatric Cardiology, Istanbul, Turkey

Background

The treatment of hemodynamically significant patent ductus arteriosus (hsPDA) remains controversial. Ibuprofen, a cyclooxygenase inhibitor, has been approved for treatment. In recent years, paracetamol was suggested as an alternative treatment for PDA closure. The aim of this study was to compare the efficacy and side effects of oral ibuprofen and intravenous paracetamol for PDA closure in preterm infants.

Objectives

The aim of this study was to compare the efficacy and side effects of oral ibuprofen and intravenous paracetamol for PDA closure in preterm infants.

Methods

Very low birth weight (VLBW) preterm infants with hsPDA were enrolled to this study. All infants were evaluated by the same cardiologist and echocardiography was performed before and after the treatment. PDA closure treatment was started in the presence of hsPDA. Infants were given either oral ibuprofen or intravenous paracetamol. Paracetamol was given in infants who had contraindication to ibuprofen.

Conclusions/Results

A total of 510 VLBW infants were admitted to our neonatal intensive care unit and 74 infants (15%) were considered to have hsPDA. Thirty five infants (47%) received ibuprofen and 39 infants (53%) received paracetamol. The ductal closure rates for ibuprofen and paracetamol were 96% and 86%, respectively and this was not statistically significant (p=0.44). No adverse effect including elevated liver enzymes or significant temperature differences were observed in both groups.

This study showed that oral ibuprofen and intravenous paracetamol had similar efficacy for PDA closure. We suggest that paracetamol should be considered as a promising, effective and safe therapy for PDA closure in preterm infants.

References (if needed)
ETHICS: DECISION-MAKING IN NEONATAL AND PAEDIATRIC INTENSIVE CARE

ESP7-0994

UNDERSTANDING THE NATURE AND CONSTRUCT OF BEST INTERESTS WHEN MAKING DIFFICULT DECISIONS IN THE PAEDIATRIC INTENSIVE CARE UNIT (PICU)

D. Ritchie¹, K. Pollock¹, R. Sandland²
¹University of Nottingham, School of Health Sciences, Nottingham, United Kingdom
²University of Nottingham, School of Law, Nottingham, United Kingdom

Background

The predominant end of life scenario within PICUs in the developed world results from an active decision to withdraw life sustaining medical treatment. Consideration centres on the problematic concept of whether treatment being provided is no longer in the best interests of the child. The involvedness of lay and professional stakeholders characteristically results in multiple distinct understandings, allowing a range of reasonable outcomes.

Objectives

This study aimed to explore how best interests was constructed and enacted when making difficult decisions to persevere with, withhold or withdraw life sustaining medical treatment in children.

Methods

A qualitative methodology involving an 18 month case study of a single PICU was used. Data collection comprised ethnographic approaches of observations of care given to children, documentary analysis, interviews and informal discussions with parents and healthcare professionals directly involved in each of six embedded cases. Data were analysed using thematic analysis providing insight of both families and clinicians understanding
into the nature and construct of decisional processes.

**Diagram 1: Data Collection Process**

Located within a single PICU: in excess of 750 hours observational visits between Jan 2014 – Dec 2015

- Incorporating 6 embedded cases
  - 179 hours Participant Observation (Parents and Healthcare Professionals) across 6 recruited cases
  - 32 Semi-structured interviews (parents and healthcare professionals)
  - In excess of 400 Documents Analysed

**Conclusions/Results**

The concept of ‘best interests’ presupposes that there is, theoretically, a definitely right answer when making decisions about critically ill children. Yet findings reflect the uncertainty and indeterminacy of clinical decision making. This paper focuses on two themes:

1). How best interests arises and is advanced in light of nuanced interpretations.

2). Interface between best interests, parental rights and family rights.

**Conclusion**

Best interests emerges as an elastic notion used by clinicians and families struggling to do their best to validate and justify decisional processes according to diverse and shifting perspectives.

**References (if needed)**
ETHICS: DECISION-MAKING IN NEONATAL AND PAEDIATRIC INTENSIVE CARE

ESPN7-0166

A LOCAL PERSPECTIVE ON END OF LIFE DECISIONS IN VIRTUAL CRITICALLY ILL PATIENTS IN THE PEDIATRIC INTENSIVE CARE UNIT

Y.K. Chiong¹, X. Fu¹, N.S.P. Ngiam²,³

¹National University Hospital, Khoo Teck Puat-University Children’s Medical Institute, Singapore, Singapore
²National University Hospital, Khoo Teck Puat-University Children’s Medical InstituteSin, Singapore, Singapore
³Yong Loo Lin School of Medicine, Centre for Healthcare Simulation, Singapore, Singapore

Background

There are perceived barriers to end-of-life care in our local population, especially in the PICU setting. The perspective of Asian parents is an area that lacks representation in literature.

Objectives

The aims of this project are to better understand patient and parent preferences regarding end-of-life care decisions and to find out the barriers and factors that influence these decisions.

Methods

Our study population are parents of children who are previously well and are admitted to general paediatric wards for acute illnesses or are being followed up in general paediatric clinics.

We interviewed 30 parents with surveys comprising 4 scenarios on end-of-life issues. The questionnaires are carried out by trained interviewers after written consent is obtained. All responses are anonymous.

Conclusions/Results

Parents with 3 children or less find it more difficult to accept potential intellectual impairment. Parents with higher education are more likely to maintain life support in an ADL dependent child, and allow their child to undergo cardiopulmonary resuscitation if he has viral myocarditis.

Parents who are more emotional find their child suffering more if he has multiple intravenous lines, intellectual impairment or is ADL dependent. They are more likely to consider what their child would want for end-of-life decisions, and religious beliefs are more likely to affect their decision-making. There is no difference in the decisions made for withdrawal of care.

End-of-life decisions still remain difficult for parents to face, due to lack of knowledge and understanding. More effort has to be put into education of end-of-life issues.

References (if needed)
Background

Caring for dying children is complex and requires coordination of all resources. In PICU the main objective is to save lives and ensure vital functions in critically ill children. However due to the child’s critical and life threatening condition, there is always the possibility the child will not survive. The acuity and technical nature of the intensive care context can provide an obstacle in the transition to palliative care and furthermore conflict with the affected families’ needs.

Objectives

The study aim was to enlightening caring as it is represented in caring situations of dying children at PICU.

Methods

An Interpretative Phenomenological design was applied. The data collection was performed at three PICU in Sweden at 2011 and 2016. Caring situations of a total of 18 children were observed, six cases were estimated as end of life care or life threatening conditions. Nurses and parents were interviewed in direct connection to the observation.

Conclusions/Results

Preliminary findings showed that for nurses, it was a challenge to change perspective from curative to palliative care. Medical examinations and treatment was experienced to disturb the dying child thus causing unnecessary suffering. Parents found it difficult to leave their dying children even just for a moment and the space in PICU did not support closeness and parenting but rather separated the dying child from her/his family. In conclusion, these findings illuminates the importance of guidelines and training in palliative care in PICU. Children and their family ought to have the best care possibly when affected by life-limiting or life-threatening illness.

References (if needed)
Background

The loss of a child in the neonatal period can occur with an intense, complicated and long grief. Supporting the family during the grief period is one of the principles of the practice in Neonatal Palliative Care.

Objectives

To facilitate the process of preparation for the loss by the support the bereaved family. To bring families together so they may share similar experiences and they may identify themselves with other families.

Methods

The Grief Support Meeting was initiated by the Neonatal Palliative Care Team (NPCT), a multidisciplinary group, at a Neonatal Intensive Care Unit of an university hospital in Sao Paulo, Brazil, in 2015. Two months after the death of the child, an invitation for the Grief Support Meeting was made by telephone. If the parents agreed, a formal invitation was mailed to the families. The Grief Support Meeting was organized in different moments, including a puppet presentation based on the *The memory tree* story (Britta Teckentrup), time to share feelings and experiences and ended by a beautiful song.

Conclusions/Results

There were four meetings, when the families were able to share their experiences with other families and also with the NPCT. Most of them were grateful by the opportunity of meeting some NICU professionals who took care of their children. Parents were able to talk about how they were reorganizing themselves.

Conclusion: The intervention in the period after death favors the families for using emotional resources at the confrontation phase, by the recognition of the pain from their loss.

References (if needed)
Background

Critically ill children admitted to PICU can represent widely differing developmental skills and milestone achievement. Consequently, screening for delirium can be challenging. Research which examines how delirium symptoms may vary within a PICU population may aide early detection, yet to date has not been explored.

Objectives

To investigate the symptoms of delirium recorded in critically ill children and determine whether differences between age groups exist.

Methods

A 10-month prospective observational study (November 2015 to September 2016) was carried out in a tertiary, 36 bed PICU in Australia. 1,349 critically ill children aged up to 18 years (Median = 2.16 years, IQR = 0.33 - 8.17) who were admitted to PICU were screened for delirium using the Cornell Assessment of Pediatric Delirium (CAP-D). 3,493 assessments were completed for 269 patients (19.94%).

Conclusions/Results

Symptom expression based on the CAP-D items did vary significantly between age groups (dCohen’s = small-medium). Young children were more likely to be restless (5) and inconsolable (6), while older children and adolescents (> 5 years) were more likely to exhibit signs of reduced eye contact (1), purposeful movement (2), awareness of surroundings (3), and ability to communicate needs (4). Adolescents (13+ years), in particular, were more likely to be underactive (7) and take longer to respond to interactions (8). These results suggest variations in symptom expression between ages in PICU patients, and may aide clinicians during routine screening. Further research exploring variation in age-related symptom expression is necessary.
References (if needed)
Background

Benzodiazepines have been clearly implicated in the development of delirium in adults, with related effects on outcome. As a result, the Society of Critical Care Medicine has recommended an analgo-sedation approach in adults, with alternatives to benzodiazepines used when possible. However, benzodiazepines remain the first-line sedative agents administered to children in pediatric intensive care units worldwide.

Objectives

To describe the benzodiazepine dose associated with next-day delirium in critically ill children.

Methods

Prospective/retrospective observational cohort study. Subjects were prospectively screened for delirium twice each day. After discharge, the electronic medical record was reviewed to determine daily midazolam and lorazepam doses administered throughout the hospitalization. All benzodiazepines were converted to midazolam equivalents for analysis.

Conclusions/Results

Results: 539 consecutive admissions, and 2,141 hospital days, were included in analyses. 23% of children were diagnosed with delirium during their hospital stay. In this cohort, benzodiazepines were independently associated with delirium, after controlling for known confounders, including age, severity of illness, history of developmental delay, need for invasive mechanical ventilation, and receipt of opiates (OR 15.8, CI 9.1-28.5) (Table 1). An association was found between benzodiazepine dose and delirium status; delirium was present in 79% of children who received more than 0.82 mg/kg/day midazolam-equivalents, as compared to a 27% delirium rate in children given <0.82 mg/kg/day (p<0.001) (Table 2).

Conclusion: Benzodiazepines are temporally related to delirium development in critically-ill children, with a dose-response effect, suggesting that benzodiazepines may be a modifiable risk factor for pediatric delirium.

References (if needed)
Background

Autonomic dysfunction in neonatal encephalopathy (NE) alters heart rate variability (HRV) and may indicate severity of brain injury. Early monitoring of HRV could improve treatment decision and optimise ongoing care in infants with NE.

Objectives

To systematically review the evidence on the utility of early HRV for predicting brain injury and/or adverse neurodevelopmental outcome (NDO) after NE in term infants.

Methods

Two reviewers independently searched the literature (1980 to 2015; Medline, Embase, Scopus, Web of Science, Proquest and Cochrane Library) and extracted data. Studies were graded for quality and evidence appraised using CASP checklists and Cochrane method for assessing risk of bias. From 2133 examined citations, 14 were relevant to babies with NE. We excluded 8 studies (preterm infants or full text not available), and included 6 (251 infants). HRV recordings included were obtained from different devices, performed “as soon as possible after birth” until day 7.

Conclusions/Results

Despite heterogeneity of index tests and outcome assessments, HRV was associated with NDO in all studies (Area under the curve [AUC] 0.66 to 0.93).

HRV is a promising bedside tool for identification of infants ‘at risk’ of neurodisability, that could significantly improve the care and outcome of infants with NE, once technological refinement and standardisation of early measures are completed.
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Abbreviations: LF – Low frequency power spectrum; VLF – Very low frequency power spectrum; M – Magnetic Resonance Imaging; EEG – electroencephalogram; SSD – Bailey Scores of Infant Development; NDI – Mental Developmental Index; GMFCS – Gross Motor Function Classification System; SDNN – normalised RR standard deviation of RR intervals

References (if needed)
NEURO CRITICAL CARE

STATUS EPILEPTICUS IN PEDIATRIC INTENSIVE CARE UNIT (PICU)

A. Granda

University Medical Centre Ljubljana, Pediatric Surgery and Intensive Care, Ljubljana, Slovenia

Background

Status epilepticus (SE) is defined as a prolonged or recurrent seizures without a return to baseline. Treatment protocols prescribe two doses of benzodiazepines, followed by intravenous antiepileptic drugs. Refractory SE requires treatment in PICU with infusion of thiopental or midazolam.

Objectives

Evaluation of data on clinical course of SE in the children admitted to tertiary PICU in 2015-2016.

Methods

Retrospective review of medical records for children admitted to tertiary PICU in 2015-2016 with SE. Aetiology, management before PICU admission, medications used in PICU, duration of sedation and of ventilatory support, length of the PICU stay, the use of EEG and aEEG were evaluated.

Conclusions/Results

36 cases were identified, 44% male, average age 4.3 years. 64% of patients had previous neurological condition. SE etiology: 30.6% remote symptomatic, 19.4% prolonged febrile seizures, 16.7% idiopathic, 13.9% acute on remote symptomatic, 13.9% no identifiable cause, 2.8% acute symptomatic and 2.8% cryptogenic. Before admission, 8.3% of patients had no treatment, 36.1% of patients received first and second line drugs, remaining received benzodiazepins only.

In PICU, in 75% patients midazolam was first line therapy. Second line treatment had 22.2% of patients. Thiopental was first line drug in 11.1% cases and second line in 8.3%. 33% patients needed additional therapy, in 67% it was levetiracetam. 22.2% patients had SE recurrence, 2 patients had superrefractory SE. 41.6% had EEG and 25% had aEEG monitoring.

References (if needed)

Conclusions We discovered suboptimal use of aEEG and EEG in PICU and need for better adherence to treatment protocols.
MULTIDISCIPLINARY APPROACH CONSISTING OF NEUROLOGY-ORIENTED INTENSIVE CARE, AGGRESSIVE ARTIFICIAL LIVER SUPPORT, AND LIVER TRANSPLANTATION FOR PEDIATRIC ACUTE LIVER FAILURE

K. Ide¹, H. Uchida², N. Nishimura¹, S. Nakagawa¹, A. Fukuda², S. Sakamoto², M. Kasahara²
¹National center for child health and development, Critical Care Medicine, Tokyo, Japan
²National center for child health and development, Organ Transplantation Center, Tokyo, Japan

Background

Acute liver failure (ALF) is a life-threatening disease. Although liver transplantation (LT) is the only known curative treatment, effective artificial liver support is necessary as bridge to liver regeneration or LT in countries where donated organ is scarce.

Objectives

The purpose of this study was to assess our multidisciplinary approach consisting of early application of neurology-oriented intensive care, aggressive artificial liver support, and LT for ALF.

Methods

We conducted a retrospective cohort study for children with ALF who subsequently underwent LT between November 2005 and October 2014.

Conclusions/Results

Results: There were 48 children with ALF who underwent LT. Age varied from one month to 12 years, with a median of 10 months. The median body weight was 8.6 kg (range, 2.7-32). The etiology of ALF was unknown in 38 children (79%). Continuous veno-venous hemodiafiltration and plasma exchange were applied to all children. The median duration after admission to LT was six days (range, 1-79). Living donor LT was performed in 45 children (94%). The graft survival rate was 79% (38/48) and the overall survival rate was 85% (41/48) in a median follow-up period of 4.2 years (figure1).
Conclusions: Our multidisciplinary approach for pediatric ALF achieved favorable outcomes. Further investigation is needed to evaluate the efficacy of the artificial liver support.

References (if needed)

none
CRRT / RENAL: HOT TOPICS IN KIDNEY INJURY

ESPN7-0101

FEASIBILITY OF PERFORMING CRRT IN CHILDREN LESS THAN 10KG USING STANDARD CRRT MACHINES
A. Deep¹, S. Glace²
¹, United Kingdom
², London, United Kingdom

Background

Continuous renal replacement therapy (CRRT) is an established supportive treatment for acute kidney injury (AKI) in the PICU with machines designed for adults. However, its use is considered off-label when applied to children weighing <10kg.

Objectives

To assess the safety and efficacy of CRRT in children weighing ≤10kg using standard CRRT machines.

Methods

6-year retrospective analysis of data from all patients weighing ≤ 10kg undergoing CRRT. Survival to PICU discharge, duration of mechanical ventilation and ICU stay, primary diagnosis, markers for illness severity at admission, CRRT indication, machine, vascular access and CRRT characteristics were collected. Descriptive analysis compared survivors and non-survivors. Serial progression in markers of safety and efficacy were collected (changes in creatinine, fluid overload and electrolytes, bleeding episodes, vascular complications and hypotension following CRRT initiation). Multivariate logistic analysis with stepwise regression identified risk factors for non-survival. We also compared data in children less than and more than 5 kg up to 10kg.

Conclusions/Results

41 patients ≤10kg received 8655 hours of CRRT for various indications including 60% for liver failure. Median weight was 4.4kg, 58.5% survived to hospital discharge. Survivors had a lower PIM2 score at ICU admission (p=0.0019) and lower FiO2 requirement at CRRT initiation (p=0.339). Analysis of efficacy showed reductions in fluid overload at 48 hours (p=0.0002), serum creatinine at 24 and 48 hours (p=0.0023, p=0.0110), and serum potassium at 4 hours (p=0.0139). There were no complications related to blood priming, anticoagulation, bleeding or hypotension. In the subgroup analysis, filter life was longer in children ≤ 5kg (p<0.0001), maximum blood flow was higher (p=0.0194) and survival was not significantly different (p=0.1672) between less than and more than 5 kg.

This study demonstrates that CRRT can be safely and effectively delivered on children ≤ 10kg using adult-sized CRRT machines and literature-matched survival.

References (if needed)
ACUTE KIDNEY INJURY IN CRITICALLY ILL PATIENTS

I. Candeias¹, C. Camilo¹, E. Torres¹, L. Boto¹, F. Abecasis¹, M. Vieira¹
¹Hospital Santa Maria-CHLN, Unidade de Cuidados Intensivos Pediátricos, Lisboa, Portugal

Background

Acute kidney injury (AKI) is an abrupt decline in kidney function and has been associated with higher morbidity and mortality in Paediatric Intensive Care Units (PICU).

Objectives

To analyse the incidence, aetiology and risk factors among children with AKI admitted to a PICU.

Methods

Retrospective study of all patients with a diagnosis of AKI, as defined by pRIFLE criteria, between January 2009 and December 2016. Neonatal patients were excluded. Demographic data, comorbidities, aetiology of AKI, use of renal replacement therapy (RRT) and other organ support therapies were registered.

Conclusions/Results

During this period 2924 children were admitted. The incidence of AKI was 7.9% (n=231), with 35.5%, 36.4% and 28.1% of patients in the at risk, injury and failure groups, respectively. The mean age was 8.5 ± 6 years, 58.4% were males, and 11.3% had chronic renal disease. On admission 75.8% patients presented with AKI; 24.2% had hospital-acquired AKI. Mechanical ventilation was used in 43.3%, vasoactive drugs in 37.7%, extracorporeal membrane oxygenation in 7.8% and RRT in 12.6% patients. Pre-renal was the main cause (78.8%) followed by renal (16.5%) and post-renal causes (0.9%); 3.4% had multiple aetiology. Nephrotoxic drugs were used in 29.4%. Mortality was 14.7%.

The majority of patients presented with pre-renal AKI on admission and pre-renal aetiology was the main cause. A high mortality rate reflects the severity of these patients. The pRIFLE criteria allow early identification of patients at risk of renal failure, independent of the diagnosis at admission.

References (if needed)
OUTCOME OF IN UTERO TRANSFERS IN YORKSHIRE AND THE HUMBER
K. Munthali¹, C.M. Harrison¹, C. Bradford²
¹Sheffield Childrens Hospital NHS Foundation Trust, Embrace Transport Service, Sheffield, United Kingdom
²Yorkshire and Humber Neonatal Operational Delivery Network, Information management, Bradford, United Kingdom

Background

Yorkshire and Humber is a large Neonatal Operational Delivery Network, with 14 % of UK births.

In utero transfers (IUT) are facilitated by Embrace, the regional neonatal and paediatric transport team.

An earlier audit showed only 50% of women moved, delivered within 48 hours of transfer.

Historically reasons for transfer have included decreased staffing levels in referring units.

Objectives

To determine:

• Reasons for transfer
• When, and whether women delivered after transfer
• Capacity implications on transfer requests
• Distances travelled by mothers

Methods

Retrospective audit using Embrace’s database to identify all in utero transfers between August 1st 2014 and September 1st 2015.

Detailed analysis of maternal and neonatal notes, Network cot occupancy and staffing data.

Conclusions/Results

Results

483 referrals

Delivery data from 194 women available.

45% delivered within 48 hours of referral.
Capacity was the main reason for referral with reduced neonatal nurse staffing reported on 141 (50.5%) occasions. In 45 (16%) cases, referring unit cot occupancy was exceeded. The remainder due to delivery suite workload.

Gestational age was the main reason for uplift of care requests - 87 tertiary referrals, 388 non-tertiary. 30.6% extreme preterms, and 54 % 27-33+6 weeks.

41 hospitals referred /accepted IUTs. 65 (out of 483) women transferred to a different region. Distance travelled ranged from 4.6 to 225 miles, mean distance 42.3 miles (within ODN), 70.4 miles (out of ODN).

**Conclusion**

Neonatal staffing is an important factor in determining need for IUT transfers, 45% of the women moved delivered post transfer, however data was missing for a large number. Perinatal databases could improve further studies.

**References (if needed)**
HOT TOPICS IN PAEDIATRIC TRANSPORT

ESP7-0178

NEONATAL HYPOTHERMIA IN TRANSPORT: WHICH BABIES GET COLD AND WHEN?
C. Vas1, C. Harrison1, N. Ramjeeawon1
1Sheffield Children’s Hospital NHS Foundation Trust,
Embrace- Yorkshire and Humber Infant and Children’s Transport Service, Sheffield, United Kingdom

Background

Thermoregulation is a vital part of neonatal transport care. Cold stress can cause harmful side effects such as hypoglycaemia, respiratory distress and metabolic acidosis(1).

Objectives

To identify risk factors of hypothermia in neonatal transport and guide changes to improve performance.

Methods

The transport notes of all babies arriving at their destination with a temperature less than 36.5 degrees were reviewed. The temperatures during the transport process were analysed; First look temperature (When transport team arrive), Pre-departure temperatures and the arrival temperature at destination. Further data analysed included weight, gestation and the environmental temperature.

Conclusions/Results
Over the one-year period, 59 babies were hypothermic on arrival (total neonatal transfers 1715). The largest proportion of hypothermic babies were the late preterm babies (figure 1).

There was no specific time during transport when babies were more at risk of hypothermia (figure 2). Several babies hypothermic pre-departure were unable to achieve normothermia during transport.

Conclusion:
More vigilance in the temperature control of late preterm babies and larger babies is required during transport.
References (if needed)

HOT TOPICS IN PAEDIATRIC TRANSPORT

ESPN7-0309

A YEAR’S REVIEW OF HDU-LEVEL REFEREALS TO A REGIONAL PIC TRANSPORT SERVICE FOR NORTH-WEST ENGLAND AND NORTH WALES

R. Barton¹, L. Pritchard¹

¹North West and North Wales Transport Service, NWTS, Warrington, United Kingdom

Background

North West and North Wales Transport Service (NWTS) is a transport service for children needing ICU-level care. HDU-level transfers are not funded unless patients require high-flow oxygen therapy or non-invasive ventilation (NIV).

Objectives

To quantify and analyse referrals of HDU-level patients made to NWTS over a 1 year period. To ensure that both NWTS and local DGH teams are undertaking appropriate transfers and identify any specific issues leading to avoidable requests.

Methods

Identify patients referred for HDU-level transfer (definition: at risk of deterioration but not needing invasive ventilation or inotropic support) between January 2016 and December 2016 from NWTS database, and review casenotes. Out of region, time-critical and ward-level transfers were not included.

Conclusions/Results

Of 1321 referrals to NWTS in 1 year, 83 (6%) were HDU-level. Of these, 46 (55%) were transferred by NWTS and 23 (28%) by local DGH teams. The majority of requests were transfer for tertiary-level opinion or lack of HDU beds in local DGHs (n=74; 89%). One third of those transferred by NWTS did not require respiratory support; the rest required high-flow oxygen, CPAP or BIPAP via NIV. NWTS undertake a significant number of HDU-level transfers for tertiary opinion, or lack of local HDU-level beds; consideration should be made to fund all such NWTS transfers and strategies made for local DGH team transfer where possible.

References (if needed)
CARDIOVASCULAR DYNAMICS: THE HOLY GRAIL OF HEMODYNAMIC MONITORING, IN SEARCH FOR NEW TARGETS

ESPN7-0121

ASSESSMENT OF THE EFFECTIVENESS OF THE TAILORED ULTRASONOGRAPHY PROTOCOL FOR MONITORING PULMONARY COMPLICATIONS AFTER CARDIO-SURGICAL PROCEDURES.

M. Myszkowski¹, M. Karolczak¹, M. Wojciech¹
¹Medical University of Warsaw, Department of Cardiac Surgery and General Pediatric Surgery, Warsaw, Poland

Background

The developed protocol, of the ultrasound recording for examination of the respiratory system, enables a successful assessment of the type and intensity of changes occurring within the respiratory system.

Objectives

Assessment of the effectiveness of the tailored ultrasonography protocol.

Methods

Patients after cardiac surgical procedures, were included in the study. The sample comprised 85 patients (49 boys and 36 girls) aged 0–1 years (5.38±2.46 months). During the first seven days postoperatively, everyday bedside lung ultrasound (US) scan was performed, using the tailored protocol. The obtained results were compared with the X-ray images and the intraoperative data, such as extracorporeal circulation (ECC) time and aortic cross-clamp (ACC) time and with the data obtained from arterial blood gasometry, carried out during the imaging, such as partial oxygen pressure (pO2) partial CO2 pressure (pCO2) and hemoglobin oxygen saturation (SaO2).

Conclusions/Results

A significant correlation (p<0.05) was found between the number of pulmonary complications revealed by US and ECC time (r=0.642 p=0.003) ACC time (r=0.633 p=0.002) and SaO2 (r=0.483 p=0.003). X-ray imaging revealed a similar correlation between the number of pulmonary complications and ECC time (r=0.480 p=0.006), ACC time (r=0.476 p=0.002) and SaO2 (r=0.396 p=0.007). Parenchymal atelectasis was revealed by US and x-ray in 80 (94.12%) and 78 (91.76%) patients respectively. Fluid in the pleural cavities was revealed by US in 79 (92.94%) patients and by x-ray in 77(90.59%) patients.

The graphic protocol of respiratory system examination using ultrasound imaging is an effective diagnostic tool allowing monitoring of pulmonary complications in infants after cardiac surgical procedures.

References (if needed)
SEMIAUTOMATED LEFT VENTRICULAR VOLUME MEASUREMENTS IN PRETERM INFANTS
K. de Waal¹, N. Phad¹
¹John Hunter Children’s Hospital, Neonatology, Newcastle, Australia

Background

Measurement of left ventricular (LV) volumes are essential for assessment of cardiac function. The biplane method of disks (MOD) is recommended whereby the LV cavity is manually traced at end diastole (EDV) and end systole (ESV) to calculate stroke volume (SV) and ejection fraction (EF). Speckle tracking echocardiography (STE) is a semi-automated technique that is increasingly used in clinical practice. STE provides parameters of cardiac motion and deformation in addition to LV volumes, and with better reproducibility compared to conventional parameters in adults.

Objectives

Assess the reproducibility and agreement of LV volumes using manual MOD and semi-automated STE in preterm infants.

Methods

Prospective analysis of apical 3 and 4 chamber images of preterm infants to derive volume parameters by 2 observers using both methods. Intra and interobserver reproducibility was determined for each method and methods compared using the Bland-Altman approach.

Conclusions/Results

Results

Images of 30 infants with a median weight of 1140 gram (range 580 to 2280) were analysed. STE showed higher correlation coefficients and lower coefficient of variation compared to MOD in both intra and interobserver analysis. Agreement between STE and MOD was good with all volume parameters clinically insignificantly higher with STE (table).

<table>
<thead>
<tr>
<th></th>
<th>MOD</th>
<th>STE</th>
<th>Bias</th>
<th>Limits of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDV (ml)</td>
<td>3.23 (1.29)</td>
<td>3.40 (1.23)</td>
<td>+0.17</td>
<td>-0.52 to +0.85</td>
</tr>
<tr>
<td>ESV (ml)</td>
<td>1.54 (0.60)</td>
<td>1.58 (0.57)</td>
<td>+0.04</td>
<td>-0.32 to +0.41</td>
</tr>
<tr>
<td>SV (ml)</td>
<td>1.70 (0.70)</td>
<td>1.82 (0.68)</td>
<td>+0.12</td>
<td>-0.41 to +0.66</td>
</tr>
<tr>
<td>SV index (ml/kg)</td>
<td>1.44 (0.42)</td>
<td>1.56 (0.43)</td>
<td>+0.11</td>
<td>-0.29 to +0.53</td>
</tr>
<tr>
<td>EF (%)</td>
<td>52.5 (3.4)</td>
<td>53.6 (3.1)</td>
<td>+1.0</td>
<td>-7.7 to +9.8</td>
</tr>
</tbody>
</table>

Conclusion

STE derived LV volumes are in agreement with MOD LV volumes with better reproducibility and can be used in neonatal clinical practice.
References (if needed)
Background

Hemodynamic monitoring methods of newborn should be reliable, fast and repeatable. USCOM (ultrasonic cardiac output monitor) method for cardiac output (CO) measurement found to be reliable in various conditions and with different users. Also in all age groups, it produces cost effective and similar results with both invasive and noninvasive methods.

Objectives

This study was performed in order to measure the CO and systemic vascular resistance (SVR) in term newborns noninvasively via doppler ultrasonography method and assessing its usefulness in hemodynamic monitoring by calculating reference values.

Methods

Study group was consisted of 100 healthy newborns with normal APGAR scores and physical examination who were born without any complication after a regular pregnancy period. We compared the CO and SVR values of the study group which were obtained via ultrasonographic cardiac output monitor in the first and second day of their life by the literature and reference values.

Conclusions/Results

Statistical analysis revealed that CO values at the first day of the life are lower than the CO values at the second day, however SVR values at the first day are higher than the SVR values at the second day. Our mean CO values are similar with the reference values in the literature. Especially the newborns who were admitted to NICU have frequent changes in their hemodynamic states and this method is found to be appropriate for the monitoring of the newborn with the predicted safety due to its similarity with the ecocardiographic results.

References (if needed)
PACKED RED BLOOD CELL TRANSFUSION IN CRITICALLY ILL CHILDREN ASSOCIATED WITH INCREASED MORTALITY: SEVERITY MATCHED PROSPECTIVE COHORT STUDY

S. Mahadevan1, R. Rameshkumar1, S. Bhanudeep1
1Jawaharlal Institute of Postgraduate Medical Education and Research JIPMER, Pediatrics, Puducherry, India

Background

Packed red blood cell transfusions (PRBC) are frequently done with the concept of systemic oxygen consumption may improve in critically ill children, but this concept is not proven.

Objectives

To compare the all cause 28-day mortality of critically ill children who transfused PRBC versus non-transfused with the same severity.

Methods

The study was conducted in 19 bedded-PICU of a tertiary care institute. Children aged 1-month to 12-year divided into transfused (n=201) vs. non-transfused (n=402) with severity matched with PRISM-III and ratio of 1:2. Data of PRBC transfusion, ventilation, stay in PICU and 28-days mortality were collected prospectively from December-2015 to June-2016. Hematological malignancies, on an immunosuppressant, those who received repeated transfusions like thalassemia major, aplastic anemia and received transfusion before PICU admission and imminent death within 24-hour were excluded.

Conclusions/Results

Median (IQR) age, PRISM-III in transfused and non-transfused were 12 (4-48) vs. 24 (7-75) months (p=<0.001), 16 (14-20) vs.16 (14-18) (p=0.490). Lowest median Hb documented was 8 (7.3-8.2) vs. 9 (7.7-10) gm% (p=<0.001). Median threshold for first PRBC transfusion in transfused patients was 8 (7.4-8.4) gm%. All cause 28-day mortality was higher in transfused (26%) as compared to non-transfused (16%) (Hazard ratio, unadjusted 1.7, 95%CI 1.2-2.4, p=0.04, adjusted to age and sex 1.7, 95%CI 1.2-2.5, p=0.004). No difference in median (days) length of ventilation (4, 2-6 vs 4,2-6; p=0.541), PICU stay (6, 4-10 vs 6, 5-9; p=0.363) and hospital stay (8, 5-13 vs 8, 5-12; p=0.358).

Conclusions: Blood transfusion in critically ill children was associated with increased mortality.

References (if needed)
Background

Family Integrated Care (FIC) is a recent innovation in neonatal care. The principle is supporting parents to become the mainstay of their infant’s care. Nurses adopt the role of coach and educators. Early studies have shown FIC improves breastfeeding rates, weight gain and decreases parental stress [1].

Objectives

A quality improvement project (QIP) to improve breastfeeding at discharge rates.

Methods

Families were invited to join the QIP if their baby was less than 35 weeks gestation at birth. Education, mentoring and coaching was introduced for parents to learn and provide traditional nursing tasks. Nurses retained responsibility for technical tasks.

Conclusions/Results

Over a one year period, 66 families joined the QIP. Patients were matched for sex, gestation and birth weight. Discharge breastfeeding rates rose from 33% to 56% (p-value =0.008). Subgroup analysis of babies born >31 weeks revealed an increase from 24% to 69% (p-value =0.001). Shortening of hospital stay by seven days though not statistically significant, was noted in the <31 weeks cohort (95% CI -15 to 1.4), p-value =0.1.

<table>
<thead>
<tr>
<th>Breastfeeding at discharge</th>
<th>31-35 weeks</th>
<th>Overall</th>
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<tbody>
<tr>
<td>Standard care</td>
<td>24% (7/29)</td>
<td>33% (22/66)</td>
</tr>
<tr>
<td>Family Integrated Care</td>
<td>69% (20/29)</td>
<td>56% (37/66)</td>
</tr>
</tbody>
</table>

This suggests that improving education and support can improve breastfeeding rates, may decrease the length of hospital stay having significant long term health and economic outcomes.

References (if needed)

LONG TERM OUTCOME / HEALTH SERVICES

ESPN7-0137

CHANGING TRENDS IN LATE PRETERMS OVER A DECADE IN SINGAPORE

W.B. Poon¹, W.L.I. Ang¹, G. Viegelmann¹
¹Singapore General Hospital, Neonatal and Developmental Medicine, Singapore, Singapore

Background

Singapore’s Total Fertility Rate (TFR) decreased and maternal age increased over the last decade, with increased use of Artificial Reproductive Technologies (ART).

Objectives

Review the maternal, perinatal and neonatal short term outcomes of late preterm infants as compared to term infants, comparing outcomes with a decade ago.

Methods

Retrospective cohort study comparing late preterm infants with term gestation infants from August 2012 till November 2016 (Epoch 1), as compared to a previously published cohort Jan 2005 till December 2008 (Epoch 2).

Conclusions/Results

Results:

7,606 and 6826 infants were studies in Epoch 1 and 2 respectively. Increased ART was found in late preterms, increasing from 10.0% to 20.2%. Mean birth weight of late preterms reduced from 2.545kg to 2.424 kg. Multiple pregnancies increased from 16.0% to 28.8%, while caesarian delivery increased from 49.9% to 60.7%. More babies required intubation at birth. More TTNB but less hyaline membrane disease and pneumonia were found. More infants required phototherapy and more were treated for sepsis after modified CDC guidelines for GBS prevention and universal GBS screening, increasing from 1.7% to 13.8%. NICU utilization rate increased from 11.9% to 18.8%, while median length of stay increased from 4 to 5 days. A marginal increase in mortality from 0.1% to 0.3% was found.

Conclusion:

Increase in ART, multiple pregnancies and caesarian section over the 2 epochs resulted in more babies requiring intubation at birth and more NICU admissions.

References (if needed)
LONG TERM OUTCOME / HEALTH SERVICES

ESPN7-0149

A POPULATION-BASED STUDY OF MORTALITY OF CONGENITAL DIAPHRAGMATIC HERNIA IN SOUTHERN/WESTERN DENMARK - A SINGLE CENTER WITHOUT ECMO

U.L. Larsen¹, T. Strøm¹, S. Jepsen¹, N. Qvist², P. Toftº
¹University Hospital Odense, Department of Anaesthesia and Intensive care, Odense, Denmark
²University Hospital Odense, Department of Surgery, Odense, Denmark

Background

Congenital diaphragmatic hernia (CDH) is a defect in the diaphragm allowing displacement of abdominal organs into the chest cavity of the fetus during pregnancy. In the postnatal period, the main features of the condition are pulmonary hypoplasia and vascular bed abnormalities, resulting in pulmonary hypertension and persisting fetal circulation. Treating CDH continues to be challenging despite advances in intensive care therapy, including the use of ECMO. The effect of ECMO in treating neonates with CDH is still unclear and therefore remains controversial.

Objectives

To evaluate the mortality of infants with symptomatic CDH treated in a single center (PICU, Odense University Hospital) providing advanced intensive care (HFOV, iNO, vasopressor support) but without ECMO.

Methods

Baseline data and 28-day mortality was recorded. Data was collected retrospectively from journals and electronic information systems after obtained permission from the Danish health and medicines authority.

Conclusions/Results

During the study period 1998-2015, 94 infants with symptomatic CDH were identified. 44% were female, 77% left-sided and 52% were diagnosed prenatally. Median (interquartile range) LOS-ICU was 8.4 days (4.8 – 19.8 days) and days on mechanical ventilation was 7.70 (3.86-18.65). 28-day mortality was 21.3% (20/94). Of the 20 non-survivors, 9 underwent surgery.

Our results are comparable to reported data from other centers, including centers using ECMO.

References (if needed)
RESPIRATORY FAILURE: MANAGING THE YOUNG CHILD WITH VIRAL BRONCHIOLITIS

OUTCOMES OF EXTRAPULMONARY PEDIATRIC ACUTE RESPIRATORY DISTRESS SYNDROME: A MULTICENTER ANALYSIS


1K K Women's and Children’s Hospital - Singapore, Pediatrics, Singapore, Singapore
2K K Women's and Children's Hospital - Singapore, Children's Intensive Care Unit, Singapore, Singapore
3Khoo Teck Puat-National University Children's Medical Institute, Paediatrics, Singapore, Singapore
4Khoo Teck Puat-National University Children's Medical Institute, Paediatric Critical Care, Singapore, Singapore
5Siriraj Hospital Mahidol University, Faculty of Medicine, Bangkok, Thailand
6The National Hospital of Pediatrics, Pediatric Intensive Care, Hanoi, Vietnam
7Sarawak General Hospital, Pediatric Intensive Care, Kuching, Malaysia
8King Chulalongkorn Memorial Hospital, Pediatric Intensive Care, Bangkok, Thailand
9Ramathibodi hospital, Pediatric Intensive Care, Bangkok, Thailand
10University Malaya Medical Centre, Pediatric Intensive Care, Kuala Lumpur, Malaysia
11Children's Hospital of Chongqing Medical University, Pediatric Intensive Care, Chongqing, China
12Beijing Children’s Hospital, Pediatric Intensive Care, Beijing, China

Background

Pediatric Acute Respiratory Distress Syndrome (PARDS) is a heterogeneous clinical entity caused by pulmonary (PARDSp) and extrapulmonary (PARDSexp) etiologies.

Objectives

We aim to investigate whether there are differences in outcomes in children with PARDSexp compared to those with PARDSp.

Methods

This is a multicenter, retrospective study from 2009-2015 within the Pediatric Acute and Critical Care Medicine Asian Network. Primary and secondary outcomes were pediatric intensive care unit (PICU) mortality, and ventilator free days (VFD) and PICU free days (IFD) up to 28 days. Multivariate regression adjusting for sites, severity of illness and oxygenation index was performed to investigate whether patients with PARDSexp had poorer outcomes compared to PARDSp.

Conclusions/Results

Among 438 patients with PARDS from 10 centers, 50/438 (11%) had PARDSexp. Patients with PARDSexp had higher admission severity scores, higher incidence of bacteremia and organ dysfunction. Compared to patients with PARDSp, PARDSexp had similar oxygenation index [13.2 (7.6, 19.3) vs 15.1 (8.5, 26.0); p=0.412 respectively] but required increased use of inotropes, blood transfusion and dialysis. Mortality was higher in the PARDSexp group compared to the PARDSp group [22/50 (44%) vs. 110/388 (28%); p=0.032]. VFD and IFD were lower in the PARDSexp group. However, on multivariate analysis, PARDSexp was not associated with mortality (adjusted odds ratio 1.50 [95% confidence interval (CI) 0.84, 2.67]; p=0.175), VFD [mean difference (MD) 0.77 (95%CI -2.44, 4.00) days; p=0.471] or IFD [MD 1.08 (95%CI -1.86, 4.02) days; p=0.470]. In conclusion, this first study describing PARDSexp did not demonstrate that PARDSexp in itself was a risk factor for poor clinical outcomes.

References (if needed)
RESPIRATORY FAILURE: MANAGING THE YOUNG CHILD WITH VIRAL BRONCHIOLITIS

ESPN7-0357

A PILOT RANDOMIZED CONTROLLED TRIAL COMPARING “LOWER VS HIGHER” HEMOGLOBIN THRESHOLD FOR TRANSFUSION IN CHILDREN WITH ARDS

A. Choudhary1, J. Murlidharan1, A. Bansal1, K. Nallasamy1, R. Sharma2
1Post Graduate Institute of Medical Education and Research Chandigarh, Pediatrics, Chandigarh, India
2Post Graduate Institute of Medical Education and Research Chandigarh, Transfusion Medicine, Chandigarh, India

Background

RBC transfusions are given in children with ARDS to improve tissue oxygen delivery though the “optimal hemoglobin threshold” is still not defined in pediatric ARDS (PARDS).

Objectives

We compared lower hemoglobin transfusion threshold (7 gm/dl) with higher hemoglobin transfusion threshold (9 gm/dl) in PARDS for clinical outcomes of 28 day mortality, new onset/progressive MODS, 28 days ventilator free days (VFD), length of PICU and hospital stay.

Methods

This was a open labelled feasibility trial where 40 critically ill ARDS children (1 month-12 years) with a hemoglobin concentration of ≤ 9 gm/dl within 7 days of onset of ARDS were randomized into either lower hemoglobin transfusion threshold group of 7 gm/dl with targeted hemoglobin range of 7 gm/dl to 9 gm/dl or higher hemoglobin transfusion threshold group of 9 gm/dl with targeted hemoglobin range of 9 gm/dl to 11 gm/dl. Leukocyte reduced PRBCs were transfused in both the groups once transfusion threshold was met

Conclusions/Results

Results - Number of children requiring PRBC transfusion (p=0.001) and volume (ml/kg) of PRBC transfused per transfused patient (p=0.02) were significantly less in lower hemoglobin transfusion threshold group as compared to higher. Overall 28 day mortality was similar in both groups (p=1). New onset/progressive MODS (p=1), 28 days ventilator free days (p=0.42), length of PICU stay (p=0.29) and hospital stay (p=0.35) were similar in both groups.

Conclusions - Both lower and higher hemoglobin transfusion threshold strategy in PARDS were similar with respect to mortality, however to prove that lower hemoglobin threshold strategy is better than higher a multicentre superiority trial is needed

References (if needed)
RESPIRATORY FAILURE: MANAGING THE YOUNG CHILD WITH VIRAL BRONCHIOLITIS

ARE CHLORAL HYDRATE AND ALIMEMAZINE SAFE IN RESPIRATORY FAILURE IN BRONCHIOLITIS OUTSIDE A PICU

K. Patel1, P. Alport2

1Brighton & Sussex Universities Hospital NHS Trust, Paediatric Level 2 Critical Care, Brighton, United Kingdom
2Brighton & Sussex Medical School, Medical Student, Brighton, United Kingdom

Background

Bronchiolitis is the commonest cause of respiratory failure in infants. High Flow nasal cannula oxygen (HFNC) & Non-Invasive Ventilation (NIV) in our experience markedly reduces (down to 4%) mechanical ventilation. Success in HFNC & NIV is improved by sedation. However there is a lack of data on the optimal regime. The HDU of The Royal Alexandra Children’s Hospital(RACH), Brighton, UK uses chloral hydrate and alimemazine and has also developed and piloted a clinical sedation score tool to standardise assessment and dosing.

Objectives

To determine whether chloral hydrate with or without alimemazine is safe and effective sedation in NIV and HFNC in infants with respiratory failure due to severe bronchiolitis aged 0-2 years.

Methods

A retrospective detailed case note analysis of 124 children, admitted to HDU between October 2015 to March 2016, identifying 82 admissions given sedation for respiratory support. Analysis was performed using Paired T-tests and Chi-squared tests, p<0.05 was statistically significant. An additional set of 119 patients from a 2014/15 database was included in safety analysis.

Conclusions/Results

Of the 82 admissions total of 2769 sedation clinical scores recorded. Incidence of abnormal sedation score was only 5%. There were no sedation complications in our cohort of 201 patients. Chloral hydrate 30-50mg/kg 6hrly alone or co-administered with alimemazine 2mg/kg 8hrly appears to be a safe and effective sedation regimen for infants receiving respiratory support outside of a PICU. It has contributed to a very high HFNC & NIV success rate in severe bronchiolitis.

References (if needed)
PICU NURSES' DECISION MAKING AROUND GASTRIC RESIDUAL VOLUME MEASUREMENT: EVIDENCE OR RITUAL?

L. Kenworthy, L. Latten, L. Tume

Alder Hey Children's NHS Foundation Trust, PICU, Liverpool, United Kingdom
Alder Hey Children's NHS Foundation Trust, Nutrition & Dietetics, Liverpool, United Kingdom

Background

A common nursing practice to assess enteral nutrition (EN) 'tolerance' is to measure gastric residual volume (GRV) regularly. Nurses cite their role as being very important in starting (67%), delivering (80%) and evaluating (75%) enteral feeding.

Objectives

To explore nurses' decision-making around GRV measurement and decisions to withhold enteral feeding.

Methods

A cross sectional electronic survey was conducted in a single mixed cardiac and general PICU in UK.

Results

90/154 nurses responded (response rate 58%) mean PICU experience of 10.8 years (SD 8.09). Nurses rated their role in starting, delivering and evaluation enteral nutrition as very high (mean rating of 9/10, 9.6/10 and 9.7/10 respectively). The top 3 perceived barriers to delivering EN were: Fluid restrictions (52% especially in cardiac children), nurses' education, attitudes and knowledge (33%) and fasting for procedures (33%). The top reasons for withholding feeds were: volume of aspirate (67%), appearance of the aspirate (40%) and condition of the child (23%). When asked to consider not routinely measuring GRV; 50% of responders were broadly negative, 43% were broadly positive (if given guidance) and 3% were indifferent.

Conclusions

Nurses play a vital role in the delivery of adequate enteral nutrition for critically ill children. Their decision making surrounding stopping and restarting feeds is heavily based on GRV and this practice is not supported by evidence. Future research to avoid this practice needs to consider nurses' views.

References (if needed)
EFFECTS AND TOLERANCE OF EARLY ADMINISTRATION OF PROTEIN AND ENERGY-ENRICHED FORMULA AMONG INFANTS UNDERWENT CARDIAC SURGERY: A RANDOMIZED CONTROLLED TRIAL

Y. Cui
Guangzhou Women and Children's Medical Center, CICU, Guangzhou, China

Background

Nutritional support is an important aspect of clinical management to improve outcomes of infants who underwent congenital heart surgery. Protein and energy-enriched formula (PE-formula) may help provide adequate nutrition and promote wound healing. However, the effects and tolerance of increased protein and energy intake of these infants are not well defined.

Objectives

To evaluate tolerance and nutritional effects of a PE-formula compared with that of a standard infant formula (S-formula) in cardiac infants after congenital heart surgery.

Methods

Fifty infants after surgical repair were randomized in the trial for enteral nutrition. They were randomly assigned to a standard formula (S-group, n =26) or a protein and energy-enriched formula (PE-group, n=24). Daily intake and tolerance were recorded. Plasma amino acid concentrations were measured, and cumulative energy balance and nitrogen balance were calculated.

Conclusions/Results

Results: Compared to S-formula group, nutrient intakes were significantly higher in PE-infants after the day 1 and all met the adequate intake as early as on day 2. Nitrogen balance in the PE-infants met positive nitrogen balance from day 2 whereas in infants receiving S-formula this was not until day 5. PE-infants also had significantly higher increase in many essential amino acids, especially leucine and isoleucine. With the exception of tolerable diarrhea (multivariate adjusted HR=3.16, 95%CI=1.24-8.01), no significant higher incidence of intolerable events was found in PE-infants compared to S-infants.

Conclusions: Among infants underwent congenital heart surgery in the ICU, early admission of PE-formula was as well tolerated as S-formula and effective in achieving higher nutritional intakes and earlier nitrogen balance.

References (if needed)
RESUSCITATION

ESPN7-0218

COMPARISON OF NORMAL SALINE, HYPERTONIC SALINE AND HYPERTONIC ALBUMIN RESUSCITATION IN AN INFANT ANIMAL MODEL OF UNCONTROLLED HEMORRHAGIC SHOCK

L. Butragueno Laiseca1, R. Gonzalez1,2, M.J. Solana1, J. López1,2, S.N. Fernández1,2, I. Ortiz1,2, M. García1,2, G. Manrique1, R. de la Morena1, J. López-Herce1,2, J. Urbano1,2

1Gregorio Marañón General University Hospital and Research Institute, Pediatric Intensive Care, Madrid, Spain
2Health Research Found- Health Institute “Carlos III”, Maternal And Child Health And Development Research Network, Madrid, Spain

Background

Previous experience in resuscitation of uncontrolled hemorrhage in children with hypertonic colloids is scarce.

Objectives

To determine if in an infant animal model of uncontrolled hemorrhagic shock, hypertonic albumin, as opposed to isotonic or hypertonic crystalloid, would improve global hemodynamic and perfusion parameters, without increasing bleeding.

Methods

Randomized study in 43 two-month old piglets (9.9±2kg). Following mechanical ventilation, hemorrhage was induced by standardized liver laceration. After 35 ml/kg bleeding was achieved (t3), pigs received: Normal Saline (NS) 40 ml/kg, n=15, Hypertonic 3% Saline (HS) 20 ml/kg, n=14, or Albumin 5% plus Hypertonic 3% Saline (AHS) 20 ml/kg, n=14, over 30 min. Forty-five minutes after the first fluid bolus (t6), a second bolus was administered with half of the volume, followed by 45’ observation period (t9). Cardiac index (CI), lactate, central venous blood oxygen saturation (ScVO2), bleeding and mortality were compared.

Conclusions/Results

Results: Non-significant differences between groups were observed at t3. Higher mortality was observed with crystalloids (20.6%) as opposed to colloid (7.1%) (NS:3/15, HS:3/14, AHS:1/14, p=0.26). Higher CI (t9: NS:2.69, IQR:2.1-3.3; HS:2.95, IQR:1.8-3.4; AHS:4.3, IQR:4.1-4.5 L/min/m2, p<0.001) and ScVO2 (t9: NS:58, IQR:43-66; HS:45, IQR:27-56; AHS:73, IQR:62-79 %, p=0.008), and lower lactate values (t9: NS:1.6, IQR:1.1-3.6; HS:1.9, IQR:1.1-6.7; AHS:0.8, IQR:0.6-1.5 mmol/L; p=0.032) were observed in the AHS group, both in t6 and t9. Bleeding was similar in all groups throughout the experiment (t9: NS:39.8, IQR:36.1-45.6; HS:37.8, IQR:35.8-43.3; AHS:37.3, IQR:31.1-41.5 ml/kg, p=0.315).

Conclusion: Similar bleeding was observed in all groups. Resuscitation with NS and HS was comparable. AHS achieved higher hemodynamic and perfusion values.

References (if needed)
ADHERENCE TO SURVIVING SEPSIS CAMPAIGN BUNDLES FOR PEDIATRIC SEPTIC SHOCK IN A TERTIARY HOSPITAL IN VIETNAM.
H. Le¹, D. Nguyen¹, P. Phan²
¹Vietnam National Children's Hospital, Emergency Department, Hanoi, Vietnam  
²Vietnam National Children's Hospital, Pediatric Intensive Care Unit, Hanoi, Vietnam

Background

Few studies have evaluated pediatric sepsis guideline adherence and its impact to outcomes in developing countries.

Objectives

To evaluate adherence to 2012 Surviving Sepsis Campaign bundles for pediatric septic shock and its relation to outcomes.

Methods

Prospective cohort study conducted at the National Children’s Hospital, Hanoi, Vietnam from January to September 2016. Adherence to one-hour (measure lactate levels, administer 20 ml/kg crystalloid for hypotension, delivery of vasopressors for fluid refractory shock, blood culture prior to antibiotics, and administer broad spectrum antibiotic) and 6-hour (re-measure lactate level, re-assess volume status and tissue perfusion by either repeat focused exam, or measure CVP, ScvO2, bedside cardiac ultrasound, or dynamic assessment of fluid response) bundle was reviewed. The association between bundle adherence and outcome was evaluated by using multivariate logistic regression.

Conclusions/Results

A total of 50 septic shock children were evaluated. Thirty-four percent adhered to both complete bundles. There was 36% and 90% adherence to all components of 1-hour and 6-hour bundles, respectively. Adherence to 1-hour bundle component was: 94% measure lactate levels; 84% blood culture; 80% administer fluid; 70% administer vasopressors, and 68% administer antibiotics. Adherence to 6-hour bundle component was: 100% re-measure lactate levels, 90% measured CVP; 86% measured ScvO2, and 60% had cardiac ultrasound. The children with complete bundles adherence had non-significantly shorter mechanical ventilation duration and PICU stay than children who did not. There was no difference in mortality between complete and incomplete adherence to sepsis bundles.

Conclusions: Overall adherence to complete sepsis bundles was low and it may relate to outcomes.

References (if needed)
EVALUATION OF A NEW SCORING SYSTEM IN DELIVERY ROOM FOR PREDICTION OF HOSPITALIZATION IN NEONATES

M. Cetinkaya¹, G. Buyukkale¹

¹Kanuni Sultan Suleyman Training and Research Hospital - , Neonatology, Istanbul, Turkey

Background

Apgar scoring system has been used for the evaluation of the infant's postnatal condition. However, it is influenced by gestational age and resuscitative interventions. Combined Apgar score has been developed by evaluation of the requirement of positive pressure ventilation, oxygen, intubation, chest compression and drugs. We expanded the combined Apgar scoring by inclusion of the cord blood gas pH and targeted oxygen saturation levels. We defined it as modified combined Apgar scoring system.

Objectives

The aim of this study was to compare the utility of modified combined Apgar scoring system with Conventional and Combined Apgar scoring systems for prediction of hospitalization.

Methods

This prospective cohort study was performed in the delivery room. All infants were evaluated by Conventional, Combined and Modified Combined Apgar scores at minutes 1 and 5. These scores were all recorded. Blood sample was obtained from the umbilical artery and pulse oximetry was used for measurement of oxygen saturation. Prediction of NICU hospitalization was used as a surrogate parameter to compare the scores.

Conclusions/Results

A total of 800 neonates (228 preterm, 572 term) were enrolled. Modified Combined Apgar scores showed positive correlation with Conventional and Combined Apgar scores. Two hundred and thirty one (%29) of the infants were admitted to the NICU. Modified Combined Apgar at minute 1 was significantly better for prediction of hospitalization in both term and preterm infants compared with Conventional and Combined Apgar scores (both p<0.05).

In conclusion, Modified Combined Apgar should provide an appropriate assessment of neonates in the era of modern delivery room.

References (if needed)
WHITE MATTER IMPAIRMENT AFTER EXPOSURE TO CELL-FREE HEMOGLOBIN AND HYPEROXEMIA

Å. Jungner¹, S. Vallius², O. Romantsik¹, M. Bruschettini¹, I. Bendix³, J. Herz³, U. Felderhoff-Mueser³, M. Gram¹, D. Ley¹

¹Institute of Clinical Sciences Lund- Skåne University Hospital- Lund University, Dept of Pediatrics, Lund, Sweden
²Institute of Clinical Sciences Lund Lund University, Dept of Pediatrics, Lund, Sweden
³University Clinic Essen- University Duisburg-Essen, Dept of Pediatrics ¹- Neonatology, Essen, Germany

Background

Infants with congenital heart defects (CHD) are at risk for neurodevelopmental impairment and diffuse white matter injury. We hypothesize that the inherent vulnerability of immature oligodendrocyte-populations renders the neonatal brain susceptible to hyperoxemia and cell-free hemoglobin, conditions present during cardiopulmonary bypass (CPB).

Objectives

To characterize the effect of systemic cell-free hemoglobin and hyperoxemia on white matter integrity in a rat pup model.

Methods

P6 rat pups were injected intraperitoneally with cell-free hemoglobin or vehicle and exposed to 24h of hyperoxia or normoxia. Assessment of oligodendrocyte maturation and apoptosis was performed by immunohistochemistry (IHC) using Olig2+ and TUNEL-staining at 24 and 120h. Quantified evaluation of myelination (MBP) and apoptosis (cleaved caspase-3) was performed at 6, 24, 72 and 120 h using Western blot. MRI (9.4 T) was performed at P7, P9 and P21 for evaluation of white matter integrity as determined by fractional anisotropy (FA).

Conclusions/Results

In groups subjected to hyperoxia, an increase in oligodendrocyte apoptosis (TUNEL+/Olig2+ -cells) was observed. In the group subjected to hemoglobin only, staining was comparable to that of the control group. The group subjected to the combined insult showed a significant reduction in MBP at 120 h (p<0.01). Groups subjected to singular insults did not differ from the control group. Analysis of FA-values (MRI) revealed no differences between groups.

In this animal model, we have confirmed that hyperoxia mediates apoptosis in immature oligodendrocytes. Further, the combined challenge of systemic cell-free hemoglobin and hyperoxia results in decreased long-term myelination.

References (if needed)
IS CYANOTIC HEART DISEASE A RISK FACTOR FOR BLOOD PRODUCT TRANSFUSION IN CHILDREN UNDERGOING CARDIAC SURGERY?
A. Willems¹, P. Patte², D. Datoussaid³, P. Van der Linden²
¹Hôpital Universitaire des Enfants Reine Fabiola, Paediatric Intensive Care Unit, Brussels, Belgium
²Centre Hospitalier Universitaire Brugmann, Anaesthesia, Brussels, Belgium
³Hôpital Universitaire des Enfants Reine Fabiola, Anaesthesia, Brussels, Belgium

Background
Cyanotic heart disease is associated with increased risk of bleeding.

Objectives
We examined if cyanotic children are at risk for blood product transfusions and if they present coagulation abnormalities on point-of-care tests (POCT).

Methods
A retrospective observational study was conducted from 2002 to 2014. Transfusions of blood products were compared between acyanotic and cyanotic heart patients. Multivariate analysis was used to determine risk factors of blood product transfusions. Between 2010 and 2012 children underwent systematically POCT after separation from CPB and tests results were compared between both groups.

Conclusions/Results
From the 1846 patients retained for analysis, 1063 patients were in the acyanotic and 783 patients in the cyanotic group. As shown in Table 1, RBC were less frequently added in the CPB prime and transfused in the cyanotic group but blood loss was significantly higher. Overall, more children in the cyanotic group received FFP and platelets transfusions. The presence of a cyanotic heart disease was an independent predictor of FFP (OR: 2.08 and 95% CI: 1.44 to 3.01) and platelet transfusion (OR: 3.90 and CI: 2.27 to 6.69). From the 148 patients who underwent POCT, 102 were in the acyanotic and 39 in the cyanotic group. Table 2 showed the results of the coagulation tests.

Children with cyanotic heart disease have impaired coagulation tests and an increased risk to be exposed to blood product transfusion in the perioperative period of cardiac surgery.

References (if needed)
PERIOPERATIVE FLUID MANAGEMENT IN DUTCH PEDIATRIC CARDIAC SURGERY PATIENTS

M.J. Verhagen¹, P.P. Roeleveld¹, R.P. de Wilde¹, H.E. Bunker-Wiersma¹
¹Leiden University Medical Center, Pediatric intensive care unit, LEIDEN, The Netherlands

Background

Background: Postoperative fluid overload (FO) in cardiac surgery patients is thought to increase morbidity. In this study we explore fluid administration in scheduled pediatric cardiac surgery patients operated with or without cardio-pulmonary bypass (CPB).

Objectives

Objective: The aim of this study was to evaluate the effect of FO on duration of mechanical ventilation and PICU length of stay (LOS).

Methods

Methods. Data were prospectively collected from our patient data management system (Metavision, iMDsoft), between May 2015 and June 2016. The fluid balance was calculated as total fluid in (incl. priming CPB system) minus ‘total fluid out’ (urine output, drain losses and/or filtration volume after CPB). A fluid balance in excess of 100 ml/kg/day is considered fluid overload (FO). Patients were divided in two separate groups, according to their fluid balance. Group 1, no FO, group 2, FO. Duration of mechanical ventilation and PICU length of stay were compared between both groups (Kaplan-Meier). Continues data were analysed using Student T test (Mann-Whitney U-test).

Conclusions/Results

131 patients were included, 2 weeks to 10 years, following scheduled cardiac surgery. FO occurred in 87 patients (66%). FO resulted in a prolonged time of mechanical ventilation (p = 0.002) and a prolonged length of stay in the PICU (p = 0.001). Associated risk factors for FO are the duration of CPB and length of aortic cross clamp time.

Conclusion: Perioperative fluid overload on the first day after cardiac surgery is associated with a deteriorated clinical outcome, mainly found in prolonged mechanical ventilation and PICU LOS in pediatric patients.

References (if needed)
WHAT FLUIDS ARE USED FOR RESUSCITATION IN PAEDIATRIC SEPSIS IN THE UK?

W.Y.E. Chia¹, A. Sutherland², R. Barber¹
¹Royal Manchester Children's Hospital, Paediatric Intensive Care, Manchester, United Kingdom
²University of Manchester, Pharmacology, Manchester, United Kingdom

Background

Fluid resuscitation is a key component of paediatric sepsis management. However, there is little evidence on which fluids to use. Recent national guidelines on sepsis recommend crystalloids containing sodium 130-154 mmol/l but not the fluid type.[¹] There is evidence suggesting that the type of intravenous fluids used may impact mortality, morbidity and acute kidney injury.[²]

Objectives

To determine current practice of fluid resuscitation for paediatric sepsis in the UK focusing on the type of fluid used.

Methods

A survey was disseminated to clinicians in the UK via Paediatric Critical Care Networks and Regional Transport teams. The target audience was paediatricians, Emergency physicians, anaesthetists and intensivists.

Conclusions/Results

Results

Of 151 respondents, 80.1% (n=121) were consultants. There was good distribution across the target specialties.

0.9% sodium chloride (NS) was the first line intravenous fluid used by 67.5% (n=102), while 31.9% (n=48) used balanced fluids (Hartmann's/Plasma-Lyte/Ringer's). Other fluids used included synthetic colloids (11.3% (n=27)) and human albumin solution (23.3% (n=56)).

National and local protocols/guidelines were as significant as other factors such as availability of fluid type and amount of fluid already given in determining the choice of fluid used.

51% of respondents (n=77) would change the type of fluid used after 40ml/kg of fluids already given.

Conclusion

Clinicians are starting to use balanced fluids in resuscitation and therefore randomised controlled trial comparing different fluid strategies in paediatric sepsis resuscitation is recommended to improve guidelines and clinical practice.

References (if needed)

IMPACT OF ULTRASOUND GUIDANCE ON CENTRAL VENOUS CATHETER PLACEMENT IN THE PEDIATRIC INTENSIVE CARE UNIT: PROSPECTIVE MULTICENTRIC STUDY.


¹Gregorio Marañón General University Hospital, Pediatric Intensive Care, Madrid, Spain  
²Hospital Universitario de León, Pediatric Intensive Care Unit, León, Spain  
³Hospital Universitario Carlos Haya, Pediatric Intensive Care Unit, Málaga, Spain  
⁴Hospital Universitario Ramón y Cajal, Pediatric Intensive Care, Madrid, Spain  
⁵Hospital Universitario Sant Joan de Deu, Pediatric Intensive Care, Barcelona, Spain  
⁶Hospital Universitario Reina Sofia, Pediatric Intensive Care, Córdoba, Spain  
⁷Hospital Universitario de Pamplona, Pediatric Intensive Care, Pamplona, Spain  
⁸Hospital Universitario Virgen de la Salud, Pediatric Intensive Care, Toledo, Spain  
⁹Hospital Universitario 12 de Octubre, Pediatric Intensive Care, Madrid, Spain  
¹⁰Hospital Universitario La Paz, Pediatric Intensive Care, Madrid, Spain  
¹¹Hospital Universitario Central de Asturias, Pediatric Intensive Care, Oviedo, Spain  
¹²Hospital Universitario Son Espases, Pediatric Intensive Care, Mallorca, Spain  
¹³Hospital Universitario Miguel Servet, Pediatric Intensive Care, Zaragoza, Spain  
¹⁴Hospital Universitario de Salamanca, Pediatric Intensive Care, Salamanca, Spain  
¹⁵Corporació Sanitaria Parc Taulí, Pediatric Intensive Care, Sabadell, Spain  
¹⁶Hospital Universitario de Burgos, Pediatric Intensive Care, Burgos, Spain  
¹⁷Complejo Hospitalario Universitario de Santiago, Pediatric Intensive Care, Santiago de Compostela, Spain  
¹⁸Hospital Universitario Virgen de la Macarena, Pediatric Intensive Care, Sevilla, Spain  
¹⁹Hospital Universitario Marqués de Valdecilla, Unidad de Cuidados Intensivos, Santander, Spain  
²⁰Hospital Xeral de Vigo, Pediatric Intensive Care, Vigo, Spain

Background

Recommendations on US guiding for central venous catheter (CVC) placement are derived from single center studies most including elective cannulations in the operating room.

Objectives

To determine whether ultrasound (US) guidance improves CVC placement outcomes compared to landmark (LM) technique by PICU providers.

Methods

Prospective multicenter observational study involving 27 PICUs. For each procedure PICU, patient, operator and placement technique characteristics were recorded. The main outcome was first attempt success. Other outcomes included final CVC placement success, number of punctures and occurrence of complications.

Conclusions/Results

500 procedures involving 354 patients were included. Age and weight median and (IQR) were 9 months (2-48) and 7.8kg (4.5-15). 323 procedures used US guidance and 177 LM technique. First attempt success (48.6% vs 30.5%, p<0.001) and final success (80.8% vs 72.9%, p=0.040) were higher on the US group. US group had less procedures requiring more than 3 punctures (17.6% vs 31%, p=0.001) and less number of punctures [2 (1-3) vs 2 (1-4), p<0.001]. Accidental arterial puncture (5.9% vs 10.7%, p=0.05) and overall complications (13.3% vs 19.3%, p=0.065) were lower in the US group. US guidance [OR 1.94, CI 95% (1.28-2.95); p=0.002], operator's PICU experience [OR 1.74, CI 95% (1.18-2.56), p=0.005] and patient's weight (5 kg change) [OR 1.12 CI 95% (1.04-1.20)].
1.20), p=0.001] were independent factors associated with first attempt success in the multivariate regression model. Total number of punctures was the most important factor associated with complications.

US guidance increases first attempt and overall success rates and reduces the number of punctures and complications compared to LM technique.

References (if needed)
YOUNG INVESTIGATOR SESSION

ESPN7-0116

POPULATION PHARMACOKINETICS OF PROPOFOL IN CRITICALLY ILL PRETERM AND TERM NEONATES
M. Rantanen¹, H. Soukka², K. Olkkola³, T. Launiainen⁴, M. Niemi⁴, T. Saari⁴
¹University of Turku and Turku University Hospital, Department of Anaesthesiology and Intensive Care, Turku, Finland
²University of Turku and Turku University Hospital, Department of Paediatrics and Adolescent Medicine, Turku, Finland
³University of Helsinki and Helsinki University Hospital, Department of Anaesthesiology- Intensive Care and Pain Medicine, Helsinki, Finland
⁴University of Helsinki and Helsinki University Hospital, Department of Clinical Pharmacology, Helsinki, Finland

Background

Propofol is used for preintubation sedation in neonatal intensive care. Pharmacokinetics (PK) data in neonatal population is limited, and dosing regimens are extrapolated from studies done in older children or adults.

Objectives

Describe the PK of propofol in critically ill neonatal population. Identify covariates responsible for inter-individual variability.

Methods

40 neonates requiring intubation were recruited. Median post-menstrual age (PMA) was 32.8 weeks (22.9 – 42.5) and median weight was 1.910 kg (0.480 – 4.420). Propofol dosing was decided by the neonatologist on duty (2 mg/kg by the local protocol). 165 blood samples (10 µl each) for concentration assays were collected 24 h after the first drug dose using Mitra® microsampling devices. Concentration samples were drawn only when a blood sample was indicated for clinical purposes. Population PK analysis was performed using a non-linear mixed effect modelling approach with NONMEM® 7.3.0.

Conclusions/Results

Based on the concentration–time curves, the pharmacokinetics of propofol in critically ill neonates show a strong age and weight dependency. (Fig. 1).
A three-compartment model with weight and PMA as covariates describes propofol PK in neonates requiring...
intubation. The model predictions were confirmed with the visual predictive check plot (Fig. 2).

Figure 2. Visual Predictive Check
Observations vs. Time

Observations (ng/ml)

Time (min)

References (if needed)
A COMPARISON OF NON-INVASIVE OSCILLOMETRIC AND INVASIVE ARTERIAL BLOOD PRESSURE MEASUREMENTS IN PAEDIATRIC INTENSIVE CARE UNITS

S. Ray¹, L. Rogers², D. Noren³, R. Dhar⁴, S. Nadel⁵, M. Peters¹, D. Inwald⁶

¹UCL GOS Institute of Child Health, Respiratory - Critical Care and Anaesthesia, London, United Kingdom
²University College London, Clinical Operations Research Unit, London, United Kingdom
³Philips Healthcare, Philips Healthcare, Boston, USA
⁴Great Ormond Street Hospital NHS Trust, Paediatric Intensive Care Unit, London, United Kingdom
⁵Imperial Healthcare NHS Trust, Paediatric Intensive Care Unit, London, United Kingdom

Background

Background: Oscillometric non-invasive blood pressure measurements are routinely used in paediatric intensive care.

Objectives

The aim of this study was to compare non-invasive pressure (NIBP) and invasive arterial blood pressure (IABP) measurements and to determine whether they can be used interchangeably to guide therapy in hypotensive patients.

Methods

Methods: Retrospective observational study, comparing concurrently measured NIBP and IABP values from electronic health records from two paediatric intensive care units, between 2009 and 2016. Bland-Altman plots were used to determine the mean difference and limits of agreement. The effect of age, weight standardised for age and vasoactive medication use on any difference was determined using linear regression.

Conclusions/Results

Results: Paired NIBP and IABP values were available for 50397 systolic, 50266 diastolic and 49404 mean paired measurements from 2459 children. Mean difference between NIBP and IABP was -9.23 mm Hg (95% CI -9.33, -9.12) for mean, 0.96 mm Hg (95% CI 0.82, 1.10) for systolic and -8.67 mm Hg (95% CI -8.77, -8.55) for diastolic blood pressure. The limits of agreement were wide (45 mm Hg, 62 mm Hg and 42 mm Hg for mean, systolic and diastolic blood pressure respectively). Weight standardised for age, and to an extent age, had complex but significant effects on the difference between NIBP and IABP; vasoactive medication did not. NIBP was able to ‘rule-out’ hypotension (IABP <5th centile), but was poor at ruling it in (confirming it).

Conclusions: NIBP and IABP measurements show poor agreement. Diagnosis of hypotension by NIBP measurement alone may lead to over-treatment of patients.

References (if needed)
TEMPORAL CHANGES IN GENOME-WIDE EXPRESSION IN HYPOXIC ISCHAEMIC ENCEPHALOPATHY


1Imperial College London, Medicine, London, United Kingdom
2Health Research Institute Hospital La Fe, Unidad de Bioestadistica, Valencia, Spain
3Health Research Institute Hospital La Fe, Paediatrics, Valencia, Spain
4Medway NHS Foundation Trust- UK, Neonatology, Medway, United Kingdom
5Wayne State University, Neonatology, Detroit, USA

Background

Hypoxic-ischaemic encephalopathy (HIE) induces specific changes in whole blood gene expression at birth (Montaldo et al., NNS meeting 2016), but the temporal changes in the gene expression profile are not known.

Objectives

To characterise changes in the gene expression profile of term HIE babies between birth and 24 hours of age, and to compare this to the gene expression profile of healthy control babies at birth.

Methods

We performed next generation sequencing (Ion Proton™ Sequencer) on whole blood RNA from 20 babies with HIE undergoing cooling therapy (12 aged 5-10h [early group] and 8 aged 22-35h [late group]), and 6 healthy term babies (aged 4-7h [control group]). Principal component analysis (PCA) was used to determine significant sources of variability in the data sets. We used Limma package to identify differentially expressed genes, which were then subjected to pathway analysis (Ingenuity Pathway Analysis).

Conclusions/Results

Early, late and control groups formed separate clusters on PCA (Fig 1). The overall activation state of biological pathways according to z score is shown in Fig 2 (orange – activated; blue – inhibited). The most dramatically affected pathways were linked to apoptosis and innate immunity and were down-regulated at both time-points in comparison to controls. The volcano plot showed that all the biologically significant genes (red dots) were down-
regulated in the early compared to the late group suggesting a recovery process by 24 hours (Fig 3).

**Conclusion**

HIE babies showed a specific transcriptomic profile at different time points and gene expression was suppressed in pathways linked to apoptosis and innate immunity.

**References (if needed)**
PHARMACOLOGY: PHARMACOTHERAPY AND ARTIFICIAL DEVICES

ESPN7-0126

IATROGENIC WITHDRAWAL SYNDROME IN CRITICALLY ILL CHILDREN – A SINGLE CENTER RETROSPECTIVE CHART REVIEW

T.Z.A.L. Sampaio1,2, C. Fitzgibbons1, B. Flynn1, N. Varughese1, G. Paulus1, E. Lamers1, H.J. Jardine1, S. Dhanani1,2

1Children’s Hospital of Eastern Ontario, Pediatric Intensive Care, Ottawa, Canada
2University of Ottawa, Department of Pediatrics- Division of Pediatric Intensive Care, Ottawa, Canada

Background

Sedation and analgesia, used to maintain the comfort and safety of intubated patients, can cause iatrogenic withdrawal syndrome (IWS). As IWS has unspecific symptoms, its incidence has been inconsistently reported. Recently, the Withdrawal Assessment Tool-1 score (WAT-1) was validated to assess IWS in pediatrics.

Objectives

To determine the incidence of IWS among pediatric patients intubated and ventilated for 5 days or more, identify risk factors associated with presence and intensity of IWS and verify the correlation between severity of IWS and PICU/Hospital length of stay.

Methods

This retrospective chart review included 45 eligible patients admitted from February 2015 to January 2016. Presence of IWS was defined as WAT-1 ≥ 3 during the hospital admission. Intensity of IWS was defined as the maximum WAT-1 measured. Correlations between the presence and intensity of IWS and risk factors including: severity of illness (PELOD-2 at 12h of PICU admission) and cumulative doses of opioids and benzodiazepines were assessed by a univariate approach. Associations between length of stay in PICU and Hospital (PICU-LOS/ Hospital-LOS) and intensity of IWS were tested.

Conclusions/Results

The incidence of IWS was 82.2%. Cumulative dose of opioids was significantly associated to presence and intensity of IWS (p<0.001). Cumulative dose of benzodiazepines was significantly associated with intensity of IWS (p<0.001). No significant correlation between severity of illness and presence/intensity of IWS was found. Severity of IWS was significantly associated with Hospital-LOS (p=0.037), but not with PICU-LOS. Using WAT-1 we identified a higher incidence of IWS in this high risk population.

References (If needed)
PHARMACOLOGY: PHARMACOTHERAPY AND ARTIFICIAL DEVICES

ESPN7-0152

INTRAVENOUS PARACETAMOL FOR ANALGESIA AFTER MAJOR SURGERY IN NEONATES AND INFANTS: PROOF OF CONCEPT IN REAL-LIFE CLINICAL CARE

E. Ista¹, M. Baarslag², T. de Leeuw², J. van Rosmalen⁴, D. Tibboel¹, M. van Dijk¹, S. de Wildt⁵
¹Erasmus University Medical Center - Sophia Children's Hospital, Intensive Care and Pediatric Surgery, Rotterdam, The Netherlands
²Erasmus University Medical Center - Sophia Children's Hospital, Intensive Care and Pediatric Surgery - Room Sp-2430, Rotterdam, The Netherlands
³Erasmus University Medical Center, Anesthesiology, Rotterdam, The Netherlands
⁴Erasmus University Medical Center, Biostatistics, Rotterdam, The Netherlands
⁵Radboud University, Pharmacology and Toxicology, Nijmegen, The Netherlands

Background

Opioids, first-choice analgesics after major surgery in infants, carry a high risk of adverse events. In a previous RCT, IV paracetamol as primary analgesic reduced morphine requirements of infants by 66%.

Objectives

To confirm these RCT results in daily clinical practice.

Methods

In a prospective observational study, we included infants up to one year of age after major non-cardiac thoracic or abdominal surgery. The updated postoperative pain protocol dictated IV loading doses of morphine and paracetamol directly postoperatively, followed by paracetamol IV maintenance. If indicated by guidance of validated pain assessment scores, rescue morphine was given. Morphine consumption was compared to the RCT results and protocol adherence was documented.

Conclusions/Results

Of 75 patients, 62 were ≤ 10 days of age (82.7%). Seventy-four (98.7%) received IV paracetamol; one received rectal paracetamol. Sixty (80.0%) patients received a median morphine (n=50) or, other opioid (n=10) loading dose of 100 mcg/kg (IQR 88.2-112.4). Forty (53.3%) received no additional morphine, 8 only received rescue boluses (median 2, IQR 1-4), twenty-seven a continuous morphine infusion (median 7.9 mcg/kg/hr (IQR 5-10)). The overall median cumulative morphine consumption, including the initial loading dose, up to 48 hours postoperatively (121 mcg/kg (IQR 93-320)) was similar to the RCT paracetamol group (121 mcg/kg (IQR 99-264); p=0.72).

These results confirm that IV paracetamol as first-choice analgesic after major surgery in infants works well in daily practice and support the implementation of IV paracetamol as primary analgesic after major surgery in postoperative pain protocols for infants.

References (if needed)
PHARMACOLOGY: PHARMACOTHERAPY AND ARTIFICIAL DEVICES

ESPN7-0209

ANALGESIC AND SEDATIVE DRUGS IN ASPHYXIATED NEONATES
P. Pokorná¹, M. Bašková¹, L. Posch², P. Kliment³, D. Tibboel³
¹General Faculty Hospital-Charles University, Pediatric ICU, Prague, Czech Republic
²General Faculty Hospital Charles University, Pediatric ICU, Prague, Czech Republic
³Erasmus MC Sophia Children Hospital, Pediatric ICU, Rotterdam, The Netherlands

Background

Evidence based data of protocolized analgosedation in asphyxiated neonates are sparse.

Objectives

Evaluation of pharmacodynamic parameters (PD) of protocolized analgosedation in asphyxiated neonates under hypothermia (HT) and rewarming (RW) at different hypoxic-ischemic encephalopathy (HIE) grades and the impact of analgosedation on outcome.

Methods

Prospective evaluation of 43 consecutive asphyxiated neonates undergoing HT (TOBY trial protocol) treated with analgesic and sedative drugs. Pain was scored by COMFORT-B scale every 3 hours, number of analgesic and sedative drugs, length of analgosedation Bayley’s - II scale were used as PD parameter. Results were reported as median (interquartile range), and Student’s t test analysis with the 95% confidence interval by using Mann-Whitney (Wilcoxon) test.

Conclusions/Results

Results: Term neonates were stratified according to HIE severity (Sarna/Sarnat, aEEG) in two groups: HIE 2 (n=26) and HIE 3 (n=18), 60.8% scores indicated oversedation, 39.1% optimally sedated, and 0.1% undersedated of all scores (n=1427). Comfort-B was 10.2, IQR (8.9-12.3) in HIE grade 2, and 9.0, IQR (8.0-10.2) in HIE grade 3 under HT. Comfort scores were statistical significant between HIE 2 11.5, (9.9-14.3) vs 9.0 (7.1-11.2) in HIE 3 under RW (P=0.017). Bayley’s - II scale parameters (psychomotor - PVI and mental developmental index -MVI) were not statistically different by comparing HIE severity: MVI was 90 (81-106) in HIE 2, 76 (50-98) in HIE 3, PVI (IQR) was 94.5 (75.5-100) in HIE 2, and 70 (50-103) in HIE 3.

Conclusions: HIE severity is an independent variable potentially leading to oversedation during RW.

References (if needed)
INTRANASAL KETAMINE FOR PERIPHERAL VENOUS ACCESS: A RANDOMIZED DOUBLE BLIND AND PLACEBO CONTROLLED STUDY ABSTRACT

P. Lago¹, S. PINHEIRO², V. MACHADO²
¹universidade federal do rio grande do sul, Pediatric, Porto Alegre, Brazil
²HOSPITAL DE CLINICAS DE PORTO ALEGRE, PEDIATRIC INTENSIVE CARE, PORTO ALEGRE, Brazil

Background

Effectiveness of intranasal ketamine as an analgesic and sedative for pediatric procedures in Pediatric Intensive Care Unit (PICU) has been reported previously. Few studies evaluated IN ketamine comparing with placebo as sedative agent.

Objectives

Verify the efficacy of intranasal ketamine as sedative agent for venous access

Methods

Randomized, double blind, placebo controlled study conducted at PICU from November 2015 to August 2016. Children needing venous access were randomized to receive intranasal ketamine (4mg/Kg) or normal saline solution. Groups were compared regarding the time for venous access, facility for performing the procedure, adverse events, disturbances in vital signs and perception of the accompanying adult.

Conclusions/Results

39 children (21 Ketamine; 18 Placebo) were included without differences regarding to age, sex, weight, reason for hospitalization and professional experience. The median age was similar (19.8 x 15.8 months), as well as the median weight (10.0 x 11.3Kg). Ketamine reduced the length for venous access (23.0 x 67.5 seconds; p=0.01), and facilitated the procedure (p=0.00009). Ketamine induced sleepiness 15 minutes after its administration (p=0.003) and reduced the number of people for the child’s restraint (p=0.025). No difference was verified between groups regarding adverse effects or vital signs disturbances. Side effects were observed in 29% of the children in the Ketamine group and 17% in the Placebo group, irritability being the most common for both. The accompanying adult reported that 81% of children in ketamine group were calm and quiet (p=0.0003).

Conclusion: Intranasal ketamine reduces the time for venous puncture, facilitates the procedure to the nurse, and provides calm environment.

References (if needed)
PAEDIATRIC AND NEONATAL INTENSIVE CARE NURSING: WHY CAN’T WE GET EVIDENCE INTO NURSING PRACTICE?

ESPN7-0400

REVIEW OF A TWELVE YEAR TIME SERIES OF UNPLANNED ADMISSION TO PAEDIATRIC INTENSIVE CARE; WHAT WAS THE IMPACT OF PEWS?

G. Sefton1, S. Lane2, B. Carter3, E.D. Carroll4
1Alder Hey Children’s Hospital, PICU, Liverpool, United Kingdom
2University of Liverpool, Biostatistics, Liverpool, United Kingdom
3Edge Hill University, Nursing, Ormskirk, United Kingdom
4University of Liverpool, Infectious Diseases, Liverpool, United Kingdom

Background

Critical deterioration in children in hospital requiring unplanned admission to Paediatric Intensive Care Unit (PICU), is concerning. Mortality is twice that of other PICU admissions and morbidity is also significant. Paediatric Early Warning (PEW) has been advocated to assist in identification of children at risk of deterioration, so that early intervention may improve outcome. Most published studies have reviewed the impact of interventions over a relatively short period. There is limited data about the longitudinal impact of a PEW system.

Objectives

To explore the impact of three different mechanisms to identify deterioration in hospitalised children; traditional care (TC) from 2003 to 2006, PEW trigger tool (PEWT) from 2006 to 2011 and a PEW aggregate score (PEWS) from 2011 to 2015.

To review severity of illness (PIM3) at PICU admission, PICU interventions required and the PICU outcome

Methods

Retrospective analysis of a data collected prospectively for all admissions to a tertiary PICU in the United Kingdom.

Conclusions/Results

<table>
<thead>
<tr>
<th>Unplanned admission</th>
<th>TC</th>
<th>PEWT</th>
<th>PEWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual mean N (% total PICU admissions)</td>
<td>157 (13%)</td>
<td>187 (8.9%)</td>
<td>187 (8.15%)</td>
</tr>
<tr>
<td>PIM3 mean (range)</td>
<td>0.063 (0.052-0.08)</td>
<td>0.054 (0.045-0.066)</td>
<td>0.067 (0.056-0.076)</td>
</tr>
<tr>
<td>Invasive ventilation %</td>
<td>72%</td>
<td>65%</td>
<td>61%</td>
</tr>
<tr>
<td>Inotropes %</td>
<td>26%</td>
<td>28%</td>
<td>26%</td>
</tr>
<tr>
<td>Length of stay days median (IQR)</td>
<td>5.3 (2.7-11.3)</td>
<td>4.6 (2.4-8)</td>
<td>5.5 (3-10)</td>
</tr>
<tr>
<td>Mortality mean (% total unplanned)</td>
<td>20 (12.5%)</td>
<td>16.4 (8.8%)</td>
<td>15 (8%)</td>
</tr>
<tr>
<td>PICU all-cause mortality mean</td>
<td>6.1%</td>
<td>5.6%</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

References (if needed)

Following implementation of PEW the number of unplanned admissions to PICU rose but were a smaller proportion of total PICU admissions. Mortality among unplanned admissions dropped.
Background

Building new Pediatric and Neonatal Intensive Care Units (PICU and NICU) poses many challenges. One major challenge is caused by the new recommendations on ICU construction and public opinion: the demand of single-bed, family-centered rooms.

Objectives

The doors of such can and will be closed at times, which will have major implications for patient alarm communications. The workflow of the nurses will change drastically as nurses simultaneously take care of two patients in the Netherlands. We aimed to simulate the impact of single-patient rooms and how to solve the problem of alarm communication.

Methods

To investigate the impact of single patient rooms we built a simulated single-bed setup; The simulation setup consisted of one ICU room; Philips monitoring connected with BBraun docking and Maquet ventilator; one high care room with Philips monitoring; and a separate nurse working station. The nurses were randomized to different sequences of three scenarios; doors close / doors open (both without communication device) / doors close with handheld communication device.

After each scenario the nurses answered a questionnaire.

Conclusions/Results

Twenty-one nurses (48% NICU/52% PICU) were enrolled in this training and fulfilled the questionnaires. Results showed of the questionnaire (Figure 1) indicate that without handheld device, nurses feel uncomfortable in a
closed-door scenario and consider that an unsafe work environment.

**Conclusion**

Single-bed NICU/PICU creates a necessity of communication of alarms to nurses. A standard handheld solution has major potential, but needs fine tuning if you will create a situation greater than a just sufficient solution.

**References (if needed)**

Simulation supported by J.W Burgler, employed by Royal Philip
PAEDIATRIC AND NEONATAL INTENSIVE CARE NURSING: WHY CAN'T WE GET EVIDENCE INTO NURSING PRACTICE?

ESPN7-0147

TAKING CARE OF THE VENTILATED CHILD: EVEN EXPERIENCED NURSES MAY BE SHY OF THE VENTILATOR

J. Steenhorst¹, J. Smit¹, J.W. Kuiper¹, M. van Dijk¹
¹Erasmus MC-Sophia Children's Hospital, Intensive Care-Sophia Children's Hospital, Rotterdam, The Netherlands

Background

PICU nurses have been trained to care for mechanically ventilated patients. However, in our practice we found that although nurses are familiar with the workings of the ventilators, they are reluctant to adjust ventilator settings to the patients’ status.

Objectives

We developed a ventilator checklist to provide ventilation-trainers insight in the nurses’ knowledge and need for bedside training with regard to patient-ventilator interactions.

Methods

In this study ICU nurses with at least one year experience after completing their PICU training were asked to complete a dedicated ventilator checklist after their shift related to a patient they cared for during that shift. The checklist consists of 3 parts: 1) current ventilator settings and patient characteristics 2) the evaluation of the current ventilator settings and 3) options for weaning or fine-tuning of the ventilator settings. Descriptive statistics were performed.

Conclusions/Results

Fifty surveys were collected from September to November 2016. Analysis revealed that nurses had difficulty assessing the Inspiration: Expiration ratios (n=16; 32%), curves and loops (n=11; 22%) and chest X-rays (n=7; 14%). Also, the percentage of missing data for these items ranged from 8 to 20%. For n=21 (42%) of the patients the ventilator settings were adapted based on the results of the checklist.

These results confirm the need for ongoing bedside training even for experienced PICU nurses.

References (if needed)
DEDICATED NURSING TEAM REDUCES CENTRAL LINE RELATED COMPLICATIONS IN THE NEONATAL INTENSIVE CARE UNIT (NICU)

O. Levit¹, V. Shabanova², M. Bizzarro³
¹Yale University, Pediatrics, New Haven, USA
²Yale Center for Analytical Science, Public Health, New Haven, USA
³Yale University School of Medicine, Pediatrics, New Haven, USA

Background

Percutaneously inserted central catheters (PICC) are vital for the care of infants in the NICU. Their use may be associated with significant complications. In an effort to reduce complications, a NICU nursing-based PICC team was created and fully implemented in January, 2013 at Yale New Haven Hospital (YNHH).

Objectives

To evaluate the impact of a dedicated nursing PICC team on central line-related complications.

Methods

Prospective observational cohort with pre/post intervention study design.

Methods: A prospective electronic database containing multiple variables related to central lines was utilized to determine the impact of implementation of a nursing-led PICC team on rates of PICC-related complications per 1000 central line days. Baseline data collected from January 1, 2009 through June 30, 2011 were compared with data from January 1, 2013 through June 30, 2015. Complications included central line-associated blood stream infection, effusion, infiltration, obstruction, and phlebitis. Random intercept Poisson and logistic regression models were used for count and binary outcomes respectively.

Conclusions/Results

Baseline data on 625 PICC lines inserted in 325 infants were compared with 630 PICC lines in 406 infants inserted by an RN-based central line team. Among 800 successful PICC lines in both periods (N=528 infants), the overall observed central-line related complication rate decreased from 12.8 to 5.5 per 1000 line days after implementation of a RN-based central line team, with specific reductions noted in phlebitis (p<0.0001).

Conclusions: A dedicated nursing PICC team, skilled in both insertion and certain aspects of central line maintenance reduced line-related complications.

References (if needed)
PROCALCITONIN (PCT) - A POSSIBLE MARKER FOR LATE-ONSET SEPSIS AND NECROTIZING ENTEROCOLITIS IN PRETERM INFANTS

O. Levit1, M. Posner1, V. Shabanova2, H. Rinder3, V. Bhandari4

1Yale University School of Medicine, Pediatrics, New Haven, USA
2Yale Center For Analytical Sciences, Public Health, New Haven, USA
3Yale University School of Medicine, Laboratory Medicine, New Haven, USA
4Drexel University College of Medicine, Pediatrics, Philadelphia, USA

Background

PCT is an acute phase reactant that has been shown to increase early in bacterial infection, but also in other inflammatory states.

Objectives

To determine the clinical utility of PCT as a screening tool for late-onset sepsis in preterm infants.

Methods

Preterm infants delivered between March 2015 to October 2016 at Yale New Haven Hospital were prospectively enrolled and had PCT levels measured at the time of evaluation for suspected late-onset sepsis. Analyses were performed using the Wilcoxon Rank Sum Test and ROC curves.

Conclusions/Results

A statistically significant difference was found in the PCT level between infants with positive blood cultures (BC) or clinical sepsis (median value 3.64ng/ml, n=23) and infants with no sepsis (0.56ng/ml, n=13) (p=0.0002). In addition, significantly higher PCT levels (median levels of 29.7ng/ml) were noted in seven infants who had necrotizing enterocolitis, but had negative BC. A cut-off value of PCT of ≥1.48ng/ml for BC positive cases had a sensitivity/specificity of 80% and 73%, respectively, a NPV of 90% and an AUC (area under curve) of 82%. For the BC positive and clinical sepsis group a cut-off value of PCT >1ng/ml had a sensitivity/specificity of 78% and 85%, respectively, with a PPV of 90% and an AUC of 88%.

Conclusion: PCT may be an important marker for late-onset neonatal sepsis in the premature infant. Elevation of PCT in infants with NEC suggests that it may also be a marker for this condition, but further studies are necessary.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS: TOXIC SHOCK AND IMMUNOGLOBULINS: WHAT ARE THE EVIDENCES?

ESPN7-0153

PROGNOSTIC VALUES OF PLASMA N-TERMINAL PRO-BRAIN Natriuretic Peptide (NT-proBNP) AMONG PEDIATRIC PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK.

P. Phan¹, T. Ha¹, M. Tran²
¹Vietnam National Children's Hospital, Medical Intensive Care Unit, Hanoi, Vietnam
²Vietnam National Children's Hospital, Biochemistry Department, Hanoi, Vietnam

Background

The levels of plasma NT-proBNP and its prognostic values for outcomes of pediatric sepsis are unclear.

Objectives

To determine the prognostic values of NT-proBNP on mortality of pediatric sepsis.

Methods

Seventy-one children with sepsis admitted to the National Children's Hospital, Hanoi, Vietnam, from November 2015 to September 2016 were enrolled. Plasma NT-proBNP levels were measured on admission by ELISA technique. Patient's demographic, clinical and laboratory parameters, basic hemodynamic data, and vasoactive-inotropic (VIS) score were collected daily. Ejection Fraction (EF) of left ventricle was measured by echocardiography within 24 hours of admission. Patients were follow-up until hospital discharge or 28 days in intensive care unit.

Conclusions/Results

The levels of NT-proBNP were higher among septic shock (median 1119.0 pmol/L, IQR, 208.9-4083.0) and non-survivors (median 1899.5 pmol/L, IQR 934.5-4278.8) compared to severe sepsis (median 273.0 pmol/L, IQR, 106.0-1455.0), p=0.03, and survivors (median 176.0 pmol/L, IQR 101.4-5289.5), respectively. The receiving operating curve (ROC) of NT-proBNP levels for mortality resulted in AUC of 0.85 (95% CI 0.77-0.94  p<0.001).

There were significant correlations between NT-proBNP level with: PRISM-III score (r= 0.36, p= 0.002), PELOD score (r= 0.40, p= 0.001), Lactate (r=0.33, p=0.005), Procalcitonin (r= 42, p=0.004), and max VIS (r= 0.51, p=0.001). NT-proBNP levels were significantly higher among septic patients with EF <50% (median 3564.5 pmol/L, IQR 909.5-4488.0 pmol/L) than those with EF> 50% (median 273.0 pmol/L, IQR 113.4-1236.0). In logistic regression analysis, NT-proBNP levels was independent predictor of hospital mortality.

Conclusions: NT-proBNP can be used as a prognostic marker for mortality among pediatric patients with sepsis.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS: TOXIC SHOCK AND IMMUNOGLOBULINS: WHAT ARE THE EVIDENCES?

ESPN7-0397

FREQUENCY OF ORGAN DYSFUNCTION AND IMPACT ON MORTALITY IN CHILDREN DEFINED AS BACTERIAL SEPSIS – THE SWISS PEDIATRIC SEPSIS STUDY

L.J. Schlapbach\textsuperscript{1}, K. Posfay-Barbe\textsuperscript{2}, E. Giannoni\textsuperscript{3}, M. Stocker\textsuperscript{4}, C. Kuehni\textsuperscript{5}, U. Heininger\textsuperscript{6}, S. Bernhard-Stürmann\textsuperscript{7}, P. Hasters\textsuperscript{8}, A. Niederer-Loher\textsuperscript{9}, C. Kahler\textsuperscript{10}, W. Baer\textsuperscript{11}, C. Relly\textsuperscript{11}, C. Aebi\textsuperscript{12}, C. Berger\textsuperscript{11}, P. Agyeman\textsuperscript{12}

\textsuperscript{1}Paediatric Critical Care Research Group- Mater Research- University of Queenslan, Paediatric Intensive Care Unit- Lady Cilento Children’s Hospital, Brisbane, Australia
\textsuperscript{2}University Hospitals of Geneva and University of Geneva, Department of Pediatrics- Children’s Hospital of Geneva, Geneva, Switzerland
\textsuperscript{3}Lausanne University Hospital and University of Lausanne, Service of Neonatology, Lausanne, Switzerland
\textsuperscript{4}Children’s Hospital Lucerne, Children’s Hospital Lucerne, Lucerne, Switzerland
\textsuperscript{5}Institute of Social and Preventive Medicine- University of Bern, Institute of Social and Preventive Medicine- University of Bern, Bern, Switzerland
\textsuperscript{6}University of Basel Children’s Hospital, Division of Infectious Diseases and Vaccines- University of Basel Children’s Hospital, Basel, Switzerland
\textsuperscript{7}Children’s Hospital Aarau, Children’s Hospital Aarau, Aarau, Switzerland
\textsuperscript{8}University Hospital Zurich, Department of Neonatology- University Hospital Zurich, Zurich, Switzerland
\textsuperscript{9}Children’s Hospital of Eastern Switzerland, Children’s Hospital of Eastern Switzerland, St. Gallen, Switzerland
\textsuperscript{10}Graubuenden Cantonal Hospital, Neonatal and Pediatric Intensive Care Unit- Graubuenden Cantonal Hospital, Chur, Switzerland
\textsuperscript{11}University Children’s Hospital of Zurich, Division of Infectious Diseases and Hospital Epidemiology, Zurich, Switzerland
\textsuperscript{12}Inselspital- University Hospital Bern- University of Bern, Department of Pediatric, Bern, Switzerland

Background

Recently, the definition of sepsis in adults has been refined as life-threatening organ dysfunction caused by a dysregulated host response to infection.

Objectives

We analysed the relationship of number of organ dysfunctions with case fatality rate in a prospectively collected dataset on sepsis in children.

Methods

Prospective observational cohort study of newborns and children <17 years with blood culture-proven sepsis admitted to ten paediatric hospitals in Switzerland between 9/2011 and 12/2015. Organ dysfunctions were defined according to the 2005 pediatric consensus definition.

Conclusions/Results

Of 1204 confirmed bacterial sepsis episodes, organ dysfunction was present in 474 (39%). In 590/1204 (49%) episodes patients were admitted to the intensive care unit. 323/590 (55%) patients required mechanical ventilatory support and in 90 (7.5%) the outcome was fatal in the first 30 days after sepsis onset. The odds ratio of death increased by 2.9 (95%CI 2.5 - 3.5, p < 0.001) for every additional organ dysfunction from a case fatality rate of 0.7% (95%CI 0.3 - 1.7) in 730 episodes with no organ dysfunction to 46% (95%CI 34.4 - 58.7) in 69 episodes with 4 or more organ dysfunctions.
Conclusion: Only a minority of children presenting with bloodculture-proven sepsis as per 2005 definitions had any organ dysfunction. Presence and number of organ dysfunctions were strongly associated with mortality, and should be considered for future sepsis definitions to discriminate children with infection from children with life-threatening dysregulated host response to infection.

References (if needed)
RESUSCITATION: CPR BEST PRACTICE

ESPN7-0086

NATIONAL SURVEY OF AIRWAY MANAGEMENT AND CAPNOGRAPHY IN UK PAEDIATRIC AND NEONATAL INTENSIVE CARE UNITS: PICNIC SURVEY

K. Foy1, E. Mew1, J. Bower1, P. Knight2, K. Herneman1, S. Dean2, F. Kelly1, T. Cook1

1Royal United Hospitals Bath NHS Foundation Trust, Anaesthesia and Intensive Care, Bath, United Kingdom
2Bristol Royal United Hospital for Children, Paediatric Intensive Care, Bristol, United Kingdom

Background

The Fourth National Audit Project of the Royal College of anaesthetists (NAP4) found that airway complications were 60 times more likely to occur in adult intensive care units (ICUs) than in operating theatres, and were more likely to result in death or significant brain injury (ICU 61%, theatre 14%).[1] Lack of capnography was found to be contributory in more than 70% of ICU-related deaths.[1] NAP4 recommendations included preparation for airway difficulty, immediately available emergency airway equipment and routine end-tidal capnography, and are widely accepted in adult ICU practice. We investigated penetration of NAP4 recommendations into United Kingdom (UK) paediatric and neonatal intensive care (PICU/NICU) practice.

Objectives

A national survey of UK PICU and NICU airway management practice, referenced against NAP4 recommendations.

Methods

A structured telephone survey, with a senior member of medical or nursing staff in all UK PICUs and NICUs in January-October 2016.

Conclusions/Results

<table>
<thead>
<tr>
<th></th>
<th>PICU</th>
<th>NICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response rate</td>
<td>100% (27/27)</td>
<td>90% (129/143)</td>
</tr>
<tr>
<td>Difficult airway management</td>
<td>67% (18/27)</td>
<td>40% (52/129)</td>
</tr>
<tr>
<td>policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult intubation trolley</td>
<td>96% (26/27)</td>
<td>50% (65/129)</td>
</tr>
<tr>
<td>Pre-intubation checklist</td>
<td>70% (19/27)</td>
<td>42% (54/129)</td>
</tr>
<tr>
<td>Videolaryngoscopy available</td>
<td>55% (15/27)</td>
<td>29% (37/129)</td>
</tr>
<tr>
<td>Capnography available</td>
<td>100% (27/27)</td>
<td>46% (60/129)</td>
</tr>
<tr>
<td>Capnography always available</td>
<td>100% (27/27)</td>
<td>19% (24/129)</td>
</tr>
</tbody>
</table>

Death or harm associated with airway management difficulty or displacement in the last 5 years was reported by 18% PICUs and 26% NICUs.

In conclusion, major gaps in optimal airway management exist in UK PICUs and to a larger extent in UK NICUs.

References (if needed)
RESUSCITATION: CPR BEST PRACTICE

ESPN7-0182

TIDAL VOLUMES OF PRETERM INFANTS DURING INITIAL STABILIZATION WITH MASK POSITIVE PRESSURE VENTILATION IN DELIVERY ROOM

M. Carron Bermejo1, G. Zeballos Sarrato1, N. Oikonomopoulou1, S. Zeballos Sarrato1, C. Ramos Navarro1, M. Sanchez Luna1

1Hospital Gregorio Maranon, Neonatology, Madrid, Spain

Background

Approximately 50% of preterm <32 weeks require respiratory stabilization at birth. Usually we don’t have data on delivered tidal volumes (VT), which is variable during stabilization with positive pressure inflations (PPI). Respiratory function monitor (RFM) allows to measure VT and impairing the effectiveness of ventilation.

Objectives

To measure VT and describe the interactions between spontaneous breaths and positive pressure ventilation (PPV) inflations during stabilization of preterm infants in the delivery room.

Methods

Observational study of infants <32+6 weeks gestational age at birth, born between October 2014-June 2016, in a single tertiary center receiving mask PPV in the delivery-room. The RFM display was not visible to the resuscitator.

RFM and videos were recorded during the first 10 min of stabilization with mask respiratory support, to evaluate inflations and spontaneous breaths between inflations and during CPAP. Parameters measured included VT, pressures and air flow. We analyzed data stratifying by gestational age (<28 weeks or ≥28).

Conclusions/Results

A total of 4885 inflations and breaths from 32 preterm infants were analyzed. Expired VT were greater during inflations than spontaneous breaths during CPAP. When we analyzed data stratifying by gestational age (<28 or ≥28 weeks) this difference is higher in more premature, and no statistical difference in ≥28 weeks. VT used in VPPI in <28 weeks are >8 mL/kg.

<table>
<thead>
<tr>
<th></th>
<th>CPAP 3952 breaths</th>
<th>VPPI 3933 breaths</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expired tidal volumes (mL/kg) Mean±SD</td>
<td>5.15 [3.54]</td>
<td>8.89 [2.88]</td>
<td>0.04</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gestational Age (weeks) Mean±SD</th>
<th>&lt;28 weeks, n=14</th>
<th>≥28 weeks, n=18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (gr) Mean±SD</td>
<td>817.5 [140]</td>
<td>1416.9 [281]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>CPAP 944 breaths</th>
<th>VPPI 526 breaths</th>
<th>p</th>
<th>CPAP 948 breaths</th>
<th>VPPI 405 breaths</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expired tidal volumes (mL/kg) Mean±SD</td>
<td>4.97 [0.4]</td>
<td>9.96 [2.11]</td>
<td>&lt;0.01</td>
<td>5.33 [2.2]</td>
<td>6.5 [2.5]</td>
<td>0.18</td>
</tr>
</tbody>
</table>
Conclusion: Tidal volumes delivered during PPV inflations are significantly greater than those generated during spontaneous breathing by an infant on CPAP. This difference is higher in more premature newborn. Infant's gestational age influence tidal volumes during resuscitation with PPV.

References (if needed)
RESUSCITATION: CPR BEST PRACTICE

ESPN7-0184

RESPIRATORY FUNCTION MONITOR GUIDANCE TO IMPROVE INITIAL STABILIZATION IN PRETERM INFANTS
N. Oikonomopoulou\textsuperscript{1}, G. Zeballos Sarrato\textsuperscript{1}, M. Carrón Bermejo\textsuperscript{1}, S. Zeballos Sarrato\textsuperscript{1}, A. Pérez Pérez\textsuperscript{1}, M. Sánchez Luna\textsuperscript{1}
\textsuperscript{1}Hospital Gregorio Marañón, Neonatology Department, Madrid, Spain

Background

Approximately 50\% of preterm infants <32 weeks require respiratory stabilization at birth.

Objectives

Display that tidal volume and gas flow with a respiratory function monitor (RFM) during stabilization of preterm in the delivery-room improve mask ventilation and reduce the need for surfactant in the first 72 hours of life.

Methods

Randomized controlled trial between October 2014 and June 2016. Newborns <32+6 weeks who received mask ventilation in the delivery-room were included and randomized to have RFM either visible or masked. RFM and videos recorded were examined to review the first 10 minutes of stabilization for each infant breath by breath.

Conclusions/Results

Results: Recordings of 64 preterm infants were analyzed: 32 infants RFM visible and 32 masked. The data of the breaths analyzed for each group are presented on the table 1. Median expired volume tidal (VTe) was lower in RFM visible group (4.95 mL/kg [DS1.97] vs 5.85 mL/kg [DS2.54]; p=0.30). Minute ventilation (0.22[DS0.15] vs 0.15[DS0.7][L/kg/min]) and ventilation rate (40[DS11.2] vs 33[DS8.5] bpm), was higher in masked RFM group (p=0.09, p= 0.02) with less EtCO2 [29.74mmHg (DS8) vs 41.83mmHg (DS13.9) (p=0.012)].

Intubation in the delivery room was performed in 14.28\% of the visible group and in 5\% of the masked (p= 0.74).

By 72 hours of age, there was no significant difference between the 2 groups in proportion of infants who were intubated (p=0.67) and needed surfactant (p=0.73).

Conclusión: RFM identifies adverse events during mask ventilation and reduces hiperventilation, but there are no differences regarding the need of intubation or surfactant administration.
Table 1: Breaths analyzed in each group

<table>
<thead>
<tr>
<th>Event Type</th>
<th>CPAP: 4,927 breaths</th>
<th>VPPI: 534 breaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFM Visible</td>
<td>RFM Masked</td>
<td>RFM Visible</td>
</tr>
<tr>
<td>EVENT ADVERSE</td>
<td>202 (10.74%)</td>
<td>492 (16.74%)</td>
</tr>
<tr>
<td>MASK REPOSITION</td>
<td>119/202 (59%)</td>
<td>69/492 (14%)</td>
</tr>
</tbody>
</table>

References (if needed)
CONSENT IN PAEDIATRIC INTENSIVE CARE: A QUALITATIVE STUDY OF PARENTAL AND PROFESSIONAL VIEWS

P. Aubugeau-Williams¹, J. Brierley²
¹, London, United Kingdom
²Great Ormond Street Hospital for Children NHS Foundation Trust, Intensive Care, London, United Kingdom

Background

There is no established tradition of seeking consent in intensive care units (ICU), probably reflecting the specialist life-saving therapies involved and the usual incapacity of the ICU-patient. With critically ill children, someone with capacity to consent is usually present, but rarely does so.

Objectives

The study aimed to investigate staff and parents’ views about consent to assess whether there was a need for a more formal consent system and to identify local good practice to share with other units.

Methods

This qualitative project was based in a specialist children’s hospital with three intensive care units. Semi-structured interviews were completed with nine members of ICU staff and fifteen parents of children recently admitted to ICU. A phenomenological approach was used during analysis with themes emerging until saturation.

Conclusions/Results

Themes from staff included inconsistency and protecting parents from the burden of consent. Themes from ICU-parents included maintaining control and feeling empowered. Overall, mutual trust between families and ICU teams underpins satisfaction with the current system and neither group expressed a strong desire to introduce written consent for ICU-care. However, some conflicting views emerged between staff and parents: whilst staff judged consent to be an emotional burden for families, parents found decision-making processes a means of coping, empowerment and maintaining control. Staff were divided about which ICU-interventions it was deemed necessary to obtain written consent for, and for which ideally this should be the case.

Parents want to be updated regularly on ICU and share decision-making but do not want to explicitly consent.

References (if needed)
THE FIRST FAMILY CONFERENCE AT THE ADMISSION OF A CHILD IN THE PEDIATRIC INTENSIVE CARE UNIT: AN EVERYDAY CHALLENGE

A. Béranger¹,², C. Pierron³, L. De Saint Blanquat⁴, N. Bouazza¹,⁵,⁶, S. Jean⁷, H. Chappuy⁶,⁸

¹Clinical Investigation Centre-0901 Inserm- Cochin-Necker Enfants-Malades teaching hospital, Paris Descartes University- Sorbonne-Paris Cité, Paris, France
²Paris Descartes University, Medical ethics and forensic medicine laboratory, Paris, France
³Pediatric and neonatal intensive care unit- Luxembourg teaching hospital, Luxembourg, Luxembourg, Luxembourg
⁴Necker Enfants-Malades teaching hospital, Department of Pediatric Intensive Care Unit, Paris, France
⁵Tarnier hospital, Clinical Research Unit, Paris, France
⁶EA 7323, Research team, Paris, France
⁷Armand Trousseau teaching hospital, Department of Pediatric Intensive Care Unit, Paris, France
⁸Armand Trousseau teaching hospital, Department of Pediatrics emergency, Paris, France

Background

Parents of critically ill children meet the physicians to receive medical information on their child’s status and treatments, and to discuss the prognosis. The format of these meetings in the pediatric intensive care unit (PICU) is the family conference (FC).

Objectives

To evaluate the parents’ information and their comprehension during the first FC, more than 48 hours and less than 15 days after the PICU admission.

Methods

This prospective observational qualitative study took place in three university-affiliated PICU in Paris, France. Forty-two parents of 30 children admitted in the PICU were interviewed. The child’s physician and nurse completed a questionnaire. We assessed the information given by the HCPs (physicians and nurses), and we evaluated the parents’ comprehension by comparing the parents’ and physicians’ responses to different items. Comprehension was defined in 3 categories: excellent, fair and poor.

Conclusions/Results

Parental excellent comprehension was frequent for the affected organ (n=25/28, 89.3%), the reason of hospitalization (n=18/28, 64.3%) and the diagnosis (n=19/30, 63.3%), but rare for the further investigations (n=8/21, 38.1%) and the treatments (n=10/30, 33.3%). During the FC, the physicians didn’t mention the prognosis for 12 children (40%). Despite the absence of information according to the physicians, the prognosis was completely understood by 26 families (86.7%). Nurses remained silent during the FC, but 26 of them (86.7%) contributed to give information, outside the FC, especially about the treatments (n=15, 50%). Communicating with the parents is an everyday challenge for the HCPs, which must be faced.

References (if needed)

With the support of the Société Française de Pédiatrie
TRAUMATIC SPINAL CORD INJURY (SCI) IN PEDIATRIC INTENSIVE CARE (PICU) PATIENTS AT A MAJOR TRAUMA CENTER IN THE UK

A. Jain¹, L. Bedetti², S. Manna¹
¹St. Georges Hospital, Paediatric ICU, London, United Kingdom
²St Georges Hospital, Paediatric ICU, London, United Kingdom

Background

Literature reports a very low incidence of SCI in children (1%) presenting with polytrauma, 3-34% of that is SCIWORA (Spinal Cord Injury without radiological abnormality)¹. However high quality pre-hospital care in recent years has enhanced survival of the most severely injured and they are intuitively more at risk of SCI including SCIWORA.

Objectives

1. Review the incidence of CSI in children admitted to PICU with polytrauma.
2. Describe radiological findings and outcome of these injuries.

Methods

We retrospectively reviewed PICU database to identify children admitted with a diagnosis of major trauma between January 2011 and August 2016. Children at risk of CSI were identified according to “NICE clinical guideline - Spinal Injury assessment and initial management, 2016”² by reviewing case notes. Patient demography, initial management, radiological and clinical assessment for SCI and outcome data were analysed.

Conclusions/Results

Result: A total of 215 children (age 17 days to 16 years; mean 7.5 years) with polytrauma were admitted. 100 children were at risk of C-spine injury. 83 patients underwent 91 radiological investigations (CT = 71, MRI =11, X-ray =9). 12 patients had radiological evidence of CSI. 11/12 had neurological deficit. 2/12 died of CSI, 3 remained paralyzed; 2 have residual paralysis and 4 made good functional recovery. No SCIWORA was identified.
### Conclusion
Incidence of SCI in a PICU is significantly higher than commonly reported and improvement in CT and MRI technology may have eliminated the incidence of SCIVORA in this cohort of patients.

### References (if needed)
Background

Cerebral palsy (CP) is a multifactorial movement syndrome with signs and symptoms dissimilar caused by perinatal damage or abnormal development of the brain. Scoliosis is a frequent manifestation of this syndrome and its surgical correction has high risk factors for postoperative complications.

Objectives

The objective of this study was to study the incidence of postoperative complications and the correlation with risk factors in patients with cerebral palsy after scoliosis surgery in Bambino Gesù Hospital.

Methods

All scoliosis surgeries consecutively executed from September 2015 to September 2016 in children with CP were reviewed retrospectively. Preoperative comorbidities, perioperative course and postoperative complications were recorded.

Conclusions/Results

Nineteen patients were identified with a mean age of 13±4.2 years. Ten out of 19 (55.5%) patients had at least a complication. Seven patients (36.8%) had a respiratory complication, four patients (21%) had a wound infection and two patients had (10.5%) Sepsis. The operative time and the estimated blood loss were varied in patients with complication (314 min ± 90 , 800 ml ± 300) and without any complication (274,1 ± 66,15 , 610 ± 407).

The postoperative complications increased intensive care (1.6 VS 1.12 days) and Hospital (12.5 VS 35.5 days) stay.

We conclude that the respiratory complications such as chest infection or reintubation and wound infection are the most common postoperative complications in children with CP undergoing scoliosis surgery. Our review showed that the duration of Intensive Care and Hospital stay was prolonged by presence of these complications.

References (if needed)
NEURO CRITICAL CARE

ESP7-0414

BUNDLE STRATEGY FOR REDUCING INTRAVENTRICULAR HAEMORRHAGE INCIDENCE IN VERY PRETERM AND/OR VERY LOW BIRTH WEIGHT NEONATES

F. Pinto1,2, C. Investigators3,4,5,6, M. Alves7, D. Virella7, A. Abrantes8, M.T. Neto9
1Centro Hospitalar Lisboa Central - Maternidade Dr Alfredo da Costa, Neonatal Intensive Care Unit, Lisboa, Portugal
2Universidade NOVA de Lisboa, Escola Nacional de Saúde Publica, Lisboa, Portugal
3Centro Hospitalar Lisboa Central - Maternidade Dr Alfredo da Costa, Obstetrics and Neonatal Intensive Care Unit, Lisboa, Portugal
4Hospital Garcia de Orta, Obstetrics and Neonatal Intensive Care Unit, Almada, Portugal
5Centro Hospitalar Lisboa Ocidental - Hospital S. Francisco Xavier, Obstetrics and Neonatal Intensive Care Unit, Lisboa, Portugal
6Hospital Fernando Fonseca, Obstetrics and Neonatal Intensive Care Unit, Amadora, Portugal
7Centro Hospitalar Lisboa Central, Centro de Investigação, Lisboa, Portugal
8Universidade NOVA de Lisboa, Escola Nacional de Saúde Publica, Lisboa, Portugal
9Universidade NOVA de Lisboa, NOVA Medical School, Lisboa, Portugal

Background

Intraventricular haemorrhage (IVH) is associated with adverse neurodevelopmental outcome in very preterm and very low birth weight newborns (VPT/LBWNB). Its incidence remained static in the last decade, the most severe forms reaching 10% of NB at risk(1).

Objectives

We assessed the effectiveness of a clinical bundle strategy in reducing severe grade IVH incidence in VPT/LBWNB.

Methods

A multicentre quasi-experimental trial of 2 groups of NB with less than 32 weeks of gestational age (GA) or 1500g of birth weight (BW) was performed in 4 tertiary NICU in Great Lisbon Region, Portugal. A historical cohort was compared with a prospective intervention group after the implementation of a bundle strategy: optimized prenatal steroids; delayed cord clamping; NB insertion in a polyethylene bag; preferred non-invasive ventilation; minimal handling care.

Conclusions/Results

Baseline characteristics in both groups were similar for NB and birth conditions. Median (quartile), adherence to bundle (%) was 85 (69-92). Incidence rates of IVH > II- (11.3% vs. 11.8%) and mortality (10.5% vs. 10.8%) were similar, but a tendency was found for the higher the adherence to the bundle the lower the IVH>II incidence rate. Late cord clamping was the component of the bundle with the highest impact on IVH (OR 0.120; 95% CI 0.016-0.912; p=0.040).

Conclusions: The incidence of severe IVH can be reduced with high adherence to a standardized protocol. Sustaining improvement is a challenging issue in a multidisciplinary team approach.

References (if needed)

Background

Nephrogenesis is active until 36 weeks’ gestation and may be negatively affected by preterm birth. The assessment of renal function in preterm newborns is challenging and little is known about potential endogenous biomarkers other than creatinine, such as cystatineC (CysC).

Objectives

Aim of the study was to evaluate creatinine and CysC levels in preterm newborns <32 weeks’ gestation.

Methods

In the period September 2015–April 2016 blood samples were obtained on the third day of life from newborns with gestational age (GA) <32 weeks, and creatinine and CysC levels were measured. Renal ultrasounds were performed to assess kidney dimensions with calculation of the kidney volume by the equation for an ellipsoid: volume = length x width x depth x π/6. Total kidney volume (TKV) was calculated by the sum of left and right kidney volumes. Weight and length were measured and body surface area (BSA) was calculated.

Conclusions/Results

Twenty-nine newborns were enrolled (M:F=15/14; mean GA 27±1, range 25±2–31±5). Mean creatinine level was 0.92±0.27 mg/dl, mean CysC level was 1.66±0.33 mg/l. No differences were found for creatinine and CysC according to gender. Creatinine was negatively correlated with GA (R=-0.410, p=0.02) and positively correlated with TKV (R=0.515, p=0.006). CysC was not correlated with GA, weight, length, BSA and TKV. Creatinine levels were directly correlated with CysC levels (R=0.672, p=0.001), also when adjusted for GA, weight, length and BSA (p=0.001 for each model).

In preterm newborns <32 weeks’ gestation CysC seem to be a biomarker of renal function independently of GA, gender, anthropometric measures and kidney volume.

References (if needed)
EXPERIENCE OF A REGIONAL NEONATAL TRANSPORT SERVICE IN MANAGING CARDIAC TRANSFERS OVER A SEVEN YEAR PERIOD.

N. Subbaraya1, J. Kapur2, V. Rasiah3, A. Philpott3
1Birmingham Women’s NHS Foundation Trust, Neonatology, Birmingham, United Kingdom
2Royal Stoke University Hospital, Neonatology, Stoke-on-Trent, United Kingdom
3Birmingham Women’s Hospital, Neonatology, Birmingham, United Kingdom

Background

Neonates requiring transfer for cardiac conditions form a significant proportion of case-load for a transport service. Appropriate level of training and expertise by the team ensures a safe transfer process. Paediatricians and Neonatologists with an expertise in Cardiology also play a pivotal role in supporting their local neonatal units in managing these babies effectively.

Objectives

To evaluate the experience of the Neonatal transport service (NTS) in managing cardiac transfers over the last seven years and identify any emerging trends in these transfers.

Methods

All babies transferred by the NTS for cardiac reason were identified from the electronic transport database. We retrospectively reviewed the data over a period of seven years from 01/01/2009 to 31/12/2015. The referring unit, time of transfer, ventilation status and need for prostaglandin-E2 were determined.

Conclusions/Results

A total of 506 transfers were conducted over the seven year period. 66.8% of babies were on prostaglandin-E2 infusion. Only 13.2% needed mechanical ventilation and 2.7% needed non-invasive ventilation in the form of NCPAP. Majority of the babies (83.6%) were self-ventilating in air.

Our results showed decline in trend in proportion of babies being moved within the first 24 hours of life from neonatal units over the last seven years.
Conclusion: Significant proportion of babies are being transported to regional cardiac centres after the first 48 hours of life over the last 4 years as opposed to previous years. This may reflect enhanced confidence with the early management of babies with cardiac diseases at local hospital but it needs further exploration in to the reasons.

References (if needed)
A 5 YEAR REVIEW OF ALL ARRHYTHMIAS REFERRED TO A UK REGIONAL PAEDIATRIC CRITICAL CARE TRANSPORT SERVICE

C. Fulton¹, K. Parkins²

¹Alder Hey Children’s NHS Foundation Trust, PICU, Liverpool, United Kingdom
²North West and North Wales Paediatric Transport Service, Birchwood Park, Warrington, United Kingdom

Background

NWTS (North West and North Wales Paediatric Transport Service) provide critical care advice, stabilisation and transfer to 29 referring centres across the North west of England and North Wales (since 2010). Children suffering with cardiac arrhythmias can require critical care support and transfer to tertiary centres.

Objectives

To review diagnoses, management and outcomes of children with arrhythmias referred to NWTS over 5 years.

Methods

We retrospectively reviewed all referrals to NWTS (October 2010 to December 2015) with cardiac arrhythmia (excluding systolic cardiac arrest).

Conclusions/Results

Of 5801 referrals, arrhythmias (n 37) make up a small proportion of NWTS workload (0.6%) with SVT being the most common presenting arrhythmia (n 27, 73%), 4 with complete heart block (11%), and 2 each with VT, VF and atrial flutter (all 7%).

The median age of children with SVT was 21 days (IQR 12 days - 1.5 years) and median weight 4.1 kg (IQR 3.5 - 8). The mean age of those with VT was 12.5 ± 0.7 years, VF 5.7 ± 7.4 years, CHB was 9 ± 9 months and atrial flutter was 1 day.

Regarding those with SVT, 52% (n 14) were haemodynamically stable, 48% (n 13) were in shock. 89% patients with SVT were refractory to adenosine and required multiple therapies. DC shock was used in 6 patients (23%) and had a sustained response in 4 (67%). Amiodarone was given to 6 patients (22%) with a sustained response in none.

All patients transferred with arrhythmias survived 24 hour follow up post transfer, despite the most common arrhythmia, SVT, being particularly refractory to multiple therapies.

References (if needed)
INTERHOSPITAL TRANSPORT OF PAEDIATRIC PATIENTS IN DENMARK

K. Nystrup1, M. Breindahl2, P. Pooririsak2, P. Hallas1
1Rigshospitalet- Copenhagen University Hospital, Juliane Marie Centre - Anaesthesia and Surgical Clinic Department 4013, Copenhagen, Denmark
2Rigshospitalet- Copenhagen University Hospital, Department of Neonatology, Copenhagen, Denmark

Background

No national guidelines exist in Denmark regarding interhospital transport of critically ill children, nor does a formalized training programme aimed at physicians undertaking transfers of these patients.

Objectives

The aim of this study is to disclose which physicians actually accompany critically ill children during interhospital transports nationwide and whether the physicians have adequate clinical skills to perform interhospital transfers.

Methods

A questionnaire was sent to the youngest paediatrician on call at every hospital in Denmark receiving paediatric emergencies.

Conclusions/Results

Seventeen paediatric departments were contacted with a response rate of 100%. All departments indicated that they performed interhospital transport of paediatric patients.

When presented with 5 cases, great heterogeneity in the choice of transport physician and accompanying staff was seen. With increasing severity, fewer paediatric physicians were willing to transport the children (24 to 6 percent). Irrespective of the degree of severity, more transports were delegated to anaesthesiologists than performed by paediatricians.

Paediatricians who agreed to transport neonates had adequate competencies. In cases with older children, only 0 to 75 percent of physicians who would do the transport had adequate clinical skills and experience in emergency respiratory and cardiovascular management.

Training in interhospital transport was offered by one department, and six departments (35 percent) had local guidelines describing the management of paediatric transport.

Conclusion:
This study shows that there is room for improvement in the management of interhospital transport of critically ill children in Denmark.

References (if needed)
WORK OF BREATHING AND RESPONSE TO PRONE POSITION IN CHILDREN WITH SEVERE BRONCHIOLITIS

F. Baudin1,2, G. Emeriaud3, S. Essoun4, A. Portefaix5,6, J. Beck7, E. Javouhey1, C. Guerin8
1Hôpital Femme Mère Enfant - Hospices civils de Lyon, Réanimation pédiatrique, Lyon, France
2Université Claude Bernard Lyon 1, Umrestte - IFSTTAR, LYON, France
3CHU Sainte-Justine, Pediatric intensive care unit, Montreal, Canada
4CHU Sainte-Justine, Pediatrics, Montreal, Canada
5Hôpital Femme Mère Enfant, Réanimation pédiatrique, Lyon, France
6Hospices civils de Lyon, Centre d'Investigation clinique, LYON, France
7St Michael's Hospital, Keenan Research center, Toronto, Canada
8Hôpital de la Croix-Rousse- Hospices civils de Lyon, Réanimation médicale, LYON, France

Background

Prone position (PP) may improve gas exchange and respiratory mechanics in adults as in children.

Objectives

We aimed to evaluate the effect of PP on work of breathing as compared to supine position (SP) in children with severe bronchiolitis requiring non-invasive ventilation.

Methods

Fourteen infants (9 boys) were included after written informed consent (IRB n°2015- A01200–49). Flow, oesophageal pressure (CTO-2 pressure transducer, Gaeltec, Scotland) and airway pressure were simultaneously recorded (Neurovent Inc, Toronto, Canada). Measurements were done 50 minutes after positioning in PP and SP in random order, at 7 cmH2O CPAP. A response to PP was considered when PTPes was lower in PP than in SP. Data are expressed as median (first-third quartiles) and compared using the Wilcoxon two-sample paired sign test or Mann Whitney U test. A p-value below 0.05 was considered significant.

Conclusions/Results

Eight children (57%) were responders to PP and 6 were non-responders. Clinical and biological characteristics at admission were similar between responders and non-responders (table 1).

<table>
<thead>
<tr>
<th></th>
<th>Responders</th>
<th>Non-responders</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (d)</strong></td>
<td>40 [30-63]</td>
<td>24 [17-40]</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Weight (g)</strong></td>
<td>4415 [3620-4710]</td>
<td>3850 [3460-4315]</td>
<td>0.34</td>
</tr>
<tr>
<td><strong>Venous pH</strong></td>
<td>7.29 [7.23-7.31]</td>
<td>7.30 [7.27-7.34]</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Venous pCO2 (KPa)</strong></td>
<td>7.65 [7.45-8.56]</td>
<td>7.9 [7.32-8.33]</td>
<td>0.95</td>
</tr>
<tr>
<td><strong>FiO2 (%)</strong></td>
<td>33 [29-36]</td>
<td>28 [25-34]</td>
<td>0.41</td>
</tr>
</tbody>
</table>

PTPes was higher in SP in responders (379 cmH2O/s•min [360-389]) vs non-responders (204 cmH2O/s•min [142-284]) (p=0.043). In PP, PTP decreased significantly in responders (227 cmH2O/s•min [158-280], p=0.012) and did not change in non-responders (227 cmH2O/s•min [159-317], p= 0.34).

CONCLUSION: PTPes is higher in SP in responders and decreases significantly with PP. Response to PP seem influenced by the PTPes at baseline. References (if needed)
MODERATED POSTER MEDICAL 01: RESPIRATORY FAILURE/ NEURO CRITICAL CARE

ESPN7-0020

PREDICTIVE FACTORS FOR THE FAILURE/SUCCESS OF HIGH FLOW NASAL CANNULA THERAPY : IS THE SPO₂/FIO₂ RATIO USEFUL?
F. Kamit Can¹, A.B. Anil², M. Anil³, N. Zengin¹, F. Durak¹, C. Alparslan¹, Z. Goc³
¹Izmir Tepecik Research and Training Hospital, Pediatric Intensive Care Unit, Izmir, Turkey
²Izmir Katip Celebi University- Medical School- Izmir- Turkey, Pediatric Intensive Care Unit, Izmir, Turkey
³Izmir Tepecik Research and Training Hospital, Pediatric Nephrology Department, Izmir, Turkey

Background

High flow nasal cannula oxygen therapy (HFNC) is a relatively new system in providing non-invasive respiratory support.

Objectives

To determine the parameters associated with HFNC failure/success in pediatric intensive care unit (PICU).

Methods

This prospective observational study was conducted in a PICU in Turkey. We included all patients with acute respiratory distress/failure from one month to 18 years of age that were admitted to the PICU and treated with HFNC as a primary support according to the pre-established protocol. Patients were divided into two groups: HFNC responders and nonresponders.

Conclusions

204 patients participated in the study, 26 (12.7%) of which were HFNC nonresponders. The etiologies of respiratory distress/failure were: postextubation (37.2%), bronchiolitis (28.4%), pneumonia (11.7%), extrapulmonary acute lung injury (6.8%), asthma (5.8%), pulmonary edema (5.8%), pulmonary contusion (0.9%), and neuromuscular disease (1.8%). At admission, an age >120 months (p:0.024; OR:3.906; 95% CI:2.706–7.037), a higher PRISM III score (p:0.001; OR:2.071; 95% CI:1.358–3.160), a higher respiratory score (p:0.013; OR:1.616; 95% CI:1.104–2.366), and a lower SpO₂/FIO₂ (S/F) ratio (p:0.016; OR:1.047; 95% CI:1.009–1.087) were found to be predictors of HFNC failure; whereas, bronchiolitis, as an etiology of respiratory distress, was a predictor of HFNC success (p:0.004; OR:3.825; 95% CI:2.443–6.051). The achievement drive of the S/F>200 goal at 60 minutes significantly predicted the success of HFNC therapy (p<0.001;OR:8.034; 95%CI:2.981–21.657).

HFNC therapy is an effective and easy-to-use noninvasive method of respiratory support in a PICU. The S/F ratio can be used as a predictor for HFNC failure/success just before or on follow up at 60 minutes of therapy.

References (if needed)
REVIEW OF THE CLINICAL COURSE OF BRONCHIOLITIS, LENGTH OF STAY, AND OUTCOME IN CHILDREN WITH COMORBIDITIES REQUIRING PICU ADMISSION

O. Hosheh\textsuperscript{1}, E. Randle\textsuperscript{1}
\textsuperscript{1}Great Ormond Street Hospital, Critical Care unit, London, United Kingdom

Background

Bronchiolitis remains a common cause for seasonal admission to PICU with significant mortality for those with comorbidities. Concerns about its associated morbidity and cost are still a challenge.

Objectives

We aimed to compare patients with comorbidities to those with no associated morbidities (healthy group). We hypothesized that both groups behaved similarly in terms of need for respiratory support, PICU length of stay, and mortality.

Methods

In a retrospective study, we verified 80 cases admitted with bronchiolitis <2 years of age to a tertiary level PICU between 01/01/2014-30/05/2016. 37/80 (46%) patients with at least one comorbidity (prematurity<36 wks, cardiac, immunodeficiency) were identified.

Conclusions/Results

Median admission age was 2 months, IQR:(1-5.5). 74% (95%CI: 0.64-0.84) of admissions matched seasonal distribution (November-March). Level of respiratory support: non-invasive ventilation: 5%(4/80), conventional ventilation:72.5%(58/80), high frequency oscillation ventilation(HFOV): 21% (17/80), and one ECMO case. Comorbidity was a risk factor for HFOV: 65%(11/17, 95% CI: 0.42-0.88). RSV was responsible for apnoea in 16/27(59.3%, 95%CI:0.4-0.78) and oscillation in 59%(10/17, 95%CI: 0.36-0.83).

The co-morbidities group stayed longer in intensive care than did those without(10 VS 5 days, P<0.006), and there was a trend as well towards longer ventilation(6 VS 4, P<0.16).

The level of O2/respiratory support post extubation(NIV, HFNC) was even higher in the comorbidity cases (57%) VS (29%) in the healthy group (OR: 3.04, 95%CI:0.06-0.5, P<0.012).

Mortality was also significant in the comorbidities cohort: 4 cases compared to none in the healthy ones (11% VS 0%, 95%CI: 0.063-0.16, P<0.0001).

Conclusion:
Bronchiolitis in babies with comorbidities may impose high risk for mortality, longer PICU admission duration, and probable longer ventilation period.

References (if needed)
SHORT AND LONG-TERM (18 MONTHS) RESPIRATORY OUTCOMES IN NEONATES WITH VENTILATOR-ASSOCIATED PNEUMONIA

V. Dell’Orto¹, L. De Martino¹, C. Loddo¹, S. Shankar-Aguilera¹, R. Ben Ammar¹, D. De Luca¹
¹South Paris University Hospitals, Pediatrics- Neonatal Critical Care and Transportation, Clamart Paris, France

Background

Ventilator associated pneumonia (VAP) is the commonest nosocomial infection in European NICUs. There are no available data about respiratory followup of VAP neonates.

Objectives

We aim to describe respiratory outcomes of VAP neonates at discharge and after 18m.

Methods

Prospective cohort study enrolling all neonates with VAP diagnosis (n=24) and 48 non-infected controls randomly chosen amongst those hospitalized in the same period (2013-2015). All patients underwent BAL after 48h of mechanical ventilation (MV) within an infection workout. BAL culture was considered positive when having >10³ CFU of a unique microbe. Patients were followed for 18m. Short and longterm respiratory outcomes were compared between neonates classified as follows:1) with or without VAP according to CDC criteria (clinical diagnosis[1]);2) with or without both clinical diagnosis and BAL positive culture (composite diagnosis).

Conclusions/Results

Clinical and composite diagnoses were given in 24(33.3%) and 20(27.8%) neonates in the VAP group, respectively. Basic data were similar between groups except for the gestational age (VAP 33±6 wks;controls 28±4 wks,p=0.0004). VAP babies had worst shortterm outcomes (Tab
and this is confirmed adjusting for gestational age: longer NICU stay (clinical diagnosis: $\beta 0.18; p=0.04$; combined diagnosis $\beta 0.51; p=0.04$), length of ventilation (clinical diagnosis: $\beta 0.21; p=0.04$; combined diagnosis: $\beta 0.3; p=0.006$). Combined diagnosis of VAP also carried significant mortality/BPD (HR 0.5; $p=0.04$). There was no difference for longterm outcomes, including respiratory status by a specific score.[4] Neonates with VAP have worst short term respiratory outcomes than those without VAP, but generally similar longterm outcomes.

References (if needed)
STRIDOR IN INFANTS AND CHILDREN: THE EXPERIENCE OF A TERTIARY REFERRAL CENTRE

G. Coutinho¹, J. Spratley¹, M. Santos¹
¹Centro Hospitalar São João, Department of Otorhinolaryngology, Porto, Portugal

Background

Pediatric patients with stridor often pose a challenge to the physician and frequently demand a close interaction between the Otolaryngologist and the Pediatric Intensivist. Several anatomical and physiologic peculiarities make a child vulnerable to develop an obstruction of the upper airway. Proper management is possible only after a precise diagnosis has been established.

Objectives

To review the etiology of stridor and the associated comorbidities; to identify tracheostomy contributing factors.

Methods

Retrospective chart review of patients younger than 10 years with the presenting symptom of stridor who were referred to our institution’s Pediatric Otorhinolaryngology Unit between 2008 and 2015. Cases who underwent laryngotracheoscopy were selected.

Conclusions/Results

Of the 82 cases, 55 (67%) were male and 27 (33%) were female. The mean age at presentation was 11 months (ranging from 1 day to 9 years); 21 (26%) presented stridor during the neonatal period. Congenital abnormalities were the cause of stridor in 54 (66%) cases. Congenital laryngeal anomalies were present in 50 patients and congenital tracheal disease in 17. The most frequent congenital laryngeal etiology was laryngomalacia (49%). Tracheostomy was performed in 23 (28%) cases. Those with more than one upper airway pathology (p<0.001); high-grade subglottic stenosis (p<0.05) and bilateral vocal cords palsy (p<0.05) were more prone to require tracheostomy.

A rational approach is mandatory and one should be aware of some critical aspects such as synchronous upper airway disease; high-grade subglottic stenosis and bilateral vocal cords palsy which may be associated with the need of a tracheostomy.

References (if needed)
USE OF SHORT-TERM SEVOFLURANE SEDATION BY THE ANESTHETIC CONSERVING DEVICE FOR WEANING FROM MECHANICAL VENTILATION IN CRITICALLY ILL CHILDREN

M. Pavcnik¹, I. Vidmar¹
¹University Medical Centre, Department of pediatric surgery and intensive care, Ljubljana, Slovenia

Background

Providing adequate sedation in critically ill children during weaning from mechanical ventilation can be challenging.

Objectives

To assess feasibility and physiological effects of sedation with sevoflurane administered by the anesthetic conserving device (ACD) before planned extubation in critically ill children.

Methods

Prospective observational study of 37 children (median age 43 months (4.5 months-14 years); median weight 15 (5.5-50) kg) in PICU that were switched to sevoflurane sedation by the ACD placed in inspiratory limb of ventilator (INSP group; n=23) or at Y-piece (Y group; n=14) 6-96 h (median 28 h) before planned extubation. Mean arterial pressure (MAP), heart rate (HR), PaCO₂, regional cerebral oxygen saturation (rSO₂ by NIRS) and sedation characteristics were documented, measurements before and after switch were compared by Wilcoxon test.

Conclusions/Results

In 2 patients, insufficient sedation despite increasing sevoflurane infusion rate led to premature termination of sevoflurane. In remaining 35 patients sevoflurane led to sufficient sedation (mean BIS: 55±12, mean % time with COMFORT 17-26: 85±15%). Mean end-tidal sevoflurane concentration was 0.89±0.31, MAC 0.35±0.13. Median (range) sevoflurane infusion rate was 6.2 (2.8-16.7) in INSP group, 3.4 (1.7-6.0) in Y group. Comparing 1h before to 1h after the switch, we observed a significant decrease in MAP (67.4±15.8 vs. 62.9±15.2 mmHg; p=0.002), decrease in rSO₂ (82.5±5.7 vs. 79.6±6.2%; p<0.0001) and increase in PaCO₂ (5.0±0.5 vs. 5.6±0.7 kPa; p=0.003). HR (111.4±22.6 vs. 107.1±17.2 mmHg; p=0.09) decreased slightly and nonsignificantly.

Sevoflurane administration by ACD is effective for sedation of children during weaning from mechanical ventilation. Decreased MAP, rSO₂, and increased PaCO₂ observed after switch need further investigation.

References (if needed)
PREDICTORS FOR EXTUBATION FAILURE IN MECHANICALLY VENTILATED PEDIATRIC PATIENTS: A SINGLE CENTER EXPERIENCE
P. Phan¹, L. Duong¹, H. Le²
¹Vietnam National Children's Hospital, Medical Intensive Care Unit, Hanoi, Vietnam
²Vietnam National Children's Hospital, Emergency Department, Hanoi, Vietnam

Background
Extubation failure is multifactorial; predictors for extubation failure in children are incomplete.

Objectives
To identify factors that can predict extubation failure in children

Methods
Prospective observational study conducted at PICU of the National Children's Hospital, Hanoi, Vietnam from March to October 2016. Patients aged from 1 months to 16 years, ventilated for more than 24h were underwent Spontaneous Breathing Trial (SBT). Various parameters measured during pre-SBT and pre-extubation were grouped into general, clinical, blood gas, and ventilator categories. Respiratory frequency (RR), peak inspiratory pressure (PIP), tidal volume (Vt) and frequency-to-tidal volume ratio (f/Vt) were obtained at the onset of SBT and at the end of SBT before extubation. Extubation failure was defined as needing re-intubation within 48 hours of extubation. The area under receiver operating characteristic (ROC) curve were calculated for each index as measure of accuracy in predicting extubation outcomes.

Conclusions/Results
One hundred and fifty-two patients successfully underwent the SBT and were extubated, but 20 of them (13.2%) required re-intubation. Patients failing extubation had more frequency of positive fluid balance, ventilation-related complications, and requiring low-dose of dopamine/dobutamine prior to extubation. After multiple logistic regression analysis, f/Vt ≥ 6 breaths/min/ml/kg (OR= 5.0, 95% CI, 1.2-20.0) and Vt < 6.5 ml/kg (OR=12.0, 95% CI, 2.5-80.0) were independently associated with extubation failure. The ROC curve for Vt and f/Vt measured before extubation were 0.77 (95% CI, 0.61-0.86) and 0.70 (95% CI, 0.58-0.82), respectively.

Conclusions: Vt and f/Vt measured before extubation can be used to predict extubation outcomes among mechanically ventilated children who had passed SBT.

References (if needed)
VARIATION IN PEEP LEVELS FOR MECHANICALLY VENTILATED EXTREMELY LOW BIRTH WEIGHT INFANTS

N. Bamat¹, J. Guevara², M. Bryan³, R. Roberts⁴, B. Yoder⁵, B. Lemyre⁶, A. Chiu⁷, D. Millar⁸, H. Kirpalani¹

¹The Children's Hospital of Philadelphia, Division of Neonatology, Philadelphia, USA
²The Children's Hospital of Philadelphia, Policy lab-Center to Bridge Research-Practice and Policy, Philadelphia, USA
³University of Pennsylvania, Department of Biostatistics and Epidemiology, Philadelphia, USA
⁴McMaster University, Department of Clinical Epidemiology and Biostatistics, Hamilton, Canada
⁵University of Utah School of Medicine, Division of Neonatology, Salt Lake City, USA
⁶Children’s Hospital of Eastern Ontario, Division of Neonatology, Ottawa, Canada
⁷University of Manitoba, Department of Pediatrics, Winnipeg, Canada
⁸Royal Maternity Hospital, Department of Neonatology, Belfast, United Kingdom

Background

Both insufficient and excessive positive end-expiratory pressure (PEEP) levels during mechanical ventilation (MV) can cause harm. Published data guiding PEEP level selection in preterm infants is limited. This lack of research evidence may facilitate random practice variation.

Objectives

To test the hypothesis that significant variation in PEEP level selection exists between centers even after adjustment for infant characteristics.

Methods

We included extremely low birth weight infants requiring MV after enrollment in the international NIPPV trial. The outcome was maximal PEEP level used during the initial course of MV. Data were restricted to centers with ≥ 5 eligible subjects. A priori characteristics judged to directly influence clinical PEEP level selection and characteristics associated with PEEP at p < 0.05 in bivariable analyses were included in multivariable regression. The impact of birth center and differences in PEEP level use among global regions were then assessed.

Conclusions/Results

278 infants from 17 centers were included. Significant between-center variation in PEEP level was observed despite adjustment for infant characteristics; F-test = 6.99, p < 0.0001 (Figure). In fact, birth center explained a greater proportion of the variance than all other patient characteristics combined; R-squared 0.29 vs 0.16. Significant global regional differences were observed, with Canadian and continental European centers using the most and least PEEP, respectively. Our findings highlight the need for research providing evidence-based guidance for PEEP level selection.
Figure. PEEP level by birth center adjusting for patient characteristics

95% confidence intervals

Maximal PEEP level (cm H2O)

Birth center

- Continental Europe
- United States
- British Isles
- Canada
- Middle East

References (if needed)
Background

Delirium is a common and serious neuropsychiatric complication in critically ill patients of all ages, and identifying risk factors which may be amenable to intervention is crucial. Previous studies have examined predisposing and treatment-related factors which may contribute to the development of delirium, however understanding of the factors which increase a paediatric patient’s risk of delirium is still in its infancy.

Objectives

This study aimed to investigate, throughout the course of bedside screening during routine care, treatment-related factors which may increase a critically ill child’s risk of developing delirium.

Methods

A 10-month prospective observational study (November 2015 to September 2016) was carried out in a tertiary, 36 bed PICU in Australia. 1,349 critically ill children aged up to 18 years (Median = 2.16 years, IQR = 0.33 - 8.17) who were admitted to PICU were screened for delirium using the Cornell Assessment of Pediatric Delirium (CAP-D). 3,493 assessments were completed for 269 patients (19.94%).

Conclusions/Results

Of the 269 patients screened during their admission, 186 (69.14%) screened positive for delirium. In a multivariate model younger age (< 5 years) and the administration of ketamine and benzodiazepines were independent risk factors associated with the development of delirium. Previous studies have associated delirium with mechanical ventilation and risk of death, however these findings were not replicated in the current study. Previous research examining risk factors for delirium in PICU patients consistently associates younger age and benzodiazepines administration with paediatric delirium, yet other findings are inconsistent, calling for further investigation.

References (if needed)
Background

Therapeutic hypothermia (TH) is now an established treatment for moderate to severe Hypoxic Ischaemic Encephalopathy (HIE) in neonates. National Institute for Health and Care Excellence, UK approved this treatment in May 2010.

Objectives

The aim of this study was to analyse the practice of TH within a regional cooling centre.

Methods

A retrospective analysis of all neonates who received TH between May 2010 and April 2016 was undertaken. The data was collected retrospectively from a local registry as well as the BadgerNet system.

Conclusions

With regionalisation of care and availability of TH during transfer, we have noticed that majority of babies reach target temperature under 6 hours of age. Our mortality rates are comparable to national and international data.

Table 1. A summary of results.
A breakdown of cases by HIE stages.

<table>
<thead>
<tr>
<th>Study period</th>
<th>May 2010 - April 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number</td>
<td>155</td>
</tr>
<tr>
<td>Outborn (%)</td>
<td>77</td>
</tr>
<tr>
<td>Mean birth weight (kgs)</td>
<td>3.384</td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>35+2 - 44+3</td>
</tr>
<tr>
<td>HIE Mortality (%)</td>
<td>3.8 – 35</td>
</tr>
<tr>
<td>MRI done &lt; day 14 (%)</td>
<td>97.9</td>
</tr>
<tr>
<td>Time to reach target temp (hours)</td>
<td>2.9 – 5.2</td>
</tr>
<tr>
<td>Inotropic support (%)</td>
<td>34.5 – 85</td>
</tr>
<tr>
<td>Ventilator support (%)</td>
<td>&gt;80.6</td>
</tr>
</tbody>
</table>

Picture 1. A breakdown of cases by HIE stages.

Classification of deaths by stage of HIE.

Picture 2. Classification of deaths by stage of HIE.
With regionalisation of care and availability of TH during transfer, we have noticed that majority of babies reach target temperature under 6 hours of age. Our mortality rates are comparable to national and international data\(^1\).

**References (if needed)**

PREVALENCE AND PATTERN OF BRAIN LESIONS IN PAEDIATRIC SEPTIC SHOCK PATIENTS

D. Sanz¹, F. D'Arco², J. Brierley¹
¹Great Ormond Street Hospital for Children NHS Trust, Paediatric intensive care unit, London, United Kingdom
²Great Ormond Street Hospital for Children NHS Trust, Neuroradiology department, London, United Kingdom

Background

Brain injury is frequently observed after septic shock and may be primarily related to the direct effects of the septic insult on the brain or to secondary/indirect injuries (e.g., hypotension, hypoxemia, hypocapnia, hyperglycaemia).

Objectives

To assess prevalence and pattern of brain lesions diagnosed by neuroimaging in paediatric septic shock patients.

Methods

Retrospective descriptive hospital-based study included patients with a single episode of septic shock admitted to our PICU from January 2010 to December 2013.

Conclusions/Results

49 of 194 septic shock patients, with a median age 2.6 years (7 days-15 years), had a neuroimaging examination [CT only 22 (45%), MRI only 14 (29%) and both 13 (27%)]. Neuroimaging was normal in 15 patients (31%) and showed acute cerebral infarcts/hypoxic ischaemic injury in 8 (16%), cerebritis/encephalitis in 7 (14%), mixed lesions (ischaemia and cerebritis) in 1 (2%), posterior reversible encephalopathy syndrome in 1 (2%) and haemorrhage in 2 (4%). Seizure was the most frequent neurological manifestation (31%), followed by decreased level of consciousness/low GCS (22%) and pupil alteration (16%). EEG was recorded on 33 (67%) patients with neuroimaging and showed cerebral dysfunction in 24 (73%). EEG abnormalities were not predictive of neuroimaging alterations. PIM score, vasoactive score, length of stay in PICU and mortality did not differ between patients with or without neuroimaging.

Conclusions: The diagnosis of brain dysfunction in septic shock patients relies essentially on neurological examination and neurological tests, such as EEG and neuroimaging. Neuroimaging can reveal acute intracerebral structural lesions and their reversibility, helping with management and prognosis.

References (if needed)
ANALYSIS OF VANCOMYCIN CHLORIDRATE AND SODIUM HEPARIN SOLUTIONS USED FOR ANTIMICROBIAL LOCK THERAPY IN CHILDREN

D. Barros¹, P. Onofre¹, M.A. Peterlini¹, M. Pedreira¹, P.C. Rosa², F. Fonseca³
¹Universidade Federal de São Paulo, Escola Paulista de Enfermagem, São Paulo, Brazil
²Universidade Estadual de Campinas, Faculdade de Farmácia, Campinas, Brazil
³Universidade Federal de São Paulo, Faculdade de Ciências Farmacêuticas, Diadema, Brazil

Background
Antimicrobial lock therapy for treatment and prevention of central intravenous catheters (CIC) associated infection constitutes in the instillation of an antibiotic within the lumen of the CIC, with or without an anticoagulant, in a concentration higher than the minimum inhibitory usually used for systemic therapy.

Objectives
To verify the stability of solutions containing vancomycin hydrochloride and sodium heparin used in antimicrobial lock therapy.

Methods
Experimental study consisted of six immunoenzymatic assay analysis determined by Polarized Fluorimetry (FPIA) using INTEGRA 400 Plus Roche®. Vancomycin hydrochloride (500.000μg) was reconstituted with 5 and 10mL of distilled water (DW) in a dilution proportion of 5.000μg/mL. For heparin, the studied concentrations were 100 and 2.500U/mL.

Conclusions/Results
Results: The vancomycin reconstituted in 5mL of DW had a value greater than 8.000ug/mL and at 10mL 4.565ug/mL. The solutions containing 100U/mL heparin and vancomycin in 5 mL of DW had value of 5.381ug/mL and 6.423ug/mL in 10mL of DW. Solutions with vancomycin in 5mL of DW and 2.500U/mL heparin resulted in 6.176ug/mL and 4.565ug/mL in 10mL of DW. The results of vancomycin in 5mL with sodium heparin at any concentration seem to be better evaluated by FPIA, showing specificity. Conclusions: The solutions were stable by the analytical approach applied. This is a preliminary study to support clinical practice and additional analyses are being performed. Acknowledgments: CAPES for Scholarship and CNPq-311296/2013-0; 462183/2014-9.

References (if needed)
THE CLINICAL EFFECT OF PACIFIER USE DURING OROGASTRIC TUBE FEEDING IN PREMATURE INFANTS

C. Çalık¹,², F. I. Esenay³
¹Ankara Training and Research Hospital - Ministry of Health, Neonatal intensive care unit, ANKARA, Turkey
²Ankara 1st Region Public Hospital Union General Secretariat, Departments of Research and Development, ANKARA, Turkey
³Ankara University, Faculty of Health Sciences, ANKARA, Turkey

Background

It is very important that preterm infants start oral feeding as soon as possible to survive and get healthy quickly. There is a need for evidence about clinical effect of pacifier use during tube feeding in premature infants.

Objectives

This randomised controlled trial aims to determine the effects of pacifier use on clinical parameters (vital signs, anthropometric measurements, transition to oral feeding and sucking skills) in premature infants.

Methods

Twenty-eight premature infants (31-36 weeks) were randomised into two groups: a pacifier group (n=14) and a control group (n=14). The experimental group was given pacifier during 3 non-consecutive orogastric feeding, the control group was routinely fed. Main outcome measures were vital signs, anthropometric measurements, transition to oral feeding and sucking skills. Data were collected at before, during and after feeding with daily follow-up chart; before and discharge with weekly follow-up chart.

Conclusions/Results

Descriptive characteristics of experimental and control groups were similar (p>0.05). Results indicated no significant difference between groups weekly head and chest circumference and height (p>0.05). Clinical parameters of the pacifier group was found more regular than the control group. The pacifier group weighed 74 gr. more, transitioned to oral feeding 11 days earlier, and discharged 7 days earlier than the control group (p<0.05). Suction action of the pacifier group start earlier than the control group (p<0.001). Based on this research, it seems beneficial for premature infants to use pacifier during tube feeding and pacifiers should be implemented in NICU nursing practices.

References (if needed)
NURSES KNOWLEDGE ABOUT SECRETION SUCTIONING FROM TRACHEOSTOMY TUBE BEFORE AND AFTER TRAINING

S. Kostyliovienë1, D. Grinkevičute2, A. Vaskelytė3, R. Kevalas2, J. Peciulytė4
1Kauno Kolegija University of Applied Sciences, Department of Nursing, Kaunas, Lithuania
2Lithuanian University of Health Sciences, Pediatric, Kaunas, Lithuania
3Lithuanian University of Health Sciences, Nursing and Care, Kaunas, Lithuania
4Hospital of Lithuanian University of Health Sciences, Pediatric Intensive Care, Kaunas, Lithuania

Background

Suctioning of secretions from tracheostomy tube is associated with a high risk for the patient's health. Therefore, it is important that nurses have scientific evidence-based knowledge about the safe performance of the procedure.

Objectives

To analyze nurses’ knowledge about secretion suctioning from tracheostomy tube before and after the training.

Methods

The study was conducted in Hospital of Lithuanian University of Health Sciences (LSMU) Kauno klinikos. The study was carried out in stages: Survey before training; Training; Survey after 5 months after training. Before training 69 nurses and after the training – 68 nurses were interviewed. Research was permitted Bioethics Comity of LSMU.

Conclusions/Results

Before training 52.2% of the nurses and after training 25.0% of nurses said that they suctioned secretions from tracheostomy tube routinely every few hours ($X^2=33.364, df=1, p<0.0001$). Before the training 61.5% of nurses said that they suctioned secretions at maximum possible pressure, only 24.6% of nurses would monitor suction pressure according to the patient’s age. After the training, a statistically significantly less (35.8%) nurses indicated that they would suck secretions from tracheostomy at maximum possible pressure. More than half of respondents (63.2%) would choose suction pressure according to the patient’s age ($X^2=33.535, df=2, p<0.0001$). Before training about one-fifth (17.6%) of the respondents said that they would suck from the tracheostomy tube all the secretions, after training less than one-tenth (6.6%) of the respondents would do that ($X^2=12.107, df=3, p<0.007$).

Conclusions. Part of the nurses incorrectly stated secretion suctioning speed, time and pressure before the training. After five months of training, nurses’ knowledge was significantly improved.

References (if needed)
HEMOLYSIS AFTER INFUSION IN VITRO BY PERIPHERALLY INSERTED CENTRAL CATHETERS: INFLUENCE OF IRRADIATED RED BLOOD CELLS AND CATHETER MATERIAL
K.C.S.C. Orsi¹, D.M. Kusahara¹, M.J. Avena¹, M.H. Tsunemi², A.H.P. de Souza³, V.Y.K. Miyasaki³, A.F.M. Avelar¹
¹Universidade Federal de São Paulo, Escola Paulista de Enfermagem, São Paulo, Brazil
²Universidade Estadual Paulista Júlio de Mesquita Filho, Departamento de Bioestatística, Botucatu, Brazil
³Universidade Federal de São Paulo, Hospital São Paulo, São Paulo, Brazil

Background

Most premature infants require packed red blood cells (RBCs) transfusion, and the use of irradiated RBCs is indicated. Peripherally inserted central catheters (PICC) are widely used in this population, however RBCs administration by these devices are still controversial.

Objectives

To identify hemolysis markers levels changes after infusion of irradiated and non-irradiated RBCs, performed by syringe infusion pumps in two types of PICC.

Methods

Experimental study conducted in a nursing laboratory under controlled conditions. Blood aliquots were randomly collected from silicone and polyurethane PICC (1.9Fr, 30cm of length) by syringe pumps at 5ml/h infusion rate. The aliquots from packed of RBCs and those resulted from controlled rate infusion were analyzed and percentage of hemolysis, free hemoglobin (FH) and potassium levels were evaluated.

Conclusions/Results

A total of 24 aliquots were obtained from 12 packed RBCs (A+blood type), with mean storage time of 5±0.8 days, in which, 6 packs (50%) were of irradiated and 6 (50%) non-irradiated. In silicone catheter, increase in hemolysis, FH and potassium levels, only in non-irradiated RBCs were identified. The irradiated RBCs did not present significant alterations. In polyurethane catheter, increase in hemolysis and FH levels in both types of RBCs. In non-irradiated RBCs, the percentage of hemolysis was 5 times greater than in the irradiated ones. Conclusion: Non-irradiated RBC presented more alterations than irradiated, in both catheter types, mainly in polyurethane catheter. However, polyurethane catheter type may have influenced these alterations, as it was perceived, independently of the type of RBC.

References (if needed)

Acknowledgements: National Council for Scientific and Technological Development - CNPq, No. 477055/2013-3
Background

Critically ill neonates often require dobutamine hydrochloride in continuous infusion. According to the literature, the solution stability is about 24 hours, however in most institutions it is recommended to change the infusion system every 72 hours.

Objectives

Verify the stability, pH and osmolality of dobutamine hydrochloride solution according to exposure time.

Methods

Experimental research methodological approach validation performed in the Laboratory of Nursing Experiments–Federal University of São Paulo, under controlled environmental conditions (temperature of 21.7ºC±1.1). A volume of 16 mL of dobutamine hydrochloride were diluted in 32 mL of 0.9% sodium chloride (dose of 10μg/Kg/min). The solution was maintained in a volume chamber control set for gravity infusion. The analysis of stability by High Performance Liquid Chromatography (HPLC), pH and osmolality were performed immediately, 2, 4, 24, 48 and 72 hours after preparation of the solution. The data of this pre-test are expressed as mean ± standard deviation.

Conclusions/Results

Results: In the 72 hours of exposure to the environment the mean osmolality was 224.91(±3.23) mOsm/Kg and the mean pH was 3.89(±0.26). The concentration of the solution after preparation was 106.38(±1.76), with 2 hours of 108.17(±0.09), with 4 hours of 108.30(±0.86), with 24 hours of 107.70(±0.74), with 48 hours of 109.02(±0.45) and with 72 hours of 110.01(±0.52). Conclusions: From the initial results, it is possible to infer that the dobutamine hydrochloride solution remained hypotonic, acid and with an increase of the drug concentration in 72 hours, due to loss of diluent.

References (if needed)

EFFECTS OF MUSIC THERAPY AND DISTRACTION CARDS ON PAIN RELIEF DURING PHLEBOTOMY IN CHILDREN

D. Aydin1, N. Canbulat Sahiner2
1Bandirma Onyedi Eylul University Faculty of Health Sciences, Department of Pediatric Nursing, Bandirma, Turkey
2Karamanoglu Mehmetbey University- School of Health, Department of Pediatric Nursing, Karaman, Turkey

Background

Pain is first experienced in childhood and its experience is very influential in a child’s life.

Objectives

To investigate three different distraction methods (distraction cards, listening to music, and distraction cards + music) on pain and anxiety relief in children during phlebotomy.

Methods

This study was a prospective, randomized, controlled trial. The sample consisted of children aged 7 to 12 years who required blood tests. The children were randomized into four groups, distraction cards, music, distraction cards + music, and controls. Data were obtained through face-to-face interviews with the children, their parents, and the observer before and after the procedure. The children’s pain levels were assessed and reported by the parents and observers, and the children themselves who self-reported using Wong-Baker FACES. The children’s anxiety levels were also assessed using the Children’s Fear Scale.

Conclusions/Results

Two hundred children (mean age: 9.01 ± 2.35 years) were included. No difference was found between the groups in the self, parent, and observer reported procedural pain levels (p=0.72, p=0.23, p=0.15, respectively). Furthermore, no significant differences were observed between groups in procedural child anxiety levels according to the parents and observer (p=0.092, p=0.096, respectively).

Pain and anxiety relief was seen in all three methods during phlebotomy; however, no statistically significant difference was observed.

References (if needed)
KEY INTERVENTIONS TO ENHANCE PRETERM INFANTS' NEUROBEHAVIORAL DEVELOPMENT IN THE NICU: GUIDING AN EVIDENCE-BASED NEONATAL CLINICAL PRACTICE

M. Aita¹, M. Héon¹, A. Lavallée¹, G. De Clifford Faugère¹, C. Garcia Becerra¹, N. Fernandez Oviedo¹
¹Université de Montréal, Faculty of Nursing, Montréal, Canada

Background

Promoting preterm infants’ stability in the NICU can favor their optimal long-term neurobehavioral development. Anchored in developmental care [DC] underpinnings and Als’ Synactive Theory of Newborn of Behavioral Organization and Development, key interventions acknowledged as reducing preterm infants' stress in the NICU, and thereby favoring their autonomic, motor and state/interactive subsystems’ stability are: a) controlling environmental stimulation, b) positioning, c) managing pain, d) optimizing breastfeeding, and e) respecting rest periods by clustering care.

Objectives

The aim of this communication is to synthesize evidence about the effects of these DC interventions on preterm infants’ subsystems’ stability and thereby, their neurobehavioral development.

Methods

Following a methodological search in databases such as CINAHL, Embase, CENTRAL and Medline, studies evaluating the effectiveness of these DC interventions were reviewed and evidence synthetized.

Conclusions/Results

Controlling NICU light and noise environmental stimulation and clustering care increase preterm infants’ autonomic stability and quiet sleep states. Infants’ positioning improves their motor development, whereas managing pain effectively and optimizing breastfeeding enhances autonomic and motor subsystems’ stability.

References (if needed)

Evidence supports that these DC interventions foster preterm infants’ stability in the subsystems which are central to their neurobehavioral development. Therefore, these DC interventions should be encouraged in the NICU to promote an evidence-based neonatal clinical practice.
IMPLEMENTATION OF PERI-OPERATIVE SCOLIOSIS SURGERY PROTOCOL: IMPLICATIONS FOR THE ICU

F. Ana Margarida¹, S. Nóbrega¹, S. Gouveia¹, S. Ramos¹
¹Anesthesiology and Immunohemotherapy Departments, Centro Hospitalar de Lisboa Central, Portugal

Background: Scoliosis affects 2-4% of children. Scoliosis surgery aims to stop the progression of the disease, avoid worsening of respiratory and cardiac function, and improve quality of life and physical appearance. During 2015 a new peri-operative scoliosis surgery protocol was developed to optimize intraoperative blood loss and transfusion, postoperative analgesia and respiratory function.

Objectives: We developed a multidisciplinary protocol for standardizing care, aiming at minimizing blood transfusion requirements, optimizing pain control and reducing postoperative ventilation and prolonged ICU stay.

Methods: Retrospective analysis of the blood transfusion requirements, postoperative ventilation and length of stay in the ICU during 2013-2014, before protocol development, and 2016, after implementation of the protocol. The protocol introduced preoperative evaluation by Immunohemotherapy - bleeding history, haemoglobin, iron metabolism status and coagulation disorders - and their optimization. Intra-operative Tranexamic acid is now administered at a loading dose of 20 mg/kg followed by infusion of 10mg/kg/hour. Desmopresin may be used along with replacement of coagulation factors as per pre-operative study. The analgesia includes placement of two epidural catheters at the end of surgery and a postoperative epidural infusion of Ropivacaine 0.2% and Morfine. All patients are extubated at the end of surgery unless respiratory failure is present.

Conclusions: Comparing standard surgical blood order in scoliosis surgeries between 2013-2014 and 2016, we obtained a substantial reduction in transfusional requirements. With the dual epidural catheter placement we were able to optimize analgesia which resulted in reduced number of children ventilated in the postoperative period and the length of stay in the ICU.
SCRUB TYPHUS- A MAJOR CAUSE OF PICU ADMISSION AND MODS- A SINGLE CENTRE EXPERIENCE FROM INDIA
P.P. Giri¹
¹Institute Of Child Health, PICU, Kolkata, India

Background

Scrub typhus (ST) has been globally recognised as an emerging infectious disease contributing significantly to pyrexia of unknown origin (PUO) and a potential cause of multi-organ dysfunction syndrome (MODS). We studied the incidence of ST as a cause of PICU admission and MODS in our hospital and its clinical and laboratory characteristics.

Objectives

To measure the incidence of MODS caused by Scrub Typhus

Methods

This study was done in a Paediatric teaching hospital in Kolkata, India. Records of patients admitted with PUO from March-2012 to December-2015 were reviewed. Rathi-Goodman-Aghai (RGA) scoring system was used to identify potential ST patients and confirmed by serological testing. Clinical characteristics, laboratory findings and treatment response were noted of those needing PICU admissions.

Conclusions/Results

RESULTS – ST was the serologically confirmed final diagnosis in 97 out of 764 children i.e. 11% of PUO admissions. PICU admission was needed in 30 of them (31%). It contributed 8.43% of total PICU admissions and 18.29% of MODS. Septic shock and encephalopathy (60%) followed by ARDS/ALI (43%) was the main cause of PICU admissions. Typical rash, generalised lymphadenopathy, low leucocyte and platelet counts, hypoalbuminemia and hyponatremia are significantly associated with MODS due to ST. Patients were treated with either Doxycycline alone or in combination with Azithromycin. Mean time to complete defervescence was 32 hours after first dose of Doxycycline. Outcome was excellent without a single mortality.

CONCLUSION – Scrub typhus is an important cause of MODS in this part of the World, specially in fevers associated with features as identified and not responding to conventional antibiotics.

References (if needed)
Background

Central Line-Associated Bloodstream Infection (CLABSI) is an important cause of complications in Pediatric Intensive Care Units (PICUs). Indeed, CLABSI increases length of stay, antibiotic use, hospital costs and morbidity. Peripherally inserted central catheter (PICC) could be an alternative to central venous catheter (CVC) in preventing CLABSI. There are controversial results for hospitalized and critically ill patients and it is still lacking a comparison between PICC and CVC in PICUs.

Objectives

To evaluate whether PICC was associated with a protective effect for CLABSI when compared to CVC in children admitted to four PICUs in Brazil.

Methods

Retrospective multicenter study in four PICUs in São Paulo, Brazil. We included patients aged 0 to 14 year-old, who needed a CVC or PICC during PICU stay from January 2013 to December 2015. Our primary endpoint was CLABSI up to 30-days of catheter placement. We defined CLABSI based on the Center for Disease Control and Prevention’s National Healthcare Safety Networks (NHSN) 2015 surveillance definitions. To account for potential confounders, we used propensity scores methodology.

Conclusions/Results

A total of 1,660 devices in 1,255 children were included in the study, with 922 PICC and 738 CVC. The overall CLABSI incidence was 2.28 (95%CI 1.70–3.07)/1000 device-day. After covariate adjustment using propensity scores, CVC was associated with higher risk of CLABSI (Hazard Ratio: 2.24 (95%CI 1.04–4.80; p=0.039) compared with PICC. PICC should be an alternative to CVC in the Pediatric Intensive Care Setting for CLABSI prevention.

References (if needed)
MORTALITY AND PREDICTIVE FACTORS IN PEDIATRIC SEVERE SEPSIS AND SEPTIC SHOCK AFTER SEPSIS BUNDLES IMPLEMENTATION AT SRINAGARIND HOSPITAL

J. Teeratakulpisarn¹, C. Wongrat¹, R. Uppala¹
¹Khon Kaen University, Pediatric Pulmonology and Critical Care, Khon Kaen, Thailand

Background

Early recognition and prompt initial resuscitation of severe sepsis could improve its outcomes. However, the sepsis bundle has not been widely utilized in many developing countries due to inadequate resources in multiple levels.

Objectives

To study mortality rates and associated factors in Pediatric patients with severe sepsis and septic shock treated in the PICU, Srinagarind Hospital, Khon Kaen University after the implementation of the survival sepsis campaign guideline.

Methods

The sepsis bundle guideline was distributed to pediatric residents in the PICU. Medical record of patients treated in 2013 was reviewed. The mortality rate was compared with historical control.

Conclusions/Results

30 patients (13 females, 17 males) were diagnosed with sepsis and septic shock. The median age was 8.5 years (2 months – 14.5 years). The sources of infection were respiratory tract infection (25%), infective diarrhea (25%) and bacteremia (17.8%). Positive blood cultures were documented in 42.8%. The organisms included Burkholderia pseudomallei (10.7%), MRSE (10.7%) and P. aeruginosa (7.1%). After the implementation of the guideline, the mortality rate has significantly decreased from 65.2% to 23.3% (p=0.002). Factors significantly associated with increased mortality included the presence of DIC (OR 10.5, 95%CI 1.06 – 103.5, p value 0.02), ScvO2 <70% (OR 16.5, 95% CI 1.0 - 250.1, p value 0.02) and lactate > 4 mmol/L (OR 28.3, 95% CI 2.3 - 336.0, p value <0.01)

The implementation of the sepsis bundle guideline leads to an improvement of outcome in a tertiary care center in a developing country. ScvO2 and lactate levels could potentially be used to predict mortality.

References (if needed)
RENAL NIRS PREDICTING DEVELOPMENT OF ACUTE KIDNEY INJURY AND NEED FOR RENAL REPLACEMENT THERAPY IN CHILDREN WITH SEVERE SEPSIS

A. Mehta¹, A. Bansal¹
¹post graduate institute of medical education and research, Pediatric critical care, chandigarh, India

Background

Acute kidney injury (AKI) is one of the life threatening manifestations of severe sepsis. There are no studies to our knowledge, comparing renal saturation as measured by NIRS with development of AKI in children with severe sepsis

Objectives

Predict detection of early AKI & need for RRT in children with severe sepsis using rSO₂
To determine the relationship between rSO₂ & ScVO₂ in children with severe sepsis

Methods

50 consecutive patients of severe sepsis with age 1-12 years went under continuous monitoring of ScVO₂, rSO₂ with urinary n-gal done at 0,24 and 72 hours of PICU stay

Conclusions/Results

24-hour mean rSO₂ of Right Kidney(RK) was 61% and Left Kidney(LK) was 63% in AKI group. 24-hour mean rSO₂ of RK was 75.2% and LK was 75% in Non AKI group statistically significant in predicting incidence of AKI and No AKI with p value of 0.028 and 0.006 respectively for RK & LK. 24-hour Urinary N-gal had a poor AUC 0.433 with sensitivity of 75% and specificity of 26.5% for predicting AKI. Left somatic rSO₂ < 60% for 90 mins duration collectively over first 72 hours had a sensitivity of 77.8 % and specificity of 73 % with AUC 0.83 to predict requirement for RRT. Moderate positive correlation r=0.6 was seen between rSO₂ & ScVO₂.

Conclusions: Renal NIRS was found to be better than urinary N-gal for predicting AKI stage 2 and 3 KDIGO and need for renal replacement therapy

References (if needed)
MEASUREMENT OF IMMATURE GRANULOCYTES (IG) PERCENTAGE TO RECOGNIZE SEVERE BACTERIAL INFECTIONS AS A CAUSE OF SEPSIS

J. Pavare1, I. Grope1, U.N. Urbane2
1Riga Stradins University, Department of Pediatrics, Riga, Latvia
2Riga Stradins University, Department of Paediatrics, Riga, Latvia

Background

Based on Sepsis-3 definitions sepsis-induced organ dysfunction may be occult and should be considered in any patient presenting with infection. Therefore early identification of pediatric patients with suspected serious bacterial infections (SBI) is important. Nowadays automated hematology analysers can measure additional infection marker - immature granulocytes.

Objectives

To evaluate whether the IG percentage (IG%) is a useful predictive marker of SBI.

Methods

258 children with febrile infections admitted to the Children’s University Hospital were included in the study and categorized into two groups: (i)infected without SBI (n=75); (ii)patients with SBI (n=183). Clinical follow-up, microbiological, radiological tests were used as reference standards for the definition of SBI. IG%, white blood cell count (WBC), C-reactive protein (CRP) levels were detected from the first routine blood sample.

Conclusions/Results

A statistically significant difference in IG% levels was observed between children with and without SBI. The mean IG% was 1.2 for patients with SBI and 0.3 without. The cut-off level of IG% to predict SBI was 0.45 with 84% specificity, 66% sensitivity, 90% positive predictive value. When IG% measurement was added to WBC, the sensitivity of WBC to detected SBI improved from 74% to 85%. When CRP was added to the model IG% plus WBC, the sensitivity to predict SBI was 93% (95% CI 88-96%), specificity 86% (95% CI 77-93%). ROC analysis to predict SBI showed AUC of 0.80 (95% confidence interval (CI) 0.74-0.85%) for IG%.

Addition of IG% to traditionally used markers of SBI may improve early recognition of sepsis patients by identification of children having SBI.

References (if needed)
HUMAN METAPNEUMOVIRUS RESPIRATORY INFECTION IN A REGIONAL TERTIARY PAEDIATRIC INTENSIVE CARE (PICU) - A 5-YEAR RETROSPECTIVE COHORT STUDY

C. McMillan¹, S. Gillett², C. Bradshaw², P. Muir², P. Davis¹
¹Bristol Royal Hospital for Children, PICU, BRISTOL, United Kingdom
²Public Health England, Specialist Virology Centre- Public Health Laboratory Bristol, Bristol, United Kingdom

Background

Human Metapneumovirus (HMPV) is a recently identified respiratory pathogen which may lead to critical illness in children.

Objectives

To identify the patient population presenting to a UK Paediatric Intensive Care Unit (PICU) with HMPV respiratory infection. To establish numbers and ages of cases, course of illness, co-morbidity, co-infection, and any seasonal variation.

Methods

The patient cohort was identified by searching for HMPV positive Respiratory Polymerase Chain Reaction (PCR) results from the regional Virology laboratory database, between August 2011 and July 2016. Results were cross-referenced with PICU patient records to ensure a complete dataset. Electronic records were used to identify patient age on admission to PICU, length of stay and of invasive ventilation, co-morbidity, co-infection and outcome.

Conclusions/Results

51 cases were identified over 5 winter seasons. Median age at presentation was 590 days (IQR 148.5 -1822), while median length of PICU stay was 13 days (IQR 5.5-19.5). Median length of invasive ventilation was 8 days (IQR 4.5 – 15.5). 11.8% (6/51) of patients required only non-invasive ventilation. 84% of patients had co-morbidity on admission and 59% had bacterial or viral co-infection. Mortality was 14%, of whom over half had co-morbidity and/or co-infection. Seasonal peaks and numbers varied between winters, with a third of admissions (17/51) occurring in 2014/15.

Compared to other viral respiratory infections leading to PICU admission, HMPV respiratory infection is a serious illness with a considerable risk of mortality, which seems to predominantly affect an older population of complex patients with pre-existing co-morbidity, who require longer periods of invasive ventilation.

References (if needed)
M. Mierzewska-Schmidt

Background

Fulminant pertussis occurs in unvaccinated infants <4 months and has considerable mortality. Several risk factors have been identified, the main is hyperleucocytosis causing pulmonary hypertension (PH) due to leucostasis.

Objectives

The aim of this study was to look for other risk factors of severity.

Methods

We analysed retrospectively the medical records of patients < 4 months diagnosed with pertussis treated in our PICU since 01.01. 2012. Clinical characteristics as well as laboratory parameters were studied.

Conclusions/Results

There were 10 patients (3-17 weeks), 1 died (concomitant pneumococcal sepsis). Only 2/10 patients had NIV, 8/10 required mechanical ventilation. 3 patients with PH and cardiac failure (CF) had significantly higher maximum leucocytosis - mean 92.5 x10^3 (range 70-110,2 x10^3) vs 25,43 (13,1-51,7 x10^3) and absolute lymphocyte count (ALC) 27.7 x10^3 (21,3-38,15 x10^3) vs 8,9 x10^3 (1,4-15,1 x10^3). Platelets were elevated in 10/10 of patients but in 3 with CF and PH platelets were higher than in the remaining ones 664 x10^3 (465-987) vs 825 x10^3 (494-1213). Inflammatory parameters in cases without co-infection were negative or only mildly elevated.

Discussion

Thrombocytosis has not been previously considered a contributing factor of PH and CF in pertussis but it is known to cause PH in patients after splenectomy and with myeloproliferative disorders. The limitation of this observation is low number of patients and concomitant sepsis that might affect platelet count in 1 patient with fulminant pertussis.

CONCLUSIONS

1. Hyperleucocytosis and high ALC are risk factors of fulminant pertussis with PH and CF but thrombocytosis may be a contributing factor.

References (if needed)
FLUID RESPONSIVENESS IN CONGENITAL HEART DISEASES: EFFICIENCY OF STROKE VOLUME VARIATION AND NON INVASIVE PARAMETERS MEASURED WITH ELECTRICAL CARDIOMETRY

A. Boet¹, E. Mokhfi¹, S. Demontoux¹, S. Hascoet², C. Rucker-Martin³, J. Horer²
¹Centre Chirurgical Marie Lannelongue, Cardiac PICU, Le Plessis Robinson, France
²Centre Chirurgical Marie Lannelongue, Congenital heart defect team, Le Plessis Robinson, France
³Centre Chirurgical Marie Lannelongue, INSERM U 999, Le plessis Robinson, France

Background

Fluid management is a corner-stone in post-operative care of patients with congenital heart diseases (CHD).

Objectives

We assess the ability of electrical cardiometry (EC)(ICON®, Osypka medical, measuring Stroke volume (SV), respiratory variation of SV (SVV), cardiac output CO, their weight index (Si and Ci) and contractility index (ICON)) to predict volume expansion (VE) responsiveness in our population.

Methods

CHD patients were included in early post-operative period. Management is standardized. Patients were classified in 2 groups : requiring VE or not. In second, patients requiring VE were divided in 2: responders (Rs) (>15% increase of SV) or not (nonRs) to VE. Population characteristics, EC data were collected with classical hemodynamics data.

Conclusions/Results

134 patients were included, 81 required VE whom 40 were Rs. Patients receiving VE had significantly pre VE higher HR, SVV, saturation curve variation and lower ICON, SV/Si, CO/Ci and are younger (p<0.05).

Patients with right heart CHD are not requiring more VE and are not more responders to volume expansion than others (Khi² 0.137 and 0.099).
In VE group, Si (0.788 mL vs 1.15 mL, p = .0001) and ICON (33 vs 56, p = .021) values before VE were lower and SVV (19.4% vs 13%, p = .0001) higher in Rs versus nonRs group.

The area under the curves (fig. 1) of Si and ICON are low but is 0.781 for SVV with a cut-off of 15.5% and a grey zone 13-19.5%.

This study is the first one with EC and largest one to our knowledge with non invasive bioimpedance device: it highlights efficiency of EC SVV to predict fluid responsiveness.

References (if needed)
Background

The Berlin Heart (BH) Excor is the only assist device used in children.

Objectives

We report our 11 years’ experience, focusing on patient characteristics and outcomes.

Methods

All patients who underwent BH implantation between January 2006 and April 2016 were included retrospectively. 18 patients underwent BH implantation. Edmonton anticoagulation protocol was applied.

Conclusions/Results

In these patients (Table 1), 11 were subsequently transplanted, 1 (acute myocarditis) was weaned, 6 died under BH support. Hospital survival rate was 53%. Two patients died after transplantation. Cause of death under support was bleeding, infection and stroke. One patient died 10 months after transplantation from stroke and one patient died suddenly 4 months after weaning. Survival rate to final follow-up at 2 to 5 years was 41%. Postoperative characteristics are summarized in Tab. 2. 4 required dialysis and 3 membrane oxygenation. The 2 major complications on BH support were infections (15) and thromboembolic or bleeding events (16).
<table>
<thead>
<tr>
<th>Population characteristics</th>
<th>Number or median</th>
<th>Interquartile range</th>
</tr>
</thead>
<tbody>
<tr>
<td>N total</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>N children</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Age (y)</td>
<td>7.5</td>
<td>[1.8-11.7]</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>7 (39%)</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>11 (61%)</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>24</td>
<td>[15.6-31]</td>
</tr>
<tr>
<td>Etiology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congenital defect surgery</td>
<td>5 (28%)</td>
<td></td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>13 (72%)</td>
<td></td>
</tr>
<tr>
<td>ECMO pre implantation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number</td>
<td>12 (66%)</td>
<td></td>
</tr>
<tr>
<td>Duration (Days)</td>
<td>5</td>
<td>[0-8.8]</td>
</tr>
<tr>
<td>Type of VAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left VAD</td>
<td>4 (22%)</td>
<td></td>
</tr>
<tr>
<td>Bi-VAD</td>
<td>14 (78%)</td>
<td></td>
</tr>
</tbody>
</table>
11/18 patients (61%) had maladjusted ventricular size (<30mL/m² or >50mL/m²). 5/11 (45%) of them had a thromboembolic complication versus 0/7 off patients with well-adjusted ventricular size (p=ns, Fisher’s exact test).

Concerning specific cases we highlighted a failing Fontan assisted with mono LVAD and transplanted with success despite several coagulation complications. 50% of our mortality under support involved patients whose implantation was questionable with contraindication to transplantation.

The Berlin Heart is efficient as bridge to transplantation, allowing patient to be in favourable conditions for transplantation: Main complications are thromboembolic or bleeding events, Edmonton anticoagulation protocol may not be appropriate for all patients. References (if needed)
INFLAMMATORY AND METABOLIC RESPONSE IN CRITICALLY ILL CHILDREN, PILOT STUDY

S. Zaher, R. Meyer, R. Branco, D. White, J. Ridout, S. Thurston, N. Pathan

1University of Cambridge, paediatrics, Cambridge, United Kingdom
2Imperial College London, Dietetics, London, United Kingdom
3Addenbrookes Hospital, paediatric intensive care, Cambridge, United Kingdom

Background

Critical illness is associated with derangement in metabolism manifested by production of inflammatory cytokines and acute-phase reactant as well as changes in Energy-expenditure (EE). It is still not clear if the inflammatory cytokines affect stress mediators such as EE, metabolic pattern and other nutritional markers.

Objectives

To determine the relationship between inflammatory cytokine and measured EE.

Methods

EE was measured using indirect calorimetry (IC) when the child was in resting state. The metabolic pattern was determined using the ratio of measured EE/predicted basal metabolic rate (PBMR). PBMR calculations were based on Schofield equation. The ratio of >1.1, 0.9–1.1, and <0.9 were classified as hyper-metabolic, normo-metabolic, and hypo-metabolic patterns, respectively. Serum sample was obtained from each child at the time of IC measurements for the cytokines analysis.

Conclusions/Results

A total of 20 children were included in the study. The results showed that TNFα and IL6 levels were higher in hyper-metabolic compared to hypo-metabolic group (p=0.009* and 0.03* respectively). Whilst IL-1 β and IL-10 levels did not vary significantly between groups. The inflammatory response to stress is associated with metabolic abnormalities, and hence may affect energy expenditure.

References (if needed)
DETERMINING THE PREVALENCE OF MALNUTRITION IN INTENSIVE CARE AND EXAMINING THE EFFECTS OF MALNUTRITION ON MORTALITY VIA USING MORTALITY SCORES

M. Gharibzadeh Hizal, S. Kesici, M. Tanyildiz, B. Bayrakci

1Hacettepe University, Pediatrics, Ankara, Turkey
2Hacettepe University, Intensive Care Unit, Ankara, Turkey
3Hacettepe University, Intensive Care Unit, Ankara, Turkey

Background

Malnutrition in critically ill children leads to complications with many different mechanisms and increased morbidity and mortality.

Objectives

Determine the prevalence of malnutrition and the effect of nutritional status on mechanical ventilation, hospital stay length and the biochemical parameters. Demonstrate malnutrition as an independent risk factor for mortality.

Methods

Patients admitted to the Hacettepe University Pediatric Intensive Care Unit between 2012-2014 were included (n=790). Clinical characteristics, mechanical ventilation duration, initiation time of feeding, recurrent hospitalization and biochemical values were recorded.

Conclusions/Results

9.7% of patients died in the first 28 days of follow-up. Mortality in patients younger than 2 years old were found higher (p<0.01). Frequency of acute malnutrition was found to be 23.6%. Prevalence of chronic malnutrition was found to be 28.7%. Acute and/or chronic malnutrition were detected in 35.8% of patients. Malnutrition significantly correlated with mortality, duration of mechanical ventilation, hospitalization and intensive care unit length of stay, PELOD score, PRISM score and hospital readmission, and some routine laboratory values. Initiation of enteral nutrition and mechanical ventilation were found to be significantly relating with mortality (p<0.005). In univariate regression analysis, malnutrition was found to increase mortality risk 2.74 times (p<0.001). Multivariate regression analysis using malnutrition, PRISM score, PELOD score, mechanical ventilation and intensive care unit length of stay showed that malnutrition was not an independent risk factor determining mortality (p=0.14). Malnutrition and related complications contribute to many factors that increase mortality in critically ill children. To determine whether malnutrition is an independent risk factor for mortality or not further studies are needed.

References (if needed)
CONTRIBUTIONS OF FREE WATER, CHLORIDE, PHOSPHATE, ALBUMIN AND LACTATE TO METABOLIC ACIDAEMIA AND ALKALAEMIA IN CRITICALLY ILL CHILDREN

B. Wilkins¹, V. Ward¹
¹Children's Hospital at Westmead, PICU, Westmead, Australia

Background

Plasma Base Excess (PBE), which is widely regarded as the most appropriate measure of total metabolic acid, is affected by abnormal concentrations of sodium (representing free water), chloride, phosphate, albumin and lactate.

Objectives

We investigated the contributions of these species to PBE in critically ill children in a mixed PICU.

Methods

Complete acid-base data-sets were collected retrospectively in 6712 acutely ill children within 3 hours of admission to PICU from a total of 11910 admissions over 10 years 2006-2015, including 80 admissions with diabetic ketoacidosis (DKA) and 131 with inborn errors of metabolism. pH, pCO2 and electrolytes were measured by blood gas analyser; albumin and phosphate by standard laboratory methods and their contributions to PBE calculated using their known physicochemical properties.

Conclusions/Results

Free water and phosphate had small effects on PBE, range -10 (acidaemia) to +10 meq/L (alkalaemia) centred around zero. Albumin range was -5 to +10, with hypoalbuminaemic alkalosis in 87%. Lactic acidaemia effect ranged from 0 to 21 meq/L, highly skewed with mean 2.1 meq/L; 35% of the sample had >2 meq/L. Chloride had largest effect, range -27 (hyperchloraemic acidosis) to +30 (hypochloraemic alkalosis) meq/L. Unmeasured anions (strong ion gap) were mean 2 meq/L except in DKA (mean 11 meq/L). All species contribute to PBE, often
Contributions to Plasma Base Excess

- Mean ± 1 SD

- Na (Free Water)
- Chloride
- Phosphate
- Albumin
- Lactate
- SID Gap

References (if needed)
ENERGY AND MACRONUTRIENT DELIVERY IN PAEDIATRIC CRITICAL CARE UNIT (PICU)

S. Zaher1, R. Meyer2, S. Thurston1, D. white3, J. ridout6, R. branco5, N. pathan1
1University of Cambridge, Paediatrics, Cambridge, United Kingdom
2imperial college London, dietetics, London, United Kingdom
3addenbrookes hospital, paediatric intensive care unite, Cambridge, United Kingdom

Background

Underfeeding is a significant problem in PICU. The clinical impact of under-nutrition in the PICU remains uncertain. Some studies suggest that the provision of full requirements improves the clinical outcomes.

Objectives

Assessing the amount of macronutrient delivered compared to the requirements during the first 3 days of admission.

Methods

We retrospectively reviewed case-notes of 125 critically-ill children (0-16 years) requiring >3days PICU. Caloric requirements were calculated using Schofield-equation. Carbohydrate and fat requirements were calculated as 55% and 30% respectively of the total caloric requirements. Protein requirement was calculated using ASPEN guidelines. The intake was calculated as a percentage of the delivered compared to the requirements.

Conclusions/Results

Enteral feeding was commenced within 5 hours of admission in 29% of children, within 6-11 hours in 34%, and within 12-23 hours in 27% of children. 10% did not receive any enteral feed in the first 24-hours of admission. On Day 1,2 and 3 the delivered energy and macronutrients were < requirements, expect for fat where intake was > requirements on day 3 (Fig1).
Enteral Feed was frequently stopped; the median number of NBM hours during the 3 days was 22 hours. Younger children <5 years met their requirements better than the older ones. The period of invasive ventilation during PICU-stay was correlated with the amount energy, carbohydrate and fat delivered during the first 3 days of admission, P<0.05*, the presence of pre-existing co-morbidity did not affect caloric-intake p>0.05.

Meeting nutritional requirements during the early-phase of illness is challenging in children, monitoring intake is crucial to avoid morbidities associated with under and overfeeding.

References (if needed)
Changes in gut hormones levels in critically ill children (Pilot Study)

S. Zaher1, R. Meyer2, R. Branco1, D. White3, J. Ridout4, S. Thurston1, N. Pathan1

1University of Cambridge, Paediatrics, Cambridge, United Kingdom
2Imperial college London, Dietetics, London, United Kingdom
3Addenbrookes Hospital, Paediatric intensive care, Cambridge, United Kingdom

Background

Nutritional intake in paediatric intensive care unit (PICU) is frequently affected either due to reduced appetite, or the presence of feeding intolerance symptoms associated with illness. Emerging evidence suggest that gut hormones might play a role in affecting the intake during PICU stay through controlling the appetite and gut motility.

Objectives

Assessing the pattern of the gut hormones in critically-ill children.

Methods

Three gut hormones were studied: GLP1, PYY and Ghrelin. Blood sample was collected from each child on admission, day 3 and day 5. To compare the levels of the gut hormones between critically ill and healthy children we used data from a previous study in healthy children (Huml et al. 2011).

Conclusions/Results

A total of 15 children were included in the study. The results shows that PICU children had significantly lower levels of GLP1 compared to healthy children (p value <0.05*), while they had significantly higher levels of PYY and Ghrelin (p value <0.05*, <0.01* respectively). Changes in the eating pattern in PICU could be related to abnormalities in the gut hormones levels.

References (if needed)

RISK FACTORS FOR CEREBRAL OEDEMA IN CHILDREN ADMITTED TO PEDIATRIC INTENSIVE CARE UNIT WITH DIABETIC KETOACIDOSIS: TEN YEARS IN REVIEW

R.M. Martins¹, J. Nogueira¹, L. Boto², J. Rios³, C. Camilo³, F. Abcasis³, M. Vieira²
¹Santa Maria Hospital- Academic Medical Center of Lisbon, Department of Pediatrics, Lisboa, Portugal
²Santa Maria Hospital- Academic Medical Center of Lisbon, Pediatric Intensive Care Unit- Department of Pediatrics, Lisboa, Portugal
³Santa Maria Hospital- Academic Medical Center of Lisbon, Pediatric Intensive Unit Care- Department of Pediatrics, Lisboa, Portugal

Background

Cerebral oedema (CO) is an uncommon complication of diabetic ketoacidosis (DKA), but it can be life-threatening.

Objectives

To identify risk factors for CO in a population with DKA admitted to a level III Pediatric Intensive Care Unit (PICU).

Methods

Retrospective analysis of the medical records of patients admitted to PICU in a ten-year period (2007-2016). Clinical diagnostic criteria for CO were used. Data analysis was performed using SPSS®21.

Conclusions/Results

Thirty-two patients (72% female) were included. Median age was 12.45 (1.1-19.4) years. DKA was the first manifestation of the disease in 18 (56.3%) and was severe in 27 (84.4%). Fourteen (43.7%) had clinical criteria for CO (female 64% (9); median age 12 years). These patients presented on admission: (median values) blood glucose 455 mg/dL, pH 6.9, HCO3 4.5 mmol/L, BE -27 mmol/L, pCO2 17.5 mmHg, urea 36 mg/dL, lethargy/prostration 14 (100%), Kussmaul breathing 12 (85.7%), vomiting 9 (64.3%), headache 3 (21%). No patient had cranial nerves paresia or other focal signs. NaCl 3% was administered in 5 (35.7%). Neither needed advanced life support. The following risk factors for CO were present: severe DKA (13); pCO2< 22 mmHg (9); blood glucose> 500 mg/dL (5), with rapid decrease (3); < 5 years old (5); slow rise in sodium levels (3); fluid bolus (4); urea> 39 mg/dL (4); bicarbonate therapy (3); PAD> 90 (1). There was no significant association between these risk factors and CO. No patient died or had sequelae.

The incidence of CO was higher than described in the literature, but less than 50% required hyperosmolar therapy. These results highlight the importance of identifying subtle neurological signs to allow immediate therapeutic intervention.

References (if needed)
CONCURRENT MENINGITIS IN INFANTS WITH BRONCHIOLITIS

A. Venkataraman¹, K. Sadasivam¹
¹The Royal London Hospital Barts Health NHS Trust, Paediatric Critical Care Unit, London, United Kingdom

Background

Concomitant meningitis in infants with bronchiolitis is known to occur but is extremely rare. These children frequently present with apneas and undergo investigations including cerebrospinal fluid (CSF) analysis to exclude meningitis. Empiric broad spectrum antibiotics are routinely given until CSF culture results are received.

Objectives

The purpose of this study was to determine the prevalence of coexistent meningitis in children less than 1 year of age with nasopharyngeal aspirate (NPA) polymerase chain reaction (PCR) confirmed viral bronchiolitis.

Methods

All children less than 1 year of age admitted to PICU from January 2014 to January 2017 with a NPA PCR confirmed viral bronchiolitis were included in the study. Data were collected through a retrospective review of the medical records and the frequency of meningitis was determined.

Conclusions/Results

A total of 143 children less than 1 year of age with NPA positive PCR tests were identified. Mean age at presentation was 4.2 months (range 2 days to 12 months). The most common virus isolated was RSV (52%), followed by Rhino virus (34%), Metapneumovirus (8%) and other viruses (6%). Of the 143 children, lumbar puncture for CSF analysis was performed in 40 children (28%), who presented with apneas. CSF analysis revealed normal cell counts and no positive cultures. All were treated with broad spectrum empirical antibiotics that were stopped after culture results.

Conclusions: Our study shows no infants with NPA PCR positive bronchiolitis presented with concurrent meningitis. More studies are required to rationalize the investigations in children presenting with apneas in confirmed bronchiolitis.

References (if needed)
TORCH IN IUGR AND SGA NEONATES: REVIEWING EFFICACY IN CURRENT PRACTICE

M.H. Chung¹, J. Lee¹
¹Bucheon St. mary's Hospital, Department of Pediatrics, Bucheon, Republic of Korea

Background

Routine screening test for ‘TORCH’ - toxoplasmosis, rubella, cytomegalovirus, herpes simplex virus - in intrauterine growth restriction (IUGR) and small for gestational age (SGA) neonates has become common practice. However, the costs of such screening tests may outweigh the benefits, especially in countries where incidence of TORCH is low.

Objectives

To evaluate the efficacy of TORCH screening, medical charts of IUGR or SGA neonates born in a single institution in Bucheon, South Korea from 2011 to 2015 were reviewed.

Methods

Of the 133 IUGR or SGA neonates, 128 neonates (96.2%) had TORCH screening work up. Regarding patient’s clinical information, gestational age, Apgar score, ultrasonography study, chromosome study, morbidities, developmental follow up, and growth catch up were collected. Maternal factors such as underlying maternal disease and placental findings were gathered when available.

Conclusions/Results

Of the 128 TORCH screening studies done, only 1 positive finding of toxoplasmosis IgM was found. The patient had no other clinical findings other than a small PDA, and was tested negative for toxoplasmosis IgG. Follow up until 4 years of age showed no comorbidities. Considering the very low incidence of positive findings of TORCH in IUGR or SGA neonates, we recommend abolishing the common practice of TORCH screening. The financial costs of screening IUGR or SGA neonates for TORCH is much higher compared to benefits gained. Also, the unnecessary process of blood sampling in small neonates cannot be ignored.

TORCH testing should be reserved for neonates who have maternal history of infection or additional clinical symptoms suspicious of infection.

References (if needed)
MODERATED POSTER MEDICAL 05: INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS 2

ESPN7-0243

PLASMA-LYTE 148 VS 0.9% SALINE FOR FLUID RESUSCITATION IN CHILDREN: ELECTROLYTIC AND CLINICAL OUTCOMES

B. Garside¹, A. Wignell², P. Davies²
¹University of Nottingham, Medical School, Nottingham, United Kingdom
²Nottingham Children’s Hospital, Paediatric Critical Care Unit, Nottingham, United Kingdom

Background

0.9% saline, the most prevalent fluid used for resuscitation, is associated with increased plasma chloride and acidosis which causes detrimental clinical effects. Using a balanced crystalloid for boluses may reduce these and improve outcomes. Plasma-Lyte has 98mmol/l chloride compared to 154mmol/l for 0.9% saline.

Objectives

To compare fluid boluses of Plasma-Lyte 148 to 0.9% saline boluses, in children < 16 years.

Methods

All patients admitted to the Paediatric Intensive Care Unit receiving a fluid bolus in the first 24 hours were included retrospectively, 18 months pre and post a change to Plasma-Lyte 148 as standard resuscitation fluid. Patients were split into volume (ml/kg) based groups, then categories based on the balance of Plasma-Lyte and saline boluses. ABG and creatinine values were examined up to 5 days post administration. The primary outcome was plasma chloride. Secondary outcomes included pH and percentage change in creatinine.

Conclusions/Results

126 patients were included. Increasing chloride load given via resuscitation fluids was correlated with a higher maximum chloride, higher average chloride, lower pH, and higher % creatinine increase. Subgroup analysis showed a p<0.05 for the 61-90 ml/kg group maximum chloride [105.59 vs 111.29 mmol/L]. Patients receiving Plasma-Lyte tended to have a higher pH than those receiving saline: a significant difference was seen in the 10-30 ml/kg group [7.42 vs 7.33]. There was no significant change in length of stay or ventilated days.

The use of PlasmaLyte boluses is correlates with reduced plasma chloride and higher pH, and a reduction in percentage creatinine increase, when compared to 0.9% saline.

References (if needed)
DOES MENINGOCOCCAL GROUP B VACCINE AFFECT PICU ADMISSIONS? THE SOUTH EAST SCOTLAND PERSPECTIVE

Y.N. Abo¹, E. Sullivan¹, L. Jones², T.Y.M. Lo¹
¹Royal Hospital for Sick Children, Paediatric Intensive Care Unit, Edinburgh, United Kingdom
²Royal Hospital for Sick Children, Department of Paediatrics, Edinburgh, United Kingdom

Background

Invasive meningococcal disease (IMD) is the leading infectious cause of death and morbidity in Britain during early childhood. The meningococcal B vaccine was introduced into the UK infant routine immunisation schedule in September 2015. Its impact on the number of patients requiring paediatric intensive care unit (PICU) is unknown.

Objectives

This study aims to determine if introduction of meningococcal B vaccine has affected PICU admission rates and patients’ management.

Methods

A case-note review was conducted for all patients admitted to a single PICU in South-East Scotland with a confirmed diagnosis of IMD between January 2010 and January 2017. Comparison was made between the 68 months before and 16 months after introduction of the meningococcal B vaccine. A pre-designed proforma was used for data collection regarding patient demographics, PICU management and meningococcal serotypes.

Conclusions/Results

27 cases (15 girls and 12 boys, with a median age of 17 months) were included in the study. The IMD admission rates for before and after introduction of the vaccine were 0.34 and 0.25 cases per month respectively (p = NS). Patients admitted during the post-vaccine study period had significantly longer duration of PICU stay (p < 0.01) and ventilation days (p = 0.02). Meningococcus group W was identified for the first time in 2 of the cases within the post-vaccine period.

Meningococcal group B vaccine has not significantly reduced the IMD PICU admission rates to date but has altered the serotypes that we have identified; this warrants further investigations in a larger cohort.

References (if needed)
Background

Early neonatal sepsis (ENS) remains a potentially severe event in apparently healthy newborns. ENS diagnostic is difficult since clinical signs and conventional biomarkers as C-reactive protein (CRP) are nonspecific. Procalcitonin (PCT) appeared as a promising biomarker, but described cut-off values are widely variable during the first 72 hours.

Objectives

To evaluate the diagnostic utility of PCT for ENS diagnostic workup in apparently healthy term neonates with ENS risk factors.

Methods

Single-centre, prospective study over a 6-month period. Term/near-term infants admitted to neonatal nursery (Level I) with at least one ENS risk factor were enrolled, after obtaining informed consent. Statistical analysis was performed using SPSS® v23.0 (Mann–Whitney or Fisher’s exact test for numeric or categorical variables, respectively).

Conclusions/Results

Of the 93 newborns enrolled, mean birthweight was 3266±479g and mean gestational age 39.0±1.6 weeks. Most frequent risk factors were: prolonged membrane rupture (68%), GBS positive (12.2%), positive maternal sepsis screen (11%), maternal fever (10%) and preterm membrane rupture (8%). All newborns were asymptomatic. Mean values were 0.64±0.7mg/dL for CRP (93.5% of the evaluations below our 2mg/dL cut-off for starting antibiotics) and 2.85±3.0ng/mL for PCT (79.6% below the 5ng/mL cut-off). When used to predict CRP>2mg/dL, PCT exhibited 57% sensibility and 82% specificity (21.05% PPV and 95.95% NPV). Although 19 newborns showed a PCT>5ng/mL, none was readmitted due to infection during the first month of life.

Significant lack of sensibility of PCT in our study argues against its use for septic workup in newborns with risk factors for ENS, when using conventional cut-off values.

References (if needed)
PREDICTIVE FACTORS FOR NECROTIZING ENTEROCOLITIS IN PRETERM NEWBORN - IS THERE ANYTHING NEW?

S. Lobo¹, M. Morgado¹, J. Saldanha²
¹Hospital de Santa Maria - CHLN, Pediatric Surgery Division of Pediatric Department, Lisbon, Portugal
²Hospital de Santa Maria - CHLN, Neonatal Intensive Care Unit of Pediatric Department, Lisbon, Portugal

Background

Potential predictors of necrotizing enterocolitis (NEC) in low-weight and preterm newborns have been studied in the last decades and the contribution of red blood cell transfusion (RBCT) to NEC is conflicting.

Objectives

Investigate the association between NEC and exposure to RBCT. Analyze other possible risk factors for this condition.

Methods

Retrospective case-control study in a sample of preterm neonates (≤33 weeks gestation and weight ≤ 2000 g), without major congenital anomalies, who developed NEC, and compare it with a random age, gestation and RBCT-matched group, for the following variables: gender, maternal age, ventilation period, umbilical venous catheterization, enteral nutrition (formula or breast milk) and timing of oral feeding. A p-value <0.05 was considered statistically significant.

Conclusions/Results

The number of transfusions per infant didn’t differ between NEC cases (total of 14 patients, 11 suffering from grade≥II by Bell classification) and their controls. No association was found between NEC and RBCT in 5-day time periods before onset (p=0.256). Formula milk was statistically related to NEC (p=0.022). Analyzing NEC severity, a trend in gender was found - more males had severe grades of disease (p=0.065). Type of enteral nutrition and starting time of feeding were not related to severity. No other differences were identified between groups. One death was registered in NEC group. According to literature, there is high controversy concerning temporal association between RBCT and NEC and, albeit with few cases, our study didn’t identify one. The type of enteral feeding before NEC proved to be a statistically significant association. Large prospective studies are needed.

References (if needed)
Background

Availability of powerful neuroimaging techniques in fMRI (functional Magnetic Resonance Imaging) give to clinicians an overview about neuromodulatory effect of anesthetics. In September 2013, under approval of Ethical Committee, we programmed a study about investigation of neurofunctional connectivity in three groups of pediatric patients undergoing general anesthesia.

Objectives

Aims of the study consists of exploring the interconnection between neural networks during the narcotic phase of fMRI examination in a pediatric population aged from 2 to 16 years. The neuronal activity is detected by processing BOLD signal (Blood Oxygen Level Dependent), regarding the increase of oxyhemoglobin levels during Resting state. Exclusion criteria were ASA III or more, neurological or psychiatric disease.

Methods

From 2014 8 children have been enrolled, 6 of them treated with Sevoflurane 2%, 1 child received Propofol in TIVA-TCI (Cpt 3 mcg/ml) and in 1 case Dexmedetomidine (1 mcg/kg/h) was used. Resting state fMRI data were acquired after the examination and the data were processed by creating a graph and by computing the eigenvector-centrality. Here we present the analysis of three cases (mean age 4 years) as preliminary data.

Conclusions/Results

Although the results are very preliminary, we observed an overall lower eigenvector-centrality value for Sevoflurane compared to the other anesthetics used, partially explaining the specific neuromodulation showed by these 3 drugs.

References (If needed)

THE IMPACT OF SUFENTANIL AND MIDAZOLAM DOSING ON SAFETY AND EFFICACY OF ANALGOSEDATION DURING THERAPEUTIC HYPOTHERMIA AND REWARMING

K. Hronová1, P. Pokorná2, P. Klement3, O. Slanař4
1Charles University in Prague, Department of Pharmacology, Prague, Czech Republic
2General Faculty Hospital, Department of Pediatric ICU, Prague, Czech Republic
3General Faculty Hospital Prague, Department of Paediatric ICU, Prague, Czech Republic
4Charles University, Department of Pharmacology, Prague, Czech Republic

Background

Optimal analgosedation is a key point of therapy during therapeutic hypothermia (HT).

Objectives

Aim of a prospective observational study was to describe relationship between sufentanil and midazolam dosing and analgosedation efficacy and safety parameters during HT in neonates with hypoxic ischaemic encephalopathy (HIE).

Methods

We analysed drug doses with respect to COMFORT-Neo scale values (CS-Neo), and time to normalized aEEG (t\text{norma} EEG), or mean blood pressure (BP), heart rate (HR), length of stay (LOS), length of artificial ventilation (LOAV) in asphyxiated neonates according HIE severity.

Conclusions/Results

Results: Totally 49 subjects [mean birth weight 3300 g (2000 – 4200), 39 g.w. (36 – 41)] with moderate (n = 25) and severe HIE (n = 24) were enrolled. All patients received phenobarbital and sufentanil and/or midazolam. Neither CS-Neo values during HT and rewarming period nor other studied parameters were dependent on sufentanil and midazolam doses. Neonates with severe HIE had significantly higher LOAV [112 h (0 – 406) vs. 151 h (87 – 532); P < 0.01], t\text{norma} EEG [6 h (1 – 120) vs. 120 h (5 – 120); P < 0.00001] and received more additional anticonvulsive drugs compared to moderate HIE. There was no difference in cumulative doses of both drugs between HIE groups. Significantly lower HR occurred during HT vs. RW while difference in mean BP was nonsignificant between periods in whole study population and in HIE subgroups.

Conclusions: Sufentanil and midazolam dosing in our analysis were not predictive for used parameters of analgosedation efficacy and safety.

References (if needed)
SEX-SPECIFIC EFFECTS OF CAFFEINE ON BREATHING AND APNEA FREQUENCY IN 12-DAY-OLD RATS

A. Bairam¹, N. Uppari¹, H. Kouchi¹, V. Joseph¹
¹University Institute of Cardiology and Pneumology of Quebec- Laval University, Department of Pediatrics, Quebec, Canada

Background

Caffeine is the first pharmacological choice to treat apnea in newborn infants. However, caffeine reduces but does not eliminate apnea.

Objectives

Whether this partial effects of caffeine is sex-specific remains unknown despite over 40 years of its usage. To test such possibility

Methods

We used male and female rats at 12-day-old (total=63 rats) to determine the sex-specific effects of caffeine following either single (10 mg/kg, i.p.) or chronic administration (7.5 mg/kg, gavaged once/day between 3-12 days of life). Ventilation, apnea frequency and total time in apnea were assessed using plethysmography under normoxia and in response to hypoxia (HVR, 12%O₂, 20 min). Each rat was used only once.

Conclusions/Results

There was no sex-effect following acute caffeine injection on basal minute ventilation or the HVR. But, caffeine reduced apnea frequency and apnea time more in females than males (sex effect: p<0.002) during hypoxia (not normoxia). Likely to acute injection, there was no sex-effect on basal breathing frequency or on HVR after chronic caffeine administration. However, chronic caffeine reduced apnea frequency and total apnea time more in females than males (sex effect: p<0.001) in normoxia and the frequency of apnea (not time) during hypoxia (sex effect: p<0.001). These results indicate better efficiency of caffeine in controlling apnea in newborn female than male rats. The underlying mechanisms of these sex-specific observations of caffeine on breathing irregularities need further investigation. Although obtained from animal model, our results present a primary data to help better use of caffeine in newborn infants with apnea. (CIHR to A. B. MOP-119272).

References (if needed)
TIME TO EXTUBATION OF VENTILATED PRETERM INFANTS RECEIVING DISTINCT CORTICOSTEROID TREATMENTS – A RETROSPECTIVE ANALYSIS
F. Cardona¹, M. Vass¹, L. Unterasinger¹, A. Berger¹
¹Medical University Vienna, Dept of Pediatrics, Vienna, Austria

Background

Bronchopulmonary dysplasia is responsible for considerable morbidity in very preterm infants. Postnatal corticosteroids may be effective in the short-term, but may have troublesome long-term consequences. Different corticosteroids may have distinct advantages in clinical use.

Objectives

The goal of this retrospective study was to analyze the time until extubation of three different corticosteroid regimens used at our department: hydrocortisone (H), prednisolone (P) and dexamethasone (D).

Methods

Infants with <28 weeks gestational age at birth were included in the study if they had received more than two doses of any corticosteroid on at least three successive days while intubated. Time to extubation was evaluated with Kaplan-Meier survival-curves and hazard ratios. Further tests compared different rates in relevant clinical outcomes for BPD, adverse effects and mortality. Regression analysis was used to evaluate confounding.

Conclusions/Results

We identified 69 patients in our patient population. (D: 11, P: 25, H: 23). The Kaplan-Meier-analysis did not find a statistically significant difference in extubation times between different corticosteroid groups (mean of days: D: 4.2, P: 3.4, H: 4.7). Regarding side effects, a significantly lower percentage of infants receiving hydrocortisone required therapy with insulin (5% vs. 36%) or developed hypertension (5% vs. 36%) than with dexamethasone. BPD and death rates were not different between groups.

Conclusion:

Extubation times did not differ between postnatal corticosteroids used, though some adverse effects were seen less commonly with hydrocortisone compared to dexamethasone.

References (if needed)
Parents' Attitudes Towards Pharmacokinetic Research in Paediatric Intensive Care

J. Menzies, K. Morris, H. Duncan, J. Marriott

1Birmingham Children's Hospital NHS FT, PICU, Birmingham, United Kingdom
2University of Birmingham, Institute of Clinical Sciences, Birmingham, United Kingdom

Background

Pharmacokinetic (PK) studies in critically ill children are vital to improve the information available for clinical management. However, little is known about the attitudes of parents towards PK research.

Objectives

To explore parents' attitudes towards PK research and identify barriers/facilitating factors to the conduct of PK studies, with reference to the PIC setting.

Methods

Following ethics approval, parents of children at Birmingham Children's Hospital were invited to participate in semi-structured interviews. Interviews were conducted between July 2013-July 2014 and were digitally recorded, transcribed and analysed using NVivo11 and framework analysis approach.

Conclusions/Results

Parents were motivated to participate to help others and improve their child's care. Parents valued approaches which utilise scavenged samples, utilise alternative bodily fluids and 'research' information being made available for clinical management. 'The approach' by research staff was identified as pivotal. Key elements are timing, professionalism and sensitivity. Despite concerns about being approached when acutely ill, PIC is perceived an
appropriate context to conduct PK studies owing to pain management and the presence of clinically indicated lines.

Conclusion
Parents have an appreciation of the importance of gaining more information about medicines through PK studies but have concerns about painful procedures and decision making during acute illness. Provided there is sensitivity to the circumstance and timing of approach, PIC is regarded as an optimum time to carry out PK studies.

References (if needed)
Background

Mechanical ventilation is a commonly used vital support in pediatric intensive care units (PICUs). Pediatric guidelines recommend a coprescription of sedation and analgesia. Benzodiazepines and opioids are frequently used drugs. Reducing cumulated benzodiazepine doses remains a major concern, due to their impact on short and long-term morbidity.

Objectives

To demonstrate that implementation of a nurse-driven sedation protocol lowers midazolam received doses in ventilated patients 24hours after initiation of sedation.

Methods

We are currently conducting a prospective trial in our PICU, with randomization of mechanically ventilated patients into 2 groups: implementation of a nurse-driven sedation protocol, or “classical” medical prescription and adaptation of benzodiazepine and opioid doses. Inclusion is realized at initiation of sedation, when mechanical ventilation is estimated to be required for more than 24 hours. Study duration is limited to 72 hours.

Conclusions/Results

Our preliminary results are obtained after inclusion of 3 patients in the experimental group and 5 patients in the control group (expected final samples: 31 vs. 31). With the nurse-driven protocol, the average administered midazolam dose at 24h is 0.37mg/kg/d [0.36-0.4], compared to 2.14mg/kg/d [1.3-4.9] with a “classical” attitude (p = 0.03).

Our study seems to show that use of such a protocol allows lowering received midazolam doses in pediatric ventilated patients. This data had also been previously reported in another French study(1). These observations encourage the implementation of sedation protocols in PICUs, in order to reduce sedative-induced morbidity. Nevertheless, these are very preliminary results, and have to be confirmed with larger samples size.

References (if needed)

INFLUENCE OF BODY POSITION IN THE MOTOR DEVELOPMENT OF PRETERM INFANTS AT HOME

V. Cardoso¹, M. Brunheroti²
¹Capes Scholarship/ Doctorate Sandwich in Exterior Program/Process nº88881.132348/2016-01 in Postgraduate Program in Health Promotion - University of Franca, Franca-SP, Brazil. University of Franca – Departament Health Promotion / Maternal-Infants
²Postgraduate Program in Health Promotion Teacher - University of Franca, Franca-SP, Brazil. University of Franca – Departament Health Promotion / Maternal-Infants

Background

Premature newborns are at increased risk for growth deficit and delay in neuropsychomotor development, with changes in the acquisition of motor, cognitive and psychosocial skills. Stimulating body positioning may facilitate the acquisition of motor skills of premature infants.

Objectives

Evaluating the influence of body positioning in the motor development of preterm infants who received stimulation by the mother at home until four months old of corrected age.

Methods

A randomized clinical trial in 30 premature infants divided into interventional group: (A) prone position, (B) supine position, (C) free position. The positions were stimulated for four hours / day. Motor development was assessed by the Alberta Infant Motor Scale (AIMS) in the first month of follow-up after hospital discharge and in the fourth month of corrected age.

Conclusions/Results

At four months, premature infants achieved lower scores on the Alberta scale, but body positions did not influence in the motor development, however there could be changes for the upcoming motor acquisitions.

Series 1: control, series 2: prone, series 3: supine
<table>
<thead>
<tr>
<th>Group/Position</th>
<th>Average DP</th>
<th>Comparison</th>
<th>IC 95%</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free 1</td>
<td>74,5 ± 16,6</td>
<td>Free 1 x Supine 1</td>
<td>-12,2 17,1</td>
<td>0,72</td>
</tr>
<tr>
<td>Prone 1</td>
<td>74,4 ± 15,5</td>
<td>Free 1 x Prone 1</td>
<td>-15,3 15,0</td>
<td>0,98</td>
</tr>
<tr>
<td>Supine 1</td>
<td>77,0 ± 15,3</td>
<td>Supine 1 x Prone 1</td>
<td>-17,5 12,4</td>
<td>0,72</td>
</tr>
<tr>
<td>Free 2</td>
<td>56,3 ± 34,4</td>
<td>Free 2 x Supine 2</td>
<td>-31,2 25,5</td>
<td>0,83</td>
</tr>
<tr>
<td>Prone 2</td>
<td>48,3 ± 32,8</td>
<td>Free 2 x Prone 2</td>
<td>-39,8 23,8</td>
<td>0,60</td>
</tr>
<tr>
<td>Supine 2</td>
<td>53,5 ± 27,3</td>
<td>Supine 2 x Prone 2</td>
<td>-34,9 24,6</td>
<td>0,71</td>
</tr>
</tbody>
</table>

T test paired data and independent t test for non-dependent variables, adopting significance level of 5%.

References (if needed)
MODERATED POSTER MEDICAL 06: PHARMACOLOGY/HEALTH SERVICES RESEARCH

ESPN7-0161

EFFECTIVENESS OF PERACETIC ACID AND SODIUM HYPOCHLORITE AGAINST FUNGAL BIOFILMS

R.H. Pires¹, L. Teodoro Oliveira¹, L. Guedes Lopes¹, L. Almeida Czonka¹
¹University of Franca, Postgraduate Program in Health Promotion, Franca, Brazil

Background

Hemodialysis systems usually are disinfected by chlorine-based disinfectants (e.g., sodium hypochlorite), aqueous formaldehyde, heat pasteurization, ozone, or peracetic acid. However, the adhesion of microorganisms to solid surfaces culminating in the formation of biofilms, has contributed to the reduction of quality in the prevention of dialysis infections. For the disinfection of hemodialysis machines, the use of sodium hypochlorite (0.5%) during 30 min has been recommended, and peracetic acid (1%) has been recently introduced. However, the use of both antimicrobials for the biofilms disinfection, especially fungal biofilms, is not mentioned.

Objectives

The objective of this study was to evaluate the efficacy of both peracetic acid (commercial formulation, Puristeril®) and sodium hypochlorite against biofilms formed by Fusarium oxysporum (8 isolates) and Penicillium spp. (6 isolates).

Methods

The isolates used were previously collected in a water circuit of the hemodialysis facility. The biofilms were formed into microplates (96 wells), and the tetrazolium salt (XTT) reduction assay determined the cellular viability of the treated biofilms.

Conclusions/Results

The results showed that all the fungal biofilms studied were sensitive to peracetic acid (1%) and resistant to sodium hypochlorite (0.5%) after 30 minutes of exposure. The anti-biofilm activity of peracetic acid encourages its use in disinfection/sterilization in the dialytic environment, contributing to infection control and minimizing the risk of fungal contamination. Infections related to biofilms represent one of the great current challenges of public health, leading to high rates of morbidity and mortality, increased hospitalization time and health system expenditures.

References (if needed)

Acknowledgments: We thank FAPESP for financial support (project 2015/19090-5).
PROTOCOLIZED PHARMACOTHERAPY IN 181 CONSECUTIVE ASPHYXIATED NEONATES UNDER HYPOTHERMIA: A SINGLE CENTER OBSERVATIONAL STUDY

P. Pokorná¹, P. Klement², O. Černá³, P. Smisky⁴, M. Bašková⁵, V. Vobruba⁶
¹Charles University in Prague, Pediatric ICU Department, Prague, Czech Republic
²General Faculty Hospital- Charles University, Pediatric ICU Department, Prague, Czech Republic
³General Faculty Hospital Prague Charles University, Pediatric ICU Department, Prague, Czech Republic
⁴General Faculty Hospital Charles University, Pediatric ICU Department, Prague, Czech Republic
⁵General Faculty Hospital Charles University, Pediatric ICU Department, Prague, Czech Republic

Background

Therapeutic hypothermia (HT) is an effective neuroprotective method in neonates with hypoxic-ischemic encephalopathy (HIE). Early induced HT and optimal pharmacotherapy may improve outcome parameters in asphyxiated neonates, but there is no evidence on protocolized pharmacotherapy based on comparative studies.

Objectives

To analyze protocolized pharmacotherapy in neonates treated with HT.

Methods

A prospective observational study involved 181 asphyxiated neonates ≥ 36 weeks of gestation treated with HT (33-34 °C, TOBY protocol) after written informed consent in 2007-2015. Pharmacotherapy with different drugs was initiated according to international recommendations. Mortality and morbidity rates were identified. Results were reported as mean (SD), and Student’s t test analysis with 95% confidence interval.

Conclusions/Results

Results: 94% of newborns were treated by mechanical ventilation, 99% received phenobarbital, sufentanil, and dobutamine (80%), ampicillin (73%), gentamicin (74%), plasma (70%), hydrocortisone (60%), and other drugs (<60%). In the course of the study the treatment strategies changed significantly to reduced use of dopamine (69/98 vs 29/98; P=0.022), while more often norepinephrine (5/50 vs 45/50; P=0.005) and vasopressin (0/3 vs 3/3, P = 0.02) were used. Mortality rate was 12%, major disability outcome parameters (cerebral palsy) were observed in 13% of treated neonates (n=147/181), which is statistically less in comparison with the literature.

Conclusions: Protocolized pharmacotherapy is a key element in the treatment of neonates under hypothermia.

References (if needed)
Background

Postoperative care of the child with congenital cardiac conditions requires a complex patient-care environment with utilization of advanced technologies. With the proliferation of the pediatric intensive care unit (PICU) and pediatric intensivists in Turkey there is no data on the contribution of these to pediatric cardiac surgical intensive care.

Objectives

To assess unit structure, staffing practices and availability of treatment modalities in ICU’s caring for pediatric cardiac surgical patients in Turkey.

Methods

We conducted a survey of 24 medical directors of ICUs at centers caring for pediatric cardiac surgical patients.

Conclusions/Results

Of 24 centers 18 responded. A majority were caring for 100-200 patients on average, with one dedicated cardiac surgical center reporting 847 pediatric cases. A pediatric intensivist and PICU was present in 15 (77%) of centers. In 33% of centers all; and in 44% some of the post-operative pediatric patients were cared in the PICU, under supervision of a pediatric intensivist. In 3 centers, all pediatric cardiac patients were cared in a Cardiac Surgical ICU where pediatric intensivists were not available. Only 8 of 15 pediatric intensivists surveyed reported having received training in cardiac intensive care. In 88% of centers extracorporeal membrane oxygenation (ECMO), in 72% continuous renal replacement therapies, and in 66% inhaled nitric oxide (iNO) was available.

These data demonstrate that PICUs and pediatric intensivists are involved in the care of pediatric cardiac surgical patients in varying degrees at different centers in Turkey. References (if needed)
USE OF LEVOSIMENDAN IN THE TREATMENT OF CARDIOGENIC SHOCK IN CHILDREN

A. Bouziri¹, S. Haj Hssine¹, A. Ayari¹, A. Louati¹, A. Hajji¹, K. Menif¹, N. Ben Jaballah¹
¹Children Hospital of Tunis, Pediatric Intensive Care Unit, Tunis, Tunisia

Background

Levosimendan is a calcium-sensitizing drug with positive inotropic properties. It improves myocardial contractility without increasing oxygen requirements and improves peripheral vasodilation. While its efficacy has been demonstrated in the adult in the context of cardiac surgery, its pediatric use is still not widespread.

Objectives

The objective of this study was to evaluate the safety and the effectiveness of Levosimendan in children with cardiogenic shock.

Methods

A retrospective study performed in the pediatric intensive care unit of the children hospital of Tunis over a period of 3 years (2014 - 2016).

All patients admitted for cardiogenic shock and treated with Levosimendan were included.

Conclusions/Results

Results:

Eight patients were included. Their mean age was 15 months ± 4,4 (8 - 23). Cardiogenic shock was caused by viral myocarditis in 7 patients and by inherited metabolic disorder in one patient. The mean ejection fraction at admission was 27,6% ± 15,7. Levosimendan was used 41 hours ± 21 (24 - 77) after admission with a dose of 0,3 - 0,5 μg/kg/min maintained during a mean duration of 3,5 days. Its use allowed an improvement of the ejection fraction in 7 patients. No case of arterial hypotension or rhythm trouble was noted. One patient died. The death was caused by refractory cardiogenic shock.

Conclusion:

The use of Levosimendan allowed the improvement of the ejection fraction in 7 patients presenting a cardiogenic shock caused by a dilated cardiomyopathy without severe adverse events.

References (if needed)
BRAIN- DERIVED PROTEIN (S100B), SOLUBLE TUMOR NECROSIS FACTOR RECEPTOR-1 (STNFR-1), AND CEREBRAL OXYGEN SATURATION AS PREDICTORS OF NEUROLOGICAL DEFICIT IN PEDIATRIC CARDIAC SURGERY

M.T. Puspanjono¹
¹Pediatric Critical Care Unit, Ph.D Education Programme Faculty of Medicine University of Indonesia, Jakarta, Indonesia

Background

In Indonesia every year 45,000 babies born with congenital heart disease (CHD), and 25% of them needed surgical intervention. Neurological injury after pediatric heart surgery still cannot be avoided.

Objectives

To evaluate the role of S100B, sTNFR-1, lactate, saturation of superior vena cava and cerebral saturation (NIRS) as predictors of neurological injury incidence on correction of CHD.

Methods

This is a prospective cohort study. Inclusion criteria are child patient with CHD aged 1 month-6 years old that undergo corrective operation. In analysis, subjects will be divided into 2 groups; group 1 with neurological deficit and group 2 with no neurological deficit. All subjects are observed closely while they were in ICU, until they are released from hospital. Blood examination is done in 3 times observing: before surgery, after cardio pulmonary bypass (CPB), and 4 hours after CPB.

Conclusions/Results

During March-September 2015, there were 51 patients observed. There are significant difference of S100B, sTNFR-1, lactate, and AUC 20% baseline of cerebral saturation concentrations observed post CPB between group with and without neurological deficit. In addition, other parameters such as core temperature at CPB and CPB time are related with neurological deficit after congenital heart surgery. The neurological deficit event regression model was obtained as

\[ S(t) = [S_0(t)] \exp(2.54 \times S100B + 1.98 \times sTNF + 1.76 \times Laktat + 0.61 \times \text{core temperature} + 0.04 \times \text{CPB time}) \]

In CHD patients who undergo corrective surgery, S100B value, sTNFR-1, lactate, and AUC 20% baseline of cerebral saturation can be used as predictors of neurologic deficit incidence after CPB.

References (if needed)
Background

Hypoplastic left heart syndrome (HLHS) is a complex congenital heart disease resulting in a functionally univentricular heart and requiring multi-disciplinary management. Long-term results of the treatment of HLHS patients have not been previously studied in Latvia.

Objectives

The objective of this study was to review the outcomes of HLHS patients treated at the only paediatric cardiothoracic centre in Latvia.

Methods

We performed a retrospective audit of medical records of all either antenatally or postnatally diagnosed cases of HLHS at Children’s Clinical University Hospital (CCUH) in Riga from 2007 until 2015. Surgical interventions were categorised in accordance with the International Paediatric and Congenital Cardiac Code (IPCCC, v3.0). Cumulative survival was calculated by using the Kaplan Meier method in SPSS Statistics (v24.0) software.

Conclusions/Results

During the study period, a total of 19 patients with HLHS were admitted to CCUH with the average incidence of 0.1 cases per 1000 live births per year. After correcting for the terminated HLHS pregnancies, the average incidence was 0.31 cases per 1000 live births per year. 16 (74.2%) patients had died by the end of data collection. The majority of deaths (12 out of 16) occurred before or during the stage I surgical palliation peri-operative period. The cumulative neonatal and five-year survival was 42% and 11%, respectively. The high mortality reflects the challenges of a small-volume developing congenital cardiac surgery centre and suggests that HLHS patients could benefit from an early referral to a more experienced treatment centre abroad.

References (if needed)
TRANPOSITION OF THE GREAT ARTERIES IN NEONATES: INCIDENCE AND OUTCOME

A. Smildzere¹, E. Ligere², D. Kviluna¹
¹Children's Clinical University Hospital of Latvia, Neonatal ICU, Riga, Latvia
²Children's Clinical University Hospital of Latvia, Pediatric cardiology, Riga, Latvia

Background

Transposition of great arteries (TGA) is one of the most common and severe congenital heart disease (CHD). If managed with early surgical intervention, TGA is a prevalent congenital heart defect with a high survival rate and a good long-term outcome.

Objectives

Our objective was to describe the incidence of TGA, patient characteristics and outcomes and to identify possible predictors of early morbidity and mortality.

Methods

Retrospective analysis through review of clinical and surgical charts of patients with TGA admitted to the Clinic of Neonatology during 2007-2015. We enrolled 22 neonates, 7 girls and 15 boys in the study with median gestational age of 40 weeks (Range 32<41 weeks) and body weight (Median) of 3.7 kg (Range 1.63<4.25 kg). Prenatal diagnosis in survivors was established in 23.7% vs.11% in nonsurvivors (p= 0.0008). Rashkind procedure was performed in 15 patients (68.2%), 18 hours (Median) after the birth (Range 6 hours<22 days). Baloon atrial septostomy was performed 14 hours after the birth in survivors vs. 62 hours in nonsurvivors (p<0.05).16 neonates had undergone arterial switch operation. In this group we recorded the duration of cardiopulmonary bypass, aortic cross-clamp time, duration of postoperative mechanical ventilation, inotropic treatment, and length of hospital stay. There was no difference in body weight, gestational age, start of treatment in survivors and nonsurvivors. Survival rate was 59% (13 from 22 patients).

Conclusions/Results

Prenatal diagnosis and early transport with appropriate pharmacological management to the tertiary care center is a major determinant of survival in newborns with TGA.

References (if needed)
ADVANCED TRAINING IN THE DEPARTMENT BY REDUCING RESPONSE TIME

N. Zaid¹
¹Sheba Medical center, pcicu, Ramat gan, Israel

Background

Opening a Heart ICU demanded an appropriate strategic planning and a commitment to strive for quality at all levels and parameters, for successful implementation and professional development.

Simulation as a teamwork routine - an efficient means for training and guidance. Simulation is a powerful means for practicing pediatric emergency situations.

Objectives

* Practice and evaluation of the professional skills in various emergency situations.
* Opportunities to acquire confidence and professional development.
* An opportunity to combine fields of theory and practice - experience theoretical framework and practice under supervision, in a safe and supportive environment.
* A chance to look at the department's work and the way staff members interact with each other and use the department's resources.
* Identifying improvements needs in specific processes.

Methods

The team met in the ICU for a simulation that included 3 scenarios of life threats and sudden changes in children's condition:*VF *TENSION PNEUMOTHORAX* TAMONADE

Conclusions/Results

Simulating and dozens of repeating trainings reduced the response time of real time resuscitation.

This assumption is tested by:

Examining response time of an event requiring resuscitation. Prior to the simulations, 30 seconds were required to reach the patient, while after the simulations, the response time stood on 5 seconds only.

Most sessions are short and are given no prior notice.

This is an effective method that complements existing quality and processes of Training, practice and research in the department.

References (if needed)
NEAR INFRARED SPECTROSCOPY (NIRS) IN PEDIATRIC SHOCK, AND THE EFFECT OF FLUID RESUSCITATION ON NIRS VALUES

B. Aygun1, F. Girgin2, E. Uyar2, M.N. Ozturk Yalindag2
1Marmara University Hospital, Pediatrics, ISTANBUL, Turkey
2Marmara University Hospital, Pediatric Critical Care Unit, ISTANBUL, Turkey

Background

Tissue oxygenation monitoring via non-invasive NIRS method has gained interest in critically ill patients.

Objectives

To study the effects of fluid resuscitation on cerebral (cSO2) and renal tissue oxygenation (rSO2) in pediatric shock patients

Methods

Prospective, observational study in a tertiary PICU (January - September 2016). We monitored bilateral cSO2 and rSO2 via NIRS during fluid resuscitation.

Conclusions/Results

Twenty five patients (56% female) were included. Median age was 19 months (IQR 10-85). Tissue saturations increased significantly after fluid resuscitation (Table). The decline in lactate level and the increase in systolic and diastolic blood pressures was statistically significant. There were differences in right and left cerebral and renal NIRS values, but the difference held significance for brain only (p = 0.046). Nine patients died (36%). Mean cSO2 and rSO2 of the survivors were higher than non-survivors before fluid bolus, but the difference was not significant in survivors, bilateral cSO2 and rSO2 increased significantly after fluid bolus. The mortality scores of the non-survivors were higher than survivors (p<0.005).

Table: Tissue oxygenation values before and after fluid resuscitation

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Median (IQR)</th>
<th>Min-Max</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>cSO2 (L)</td>
<td>Before</td>
<td>57.7 ±16.4</td>
<td>58 (47.5-72)</td>
<td>24-92</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>62.6 ±18</td>
<td>65 (51.5-71.5)</td>
<td>15-91</td>
</tr>
<tr>
<td>cSO2 (R)</td>
<td>Before</td>
<td>54.1 ±16.7</td>
<td>55 (44-65.5)</td>
<td>16-95</td>
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<tr>
<td></td>
<td>After</td>
<td>58.6 ±17.2</td>
<td>58 (44.5-72.5)</td>
<td>15-95</td>
</tr>
<tr>
<td>rSO2 (L)</td>
<td>Before</td>
<td>63.1 ±14.1</td>
<td>61 (50-74)</td>
<td>43-91</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>69.4 ±19.3</td>
<td>73 (57-84.5)</td>
<td>15-95</td>
</tr>
<tr>
<td>rSO2 (R)</td>
<td>Before</td>
<td>62.8 ±14.8</td>
<td>62 (51-74.5)</td>
<td>31-95</td>
</tr>
<tr>
<td></td>
<td>After</td>
<td>69.4 ±18</td>
<td>71 (57.5-86.5)</td>
<td>15-93</td>
</tr>
</tbody>
</table>
Conclusions: There are right and left side differences in cSO$_2$ in pediatric shock, and the increment in cSO$_2$ with fluid bolus may have a prognostic value. Our findings challenge previous literature using unilateral monitoring, and call for future studies of larger scale performed with bilateral monitoring in shock.

References (if needed)
NORMATIVE VALUES OF BILATERAL CEREBRAL AND RENAL TISSUE OXYGENATION IN CHILDREN
B. Aygun¹, F. Girgin², E. Uyar², M.N. Ozturk²
¹Marmara University Hospital, Pediatrics, ISTANBUL, Turkey
²Marmara University Hospital, Pediatric Critical Care, ISTANBUL, Turkey

Background
NIRS monitoring is performed increasingly in critical illness, but normative values in children are scarce.

Objectives
To investigate cerebral (cSO₂) and renal tissue oxygenation (rSO₂) in children without critical illness

Methods
This was a cross sectional descriptive study performed in a university based hospital. One hundred consecutive children seen in outpatient setting were included. Bilateral cerebral (cSO₂) and renal oxygen saturations (rSO₂) were measured with INVOS 5100 C cerebral/somatic oxymeter, and patient demographics and presenting complaints were recorded.

Conclusions/Results
Out of 100 children 59 were females. Median age was 6.7 years (IQR 3.0-10.4), median weight was 21 kilograms (IQR 13-33). There were no differences in right and left cerebral and renal NIRS values (Table). Renal SO₂ values were higher than cerebral SO₂ in 63% of the children. Breakdown by gender did not show any differences in relation to tissue oxygen saturations.

Table: Cerebral and renal NIRS values

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Median (IQR)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>cSO₂ (L)</td>
<td>79.1 (5.7)</td>
<td>78.5 (74-83)</td>
<td>65.0</td>
<td>92.0</td>
</tr>
<tr>
<td>cSO₂ (R)</td>
<td>78.7 (6.0)</td>
<td>78.0 (82-73)</td>
<td>66.0</td>
<td>95.0</td>
</tr>
<tr>
<td>rSO₂ (L)</td>
<td>81.4 (9.2)</td>
<td>82.5 (73-90)</td>
<td>61.0</td>
<td>95.0</td>
</tr>
<tr>
<td>rSO₂ (R)</td>
<td>81.5 (9.4)</td>
<td>83.0 (75.2-89)</td>
<td>61.0</td>
<td>95.0</td>
</tr>
<tr>
<td>delta C</td>
<td>1.6 (1.2)</td>
<td>2.0 (0.0-6.0)</td>
<td>0.0</td>
<td>6.0</td>
</tr>
<tr>
<td>delta R</td>
<td>1.5 (1.2)</td>
<td>1.0 (0.0-5.0)</td>
<td>0.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

cSO₂ (L) left cerebral oxygen saturation; cSO₂ (R) right cerebral oxygen saturation; rSO₂ (L) left renal oxygen saturation; rSO₂ (R) right renal oxygen saturation; delta C (absolute difference in right and left cerebral saturation); delta R (absolute difference in right and left renal saturation).

Conclusions: There are no right and left side differences in cSO₂ and rSO₂ values in children with non critical conditions.
References (if needed)
Accurate newborn monitoring during and after surgery is essential to adapt resuscitation protocols. Near InfraRed Spectroscopy (NIRS) is non-invasive and can detect hypoperfusion which indicates a low circulatory blood flow, regardless of the cause.

In this preliminary study, we aimed to evaluate changes in cerebral and renal regional oxygen saturation during neonatal digestive surgeries, conducted according to normal practices, with commonly used monitoring parameters.

We enrolled prospectively all neonates referred for digestive surgery. NIRS allows the measurement of cerebral and renal oxygenation fluctuations, as well as calculating difference in intraoperative and postoperative values. We analyzed the inter-relationships between NIRS values and mean arterial pressure (MAP) values as well as pre-ductal SpO2.

Nineteen patients were included. 72% of cerebral and renal regional oxygen saturation (C and R rSO2) decline episodes occurred after the first 30 minutes of surgery. After surgery, 60% of C rSO2 and R rSO2 anomalies occurring in the first six hours. There was a significant correlation between R rSO2 and SpO2 values (p < 0.01), but not with C rSO2 values. There was no correlation with the MAP either for the C rSO2 values or R rSO2 ones.

This preliminary study confirms that NIRS is a promising non-invasive bedside tool to monitor cerebral and tissue perfusion, analyzing tissue microcirculation. NIRS has its interest to guide neonatal digestive surgeries (bowel manipulation, viscera reduction).
CARDIOVASCULAR DYNAMICS part 2

ESP7-0437

BEDSIDE ECHO FOR HEMODYNAMIC MEASUREMENTS OF CRITICALLY ILL CHILDREN WITH SEPTIC SHOCK IN EGYPTIAN PEDIATRIC INTENSIVE CARE UNIT.

H. algebaly¹, A. Behairy¹, S. Elsherbini¹, R. Ibrahim¹, F.A. Abdalaziz¹

¹Faculty of medicine Cairo university, pediatrics, CAIRO, Egypt

Background

The measurements of SV and CI are fundamental to the hemodynamic management of unstable patients.

Objectives

Follow up of CI & SVRI by bedside echo till resuscitation.

Methods

A set of hemodynamic parameters was obtained included COP, SV, CI, SVRI, VTI, Tei index, capillary refill time and heart rate at zero hours after fluid boluses and before the start of inotropes and followed after 6 hours & 24 hours.

Conclusions/Results

45 patients with community-acquired septic shock were included. Septic focus: 24% gastroenteritis, 24% intestinal perforation requiring emergency surgery, 20% pneumonia, 22% CNS infection, 8% soft tissue infection. klebsiella & Enterobacter were the most frequent isolates. We estimated the factors affecting the CI: high CVP at zero time \( r=0.33, p \text{ value}=0.024 \) persistently high heart rate at hour 6 \((r=0.33, p \text{ value }0.03)\). The SVRI remained high in most patients till the time of resuscitation and inversely affected the CI \(( r=-0.65, -0.6, -0.69\&0.7)\) at zero, six, 24 hours & at the time of resuscitation & also affected the VTI \((r=-0.416, -0.61, -0.55\&-0.295)\). CRT was a clinical predictor of low VTI at 24 hours.(\( r=-0.4 \)). The mortality was 27%. Lower SVRI & higher COP were observed in non-surviving patients. Conclusion: there was a persistently high SVRI in cold shock patients which influenced the SVI, CI & VTI. The use of echo for hemodynamic measurements is important in pediatric septic shock patients to modulate dilators & vasopressor does and achieves resuscitation targets at a proper time

References (if needed)
APPLICATION OF TELMEdICINE IN PEDIATRIC AND CONGENITAL CARDIOLOGY

F. Bennaoui¹, N. El Idrissi Slitine¹, S. Kajai¹, C. Sable², F.M.R. Maoulainine¹

¹Mohammed VI University Hospital, Neonatal Intensive Care Department, Marrakech, Morocco
²Pediatric Cardiology- Children's National Health System, Children's National Health System, Washington DC, USA

Background

The current maturity of information technology allows telemedicine to integrate into current medical practice. Pediatric cardiology is one of the privileged fields of application. This facilitates access to specific skills and management of patients.

Objectives

The purpose of this work was to determine for each patient an optimal therapeutic strategy, to study the contribution of this technology in teaching and continuing medical education.

Methods

We report on our experience in telemedicine between the team of the Marrakech hospital Mohammed VI (neonatology service and cardiovascular surgery department) and the director of the cardiology and echocardiography teaching program in Washington. A weekly videotransmitted consultation was conducted between March 2011 and December 2016.

Conclusions/Results

The telemedicine meeting consisted of two parts: consultation with transmission of echocardiography and then medical collegial discussion. The total number of patients included was 140, with 50.7% female. Their age ranged from 3 days to 16 years. Heart disease was congenital in 121 patients and acquired in 19 patients. The diagnosis was confirmed in 65 cases, completed in 47 cases and straighten in 26 cases. The aim of the telemedicine consultation was to specify the medical therapy in 23 patients; the indication of surgery or interventional catheterization in 77 and 16 patients respectively. The evolution of the patients was favorable in 44% of the cases, 13% wait for surgery.

The consultation of pediatric and congenital cardiology by telemedicine allows patients to benefit from advice about the optimal therapeutic strategy and represents an opportunity for the medical and team for continuing education.

References (if needed)
Background

Increased intra-abdominal pressure (IAP) is observed in many critically ill neonates. It can lead to abdominal compartment syndrome with multiple organ dysfunction. There are very limited data about baseline IAP in critically ill neonates in the literature.

Objectives

To determine baseline IAP in critically ill neonates without risk factors for intra-abdominal hypertension (IAH) and compare IAP in positive pressure ventilation (PPV) and spontaneous breathing (SB) group.

Methods

Prospective observational study in multidisciplinary neonatal and pediatric ICU on neonates who required a urinary catheter and did not have risk factors for IAH. IAP was measured using AbViser™ monitoring system and bladder instillation volume of 1ml/kg+2 ml. Groups of patients were compared using t-test and U-test statistics.

Conclusions/Results

Twenty neonates were included. The median (range) birth weight and gestational age were 2907.5 g (1870-3740) g, 36 (33-41) weeks, respectively. SB (N=5) and PPV (N=16) group did not differ (p>0.05) in birth weight or gestational age. Median (range) PEEP in PPV group was 5.9 (4.0-9.0) cmH2O. The median (range) IAP for all measurements was 7.2 (4.3-9.2) mmHg. Median (range) IAP for SB and PPV group did not differ significantly (p=0.17) and was 6.3 (4.3-8.3) and 7.2 (4.5-9.2) mmHg, respectively.

Median IAP in our study group of critically ill neonates was 7.2 mmHg. PPV is known to influence IAP, but results of our study did not show statistically significant elevation of IAP between SB and PPV group. Larger study sample is needed to further evaluate IAP in critically ill neonates.

References (if needed)
Background

The left atrium (LA) functions as a reservoir, conduit, and booster pump to provide the left ventricle with blood. New information on the clinical relevance of left atrial volume and deformation analysis is constantly emerging in adults where atrial dysfunction may exist as an isolated entity, precede ventricular dysfunction and/or coexist with ventricular dysfunction.

Objectives

Assess the feasibility and reliability of left atrial volume, strain (S) and strain rate (SR) analysis in preterm infants.

Methods

Apical 2, 3 and 4 chamber images of the LA were collected for analysis with speckle tracking software in preterm infants <30 weeks' gestation with normal ventricular function. Measurements were timed to the R wave of the ECG (min), at ventricular end systole (max) and at the onset of the P wave (preA).

Conclusions/Results

Results

68 images of 20 infants were analysed. Feasibility of analysis was 89%, but optimal standard image acquisition required training. Inter and intra class correlation for the parameters varied between 0.82 and 0.96. Atrial reservoir, conduit and booster pump function are presented in the table.

<table>
<thead>
<tr>
<th>Volumetric analysis</th>
<th></th>
<th>(ml/kg)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LA remodelling</td>
<td>LA maximum volume index</td>
<td>1.51(0.37)</td>
<td></td>
</tr>
<tr>
<td>LA total</td>
<td>LA total ejection fraction, (max-min)/max</td>
<td>57.4(6.6)</td>
<td></td>
</tr>
<tr>
<td>LA reservoir</td>
<td>LA expansion index, (max-min)/min</td>
<td>142.9(34.4)</td>
<td></td>
</tr>
<tr>
<td>LA conduit</td>
<td>LA passive ejection fraction, (max-preA)/max</td>
<td>24.9(6.5)</td>
<td></td>
</tr>
<tr>
<td>LA pump</td>
<td>LA active ejection fraction, (preA-min)/preA</td>
<td>42.9(7.1)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Myocardial analysis</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LA reservoir</td>
<td>S and SR at ventricular end systole (max)</td>
<td>38.8(7.2), 2.95(0.61)</td>
<td></td>
</tr>
<tr>
<td>LA conduit</td>
<td>S and SR during passive emptying (max-preA)</td>
<td>15.7(4.1), -2.10(0.45)</td>
<td></td>
</tr>
<tr>
<td>LA pump</td>
<td>S and SR at atrial systole (preA)</td>
<td>23.2(5.1), -4.46(0.45)</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

This is the first study on atrial mechanics in preterm infants. It showed that volume and deformation analysis was feasible and can provide detailed information on atrial mechanics. Further research is required to test the clinical performance of these parameters in this population.
References (if needed)
DOES THE BISPECTRAL INDEX REFLECT THE LEVEL OF SEDATION IN VENTILATED PEDIATRIC INTENSIVE CARE PATIENTS?

P. Deindl1, M.D. Joesch1, F. Uhlenberg1, M. Blohm1, C. Ebenebe1, D. Singer1

1University Medical Center Hamburg-Eppendorf, Department of Neonatology and Pediatric Intensive Care Medicine, Hamburg, Germany

Background

Few studies report the potential of the BIS for the estimation of the level of sedation in children.

Objectives

Aim of this study was to analyse whether the BIS reflects the level of sedation and if the BIS can predict movement and haemodynamic responses to a noxious stimulus in pediatric intensive care patients.

Methods

Fifteen patients between 2 and 17 years of age that were ventilated and received continuous sedoanalgesic therapy for various reasons were included in this study. The Bispectral Index and heart rate were recorded and both the COMFORT B Scale and the Behaviour Pain Scale (BPS) before and during an endotracheal suctioning manoeuvre were assessed. Positive responses were defined as an increase in heart rate > 5 bpm and a BPS of >5.

Conclusions/Results

Mean BIS±SD values for the sedation categories undersedation, adequate sedation and oversedation according to the COMFORT B scale (0 to 10; 11 to 22 and >22) were as follows: 34 ± 19; 59 ± 18 (p<0,001) and 77 ± 8 (p=0.12). The correlation of the BIS and COMFORT B scale high (Spearman correlation index r=0.59, p<0.001). Mean BIS±SD values in patients that responded to a noxious stimulus were significantly lower than in those that did not respond (heart rate: 34±18 vs. 55±27, p<0.001; BPS response: 39±23 vs. 56±19, p=0.004).

We conclude that the BIS highly correlates with the COMFORT B scale as well as with responses to a noxious stimulus in ventilated pediatric intensive care patients.
NEED OF INTENSIVE CARE IN VOLUNTARY POISONING WITH CARDIOVASCULAR DRUGS

O. Frasinariu1, A.M. Buga2, C. Jitareanu2, N. Nistor1, V. Streanga1
1University of Medicine and Pharmacy "Grigore T. Popa" Iasi, Pediatrics, Iasi, Romania
2Saint Mary Children Hospital, First Pediatric Clinic, Iasi, Romania

Background

Simultaneously overdose of calcium channel blockers and beta-adrenergic receptor antagonists can have severe adverse effects due to the hypotensive and bradicardizante effects that often can be refractory to standard resuscitation measures.

Objectives

We would like to emphasize the need of intensive care in severe poisoning with cardiovascular drugs.

Methods

We present the case of a female adolescent, under antidepressant treatment, that after a fight with her family, voluntary ingested 30 tablets of bisoprolol, 20 tablets of amlodipine and 12 tablets of her antidepressant treatment. One hour after, she was brought to the emergency room with hypotension (systolic blood pressure less than 60 mmHg) and bradycardia (heart rate less than 55/min). EKG revealed also an atrioventricular block 1st degree. In the intensive care unit, after initial fluid resuscitation with crystalloids, was instituted the infusion with double association of vasoactive drugs, dopamine using an initial dose of 10 mcg/kg/min and norepinephrine in dose of 10 mcg/min, and calcium gluconate administration. In absence of glucagon or phosphodiesterase inhibitors, we needed to increase the doses of catecholamines. The patient had a favorable slow evolution, the vital parameters returning to optimal ranges approximately 40 hours after initiation of therapy. Although the patient did not recognize suicidal intent, patient was transferred to the psychiatric clinic for reevaluation and further specialized treatment.

Conclusions/Results

Cardiovascular drugs intoxication may be fatal without an aggressive treatment in intensive care and such events can be repeated in patients and adolescents with psychiatric disease.

References (if needed)
Background

Pulmonary thromboembolism in children is a rare condition, most commonly associated with the use of vascular devices and prothrombotic syndromes. Its association with the use of oestrogen-containing medications has been increasingly described in literature.

Objectives

Clinical report

Methods

A 16-years old obese female was brought to the Paediatric Emergency Department due to effort syncope, dyspnea and altered conscious level. At admission the patient had poorly perfused extremities, HR 145 bpm and BP 75/58mmHg, SpO2 95-96% with FiO2 100%, GCS 15, with no other relevant findings. Arterial blood gas: pH 7.15, paCO2 52.7mmHg, paO2 96.4mmHg, HCO3 16.8mmol/L, lactate 4.8mmol/L. Relevant lab results: FDPs 17329mcg/L, total CK and troponin I normal. Irrelevant chest x-ray. The EKG showed a S1Q3T3 pattern. Pulmonary angio-CT scan revealed a massive pulmonary thromboembolism affecting the right and left main pulmonary arteries extending into segmental branches. Although 100mg IV alteplase was initiated, the patient presented a cardio-respiratory arrest. Resuscitation manoeuvres were performed and the patient recovered spontaneous circulation with a complete AV block pattern, and an external pacing was started. She was transferred to an adult haemodynamics unit where she was placed in ECMO. Identified risk factors for thrombosis included morbid obesity (BMI 35kg/m2), the use of a combined oral contraceptive for 1.5 years, and minor heterozygous mutations in genes MTHFR (677C>T & 1298A>C) and PAI-1 (5G/4G).

Conclusions/Results

With the increasing paediatric age, associated with obesity epidemics, uncommon cause of respiratory distress or haemodynamic instability, such as pulmonary thrombosis, must be suspected in the primary approach of these patients.

References (If needed)
A MASSIVE ARTERIOVENOUS MALFORMATION ARISING FROM THE AORTA CAUSING SUPRA-SYSTEMIC PULMONARY HYPERTENSION

P. Kennelly¹, G. Nolan², L. Mac Darby³, S. Crowe⁴

¹Our lady’s hospital for Sick Children- Crumlin, Intensive care medicine, Dublin, Ireland
²Our ladys children’s hospital- Crumlin, Intensive Care Medicine, Dublin, Ireland
³Our Lady’s children’s hospital- Crumlin, Intensive Care Medicine, Dublin, Ireland
⁴Our ladys hospital for Sick Children- Crumlin, Intensive care medicine, Dublin, Ireland

Background

Aortic arteriovenous malformations (AVMs) are rare vascular anomalies where the aorta communicates with adjacent venous structures bypassing the capillary system. We report a case of a neonate born at 34 weeks gestation who presented at 3 weeks of life in respiratory distress. Echocardiography showed severe pulmonary hypertension with right ventricular dilatation but an otherwise structurally normal heart. Routine renal ultrasonography as part of the congenital work up demonstrated a large cystic mass arising from the inferior vena cava (IVC) with both arterial and venous vascular flow within it. A large pulsatile mass could be palpated in her abdomen and there was an audible bruit associated with it. Further evaluation with magnetic resonance angiography (MRA) showed a massive arteriovenous malformation from both left and right iliac arteries, and lumbar arteries communicating with the IVC. Following discussion with interventional radiology the decision was made to attempt coiling of the vascular lesion. Following this procedure her pulmonary hypertension worsened in severity culminating in acute heart failure and multi-organ dysfunction. A subsequent interventional radiology procedure found that there was no blood flow to her bowel or abdominal viscera. During the procedure severe haemodynamic instability ensued resulting in cardiac arrest with an ultimately unsuccessful attempt at resuscitation.

Objectives

N/A

Methods

N/A

Conclusions/Results

This case describes a presentation of severe pulmonary hypertension initially considered to be secondary to either congenital heart disease or intrinsic pulmonary disease but which was found to be as a result of a very rarely occurring massive aortic AVM.

References (if needed)

N/A
ADHERENCE AND NEONATAL OUTCOMES FOLLOWING IMPLANTATION OF A PATENT DUCTUS ARTERIOSUS EARLY DETECTION AND TREATMENT PROTOCOL FOR EXTREMELY PRETERM INFANTS

A.R. Lehr¹, N. Dakhallah¹, A. Moussa², M.J. Raboisson³, A. Lapointe²
¹CHU Sainte Justine, Paediatrics, Montreal, Canada
²CHU Sainte Justine, Neonatology, Montreal, Canada
³CHU Sainte Justine, Paediatric Cardiology, Montreal, Canada

Background

Patent ductus arteriosus (PDA) management remains controversial and therefore practice vary widely. Early detection and treatment approach of the PDA was introduced as a quality improvement initiative in our level 3 neonatal intensive care unit (NICU).

Objectives

To determine the adherence to a PDA management protocol and its impact on neonatal outcomes.

Methods

Retrospective review of medical records and echocardiograms of infants born at less than 27 weeks before (Epoch 1: May'14-May'15) & after (Epoch 2: Jul'15-Jul'16) the introduction of a PDA management protocol in Jun'15. Primary outcome was adherence to the protocol and secondary outcomes were incidence of mortality and morbidities.

Conclusions/Results

101 premature infants, born at a median gestation of 25.0 [24.1-26.0] weeks and a mean birth weight of 750.5±172.7g, were analyzed. There was no difference in neonatal demographics, PDA characteristics or median time for the first echocardiography (22h:39min vs 25h:31min;p=0.17) between Epoch 1 (n=49) and Epoch 2 (n=52). Mortality and morbidities are presented in Table 1. After implantation, adherence to protocol was good (71%). Also, we observed more non steroids anti-inflammatory exposition for PDA treatment (88.5% vs 61.9%;p=0.002 after the first and 80% vs 53.3%;p=0.04 after the second echocardiography) without more side effects, a trend toward a decrease in PH, significantly less sepsis, higher PDA closure rate (32.4% vs 15%;p=0.02) and less surgical PDA ligation (5.8% vs 20.4%;p=0.03).
<table>
<thead>
<tr>
<th>Outcome measure</th>
<th>Epoch 1 (n=49)</th>
<th>Epoch 2 (n=52)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary Hemorrhage (%)</td>
<td>6 (13)</td>
<td>1 (2.2)</td>
<td>0.06</td>
</tr>
<tr>
<td>Sepsis (%)</td>
<td>17 (33)</td>
<td>5 (10.9)</td>
<td>0.01</td>
</tr>
<tr>
<td>Spontaneous intestinal perforation (%)</td>
<td>8 (17)</td>
<td>5 (9.6)</td>
<td>0.28</td>
</tr>
<tr>
<td>Necrotizing enterocolitis (%)</td>
<td>15 (32.6)</td>
<td>13 (25.0)</td>
<td>0.48</td>
</tr>
<tr>
<td>Pulmonary bronchodysplasia (%)</td>
<td>33</td>
<td>36</td>
<td>0.28</td>
</tr>
<tr>
<td>Hospitalisation duration (days)</td>
<td>108.6±90</td>
<td>90.3±66.6</td>
<td>0.25</td>
</tr>
<tr>
<td>Mortality (%)</td>
<td>17 (34.7)</td>
<td>14 (26.9)</td>
<td>0.40</td>
</tr>
</tbody>
</table>

References (if needed)
Background

Third-degree atrioventricular block (AVB) is a disorder of the cardiac conduction system, in which there is no conduction through the atrioventricular node, leading to a complete dissociation of the atrial and ventricular activity.

Objectives

The aim was to study the evolution of newborns with congenital third degree AVB in a single centre.

Methods

Descriptive, retrospective analysis of nine cases of third degree AVB prenatally diagnosed in a single centre in a 10-year period.

Conclusions/Results

Nine cases were registered, all of them with prenatal diagnosis; 75% of them were girls. Maternal antibodies (antiRo and antiLa) were associated with 66.7% of the cases, but only in two of them (33.3%) the mother was diagnosed before pregnancy. Half of the newborns presented congenital cardiac malformations, such as atrial or ventricular septal defects. The average heart rate at birth was 54 bpm. Two newborns needed advanced maneuvers of resuscitation. In all cases, but one, a pacemaker was required at the mean age of 3.75 days. Three of them were diagnosed of dilated myocardioopathy at the mean age of 3.23 years and they are currently on medication against heart failure. Only one of these newborns needed a heart transplant.

Conclusions: congenital atrioventricular block is related to maternal antibodies, antiRo and AntiLa, that are usually diagnosed in the maternal serum during pregnancy. Therefore, a complete study of pregnant women is necessary. Newborns may develop in the future dilated myocardioopathy, but the need for a heart transplant is not very frequent.

References (if needed)
A RARE TOGETHERNESS OF EBSTEIN ANOMALY AND GIANT HAIRY NEVUS IN A NEONATE

F. Ozlu1, M. TÜLÜCE2, N. ÖZBARLAS3, M. Satar1, B. Kozanoğlu4, A. Yücel5, H. Yapıcıoğlu Yıldızdaş1

1Çukurova University, NEONATOLOGY, ADANA, Turkey
2Çukurova University, pediatrics, Adana, Turkey
3Çukurova University, pediatric cardiology, Adana, Turkey
4Çukurova University, pediatric oncology, Adana, Turkey
5Çukurova University, Dermatology, ADANA, Turkey

Background

Ebstein’s anomaly is a congenital heart defect in which the septal and posterior leaflets of the tricuspid valve are displaced through the apex of the right ventricle. This leads atrialization of a portion of the right ventricle. This causes the right atrium to be large and the anatomic right ventricle to be small in size. The insidans of this anomaly is 0.3-0.8% among all congenital heart defects due to the narrowing of right ventricle ductus arteriosus may be obligatory for pulmonary blood flow at early hours after birth.

Objectives

The congenital nevomelanocytic nevus, known commonly as the congenital hairy nevus, denotes a pigmented surface lesion present at birth. Using the prediction classification, giant nevi have been described as comprising 9 cm on a child’s head and 6 cm on a child’s body. Very large congenital nevi account for less than 0.1% of cutaneous melanomas

Methods

Here we present a neonate with Ebstein anomaly diagnosed prenatally with giant hairy nevus comprising more than %50 of the body

Conclusions/Results

This is the only case in literature describing these two pathologies in the same neonate

References (if needed)
MYOCARDIAL DYSFUNCTION IN SEPTIC SHOCK

L. Pejic¹, M. Ratkovic Jankovic²

¹Clinic for pediatric internal diseases- Clinical Center Niš, Cardiology, Nis, Serbia
²Clinic for pediatric internal diseases- Clinical Center Niš, ICU, Nis, Serbia

Background

Septic shock is a serious, lifethreatening condition often associated with multiple organ dysfunction. The incidence of myocardial dysfunction in sepsis is unknown as well as its impact on survival, independently other organ system dysfunction.

Objectives

We reported a 15 years old boy with septic shock who developed severe myocardial dysfunction

Methods

Adolescent aged 15 years with clinical signs of septic shock was admitted to the Intensive Care Unit. The previous five days he has occasionally hyperthermia and complained of dry cough and diarrhea. In laboratory investigations dominate leukocytosis, thrombocytopenia, very high parameters of inflammation, moderately elevated levels of nitrogen products, hypoalbuminemia, hypoproteinemia and metabolic acidosis. After initial therapy of septic shock, patient was still haemodynamically unstable with significant signs of myocardial dysfunction. Transthoracic echocardiography showed left ventricular dysfunction (FS = 18%), with mitral regurgitation 1+, tricuspid regurgitation 2+ and pericardial effusion. We continued with intensive inotropic stimulation, antibiotics, corticosteroids and correction of metabolic disorders. During further hospitalization clinical and laboratory recovery were a significant, but with long-term maintenance depending on inotropes. After two weeks the boy was discharged home with regular clinical and echocardiographic findings.

Conclusions/Results

The diagnosis of sepsis requires the clinician carefully continuous haemodynamic monitoring in order to recognize early signs of possible development of a shock because only timely use of aggressive treatment can prevent a bad outcome. Current treatment for sepsis-induced cardiac dysfunction is based on appropriate treatment for the infectious focus (antibiotics and source control) and hemodynamic support (fluids, vasopressors, and inotropes).

References (if needed)
SEVERE TRANSIENT LEFT VENTRICULAR DYSFUNCTION MIMICKING CRITICAL AORTIC STENOSIS IN AN ASPHYCTIC NEONATE PRESENTING WITH CARDIOGENIC SHOCK

B. Reulecke1, T. Krasemann2, C. Garland1, H. Rabe1, R. Fernandez1
1Royal Sussex County Hospital, Neonatology, Brighton, United Kingdom
2Evelina Children's Hospital, Paediatric Cardiology, London, United Kingdom

Background

The majority of neonatal cardiogenic shock is caused by structural cardiac anomalies or arrhythmias.

Objectives

We report the case of an asphyctic neonate with severe transient left ventricular dysfunction mimicking critical aortic stenosis.

Methods

A post-term infant born via vaginal delivery unexpectedly collapsed at birth requiring therapeutic hypothermia. Persistent central cyanosis with pre-/post-ductal saturations of 40-50% not responsive to aggressive ventilation was recorded. Echocardiography showed normal right heart function, no tricuspid regurgitation or shunting across the foramen ovale, a ballooned left ventricle with significant mitral regurgitation, no antegrade flow through the aortic valve, retrograde flow in the aortic arch and poor bi-directional flow across the patent ductus arteriosus (PDA). Based on these findings the diagnosis of critical aortic stenosis was made. Treatment with high-dose prostaglandin resulted in significant clinical improvement and oxygenation. A right-to-left shunt via a wide PDA was documented subsequently. Approximately 5h into prostaglandin treatment the echocardiogram was normal without evidence of congenital heart disease and normal biventricular contractility, the PDA had closed.

Conclusions/Results

Echocardiographic findings at the time of cardio-circulatory failure pointed towards left ventricular outflow tract obstruction.

Creating a right-to-left shunt via the PDA allowed stabilisation of the compromised systemic perfusion. Transient global myocardial dysfunction following perinatal asphyxia as well as transient functional aortic stenosis have been separately documented in the literature. To our knowledge this is the first published case of perinatal asphyxia with isolated acute left myocardial dysfunction resulting in right heart pressures exceeding left heart pressures mimicking aortic stenosis.

References (if needed)
EVALUATION OF INFERIOR VENA CAVA COLLAPSIBILITY INDEX IN CASES WITH INTRAVASCULAR VOLUME DEPLETION

M.M. Cengiz¹, R. İşgüler¹, G. Ceylan¹, B. Polat¹, G. Atakul¹, Ö. Saraç Sandal¹, F. Sarı¹, H. Ağın¹
¹Behcet Uz Children Diseases and Surgery Training and Research Hospital, pediatric intensive care unit, izmir, Turkey

Background

The symptoms of dehydration in children are silent and variable, and many of these findings are not specific. Failure to determine the degree of dehydration extends the length of hospital stay. Furthermore, it is known that incorrect fluid therapy causes morbidity and even mortality. Inferior Vena Cava (IVC) ultrasonography (USG), is a noninvasive method for assessing intravascular volume status and for verifying the diagnosis of dehydrated children.

Objectives

In our study, we aimed to measure the IVC collapsibility index before and after fluid treatment with bedside USG in children who had dehydration clinic and to compare these data with the data of the control group.

Methods

Between July and November 2016, 44 children were enrolled in the study prospectively. Dehydration group consisted of 26 (59.1%) patients and control group was consisted of 18 (40.9%) patients without dehydration. The measurements were done by a single radiologist. For the longitudinal measurement of IVC, the probe was placed in the subxiphoid region, and measurement was taken between 1 cm below hepatic vein junction and the entry point to the right atrium.

Conclusions/Results

In our study, inspiratory and expiratory IVC diameters in the patient group were found to be lower than those in control group (p<0.001 and p=0.02 respectively). In the patient group, significantly increased IVC diameters and decreased IVCCI after rehydration were found (p=0.009 and p<0.001 respectively). A quick and correct evaluation of dehydration by determining IVC parameters with bedside US is a diagnostic test with a relatively high sensitivity and specificity.

References (if needed)
A RARE CARDIAC ARRHYTHMIA: ASHMAN PHENOMENON
G. Atakul¹, F. Sarı¹, R. İşgüder¹, G. Ceylan¹, Ö. Saraç Sandal¹, M.M. Yılmazer¹, H. Ağın¹
¹Behcet Uz Children Diseases and Surgery Training and Research Hospital, pediatric intensive care unit, izmir, Turkey

Background
Ashman phenomenon is an aberrant ventricular conduction during atrial fibrillation. It is due to a change in the length of QRS complex. It is most often mistaken as premature ventricular contraction (PVC) or ventricular tachycardia.

Objectives
We aimed to represent an arrhythmia case which can easily misdiagnose and mistreated.

Methods
A 15-year-old male patient admitted to emergency department with the complaint of palpitation. He has 3 years of Type 1 DM history and he was using isotretinoin to treat nodular acnes for 1 month. His heart rate was 195 beats/min and his ECG was compatible with SVT. Adenosine was administered twice, but subsequently, he was transferred to our PICU because his heart did not return to the sinus rhythm. A new dose of 6 mg/kg adenosine was given IV. Just after the adenosine administration, we have noticed that he has atrial fibrillation and the PVCs are due to Ashman phenomenon. After a transesophageal echocardiography, synchronized cardioversion was performed to the patient 3 times starting from 0.5 J/kg. Synchronized cardioversion was repeated 3 times with 0.5 J/kg dose increments but the patient was unresponsive. Amiodarone was initiated in order to medical cardioversion and the patient responded very quickly. Amiodarone infusion had been stopped after 48 hours, and the patient was transferred to pediatric cardiology department with oral propranolol treatment.

Conclusions/Results
Ashman phenomenon is a very rare condition in childhood and should be distinguished from PVC and series of consecutive aberrantly conducted supraventricular complexes, because of their totally different treatment options.

References (if needed)
BACKGROUND

The red blood cell (RBC) transfusion is commonly administered in preterm infants because of frequent blood test or anemia of prematurity. Recently, the measurement of cerebral regional tissue oxygenation by near infrared spectroscopy (NIRS) has been established as a promising method to assess cerebral oxygenation in neonatal care units.

OBJECTIVES

To evaluate efficacy of cerebral perfusion in RBC transfusion, we investigated changes before and after RBC transfusion in cerebral regional tissue oxygenation and hemodynamic variables using a NIRS system and echocardiography in stable preterm infants.

METHODS

Stable preterm neonates were reviewed after transfusion of red blood cells of 15-20 mL/kg in 3 hours. Vital signs, echocardiography, cerebral oxygenation and pulse oximetry were collected before, immediately-after, and 24-hours after the initiation of transfusion. Clinical data were analyzed using ANOVA with repeated measures.

CONCLUSIONS/RESULTS

RESULTS: Fifteen preterm infants were studied with a mean gestational age of 28.2±4.2 weeks and body weight is 2.7±2.3 Kg. Hemoglobin and hematocrit levels of before RBC transfusion were 9.6±1.5 mg/dl and 28.4±4.3 %, respectively.

Cerebral regional tissue oxygen saturations were significantly increased immediately-after and post 24-hours transfusion (56.2±10.9 vs 64.4±10.6 vs 63.4±12.3, P<0.01). And ejection fractions, right ventricular outputs and stroke volumes were significantly increased immediately-after and post 24-hours transfusion.

Heart rates, diastolic blood pressures, systolic blood pressures and peripheral oxygen saturation were not changed after transfusion.

CONCLUSION: RBC transfusion may be clinically beneficial to the hemodynamically stable preterm infants to increase cardiac output and cerebral oxygenation.

REFERENCES (if needed)
ADMINISTRATION OF INTRAPERICARDIAL TISSUE PLASMINOGEN ACTIVATOR IN A 2 YEAR-OLD CHILD WITH PURULENT PERICARDITIS DUE TO HAEMOPHILUS INFLUENZAE

I. Alexandra¹, U. Yousifi², K. Shimabukuro¹
¹Loma Linda Univ Medical Center, Pediatrics, Loma Linda, USA
²Seventh-day Adventist Guam Clinic, Pediatrics, Tamuning, Guam

Background

Purulent pericarditis (PP) is a now rare disease that, even when treated, carries a poor prognosis. Prompt recognition, intravenous antibiotics, and pericardial drainage are crucial to good outcomes, but extensive fibrin deposition often necessitates surgical intervention. Intrapericardial fibrinolytics may offer a less invasive alternative to surgery.

Objectives

Describe a patient with PP, and interventions taken to prevent tamponade and subsequent constrictive pericarditis.

Methods

Intervention Details: 1 mg of tissue plasminogen activator (tPA) per 5 mL normal saline was administered intrapericardially daily for 3 days, with a dwell time of 2 hours each day.

Case Report: A previously healthy, though unvaccinated, 2 year-old male developed Haemophilus influenzae septic shock. He was acidotic, and required intubation and vasoactive drips. An echocardiogram showed depressed function and a moderate, circumferential pericardial effusion. Despite clinical improvement his effusion remained, and echo was concerning for compression of the right ventricle and markers of constrictive pericarditis. Percutaneous pericardiocentesis was performed with 75 mL of frankly purulent fluid withdrawn via a pigtail catheter. tPA was administered intrapericardially daily for 3 days with 100-300 mLs of fluid drainage per day. Patient survived to hospital discharge, with subsequent echoes confirming no constrictive pericarditis.

Conclusions/Results

Intrapericardial fibrinolytics may avoid the need for invasive surgical management of PP and the subsequent development of constrictive pericarditis.

References (If needed)
Prenatal Diagnosis of the Congenital Cardiac Disease Impact Outcome in the Newborn Patients

L.M. Suciu¹, M. Cucerea¹, M. Simon¹
¹University of Medicine and Pharmacy Tîrgu Mureș, Pediatrics, Tîrgu Mureș, Romania

Background

Congenital heart disease remains the most important cause of death in the first year after birth. Mortality occurs mainly in patients with severe forms of congenital heart disease requiring immediate surgical intervention.

Objectives

The purpose of this study was to evaluate retrospectively the effect of prenatal diagnosis on the newborn with congenital heart disease, comparing the length of hospital stay and associated morbidity and mortality in prenatally and postnatally diagnosed groups of patients with similar diagnoses.

Methods

This retrospective study included 66 patients diagnosed with congenital heart disease between January, 2014 to December, 2016 admitted in one university referral Neonatal Intensive Care Unit. Two different groups of patients with structural heart disease were compared, one in which the diagnosis was made prenatally and the other in which the cardiac anomaly was discovered after birth.

Conclusions/Results

10 of 24 infants with PDA dependent pulmonary circulation, 7 of 11 infants with PDA dependent systemic circulation and 16 of 31 infants with PDA mixing circulation were included in the antenatal diagnosis group. For those infants included in the antenatal diagnosis group mean PEG1 infusion length was 19.39 (SD 13.6) vs 16.79(SD 7.9) and 18% vs 30% (p=0.024) needed respiratory support during admittance.

Prenatal diagnosis of congenital heart disease minimizes the length of ventilator support and PGE1 infusion in newborn patients with congenital cardiac diseases and may be associated with the improved outcomes although no significant effect on time to surgical repair or mortality were encountered.

References (if needed)
CASE REPORT: ACUTE MYOCARDIAL INFARCTION AFTER THE USE OF INHALATORY EPINEFRIN IN A PAEDIATRIC INTENSIVE CARE UNIT

M. Tonelotto¹, C. Neiva¹, R. Bassani¹, A. Stape¹, G. Foronda¹, S. Kushida¹
¹Hospital Israreliita Albert Einstein, PICU, São Paulo, Brazil

Background

The acute laryngitis pos intubation is a common pathology at paediatric critical care unit. The inhalatory epinefrin is often used as a prophylactic therapeutic to avoid the laryngitis, but, its use has its side effects, some of which are common, such as tachycardia; others rare, such as Acute Myocardial Infarction, this last one, our focus on this case report.

Objectives

This is a case report that aims to warn of a possible side effect of using inhalatory epinefrin. This is a rare side effect but with an important morbidity and mortality, that must be remembered.

Methods

Retrospective, descriptive study of case report type. An analysis of the medical records of a patient admitted to the PICU of the Hospital Israelita Albert Einstein in 2016.

Conclusions/Results

Although the use of inhalatory epinefrin is considered safe, the present report is an alert, of the potential adverse effects of epinefrin. It can increased morbidity in critically ill patients. Therefore, from the moment of decision of the inhalation therapy, we must know it’s possible adverse effects, so that once installed we can act as soon as possible to minimize them.

References (if needed)
Background

Little is known about the effects of carbon dioxide (CO₂) insufflation on cerebral oxygenation during thoracoscopy in neonates. Near-infrared spectroscopy (NIRS) can measure perioperative brain oxygenation (regional cerebral oxygen saturation (rScO₂)).

Objectives

To evaluate the effects of CO₂ insufflation on rScO₂ during thoracoscopic esophageal atresia (EA) repair.

Methods

Observational study during thoracoscopic EA repair with 5 mmHg CO₂ insufflation pressure. Mean arterial blood pressure (MABP), arterial oxygen saturation (SaO₂), partial pressure of arterial carbon dioxide (paCO₂), pH, and rScO₂ were monitored in 15 neonates at seven time points: baseline (T0), after anesthesia induction (T1), after CO₂-insufflation (T2), before CO₂-exsufflation (T3), and postoperatively at 6 (T4), 12 (T5), and 24 hours (T6).

Conclusions/Results

**Results.** MABP remained stable. SaO₂ decreased from T0 to T2 (97±3% to 90±6% (p<0.01)). PaCO₂ increased from T0 to T2 (41±6 mmHg to 54±15 mmHg (p<0.01)). pH decreased from T0 to T2 (7.33±0.04 to 7.25±0.11 (p<0.05)). All parameters recovered during the surgical course. Mean rScO₂ was significantly higher at T1 compared to T2 (77±10% to 73±7% (p<0.05)). Mean rScO₂ levels never dropped below a safety threshold of 55%.

**Conclusion.** Intrathoracic CO₂ insufflation causes a reversible decrease in SaO₂ and pH and an increase in paCO₂. rScO was stable during the CO₂ pneumothorax, which suggest no hampering of cerebral oxygenation. Thoracoscopic repair of EA with insufflation of CO₂ at 5 mmHg appears to be safe and sustains stable cerebral oxygenation levels in neonates.

References (if needed)
SAFETY OF SUCCINILATED GELATIN FOR VOLUME RESUSCITATION AFTER CARDIAC SURGERY IN CHILDREN: A SINGLE CENTER, PROSPECTIVE, OBSERVATIONAL STUDY

I. Ortiz¹, J. Urbano¹, L. Butragueño¹, J. López-Herce¹, F. Verscheure¹, M.J. Solana¹, R. González¹, J. López¹, S. Fernandez¹, J. Del Castillo¹, A. Carrillo¹
1Gregorio Marañón University Hospital-Gregorio Marañón Research Institute lISGM, Pediatric Critical Care Medicine, Madrid, Spain

Background

The best strategy for fluid replacement after cardiac surgery remains unknown. Restrictive fluid strategies may be desirable. There is a lack of clinical evidence for the safety of succinilated-gelatin use as a volume expander.

Objectives

To investigate the safety and efficacy of succinilated-gelatin after cardiac surgery in children.

Methods

A single center, prospective observational study, over a 12-month period, with 72 consecutive patients admitted after cardiac surgery was performed. Data of patients and fluid boluses in the first 48 hours after PICU admission were collected. Comparisons regarding patient outcome were analyzed dividing the sample into high-volume (> or = 30 mL/kg) or low-volume (< 30 mL/kg) subgroups.

Conclusions/Results

Results: Fifty-two patients received succinilated-gelatin as fluid bolus. Median volume infused was 12.1 mL/Kg (IQR 10.2-18.3 mL/Kg) in the low-volume group, and 54.8 mL/Kg (IQR 39.2-93.0 mL/Kg) in the high-volume group. In the univariate analysis, high-volume was associated to higher Aristotle, PRISM and PELOD scores, use of renal replacement therapies, inotropes and mechanical ventilation. In a multivariate analysis, only the PELOD score was associated as an independent factor to the use of high volumes of gelatin infusion. No differences in mortality were observed between both groups.

Conclusions: Worst patient outcomes in the high-volume group may be related to the illness severity of patients on admission after cardiac-bypass, rather than to the amount of the fluid infused. However, it is advisable to perform more studies with an appropriate sample size to analyze the security of succinilated-gelatin high-volume infusion after cardiac surgery in children. References (if needed)
CARDIOVASCULAR DYNAMICS part 5

ESPN7-0118

A SCORING SYSTEM TO HELP IMPROVE ADHERENCE TO BLOOD TRANSFUSION GUIDELINES FOR CARDIAC PATIENTS IN PICU

S. van der Bijl1, V. Sheward1
1Royal Brompton Hospital London, PICU, London, United Kingdom

Background

It was noted that blood transfusion guidelines were not always being strictly followed

Objectives

To review whether given red cell transfusions were clinically indicated using a scoring system

Methods

Retrospective data collected from electronic records of all Red Cell transfusions (excluding ECMO) in March and April 2016 and transfusion score applied

Scoring system

<table>
<thead>
<tr>
<th>Condition</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood loss &gt;10ml/kg/hour or &gt;5ml/kg/hour and increasing</td>
<td>0</td>
</tr>
<tr>
<td>Stable and Hb &lt;8 (cyanotic) or Hb &lt;10 (cyanotic)</td>
<td>0</td>
</tr>
<tr>
<td>Unstable* and Hb &lt;10 (cyanotic) or Hb &lt;12 (cyanotic)</td>
<td>0</td>
</tr>
<tr>
<td>Blood loss 5-10ml/kg/hour and decreasing</td>
<td>1</td>
</tr>
<tr>
<td>Stable and Hb 8-9.9 (cyanotic) or Hb 10-11.9 (cyanotic)</td>
<td>1</td>
</tr>
<tr>
<td>Unstable* and Hb 10-11.9 (cyanotic) or Hb ≥12 (cyanotic)</td>
<td>1</td>
</tr>
<tr>
<td>Minor blood loss &lt;5ml/kg/hour</td>
<td>2</td>
</tr>
<tr>
<td>Stable and Hb ≥10 (cyanotic) or Hb ≥12 (cyanotic)</td>
<td>2</td>
</tr>
<tr>
<td>Unstable* and Hb ≥12 (cyanotic)</td>
<td>2</td>
</tr>
</tbody>
</table>

*Unstable:

- FiO₂ ≥ 0.5
- Adrenaline ≥0.1 or adrenaline ≥0.05 plus noradrenaline ≥0.05
- ≥50% difference between SaO₂ and MVO₂

Conclusions/Results

The audit showed that a significant number of transfusions were not clinically warranted and that the scoring system could be a helpful way of improving compliance.
The audit brought up a number of important discussion points for further review.
ACCEPTANCE OF NEONATAL SIMULATOR TRAINING FOR NON-CARDIOLOGISTS IN ECHOCARDIOGRAPHY COURSES

M. Weidenbach\textsuperscript{1}, R. Wagner\textsuperscript{2}, F. Löffelbein\textsuperscript{2}, N. Wolf\textsuperscript{3}
\textsuperscript{1}Heart Center Leipzig, Leipzig, Germany
\textsuperscript{2}Heart Center Leipzig, Department of Paediatric Cardiology, Leipzig, Germany
\textsuperscript{3}University of Leipzig, Neonatology, Leipzig, Germany

Background

In paediatric and neonatal medicine echocardiography is more and more used by non-cardiologists and termed targeted, functional or neonatologist performed echocardiography. Recently published recommendations endorsed by the European Society of Neonatology recommend the use of simulators to meet training demands.

Objectives

We wanted to evaluate the acceptance of simulator use in echocardiography courses.

Methods

We have used a neonatal echocardiography simulator (EchoCom GmbH, Leipzig, Germany) in our echocardiography courses. The 3-day courses were organized by the Heart Centre Leipzig and divided into 3 parts covering basic echocardiography, functional assessment and structural defects. Hands-on training was provided via patient/volunteer scanning and simulator training for 40\% of the total course time. During a 5 year period a total of 174 participants were asked about their background and pre-course knowledge. On a 5 point Likert scale participants were asked, if they thought simulator training was meaningful and if they wanted to have less/more simulator training. Participants were asked to answer the questionnaire to ensure maximal feedback.

Conclusions/Results

A total of 174 trainees had simulator training. 152 trainees were paediatricians or residents, 11 neonatologists, 3 adult cardiologists, 8 paediatric cardiologists. 120 had no experience or have done less than 10 studies, 54 having done more than 10 scans themselves prior to the course. All participants were in favour of simulator training. 96 wanted to have more training, 77 said the amount of simulator training was just right, while 1 voted for less simulator training.

Conclusion: This survey demonstrates that simulator training is well accepted for echocardiographic training for paediatricians.

References (if needed)
Background

A female infant was delivered by cesarean section at 31 weeks because of fetal distress and oligohydramnios. Birth weight was 2043 g. Apgar score 2 and 4 at 1 and 5 minutes respectively. Respiratory failure ensued due to voluminous abdominal mass. Laboratory work-up revealed anemia (E 1.97x10⁶/uL, hgb 6.8 g/dL, hct 22.8%), thrombocytopenia and coagulopathy (Plt 62x10³/uL, INR 1.5, APTT 50.7, fibrinogen 1.2 g/L) An echocardiogram showed volume overload and pulmonary hypertension. Imaging demonstrated highly vascular mass in the left liver lobe (8.5x5.7x8.4 cm). Intravenous metil-prednisolone and propranolol were started immediately, but consumption coagulopathy persisted (INR 2.45, fibrinogen <0.4) with development of kidney (BUN 15.6 mmol/L, creatinine 122 umol/L), and liver damage (AST 5488 U/L, ALT 1072 U/L, LDH 10020 U/L, albumin 22.1 g/L, bilirubin 153/77 umol/L). On the 6th day of age tumor embolization through the left hepatic artery with cyanoacrylate glue was performed. It was successful and post-procedure angiogram showed minimal residual vascularization of the mass via intercostal vessels. Coagulopathy reversed. Restrictive respiratory failure persisted and on 18th day of life left lateral heptectomy with complete excision of the remaining mass was done. Baby was soon extubated. Histology finding was consistent with hemangioma. Follow-up visit at 4 months
showed healthy baby with normal lab tests and weight gain.

Objectives

Methods

Conclusions/Results

References (if needed)
HEART RATE VARIABILITY ASSESSMENT IN PEDIATRIC DIABETIC KETOACIDOSIS

A. Halci Uğur¹, G. Ceylan¹, R. İşgüder¹, G. Atakul¹, C. Karadeniz², T. Meşe², Ö. Nalbantoğlu³, H. Ağın¹
¹Dr. Behçet Uz Children’s Hospital, Pediatric Intensive Care Unit, İzmir, Turkey
²Dr. Behçet Uz Children’s Hospital, Pediatric Cardiology, İzmir, Turkey
³Dr. Behçet Uz Children’s Hospital, Pediatric Endocrinology, İzmir, Turkey

Background

Diabetic ketoacidosis (DKA) is the 1-10% of hospital admission reason of Type 1 diabetes mellitus (DM) patients annually. The most early cardiac autonom neuropathy finding is the decrease in heart rate variability and the major cause of this cardiac autonomic neuropathy is dysregulation of blood sugar levels.

Objectives

In our study we aimed to assess the heart rate variability (HRV) decrease caused by diabetic ketoacidosis, which is an acute complication of Type 1 DM.

Methods

Patients who were admitted to our Pediatric Intensive Care Unit (PICU) with DKA diagnosis without any congenital cardiomyopathy, cardiac surgery or arrhythmia history between May-December 2016 were included in our study. At the time of admission and 72 hours after the complete resolution of DKA, 24-hour Holter ECGs were obtained and prospectively analysed.

Conclusions/Results

Mean ages of 18 Type 1 DM patients who were included in the study were found to be 138.5 ± 45.5 months and their HbA1c mean was 11.2 ± 1.5 mg/dl. Heart rate variability values which were obtained during the DKA and 72 hours after the resolution of the DKA compared and during the DKA, HRV values were found to be statistically significant shorter.

DKA episodes can decrease the HRV of Type 1 DM patients so that early cardiac autonomic dysfunctions can occur. Follow-up of Type 1 DM patients by means of HRV can have importance of predicting the possible morbidities.

References (if needed)
NEONATAL CONGENITAL HEART BLOCK: PRESENTATION, MANAGEMENT, AND OUTCOME OF CASES ADMITTED AT A REGIONAL TERTIARY NEONATAL INTENSIVE CARE UNIT

S. Kamupira¹, A.S. Varghese¹
¹Central Manchester University Hospital NHS Foundation Trust, Neonatal Intensive Care Unit, Manchester, United Kingdom

Background

Congenital heart block (CHB) detected at or before birth is strongly associated with maternal auto-antibodies, anti-La and anti Ro. The majority of cases are diagnosed between 18–24th weeks of gestation. Most mothers carrying auto-immune antibodies are not aware until their child is diagnosed with CHB.

Objectives

To describe the clinical presentation, neonatal management and short term outcome of newborn infants diagnosed with CHB.

Methods

We conducted a retrospective case notes review of all infants born and admitted with CHB to our regional tertiary neonatal unit between 2009 and 2015.

Conclusions/Results

11 infants, 5 boys and 6 girls were admitted during the study period. All cases were diagnosed antenatally apart from 1 infant who was delivered by emergency Caesarean section for foetal bradycardia at 27 weeks. Mean gestational age was 37 weeks and the smallest infant was born at 27 weeks gestation. Maternal autoimmune disease was present in 8/11 cases with Anti-Ro antibodies detected 83% of the cases. Two cases had a structural cardiac anomaly and one case was due to Long QT syndrome. The lowest heart rate recorded was 35bpm. 5 infants with baseline heart rate <50bpm has pacemaker placement in the neonatal period. 2 infants had acute cardiac collapse from pulse-less ventricular.

References (if needed)

Infants with antenatally diagnosed CHB were assessed with 24-hour ECG, echocardiography and electrolyte analysis after delivery. CHB can be associated with life-threatening cardiac arrhythmias. In our cohort a neonatal heart rate < 50bpm and presence of VT on 24-hour ECG tape were indications for a pacemaker.
Background

Impedance cardiography (IC) by PhysioFlow® technology (PF®) is a promising non-invasive, continuous cardiac output (CO) monitoring method.

Objectives

Compare CO and cardiac index (CI) measurements in PICU patients by PF® with those obtained by trans-thoracic echocardiography (TTE).

Methods

Simultaneous sets of three measurements were realized by TTE and PF® in 43 PICU patients. CO and CI measured by TTE (CO_{TTE} and CI_{TTE}) were compared to CO and CI obtained by PF® (CO_{IC} and CI_{IC}), with regard to accuracy (concordance correlation coefficient (CCC) and Bland-Altman analyses), and reproducibility.

Conclusions/Results

On 129 paired measurements, mean CO_{TTE} was 1.74±0.93 L/min whereas mean CO_{IC} was 2.23±1.21 L/min. Concordance for CO was good (CCC r=0.54), but mean absolute bias was 0.80 L/min (40%) with an unacceptable percentage error (PE) of 158%. Mean CI_{TTE} was 3.74±1.00 L/min/m² whereas mean CI_{IC} was 4.93±1.95 L/min/m². Concordance for CI was low (CCC r=0.12), and mean absolute bias was 0.77 L/min/m² (18%) with an unacceptable PE of 62%. Nevertheless, reproducibility of PF® for CO and CI measurements was excellent: Intraclass Correlation Coefficients were respectively r=0.94 and r=0.90. Precision of PF® for CO measurements was 6.9% (IQR 4.6%-11.6%) and 7.3% for CI (IQR 4.2%-12.2%). Age, weight, heart rate, and hematocrit didn’t affect differences between the two methods. Post-hoc signal analysis revealed that only 67.4% patients had an accurate IC signal for the PF® algorithm.

Conclusion: PF® can’t accurately estimate CO and CI in comparison with TTE; nevertheless, it is a promising technique for trending ability because of excellent reproducibility.

References (if needed)
PREMATURE NEONATE REQUIRING TRANSFUSION DUE TO G6PD DEFICIENCY

B. Whitehurst

Background

Male triplet 1, born at 33+4 weeks by elective caesarian section. Background of, IVF pregnancy, trichorionic, triamniotic. Parents Afro-caribbean. APGAR's of 7 and 8. Birth weight 1.830 kg. Had initial respiratory distress and had in & out surfactant, then CPAP for two days. Had an initial two days of antibiotics. On day 5 recommenced antibiotics for umbilical flare. On day 7 commenced on double phototherapy for unconjugated jaundice. Blood group was O+ve and DAT negative, maternal blood group was also O+ve and no irregular antibodies. On day 10 haemoglobin noted to be 77g/L, previously 161g/L on day 5. Cranial ultrasound was normal and no indication of gastrointestinal bleed. A repeat haemoglobin on day 12 which showed a drop to 40g/L. The reticulocyte count was 15.8%. The film target cells and anisocytosis, but did not show any Heinz bodies. Clotting was normal. Was haemodynamically stable and repeat cranial ultrasound and abdominal examination were normal. Baby was transfused and haemoglobin increased to 78g/L. G6PD level sent prior to transfusion was low at 2.7IU/gHb. Male triplet 2 was also deficient with a level of 1.6IU/gHb, but haemoglobin remained normal, female triplet 3, G6PD level was normal at 15.9IU/gHb.

Objectives

To highlight G6PD deficiency as a cause of haemolysis in the neonatal period leading to a need for transfusion and phototherapy. This is not commonly seen within the UK population.

Methods

Case study

Conclusions/Results

To consider G6PD as a cause for a significant drop in haemoglobin and send blood for analysis prior to transfusion

References (if needed)
Background

The Neonatal Intensive Care Unit (NICU) is organized as an environment for early life. However, the healthcare team and families are constantly experiencing terminality of life.

Objectives

To report the implementation of the Neonatal Palliative Care Program in the NICU at an university hospital in São Paulo, as part of the care of the newborns and their families.

Methods

This is a case report on the experience of a Neonatal Palliative Care Team (NPCT) initiated on October 2014 by a multidisciplinary team constituted by a psychologist, neonatologists, neonatal nurses, social worker and speech therapist, working in a NICU for high-risk newborns with multiple malformations and extreme premature neonates. There are weekly meetings of the NPCT for self-training and discussion of cases in the NICU; and meetings with the NPCT and multiprofessional team in training (medical residents in pediatrics, clinical fellows in neonatology, residents in physiotherapy and residents in nursing) to discuss bioethical dilemmas.

Conclusions/Results

From September 2014 to June 2016, 50 situations in the NICU were discussed with the multiprofessional team. Bioethical discussions and simulations of healthcare team/family communication facilitated reflections on the processes of illness and termination of life of newborns. The NPCT stimulated the dissemination of bioethical and palliative care principles among all healthcare professionals in the NICU.

Conclusion: the development of an NPC program favors the care of newborns and their families in an high quality approach, especially those who may experience grief and termination of life.

References (if needed)
ETHICS

ESP7-0280

THE CRITICALLY ILL PEDIATRIC MEDICAL REFUGEE - A CASE BASED ILLUSTRATION OF THE MEDICAL, SOCIAL, LEGAL, AND ETHICAL CONSIDERATIONS

D. Greaney1, S. Crowe1

1Our Lady’s Children’s Hospital Crumlin, Paediatric Intensive Care Unit, Dublin 12, Ireland

Background

Case: An 8 year old microcephalic profoundly malnourished boy presented with respiratory failure rapidly progressing to multiorgan failure having arrived in Ireland that day from rural Pakistan with his apparent guardian. We describe the multifactorial complexities associated with his care.

Medical: Uncertainty surrounding comorbidities
His profound physical and cognitive impairment was seemingly due to neonatal hyperbilirubinaemia. Other co-morbidities were unknown. Medical refugees may present with conditions otherwise reversible or eradicated in other societies (e.g. kernicterus, cretinism, polio). Unusual infectious diseases (TB, helminthes, malaria, MERS-CoV) required screening. Psychiatric illnesses such as PTSD and depression are also disproportionally high in this population.

Social: Interaction with guardians
Establishing relationship and communication with guardians may be difficult. Barriers to effective communication may include language, potential distrust of western medicine, cultural and spiritual beliefs about their child’s illness.

Legal: Absence of legal guardianship or consent refusal
Should a guardian refuse treatment, the state would likely apply the “best interests” principle to guide medical care. If a patient is a refugee minor with no legal guardian, the child is referred to the Irish Child and Family agency, which provides appropriate legal supervision.

Ethical: Bed occupancy
He occupied a tertiary PICU bed for 8 days, requiring input from multiple specialties. Concomitantly, some national referrals were delayed. Some contend that socially funded hospital beds should be primarily reserved for domestic citizens. However, as a signatory to the 1951 UN Convention Relating to the Status of Refugees, Ireland espouses the right to health care for all refugees.

Objectives

NA

Methods

NA

Conclusions/Results

NA

References (if needed)
ETHICS

ESPN7-0029

A CHOICE POINT DECISION MODEL TO GUIDE DISCOURSE FOR OPTIMUM PEDIATRIC/NEONATAL INTENSIVE CARE

P. Seibert¹, C. Calzacorta¹, E. Carroll¹, C. Zimmerman¹

¹Saint Alphonsus Regional Medical Center, Research Institute, Boise, USA

Background

When a child requires intensive care, all associated with the event face a multitude of extraordinarily challenging decision making processes. At every choice point, the pediatric/neonatal physicians and nurses need to aptly engage the family members to ensure the child receives optimal case-specific treatment. These arduous and often emotionally laden discussions may include conversations about potential quality of life (QoL). Because pediatric/neonatal patients are unable to actively contribute to the decision making process, the complexity of the ethical dilemma is intensified. Indeed, in certain cases, all involved struggle to ascertain the definitive effect of a life sustaining procedure on eventual quality of life. An attempt to find a balance between what is assumed is in the best interest of the patient and the predicted resultant QoL routinely results in tension and dissonance.

Objectives

We used data gathered from multiple sources: outcomes data, questionnaires, observations, and a model for superior recovery to create a decision model.

Methods

We developed a model to guide the discourse process when attempting to make decisions about treatment modalities. This model includes topics such as ethics, religion, culture, financial drivers, and individual differences. These are conveyed in hierarchical and multi-directional choice points to facilitate consideration of the range of intervening variables.

Conclusions

This model is a guide developed to serve as a heuristic with the goal of assuaging stressors surrounding decisions about treatment modalities and best practice approaches for pediatric/neonatal intensive care by providing a simplistic platform to carefully consider individuality and daunting ethical decisions.

References (if needed)
ULTRASOUND-GUIDED COMPARED WITH THE TRADITIONAL PALPATION RADIAL ARTERY CANNULATION IN CRITICALLY ILL CHILDREN: A RANDOMIZED TRIAL

N. Anantasit¹, P. Cheeptinnakornrattaworn¹, M. Chantara¹, R. Lertbunrian¹
¹Ramathibodi Hospital, Pediatric, Bangkok, Thailand

Background

Insertion of radial artery catheter with traditional palpation may be technically challenging, particularly in critically ill children. There are few published studies on the use of ultrasound guidance for radial artery catheter placement and mostly they were elective surgery children.

Objectives

To identify success rates for radial artery cannulation in pediatric critical care unit using either palpation or ultrasound guidance to cannulate the radial artery.

Methods

A prospective, randomized, comparative study of critically ill children who required invasive monitoring in a tertiary referral center. All patients were randomized by stratified block of four to either ultrasound-guided or traditional palpation radial artery cannulation. The primary outcomes were the first attempt and total success rate.

Results: Eighty-four children were enrolled, with 43 randomized to the palpation technique and 41 to the ultrasound-guided technique. Demographic data between the two groups were not significantly different. The total success and first attempt rate for the ultrasound-guided group were significantly higher than the palpation group (RR 2.03; 95% CI, 1.13-3.64; p=0.018 and RR 4.18; 95% CI, 1.57-11.14; p=0.004, respectively). The median time to succeed of ultrasound group was significantly shorter than the palpation group (3.3 vs. 10.4 min, respectively; p<0.001). Cannulation complications were lower in the ultrasound-guided group than in the palpation group (12.2 vs. 53.5%, p<0.001).

Conclusions

The ultrasound-guided technique could improve the success rate and allow for faster cannulation of radial artery catheterization in critically ill children.

References (if needed)
ACCURACY OF CHEST RADIOGRAPHY, LUNG ULTRASOUND AND THORACIC COMPUTED TOMOGRAPHY IN THE DIAGNOSIS OF PULMONARY DISEASES

D. Teresa1, J. Aquino1, A. Dias1, R. Moinho1, C. Pinto1, L. Carvalho1, J. Farela Neves1
1Hospital Pediátrico - Centro Hospitalar e Universitário de Coimbra, Intensive Care Unit- Paediatric Hospital, Coimbra, Portugal

Background

Lung ultrasound (LUS) is easily available at bedside, free of radiation hazard and provides real time imaging by intensivist.

Objectives

To compare diagnostic accuracy between Chest X Ray (CXR) or LUS to thoracic computed tomography scan (TCT) - gold standard of thoracic imaging - for detection of pleural and parenchymal lung diseases in a Paediatric Intensive Care Unit (PICU).

Methods

An observational study was performed during 5 years (2012-2016) comparing CXR and LUS with TCT scan results. The intensivist was unaware of TCT results. The main imaging diagnoses were grouped into: pleural effusion (PE), alveolar consolidation, alveolar interstitial syndrome (AIS) and pneumothorax. For each diagnosis the sensitivity and specificity of CXR and LUS were compared with TCT. All exams were performed at intervals <8 hours. Thoracic malformations and newborns were excluded.

Conclusions/Results

All exams were performed in 50 patients (60% male). The median age was 12 years (P25=5; P75=16). Most PICU admissions were due to trauma (54%). For PE (8 cases) sensitivity and specificity were 44% and 93% for CXR; 100% and 100% for LUS. For alveolar consolidation (36 cases) sensitivity and specificity were 61% and 82% for CXR; 86% and 93% for LUS. Two pneumothoraces were diagnosed by CXR, LUS and TCT. Relating to the diagnosis of AIS (4 cases), sensitivity and specificity were 25% and 94% for CXR; 100% and 96% for LUS. Conclusions: In our study LUS had similar diagnostic accuracy to CT in detecting PE and AIS, and surpasses the CXR. More paediatric large-scale studies are required.

References (if needed)
Pediatric and Neonatal Intensive Care Unit in Medium Size City in Central-Northern Spain: What Kind of Patients Do We Have?

L. Bermúdez Barrezueta¹, M. Miñambres Rodríguez², C. Fernandez García-Abri³, A. Pino Vázquez¹, M. Brezmes Raposo⁴, M. Benito Gutierrez⁵, M. Pino Velázquez¹, C. Villa Francisco¹, M.C. Tobar Mideros¹, J.L. Moreno Carrasco⁴, S. Rodriguez Rodero⁴

¹Hospital Clínico Universitario de Valladolid, Pediatric and Neonatal Intensive Care Unit, Valladolid, Spain
²Hospital Clínico Universitario de Valladolid, Pediatric and Neonatal Intensive Care Unit, Valladolid, Spain
³Hospital Clínico Universitario de Valladolid, Paediatric and Neonatal Intensive Care Unit, Valladolid, Spain
⁴Hospital Clínico Universitario de Valladolid, Pediatrics, Valladolid, Spain

Background

The Hospital Clínico Universitario de Valladolid, Spain has a mixed intensive care unit with two exclusive neonatal beds and four interchangeable pediatrics-neonatal beds. It’s an III B level unit.

Objectives

The aim of this study was to analyze the patients admitted to the mixed Pediatric and Neonatal Intensive Care Unit (PICU/NICU) of Hospital Clínico Universitario de Valladolid.

Methods

Descriptive analysis of the patients admitted to the NICU/PICU in a period between January 2014 and December 2016.

The mean unit admission was 342 patients/ year: 8.4% were scheduled surgery, 10.7% urgent surgery, 26.2% sedation-required procedures, 26% pediatric intensive care patients and 18.7% neonatal intensive care patients. The overall mean stay was 4.4 days, being 4 days for the pediatric intensive care patients, 3.5 days for the urgent surgery patients, 1 day for the scheduled surgery patients and 14.8 days for the neonatal intensive care patients.

The most common clinical manifestation of the pediatric intensive care group was respiratory insufficiency (46.1%), followed by neurological disease (43%). Invasive and non-invasive respiratory was applied in 15.7% and 28.1%, respectively. In the neonatal intensive care group, 36.5% were <1500g premature: 50.7% had invasive respiratory support and 44.3% non-invasive respiratory support.

The overall mortality rate was 1.7%. We have an occupancy rate of 90%.

Conclusions/Results

The occupancy rate of our unit justified the existence of mixed intensive care unit that makes them profitable in medium size cities. The neonatal average stay is three times the pediatric average stay, similar to others mixed units.

References (if needed)
NEONATAL PATIENTS IN A MIXED PEDIATRIC AND NEONATAL INTENSIVE CARE UNIT

A. Pino Vazquez, L. Bermúdez Barrezueta, M. Miñambres Rodríguez, C. Fernandez García-Abril, M. Benito Gutierrez, M. Pino Velazquez, M. Brezmes Raposo, C. Villa Francisco, J.L. Moreno Carrasco

1Hospital Clínico Universitario de Valladolid, Paediatric and Neonatal Intensive Care Unit, Valladolid, Spain
2Hospital Clínico Universitario de Valladolid, Pediatric and Neonatal Intensive Care Unit, Valladolid, Spain
3Hospital Clínico Universitario de Valladolid, Pediatrics, Valladolid, Spain

Background

Pediatric and Neonatal Intensive Care Units (PICU/NICU) have been under debate for a long time, but in medium size cities they are a reasonable and profitable solution.

Objectives

The aim of this study was to analyze the characteristics and complications of neonatal patients admitted to a mixed intensive care unit in the last 3 years.

Methods

There were a total of 192 neonatal admissions: 71 (31%) were < 1500 g and 18 (9.3%) were < 1000 g, infants. If we classified them by gestational age (GA), 16 (8.3%) were ≤ 27 weeks GA, 78 (40.6%) of 28-32 weeks GA, 31 (16.1%) of 32-36 weeks GA and 67 (34.9%) were full-term infants. The main reasons for admission within the full term and late preterm infants were respiratory distress syndrome (59.4%), urgent surgery (10.1%), neonatal asphyxia (8.5%) and convulsions (5.4%). In the very low weight preterm group, 49.3% needed invasive respiratory support and 46.5% non-invasive respiratory support. The incidence of pneumothorax was 4.2%, 23.9% had patent ductus arteriosus, 15.5% bronchopulmonary dysplasia, 14.1% intraventricular haemorrhage, 5.6% necrotizing enterocolitis and 29% sepsis, 4.2% catheter-related bloodstream infection and 1.4% invasive fungal infection. The mortality rate in this group was 5.6%.

Conclusions/Results

Our results do not differ from those found in the literature in other series of exclusive neonatal intensive care units. We think that a mixed unit is a reasonable and profitable solution in a medium sized city.

References (if needed)
THE ROLE OF PAEDIATRIC CRITICAL CARE TRANSPORT TEAMS IN SUPPORTING REGIONAL DEPARTMENTS IN DIFFICULT INTUBATION SCENARIOS: LESSONS FROM 10 CASES.

C. Kanaris¹, K. Parkins², L. Pritchard², R. Phatak², S. Emsden³, J. Bordoni¹
¹Alder Hey Children's NHS Foundation Trust, Paediatric Intensive Care Unit, Liverpool, United Kingdom
²NWTS, North West and North Wales Paediatric Transport Service, Warrington, United Kingdom
³NWTS, North West and North Wales Paediatric Transport Service, North West and North Wales Paediatric Transport Service, United Kingdom

Background

Difficult airway is the clinical situation whereby anaesthetists experience difficulties with facemask ventilation, tracheal intubation, or both. Centralisation of children's services in the UK has decreased exposure of district general hospital staff to paediatric airway management in critically ill children. Regional retrieval teams such as the North West and North Wales Paediatric Transport Service (NWTS) provide support and have proposed a regional difficult paediatric airway intubation guideline.

Objectives

Difficult intubation occurs in approximately 0.42% of elective paediatric tertiary intubations. 0.08% occur in healthy children, increasing to 0.24% in the under ones. Difficult mask ventilation occurs in approximately 0.02%. Can’t intubate can’t ventilate situations occur in 1/10-50,000 adults. There is lack of published data on the incidence of difficult paediatric airways during emergency intubation for respiratory failure, but it is likely to be significantly higher. NWTS data revealed 11.2% incidence of grade 2 or above laryngoscopy (357 intubations of critically sick 1-5 year olds); and in the under 2's a 21% complication risk (hypotension or hypoxia).

Methods

We describe 10 cases referred to NWTS from regional emergency departments. These highlight how the proposed regional difficult airway guideline helps in anticipating problems when managing challenging paediatric airways. The importance of advanced planning of alternative strategies for securing an airway is highlighted. Furthermore, standardisation of equipment and monitoring across hospital departments is key. Education and regular training in airway management reduces the risk of paediatric airway difficulties.

Conclusions/Results

Teams like NWTS can facilitate access to specialist equipment and transfer to tertiary specialised units when required.

References (if needed)
NEED FOR HOME OXYGEN THERAPY IN PRETERM INFANTS
M. Brunherotti¹, S. Ramos¹, F. Eulógio Martinez²
¹University of Franca, Health Promotion, Franca, Brazil
²University of São Paulo, Pediatrics, Ribeirão Preto, Brazil

Background

Preterm infants with bronchopulmonary dysplasia more frequently require home oxygen therapy. There are few studies investigating home oxygen therapy in groups of preterm infants, but research is relevant to solidify social programs.

Objectives

To identify the profile of preterm infants with characteristics indicating the need for home oxygen therapy.

Methods

Observational, cross-sectional, prospective study. Sixty-three preterm infants under outpatient follow-up were divided into two groups: group 1 consisted of 27 infants with bronchopulmonary dysplasia, and group 2 of 36 infants without a diagnosis of dysplasia. Hospitalization-related data were obtained from the individual records. Maternal, sociodemographic and prenatal data, as well as growth measures and oxygen saturation of the infants, were collected during outpatient follow-up.

Conclusions/Results

Infants with bronchopulmonary dysplasia had a lower gestational age and lower birth weight (28.5±2.2 weeks, 1,095±338 g, p<0.000). Dysplastic infants continued to weigh less at the beginning of outpatient follow-up (3,346±639 g, p=0.01). These infants received ventilatory support and were hospitalized for a longer period of time (p≤0.02) and 92.5% used inhaled corticosteroids before hospital discharge (p<0.000). In the whole group, only six infants used oxygen at home (p=0.0001), five were born between 26 and 29 weeks, and three during weaning in the first month at home. However, most preterm infants developed bronchopulmonary dysplasia, but the need for oxygen therapy after hospital discharge was low. Dysplastic infants were born smaller and continued to have lower body weights in the first month of follow-up.

References (if needed)
Background
Post-traumatic Stress Disorder (PTSD) is an abnormal neuropsychological reaction of the individual when experiencing a traumatic event.

Objectives
To evaluate the incidence of PTSD in postpartum mothers and identify the associated risk factors.

Methods
This is a prospective study involving 275 mothers between 9/2014 and 11/2015. We used the perinatal PTSD questionnaire that was applied on two occasions: the first in a hospital setting between the 1st and 5th day after childbirth and the second 6 to 8 weeks after. A traumatic event questionnaire was used to evaluate traumatic events before delivery. Childbirth related questions were also asked. The McNemar test and the multiple Poisson regression analysis with robust variance were used. Significant p <0.05 was considered significant.

Conclusions/Results
The prevalence of PTSD in the second interview was 16.02%. There was an association between the presence of PTSD and the following variables: Previous traumatic event: presence when a fire or explosion occurred, (PR = 5.02, 95% CI: 2.02-12.49), had suffered some unwanted sexual experience, (PR = 2.35, 95% CI: 1.03-5.33). During childbirth: having had intense fear of dying or that the baby died during childbirth (PR = 3.74, 95% CI: 1.58-8.86), experienced a loss of control during delivery (PR = 2.07, 95% CI: 1.06-4.03). Variables: maternal education, income, maternal age and marital status did not present a significant association with the presence of PTSD. It is important to consider strategies that can prevent the development of PTSD in mothers.

References (if needed)
EXTUBATION FAILURE IN PEDIATRIC INTENSIVE CARE UNIT: RISK FACTORS, INCIDENCE AND EVALUATION OF A MECHANICAL VENTILATOR WEANING PROTOCOL.

A.S. Guilbert¹, L. Petitdemange¹, C. De Melo¹
¹Hopitaux Universitaires de Strasbourg, PICU, Strasbourg, France

Background

Extubation failure increase the risks of mortality and morbidity for our patients in intensive care unit.

Objectives

We hypothesized implementation of a mechanical weaning protocol decrease extubation failure. Our second objective was to determinate risk factors for extubation failure.

Methods

In a monocentric and retrospective study, we included 245 children aged from birth to 18 years, during a period of 15 months. Their medical past, ventilation parameters at time of extubation, extubation failure or complications were noted. Then, in the second period, we prospectively included 250 patients extubated after implementation of a mechanical ventilator weaning protocol.

Conclusions/Results

Our study confirms published data about extubation failure risk factors. Duration of intubation, chronic respiratory diseases, previous intubation, and benzodiazepine's infusion were the main risk factors.

Using a multivariate analysis, every additional hour of mechanical ventilation increased the risk of failure extubation of 1,004 [1,001; 1,0081] (p=0,02), whereas extubation complications increased the same risk of 10,86 [3,947; 29,907] (p=0,000004).

In the second part, we showed a decrease of extubation failure rate after using a specific mechanical ventilator weaning protocol (12,6% vs 7,8%). There were no difference about duration of mechanical ventilation between the 2 periods (51,6 vs 48 hours p=0,07) neither about incidence of extubation complications (17,1 vs 10% p=0,19).

Conclusion: Our study showed the interest of a mechanical ventilator weaning protocol to reduce the incidence of extubation failure in PICU.

References (if needed)
Background

NHS England - which leads the English National Health Service (NHS) and is the sole national commissioner of Paediatric Critical Care (PCC) services - is undertaking a national review of PCC & specialised surgery in children, including transport for children requiring PCC and Extracorporeal Membrane Oxygenation (ECMO). The review is due to publish recommendations and move to implementation in 2017.

Objectives

To develop sustainable solutions to the significant demand and capacity challenges facing PCC in England - a result of a combination of: more complex and long-term co-morbidities; increased average length of stay; staffing shortages; consistently high occupancy levels despite expansion in bed numbers; seasonal variation; balancing elective & emergency admissions - all in a nationally resource-constrained environment.

Methods

The process includes:
- Broad engagement with commissioners, clinicians, arm’s-length-bodies, professional organisations and the public to co-produce a vision for future PCC services
- Use of extensive available national data
- Linking strategically with other key national reviews & initiatives
- Consideration of the costs, benefits and implementation challenges of proposals
- Seeking to achieve a broad consensus around final proposals

An expert stakeholder panel has been convened to provide advice and feedback to inform the development of the review; help identify potential solutions facing PCC; challenge constructively emerging solutions; work with healthcare providers and share review outputs widely with professional bodies and colleagues.

Conclusions/Results

Many of the challenges faced by PCC in England are confronted by PICUs internationally. We wish to communicate our process and experiences in order to share problems and solutions.

References (if needed)

PICANET Annual Report 2016: http://www.picanet.org.uk/Audit/Annual-Reporting/
PERIODONTAL DISEASES IN PREGNANT WOMEN: GESTATIONAL CONSEQUENCES - PARTIAL RESULTS

c. R. B. Fonseca¹, S. Y. Takita¹, M. G. O. P. Figueiredo¹, B. M. R. Dourado¹, H. D. S. Mendes², J. C. Peraçoli³, L. R. Carvalho⁴

¹Botucatu Medical School, Pediatrics, Botucatu, Brazil
²Botucatu Health Office, Basic Health Unit, Botucatu, Brazil
³Botucatu Medical School, Gynecology, Botucatu, Brazil
⁴Botucatu Biosciences Institute, Biostatistics, Botucatu, Brazil

Background

Periodontal diseases are prevalent in pregnant women due to poor oral hygiene and presence of steroid hormones. They trigger immune-inflammatory responses with production of cytokines and pharmacologically active mediators. These mediators and infectious agents are spread through the bloodstream, generating gestational complications such as hypertensive disease, preeclampsia and eclampsia.

Objectives

To study the correlation between periodontal diseases in pregnant women and gestational complications.

Methods

A Cohort Study, with collection of secondary data from the Information System for Live Births (SINASC), and records of newborns at the Clinics Hospital. It included a randomized sample of 142 pregnant women in visits of prenatal care in Basic Health Units in Botucatu, Brazil (2012-2014). The study was approved by the Research Ethics Committee. Data: gestational complications, such as Gestational Hypertension, Gestational Diabetes, Infections, and their correlations with periodontal diseases in pregnant women. Database in Excel and analyzed by the Statistical Analysis System (SAS).

Conclusions/Results

A total of 72 pregnant women were evaluated so far, 58 of which (80.5%) were analyzed, and 37 (63.8%) of which had periodontal diseases (p = 0.03). The prevalence of urinary tract infections (12.1%) and vulvovaginitis (14%) in the Group with periodontal diseases was high. No statistically significant difference was found between groups concerning Preeclampsia (3.5%) and Eclampsia (1.8%).

Pregnant women with periodontal diseases had a higher prevalence of gestational morbidity, but no correlation with periodontal diseases could be established. Final data will bring contributions to improve maternal-infant health care.

References (if needed)
PERIODONTAL DISEASES IN PREGNANT WOMEN AND THEIR REPERCUSSIONS FOR NEWBORNS – PARTIAL RESULTS.

C. Fonseca¹, M.G.O.P. Figueiredo¹, S.Y. Takita¹, B.M.R. Dourado¹, H.S. Mendes², J.C. Peraçoli³, L.R. Carvalho⁴

¹Botucatu Medical School, Pediatrics, Botucatu, Brazil
²Botucatu Health Office, Basic Health Units, Botucatu, Brazil
³Botucatu Medical School, Gynecology, Botucatu, Brazil
⁴Botucatu Biosciences Institute, Biostatistics, Botucatu, Brazil

Background

Periodontal diseases are prevalent in pregnant women. They are caused by microorganisms, which stimulate the inflammatory response and may cause several changes in pregnancy. As a result, an association with complications for newborns is suggested, such as low birth weight, prematurity and increased risk for early neonatal infection.

Objectives

To study the correlation between periodontal diseases in pregnant women and repercussions for newborns.

Methods

A cohort study, with collection of secondary data from the Information System for Live Births and records of newborns at the Clinics Hospital. It included a randomized sample of 142 pregnant women in prenatal care visits in Basic Health Units in Botucatu and their newborns, Brazil (2012-2014). The study was approved by the Research Ethics Committee. Data collection: newborn birth and weight, gestational age, neonatal infections and diseases. Database in Excel and analyzed by the Statistical Analysis System.

Conclusions/Results

A total of 72 pregnant women and their newborns were evaluated so far, 58 of which (80.5%) were analyzed, and 37 (63.8%) had periodontal diseases (p = 0.03). Neonatal depression was prevalent in 8.7% and 1.7% in groups with and without periodontal diseases, respectively. Low prevalence of neonatal infection was observed in both groups (1.7%). No statistically significant difference was found between groups concerning prematurity and low birth weight.

Periodontal diseases were highly prevalent in pregnant women, corroborating data from the literature, but no correlation between periodontal diseases and repercussions for newborns could be established. Final data will bring contributions to improve maternal-infant health care.

References (if needed)
FETAL AND NEONATAL DEATHS – EVALUATION OF PREVENTION, QUALITY AND SHORTCOMINGS IN NEWBORN AND MATERNAL HEALTH CARE

C. Fonseca¹, L.M. Noda², I.C. Salvador², L.R. Carvalho³, C.M.G.L. Parada²
¹Botucatu Medical School, Pediatrics, Botucatu, Brazil
²Botucatu Medical School, Nursing, Botucatu, Brazil
³Botucatu Biosciences Institute, Biostatistics, Botucatu, Brazil

Background

Infant mortality has been a global focus in recent decades. In Brazil, public programs have been employed with the goal of improving health care quality for women and children.

Objectives

To evaluate fetal and neonatal mortality in order to classify it according to its prevention and relationship with possible shortcomings in maternal and child health care.

Methods

A descriptive cross-sectional study, Botucatu, Brazil, 2008-2012. It was considered all fetal and neonatal deaths of this period. To evaluate the causes and prevention of deaths were used the List of Preventable Causes of Deaths according to the ICD-10 (Ministry of Health) for neonatal deaths, and Wigglesworth Classification modified by Keeling et al for fetal deaths.

Conclusions/Results

A total of 84 fetal deaths (55.5%) and 62 neonatal deaths (45.5%) were included in the study, in which 64.5% and 35.5% were early and late neonates, respectively. The analysis of adequacy of prenatal care and delivery assistance shows that the neonatal death group had the best adequacy indices, 16.6% for prenatal care and 23.2 % for delivery.

According to the Wigglesworth Classification on the causes of fetal deaths and possible shortcomings in health care assistance, 56.7% would be a result of shortcomings in prenatal care and only 1.2% as a result of lethal or potentially lethal abnormalities.

Adequate assistance to pregnant women and to the newborn can lead to an improvement in indicators of care quality and also to a reduction in fetal and neonatal mortality rates in Brazil, the country could meet rapidly the Millennium Development Goals.

References (if needed)
IMPACT OF THERMOREGULATION BUNDLE AND EDUCATION IN IMPROVING THE NEONATAL CARE PROVIDED FOR PRETERM BABIES IN OUR TERTIARY NEONATAL UNIT.

N. Ganjoo¹, P. Amato-Gauci², S. Nallagonda²
¹Luton and Dunstable University Hospital, Neonatal Medicine, Luton, United Kingdom
²Luton and Dunstable University Hospitals, Neonatal Medicine, Luton, United Kingdom

Background

Importance of thermoregulation around the time of birth cannot be underestimated. Temperature instability and in particular admission temperatures <36.5°C are associated with increased morbidity and mortality¹.

Objectives

Audit impact of thermoregulation bundle and staff education on neonatal admission temperatures on our unit.

Methods

Our departmental audit in 2015 identified 62% of our neonates (<32 weeks gestation) were having target admission temperatures (36.5-37.5°C), which is comparable to national average according to NNAP report.

A thermoregulation bundle with ‘thermoregulation stickers’ was introduced in April 2016. Alongside, one-to-one thermoregulation staff training sessions involving monitoring temperature of the baby in the delivery suite and on admission, taking measures to maintain normothermia while in transfer to neonatal unit.

A retrospective audit involved collecting admission temperature from Badgernet of these neonates over 2016.

Results: The admission temperature data for 81 inborn neonates (<32 weeks gestation) was analysed before and after changing the practice. Prior to implementation, between January-April, we had 18/30 babies (60%) maintaining the target admission temperatures. After implementation, during May-December, 38/51 babies (75%) maintained the target temperature. Post implementation, there were no babies with temperatures <36°C.
Conclusions/Results

Increasing awareness and staff education has had significantly positive impact in improving existing practice of thermoregulation in babies admitted to NICU.

Recommendations:
We recommended monitoring the temperature of new-born’s in the delivery suite. We also recommended routine inclusion of the stickers of thermoregulation in to the admission notes and importance of regular staff education to increase awareness.

References (if needed)
A CROSS-SECTIONAL STUDY OF PRACTISE RELATING TO PAEDIATRIC ORGAN DONATION (POD) FAMILY INFORMATION, AND STAFF EDUCATION IN UK AND IRELAND

D. Gomez¹, L. Hatcher¹, S. Drane¹, O. Cowen¹
¹Bart's Health - Royal London Hospital, PCCU, London, United Kingdom

Background

The Paediatric Donor Working Group[i] report potential to almost double the numbers of UK donors. At present, there is “no clear ethical framework for donation […] practitioners have a range of views and concerns about what constitutes best practice”[ii]. A rare donation after circulatory death enabled us to reflect on our unit’s practise and compare it nationally.

Objectives

We sought to establish how units access Paediatric Specialist Nurses in Organ Donation (PSNOD), if units have dedicated link nurses, and what training doctors and nurses get on POD.
We also looked to ascertain what information, if any, is provided for families, and the reasons why

Methods

We surveyed 33 participating organisations of the Paediatric Intensive Care Audit Network (PICANet) by telephone

Conclusions/Results

Results

- 54% reported PSNOD access
- 85% do not display visual information, mainly believing it is inappropriate; but the 9% that do display, have had no negative feedback
- POD training is variable between units, and often ad hoc, with wide differences in training between and within professional groups; 24% have no training at all
- 66% have link nurses

Conclusion

The different practises relating to POD information on each unit warrant further analysis; but potential exists to improve training and engagement with POD services for both staff and families, and research into families views is indicated

References (if needed)

[i] Potential to almost double the number of UK paediatric donors; Hodge R et al; http://www.odt.nhs.uk/pdf/potential_to_almost_double_the_number_of_uk_paediatric_donors_(donation_congress_2013).pdf
THE LEARNING FROM EXCELLENCE PILOT PROJECT – IRELAND’S FIRST MULTIDISCIPLINARY PICU/THEATRE POSITIVE EVENT REPORTING SYSTEM

D. Greaney¹, C. Barry¹, A.M. McGuinness¹, J. McGinley¹
¹Our Lady’s Children’s Hospital Crumlin, Paediatric Intensive Care Unit, Dublin 12, Ireland

Background

We recently introduced Ireland’s first multidisciplinary positive event reporting system in our shared anaesthesia/PICU department. Traditional event reporting systems focus on negative events (e.g. incident reports, morbidity and mortality). A similar programme in the UK proved highly popular and showed evidence of quality improvement; however, our institution lacks the IT infrastructure utilized in that programme.

Objectives

To focus on exemplary care for learning and understanding complex systems and improve staff morale.

Methods

A large A0 display with a postbox (figure 1) was placed in the main stairwell used to access the PICU and theatre complex. Forms were anonymously and voluntarily completed by staff and asked a. “who did something excellent,” b. “what did they do,” c. “how can we learn from this?” All forms were logged into a spreadsheet for appreciative enquiry analysis, and cards were returned to the reported employees with the text submitted. A
Conclusions/Results

Users filled out 15 and 12 forms in the first two reporting months. Reported employees were generally evenly distributed across all disciplines, with doctors receiving 5, nurses 10, health care attendants 4, and porters 8. Qualities appreciated focused on compassionate care, consistency of excellent care, teamwork, and attainment of additional professional qualifications. Our pilot programme was positively received and staff have universally expressed interest in its continuation.

We hope that similar programmes may be introduced elsewhere.

References (if needed)
CONFIDENCE FOLLOWING PAEDIATRIC INTENSIVE CARE SIMULATION TRAINING IN IRELAND FROM 2010 – 2016, A SEMI-QUANTITATIVE RETROSPECTIVE ANALYSIS

D. Greaney¹, C. Burlacu², S. Harte¹
¹Our Lady’s Children’s Hospital Crumlin, Paediatric Intensive Care Unit, Dublin 12, Ireland
²College of Anaesthetists of Ireland, Simulation, Dublin, Ireland

Background

Mandatory paediatric intensive care simulation for all mid-level trainee anaesthetists has been conducted in Ireland since 2010.

Objectives

This study aims to analyze baseline demographic characteristics among trainees and to quantify candidates self-perceived confidence before and after the programme.

Methods

All participants completed a pre-course confidence questionnaire on clinical skill competencies (eg. managing a sick child, a child with breathing difficulty) and a post-course confidence questionnaire for eight simulated ICU scenarios. The competences were matched and compared against each relevant scenario. Subgroup analysis included those with >5 years anaesthesia, those currently working with pediatric patients, and those with APLS certification.

Conclusions/Results

235 trainees completed the programme between 2010 - 2016. Pre and post course confidence scores are displayed in figure 1. 52% had no previous pediatric experience, 36% were APLS certified, 15% had > 5 years experience, and 33% were currently managing pediatric patients. Baseline confidence across all skill sets was higher in those with > 5 years anaesthesia (6.1), currently treating children (5.4), APLS certified (5.0), compared to those never done pediatrics or APLS (3.9). Post course confidence scores were similar across all 4 subgroups (range 7.2-7.8).
applicable to trainees at different stages of training and exposure. The smallest confidence increments were seen in management of bronchiolitis and VF which may be useful for redesigning these scenarios.

References (if needed)
THE EFFECT OF KANGAROO MOTHER CARE (KMC) APPLIED IN THE POSTNATAL PERIOD ON THE VITAL PARAMETERS OF THE HEALTHY NEWBORN

S. Inal*, S. Korkut*
*Istanbul University, Faculty of Health Sciences - Midwifery, Istanbul, Turkey

Background

Early meeting of mother and newborn during the postpartum period can decrease the stress of the baby and affect the vital parameters of newborn positively.

Objectives

The determination of the effect of KMC on the vital parameters of healthy newborns.

Methods

The study was carried out as a randomized controlled trial with 112 mothers and infants (56 experimental, 56 controls) who normally deliver at a Training and Research Hospital. Babies in the experimental group received KMC for 3 hours while the control group received traditional postnatal care. Infants were monitored for 24 hours in terms of vital parameters. This study is supported by TUBITAK. Project Number: 116S146

Conclusions/Results

When the newborns in the experimental and control groups were compared in terms of vital paremeters; the Apgar score in the 5th minute was found higher in the experimental group (p<0.05) than in the control group. Also the body temperature of the experimental group was found to be substantially higher than the control group at the 15th minute, at the 30rd minute at 2nd hours and 3rd hours (p<0.05). The respiratory rates of the infants in the experimental group were essentially lower than the control group at 15th minutes, at 1st hours, and at 3rd hours (p<0.05). The oxygen saturation of the experimental group was found to be significantly higher than in the control group both immediately after birth and after 15th minutes and 30rd minutes of birth (p<0.05).

Conclusions: KMC affects the vital parameters of the newborns positively in early postpartum period.

References (if needed)
THE INTRODUCTION AND POTENTIAL DEVELOPMENT IN PRACTICE OF AN INLINE BLOOD GAS ANALYSER WITHIN PAEDIATRIC CRITICAL CARE

C. Jennings¹, I. Sutheran¹, C. Ryan¹
¹Royal Manchester Children’s Hospital, Paediatric Critical Care, Manchester, United Kingdom

Background

Blood gas analysis is an integral part of the care delivered to critically ill patients. Traditional methods of testing involve the removal of a blood sample which is processed through a bench-top analyser. However, sample volume size can have a significant physiological impact on patients particularly for paediatric patients, due to smaller total blood volumes.

The aim of this pilot study was to implement an innovative inline blood gas analyser into the Critical Care practice.

Objectives

Measure blood loss using the inline analyser and compare to traditional sampling methods
Determine if nursing time could be saved at the bedside in comparison to traditional sampling methods
Compare analysed results to evaluate the accuracy of this product

Methods

Two patients, who were admitted for more than 72 hours and had an arterial line in situ, were selected. A blood sample was analysed by the inline gas analyser. A repeat blood sample was then analysed using a bench-top analyser. This method was repeated as required in response to the patients’ clinical condition. Comparative data for both sampling methods was collected and reviewed.

Conclusions/Results

Initial results demonstrate that all inline analyser results trended closely, with a correlation coefficient of 0.7-0.9, to the bench-top analyser results. Additionally, the inline analyser took 50% less time to obtain a result and required no time away from the bedside. Blood loss was not noted to have been any different.

CONCLUSION

Expansion of this pilot study will enhance collaboration, facilitating product development of this promising technology, with increasing benefits for paediatric critical care.

References (if needed)
WHY ARE PARENTS DECLINING CONSENT TO NEONATAL RESEARCH STUDIES
C. Firth1, S. Laing2, K. Johnson1
1Leeds Teaching Hospitals, Neonatal Medicine, Leeds, United Kingdom
2Leeds Teaching Hospitals, Children’s Research, Leeds, United Kingdom

Background

Randomised controlled trials (RCTs) generally provide the most robust evidence for determining best treatment. The implementation of findings from neonatal clinical trials has resulted in considerable improvement in outcome for babies and their families.

We believe all families should have the opportunity to consent to their baby being involved in trials on the neonatal unit.

Objectives

We sought to explore why some parents declined consent for their baby to take part in a trial and to explore any patterns that emerged in terms of the demographics of families who declined consent.

Methods

All babies born in 2016 eligible for the NIHR funded, multicentre Enteral LactoFerrIN in neonates (ELFIN) trial were reviewed.

Those families who were approached for consent but declined were compared with those families that did consent.

A wide variety of demographic information was ascertained.

Conclusions/Results

68 babies born at <32 weeks were eligible for consideration of entry into the ELFIN trial.

Key findings included:
- non consenters were significantly more likely to be non-white British and more deprived when compared with consenters.
- non consenters were significantly more likely to have had babies born at >28 weeks rather than <28 weeks.

Conclusion:
Work needs to be done in order to ensure all families are given research information in the correct language, written in the correct way in order to give them maximum opportunity to understand and take part in vital neonatal research studies.

References (if needed)
EMERGENCY EVACUATION PLANNING IN THE NEONATAL UNIT: LESSONS LEARNED FROM RECENT EXPERIENCE
A. Hurley¹, K. Johnson¹, N. Wallace¹
¹Leeds Teaching Hospitals, Neonatal Medicine, Leeds, United Kingdom

Background

A potential catastrophic electrical failure at Leeds General Infirmary on 28th February 2016 led to a full emergency evacuation of the neonatal unit. At the time there were 26 babies on the neonatal unit, 9 of which were receiving complex intensive care. As the events occurred late on a Sunday afternoon, medical staffing in particular, was minimal.

Objectives

We aimed to formally review the above events in order to elucidate learning points for the future. We aimed to review the available evidence on neonatal unit evacuation worldwide and use this and our own experience to formalise planning in case of future events and cascade learning to other units.

Methods

Events of the 28th of February were reviewed by the authors all of whom were directly involved in the evacuation.

Over a period of 6 hours the following was achieved:
- Senior team members discussed and simulated where necessary the evacuation plan, including mapping out space allocation & gas supply
- Maternity services and theatre liaison.
- Regional transport service and sister hospital liaison.
- Information leaflets for parents created and distributed.
Non-essential equipment was moved first with 2 people transporting each infant with a dispatching and a receiving consultant.

Conclusions/Results

Despite the emergency nature of the situation, planning was calm and methodical before any infants were moved. Review of the literature shows little experience of such situations other than during Hurricane’s Sandy and Katrina in the USA.

The events of February 2016 show an emergency evacuation can be safely achieved with a calm, thorough and methodical approach.

References (if needed)
THE EFFECT OF KANGAROO MOTHER CARE (KMC) APPLIED IN THE POSTPARTUM PERIOD ON BREASTFEEDING OF HEALTHY NEWBORN

S. Korkut¹, S. Inal¹

¹Istanbul University, Faculty of Health Sciences- Midwifery, ISTANBUL, Turkey

Background

KMC promotes the supply and maintenance of breastfeeding by allowing the mother to have a contact with the baby after birth.

Objectives

The purpose of the study is to determine the effects of breastfeeding on healthy newborns during the postpartum period.

Methods

The study was carried out as a randomized controlled trial with 112 mothers and infants (56 experimental, 56 controls) who normally deliver at a Training and Research Hospital. Babies in the experimental group received KMC for 3 hours while the control group received traditional postnatal care during postpartum period. Infants were monitored for 24 hours in terms of parameters related to breastfeeding. This study is supported by TUBITAK. Project number: 116S146

Conclusions/Results

When groups are compared in terms of parameters related to breastfeeding; it was found that the breastfeeding rate immediately after birth of the experimental group was significantly higher than the control group (p <0,05). It was also found that breastfeeding rate of the experimental group both in the first 30 minutes and the first 3 hours after birth was significantly higher than the control group as statistical (p <0,05). The number of breastfeeding in the experimental groups within the first 24 hours also showed a significant difference (p <0,05). When the groups were compared in terms of LATCH scores, it was found that the LATCH scores of the 24th hours of the babies in the experimental group were higher than the control group (p <0,05).

Conclusions: KMC contributes more effective and more successful sucking of healthy full term babies in postpartum period.

References (if needed)
A MULTIDISCIPLINARY CLINIC FOR INTERVENTION AND RESEARCH TO PROMOTE FAMILY RESILIENCE

F.R.B. Marques¹, B.C.C. Giacon², A.A. Anache³, M.A. Mandetta⁴, M.A. Marcheti¹
¹Federal University of Mato Grosso do Sul, Pediatric Nursing Department, Campo Grande, Brazil
²Federal University of Mato Grosso do Sul, Nursing Department, Campo Grande, Brazil
³Federal University of Mato Grosso do Sul, Psychology Department, Campo Grande, Brazil
⁴Federal University of São Paulo, Pediatric Nursing Department, São Paulo, Brazil

Background

An increasing number of children/adolescents is discharged from intensive care unit with chronic health condition and in need of complex care. Their families need to face many challenges in their trajectory to cope with them. Sometimes they feel overwhelmed, tired and frustrated to handle the situations that arise from these contexts. In view of this problem, a multidisciplinary clinic for intervention and research with family was proposed at the Federal University of Mato Grosso do Sul - Brazil. The mission is to empower the family to assume their child’s care and to better cope with the illness and other family demands. Individual meetings with families are scheduled, always led by a family nursing specialist and other members of the healthcare team. A theoretical framework was developed to conduct the actions.

Objectives

To present the implementation of the multidisciplinary clinic for intervention and research with families.

Methods

A systematic experience report was conducted to identify the activities, the resources, the findings and the difficulties.

Conclusions/Results

Five families are participating in individual meetings where they are strengthened and encouraged to make decisions about their needs so as to better provide their child/adolescent’s and other family member’s care. The resources are in charge of the university that makes available the clinic facilities. The great issue is the family social vulnerability. The actions carried out have promoted the family’s resilience in face of the challenging situations emerged with the health condition. The clinic is an innovative accomplishment and can stand for a pilot experience for other institutions.

References (if needed)
"LEAN" IN HEALTH CARE IMPROVEMENT IN NEONATAL CARE

E. Moerman1, F. Jenken1, A. Hoogen1
1UMCU, 06, Utrecht, The Netherlands

Background

Changes in care are affecting hospitals and care institutions. It is therefore important that health care workers reflect on their own care processes and, in addition evaluate these processes. Our neonatal intensive care unit (NICU) is using the 'Lean' method for nurses to critically evaluate their care processes and, to adapt recommendation and translate these into practice.

Objectives

Aim

Nurses are able to critically review their work and to implement small improvements in care to create a more efficient working process. Methods

Method

Six NICU nurses were trained to use the Lean method. All nurses of the NICU have the possibility to write daily problems on a so called 'improvement board'. Weekly those problems are discussed among colleagues and a Lean certificated nurse. In addition an 'owner' of a problem is chosen. Subsequently solutions can be worked out and written at the board with a date of evaluation and progress.

Conclusions/Results

Results

In the last two years 60 problems to improve care were detected. Of these, 50 problems were discussed and improvements were implemented in daily care. Ten problems, could not be solved because of hospital reasons or in need of serious project management.

Conclusion

Nurses judged the improvement board as efficient and they know in a glance what to improve and where to work on. The threshold to take steps to improve quality of care is low by using this method. Discussing small problems and solving them in a structured way gives an optimum in adaptation of improvements in daily neonatal care.

References (if needed)
TELEPHONE INFORMATION PROVIDED TO PARENTS IN ITALIAN PEDIATRIC ICUS: AN UPDATE

A. Giannini, M. Guido, P. Edi

1 Fondazione IRCCS Ca' Granda - Ospedale Maggiore Policlinico, Pediatric Intensive Care Unit, Milan, Italy
2 Istituto per lo Studio e la Prevenzione Oncologica – ISPO, Unit of Epidemiology, Florence, Italy

Background

Families of ICU patients need information, proximity to their loved ones and assurance [1]. This leads them to telephone frequently for news [2]. Ten years ago we found that in Italian PICUs the telephone plays a relatively important role in giving parents information [3].

Objectives

We updated this issue in the course of a national survey on visiting policies in Italian PICUs.

Methods

An email questionnaire on visiting policies was sent to the heads of all 30 Italian PICUs, including questions about their policy on providing telephone information to parents.

Conclusions/Results

The response rate was 100%. Daily meetings of doctors with parents were held systematically in almost all PICUs (97%). In most units (97%) information was also given by phone (often or always, 80%; sometimes, 20%). Those authorized to provide this information were mainly physicians (doctor on duty 97%, nurses 53%). Frequently (often or always, 87%, 26/30) the family was given the unit’s extension number, and 33% of units had a specific time slot for taking relatives’ phone calls. Not only reassurance (63%) and logistical information (60%) were given over the phone, but above all generic clinical information (93%), e.g. regarding temperature or sleep. However, even detailed clinical data, e.g. on diagnosis, prognosis and treatment, were given in 17% of PICUs.

Our findings confirm that in Italian the telephone has a relatively important role in giving parents information, and that it is more widely used than in Italian adult ICUs [4].

References (if needed)

1) Bijttebier, ICM 2001;27:160-52
2) Quinio, ICM 2002;28:1389-943
3) Giannini, PCCM 2011;12:e46–e504
4) Giannini, ICM 2008;34:1256-62
PROFILE OF WEIGHT AND HEIGHT GROWTH OF NEONATAL INTENSIVE CARE UNIT PRETERM INFANTS IN OUTPATIENT FOLLOW-UP

V.R.D.M. Cardoso Rodrigues¹, M.A. Andrade Brunherotti²

¹Capes Scholarship/ Docturate Sanduíche in Exterior Program/Process nº88881.132348/2016-01 in Postgraduate Program in Health Promotion - University of Franca, Franca-SP, Brazil. University of Franca – Departament Health Promotion / Maternal-Infants

²Postgraduate Program in Health Promotion Teacher - University of Franca, Franca-SP, Brazil. University of Franca – Departament Health Promotion / Maternal-Infants

Background

One of the sequelae due to prematurity is the weight-loss deficiency perceived in the first months of life that can persevere for long periods until adulthood. In this situation, it is difficult to predict how premature growth will be over time.

Objectives

To evaluate the weight and height growth of preterm newborns from the neonatal intensive care unit in outpatient follow-up.

Methods

Longitudinal and descriptive clinical study with 31 premature newborns attended at the High Risk Outpatient Clinic of Franca-SP. To evaluate the growth of preterm infants, we analyzed: corrected age, weight, length in the following periods: birth and hospital discharge and at four months corrected age, placing weight and length in the WHO growth curves. To evaluate the weight gain and length of the newborn until the 40th week we used the Fenton curves.

Conclusions/Results

Regarding weight, it was observed that the occurrence of low and extreme low weight increased with each evaluation, as well as the occurrence of short stature and extreme short stature. Growth assessment is very important for detecting growth changes and improving outpatient care.
Classificação do Percentil de Comprimento

Classificação do Percentil de Peso

References (if needed)
Background

The majority of intracranial arachnoid cysts are asymptomatic and detected incidentally. Rupture may result in symptomatic presentation, the most common symptom being headache. Raised intracranial pressure is rare.

Objectives

To present an interesting case of a 10 year old that presented with a 2 month history of a strange sensation in her head while doing any physical activity. A week prior to admission she heard a ‘pop’ in her head while performing a cartwheel, developed nausea and headache that was eased when standing up or tilting her head to the right. The patient was neurologically intact with no signs of raised intracranial pressure on examination. However, MRI brain showed a ruptured 3.8 x 2.9 x 2.3 cm left middle cranial fossa arachnoid cyst with extensive subdural hygroma and mass effect (Image 1, 2). She was managed with burr hole drainage.
Methods

Information was collected from the patient, parents, notes and hospital databases.

Conclusions/Results

It is essential to pay attention to the history which may appear to be trivial on presentation (a sensation of pop while doing cartwheel) to avoid missing burst arachnoid cysts that may have disastrous consequences.

References (if needed)
INFLUENCE OF THE DURATION OF NONINVASIVE VENTILATION ON THE CARDIORESPIRATORY INDICATORS OF PRETERM INFANTS: A RANDOMIZED CLINICAL TRIAL

C. Silveira¹, K. Leonardi², A.P. Melo³, M. Brunherotti⁴

¹Santa Casa de Franca, Pediatrics, Franca, Brazil
²Santa Casa de Franca, Unidade Terapia Intensiva Pediatria, Franca, Brazil
³Santa Casa de Franca, Unidade de Terapia Intensiva Pediatrica, Franca, Brazil
⁴University of Franca, Health Promotion, Franca, Brazil

Background

Nasal continuous positive airway pressure has been valued as beneficial for the preterms, despite of that, there is a lack of specific knowledge about the parameters adopted, modalities used, and effects of different interfaces. The duration of noninvasive ventilation is also a factor of interest since the literature has shown important variability in the effects of different durations.

Objectives

To evaluate the cardiorespiratory indicators of preterm infants submitted to two periods of noninvasive ventilation.

Methods

Controlled randomized clinical trial. Fifty-two newborns (gestational age of 30.6 weeks, weight of 1,366 g) submitted to continuous positive airway pressure (CPAP) therapy were studied. The infants were randomly allocated to two groups: 31 children received CPAP therapy for 48 hours and 21 children for 72 hours. The respiratory rate, heart rate, oxygen saturation and Silverman-Andersen Score were recorded once a day. Three measurements were obtained at intervals of 15 minutes.

Conclusions/Results

The birth characteristics were homogenous, without significant differences between groups. The cardiorespiratory indicators did not differ significantly between groups, but better mean values were observed for the 72-hour group. There was a difference in the respiratory rate of 5.0 breaths per minute and the heart rate was 7.8 bpm, while oxygen saturation was similar in the two groups. Neither the duration of noninvasive ventilation of 48 or 72 hours nor the nasal CPAP and nasal intermittent positive pressure had an influence on the cardiorespiratory indicators of preterm infants. However, the period of 72 hours resulted in lower respiratory and heart rates.

References (if needed)
EVALUATING IN UTERO MEDICATION EXPOSURE AND MATERNAL DISEASE ON INFANTS: THE IMPORTANCE OF PEDIATRIC FOLLOW-UP INFORMATION

S. Sinclair¹, A. Theodossiou², J. Albano³

¹University of North Carolina Wilmington, School of Nursing- Clinical Research Program, Wilmington, USA
²University of North Carolina Wilmington, School of Nursing, Wilmington, USA
³INC Research, Real World & Late Phase, Wilmington, USA

Background

Pregnancy exposure and disease-based registries are conducted to evaluate the safety of in utero medication exposure and maternal disease on birth outcomes, such as congenital anomalies, neonatal distress, and infant growth and development. Typically, in these population-based studies, pregnant women are followed from early pregnancy until the end of pregnancy. Infants are followed for varying lengths of time. Multiple reporters are needed for each pregnant woman (e.g., health care provider [HCP] managing the maternal condition; obstetric HCP; pediatric HCP). Pediatric follow-up information is critical, especially for capturing infant abnormalities that were not apparent at birth, and confirming abnormalities suspected at birth that require additional pediatric evaluation.

Objectives

To identify and characterize ongoing registries in Europe that collect infant follow-up information from pediatric HCPs.

Methods

We conducted a systematic search of the literature and Internet using numerous key words (e.g., pregnancy, congenital anomalies, registries) and cross-referencing of relevant articles. We searched the databases of the European Network of Centres for Pharmacoepidemiology and Pharmacovigilance (ENCePP) and the US Food and Drug Administration, by study design, location, and key words.

Conclusions/Results

Twenty-one ongoing registries with an infant component were identified. Nineteen (90%) were medication-based (including 12 conducted by biopharmaceutical companies), and 3 (10%) were disease registries. Infant follow-up ranged from 1 month to 3 years; 8 (38%) included a 1-year follow-up. Duration was not specified for 8 (38%) registries. Maternal conditions were neurologic, autoimmune, rare diseases, and infectious disease.

Pediatric follow-up information is critical for evaluating in utero medication exposure and maternal disease.

References (if needed)
MANAGEMENT OF POLYCYTHAEMIA IN NEONATAL INTENSIVE CARE UNIT

P. Stilwell\textsuperscript{1}, C. Jordan\textsuperscript{1}

\textsuperscript{1}University College London Hospital, Neonatal Intensive Care, London, United Kingdom

Background

Polycythaemia (defined as packed cell volume, PCV, \textasciitilde70) can lead to problems such as hypoglycaemia, apnoea and poor feeding; rare complications include cerebral venous thrombosis.

The rationale for treating polycythaemia is to prevent hyperviscosity and subsequent poor oxygenation and microthrombi. There is controversy over the need to treat as there is no firm evidence that intervention improves neurological outcome.

In the absence of clear clinical guidelines about the management of polycythaemia in our neonatal intensive care unit (NICU), we decided to investigate how these babies are being managed.

Objectives

The aim of this project was to work out 1) the proportion of babies admitted to NICU with polycythaemia 2) how these babies are being managed.

Methods

Notes reviewed of all babies admitted to NICU with polycythaemia, between 01/09/2016–10/02/2017. Data collected on multiple factors including gestation, signs/symptoms, PCV, intravenous fluids, whether dilutional exchange was performed. Excluded if no documented PCV.

Conclusions/Results

There were a total 415 admissions to NICU during the time period investigated. 30 babies (7.2\%) were admitted due to polycythaemia. 4 were excluded. 23/26 had PCV\textasciitilde70, 4/26 PCV\textasciitilde75. All babies received IV fluids. 13/26 (50\%) had dilutional exchange.

Polycythaemia accounts for a significant proportion of admissions to neonatal intensive care. There is inconsistency in the management of babies admitted with polycythaemia, with only some babies receiving partial dilutional exchange.

This work has led to a literature review and the introduction of new criteria to guide the decision about when to admit babies with polycythaemia and how to manage them based on PCV and symptoms.

References (if needed)
UNDERSTANDING THE CAUSES OF PRESCRIBING ERRORS IN PICU: A NOVEL HUMAN FACTORS APPROACH
A. Sutherland1,2, D.M. Ashcroft1, D.L. Phipps1, L. Tume3,4
1University of Manchester, Division of Pharmacy and Optometry, Manchester, United Kingdom
2Royal Manchester Children’s Hospital, Pharmacy Department, Manchester, United Kingdom
3Alder Hey Children’s Hospital, Paediatric Intensive Care Unit, Liverpool, United Kingdom
4University of Central Lancashire, School of Nursing, Preston, United Kingdom

Background
PICU is a high-risk environment with an prevalence of prescribing error of 11-25 per 100 orders(1). However, little is known of how prescribing errors occur in PICU therefore a prospective approach to describe these causes was taken(2).

Objectives
To describe the prescribing process in a systematic way, and identify causes of prescribing errors in two UK PICUs

Methods
Task analysis was used to analyse the prescribing process in consultation with PICU pharmacists, clinicians and nurses. Semi-structured interviews with prescribers (n=18) were used to explore different error types. The interviews were analysed thematically and combined with the task analysis to inform a Systematic Human Error Reduction and Prediction Approach (SHERPA) (3) to identify the types and causes of prescribing errors in PICU.

Conclusions/Results
Prescribing is viewed by prescribers as an important task with a high cognitive burden, but with low operational priority. Errors are caused by a complex interplay of factors which are presented in Table 1
<table>
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<th>Associated error(s)</th>
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<td>Individual Factors</td>
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<td>Divergent practice; Role confusion</td>
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<td>Task factors</td>
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<td>Support; Leadership; Communication</td>
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<td>Handover; Unpredictability</td>
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Table 1 - Causes of prescribing errors in PICU

Using SHERPA we have been able to link activities with failure modes and causative factors.

CONCLUSION: SHERPA may present a useful tool to support the design of future interventions to reduce prescribing error.

References (if needed)

BACKGROUND

Paediatric tracheostomy care is a core component of the specialist medical training required to be delivered by our PICU. We are responsible for training staff (medical and advanced nurse practitioners) from a range of backgrounds (paediatrics, anaesthesia, adult intensive care medicine, emergency medicine). Staff have a variable level of past experience with regards to patients with tracheostomies.

Knowledge, skills and experience is essential when providing care to these patients and in developing the confidence to respond effectively to clinical situations. The potential for serious harm to occur from tracheostomy complications is recognised and is the focus of the National Tracheostomy Safety Project (NTSP).

OBJECTIVES

Our aim was to improve the knowledge, skills and confidence of PICU medical staff in tracheostomy care.

METHODS

A baseline survey of the current trainee staff was used to guide development of a teaching programme in collaboration with experienced senior medical and nursing staff. NTSP modules were accessed as pre-course self-directed e-learning. Teaching sessions covered knowledge (airway anatomy, tracheostomy indication, procedure, complications, emergency management, routine care), equipment familiarisation and utilised simulation scenarios. Trainees were able to assist with routine tracheostomy care and tube changes on the PICU. Post-course feedback was obtained.

CONCLUSIONS/RESULTS

91% of staff increased in confidence following the training. 100% attendees felt able to manage a blocked/displaced tracheostomy after the session. Improved knowledge regards humidification and speaking valves was specifically highlighted.

This simple training can complement the NTSP and be implemented to improve tracheostomy care and staff familiarity with life-saving protocols.

REFERENCES (if needed)

NTSP; www.tracheostomy.org.uk
OFF-HOURS ADMISSIONS AND MORTALITY IN PICU WITHOUT ONSITE PEDIATRIC INTENSIVIST

F. Thabet¹, F. al Haffaf²
¹Prince Sultan Military Medical City, pediatrics, Riyadh, Saudi Arabia
²Prince Sultan Military Medical City, pediatrics, Riyadh, Saudi Arabia

Background

The effect of the presence of 24h inhouse intensivist on the outcome of critically ill children admitted to PICU is controversial.

Objectives

To examine the influence of time of admission on risk-adjusted mortality and length of stay for non-elective patients admitted to a pediatric intensive care unit (PICU) without 24-h per day in-house intensivist coverage.

Methods

Design: Prospective cohort study.

Setting: A 34-bed tertiary PICU.

Patients: All consecutive non-elective patients aged 0-14 years admitted from January 2011 to June 2015.

Measurements and results: Patients were categorized according to time of admission to the PICU as either in-hours (07:30 to 16:30 from Sunday to Thursday and, whenever an intensivist is present in the ICU), or after-hours when intensivists attend only on an as-needed basis (16:30 to 07:30, Friday and Saturday and public holidays).

Multivariate logistic regression was used to assess the effect of time of admission on outcome after adjustment for severity of illness using the Paediatric Risk of Mortality 2 (PRISM 2).

Conclusions/Results

The mortality observed in the office hours group was 9.4% and in the off-hours group 8.1%. The PRISM 2-based SMR was 0.83 (95% Confidence interval 0.43–1.47) for the office hours group and 0.68 (95% confidence interval 0.34–1.36) p? for the off-hours group.

Length of stay was also significantly shorter for patients admitted after hours (44.05 h vs. 50.0 h, p = 0.001).

The absence of in-house intensivist is not associated with an increase in mortality or length of stay for patients admitted to our pediatric ICU.

References (if needed)
MATERNAL SELF-EFFICACY AS A MARKER OF MOTHER’S MENTAL HEALTH POST DELIVERY

R. Tristão¹, E. Adamson-Macedo², J.A. de Jesus³, K. Costa³
¹, BRASILIA, Brazil
²University of Wolverhampton, Mental Health Centre for Health and Social Care Improvement- School of Health, Wolverhampton- UK, United Kingdom
³University of Brasilia, Faculty of Medicine, Brasilia, Brazil

Background

Symptoms of mental disorders, mood, personal counseling, and family support are factors that influence the level of parents’ self-efficacy. The occurrence of postpartum depression that may be associated with low perception of maternal self-efficacy may also influence negatively the construction of the mother-baby bond and consequently the development of the child.

Objectives

The aim was to investigate the relation of maternal self-efficacy perception to emotional state, previous exposition to distress and clinical and demographic variables.

Methods

In a cross-sectional exploratory study, 89 mothers, mean age 27.6 (±6.4) of healthy newborns within 48 hours post-delivery, mean gestational age 36.5 (±3.6), were investigated for emotional markers, prenatal distress, depression, anxiety considering demographic and clinical variables. It was used the scale Perceived Maternal Parenting Self-Efficacy (PMP S-E) Brazilian version, and the Edinburgh Postnatal Depression Scale, for depression and anxiety factors.

Conclusions/Results

It was found 62.9% of mothers achieved the criteria for depression. A cut-off point for low self-efficacy for PMP S-E was settled at percentile 25 to this sample and depression factors had significant effect over Care Taking and Evoking Behaviour PMP S-E factors [F(5,88)=3.494, p=.006 and F(5,88)= 2.471, p=.039, respectively]. MANCOVA showed that together higher maternal education and age implied in high level of perceived maternal self-efficacy [F(7)= 3.478, p = .004]. Among the investigated clinical and environmental variables that had impact at the perceived self-efficacy are gestational age and weight of baby at birth, maternal age, maternal education, death of previous child, number of previous gestation, previous abortion, high level of stress during pregnancy.

References (if needed)
OUTCOMES OF PAEDIATRIC INTENSIVE CARE IN LATVIA
I. Veģeris¹, R. Balmaks¹, J. Kolbergs¹, A. Bārzdīna¹
¹Children’s Clinical University Hospital, Intensive Care Unit, Riga, Latvia

Background
Latvia is an Eastern European country with a population of just less than 2 million. There is only one paediatric hospital with a single multidisciplinary 8-bed PICU where all critically ill children outside neonatal period are admitted. Its outcomes have not been systematically monitored yet.

Objectives
Our aim was to describe demographic profile and outcomes of PICU patients in Latvia over three consecutive years.

Methods
Retrospective analysis of data retrieved from electronic medical records of all admissions to Children’s Clinical University Hospital PICU between 1/1/2013 and 31/12/2015.

Conclusions/Results
During the study period, there were a total of 2246 PICU admissions (average 749 per year) with population incidence of 213 per 100,000 children per year, 25.6% were infants (<1), 73.6% were children (1–17) and 0.8% were adults (18 or older). The median length of stay was 0.97 days (IQR: 0.82–2.66). 30.9% required mechanical ventilation; 1.96% (range 1.67–2.11% in individual years) died. Readmission rate within 48 hours after PICU discharge was 1.83%. The patient flow (number of patients in the PICU for any part of a day) was the highest on Thursdays and the lowest on Sundays, average 9.2 and 6.1, respectively. This is the first study of PICU outcomes in Latvia. Several possibilities for quality improvement were identified, e.g. the need for PICU admission criteria and improved flow of elective admissions. This study will serve as the basis for prospective data registry development.

References (if needed)
PREVALENCE OF RETINOPATHY OF PREMATURITY IN IMMATURE BABIES IN A PUBLIC HOSPITAL IN RIO DE JANEIRO – BRAZIL

A. Veiga¹, N.V. Moliterno², L.M.P.S.C. Albuquerque³, E.Q.O. Veiga², N.A. Mendes², P.A. Montagni², C.C. Mochdece², A.P.A. Perié², G.L. Benvenuti², F.M. Moliterno²
¹, Petrópolis- Rio de Janeiro- Br, Brazil
²Faculdade de Medicina de Petrópolis, Pediatrics, Petrópolis- Rio de Janeiro, Brazil
³Faculdade de Medicina de Petrópolis, Ophthalmology, Petrópolis- Rio de Janeiro, Brazil

Background

Retinopathy of prematurity (ROP) is one of the leading preventable blindness in childhood.

Objectives

To describe the prevalence, risk factors and distribution of ROP evolution stages in the NICU of the Alcides Carneiro Hospital, Petrópolis, RJ, Brazil (HEAC).

Methods

Retrospective, cross-sectional and descriptive study of ROP screening performed in the HEAC NICU, from January to December 2016. Preterm infants with GI ≤32sem and / or ≤1500g birth weight (PN) were hospitalized in the ICU between 4 to 6 weeks of life.

Conclusions/Results

We examined 47 newborns and 41 of them met the criteria established by the protocol. Twenty one (52.5%) had ROP (ROP I 71.42%, ROP 2 19.04%, ROP 3 9.52%) Risk factors as Lower Gestational Age, Lower Birth Weight, Longer lenght of Oxygen therapy, blood transfusion, lower Apgar score in the 5th minute were directly related to the severity of ROP. The prevalence of retinopexy was 2 cases (4.8%). The surveillance of premature newborns at risk for ROP must be carried out constantly, aiming at the patient's well-being and the prevention of blindness and the quality of care provided.

References (if needed)

* Dragica JOJIĆ*, Jelica PREDOJEVIĆ-SAMARDŽIĆ, Milka MAVIJA, Dimitrije NIKOLIĆ. THE EFFECT OF OXYGEN THERAPY ON THE DEVELOPMENT OF RETINOPATHY OF PREMATURITY. Paediatrics Today 2015 DOI 10.5457/p2005
"NESTED" VS WARD WORKING NURSES IMPROVES WORKING PROCESS

H. Vernooij1
1UMC Utrecht, WKZ, Utrecht, The Netherlands

Background

Our pediatric intensive care unit (PICU) will change from multi-patients to single-patient rooms, requiring adjustments in nurses' workflow. We sought to examine the effect of this transition on nurses’ perceptions of providing care by introducing mock-ups were new working processes were tested.

Objectives

Methods

Nurses were assigned to 1 or 2 patients and to a colleague to work closely together within the unit (“nested” pairs of nurses). A questionnaire was used to identify benefits, risks, and specific patient safety concerns related to this way of working.

Conclusions/Results

Results

Ten dayshifts of eight nurses were evaluated. They were positive about their collaboration, direct communication, and easy planning of breaks. Nurses reported improved safety in preparing medication, more focus on a limited amount of patients, and acute events were less stressful. There was more time for teaching and family supported care. Disadvantages of “nested” working were reduction of flexibility and the need for a good coordination making the couples. Frailties of individual nurses became more evident. Finally, nurses in training created some difficulties to guarantee presence of an adequate number of qualified staff during coffee and lunch breaks.

Conclusions

This pilot study shows that working in small (nested) groups of nurses creates perception of improved safety, focus, and time within the workflow on a ward PICU. This way of working may serve as an intermediate in the final transition to single-patient rooms. Enough support for the nested pairs is necessary and there needs to be enough flexibility to create a safe training environment.

References (if needed)
AN ONLINE PERITONEAL DIALYSIS SIMULATOR IMPROVES KNOWLEDGE IN ACUTE PERITONEAL DIALYSIS INITIATION AND MANAGEMENT IN PEDIATRIC CLINICIANS WORLDWIDE

A. Olszewski1, D. Stein2, M. McCulloch3, S. Su4, D. Hames5, D. Daniel5, T. Wolbrink5

1Seattle Children’s Hospital, Pediatrics, Seattle, USA
2Boston Children’s Hospital, Nephrology, Boston, USA
3Red Cross Children’s Hospital, Intensive Care and Nephrology, Cape Town, South Africa
4Randall Children’s Hospital, Nephrology, Portland- OR, USA
5Boston Children’s Hospital, Anesthesia, Boston, USA

Background

Peritoneal dialysis (PD) is widely used worldwide for acute kidney injury in the intensive care unit, but there is a decreasing number of appropriately trained clinicians to provide PD for children1. Online learning has been shown to be effective in medical education, including nephrology. We developed an online virtual PD simulator (VPDS) to train clinicians about PD, and released it on OPENPediatrics (www.openpediatrics.org).

Objectives

To report the VPDS usage and knowledge gains during the first year of release.

Methods

The VPDS was released as part of a curriculum with pre- and post-testing, as well as a stand-alone resource. Analytics tracked user profiles, activity and scoring for each user. Descriptive statistics described activity and paired t-tests analyzed knowledge gains.

Conclusions/Results

Between January and December 2016, 631 users (42% physicians/medical students, 50% nurses, and 7% other healthcare professionals) from 54 countries accessed the VPDS. Approximately 50% of users completed the entire knowledge guide, 40% completed all of the tactics, and 10% completed the entire simulator. 200 users completed pre- and post-testing with an increase in mean pre- versus post-test scores (29.8% versus 61.1%) by 31.3% (p<0.0001, 95% CI 27.5-32.0).

There was widespread use of the VPDS which was associated with increase in knowledge about PD management; next steps should compare learning gains from the VPDS to other educational modalities, and ideally demonstrate improvement in clinical practice.

References (if needed)

INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 1

ESPN7-0347

SUBCUTANEOUS EMPHYSEMA WITH SPONTANEOUS PNEUMOMEDIASTINUM AND PNEUMOTHORAX IN JUVENILE DERMATOMYOSITIS: A RARE CASE PRESENTATION

A.C.D. Alves¹, D.M. Tan², P.D.O. Cavalheiro², G.V. Novak³, A.M. Sallum³, C.A. Silva³, A.F. Delgado²

¹, São Paulo, Brazil
²University of Sao Paulo, Pediatric Intensive Care Unit, Sao Paulo, Brazil
³University of Sao Paulo, Pediatric rheumatology and adolescent unit, Sao Paulo, Brazil

Background

The presence of air leak is found in paediatric critical care units and may lead to great morbidity due to respiratory failure. Connective tissue disease (CTD) may often cause pulmonary manifestation although rarely present with acute respiratory failure. Among CTD are the inflammatory myopathies, characterized by muscle weakness and inflammation. The lungs can be a frequent target of autoimmune mediated injury with multiple pulmonary manifestations even though a large percentage of patients has limited disease, not requiring treatment.

Objectives

To identify a case of progressive pulmonary involvement with muscle weakness refractory to treatment and fatal outcome.

Methods

Case report with review of medical records and literature review. We describe a 8 year old boy with 3 months of chronic muscle weakness and polyarthritis admitted in PICU with progressive respiratory failure. Physical examination found symmetric weakness of proximal muscles, characteristic cutaneous changes such as Gottron papules and Heliotrope in eyelid. Work-up encountered a positive antinuclear antibody and presence of inflammatory myopathy in thigh MRI together with capillaroscopy with scleroderma pattern. After the diagnosis of juvenile dermatomyositis, pulse therapy with intravenous corticosteroid and immunoglobulin were administered without response. Progressive respiratory failure evolved together with spontaneous pneumothorax, pneumomediastinum and subcutaneous emphysema. After orotracheal intubation, the patient rapidly demanded high pressures with deterioration of clinical condition and had a fatal outcome after 50 days of hospitalization.

Conclusions/Results

Spontaneous pneumothorax and pneumomediastinum is an extremely rare complication of juvenile dermatomyositis and can be a risk factor of bad prognosis.

References (if needed)
VENTILATOR-ASSOCIATED PNEUMONIA IN A PEDIATRIC INTENSIVE CARE UNIT – INCIDENCE AND RISK FACTORS

J. Aquino1, G. Heleno2, R. Moinho1, A. Dias1, C. Pinto1, L. Carvalho1, J. Farela Neves1
1Hospital Pediátrico - Centro Hospitalar e Universitário de Coimbra, Intensive Care Unit- Paediatric Hospital, Coimbra, Portugal
2Faculty of Medicine- University of Coimbra, Faculty of Medicine- University of Coimbra, Coimbra, Portugal

Background

Ventilator associated pneumonia (VAP) is the second most common hospital-acquired infection among Paediatric Intensive Care Unit (PICU). It is estimated to occur in 3-30% of ventilated paediatric patients and mortality rate varies between 10 and 71%.

Objectives

To determine incidence and risk factors of VAP in a PICU.

Methods

Retrospective exploratory study. Mechanically ventilated patients for >48h in a PICU were included during a period of two years (2014-2015). Exclusion criteria: newborns and ventilated patients with diagnosis of pneumonia during the first 48h of ventilation. VAP was diagnosed according to CDC criteria. Demographic data and risk factors were compared between patients with and without VAP.

Conclusions/Results

Seventy four children were included, with a male to female ratio of 2:1 and median age of 2.7y (P25=0.6; P75=11.6). VAP incidence was 20.3% with a rate of 22.5 episodes per 1000 ventilator days. VAP mortality rate was 20%, related to other comorbidities of those patients. The most frequently isolated bacteria were gram-negative (50%) and Staphylococcus aureus. The only PAV risk factor identified in this sample was mechanical ventilation duration, with longer periods in PAV group (5.2 vs 10.2 median days; p=0.044).

Conclusions: Incidence of VAP was similar to previous published studies. Longer duration of mechanical ventilation was the main risk factor for PAV. Efforts must be made to reduce ventilation duration, as well as other preventive measures to reduce VAP incidence.

References (if needed)
Meningococcal septic shock (MSS) has considerable mortality but neurologic outcome is usually good. Coinfections are rare.

Objectives

We aim to present the first case of MSS with CMV meningoencephalitis.

Methods

We present a case of a 2 years-old boy admitted to our PICU with MSS (confirmed by PCR and culture) with 3 day history of rhinitis. On admission he had fever, altered mental status - GCS 5, PRISM 43 p., PDR 98.2%, neurological symptoms, purpura fulminans and progressive shock with signs of cardiac involvement (↑troponine, NT-proBNP). Soon clinical and laboratory signs for multiorgan failure developed - respiratory failure, elevated creatinine, low platelets, coagulopathy, slightly elevated liver enzymes. After 4 days of typical treatment the child was weaned from ventilation but neurological deficits were observed so CT and MRI of the brain were obtained. In the left hemisphere areas of the inflammatory changes were found. This, with the result of the CBF analysis (cytosis 4, protein 93mg/dl), suggested viral infection of the CNS. Cytomegalovirus was identified in CBF with PCR. After 2 weeks of antiviral treatment no neurological deficits were observed.

Conclusions/Results

Abnormal neurologic signs after meningococcal sepsis should lead to further investigations. Prompt treatment of CMV meningoencephalitis resulted in quick improvement in the boy’s neurological condition.

References (if needed)
Background

Vancomycin-resistant enterococcus (VRE) is a concerning microorganism among hospitalized and intensive care patients. The Centers for Disease Control and prevention reported VRE as having a 28.5% prevalence rate in intensive care units.

Objectives

The aim of this study was to report the outbreak characteristics, the risk factors and the outbreak control of VRE colonization in neonatal intensive care unit and the effect of Lactobacillus reuteri on VRE colonization.

Methods

Thirty-nine cases and seventy-eight controls were included in the case-control study. The cases were consisted of the patients whom rectal swabs were positive of VRE. The primary outcome variable was the risk factors of VRE colonization. Secondary outcome was the effect of Lactobacillus reuteri on elimination of VRE.

Conclusions/Results

Of 272 neonates, 39 (14.3%) were colonized with VRE. According to multivariate analysis gestational age, use of ultrasonography and receiving anti-methicillin resistant staphylococcus aureus drugs were suggested as the risk factors of VRE colonization. Eleven (42.3%) of 26 patients became negative after the use of probiotics. The clearance time of VRE was 9.61 ± 5.53 days. Only two (15.4%) of 13 patients who did not receive Lactobacillus reuteri had clearance of VRE.

Small gestational age, shared ultrasonography and the anti- methicillin resistant staphylococcus aureus drug exposure are major independent risk factors for VRE colonization. Effective infection control programme should be implemented. To determine the effectiveness of probiotics in VRE colonization, further randomized controlled trials must be planned.

Acknowledgements: We thank Monica Ann Malt for English editing

References (if needed)
Background

Acute bacterial meningitis is more frequent in the neonatal period than in any other time of life and leads to a high incidence of mortality and long term neurological sequelae.

Objectives

The aim of the study was to determine the epidemiological characteristics of bacterial meningitis observed in neonates.

Methods

A retrospective study of all cases of meningitis, hospitalized in the neonatal intensive care unit, Mohamed VI University hospital, from January 2016 to December 2016.

Conclusions/Results

Results: Twenty of 794 neonates (2,5%) admitted, developed meningitis. With a male predominance (12 boys and 8 girls). The mean age of symptom presentation was 5 days. All patients were symptomatic. The most common clinical features were: fever, respiratory distress and seizure. Analysis of cerebrospinal fluid was positive in 14 cases (70%). Gram-positive bacteria were more frequently responsible. In 2 cases, it was nosocomial meningitis. Antibiotic therapy should be initiated immediately after lumbar puncture. All cases were treated by third-generation cephalosporins-aminoglycosides, 2 cases by adding ciprofloxacin and 2 cases by glycopeptide antibiotic. 3 cases were complicated by hydrocephalus. The mortality rate was 25%.

Conclusion: the bacterial meningitis is a medical emergency, and immediate diagnostic steps must be taken to establish the specific cause so that appropriate antimicrobial therapy can be initiated. Even with optimal therapy, morbidity and mortality may occur. Neurologic sequelae are common among survivors.

References (if needed)

Background

Kluyvera ascorbata is a gram negative germ, which belongs to the Enterobacteriaceae family. This bacterium is generally considered a commensal germ, but it can cause significant infections in rare cases, especially in the newborn. It is generally resistant to first-line antibiotics in neonatal units.

Objectives

The authors report a case of neonatal infection secondary to this germ, with a review of the literature.

Methods

It’s about a male newborn, hospitalized in the intensive care unit of Mohamed VI University Hospital of Marrakech, Morocco.

Conclusions/Results

The newborn was admitted with materno-fetal infection, blood culture revealed a multiresistant Kluyvera ascorbata. Treatment was imipenem and amikacin and the evolution was favorable. Infection with this germ is very rare in neonatology, in case of systemic infection, early treatment with appropriate targeted antibiotics, would reduce neonatal morbidity and mortality.

References (if needed)
Background

Neonatal tetanus is a poisoning caused by Clostridium tetani, rare in newborns. It is more likely to occur in low and middle income countries especially in places such as urban slums and rural areas; in those places unhygienic deliveries at home are common, and coverage of antenatal care services and maternal tetanus toxoid immunization are usually inadequate.

Objectives

Despite the certification in Morocco of its eradication, it still rages, with still 4 cases in 2016 in our structure. We identified the global, regional, and national levels and trends of mortality from neonatal tetanus.

Methods

We report 4 cases, admitted to the intensive care unit (NICU) of Mohamed VI University Hospital of Marrakech, Morocco, during the year 2016.

Conclusions/Results

Neonatal tetanus accounted for 0.68% of all admissions. Pregnancy was not followed in all 4 cases. Only one woman received 2 doses of tetanus vaccine. The delivery occurred at home in 3 of the cases with application of "Khôl" at the level of the umbilicus. The mean age of admission was 12.5 days. A Dakar score was noted ≥ 4 in 3 cases and is classified as stage III according to the Mollaret classification. The treatment was essentially palliative: it was based on sedation and artificial ventilation. There was a mortality in 3 cases.

Tetanus remains a public health problem in Morocco, despite the progress made, it is necessary to review the eradication strategy. Currently the treatment is essentially preventive, based on vaccination, as well as health education and improvement of hygienic conditions.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 2

ESPN7-0442

BETTER BE ABSOLUTE – CSF/BLOOD GLUCOSE RATIO IS AS USEFUL AS FLIPPING A COIN IN DIAGNOSING BACTERIAL MENINGITIS

I. Brito¹, F. Abecasis²,³
¹Universidade de Lisboa, Faculdade de Medicina, Lisboa, Portugal
²Centro Hospitalar Lisboa Norte- EPE, Unidade de Cuidados Intensivos Pediátricos- Departamento de Pediatria, Lisboa, Portugal
³Universidade de Lisboa, Clínica Universitária de Pediatria- Faculdade de Medicina, Lisboa, Portugal

Background

Bacterial meningitis is a life-threatening condition that requires prompt diagnosis and treatment with antibiotics. In this clinical setting, cerebrospinal fluid (CSF) glucose, which is typically maintained above 50 mg/dL and about 70-75% of blood glucose, is severely decreased due to bacterial consumption. Although glycorrhachia is usually analyzed in comparison to glycemia, its absolute value may accurately reflect CSF intrinsic changes.

Objectives

In this study, we aimed to assess which is more helpful for the diagnosis of bacterial meningitis: CSF/blood glucose ratio or absolute glycorrhachia.

Methods

We retrospectively retrieved data from all lumbar punctures performed in the Department of Pediatrics of a university-affiliated hospital, from 1st January 2010 to 31st December 2015. Data included CSF cytochemical parameters, macroscopic examination and microbial culture and also blood glucose and blood C-reactive protein. Both absolute glycorrhachia and CSF/blood glucose ratio were tested as tools for diagnosing bacterial meningitis.

Conclusions/Results

A total of 777 lumbar punctures (LP) were performed and 249 met all criteria. There were 31 cases of bacterial meningitis (14 confirmed, 17 probable). Decreased CSF/blood glucose ratio (<0.5) had 74% sensitivity, 96% specificity, 48% positive predictive value (PPV) and 88% negative predictive value (NPV) for diagnosing bacterial meningitis. As for absolute hypoglycorrhachia (<36 mg/dL), sensitivity was 52%, specificity was 98%, PPV was 80% and NPV was 93%.

Conclusion Overall, absolute hypoglycorrhachia has a better predictive value (NPV 93%, PPV 80%) than CSF/blood glucose ratio (NPV 96%, PPV 48%), which should be taken into account when reviewing guidelines.

References (if needed)
Background

Kawasaki disease (KD) is often misdiagnosed and may cause severe complications with delayed treatment. Relationship between myositis and KD has not been clearly established, although there have been a few case reports describing their co-occurrence.

Objectives

To describe a case of refractory KD presenting as severe iliopsoas myositis and literature review of the relationship between KD and myositis.

Methods

A 7 year-old male admitted with fever, abdominal pain and iliopsoas myositis and empirically treated with antibiotics. On day 2 of admission, he developed shock and was transferred to the pediatric intensive care unit. He required surgical intervention, mechanical ventilation and inotropes. Fever was persistent on day 11 and clinical features of KD appeared on day 15, including coronary artery aneurisms. Symptoms were refractory to immunoglobulins and corticosteroid treatment but the patient improved with infliximab. Koutras first reported the occurrence of myositis with KD in 1980. Five other cases of myositis with KD in children and one in an adult patient have been published since then. Involvement of limbs, orbitary muscles, diaphragm and oesophagus has also been reported. However, in all of these cases, myositis was a co-occurrence or it appeared shortly after KD. This is the first case in which myositis preceded KD symptoms. Deposition of immune-complex in affected vessels and tissues, including muscle tissues, could explain the underlying pathophysiology.

Conclusions/Results

KD must be considered in any prolonged fever condition. Myositis is a possible complication of KD. Early recognition of this entity is crucial to avoid delay in diagnosis and severe complications.

References (if needed)
IMPROVED OUTCOME OF PEDIATRIC ONCOLOGIC PATIENTS IN A PEDIATRIC INTENSIVE CARE UNIT

L. Castro¹, C. Salgado¹, E. Torres¹, L. Boto¹, C. Camilo¹, F. Abecasis¹, M. Vieira¹
¹Centro Hospitalar Lisboa Norte - Hospital de Santa Maria, Pediatric, Lisboa, Portugal

Background

Treatment in pediatric intensive care units (PICU) is often needed for pediatric cancer patients.

Objectives

Our aim was to confirm that these children benefit from PICU admission and to identify prognostic factors that could influence decision-making in clinical practice.

Methods

Retrospective study from January 2010 to December 2016 including all oncologic patients admitted to the PICU due to medical conditions. Statistical analysis was performed using χ² test and T-test; p<0.05.

Conclusions/Results

In this period 86 patients with oncologic disease were admitted to PICU (3% of total admissions), 64% with hematological malignancy. Median age at admission was 8.7 years and 58% were male. Major causes of admission were respiratory conditions (32%), neurological conditions (26%) and septic shock (18%). Failure of two or more organs occurred in 53.5%. Vasoactive drugs were used in 32.5%, invasive ventilation in 30.3% and three patients were treated with ECMO. Therapeutic measures were limited in 20.9% and withdrawn in 8.2%. Mortality was 18.4% with a predicted mortality of 29.8% (PRISM score). Mortality was higher in cases of: relapsed disease (p<0.001), neutropenia (p=0.008), sepsis (p=0.013), mechanical ventilation (p<0.001), inotropic support (p=0.005), higher number of organ failure (p<0.001) and longer PICU stay (p<0.001).

Our mortality is in accordance with rates previously reported (13-20%), corresponding to a survival of more than 80%, fully justifying admission to the PICU. In our series, we identified several risk factors for poor prognosis that could be used as an important tool to guide clinical decisions regarding treatment strategy.

References (if needed)
SEPSIS IN A PAEDIATRIC INTENSIVE CARE UNIT: OUTCOME ACCORDING TO IMMUNODEFICIENCY STATUS

C. Correia¹, A.T. Soares², C. Pereira³, L. Boto³, C. Camilo³, F. Abecasis³, M. Vieira³
¹Centro Hospitalar Lisboa Ocidental - Hospital São Francisco Xavier, Pediatrics, Lisboa, Portugal
²Hospital Garcia de Orta, Pediatrics, Almada, Portugal
³Centro Hospitalar Lisboa Norte - Hospital Santa Maria, Pediatrics, Lisboa, Portugal

Background

Despite significant advances in the prevention, diagnosis and treatment, sepsis remains a major cause of morbidity and mortality in the immunocompromised host.

Objectives

To characterize immunocompromised patients with sepsis admitted to our PICU and compare these children's morbidity and mortality with that of immunocompetent patients.

Methods

Retrospective study of all patients admitted with sepsis from January 2007 to December 2016. Demographic, laboratory and clinical data were collected from immunocompromised patients; organ dysfunction and mortality were collected from all patients. Statistical evaluation was performed using the SPSS Statistics software and p<0.05 was considered significant.

Conclusions/Results

A total of 111 patients were identified, 43 (38.7%) immunocompromised. In the immunocompromised patient group, median age was eight years and 53.5% were male; cultures were positive in 51.2%, median length of PICU stay was eight days, 69.8% needed vasoactive drugs and 37.2% mechanical ventilation. Mortality estimated by PRISM was 15.46%, ten patients died (23.3%). When comparing immunocompromised and immunocompetent groups, mortality was 23.3% vs 11.8%, p=ns, and median of organ dysfunction was 2 (range: 1-6) vs 2 (range: 0-6), p=ns. Respiratory failure was an independent risk factor associated with poor prognosis.

In our study, immunocompromised patients presented with high severity and had multiple organ failure. When compared to immunocompetent children with the same diagnosis, no significant differences in mortality and organ dysfunction were observed. Therefore, the state of immunosuppression should not exclude the possibility and benefit of these children when considering intensive care.

References (if needed)
MONITORING OF PROCALCITONIN PLASMA LEVELS EVOLUTION COULD BE USEFUL FOR SAFELY SHORTENING DURATION OF ANTIBIOTIC TREATMENT IN PEDIATRIC VENTILATOR-ASSOCIATED PNEUMONIA

O. Lintz1, C. de Melo1, A. Perez1, A.S. Guilbert1, D. Astruc1
1University Hospital Hautepierre, PICU, STRASBOURG, France

Background

Ventilator-associated pneumonia (VAP) remains associated with high morbidity and mortality rates in pediatric intensive care units (PICUs). Reducing antibiotic (ATB) exposure is interesting in order to lower antibiotic-resistant bacteria emergence, nosocomial infections incidence, and care costs. Procalcitonin (PCT) has been studied in adult VAPs(1), showing a potential benefit for encouraging short-course ATB-therapy.

Objectives

Our objective was to study the impact of a PCT-guided treatment (plasma level measures at days 0 and 3 of infection) on the duration of ATB administration in VAPs in our PICU.

Methods

We prospectively (2016-2017) included all patients admitted in our PICU presenting VAP criteria according to the ATS/ISDA guidelines(2). We compared ATB-treatment duration in this group to a retrospective historical (2014-2016) cohort of 10 patients. Mortality rates and treatment failure (recurrence of VAP diagnostic criteria within 48 hours after interruption of ATB treatment) were also analyzed.

Conclusions/Results

Our preliminary results were obtained after including 3 patients. Mean ATB administration in this group was 4.3 days [3-7] compared to 8.7 days [4-15] in the retrospective control group. Difference was statistically significant (p = 0.03). No VAP-related death or treatment failure was observed in either group.

These results seem to show that PCT plasma levels monitoring during days 0 and 3 of infection could encourage short-course antibiotic treatments in pediatric VAPs. We intend to include a total number of at least 5 patients in our prospective group in order to increase statistical power.

References (if needed)

Background

Sepsis is a clinical entity that complicates severe infections. Patients with sepsis typically have low 25-OH D levels, and that vitamin D status is inversely associated with the severity of sepsis, affect systemic expression of cathelicidin (LL-37), a vitamin D-dependent, endogenous, anti-microbial peptide.

Objectives

The aim of this study was to evaluate serum LL-37 levels in children with sepsis and potential relationship with severity of sepsis and prognosis.

Methods

Children with sepsis have been enrolled from two large pediatric intensive care units in Turkey. Baseline demographic characteristics, clinical findings, laboratory features, PRISM and PELOD score have been noted. The primary aim is to compare serum LL37 levels between children with sepsis and healthy children. Secondary endpoints were serum LL37 concentrations in children with sepsis patients, severe sepsis cases and septic shock and also correlation with prognosis.

Conclusions/Results

Forty-three consecutive children with sepsis have been enrolled, and 28 healthy children served as a control group. Median serum LL37 levels were significantly higher in children with sepsis than the controls (p<0.001). When we compared the serum LL37 levels among children with sepsis, severe sepsis and septic shock, and also between in exitus group comparing the surviving children, there are no statistically significance(p>0.05). Serum LL37 levels were not associated with PELOD and PRISM score (p>0.05). Serum LL37 concentrations at the diagnosis of sepsis were associated with the length of PICU stay (r=0.331, p<0.05). In conclusion, this is the first study to demonstrate the higher levels of LL37 in children with sepsis.

References (if needed)
MENINGOCOCCAL Y SEPSIS AND SYSTEMIC LUPUS ERYTHEMATOSUS RESULTING IN PETRIFIED HEART SYNDROME: A CASE-REPORT

A.C. Etrusco Zaroni Santos¹, M. Luglio¹, A. Figueiredo Delgado¹, W. Brunow de Carvalho¹, C. Dell Santo Vieira Schuwartz², H. Helena de Sousa Marques², C. Carvalho de Miranda Valões³, C. Artur Almeida da Silva³, M.A. Cabrera Dominguez⁴, A. Nunes Duarte-Neto⁵

¹University of São Paulo, Pediatric Intensive Care Unit, São Paulo, Brazil
²University of São Paulo, Pediatric Infectious Diseases Unit, São Paulo, Brazil
³University of São Paulo, Pediatric and Adolescent Rheumatology Units, São Paulo, Brazil
⁴University of São Paulo, Pediatric Unit, São Paulo, Brazil
⁵University of São Paulo, Pathology Unit, São Paulo, Brazil

Background

16-year-old male teenager with Systemic Lupus Erythematosus (SLE) from São Paulo, Brazil, was admitted at Children’s Institute – University of São Paulo in July 1st, 2016 reporting fever, myalgia and vomiting. Physical examination revealed tachydyspnea without other signs. On the same day, he developed severe headaches followed by generalized tonic-clonic convulsive crisis. CSF showed: white CS cell count 36/mm³ (88% neutrophils, 8% lymphocytes), glucose 16mg/dL and protein 456mg/dL and blood culture identified Neisseria meningitidis Y intermediately sensitive to penicillin. He developed septic shock, ventilator-associated pneumonia, acute kidney injury progressing into high oxygenation index and low ventricular function and died after 29 days of hospitalization. Post-mortem examination of the myocardium showed innumerable foci of calcification in both ventricles, consistent with petrified heart syndrome, an extremely rare phenomenon associated with severe sepsis.
Myocardial calcification: necrotic cardiomyocytes with dystrophic calcification in their cytoplasms (red arrows).

**Objectives**

To describe a rare complication of systemic inflammation and sepsis; 
To relate the findings of post-mortem analysis to data from literature.

**Methods**

We performed a brief review of available studies and other case-reports on myocardial suppression and calcifications and its relation to sepsis by searching on Medline and Scopus data-bases. Two case-reports and one series-of-cases were found after database search and embased our understanding of the clinical evolution.

**Conclusions/Results**
Dystrofic myocardial calcification is rare and develops rapidly as a consequence of persistent systemic inflammation, culminating in end-stage cardiac dysfunction usually described in autopsy reports as innumerable calcification foci in both ventricles.

References (if needed)

Epidemiological Profile of Sepsis in a Medical Intensive Care Unit

O. Frasinariu¹, V. Streanga¹, C. Jitareanu², A. Rugina¹, A.M. Buga², I. Ciomaga¹, I. Miron¹, N. Nistor¹
¹University of Medicine and Pharmacy "Grigore T. Popa", Pediatrics, Iasi, Romania
²Saint Mary Children Hospital, First Pediatric Clinic, Iasi, Romania

Background

Sepsis is the main cause of death in patients treated in intensive care units (ICU).

Objectives

The aim of the study was to analyze the main causes of sepsis, the primary infection, risk factors, sensitivity to antibiotics and outcomes, in a medical intensive care unit at a tertiary care hospital.

Methods

Consecutive patients during a period of 2 years were enrolled and bacteriological data, details about risk factors, were obtained. Statistical analyses were performed.

The study group consists in 65 patients, admitted in ICU, aged one week to 16 years, 39 boys (60%) and 26 (40%) girls. Diseases considered responsible for sepsis were respiratory (30.7%), gastrointestinal/liver (26.1%), neurological (6.1%), renal (9.2%), cardiac (6.1%) and tegument (4.6%) related. Oncological disease was associated in 23% of the patients. Antibiotics were administered in 98%.

Bacteriological cultures were positive in 46% (n = 30). Gram-negative bacteria were the most prevalent pathogens (63.3%) – Klebsiella pneumoniae (16.6%), Enterococcus (13.3%), Pseudomonas aeruginosa (10%), Escherichia coli (6.6%). Uncommon bacteria found were Stenotrophomonas maltophilia (2 cases), Ewingela americana, Achrombacter xylosoxidans (1 case each). Candida was found in 2 cases. There was a high prevalence of resistance to common antibiotics. Patients with positive cultures were younger, with respiratory disease (P < 0.05). Overall mortality rate was 32.3%. Death was associated with younger age, negative cultures, and shorter duration in ICU (P < 0.05).

Conclusions/Results

There is high prevalence of infections in pediatric patients in a medical ICU in Northeast Romania. Gram-negative bacteria are the most prevalent and resistance to antibiotics is high.

References (if needed)
CHANGING PARADIGM OF SEPTIC SHOCK- FROM COLD TO WARM…A SINGLE CENTRE EXPERIENCE FROM INDIA

P.P. Giri¹, A. Saha²
¹Kolkata, India
²ich, picu, KOLKATA, India

Background

Traditionally, Pediatric septic shock has been described as cold shock. However, recently we have observed an increase in warm shock which resulted in a significant shift in our inotrope use.

Objectives

To determine the percentage of warm and cold septic shock among total septic shock patients.

Methods

This prospective study was done in a teaching hospital in Kolkata, India. Patients admitted in PICU with septic shock needing inotropes from March 2011 to December 2015 were included. Patients were divided into two groups. Group A, from March 2011 to August 2013 and Group B, from August 2013 to December 2015. Initial BP, inotropes used and diagnoses were noted. Inotropes were chosen as per the discretion of the physician keeping survival sepsis guidelines as the guide

Conclusions/Results

186 patients were included – of which 68 were in group A and 118 in group B. Overall, Dopamine was the most commonly used inoptrope(80%), followed by Nor-adrenalin(NA)(41.4%) and Adrenalin (37.5%). In group A, Dopamine was used in 100% patients, Adrenaline in 31 % and NA in 9.5%. In Group B, Dopamin was used in 69%, Adrenaline in 42% and NA in 58%. This significant change has been found due to the increased incidence of warm shock contributed by scrub typhus(ST), staphylococcal toxic shock syndrome(STSS) and Acute Encephalitic Syndrome(AES) rather than gram negative sepsis or shock due to unknown etiology. Thus we concluded that warm septic shock are now increasing in numbers and making noradrenalin as the initial inotrope of choice in majority of the cases in our PICU.

References (if needed)
WORSENING ARDS ON VV-ECMO IN A 12-YEAR OLD BOY -- REACTIVATED CYTOMEGALOVIRUS-INFECTION?

B. Heineking1, S. Fernandez Rodriguez1, A. Pilger1, N. Haas1

1LMU Munich, Paediatric Cardiology and Intensive Care, Munich, Germany

Background

Reactivation of a cytomegalovirus-infection is a common problem and side-effect of modern intensive care therapy. It is of great importance to confirm the correct diagnosis as well as to consider whether antiviral treatment is necessary or not.

Objectives

We report about a 12-year old boy with trisomy 21 who was admitted to our intensive care unit with severe lobar pneumonia with rapid worsening to an ARDS and the need for ECMO. Over the first 3 days he improved with antibiotic therapy but deteriorated on day 4 showing a more interstitial type picture on the chest x-ray and second rise of the C-reactive protein. We found a very high viral load of cytomegalovirus in the broncho-alveolar-lavage as well as in the bloodstream. The serology of CMV was positive for IgG indicating an infection with cytomegalovirus in the past and proving a current reactivation. Because of the clinical significance of this reactivated infection we commenced a treatment with ganciclovir and stopped the antibiotic therapy which resulted in a rapid decline of the viral load and the CrP as well as a marked improvement in oxygenation over the next days.

Methods

case report

Conclusions/Results

In this case report we would like to point out that it is of great importance to think of a CMV-reactivation in a deteriorating patient who is treated for other reasons on an intensive care unit.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 4

ESPN7-0444

CLINICAL PRESENTATION AND OUTCOME OF INVASIVE PNEUMOCOCCAL DISEASE IN A PEDIATRIC INTENSIVE CARE UNIT

A. Bouziri, A. Ayari, S. Haj Hssine, A. Hajji, A. Borgi, K. Menif, N. Ben Jaballah

1Children Hospital of Tunis, Pediatric Intensive Care Unit, Tunis, Tunisia

Background

Invasive pneumococcal infections (IPI) result in high morbidity and mortality globally each year. Although, it is a vaccine-preventable disease. In our country, the pneumococcal vaccine doesn’t appear in the national vaccine plan but, it’s available in the private sector.

Objectives

This study aimed to precise the clinical features and the outcome of IPI in a pediatric intensive care unit (PICU).

Methods

A retrospective study was conducted in a PICU from 2000 to 2014. All IPI admitted during the study period were included. Demographic characteristics, clinical course, serotype, antibiotic susceptibility, and outcomes were analyzed.

Conclusions/Results

Results:

During the study period, 87 patients were admitted for IPI (mean age: 9.8 ± 18.3 months). Pneumonia was the most frequent type of infection (n = 64; 73.6%) followed by meningitis (n = 19; 21.8%). The thoracic drainage was necessary for purulent pleurisy or pyopneumothorax in 14 cases (16.1%). Five patients developed hemolytic and uremic syndrome and required peritoneal dialysis. Streptococcus pneumonia was ampicillin-sensitive in 66.3% of cases. IPI was associated to viral infection in 6 cases and to Bordatella pertussis in 2 cases. Thirteen patients (14.9%) died. Death occurred 25.8 ± 62.2 days after admission and was caused by refractory septic shock in 3 cases, refractory hypoxemia in 5 cases and meningitis with brain death in 5 cases. The mean length of stay was significantly higher in deaths (29.9 ± 70 vs 10.3 ± 5.7 days; p=0.018).

Conclusions:

IPI were responsible of a high morbidity and mortality in our PICU. Thus, mass pneumococcal vaccination is needed.

References (if needed)
SAFETY AND EFFICACY OF INTRAVENOUS COLISTIN USE FOR THE TREATMENT OF NOSOCOMIAL MULTIDRUG-RESISTANT ACINETOBACTER BAUMANII INFECTIONS IN A PICU

R. İşgüder1, H. Ağınlı1, G. Ceylan1, N. Bayram2, G. Atakul1, İ. Devrim1
1Dr. Behçet Uz Children’s Hospital, Pediatric Intensive Care Unit, İzmir, Turkey
2Dr. Behçet Uz Children’s Hospital, Pediatric Infectious Diseases, İzmir, Turkey

Background

The incidence of multidrug-resistant (MDR) Acinetobacter baumannii has been emerging in pediatric intensive care units as an agent for nosocomial infection. Colistin is an old antibiotic in the treatment of these infections, which has become popular again.

Objectives

In our study, our aim was to evaluate the efficacy and safety of intravenous colistin use in patients diagnosed with central line–associated bloodstream infection (CLABSI) or ventilator-associated pneumonia (VAP) caused by MDR A baumannii between January 2013 and January 2015 in our Pediatric Intensive Care Unit.

Methods

Identification of A baumannii in blood and minibronchoalveolar lavage (BAL) samples was performed using a BacTALERT (bioMerieux, Marcy l’Etoile, France) automated system. Susceptibility of the isolates by determination of the minimum inhibitory concentrations was performed by the VITEK2 (bioMerieux) compact system.

Conclusions/Results

The total number of 14 nosocomial infection episodes was documented in 9 cases. These episodes consisted of 11 cases of VAP and 3 cases of CLABSI. In all of the episodes, MDR A baumannii was present. Colistin treatment (4.1 ± 0.7 mg/kg/d, bid) was used for 18.5 ± 7.5 days. All of the cases were receiving antibiotics other than colistin for 10.36 ± 4.3 days before the infection episode. No side effects were observed in our patients. Eight (88.9%) of our patients survived, but 1 patient died because of septic shock caused by Candida parapsilosis.

This study, despite the small size, suggested that the use of colistin in severe nosocomial infections caused by MDR A baumannii is well tolerated and efficacious.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 5

USE OF SYSTEMIC CORTICOSTEROIDS IN CRITICALLY ILL CHILDREN WITH SEVERE PNEUMONIA

J.W.J.C. Koh¹, J.J.M. Wong²³, Y.H. Mok³⁴, J.H. Lee³⁴

¹National University of Singapore, Yong Loo Lin School of Medicine, Singapore, Singapore
²KK Women’s and Children’s Hospital, Paediatrics Medicine, Singapore, Singapore
³Duke-NUS, Medical School, Singapore, Singapore
⁴KK Women’s and Children’s Hospital, Children’s Intensive Care Unit, Singapore, Singapore

Background

The role of systemic corticosteroids in children with severe pneumonia is controversial.

Objectives

Our study aims to describe its use and impact in critically ill children with severe pneumonia.

Methods

We conducted a retrospective study of children admitted to pediatric intensive care unit (PICU) from 2010–2014 with pneumonia. Patients who received systemic corticosteroids over their PICU stay (up to 28 days) were included and “total prednisolone equivalent dose” calculated. Primary outcome was PICU mortality. Secondary outcomes were ventilator free days (VFD) and intensive care unit free days (IFD) up to 28 days. Fisher exact and Mann Whitney U tests were used to analyze categorical and continuous variables respectively. Spearman correlation was used to analyze the association between total steroid dose and secondary outcomes.

Conclusions/Results

Results

The incidence of severe pneumonia was 237/3539 (6.7%). 43/237 (18.1%) received systemic corticosteroids. Overall median total dose prednisolone equivalent was 12.6mg/kg [interquartile range (IQR): 5.0, 37.1]. Non-survivors had higher partial pressure of arterial oxygen: fraction of inspired oxygen (P/F ratio) than survivors [70.0 (IQR: 55.8, 74.1) vs. 147.7 (IQR: 105.4, 219.6); p<0.001]. There was no association between dose and mortality, and no correlation between dose and duration of corticosteroid use with VFD. Higher dose of prednisolone equivalent (r²= -0.303; p=0.048) and duration of exposure (r²= -0.327; p=0.032) correlated negatively with IFD. However, after adjusting for PF ratio, this association was not significant.

Conclusion

Critically ill children with severe pneumonia received corticosteroids for varied reasons. The total dose and duration of use was not associated with poor clinical outcomes.

References (if needed)
ULTRASOUND GUIDED CENTRAL LINE PLACEMENT IN CHILDREN UP TO 10KG

S. Kralik¹, T. Kifer¹, A. Markic¹

¹Children’s Hospital Zagreb, Department of Paediatric Anaesthesiology and Intensive Care, Zagreb, Croatia

Background

Central venous catheterisation can be a great challenge in the extremities of weight or age. There are two methods of central line placement: one, using anatomical landmarks and the other, ultrasound-guided. Ultrasound-guided central line placement has become a standard of care in paediatric intensive care units.

Objectives

The aim of this study was to investigate the number of attempts, occurrence of complications, and success rate of ultrasound-guided (in-plane technique) subclavian vein catheterisation in children up to 10kg of weight.

Methods

From June 1, 2015 till December 1, 2016 we have performed 81 ultrasound-guided central line catheterisations. All included patients weighted 10kg or less, average 5.69kg (minimum 1 to maximum 10). The patient's age averaged 181.75 (minimum 1 to maximum 709) days. Either left or right subclavian vein was punctured using supraclavicular approach and in-plane ultrasound technique. We have used 22 to 16 gauge catheters. 73 catheters were placed at the first attempt, 3 catheters were placed at the second and 5 at a third attempt. All planned catheterisations have been performed successfully. We have not registered a single serious complication (arterial puncture, nerve injury, pneumothorax or haematothorax), but in three cases the tip of the catheter was misplaced. The procedures have been performed under general anaesthesia or sedation.

Conclusions/Results

We find a supraclavicular approach for ultrasound-guided in-plane subclavian vein catheterisation to be a good and safe option for newborns and infants.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 5

ESPN7-0208

DISSEMINATED CMV INFECTION AS A BASE FOR DIAGNOSIS OF SEVERE COMBINED IMMUNODEFICIENCY (SCID) IN AN INFANT - A CASE REPORT.

M. Mierzewska-Schmidt\(^1\), A. Baranowski\(^1\)

\(^1\)Medical University of Warsaw, Department of Paediatric Anaesthesiology and Intensive Therapy, Warsaw, Poland

Background

SCID is a group of genetically inherited disorders with little or no immune response. In some regions screening is offered whereas in the rest of the world the diagnosis is established when immunodeficiency becomes apparent (recurrent/severe course of infections).

Objectives

We aim to present a case of an infant with multiorgan failure due to secondary CMV infection which made us think of immunodeficiency.

Methods

Case presentation: 5-month old boy was admitted to PICU because of respiratory failure due to interstitial pneumonia. For a few weeks before admission he had episodes of hectic fever, diarrhea and neurological signs: abnormal posturing, nystagmus. Surprisingly his weight gain was good (8kg/5months). Allergy, maternal milk intolerance, metabolic or neurologic disorders were considered before PICU admission. HFO ventilation with high fi02 and pressures was required that caused progressive hypotention treated with milrinone, dopamine and noradrenaline. We also observed: renal function impairment with oliguria, hepatomegaly with mild liver enzymes elevation. We decided to check for CMV – PCR was positive (blood, urine, CSF), so ganciclovir was started. Severe secondary CMV infection prompted tests for immunodeficiency. The immunophenotype of peripheral blood showed absence of T-lymphocytes and depletion of B- and NK-Lymphocytes so SCID was considered and confirmed genetically. The patient is 13 months old now, shows moderate neurologic deficits, underwent successful bone marrow transplant.

Conclusions/Results

Unusually severe course of infections may signal immunodeficiency. Breast-feeding should not be stopped without good reason. Screening for SCID is possible, but we mustn’t forget about this diagnosis in countries where it is not available.

References (if needed)
Background

Acute necrotizing encephalopathy of childhood (ANEC) is a rare disease characterized by high fever, rapid loss of consciousness and seizures. Mostly, affect healthy children of Asian origin with sporadic cases around the world. The brain MRI is characteristic with symmetrical lesions involving the thalami and brainstem. The prognosis is guarded with high rates of mortality and morbidity.

Objectives

To present two cases of ANEC due to H1N1 infection.

Methods

Case 1: a previously healthy 3 years old boy was transferred to our PICU due to fever, vomiting and loss of consciousness. Rapidly, he developed liver failure (INR: 2.8), renal failure (anuric, Creatinine: 2 mg/dl) and persistent episodes of seizures. A PCR test in his respiratory secretions revealed Influenza H1N1 strain.

Case 2: a previously healthy 10 months old girl was transferred to our hospital after an episode of febrile seizures. Upon the admission she developed persistent episodes of seizures. She was intubated and transferred to PICU. Rapidly, she developed liver failure (INR: 3), and intracranial hypertension (ICP > 20 mmHg). Her liver failure was progressively improved and the intracranial pressure was controlled with sedation and mannitol. CSF PCR test revealed Influenza H1N1 strain.

Both our patients had liver failure and seizures early in the course of the disease. Their liver disease improved by the first week. Both of them had characteristic MRI findings in brainstem and thalami (hypodense lesions and cavitations). Their mental status was altered and received anti-convulsion therapy.

Conclusions/Results

Their neurological outcome remained altered six months after the initial episode.

References (if needed)
A CASE OF FATAL PERINATAL ENTEROVIRUS INFECTION

D. Mukherjee¹, K. Tanney¹
¹manchester royal infirmary, Neonatology, manchester, United Kingdom

Background

Enterovirus (EV) infections are mostly asymptomatic or minimally symptomatic with no long-term sequelae in neonates. However, liver or cardiac involvement can be fatal. Reported case fatality of EV with hepatic necrosis and coagulopathy is 24-31%, with hemorrhagic complications most commonly being pulmonary haemorrhage and intra-cranial bleeding [1].

Objectives

We report a 36 week baby who presented with liver failure, was diagnosed with EV and ultimately succumbed to this illness at 12 days old.

Methods

A male baby born to a mum who was suffering from pyrexia and abdominal pain became symptomatic from day 5 with increasing Oxygen requirement, abdominal distension and deranged clotting. He was presumed to have necrotising enterocolitis requiring laparotomy. This revealed a normal bowel, marked ascites and a visibly abnormal liver with necrosis. Baby had markedly deranged liver enzymes and clotting, for which he received blood products liberally. Blood cultures and metabolic screens were reassuring, but serum PCR revealed Enterovirus RNA. Baby received immunoglobulin, N-acetylcysteine and supportive treatment. On day 12 of life he suffered profound Disseminated Intravascular Coagulopathy (DIC) heralded by pulmonary haemorrhage, ultimately leading to his death.

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Conclusions/Results

In neonatal presentation with high transaminases and DIC, potentially fatal perinatal Enterovirus infection should be considered.

References (if needed)

CENTRAL VENOUS CATHETER CARE BUNDLE – IMPACT IN BLOODSTREAM INFECTION IN A NEONATAL INTENSIVE CARE

S. Peixoto¹, J. Amaral¹, M. Ferreira¹, D. Faria¹, C. Resende¹
¹Neonatology Unit-B- CHUC, Neonatal Intensive Care Unit, Coimbra, Portugal

Background

Central line-associated bloodstream infections (CLABIs) cause substantial neonate morbidity and mortality in Neonatal Intensive Care Units (NICU). A high incidence of CLABIs was found in Maternidade Bissaya Barreto (MBB) NICU and led to changes in daily clinical practice, with the implementation of a care bundle.

Objectives

To assess the effectiveness of new strategies for prevention of infection implemented in the NICU of MBB.

Methods

We conducted a retrospective study that included all newborns admitted at the NICU of MBB 6 years before (group 1) and 3 years after (group 2) the protocol change, comparing the rates of infection in both groups. Central venous catheter (CVC) care bundle in the unit included: hand decontamination, full sterile barriers precautions, skin disinfectant (2% chlorhexidine if birth weight (BW) > 1000g; povidone-iodine if BW < 1000g), early removing of unnecessary catheters.

Conclusions/Results

1623 infants were included in group 1 and 783 in group 2, with no evidence of statistical differences between the two groups (weight, gestational age, CVC utilization rate and invasive ventilation). In group 1, we registered 2095 days with CVC and 32 CLABSIs, for an incidence density of 15‰ catheter days. After implementation of a care bundle, there were 726 catheter days and 6 CLABSIs for an incidence density of 8‰ catheter days. In very low birth weight (VLBW) infants, we also observed the reduction of CLABSI with an incidence of 21‰ vs 10‰ catheter days.

This study demonstrates that implementation of central venous catheter care bundle is associated with a global CLABIs reduction even in VLBW infants.

References (if needed)
Background

Bloodstream infection (BSI), necrotizing enterocolitis (NEC) and sepsis are common conditions associated with poor outcomes among neonatal intensive care unit (NICU) infants. The HeRO predictive monitoring system measures abnormal heart rate characteristics (HRCs), that reflect decreased variability and transient decelerations. It has shown to detect early sepsis and sepsis-like conditions and decrease mortality, especially in very low birth weight infants (VLBW; <1500 g), but with limited evidence for infants > 1500 g.

Objectives

To determine: a) the predictive values of HeRO scores > 2 or >5 for BSI, NEC, sepsis and sepsis-like conditions b) the precision of HeRO scores in extremely low birth weight (ELBW) and VLBW compared to >1500 g c) the association between HeRO scores > 2 or >5 and antibiotic administration.

Methods

Following ethics approval, we will retrospectively analyze data files of infants monitored with HeRO during the period of January 2015 to December 2016 in the NICU of the Clinic of Neonatology of the CHUV. Hourly HeRO scores from the first 72 hours since admission will be extracted. Other data will include demographics, age, weight (<1000 g: ELBW <1500 g; VLBW or > 1500 g), sex, and race; main and secondary diagnoses, confirmed infection, NEC or sepsis, and antibiotic administration.

Conclusions/Results

This study will allow us to describe the sensitivity and specificity of the HeRO system to detect infections in our unit.

References (if needed)
Background

Viral pneumonia is a common cause of hospitalization in children worldwide. Parainfluenza (PIV) & coronavirus (CoV) both can cause severe lower respiratory tract infections in young as well as in immunocompromized children.

Objectives

Our aim is to identify these two respiratory virus and compare their clinical outcomes in children with severe pneumonia.

Methods

Methods: This is a prospective-descriptive study of children admitted with pneumonia at KCMH. We further categorized children who presented with severe pneumonia or required PICU admission. Their NP swab samples were analyzed for common respiratory viruses including HCoV, PIV, RSV, Influenza virus and Adenovirus. Results: 200 infants and children were hospitalized with a diagnosis of pneumonia at KCMH during the study period. We identified 55 (28%) cases with respiratory virus, HCoV was found in 5 of 131 cases (3.8%), all of them were HKU1, no MERS-CoV was detected and Parainfluenza was found in 9 of 200 cases (4.5%). Clinical manifestations were similar among hCoV, PIV, RSV and the negative group. Interestingly, there were more children developed respiratory failure in HCoV and PIV than RSV ($P=0.008$ and $<0.001$). The use of antibiotics in hCoV, PIV and the negative study group were more than RSV ($P$-value 0.002). There was no difference in duration of oxygen supplementation and duration of hospitalization in all groups.

Conclusions

hCoV and PIV had significant clinical severity in hospitalized children especially in immunocompromised group. Advances in diagnostic methods, including PCR, have led to increased identification and awareness of these infections.

References (If needed)
BACKGROUND

Scorpion stings can cause multiple clinical manifestations such as local skin reactions or multiple organ failures that can lead to death. The most important life-threatening event after the sting is cardiac and lung involvement. Because of the mortal complications like pulmonary edema and myocarditis, every child must be kept under surveillance and carefully monitored.

OBJECTIVES

In this study, we present follow-up and treatment of a 4-year-old girl who developed serious complications of scorpion sting such as myocarditis and pulmonary edema.

METHODS

A four-year-old girl was admitted to our PICU with complaints of tachycardia (159 bpm). She was tachypneic with a respiratory rate of 44/min, hypotensive (65/42 mmHg) and her GKS was 10 (E3,M4,V3). She had elevated troponin I; 9,721ng/ml (N: 0.02-0.06), CK-MB (28.99 ng/ml, N: <4.88 ng/ml), pro BNP (1072.26 pg/ml, N: <300) levels. Also, echocardiography revealed both systolic and diastolic dysfunction. Due to continuing systemic symptoms, scorpion antivenom was administered. In order to treat heart failure and pulmonary edema doxazocin, spironolactone, dopamine, and dobutamine were given. In her 14th hour of admission, her BP was within normal ranges and respiratory distress was ameliorated. She was discharged without any sequelae on her 6th day of admission.

CONCLUSIONS/RESULTS

Identifying the species is difficult in scorpion stings thus each case should be accepted as poisonous. In pediatric cases, mortality and morbidity risks are higher and clinical worsening is faster, thus pediatric patients who developed serious cardiopulmonary systemic symptoms should be admitted to PICUs and treated with scorpion antivenom.

REFERENCES (IF NEEDED)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 7

ESP7-0450

PSEUDOMONAS AERUGINOSA ENDOPHTHALMITIS IN PICU
F. Sanı, Ö. Saraç Sandalı, E.V. Altanı, G. Ceylanı, R. İşgüderı, G. Atakulı, H. Ağını
1Behçet Uz Children Diseases and Surgery Training and Research Hospital, pediatric intensive care unit, İzmir, Turkey

Background

Endophthalmitis is an inflammatory condition of the intraocular cavities (ie, the aqueous and/or vitreous humor) which can be caused by infectious agents such as bacteria, parasites or fungi. Most common causes are intraocular surgery, trauma however rarely it can originate from systemic infections. Early diagnosis and fast treatment is necessary in endophthalmitis because of the possible permanent loss of vision. Most common agents which can be isolated in endophthalmitis are gram positive coagulase negative staphylococcus spp. and rare causes are pseudomonas auriginosa, other gram negative bacteria and fungi.

Objectives

Local antibiotherapy is usually insufficient and systemic and intravitreal treatments should be combined in endophthalmitis. Despite medical treatment, usually vitrectomy is necessary and permanent loss of vision develops. Hereby we represent the treatment stages of a rare endophthalmitis case which can cause permanent vision loss.

Methods

A 10-year-old girl patient who was admitted to our intensive care unit with the diagnosis of pneumonia and sepsis was intubated due to her respiratory failure and endophthalmitis was diagnosed while she was having local antibiotherapy due to her conjunctivitis. Pseudomonas aeruginosa was detected in her BAL samples, systemic antibiotherapy was supported by intensive local antibiotherapy and moreover, intravitreal antibiotherapy was adjuncted with anti-inflammatory treatment options. Infectious regression was observed after intravitreal injections in repeated doses.

Conclusions/Results

Endophthalmitis can increase both mortality and morbidity in long-term PICU patients. Complications can be reduced with early diagnosis and aggressive treatment. In our case complicated Pseudomonas endophthalmitis could be treated via early detection and multidisciplinary approach in PICU setting.

References (If needed)
THE USE OF ANTIBIOTICS IN SEVERE RSV RESPIRATORY INFECTION

A. Michael1, R. Ohri2, C. Silvestre1
1Nottingham Children’s Hospital, PICU, Nottingham, United Kingdom
2University of Nottingham, medical student, Nottingham, United Kingdom

Background

Patients with bronchiolitis admitted to intensive care are often covered with broad-spectrum antibiotics due to the early age and the risk of a bacterial co-infection. The balance between the initiation of antibiotics and the right time to stop is controversial.

Objectives

Review the use of antibiotics in RSV positive patients admitted to Paediatric critical Care Unit (PCCU)

Methods

RSV positive children admitted to PCCU between November 2014 - March 2016. Patient demographics, presentation, infection markers, ventilation (invasive and non-invasive), presence of co-infections, and antibiotic treatment were analysed.

Conclusions/Results

69 patients were included; 68% less than 6 months, with a mean age of 8.3 ±13.2 SD. 76% of patients required ventilation (70% conventional, 6% high frequency and 19% non-invasive ventilation). 29% had another co-infection; 19% had other positive viral cultures (9% adenovirus, 7% parainfluenza, 6% rhinovirus), 2 patients had a positive blood culture for a coagulase negative staphylococcus, 7 had haemophilus influenza in respiratory secretions. 54% patients had a CRP higher than 50 mg/l (28% > 100mg/L). The majority of patients received antibiotics (90% IV antibiotics, 4% oral antibiotics) 20% received 7 or more days of antibiotics and 4% less than 5 days. There were statistical association between age < 3 months and apnoeas and the use of broad-spectrum antibiotics and CRP > 100 mg/l.

The majority of these patients had RSV bronchiolitis had broad-spectrum antibiotics, despite the lack of evidence for bacterial co-infection. The authors think that the early review of and rationalization of antibiotics is crucial to avoid over treatment of bronchiolitis.

References (if needed)
HAEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS - A NEONATAL CASE REPORT OF NEUROLOGICAL INVOLVEMENT

H. Spiers¹, A. Manou¹
¹St Mary’s Hospital, Neonates, Manchester, United Kingdom

Background

This is a case report of a baby girl born at 37+6 weeks weighing 3.22kg. There was a history of polyhydramnios. She was born by emergency caesarean section for reduced foetal movements and pathological CTG. She was noted to have distended abdomen and was admitted to the neonatal unit. On examination hepatosplenomegaly and purpuric rash were noted. Blood tests showed coagulopathy and pancytopenia. Diagnosis of HLH was confirmed on bone marrow aspiration on Day 3 of life.

Objectives

To describe the presentation and management of HLH.

Methods

HLH is a severe disorder of abnormal immune function leading to massive uncontrolled inflammation and destruction of cells, including important blood cells, resulting in Disseminated Intravascular Coagulopathy, haemorrhage and cell death. Treatment of the condition was attempted with chemotherapy and high dose steroids and full supportive intensive care.

Cranial USS and subsequent MRI brain revealed a large haemorrhage with surrounding oedema and mass effect in the left posterior frontal with another extra-axial haematoma seen in the pre-pontine cistern on the left with mass effect on the pons. There was diffuse swelling of the brain and possible early uncal herniation. Extensive diffusion restriction changes were seen in keeping with extensive irreversible ischaemic change. It was felt that these changes were all possibly due to HLH or its treatment.

She developed dilated and fixed pupils, loss of respiratory drive and was unresponsive to pain. Therefore her care was reorientated to a palliative care approach.

Conclusions/Results

This is a case of HLH with neurological involvement in a newborn baby.

References (if needed)
A PILOT STUDY EVALUATING THE USE OF BEDSIDE RECTAL MUCOSAL BIOPSY IN POST-OPERATIVE SINGLE VENTRICLE INFANTS PRESENTING WITH HEMATOCHZIA.

S. Suguna Narasimhulu 1, S.S. Kong 2, K. Bittar 3, N.H. Patel 3, C.J. Blanco 1, K.D. Piggott 1, H. Fakigolu 1, D.G. Nykanen 1, G. George 1, A.D. Marshall 1, A. Kube 1, W.M. DeCampli 4, K.K. Pourmoghadam 4

1Arnold Palmer Children's Hospital, Pediatric Cardiology, Orlando, USA
2University of Central Florida, Pediatric Cardiology, Orlando, USA
3Arnold Palmer Children's Hospital, Pediatric Gastroenterology, Orlando, USA
4Arnold Palmer Children's Hospital, Pediatric Cardiothoracic Surgery, Orlando, USA

Background

Hematochezia is an alarming symptom in infants with single ventricle physiology (SVP) and the need to appropriately differentiate necrotizing enterocolitis (NEC) vs Allergic proctocolitis (AP) is needed.

Objectives

To assess the safety and efficacy of bedside rectal mucosal biopsy (RMB) in infants presenting with hematochezia in the post-operative period to aid in the diagnosis of AP vs NEC.

Methods

We studied five infants who present with hematochezia in the post-operative period with SVP at Arnold Palmer Hospital from Jan 2013 - Jan 2016. The average age was 27.2 days at time of bleed. No one had systemic, radiologic or laboratory criteria for NEC and had not received blood transfusions 24 hrs prior to the bleed. All infants were on anticoagulation with Enoxaparin, aspirin or UF-heparin. Patients were on full feeds with maternal breast milk (MBM) or combination of MBM/ formula. All patients were on room air during the procedure and required no sedation, pain control or anxiolytics. The RMB was done bedside without any complications with respect to bleeding or hemodynamic instability. Based on AP diagnosis, infants were switched to a hydrolysate formula initially and the mothers went on an oligoantigenic diet with elimination of diary and milk proteins for 72 hrs. Following the 72 hrs of elimination diet breast milk/hydrolysate formula was introduced and was well tolerated.

Conclusions/Results

Bedside rectal mucosal skin mucosa biopsy of the rectum is determined to be safe and efficacious in diagnosis of AP in post-operative period of patients with SVP and aids in appropriate management strategy.

References (if needed)
Background

CA-MRSA (Community acquired Methicillin-resistant Staphylococcus aureus) is emerging in Brazil as an agent of potentially serious infections. The most common lineage isolated thus far is related to the OSP clone (ST30-SCCmec IV), a Panton Valentine Leucocidin producer CA-MRSA. The role of PVL toxin affects clinical presentation, disease severity, and outcome is unclear.

Objectives

Describe the serious presentation and evolution of one-year-girl necrotizing pneumonia, showing the importance to identify the patogen and emphasize the possible complications.

Methods

Report a case of one-year-girl that was admitted in other hospital, six days before presentation at our PICU and treated with antibiotics. Her past medical history included multiples otitis (suppuration and previous antibiotic therapy). She has not recently been hospitalized. Following 5 days, she presented respiratory distress and pleural effusion that was drained. After, she was transferred to our PICU. Thorax X-ray shows pneumothorax, lungs CT scan showed necrotizing pneumonia with multiple nodules and pleural effusion. In the follow up, she presented chest wall necrosis and multiple organ failure. The agent was CA-MRSA with PVL.

Conclusions/Results

Patients with recurrent infection or community-onset invasive disease should be tested for PVL. When positive, be offered decolonization after appropriate treatment, irrespective of clinical presentation. Without population-based studies we cannot know what absolute proportion of PVL positive specimens are associated with colonization and invasive disease. More research is needed to test hypothesis that PVL strains are also associated with minor skin and soft-tissue infections that are undiagnosed and treated uneventfully in the community without recourse to secondary care.

References (if needed)
SEVERE COMMUNITY ACQUIRED MYCOPLASMA PNEUMONIAE INFECTION: CASE REPORT AND BIBLIOGRAPHIC REVIEW

M. Tonelotto¹, L. Braz¹, T. Renattini¹, C. Neiva¹, M. Pegoraro¹, A.L. Fagundes¹, J. Ferranti¹, F.F. Santos¹, A. Bousso¹

¹Hospital Municipal Vila Santa Catarina / Hospital Israelita Albert Einstein, PICU, São Paulo, Brazil

Background

*Mycoplasma pneumoniae* causes community-acquired respiratory tract infections worldwide, particularly in school-aged children and young adults. Although infections are generally mild and self-limited, patients of every age range can develop severe and fulminant disease.

Objectives

To describe the occurrence of *Mycoplasma pneumoniae* pneumonia (MPP) with severe respiratory failure in young infants, emphasizing the importance of obtaining early pathogen identification.

Methods

Case report with review of medical records and literature review. We describe the case of a 7 month old girl, who was admitted to the PICU with a history of fever, coryza and respiratory distress for the past four days. Chest X-ray revealed an extensive left lung consolidation with pleural effusion. Patient’s follow-up included severe septic shock and acute renal failure. We were able to identify the presence of *Mycoplasma pneumoniae* with immunoenzimatic ELISA serological method IgM >1500 (bellow the limit detective) and IgG negative. The infant was treated with Clarithromycin, hemodynamic and respiratory support and hemodialysis with favorable clinical outcome. She remains, however, with home renal replacement therapy. Literature review shows that, despite a high prevalence of MPP, fulminant respiratory failure and septic shock have rarely been described in young children.

Conclusions/Results

We describe the occurrence of severe MPP in young children highlighting the importance of an early etiologic identification in order to obtain a better outcome.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 8

ESPN7-0326

PULMONARY MELIOIDOSIS WITH SEPTIC SHOCK IN THAI CHILDREN

R. Uppala¹, J. Teeratakulpisarn¹
¹Khon Kaen University, Pediatric Pulmonology and Critical Care, Khon Kaen, Thailand

Background

Burkholderia pseudomallei is endemic to northeastern Thailand. Pulmonary involvement can be potentially serious, especially in pediatric patients. Literature on B. pseudomallei bacteremia with pulmonary involvement is limited.

Objectives

To study the mortality rate and describe clinical characteristics of pediatric patients with B. pseudomallei bacteremia and pulmonary involvement

Methods

Retrospective chart review was performed on pediatric patients with pneumonia and positive blood culture for B. pseudomallei. All patients were treated in the intensive care unit of a teaching hospital in northeastern Thailand from 2009 – 2012.

Conclusions/Results

Twelve patients, 7 (58.3%) male, were included. The first presentation in all patients was acute high fever. Spleenic abscess was noted in 5 cases (41.6%). Chest x-ray findings included bilateral patchy infiltration (n = 7), diffuse pneumatocele (n = 2), single pulmonary nodule (n = 1), pneumonia with pleural effusion (n = 1), and pulmonary abscess (n = 1). Five patients (41.6%) needed mechanical ventilation. All patients required fluid resuscitation and inotropic agents for septic shock. Mortality rate was 41.6%. Cause of death were ARDS (n = 5), severe hypoxemia (n = 2), and refractory shock with multi-organ failure (n = 3). All B. pseudomallei isolates were sensitive to Ceftazidime and Co-trimoxazole, and resistant to Oxacillin and Ceftriaxone.

B. pseudomallei bacteremia with pulmonary involvement in pediatric patients is an aggressive disease. Prompt recognition and initiation of susceptible antibiotics is crucial. Septic shock is common and fast track management plan is warranted.

References (if needed)
INFECTION, SYSTEMIC INFLAMMATION AND SEPSIS part 8

ESPN7-0211

PULMONARY ASPERGILLOMA - A RARE COMPLICATION AFTER CARDIAC SURGERY WITH DELAYED STERNAL CLOSURE

M. Weidenbach1, C. Paech2, R. Wagner2, I. Daehner2
1Heart Center Leipzig, Leipzig, Germany
2Heart Centre Leipzig, Paediatric Cardiology, Leipzig, Germany

Background

We report of a child with hypoplastic left heart syndrome (HLHS) and pulmonary aspergilloma.

Objectives

The child underwent Norwood-I procedure with postoperative venoarterial ECMO therapy. Sternal closure was delayed until day 6 post-surgery. Due to signs of infection, antibiotic treatment was initiated. Tracheal aspirate grew aspergillus fumigatus with simultaneous positive galactomannan antigen. Treatment with caspofungin was initiated. A hyperlucent lesion on chest Xray evolved on day 20 that was characterized by CT as an aspergilloma of the left lower lobe. Follow-up showed decreasing size of the lesion under oral therapy with voriconazole. The child underwent Glenn procedure at the age of 6 months and antifungal therapy was stopped thereafter. At the age of 4 years the child was reevaluated for Fontan completion. However, pulmonary vascularization was severely reduced with perfusion of the left lung predominantly via aortopulmonary collaterals that persisted despite aggressive coil embolization.

Methods

Case report

Conclusions/Results

Nosocomial fungal infections are an increasing problem. Despite antifungal treatment pneumonia progressd to pulmonary aspergilloma. The contribution of delayed sternal closure remains unclear. Usually single aspergillomas are treated surgically. In patients undergoing Fontan pathway an optimal pulmonary status is a prerequisiste. Since total or subtotal resection of a lung lobe was thought to put the child at a higher risk, we opted for longterm antifungal therapy. Pulmonary vascularization in the affected area remained severely reduced with high resistance. The role of early aspergilloma with lung destruction and reduced pulmonary vascularization of the affected area is likely, although only speculative.

References (If needed)
CHILDREN FUNCTIONAL STATUS AFTER INTENSIVE CARE DISCHARGE
L. Lopes¹, T. Fragã³, J. Aquino¹, A. Dias¹, L. Carvalho¹, J. Farelã Neves¹
¹Hospital Pediátrico de Coimbra- Centro Hospitalar e Universitário de Coimbra, Paediatric Intensive Care Unit, Coimbra, Portugal
²Faculty of Medicine- University of Coimbra, Faculty of Medicine- University of Coimbra, Coimbra, Portugal

Background
Given the reduction of mortality rates associated with hospitalizations in paediatric intensive care unit (PICU) it is important to evaluate the morbidity, for a correct outcome evaluation.

Objectives
To evaluate the children’s functional status one year after discharge from the paediatric intensive care unit and determine possible risk factors for acquisition of additional morbidity.

Methods
Children admitted to PICU, from 28 days to 18 years, with a minimum one-year follow-up (September/14-September/15) were included. Hospitalizations lasting <48 hours and recovery/postoperative were excluded. The Functional Status Scale (FSS) was applied at pre-admission, admission, discharge and one year after discharge. The acquisition of “new morbidity” was defined by FSS score worsening≥3. Statistical analysis was performed with PASW 22® (p<0.05).

Conclusions/Results
The study included 91 patients, 58.2% were male, with a median age of three years. There was no significant difference between FSS totals in pre-admission and one year after discharge (p=1). However, one year after discharge there were 15 (16%) children with “New morbidity”. The acquisition of “new morbidity” was related to: longer length of PICU stay (p<0.001), nosocomial infection (p=0.026), surgical intervention during hospitalization (p=0.0039), use of vasoactive drugs (p=0.009), mechanical ventilation need (p=0.006) and less free days of ventilation (p<0.001). Seven children died during the hospitalization and one after discharge.

Conclusions: In this study most children had a good functional status one year after discharge. The risk of acquiring new morbidity was related to a longer length of PICU stay, nosocomial infection and use of invasive therapies.

References (if needed)
LONG TERM OUTCOME part 1

ESPN7-0057

EXTREMELY LOW BIRTH WEIGHT NEWBORNS – SURVIVAL, CLINICAL PROBLEMS, LONG TERM OUTCOMES
V. Atanasova¹, L. Veskov²
¹Medical University, Division of Neonatology, Pleven, Bulgaria
²Medical University, trainee doctor, Pleven, Bulgaria

Background

Birth weight (BW) < 1000 grams is defined as extremely low. Nowadays, minimal survival threshold decreases but mortality remains high (49-90% according to socio-economic status) and more than 50% of survivors suffer from long term disabilities (WHO).

Objectives

To examine survival rate and clinical problems in extremely low birth weight newborns (ELBWNs) who are born and treated in UMHAT, Pleven from 2005 to 2015.

Methods

117 live born ELBWNs were followed up to the discharge. Delivery way, intrapartum asphyxia, gestational age (GA), gender, intrauterine growth restriction (IUGR), congenital anomalies, infections, complications were reported and compared.

Conclusions/Results

58 from 117 examined newborns (50%) survived to the discharge. The early neonatal mortality was the highest (38 babies, 68% of the deceased). The mortality showed a tendency to decline in dynamics and (the lowest value in 2014 - 26%). The mean BW in 2005 was higher than in 2015 (905±83 vs. 767±125 grams, p 0.002). The mean GA decreased (26.5±2.3 in 2015 vs. 27.8±1.5 in 2005). The BW of the deceased was lower than that of the survivors (772±117 vs. 858±118 grams, p 0.0001). Moreover, the deceased suffered often from IUGR and intrapartum asphyxia. 20 of the survivors (17% of all ELBWNs) were not affected by any complication during their hospital stay and in 25 more than one disease developed (21% of all ELBWNs).

CONCLUSIONS: The mortality and morbidity rate of ELBWNs stay high despite progress of neonatal medicine. According to our data, the main factors for survival in these patients are BW, IUGR and intrapartum asphyxia.

References (if needed)
LONG TERM OUTCOME part 1

ESPN7-0336

CHRONIC COMPLEX PATHOLOGY IN A PEDIATRIC ICU: RESULTS OF A NEW ORGANISATION MODEL
A. Camporesi1, A. Wolfler2, I. Cigada1, M. Gotti2, S. Guarisco1
1Children Hospital Vittore Buzzi, Paediatric Anaesthesia and Intensive Care, Milano, Italy
2San Paolo hospital, Intensive Care, Milano, Italy

Background

Children affected by chronic pathologies are a growing population due to continuous medical progress which improves survival for severe diseases. These children require respiratory, nutritional and different support in relation to their pathologies, and are prone to acute exacerbations that require ICU admission.

Objectives

To describe the model of care we instituted to give a multidisciplinary care of the these children in order to reduce the need for acute ICU admissions.

Methods

An ICU bed was dedicated to the “special needs patients” for planned admissions to undergo periodic respiratory, cardiologic, nutritional evaluations and all the others they needed. Moreover, a telephonic line was instituted and for these families and an ICU nurse was dedicated to it. Answer to the line is granted 24 hours a day. We compared the need for acute admissions before and after institution of these care model. We are actually in charge of care of 151 patients; their number is increasing. Mortality is reducing after institution of the care program and in any case stable <15%. Number of acute ICU admissions has reduced significantly (p=0.04, R2=0.72). Beside that, parents are more confident caring for the child at home because they feel assisted.

Conclusions/Results

In a changing model of ICU patients with a trend toward the chronically sick, the institution of a multidisciplinary care program for optimizing respiratory, cardiologic and nutritional support has proved to reduce the need for unplanned, acute ICU admissions in a particularly fragile population.

References (if needed)
LONG TERM OUTCOME part 1

EVALUATION OF INNOVATIVE STRATEGIES DEVELOPED IN NORTH AMERICA TO IMPROVE PATIENT AND FAMILY WELLBEING FOLLOWING AN ADMISSION TO A PICU

E. Dodds¹
¹, Nottingham, United Kingdom

Background

Admission of a child to PICU can have a significant negative impact on both the child and family's psychological and emotional wellbeing. There is limited information on how to identify those most at risk. North American centres have published research on care initiatives developed to minimise these adverse effects.

Objectives

To investigate evaluated nurse-led support services in North America, which have been developed to support families of children during PICU admissions. Consider their impact on long-term outcomes and evaluate their applicability to PICUs elsewhere.

Methods

Six PICUs in North America were visited over eight weeks. Informal interviews were held with the key staff in the units, their practices were observed and nurse education explored.

Conclusions/Results

There is no ‘one size fits all’ solution. These visits demonstrated the importance of more research and of providing a high standard of Patient and Family Centred Care (PFCC) to improve family engagement and empowerment. Recommendations to improve PFCC include:
1. Raise awareness of the impact of a PICU admission on families and on the importance of good PFCC.
2. Improve the education provided to nurses on providing PFCC and on communication techniques for working with families struggling to cope.
3. Collaborate with hospital play specialists to improve support provided to siblings.
4. Form a PFCC Committee to allow the MDT to work together identify PFCC priorities, developing solutions and evaluating progress.

Conclusion: Innovative strategies to provide high quality PFCC developed in North America could be embraced by PICUs elsewhere and have the potential to improve long term outcomes for families.

References (if needed)
Background

The complications of prematurity in neonatal period are well described. However, there is very few data about ex-preterm infants and children hospitalizations in Paediatric Intensive Care Units (PICU).

Objectives

This study aimed to identify the prevalence and characteristics of ex-preterm infants and children admissions in a PICU between 2012 and 2016.

Methods

Participants were identified from our PICU database and distributed in three groups: G1 (≤27 weeks), G2 (28-31 weeks) and G3 (≥32 weeks). Review of clinical data and statistic analysis was done with Chi-square test and ANOVA.

Conclusions/Results

A total of 314 patients (G1 n=50; G2 n=56; G3 n=208) were admitted, (14.5% of all admissions). The mean number of admissions per patient and the hospitalization days were superior in G1 (2.2 vs. 1.5 vs 1.5 p=0.002; 7.8 vs. 4.0 vs 5.7 p=0.055; respectively). The principal diagnosis was acute bronchiolitis in 63 (20%), the first diagnosis in G2 (n=11; 20%) and G3 (n=44; 21%). Insertion or revision of ventricular-peritoneal shunt was the first diagnosis in G1 (n=17; 34%).

In infants with bronchiolitis, there was no difference between groups in ventilation or oxygen days. An association with Respiratory Syncytial Virus (RSV) was found in 43% and 74% of G2 and G3. In G1, only 1 case (13%, p=0.03) was identify.

The challenges of prematurity do not end in the neonatal period. In our study, gestational age ≤ 27 weeks was associated with more admissions in PICU. The RSV bronchiolitis was an important cause of hospitalization in moderate-to-late preterm infants, randomized trials should review the benefits of prophylaxis in this group.

References (if needed)
LONG TERM OUTCOME part 2

ESP7-0425

COMPARISON OF NEONATES WITH AND WITHOUT ANTENATAL MAGNESIUM INFUSION
F. Ozlu1, C. Hacioglu2, S. Buyukkurt3, H. Yapicioglu Yildizdas1, M. Akcali1, H. Simsek1, M. Satar1
1Çukurova university, NEONATOLOGY, ADANA, Turkey
2Çukurova university, PEDIATRICS, ADANA, Turkey
3Çukurova university, obstetrics and gynecology, ADANA, Turkey

Background

Administration of magnesium sulphate (MgSO4) to mothers with imminent preterm birth at <34 weeks is an evidence-based antenatal neuroprotective strategy to prevent cerebral palsy.

Objectives

We hypothesized that antenatal magnesium sulfate exposure is associated with a reduced risk of intraventricular hemorrhage.

Methods

In this study, <32 gestational week 55 premature infants who had antenatal steroid and were borned in 2011 and 2014 and hospitalized in our NICU were retrospectively compared for the effect of antenatal magnesium. Infants were grouped as Mg(+) and Mg(-) due to the antenatal magnesium

Conclusions/Results

Respiratory Distress Syndrome requiring surfactant and severe intraventricular hemorrhage (grade 3 and 4) were less in Mg(+) group compared to Mg(-) group but it is not significant statistically (p>0,05).

As a result antenatal magnesium is stil controversial. Multicentric studies including more premature infants are needed for a conclusion.

References (if needed)
SURVIVAL RATES AND NEURODEVELOPMENT OUTCOMES OF VERY PRETERM (VPT) AND/OR VERY LOW BIRTH WEIGHT (VLBW) NEWBORNS: TERTIARY CARE HOSPITAL EXPERIENCE

E. Popik¹, A. Ratola¹, C. Carvalho¹, A. Guedes¹, A.M. Alexandrino¹, A.C. Braga¹
¹Centro Materno-Infantil do Norte- Centro Hospitalar do Porto, Neonatology and Pediatric Intensive Care Unit, Porto, Portugal

Introduction: Improved survival rates in VPT/VLBW neonates has led to a higher incidence of physical and neurosensory disability (deafness or blindness).

Objectives: To analyse the survival rate (SR), neurosensory sequelae and neurodevelopment at age 3 years according to GA of VPT/VLBW children born over a 6-year period, from 01/01/2007 to 31/12/2012 in Maternidade de Júlio Dinis, Oporto Hospital Centre, Oporto, Portugal.

Methods: VPT/VLBW neonates were prospectively followed up from birth until 3 years of age. The SR was calculated at discharge from NICU. Survivors were evaluated as outpatients; neurosensory sequelae and cerebral palsy (CP) were registered as well as neurodevelopment assessment. At 3 years of age a formal neurodevelopmental test was performed. Data analysis was held by Microsoft Excell2010.

Results: 584 VPT/VLBW neonates were included; BW varied between 370g and 2250g and GA between 23w and 36w. The global SR was 88%, with SR above 50% at 25 wGA and no survivors at 23wGA. CP was diagnosed in 5.4% and neurosensory disability in 2% of infants. Four hundred and twenty four infants (83%) were evaluated up to 18-24 mo of age, and 394 (77%) maintained a surveillance by the age of 3y; 50% of these showed a normal motor and cognitive development.

Conclusions: The survival rate was comparable to literature, but unlike other centres SR at 23wGA was 0% and limit viability was at 25wGA. Data regarding CP and neurosensory sequelae was comparable to literature as well. 50% of infants evaluated at age 3y had no morbidity; further evaluation of these children might detect minor impairments.

References (if needed)
LONG TERM OUTCOME part 2

ESPN7-0416

ENTERAL FEEDING POST REPAIR OF CONGENITAL ABDOMINAL WALL DEFECTS. REAL EXPECTATIONS AND CURRENT IMPACT FACTORS
M. Shoukry¹, G. Gregori¹, A. Morabito¹
¹Royal Manchester Children Hospital, Paediatric and Neonatal Surgery, Manchester, United Kingdom

Background

Gastroschisis and exomphalos are congenital abdominal wall defects (CAWD) which result in herniation of intraabdominal organs (usually intestine) into amniotic cavity. Herniated contents are contained within a sac in exomphalos. Several studies reported survival rate in most contemporary series is over 90%, however survivors can suffer significant gastrointestinal tract morbidity resulting in prolonged need for parenteral nutrition (TPN). Delayed establishment of full enteral nutrition contributes to adverse outcomes and increased resource consumption in hospitals with some patients.

Establishment of enteral nutrition after CAWD closure is highly subjective and is known to be highly variable. There is lack of evidence and consistency in clinical practice regarding timing of initiation of enteral feeding and few studies have determined suggestive practices for post-operative nutritional management.

Objectives

A retrospective review to evaluate enteral feeding in neonate with CAWD in tertiary NICU.

Methods

Of 158 patients, 39 exomphalos and 119 gastroschisis cases, notes were collected. All cases were born or transferred to our unit for management of CAWD between January 2010 and December 2015. Establishment and building up enteral feeding were monitored by both neonatal and surgical teams. We divided our cohort into two groups, group A(< 2.5 kg) and group B(>2.5 kg) at birth and analysed difference between two groups regarding hospitalization period, management and enteral feeding approach to reach full feeding. All patients were followed up in OPC.

Conclusions/Results

Multiple factors can influence enteral feeding after repair of CAWD in neonates, including: Low birth weight, prematurity, neonatal sepsis, associated congenital anomalies and ventilation requirement.

References (if needed)
LONG TERM OUTCOME part 3

ESP7N0501

POST MORTEM STUDIES AT COIMBRA’S PICU – 11 YEARS EXPERIENCE
A. Silva¹, C. Pinto¹, R. Pina², A. Dinis¹, L. Carvalho¹, J. Farela Neves¹
¹Pediatric Department - CHUC, Pediatric Intensive Care Unit, Coimbra, Portugal
²CHUC, Anatomopathological Department, Coimbra, Portugal

Background

post mortem (PM) studies are important to clarify the cause of the death and other occult diagnosis. In critically ill patients, discrepancies have been described between clinical diagnosis and autopsy findings in 43 to 75%, depending on the unit1-4. In pediatrics these studies have other objectives with interest for future generations.

Objectives

Our aim was to analyse post mortem findings in a Pediatric Intensive Care Unit.

Methods

Retrospective review of PM findings and clinical diagnosis in a PICU, for 11 years. Only deaths with autopsy results available were included. Results of genetic, metabolic, microbiological and tissue samples analysis were also taken into account. Accidental deaths were excluded.

Conclusions/Results

31 deaths in whom was solicited ATP were studied, corresponding to 18.5% of total deaths. At our sample, 55% of deaths were paediatric and 45% neonatal. The most frequent clinical cause of death were: respiratory insufficiency (29%) and neurological (26%), 75% of whom were newborn, cardiac (22.5%), haemorrhagic (13%), infections and liver failure (6%). Anatomopathological findings were in disagreement with clinical suspicion in 13%. In 35.5% of the studies there were new findings, being the most common: congenital malformations, ischaemic/thromboembolic events and occult infections. In one third future prenatal diagnosis became possible. Post mortem studies were fundamental to support clinical suspicion. At our population, the majority of ATP was concordant with clinical diagnosis and with new findings from post mortem studies helpful for prenatal the diagnosis in future pregnancy.

References (if needed)
THE IMPACT OF PREGNANCY INDUCED HYPERTENSION ON THE INFANT - A RETROSPECTIVE STUDY

T.O. Bizerea¹,², R. Stroescu¹,³, C. Angelescu Coptil⁴,⁵, I. Jurca Simin⁶, I. Ilie⁴,⁵, O. Marginean¹,²

¹“Victor Babes” University of Medicine and Pharmacy, Pediatrics, Timisoara, Romania
²“Louis Turcanu” Children’s Clinical and Emergency Hospital, 1st Pediatric Clinic, Timisoara, Romania
³“Louis Turcanu” Children’s Clinical and Emergency Hospital, 3rd Pediatric Clinic, Timisoara, Romania
⁴“Victor Babes” University of Medicine and Pharmacy, Neonatology, Timisoara, Romania
⁵“Pius Brinzeu” Clinical Emergency County Hospital, Neonatology, Timisoara, Romania
⁶“Victor Babes” University of Medicine and Pharmacy, Genetics, Timisoara, Romania

Background

Pregnancy induced hypertension (PIH) has been strongly associated with fetal intrauterine growth restriction (IUGR) and hypoxic ischemic encephalopathy (HIE) and haematological changes in these infants.

Objectives

The study aimed to determine whether PIH is an independent risk factor, regardless of birth weight.

Methods

A retrospective study was carried out over a 2 year period (January 2014 – December 2015) focusing on the impact of PIH on the infant. 92 patients were divided in two groups: infants born to mothers with PIH (48 patients - 52%) and infants of healthy mothers (44 patients-48%).

Conclusions/Results

A higher IUGR prevalence (35% compared to 27%) was noted in the studied group. In 47% of these patients changes in ABG consistent with hypoxia were noted, compared to 12% of AGA patients and 8% of IUGR infants from healthy mothers. HIE had a higher prevalence in the studied group in both IUGR infants (29%) as well as in the AGA infants (26%) compared to the control group. In the studied group 35% of the IUGR patients developed leucopenia with neutropenia compared to 29% AGA patients and 29% IUGR infants developed thrombocytopenia compared to 16% in both AGA infants from this group and IUGR patients from healthy mothers. Although more marked in IUGR patients from the studied group, an increased prevalence of HIE and haematological changes was also noted in AGA infants from this group compared to IUGR infants from healthy mothers.

Being born to a mother with PIH appears to be an independent risk factor for developing HIE and haematological disorders.

References (if needed)
THE EFFECT OF SECONDHAND SMOKING EXPOSURE ON THE HOSPITALIZATION DIAGNOSIS OF PEDIATRIC INTENSIVE CARE UNIT AND DURATION OF MECHANICAL VENTILATION

M. uyusal yazici¹, S. Kesici¹, F. Yetimkan¹, M. Tanyildiz¹, B. Bayrakci¹
¹Hacettepe University Faculty of Medicine, Pediatric intensive care unit, ANKARA, Turkey

Background

Objectives

Aim of the study was to evaluate the effect of secondhand smoke rate (SHSR) on the hospitalization diagnosis of PICU and length of stay on mechanical ventilation (MV) and in PICU.

Methods

The questionnaires regarding the smoking habits of parents and guests were performed to all of the parents of hospitalized patients in PICU in between September 2014 – January 2015. This was cross sectional prospective survey study.

Conclusions/Results

Results: Total 125 girl and 175 boy were included in study. Mean age was 82 months. Diagnosis of hospitalizations were intoxication (16.5%), neurological disorders (14.9%), malignancy (12.9%), congenital heart disease (11.2%), genetic syndromes (9.9%), trauma (9.6%), shock (%7.3), arrhythmia (6.3%), renal failure (5%), diabetes (2.6%) and burn (2.6%), metabolic disease (%1.3). Total 42.2% of patients were on invasive, 5.3% were on non-invasive MV. Mother, father and guest smoking rate was 40.6%; 75.2% and 58.4%. The SHSR was 76.9%. The SHSR of children with diagnosis of malignancy were 83.6% which was statistically significant (p<0.05). There was no significant difference was detected in SHSR of children diagnosed as intoxication, trauma, burn and others. Mean length of stay in MV and PRISM score was 3 days and 11.6 ± 8. The PRISM score was statistically significant in SHS exposed children compared with non-exposed ones (PRISM scores 12.2±7.9 vs 9.6±7.8, p=0.007). Length of stay in PICU and on mechanical ventilation was similar in SHS exposed and non-exposed children.

Conclusion:

SHSR did not effect the length of stay in PICU and on MV. PRISM score of SHS exposed children was higher compared with non-exposed children.

References (if needed)
Background

Neonatal pain is associated with long term effects. However, data on consequences of neonatal pain in adolescence is limited.

Objectives

To study associations between prematurity, low birth weight, neonatal characteristics and estimates of neonatal disease severity on pain coping styles and experimental pain behavior.

Methods

We had access to a large population based cohort of 959 adolescents, born with a gestational age of less than 35 weeks or birth weight below 1500 g. As part of an extensive follow up program at the age of 19 years, these adolescents were asked to complete a validated Pain Coping Questionnaire, IQ testing and a Cold Pressor Test. The Pain Coping Questionnaire assesses pain coping styles in three higher order scales. The higher order scales of Approach and Problem Focused Avoidance reflect pain coping styles aiming at regulating feelings when in pain and disengaging from the pain. The higher order scale Emotion Focused Avoidance reflects maladaptive coping styles, which lead to a lack of regulation of feelings when in pain. The Cold Pressor Task was used to assess pain threshold and pain tolerance.

Conclusions/Results

In ex-preterm adolescents, neonatal characteristics or estimates of neonatal disease severity did not influence pain behavior or pain coping styles in adolescence, but necrotizing enterocolitis was associated with lower pain tolerance and pain threshold, while intraventricular hemorrhage was associated with more use of maladaptive coping strategies.

References (if needed)
IS VARIATION IN BRONCHOPULMONARY DISEASE RATES BETWEEN UK NEONATAL UNITS EXPLAINED BY UNIT VARIATION IN OXYGEN SATURATION TARGETING?

C. Vas1, S. Bryson1, S.J. Oddie2

1Leeds Teaching Hospitals Trust, Neonates, LEEDS, United Kingdom
2Bradford Teaching Hospital NHS Foundation Trust, Neonatology, Bradford, United Kingdom

Background

In the UK there is a wide variation in the rates of significant bronchopulmonary dysplasia (BPD) between neonatal units as reported by the National Neonatal Audit Programme (NNAP). We hypothesized that a factor for this variation is due to units using different oxygen saturation (SpO2) targets.

Objectives

To determine if variation in UK unit level rates of significant BPD can be attributed to variation in reported SpO2 targeting.

Methods

All UK neonatal units were contacted between September 2016 and December 2016 and asked a series of questions regarding SpO2 targets and limits used for babies reaching 36 weeks corrected gestational age. The SpO2 targets used were compared with the unit’s significant BPD rates as recorded by NNAP for 2013-2015 (definition maps to moderate and severe BPD measured by NIH definition).

Conclusions/Results

The range of saturation targets used varies widely across the UK (figure 1), suggesting a lack of clinical consensus. The low SpO2 limit target ranged from 85% to 95%. A weak correlation exists between significant BPD and the reported lower SpO2 target (figure 1), but chi squared test showed this was not clinically significant. There is no correlation between rates of BPD in NICUs and their reported lower limit of oxygen saturation target.
Conclusion: The wide variation in BPD rates appears not to be attributable to differing spo2 targeting.

References (if needed)
METABOLISM, ENDOCRINOLOGY AND NUTRITION part 1

ESPN7-0455

A RARE MUTATION IN THE LPL GENE IN A MORROCAN NEONATE WITH HYPERTRIGLYCERIDEMIA

F. bennaoui1, O. Louachama1, N. ELIDRISSI SLITINE1, F.M.R. MAOULAININE1
1Mohammed VI University Hospital, Neonatal Intensive Care Department, marrakech, Morocco

Background

Genetic hyperchylomicronemia is a rare autosomal recessive disorder of lipoprotein metabolism estimated to affect approximately one permillion individuals. This disorder characterized by extremely high triglyceride levels in fasting serum due to accumulation of chylomicrons.

Objectives

In the LPL gene, a large number of mutations has been described. We report a case with a rare mutation identified. We review the genetic features of chylomicronemia syndrome.

Methods

It’s a genetic chylomicronemia in a morrocan newborn, with massive hypertriglyceridemia and clinical signs of acute pancreatitis. Genetic study of the patient revealed a very rare mutation of the LPL gene.

Conclusions/Results

She was a female newborn, first-degree consanguineous parents. She was hospitalized for hypertriglyceridemia, complicated by acute pancreatitis, serum was noted to be milky. Confirmation of familial character was requested and the genetic study found a mutation of the LPL gene: homozygous pathogenic variant c.1019-3C>A. She enjoyed good health, thrived well and the triglyceride was maintained at a concentration of <12 g/l, after a digestive rest of five days and feeding was resumed with a specialized soy milk.

This mutation is the second case described in the world, the first case was described in 1994. The identification of the molecular etiology of these dyslipidemias explains the wide variety of phenotypes observed, some of which are accessible to targeted therapies.

The importance of genetic screening for LPL gene mutations, to envisage a dietetic and / or medicinal treatment attenuating or even suppressing the possible consequences of the metabolic disorder induced by the causal molecular anomaly.

References (if needed)
THE PREVALENCE OF OBESITY IN PAEDIATRIC AND ADULT CONGENITAL HEART DISEASE

C. Boyles¹, B. Yee¹, L. Marino²
¹Southampton General Hospital, Cardiology, Southampton, United Kingdom
²Southampton General Hospital, PICU, Southampton, United Kingdom

Background

Obesity is a significant problem in the UK. There are reports of obesity amongst adults with congenital heart disease (ACHD), which is potentially associated with increased risk of hospital acquired infections and prolonged length of hospital stay (LOS) (Crit Care Med 2016; 44:1530–1537)

Objectives

To explore prevalence of obesity in congenital heart disease

Methods

The prevalence of overweight/obesity (owt/obs) was investigated in an adult/paediatric cohort. The results were compared against the national average. Individual diagnoses of Aortic Coarctation and Atrial Septal Defect (ASD) were explored for rates of owt/obs, in addition to the relationships between LOS. Definitions: Owt BMI score of 25–30 (adults), BMIZ score 1–2 (Paediatrics); Obs: BM >30 (adults), BMIZ score >2 (Paediatrics).

Conclusions/Results

Health care providers should recognise the problem of excess weight early, providing education and support reducing individual risk as patients move from childhood to adulthood.

References (if needed)

Bechard et al: Nutritional Status Based on Body Mass Index Is Associated With Morbidity and Mortality in Mechanically Ventilated Critically Ill Children in the PICU. Critical Care Medicine 2016; 44:1530–1537
CASE OF CONGENITAL CHLORIDE DIARRHEA

N. Vaynshteyn¹, E. Britanishskaya²

¹, Moscow, Russia
²RSMU, Pediatrics, Moscow, Russia

Background

Congenital chloride diarrhea (CLD) is a rare metabolic disorder (SLC26A3 gene defect) with disrupting the epithelial Cl⁻/HCO₃⁻ transport in the ileum and colon and chloride and water stool loss.

Objectives

A 5-month-old female presented to our clinic with poor feeding and irritability. Since 21 week mother had polyhydramnios. Amnioreduction has been conducted at 22 week. She was born by cesarean section at 32 weeks gestation 1900/42. In DOL 2 newborn was suspected to have congenital intestinal obstruction and colostomy was performed. In DOL 14 colostomy closure was performed. She was discharged at 2 month eating 50x8. Her weight was 3300.

Methods

At 5 month of age she was admitted in our hospital for poor weight gain (2800g). Analysis showed pH of 7.6 and base excess of +25 mmol/L, serum sodium 118 mmol/L, potassium 1.6 mmol/L, chloride 59 mmol/L. She had watery diarrhea, but stool culture was negative, stool sodium 100 mmol/L, potassium 26 mmol/L, chloride 129 mmol/L. Electrolytes were corrected intravenously and orally and symptoms improved. Congenital chloride diarrhea was suspected and s.2024_2026dupTCA mutation of SLC26A3 gene was found. She was orally receiving NaCl and KCl. The dosage were adjusted with constant monitoring of the electrolyte level. Her weight was 4100 in 6 months and 5200 in 7. Her neurodevelopmental outcome was good.

Conclusions/Results

If neonates show prenatal polyhydramnios and intestinal obstruction or dilated bowel loops before/after birth, we should be mindful of CLD and consider evaluating blood and stool electrolytes.

References (if needed)
ARE WE GIVING EXTREMELY LOW BIRTHWEIGHT PRETERM BABIES ADEQUATE PROTEIN?

E. Erinauga¹, K. Johnson¹
¹Leeds Teaching Hospitals, Neonatal Medicine, Leeds, United Kingdom

Background

The survival of extremely low birthweight (ELBW) babies has improved significantly in the last few decades due to advances in perinatal care. However, there are controversies as to what constitutes adequate nutrition for the newborn infant. Consequently, the European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) in 2010 published a guideline which outlines the daily dietary requirements for newborns.

Objectives

To determine if ELBW babies weighing <1000 grams are receiving adequate amount of protein based on ESPGHAN recommendations.

Methods

The case notes of ELBW babies admitted into the Neonatal Unit of the Leeds Teaching Hospitals between 1st January and 31st December 2014 were reviewed. The total protein intake on days 3, 7, 14 and 28 was determined and compared with ESPGHAN recommendations.

Conclusions/Results

Seventy-nine ELBW babies were admitted, 36 babies met the selection criteria but only 25 case notes contained complete information. The number (percentage) of babies who received adequate protein on days 3, 7, 14 and 28 were 3(12%), 15(60%), 5(20%) and 10(40%) respectively.

Most babies did not receive adequate protein. However, on day 7 when most babies were on predominantly parenteral nutrition (PN), 60% received adequate protein. Also, only one baby and 8 babies on days 14 and 28, respectively received fortified breast milk.

Conclusions:

As a result of this study, work is now underway within our Trust and the wider region to ensure early initiation of adequate protein in PN in addition to early fortification of breastmilk/donor breastmilk in order to ensure appropriate protein intake once enteral feeds are established.

References (if needed)
ADVANCED OXIDATION PROTEIN PRODUCTS AND COPPER LEVELS IN CHILDREN WITH IRON DEFICIENT ANEMIA

L.E. Gaman1, C. Delia2, L. Iosi3, G. Toma4, E. Torac1, M. Gilca1, C. Muscurel4, D. Dorin4, M. Petran4, V. Atanasiu5, B. Cristea2, L. Stroica5, L. Radulescu1, D. Stefan1, M. Vasile1, I. Stoian1

1UMF Carol Davila, Biochemistry, Bucharest, Romania
2"Alfred Russescu" Children's Hospital, Biochemistry, Bucharest, Romania
3R&D Inist Labmed, Biochemistry, Bucharest, Romania
4UMF Carol Davila, Internal Medicine, Bucharest, Romania
5UMF Carol Davila, Anatomy, Bucharest, Romania

Background

Iron deficient anemia (IDA) is one of the most frequent nutritional imbalance in childhood years. Disturbances in iron metabolism may also impact the metabolism of other transitional metals and one of this is Copper. Disregulation of transitional elements metabolism may have as a consequence increased levels of oxidative modifications at the level of proteins, lipids and sugars. It is already known that IDA may increase oxidative stress.

Objectives

The aim of our study was to investigate the levels of copper, advanced oxidation protein products (AOPP) and Trolox Equivalent Antioxidant Activity (TEAC) in children with IDA.

Methods

19 IDA children (32.5±33.5 month) and 20 controls (53.5±28.1) were selected for the study. IDA was diagnosed based on Hb, hematocrit, MCV and feritine levels. On plasma samples TEAC, AOPP, copper and iron levels were determined.

As expected plasma iron levels were significantly lower in IDA children (p<0.001). We have not found any statistically significant difference between patients and the controls for TEAC (1.56 ± 0.21 in controls and 1.51 ± 0.15 mM/l in IDA ) AOPP levels (139.1 ± 33.44 in controls versus 113.7 ± 26.72 in IDA) and copper levels (96.95 ± 6.51 in controls versus 95.37 ± 7.00 in IDA).

Children with IDA have decreased TEAC and AOPP levels compared with the controls.

Conclusions/Results

Decreased AOPP levels is an interesting finding and may be a consequence of impaired neutrophils activity explaining the increased susceptibility to infections commonly seen in IDA patients.

References (if needed)
METABOLISM, ENDOCRINOLOGY AND NUTRITION part 2

URINARY METABOLIC PROFILE OF NEONATES IN WESTERN GREECE: PRELIMINARY DATA

I. Giannakopoulos¹, A. Tsintoni¹, S. Fouzas¹, S.E. Bariamis², I. Georgakopoulou², S.A. Chasapi², M. Spraul³, H. Schafer³, G.A. Spyroulias², A. Varvarigou¹

¹Medical School- University General hospital of Patras, Department of Pediatrics, PATRAS, Greece
²University of Patras, Departement of Pharmacy, PATRAS, Greece
³Silberstreifen- Rheinstetten, Bruker BioSpin, Rheinstetten, Germany

Background

Metabolomics represent a new and promising area of research in neonatology. To date, the method has been successfully applied to monitor the rapid metabolic changes after birth and to detect the metabolic responses that may be characteristic for specific neonatal disorders.

Objectives

The aim of our study was to develop a reference model of urinary metabolomics in healthy newborns up to their third day of life, taking also into account dietary effects, jaundice and exposure to tobacco smoke.

Methods

The study included 110 healthy newborns (GA 35 to 40 weeks) from the region of Western Greece. Urine samples were collected immediately after birth and at the end of the third day of life (DOL). Metabolic profiling of the samples was performed by ¹H-NMR spectroscopy. Statistical analysis was conducted in R environment, using in-house scripts.

Conclusions/Results

Results: Principal component analysis showed that there were significant differences from birth to DOL 3 in the relative intensities of the assigned metabolites, such as betaine, glycine and taurine. Trends in differentiation of metabolites levels between the two spectral groups, late preterm and term newborns, were also observed.

Conclusions: Our preliminary data confirmed the rapid changes in the urinary metabolic profile after birth. Ongoing research will enable us to develop the reference model of urinary metabolomics in healthy newborns during the period of adaptation to the extra-uterine life.

References (if needed)
BREASTFEEDING MANAGEMENT IN NICU: MACEDONIAN MODEL

S. Janchevska¹, S. Ivanovska¹
¹University Clinics of Gynecology and Obstetrics Skopje, Neonatal Intensive care unit, Skopje, FYR Macedonia

Background

The education, promotion and support of breastfeeding and skin-to-skin contact are very important for mothers and their premature newborns for intensive treatment.

Objectives

Is Macedonian model the right way from neonatal intensive care to breastfeeding?

Methods

104 pairs of newborns and their mothers are analyzed 27 months in the Clinic. The first group included 52 couples of premature babies of NICU and their mothers, who enjoyed the human milk bank and Kangaroo care sessions. We used questionnaires to obtain information on mothers Lactation consultant performed education for expressing milk with hand pumps. Mothers are relaxed by the Mozart music and video education during the kangaroo care session. The second group included 52 couples of newborns with intensive treatment without of breastfeeding and Kangaroo care.

Conclusions/Results

Three quarters of the babies of first group began with breastfeeding at clinic and 62.5% breastfed to babies age of full 6 months. 8.9% babies of the second group breastfed less than 6 months.

Kangaroo care session, promotion and support of breastfeeding as well as techniques for feeding milk lead in good management. This confirms the possibility of using a simple model for nursing premature babies in NICU and later also at home.

References (if needed)
NURSES’ DECISION-MAKING AROUND GASTRIC RESIDUAL VOLUME MEASUREMENT IN PICU

L. Kenworthy¹, L. Latten², L. Tume³

¹Alder Hey Children's NHS Foundation Trust, PICU, Liverpool, United Kingdom
²Alder Hey Children's NHS Foundation Trust, Dept Dietetics, Liverpool, United Kingdom
³Alder Hey Children's Hospital, PICU, Liverpool, United Kingdom

Background

A common nursing practice to assess enteral nutrition (EN) ‘tolerance’ is to measure gastric residual volume (GRV) regularly, and GRV is a significant factor in the decision to stop or hold enteral nutrition.

Objectives

To explore factors surrounding nurse decision-making around GRV measurement and the decision to return or discard gastric aspirates.

Methods: Cross sectional electronic survey in a single UK PICU

Methods

90/154 nurses responded (Response rate 58%) with a mean PICU experience of 10.8 years (SD8.09). 76% nurses were PICU qualified. Nurses reported checking GRV primarily to check feed ‘tolerance’ (97%) as well as to confirm NGT position (94%). Nurses cited perceived harms from high GRVs being: Risk of pulmonary aspiration (44%), malabsorption of enteral feed (20%) and risk of vomiting (19%). Nurses reported measuring GRV frequently: 58% before every feed, 27% 4 hourly and 17% 6 hourly. Over three quarters (84%) of nurses said they would be worried or very worried if they could not measure GRV routinely. The biggest concerns cited were: not being able to assess ‘feed tolerance’ (55%), confirming NGT position (32%) and the risk of vomiting and aspiration (27%). Most nurses were aware of other ways to assess feed tolerance, citing: bowel movements (62%), abdomen appearance (59%), vomiting (38%) and presence of bowel sounds (25%).

Conclusions

PICU nurses placed huge emphasis on the value of GRV measurement in determining feed tolerance and most commonly cited risk of aspiration as a fear of not measuring GRV.

References (if needed)
ADOLESCENT GIRL WITH DIABETIC KETOACIDOSIS AND SEVERE HYPERTRIGLYCERIDEMIA

K. Tziouvas¹, K. Mitropoulos¹, P. Bonou¹, M. Machaira¹, A. Dimolitsa¹, E. Goula¹, J. Papadatos¹
¹"A. & P. Kyriakou Children's Hospital, PICU, Athens, Greece

Background

Severe hypertriglyceridemia can manifest as a complication of DKA. Deficiency of insulin activates lipolysis and accelerate the formation of VLDL in liver. Furthermore, the activity of lipoprotein lipase in peripheral tissues is diminished reducing the removal VLDL eventually leading in high TG serum levels.

Objectives

To present a rare case of DKA with severe hypertriglyceridemia and favorable outcome.

Methods

A 15 years old female adolescent was transferred to our PICU because of DKA pH: 6.98, HCO3: 2, glycose 500 mg/dl and serum triglycerides levels 66.000 mg/dl. Her previous medical history was uneventful expect that the last 2 months she had loss more than 15 Kg of weight and during the last month she had 3 fainting episodes. She was admitted to the PICU because of the DKA and the high risk of thrombotic episode and acute pancreatitis. She received the standard protocol for the DKA without any complication. Her laboratory and imaging evaluation for pancreatitis was normal, except that the head of the pancreas was enlarged in the abdominal ultrasound. Her level of consciousness was normal. Her ketoacidosis was corrected during the 1st day at the PICU and her TG levels gradually dropped. By the 3rd day TG levels were 1300 mg/dl and she was transferred to the ward. At the 5th day levels were at 350 mg/dl.

Conclusions/Results

Severe hypertriglyceridemia is a rare comorbidity of DKA. Prompt diagnosis and therapy with insulin can minimize the risk of developing complications.

References (if needed)
Background

Gastroschisis is an abdominal wall defect requiring neonatal intensive care, early surgical correction and parenteral nutrition. Timing of transition to oral nutrition remains a major concern.

Objectives

Evaluate predictors for oral tolerance in newborns with gastroschisis and secondarily, analyse nutritional evolution during hospital stay.

Methods

A retrospective review, from 2007 to 2016, identified nine cases of gastroschisis. Data collected concerned: gender, pregnancy, labour, intensive care procedures, associated malformations, surgical approach and nutritional details. A p-value <0.05 was considered statistically significant.

Conclusions/Results

Results: Among nine patients, 56% were female with a median gestational age of 35 weeks [32-38] and a median birth weight of 2200g. Prenatal diagnosis was at a median of 24 weeks [13-37]. Additional intestinal malformations were verified in 56%. All initiated parental nutrition on the first post-operative day and total enteral nutrition begun at a median of 19 days [14-40]. Prolonged antibiotherapy was associated with later beginning of enteral nutrition (p-value=0.013) and with later total enteral tolerance (p-value=0.017). Sepsis and pre-operative transfusion delayed oral tolerance by bottle (p-value=0.010 and 0.054, respectively). Breast milk related with earlier enteral tolerance (p-value=0.051). Intestinal atresia, intestinal resection and ileocecal valve resection did not correlate with oral tolerance. Conclusions: Intensive care hospitalization of gastroschisis patients with sepsis, transfusion and prolonged antibiotherapy associates with delayed oral tolerance. As in previous studies, breast milk related with earlier oral tolerance. Contrarily, surgical factors did not influence enteral tolerance.

References (if needed)
EFFICACY AND SAFETY OF PERITONEAL DIALYSIS IN NEONATES PRESENTING WITH HYPERAMMONEMIA DUE TO INBORN ERRORS OF METABOLISM: A PRELIMINARY STUDY

M. Çelik1, N. Özgün2, O. Akdeniz3, H. Tuzun4, O. Iyi5, S. Conkar6, Y. Colakoglu6, A. Bulbul7, M.N. Ozbek8

1Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Neonatology, DIYARBAKIR, Turkey
2Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Child Neurology, DIYARBAKIR, Turkey
3Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Child Cardiology, DIYARBAKIR, Turkey
4Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Pediatric, DIYARBAKIR, Turkey
5Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Pediatric Surgery, DIYARBAKIR, Turkey
6Sisli Etfal Research Hospital, Neonatology, Istanbul, Turkey
7Diyarbakır Çocuk Hastanesi Diyarbakır Child Hospital, Child Endocrinology, DIYARBAKIR, Turkey

Background

To assess the effect of peritoneal dialysis (PD) on the kinetics of blood ammonia removal and on the short-term outcome in neonatal patients with inborn errors of metabolism.

Objectives

The blood ammonia level at admission was 2.705 (672–9.330 mg/dl). There was no statistically significant difference between the patients who eventually died (group II) and those who survived (group I). Urea cycle defects (UCDs) were diagnosed in eight patients, and organic acidemia (OA) in six patients. Compared to from the baseline level measured at admission to the ammonia level 12, 24, 48, and 72 h after admission was lower in group II than in group I patients (p=0.028, p=0.041, p=0.02, and p=0.003, respectively). A < 60.79% decline in the ammonia level from the baseline to 12 h post-admission carried a 3.33-fold higher risk of mortality compared to a decline > 60.79%. The mortality risk was 8.33-fold (0.63–90.86) higher for patients with UCD than for those with OA.

Methods

Methods: Fourteen neonates presenting with hyperammonemia and treated with PD were evaluated retrospectively.

Conclusions/Results

Although the rate of ammonia removal was related to the risk of mortality, the underlying etiology was the main factor.

References (if needed)
THE EFFECTS OF TWO DIFFERENT LIPID PREPERATIONS ON ANTIOXIDANT ENZYMES AND LIPID PEROXIDATION AND MORBIDITY OF PREMATURE NEWBORNS

H. Yapıcıoğlu Yıldızdaş1, B. Poyraz2, G. Atlı3, Y. Sertdemir4, K. Mert5, F. Ozu1, M. Akcalı1, M. Satar1
1Çukurova University, NEONATOLOGY, ADANA, Turkey
2Çukurova University, Pediatrics, ADANA, Turkey
3Çukurova University, Fisheries, ADANA, Turkey
4Çukurova University, Biostatistics, ADANA, Turkey
5Adana Numune Teaching Hospital, neonatology, Adana, Turkey

Background

Premature infants are at risk of oxidant injury. Increased oxygen radicals are supposed to play an important role in oxidative injury of lipids, and several morbidities such as IVH, NEC, BPD and ROP are thought to be ‘oxygen radical diseases’

Objectives

In this study, we aimed to investigate the effects of two different lipid preparations on antioxidant enzymes, lipid peroxidation and morbidity of preterm babies

Methods

We enrolled the preterm babies ≤32 gestational weeks age and/or ≤1500 g who were given lipid preparation in the first day of life and continued at least 7 days. The patients were enrolled to SMOF and olive oil/soybean oil lipid (OS) lipid groups randomly. Oxidant and antioxidant levels in the first day of life, in the 7th day of lipid use and in the 28th day of life.

Conclusions/Results

There were 34 patients in the SMOF lipid group and 28 patients in OS lipid groups. Newborns in SMOF lipid group gained their birth weight earlier (p=0.023). Catalase, SOD and GPx levels were similar in both groups in the first day of life (p>0.05), however TBARS level was higher in OS lipid group (p=0.014). On the 28th day of life, TBARS, GPx and CAT levels of groups were not significantly different, SOD level of OS lipid group was higher (p=0.021).

SMOF lipid emulsions and olive oil-soybean oil emulsions seem to be safe and well tolerated in preterm babies. Except for cholestasis, they have similar effects on lipid peroxidation and on morbidities in the early period.

References (if needed)
METABOLISM, ENDOCRINOLOGY AND NUTRITION part 2

ESPN7-0502

TRANSLOCATION OF GENE 9P,18Q IN A NEONATE WITH CENTRAL DIABETES INSIPIDUS

B. Paturi¹, K. Brokus², M. Hussain³

¹Our Lady Of Lourdes Hospital Drogheda Co. Louth, Paediatrics, Drogheda, Ireland
²University of Scranton- Scranton- PA, Paediatrics, Scranton, USA
³HSE Wexford, Paediatrics, Wexford, Ireland

Background

Baby boy X was born to a thirty-eight-year-old G3P1021 female at 39¹/² weeks gestational age

Pertinent physical exam findings include a birth weight of 2.92 kg, head circumference of 34cm, low set ears, a large sagittal suture with communicating anterior fontanelle and posterior fontanelle measured approximately 3x4cm, micrognathia, short neck, nuchal fat pad, bulging 7 cm mass in right epigastric region, rectus abdominus muscles palpated laterally, but rectus sheath not appreciated medially, palpable spleen, undescended testes bilaterally, contractures at proximal interphalangeal joints bilaterally, clinodactyly, short femurs, and small feet.

Objectives

To find out etiology of increased sodium levels with abnormal dysmorphic facial features

Methods

We determined that the cause of the patient’s hypernatremia was likely secondary to diabetes insipidus (DI). A desmopressin challenge test was ordered to determine if the patient’s DI was central or nephrogenic. One dose of desmopressin (DDAVP 60mg) corrected his urine specific gravity to within normal rage. Thus, we concluded that his ADH receptors at the level of the nephron were functioning properly, and his DI was central in etiology. Baby boy X will require synthetic ADH for the rest of his life.

Conclusions/Results

This conclusion is consistent with a larger pool of data correlating this genetic defect with panhypopituitarism. We continue to learn more from the case of baby boy X with close follow-up care. This case supports the indication for karyotyping future neonates with similar physical and laboratory findings.

References (if needed)

ALIMENTATION PATTERN IN YOUNG CHILDREN. ANYTHING LEFT TO IMPROVE?
B.E. Popovici1, M. Mitrica2, F.P. Oana2
1, Brasov, Romania
2 Transilvania University- Faculty of Medicine, Pediatrics, Brasov, Romania

Background

Alimentation in childhood still is a challenge for pediatricians. Different diets had changed with time but some principles still remain as guide-light for a harmonious growth.

Objectives

The aim of our study was to evaluate the alimentation pattern for children aged between 5 and 10 years and the alimentary preferences.

Methods

We had performed a prospective study on children between 5-10 years. We had determined the body mass index (BMI) and a questionnaire regarding alimentation addressed to parents. The data collected were confidential and statistical processed. Our study group consisted of 510 children, it was balanced as gender and age. Regarding alimentation pattern: at age of 5 years all the children had already experienced fast food. Apparently between 6-9 years was the highest incidence of fast-food consumption. Until 5 years of age all children used to drink sweet beverages (often). Cereals were present in everyday alimentation with a tendency of decrease as increasing the age; the consumption of the fresh vegetables and fruits was constantly decreasing from 5-6 years to 8-10 years. Practicing sport habit in school or as a hobby was evaluated as “occasional”.

Conclusions/Results

The younger the children, the proper alimentary pattern but as the age rised the alimentary preferences straight to more “attractive” options as fast-food and sweet beverages. The children learn to choose the food that gives them pleasant sensations, which is sweet, tasteful, and not necessarily healthy. There was a connection between alimentary preferences, body mass index tendency as the age rised and with the habit of playing sport.

References (if needed)
Background

In developed countries, the prevalence of malnutrition in hospitalized children is 6 to 51%. Technical developments have contributed to the longer follow-up of children in the pediatric intensive care unit (PICU) where they are more susceptible to have malnutrition due to their severity of illness.

Objectives

We aimed to determine the malnutrition rates of patients admitted to our PICU and evaluate their nutritional status with anthropometric measurements and laboratory data within the guidance of Pediatric Nutritional Risk Score (PNRS).

Methods

All the patients admitted to our PICU between June and November 2016 were included in our study. Patients were divided into low-risk and high-risk groups according to their PRISM III scores and their anthropometric measurements and laboratory dates were assessed both in their first day in PICU and during their follow-ups. PNRS, Gomez and Waterlow scores were calculated.

Conclusions/Results

3 (% 32.4) patients were found to be in the high-risk group, whereas 69 (% 66.6) of them were in the low-risk group according to PRISM III scores. 4(3.9%) patients were found to be in the low-risk group, whereas 26(25.5%) of them were in moderate and 72(70.6%) of them were in the high-risk group according to PNRS. Patients with chronic malnutrition were found to have a longer hospital stay. In PICU patients the malnutrition risk should be determined and the patient-specific nutritional program should also be performed using risk scales of malnutrition in order to prevent mortality and morbidity associated to nutritional deficiency.

References (if needed)
METABOLISM, ENDOCRINOLOGY AND NUTRITION part 3

ESPN7-0108

BEDSIDE ELECTROMAGNETIC (EM) -GUIDED PLACEMENT OF POST-PYORIC ENTERAL FEEDING TUBES (PET) IN SMALL, CRITICALLY ILL INFANTS AND LOCATION-CONFIRMATION BY ULTRASOUND

R. Ulreich¹, M. Pocivalnik¹, C. Cimenti¹, S. Waldner¹, R. Siedgfried¹
¹Medical University of Graz, Department of pediatrics, Graz, Austria

Background

Appropriate, early enteral nutrition is considered a cornerstone in treating critically ill infants. However it’s implementation is frequently impeded by decreased gastric emptying secondary to the underlying disease or as a side effect of ICU treatments. Increasing data is getting available regarding EM placement of PET in children. However there is uncertainty concerning the feasibility and safety in small infants.

Objectives

We present our experience of EM PET placement as case series in order to show feasibility and safety of this technique in small infants. Moreover we would like to show accuracy of placement verification exclusively by ultrasound

Methods

We used bedside Corttrak, Enteral Access System. 11 placements in 6 patients median age 4 month (2-12) weight 6.3 kg (3.7- 8.3) were performed. All infants received prokinetics. Sedation was administered via nasal route only, except in 2 invasively ventilated patients. All children received 8 FR tubes. Median duration of the procedure was 20 minutes (2-60). Accuracy of placement was assessed by ultrasound. X-ray was reserved for routine scan due to other indications than placement verification. Placement was successful in 100% of patients. 1 patient experienced a mild episode of self-limited upper gastrointestinal tract bleeding

Conclusions/Results

Bedside placement of PET using EM- guidance is feasible, fast and safe in small infants. However smaller diameter tubes would be desirable as they are unavailable at the time of writing. Confirmation of location can be done by ultrasound in order to limit x-ray exposure

References (if needed)
PLASMA BICARBONATE MEASURES TOTAL METABOLIC ACIDAEMIA AND ALKALAEMIA IN CRITICALLY ILL CHILDREN - ALBUMIN AND PHOSPHATE CONTRIBUTE NEGLIGIBLY TO BUFFERING

B. Wilkins¹, V. Ward¹
¹Children's Hospital at Westmead, PICU, Westmead, Australia

Background

Plasma base excess (PBE), which takes into account buffering by albumin and phosphate as well as bicarbonate, is widely regarded as the most appropriate measure of total metabolic acid, though whole blood base excess (BE) continues to be widely used.

Objectives

We investigated whether plasma bicarbonate alone estimates PBE with sufficient accuracy in critically ill children in a mixed PICU.

Methods

Complete acid-base data-sets were collected retrospectively in 6712 acutely ill children within 3 hours of admission to PICU from a total of 11910 admissions over 10 years 2006-2015. pH, pCO₂, haemoglobin, oxygen saturation and electrolytes were measured by blood-gas analyser, magnesium, albumin and phosphate by standard laboratory methods, and bicarbonate and BE calculated. The contributions of albumin and phosphate to PBE were calculated using their known physicochemical properties.

Conclusions/Results

PBE ranged –26 to +28, BE –34 to +24 and bicarbonate 1 to 52 meq/L. Although phosphate and albumin ranged widely (phosphate 0.2-8.2 mmol/L, albumin 9-60 g/L) they contributed maximum 1.7 and 3 meq/L respectively to plasma buffering in addition to the effect of bicarbonate, the simplest and most accessible index of metabolic acid-base status. The combined effect was curvilinearly related to bicarbonate and was maximum 2 meq/L over bicarbonate range 12-54 meq/L, increasing to maximum 4 meq/L at extreme acidaemia with bicarbonate <5 meq/L. Bicarbonate underestimated PBE by these maximum amounts. Whole blood BE overestimated metabolic acid by maximum 12 meq/L at all bicarbonate levels. Albumin and phosphate contribute negligibly to buffering even in extreme acidaemia.

References (if needed)
MULTIPLE ORGAN FAILURE SYNDROME IN A SEVERE CASE OF ANOREXIA NERVOSA

A. Wolfler1, G. Izzo2, C. Corti3, R. Vergaro4, A. Camporesi1

1Children's Hospital Vittore Buzzi, Anesthesia and intensive care, Milan, Italy
2Children's Hospital Vittore Buzzi, Division of Radiology - Department of Pediatric Surgery, Milan, Italy
3Children's Hospital Vittore Buzzi, Division of Cardiology - Department of Pediatrics, Milan, Italy
4Children's Hospital Vittore Buzzi, Division of Neurology - Department of Pediatrics, Milan, Italy

Background

Anorexia nervosa (AN) is a serious and potentially life-threatening mental illness. Medical complications increase in incidence and severity proportionally with weight loss and malnutrition.

Objectives

We report a case of a fourteen years old girl affected by AN admitted to PICU with multiple organ failure.

Methods

GP, female, BMI 17.9 kg/m². At the age of thirteen she developed AN. She was transferred in PICU with severe asthenia, hypoglycaemia, comatose. On admission the patient had a multiorgan failure syndrome: mechanical ventilation (respiratory), unconsciousness (CNS), hypotension requiring inotropes (cardiac), prolonged coagulation time (hematologic), increased blood urea and liver enzymes (metabolic). She had no nutritional intake since 7-10 days, the estimated BMI was 9.8 kg/m² (weight 27.7 kg, height 168 cm).

Conclusions/Results

Life support therapies were started and maintained until recovery of vital organs. Clinical and instrumental monitoring of cerebral function with Nuclear magnetic resonance and electroencephalogram was made during PICU stay as well as echocardiographic assessment of the heart function. The child was transferred in to an psychiatric service on day 38. She was in good clinical status, awake, normal mental status. She started oral feeding and weight raised to 33.5 kg.

Conclusions. Complications due to prolonged starvation and malnutrition might affect every body system. Sustain of vital signs and refeeding should be started as soon as clinical manifestations of deranged metabolism are evident. Although same manifestations are severe and might be life-threatening, most of them are reversible when weight restoration starts.

References (if needed)
REFEEDING SYNDROME IN A SEVERE CASE OF ANOREXIA NERVOSA

A. Wolfler1, F. Penagini2, E. Zoia1, F. Izzo1, L. Iosca1, A. Camporesi1

1Children’s Hospital Vittore Buzzi, Anesthesia and intensive care, Milan, Italy
2Children’s Hospital Vittore Buzzi, Department of pediatrics, Milan, Italy

Background

Refeeding syndrome (RS) is a potentially life-threatening condition which may occur in patients affected by anorexia nervosa (AN). The causes of the RS are excess or unbalanced enteral, parenteral or oral nutritional intake. Prevention of the syndrome includes identification of individuals at risk, controlled hypocaloric nutritional intake and supplementary electrolyte replacement.

Objectives

To report a case of a child affected by AN complicated by multiple organ failure admitted in PICU with high risk of developing RS.

Methods

Parenteral nutrition (PN) was started on day one of PICU admission with an amount of 10 kcal/kg/day. Caloric intake was titrated slowly to avoid RS. The patient’s basal metabolism, estimated with Schofield’s equation was reached on day eight. PN was composed with a ratio between glucose intake and energy supply of 50% (range 44-56%). To prevent hypophosphatemia, phosphate was supplemented in PN with a dose of 0.2 mmol/kg. Moreover, to keep the phosphate level above 2.5 mg/dl a further iv integration was used with a dose ranging between 14 and 50 mmol/die. Enteral nutrition (EN) was added after five days through a NG tube. and within nine days we reached a caloric intake of 1000 kcal/die. EN was well tolerated without diarrhoea and gastric residuals.

Conclusions/Results

RS is one of the most feared medical complications in patients with prolonged starvation. Although a slow refeeding strategy, the risk of severe hypophosphatemia was still real and needed a strict daily electrolytes monitoring. Supplementation was essential and every time it was reduced, phosphatemia decreased. No other complications were observed.

References (if needed)
Background

Seizures are a common feature in meningitis of the infant. Amplitude-integrated EEG (aEEG) is a powerful device for continuous brain monitoring, increasingly used in NICUs in acute brain injury.

Objectives

In this preliminary study, we aimed to describe aEEG findings in the acute phase of meningitis, namely aEEG patterns, frequency of electro-clinical and electrical seizures, and to appreciate the quality of prolonged recordings in the PICU setting.

Methods

Over ten years, we retrospectively enrolled all children below one year of age hospitalized in our PICU for meningitis and monitored with aEEG in the acute phase. aEEG patterns, quality and duration of the traces, seizures were analyzed. Clinical data were extracted from patient’s medical chart.

Conclusions/Results

Twenty-five patients (sex ratio 1:1) were identified, mean age at admission was 47 days (SD ± 60). Mean duration of aEEG recordings was 99 hours (SD ± 83.21), with a good quality of trace for interpretation in more than 83% of the time. Eight patients presented seizures before hospitalization (32%), 52% presented seizures during aEEG recording, whose 10 patients (40%) presented electrical seizures detected by aEEG only.

This preliminary study confirms that aEEG is quickly available, easy-to-use, and reliable over prolonged recordings in PICU setting. Along to clinical observation and sporadic standard EEG (when available) it is a promising tool for continuous monitoring in the acute phase of meningitis in PICUs.

References (if needed)
ROLE OF PLASMAPHERESIS IN AUTOIMMUNE ENCEPHALITIDES: WORTH TO TRY ANYWAY?

A. Camporesi1, A. Wolfier2, F. Izzo1, R. Di Rosso1, L. Iosca1

1Children Hospital Vittore Buzzi, Paediatric Anaesthesia and Intensive Care, Milano, Italy
2Children Hospital Vittore Buzzi, Paediatric Anaesthesia and intensive care, Milano, Italy

Background

Use of plasmapheresis in the management of autoimmune encephalitides is increasingly spreading due to the relative ease of performance and low risks connected with the procedures in face of good results. It is not a first line treatment but recent reviews strongly support its use when other therapies fail. The diagnosis of autoimmune encephalitis is also a challenge since we still don’t know all the possible autoantibodies produced.

Objectives

To describe the role of plasmapheresis as adjunct therapy in probable autoimmune encephalitides.

Methods

We describe two cases of probable autoimmune encephalitis, with different clinical aspect (first case, 9-yr-old boy with acute loss of consciousness, quick development of cerebral edema; no clinical improvement even after edema resolution, never seizures, grey and white matter damages at MRI; second case, 5-yr-old boy with multiform seizures of difficult control until need of barbituric coma, lesions in the pulvinar and caudatum). Both children had signs of intratecal production of antibodies, for both no pathogen and no autoantibody were found. Both were treated with high dose methylprednisolone and IVIG with no clinical improvement and then with 7 sessions of plasmapheresis: first child with no improvement, second child with complete recovery.

Conclusions/Results

Suspicion index for autoimmune encephalitides must be kept high when clinical features, although proteiform, are compatible, even in the absence of a defined MRI o biochemical parameter. Immunosuppressive therapy in different steps can control the production of the autoantibody and plasmapheresis can help remove circulating immunoglobulins or inflammatory mediators.

References (if needed)
NEURO CRITICAL CARE part 1

ESPN7-0269

CHANGES IN SERUM SODIUM CONCENTRATION MAY COMPLICATE THE OUTCOME OF PATIENTS WITH TRAUMATIC BRAIN INJURY

K. Costa¹, S. Muniz Pereira², R. Tristão², J.A. Lacerda de Jesus²

¹Brasília, Brazil
²Universidade de Brasília, Pediatrics, Brasília, Brazil

Background

Changes in serum sodium concentration may complicate the outcome of patients with traumatic brain injury (TBI).

Objectives

To evaluate the relationship between hypernatremia and outcome of children with TBI.

Methods

Retrospective study from January 2013 to December 2015, involving patients with severe TBI (Glasgow Coma Score ≤ 8) admitted to pediatric ICU. Clinical, epidemiological and laboratory parameters, CT scan findings, in-hospital, 30-day and 6-month outcome were evaluated. We used the statistical tests: Student T Test, Analysis of Variance and Pearson correlation. A value of p <0.05 was considered significant.

Conclusions/Results

A total of 57 patients were evaluated. Mortality was 19.3% and 14% progressed to brain death. Mannitol was used in 64.9% of the children and the hypertonic saline in 28.1% of the patients. The sodium value presented a positive correlation with the value of intracranial pressure (0.74) on the second day of hospitalization. There was no correlation between the sodium value and the water balance or diuresis. Patients who presented hypernatremia (mean) (Na> 150 meq / L) on the second day of admission to the PICU presented higher mortality: intrahospital, with 30 days and 6 months of evolution, with p = 0.001; P = 0.006; P = 0.007 respectively. Patients with hypernatremia (mean) in the second (153 mEq / L) and fourth day (163 mEq / L) in the PICU presented more brain death (p <0.01). Hypernatremia may be associated with increased mortality in the pediatric patient with TBI.

References (if needed)
SUCCESSFUL MECHANICAL THROMBECTOMY IN AN 8-YEAR-OLD MALE WITH ISCHEMIC STROKE DUE TO NEPHROTIC SYNDROME

A. Perez¹, A.S. Guilbert¹, N. Mura¹, V. Wolff², O. Gebus³, R. Beaujeux⁴, C. Dheu⁵, V. Laugel⁶
¹Hopitaux Universitaires de Strasbourg, PICU, Strasbourg, France
²Hopitaux Universitaires de Strasbourg, Neurovascular Unit- Department of Neurology, Strasbourg, France
³Hopitaux Universitaires de Strasbourg, Department of Neurology, Strasbourg, France
⁴Hopitaux Universitaires de Strasbourg, Endovascular interventional radiology, Strasbourg, France
⁵Hopitaux Civils de Colmar, Department of pediatry, Colmar, France
⁶Hopitaux Universitaires de Strasbourg, Department of Pediatry, Strasbourg, France

Background

Pediatric ischemic stroke is not common, but is associated with important sequels that impact on psychomotor development. Current treatment guidelines do not recommend thrombolytic therapy in children due to the absence of controlled trials of treatment in acute childhood stroke.

Objectives

We report the case of an 8-year-old boy who was treated for steroid-dependant nephrotic syndrome. While he was relapsed for 10 days, sudden severe left-sided weakness and speech difficulty appeared. The National Institute of Health Stroke Scale (NIHSS) score was calculated at 6. An MRI revealed an acute ischemic infarction of the right internal capsule and an occlusion of the middle cerebral artery in the segment M1. No clinical improvement was seen after the administration of intravenous thrombolysis. Mechanical thrombectomy with aspiration and stenting resulted in successful recanalization and clinical recovery. The next day, he developed severe right foot pain and cyanosis. A computed tomography angiogram revealed occlusion of the right anterior tibial artery and tibial-fibular trunk, and occlusion of the left anterior tibial, posterior tibial and fibular arteries. The symptoms resolved completely after heparinization and treatment with nicardipine. At discharge, NIHSS score was 0.

Methods

case report

Conclusions/Results

Nephrotic syndrome induces a hypercoagulability that can be a trigger for arterial and venous thrombotic events. However, the association of stroke and nephrotic syndrome is rare. Our case outlines that, although thrombolysis and mechanical thrombectomy are not recommended in pediatric stroke, it should be considered after discussion with neurologists, pediatric neurologists and interventional radiologists.

References (if needed)
COMPARISON OF OCULAR NERVE SHEATH DIAMETER MEASURED WITH ULTRASONOGRAPHY AND COMPUTED TOMOGRAPHY IN INTUBATED PEDIATRIC INTENSIVE CARE UNIT PATIENTS

B. Dadi¹, M.N. Ozturk¹, F. Girgin¹, R. Asadov², G. Ekinci², E. Uyar¹
¹Marmara University, Pediatrics, Istanbul, Turkey
²Marmara University, Radiology, Istanbul, Turkey

Background

Optic nerve sheath diameter (ONSD) is a useful tool to predict increased intracranial pressure. Computerized Tomography (CT) is the gold standard for measurement of ONSD. Recent studies suggest that ultrasonography may be an accurate, non-invasive and cheap alternative.

Objectives

Our objective was to investigate whether USG measurement correlate with CT measurements in intubated ICU patients.

Methods

This study was held in Marmara University Pediatric Intensive Care Unit (PICU) between 10.09.2016 and 05.01.2017. All intubated patients with a cranial CT were included. An optic nerve USG was performed by a single investigator (trained pediatric resident) as soon as possible after a CT scan was obtained. CT ONSDs were measured by a neuroradiologist. Data obtained from US and CT scans were compared.

Conclusions/Results

31 patients were included mean age 4.87 (95% CI: 3.02-6.72), 14 (48.3%) were male. Mean ONSD of the right eye in US and CT were 4.51 ± 0.71 (95% CI: 4.24 – 4.78) and 4.57 ± 0.65 (95% CI: 4.33 – 4.81) respectively. For US mean ONSD on the left was 4.47 ± 0.71 (95% CI: 4.20 – 4.77) while it was 4.44 ± 0.62 (95% CI: 4.21 – 4.67) for CT.

There was no difference in mean measurements (p>0.05), but the correlation of US and CT for right and left ONSD was poor (r=0.243, p=0.203 and r=0.188, p=0.318 respectively)

Poor correlation of measurements could be related to differences in timing of scans and positioning.

References (if needed)
Background:

Hypothalamic-pituitary axis failure contributes to metabolic and hemodynamic instabilities in brain death patients, but data regarding hormonal levels is vague.

Objectives

The objective of this study was to investigate the hormonal status in BD pediatric patients.

Methods

Material and method: Retrospective descriptive study

Setting: Tertiary PICU (Marmara University Pediatric Critical Care Unit)

Information obtained from Brain Death database (2012-2016)

Eligible patients were children with available hormone levels (ACTH, Cortisol, TSH) at the time of BD declaration. The blood samples were obtained at 6 am.

Conclusions/Results

Results and Conclusion:

Nine patients out of 29 screened patients had blood levels of hormones. Mean age was 3.8 years (1-12 yrs). All patients were on inotropic support due to hemodynamic instability. One third of them had developed Diabetes insipidus, and treated with desmopressin.

ACTH levels were within normal range between 1.0-9.98 pmol/L (mean 4.2 pmol/L) Cortisol levels ranged between 149.81-772.52 nmol/L (mean 295.38 nmol/L). Mean TSH was 1.17 microU/ml (SD 1.35) and four patients had low levels.

Cortisol and ACTH levels were within normal laboratory range in our BD patients.

There is a need for extensive studies of hormonal profile for better understanding the pathophysiologic process in BD patients.
References (if needed)
METABOLIC PERTURBATIONS ARE ASSOCIATED WITH WHITE MATTER MICROSTRUCTURAL INJURY IN NEONATAL ENCEPHALOPATHY

P. Lally¹, P. Montaldo¹, V. Oliveira¹, S. Thayil¹
¹Imperial College London, Centre for Perinatal Neuroscience, London, United Kingdom

Background

Unlike fractional anisotropy, Neurite Orientation Dispersion and Density Imaging (NODDI) links diffusion magnetic resonance imaging (dMRI) data to the volume of the neurite (neuron + dendrite) tissue compartment (intracellular volume fraction, ICVF) and neurite orientation dispersion index (ODI), thus providing new insight into neuronal organisation and structure.

Objectives

To evaluate changes in white matter microstructure associated with an increasing severity of metabolic injury in neonatal encephalopathy.

Methods

We acquired whole brain dMRI and thalamic ¹H magnetic resonance spectroscopy (MRS) in 20 encephalopathic infants (aged 4-12 d) who had cooling therapy, and post-processed the data using DTITK/FSL/MATLAB and LCModel respectively. Using tract-based spatial statistics, fitted NODDI and diffusion tensor parameters were regressed against lactate/N-acetyl aspartate (Lac/NAA) ratio, including gestational age and postnatal age as additional covariates.

Conclusions/Results

Both ICVF and ODI showed significant increases across the white matter with increasing metabolic injury (measured by Lac/NAA), which explain the significant decreases in fractional anisotropy (Figure 1). These underlying changes are consistent with worsening cytotoxic oedema in more severe metabolic injury.
Figure 1: Skeletonised maps displaying regions of significant correlation between each dMRI parameter and the severity of metabolic injury measured by Lac/NAA (red-yellow).

**Conclusion**
In cerebral white matter, an increasing severity of metabolic injury is associated with worsening cytotoxic oedema, as explained by the NODDI model.

**References (if needed)**
LONGITUDINAL EXTENSIVE TRANSVERSE MYELITIS – A DIAGNOSTIC AND THERAPEUTIC CHALLENGE

E. Matos¹, C. Escobar¹, M. Moniz¹, P. Nunes¹, C. Abadesso¹, H. Loureiro¹, C. Luis², A. Cadete³, L. Fonseca³
¹Hospital Prof Dr Fernando Fonseca, Pediatric Intensive Care Unit – Department of Pediatrics, Amadora, Portugal
²Hospital Prof Dr Fernando Fonseca, Neuropediatrics consultant – Department of Pediatrics, Amadora, Portugal
³Hospital Prof Dr Fernando Fonseca, Physical medicine and rehabilitation – Department of Pediatrics, Amadora, Portugal

Background

Neuromyelitis optica spectrum disorders (NMOSD) are inflammatory disorders of the central nervous system characterized by severe, immune-mediated demyelination and axonal damage predominantly targeting optic nerves and spinal cord.

Objectives

Case report: 11-year-old boy, presenting at the ER on the fourth day of fever, headache and vomiting, with stiff neck on examination. The CSF showed mononuclear pleocytosis (130 cells/mm³), proteins 170mg/dl, glucose 41mg/dL. Viral meningitis was assumed.

In D2 he developed bladder dysfunction and progressive ascendant sensory loss. The brain and spinal cord MRI showed extensive myelitis. Broad-spectrum antibiotics and immunoglobulin were started. Neurologic symptoms continued to progress with tetraparesis, sensory loss, respiratory failure and dysautonomia. Fundoscopy on D5, with bilateral optic papilitis. MRI was repeated on D8 and showed progression of the lesions and involvement of the optic nerve, aspects suggesting NMOSD. High dose corticoids, followed by therapeutic plasma exchange (TPE) were started up to a total of 7 sessions. Gradually there was some recovery of neurologic functions and a second cycle of TPE is being performed. The aquaporin-4 antibodies were negative and infectious and other autoimmune causes were excluded.

Methods


Conclusions/Results

Conclusions: It is essential to raise awareness of pediatric-onset NMOSD and its presenting features. Initial seronegative results for aquaporin-4 antibodies shouldn’t discourage an NMOSD diagnosis. Nevertheless, the clinical and imagiological picture should prompt an early diagnosis to allow early immunosuppressive therapeutic, the key to improve the outcome.

References (if needed)
Background

Amplitude integrated EEG (aEEG) is a non-invasive method of continuously monitoring cerebral background activity at the bedside, which can be interpreted by non-neurologists. I would like to present 3 clinical cases supporting its wide and varied uses.

Objectives

To demonstrate the utility of bedside brain monitoring and how it can enhance patient care.

Methods

aEEG was applied in the following case scenarios to obtain information regarding the underlying neurological state of each child.

Case 1: A 2 year old girl with urosepsis was monitored with aEEG post cardiac arrest. Initially her trace showed good variability. Whilst monitored, she exhibited a transient period of haemodynamic instability, which resolved spontaneously. Following this, her aEEG became isoelectric and a CT brain confirmed brain stem herniation. Clinically this was unremarkable except for aEEG changes.

Case 2: In a 13 year old boy admitted with fever induced refractory epilepsy syndrome (FIRES), aEEG allowed us to monitor treatments used to control his seizure activity. Our aim was to achieve burst suppression and minimize seizure related brain injury.

Case 3: A 15 year old girl was diagnosed with group B meningococcal meningitis. Whilst still intubated and sedated on day 3 she became hypertensive and bradycardic, creating concerns of raised ICP and brainstem herniation. aEEG was applied which showed no evidence of isoelectricity, and no evidence of herniation was seen on CT.

Conclusions/Results

Studies in neonates support the use of aEEG and as demonstrated above the benefits of aEEG could be expanded to paediatric and adult practice with the development of validated algorithms.
SMALL FLUCTUATION OF SERUM SODIUM LEVELS ARE ASSOCIATED WITH POOR OUTCOME IN NON-TRAUMATIC COMA IN A PEDIATRIC INTENSIVE CARE UNIT

R. Rameshkumar1, A. Gupta1, S. Mahadevan1
1Jawaharlal Institute of Postgraduate Medical Education and Research JIPMER, Pediatrics, Puducherry, India

Background

Target serum sodium in children with acute brain injury and outcome have been studied in traumatic coma and data on non-traumatic coma limited.

Objectives

To study the association of dysnatremia fluctuation and outcome (mortality or severe neurodisability) in pediatric non-traumatic coma.

Methods

Prospective observational study was conducted in 19 bedded-PICU of a tertiary care institute from September 2015 to June 2016. Eighty children aged <13-year with acute (history <7-day) non-traumatic coma (modified-GCS score ≤8 or fall of ≥3 from baseline) were included. The patient received intravenous fluid for >24-hour and developmental delay was excluded. Patients were managed with initial 0.9%-saline±5%dextrose and 3%-saline as per treating team discretion. The trend of serum sodium in first 72-hour, PICU stay, and mortality, functional status by pediatric cerebral performance category and etiological profile were collected. Sodium levels were compared with survived (n=54) vs poor-outcome (n=26) (mortality, n=24 or severe neurodisability, n=2).

Conclusions/Results

Median (IQR) age, PRISM-III and m-GCS in survived and poor outcome were 12 (3-74) vs. 33 (9-87) months (p=0.19), 17 (15-19) vs. 18 (18-22) (p=0.01) and 9 (8-11) vs.8 (6-11) (p=0.40).Etiology was acute CNS infections (30%) followed by intracranial bleed (11%) and hepatic-encephalopathy (8%). Mean(±SEM) trend of serum sodium was higher in poor-outcome (143.1±1.4) as compared to survived (140±1) (Greenhouse-Geisserp=0.03) with a difference of fluctuation was 2.6 (95% CI -0.8to6) (severity adjusted 1.7 (95% CI -1.7to5.2). No difference in PICU stay in survived and poor outcome (8, 5-11 vs.7, 4-12 days, p=0.62).Conclusions:Small fluctuation of serum sodium levels are associated with poor outcome in pediatric non-traumatic coma.

References (if needed)
DOES THE NOCICEPTIVE SPINAL REFLEX EXPLAIN THE LACK OF CORRELATION BETWEEN THE OBSERVATIONAL AND PHYSIOLOGICAL PAIN ASSESSMENT SCORES IN NEONATES?

H. Storm

Simulation Center, Acute Clinic- University of Oslo, Oslo, Norway

Background

In the US it is mandatory to assess and treat pain. UK, The Netherlands, Italy, France and Russia are also establishing similar guidelines. Physiological, behavioural, and biochemical tools have been used for pain assessment in neonates but no gold standard is yet available.

Objectives

To examine why the findings from behavioural and physiological responses during painful responses have been reported to be either uncorrelated or weakly correlated (Stevens et al 1994; Nurs Res, 43, 226-231, Johnston et al 1995; Pain, 61, 471-9, Barr et al 1998; Arch Dis Child Fetal Neonatal Ed, 79, 152-56).

Methods

To theoretical compare the anatomical nociceptive spinal reflex to both the behavioural pain scores and the physiological pain assessment tools to understand why these pain assessment methods are uncorrelated. The reasons may be multiple; the caregiver may interpret the behavioural responses differently, and the behavioural responses may be less reactive in very ill patients, small-for-gestational age infants, and different for infants who have been exposed to severe and repetitive painful insults. Sedatives may blur the behavioural pain response. Pain observational assessment tools assess modulated responses from the cortico-cortical circuits will be influenced from factors as illness of the infants, and inter-variability between the observers, different from pain assessment tools which assess responses from the nociceptive spinal reflex level. The physiological pain assessment tools may be more accurate to assess the size of the nociceptive stimulus.
Conclusions/Results

The physiological pain assessment tools may be more accurate to assess the size of the nociceptive stimulus.

References (if needed)
A RARE CASE OF CONCURRENCE OF MULTIFORM GLIOBLASTOMA AND RECTAL ADENOCARCINOMA IN A CHILD WITH NEUROFIBROMATOSIS

M. Svirkos¹, K. Papadimos¹, O. Vrani¹, E. Samkinidou¹, E. Chohliourou¹, M. Sdougka¹
¹“Hippokrateion” General Hospital, P.I.C.U., Thessaloniki, Greece

Background

Neurofibromatosis (NF) can affect multiple organ systems including gastrointestinal tract. There are few reports in the literature describing metachronous appearance of rectal adenocarcinoma but no reports of simultaneous occurrence of multiform glioblastoma and rectal adenocarcinoma in children with NF.

Objectives

An extremely rare case report of simultaneous occurrence of multiform glioblastoma and rectal adenocarcinoma in a child with NF.

Methods

A 12 year old female with a history of NF presented rapidly evolving multiform glioblastoma in the posterior cranial fossa. Approximately 80% of the tumor was surgically removed with significant residual neurologic sequelae. A 5 days treatment with temozolomide (Temodal®) was administered.

The same period diarrhea and haematochezia occurred. She was admitted in order to be evaluated but she suffered extensive thrombosis of the femoral and iliac veins. Despite the anticoagulant therapy massive pulmonary embolism was also occurred, demonstrated in MD/CT imaging. At the same time abdominal CT demonstrated a sizable exophytic tumor mass in the rectum 4-5 cm above the pectinate line and multiple metastatic infiltrations of the liver parenchyma. This finding explained the abovementioned haematochezia.

A palliative rectosigmoidectomy was performed and the biopsy findings advocated rectal adenocarcinoma moderately differentiated, with mucus secretion below 30% of the tumor volume. She was transferred to P.I.C.U. for post-operative care and she died of multi-organ dysfunction after 19 days. Conclusions/Results

Simultaneous occurrence of multiform glioblastoma and rectal adenocarcinoma in children with NF is very uncommon.

References (if needed)
Simultaneous Acute Disseminated Encephalomyelitis and Guillain-Barré Syndrome in a Six Year Old Child After Viral Infection

M. Svirkos¹, P. Mantzaferi¹, E. Chohliourou¹, S. Kalamitsou¹, A. Kassimis¹, A. Violaki¹, E. Volakli¹, M. Sdougka¹
¹"Hippokrateion" Hospital, P.I.C.U., Thessaloniki, Greece

Background

Acute disseminated encephalomyelitis (ADEM) and Guillain-Barré syndrome (GBS) are distinct immune-mediated demyelinating disorders usually due to viral infection or vaccination. Only few cases presenting with simultaneous development of ADEM and GBS have been described to date.

Objectives

A rare case report of simultaneous development of ADEM and GBS in a child after viral infection.

Methods

A 6 year old female presented initially with ear and abdominal pain. Three days after, acute flaccid quadriaparesis and generalized areflexia occurred. The MRI evaluation of CNS revealed lesions compatible to ADEM. Pulse therapy with methylprednisolone was administered. Despite the provided treatment, progressive respiratory distress occurred, which resulted to patient's intubation and mechanical ventilation. The typical ascending progression of symptoms amended the diagnosis to “Concurrent ADEM and GBS” and γ-globulin was added to the treatment. Subsequent MRI imaging of CNS demonstrated multifocal aggravated lesions in the pons and the spinal cord. Electromyography revealed severe motor neuronopathy in the upper and lower extremities. In total, pulse therapy with methylprednisolone was administered 3 times and γ-globulin was repeated 4 times. Because of no response the patient underwent 6 plasma exchange sessions with no effect. Six months after admission, the child was transferred to a pediatrician clinic with no neurological signs from the head and cervix, but still with minimal improvement of the flaccid quadriaparesis, mechanically ventilated through a tracheostomy by a portable ventilator. Until today, there has been minimal improvement below the cervix.

Conclusions/Results

Concurrent ADEM and GBS is a rare entity presenting with severe and refractory neurological morbidity.

References (if needed)
DIFFUSE AXONAL INJURY IN PEDIATRIC HEAD TRAUMA, CAN WE PREDICT OUTCOME?
A.F. Yetimakman¹, R. Gocmen², B. Konuskan³, S. Kesici⁴, B. Bayrakci¹
¹Hacettepe University Faculty of Medicine, Pediatric Intensive Care, Ankara, Turkey
²Hacettepe University Faculty of Medicine, Radiology, Ankara, Turkey
³Hacettepe University Faculty of Medicine, Pediatric Neurology, Ankara, Turkey
⁴Dr Sami Ulus Maternity and Children's Training and Research Hospital, Pediatric Intensive Care, Ankara, Turkey

Background

Diffuse axonal injury (DAI) is among the various types of brain damage which complicate moderate to severe head trauma in pediatric patients. It causes neurocognitive sequel which may result in long term disability and need of rehabilitation. It is prognosis though, is not uniform.

Objectives

The aim of our study was to define demographics and relationship of outcome in diffuse axonal injury in pediatric patients with clinical and radiological parameters in order to design future prospective studies of therapeutic interventions.

Methods

Thirty nine children were included, who were suspected to have DAI after moderate or severe head trauma. All of the children had brain MRIs revealing the presence of DAI lesions or ruling them out. The number and distribution of lesions were documented for each patient as well as clinical and laboratory parameters. The relationship between GOS(Glasgow outcome Scale) and clinical, laboratory and radiological parameters were studied in the DAI(+) group. Neurocognitive tests are planned to be carried out in outpatient clinic for the second part of our study.

Conclusions/Results

Presence of DAI was related to diminished Glasgow Coma Scale (GCS) upon admission, GOS on discharge; increased PRISM scores and days of hospital stay. While lesions in some regions of brain are related to worse GCS; only GCS and PRISM, among the evaluated clinical or radiological parameters, are found to affect GOS in this patient group. Research should focus on the relationship of these parameters to the results of detailed neurocognitive outcome evaluation and follow up.

References (If needed)
NURSING SCIENCE GROUP

ESPN7-0476

THE ORAL FEEDING METHODS OF THE PRETERM INFANTS IMPROVEMENT OF QUALITY ON NURSING PRACTICES

A.L. Brantes¹, M.A. Curado¹, P. Pereira²
¹Escola Superior de Enfermagem de Lisboa, Pediatria, Lisboa, Portugal
²Hospital de Cascais, Pediatria, Cascais, Portugal

Background

The nursing decision of oral feeding method, should be based on factors such as the wish of mother to breastfeed, the corrected age, weight and feeding behaviors. But, in practice, we verified decisions based on opinion and beliefs of the nurses. Although there are numerous published feeding protocols, and therefore the nurses have different knowledge of feeding methods, but not always applied them correctly. Although there is continued use of trial-and-error approaches to oral feeding. The infants may fail to develop nutritive sucking skills or they may develop inappropriate oral feeding responses.

Objectives

observe the nursing practices and identify the difficulties on oral feeding methods (cup, bottle, finger-feeding) of the preterm infants in neonatal unit.

Methods

The study was developed with a qualitative approach, using two technics of data collection, observation and semi-structured interview. 15 nurses (4 levels of expertise) was observed (videotape) during oral feeding. The study was approved by an institutional review board (parents and nurses gave informed written consent).

Conclusions/Results

Observation shows that cup and finger-feeding are not always applied by nurses. The first levels of nurses are insecure to use the cup and in generally the finger-feeding is an unknown practice. The bottle is the most applied method, but is not correctly applied, although the nurses do not recognize it. Nurses feel the need for training.

References (if needed)

Background

Currently, there is a crescent consciencialization towards the importance of nutricional management and the nursing role regarding feeding. Preterm infants are specially vuln erable to feeding dificulties, therefore, giving support during feeding should be a prioritary nursing care intervention. The acquisition of oral-motor competencies is considered one of the preterm infant’s milestones, as it leads to a safe, functional and pleasant feeding for the infant aswell as the parents (1, 2).

Oral-motor feeding competencies, involve the infants capacity to be interested phisiologaly and behaviourally, through oral-motricity organization, sucking and swallowing coordination, aswell as breathing and swallowing, while mantaining phisiological stability, and thus promoting an efficient caloric gain for an adequate growth and development.

Oral feeding involves complex decision making for nurses, in association with parents, specially regarding the feeding technique (2).

Objectives

Develop competencies for nurse specialist practice in health care of children and youth.

Develop a caring process in view of promoting the oral-motor competencies towards feeding of the preterm infant.

Methods

Critical in and on-action thinking about the practice and plan three research studies (observational study about practices of oral feeding, nursing training and a pilot study to evaluate bottle, cup and finger-feeding). After the evaluation of nursing training we begin a experimental study.

Conclusions/Results

The observational study under development and we are preparing the nursing training.

References (if needed)

1. Enfermagem de Reabilitação em Neonatologia Cuidados de Enfermagem de Reabilitação à Pessoa ao longo da vida.
2. Assessment of Infant Oral Sensorimotor and swallowing function. Mental Retardation and Developmental Disabilities
FACTORS THAT INFLUENCE EXCLUSIVE BREASTFEEDING IN PRETERM INFANT

L.S. Antunes¹, M.A.S. Curado²
¹ESEL, Pediatrics, Amadora, Portugal
²ESEL, Coordinator Professor-PhD, Lisboa, Portugal

Background

Preterm newborn experience several stages of feeding until it is possible for them to be breastfed, and the ideal moment to start oral feeding is not yet consensual.

Breastfeeding a preterm newborn can be difficult, and it becomes necessary to acquire knowledge in order to elaborate an individualized feeding plan that allows to define a safe time for each preterm newborn to initiate oral feeding, and that also compensates the immature feeding skills, promoting proper breast stimulation until breastfeeding is possible.

The ability to suckle is not developed at a well-defined gestational age, being related to multiple aspects of the preterm newborn, its mother and the clinical practice itself. Early oral feeding implies the ability of the preterm newborn to remain engaged with a task that is physiologically and behaviorally challenging but that will bring long-term benefits to their brain, body, and experienced development.

Objectives

Develop competencies for specialist nurse in health care of children; and develop a caring process in view of promote the Breastfeeding of the preterm infant.

Methods

Critical in and on-action thinking about the practice and plan the breastfeeding of preterm infant.

Conclusions/Results

In order to promote exclusive breastfeeding up to six months of life in preterm infants it is essential to develop strategies that include the evaluation and constant follow-up of breastfeeding.

References (if needed)

Background

The skills required to start oral feeding develop as the preterm newborn becomes hemodynamically stable and its corrected gestational age allows the coordination of breathing and swallowing with appropriate oro-motor functioning. It can vary from days to months, the length of time from the beginning of the oral feeding until it is fully established and complete, in order to allow an adequate intake of calories that favours the growth and the physiological stability of the preterm newborn. This transitional period must be adapted to the individual characteristics of each baby.

Objectives

To map the influencing factors of exclusive breastfeeding and their relation to early oral feeding.

Methods

The search strategy will aim to find both publish and unpublish English language studies. Search of CINAHL and MEDLINE, will be undertaken to identify and map articles, followed by analysis of the text words contained in the articles in the titles and abstracts. This scoping review only include relevant evidence to presente clinical practice published from 2010.

Inclusion Criteria: The current scoping review will consider studies that include newborn to 36+6 weeks of gestacional and corrected age, Hemodynamically stable, without neurological and anatomical orofacial problems.

Conclusions/Results

The development of specific interventions will make it possible to overcome the challenges that may arise in the promotion and protection of breastfeeding in this specific population.

References (if needed)
Background

Infants born before 37 weeks’ gestation are considered to be premature. Discharge from hospital to home generally proves to be a difficult transition for parents, since it is a learning and adaptation process. Ensuring that parents feel adequately prepared to take their infant home from the NICU may be important for achieving positive health outcomes for infants and their parents.

Objectives

The objectives are i) to identify what parents need to feel ready for the discharge of their infant from the NICU; ii) to understand the level of satisfaction of preterm infants parents’ that they were discharged from the neonatal unit, regarding the parental education performed by the nurses during hospitalization; iii) to understand the content of parental education was performed to the parents by the nurses during the hospitalization; iv) to understand the number, duration, and reasons for rehospitalisation; and iv) to relate the sociodemographic characteristics of the parents and the newborn to the perception of the information provided by the nurses regarding parental education.

Methods

It is a prospective study in a quantitative paradigm. A questionnaire by telephone will be conducted to preterm infants’ parents, based on the pertinenence and usefulness of the information provided by the nurses during hospitalization.

Conclusions/Results

At the moment the research is still in progress, but we expect to present data at the conference in June. This topic is of major interest to all nurses who often have to deal with issues regarding needs of parents of preterm infants about transition to home.

References (If needed)
Background

Caring for an infant with colic can be very difficult for parents, due to excessive agitation and crying. Health care professional may be required in order to recognize their signs and possible relief measures.

Objectives

This study reviewed the management of pharmacological and non-pharmacological techniques about infant colic described in the literature.

Methods

A methodological study based on an integrative review conducted in the PubMed, Lilacs and Scielo databases.

Conclusions/Results

A total of 196 articles were identified. The sample was consisted of 15 articles, after applying the inclusion and exclusion criteria. Among the non-pharmacological measures for colic management, the interventions found were: changes in the maternal diet and behavioral aspect of the family, organization of the infant, reduction of environmental stressors. Touching and use of a vibrating cradle were found as well. As pharmacological measures were included the use of probiotics and medications such as Simethicone, Diclomine Hydrochloride, and Cimetropium Bromide. CONCLUSION: Using scientific evidence in the management of infant colic is an important key to advanced health in the nursing practices.

References (if needed)
Background

The newborn’s skin surface has particularities that differ in some characteristics from adults. Diaper dermatitis occurs regularly and can be one of the most common dermatological problems in infants.

Objectives

The objective of this study was to identify and summarize clinical data on the care of the newborn’s skin for prevention of diaper dermatitis.

Methods

Literature review conducted in indexed publications identified via electronic databases between 2012 and 2016 in English, Portuguese or Spanish. In total, 30 articles were identified and 15 included within the final review.

Conclusions/Results

The studies showed that the elevated skin pH is one of the most important risk factor. The treatment consists mainly of prevention, decreasing humidity and assuring the pH maintenance. Cleaning without friction and constant diaper changing, as well as the use of products with a similar skin pH are useful interventions. The use of barriers creams such as zinc oxide, lanolin, petrolatum and creams including vitamin A & D ointment for skin conditioning are recommended. Some studies demonstrate the efficacy of topical use of dexpanthenol, witch hazel water, human milk and calendula officinalis. In specific cases, preparations with cholestyramine and guiazulene can be an efficacious treatment. CONCLUSION: More research should focus on the prevention and treatment of diaper dermatitis and a proper prevention technique is the best action.

References (if needed)
NEEDS OF FAMILIES IN THE CARE OF THE NEWBORN WITH GASTROSTOMY AT NICU: AN INTEGRATIVE REVIEW OF THE LITERATURE

F. Simphronio Balbino¹, V. Crozatti L², E. Pontes Castro Duarte¹, A. Anacleto Santa Cruz Belela¹, M.A. Mandetta¹, M.M. Ferreira Gomes Balieiro¹

¹Escola Paulista De Enfermagem-universidade Federal De Sao Paulo, Department Of Pediatrics Nursing, Sao Paulo, Brazil
²Escola Paulista De Enfermagem-universidade Federal De Sao Paulo, Department Of Pediatric Nursing, Sao Paulo, Brazil

Background

Newborns have survived thanks to technological advances in neonatal intensive care units. In this scenario the gastrostomy indication is highlighted to guarantee nutritional support. The family needs to be involved in the decision-making process to authorize the realization, according to Family-Centered Care Model. However, it is necessary to recognize the family’s needs in order to propose strategies that will help them to cope with this situation.

Objectives

To identify the needs of the parents for the care of the newborn with gastrostomy.

Methods

Literature integrative review carried out in indexed databases Pubmed and Medline, applying keywords: family; neonatal nursing; gastrostomy; newborn intensive care unit, neonatal. The inclusion criteria adopted were: a research article published in English, Spanish and / or Portuguese, addressing the family experience in the management of the newborn with gastrostomy. Qualitative Content Analysis was adopted to conduct the analytical process. The sample consisted of 12 articles.

Conclusions/Results

From the analysis emerged five thematic categories: a) receive information about the procedure and the care of the newborn; B) be included in the decision-making process for gastrostomy; C) share experiences with other parents; D) have a family support network and; E) have institutional support after hospital discharge. Conclusion: the identification of family needs contributes to promote better care practices, with the family as a participant in the process. In this way, the nurse contributes with effective actions to promote the relief of the suffering of the family of the newborn with special care needs at home.

References (if needed)
A PROTOCOL FOR THE EVALUATION OF SUPERFICIAL VEINS OF NEWBORNS BEFORE INSERTION OF PERIPHERAL CANNULAS OR PERIPHERALLY INSERTED CENTRAL CATHETERS

M. Pittiruti1, G. Barone2, V. D'Andrea3

1Vascular Access Unit, Dept. of Surgery- Catholic University Hospital, Rome, Italy
2Neonatal Intensive Care Unit, Dept of Pediatrics- Catholic University Hospital, Rome, Italy
3Neonatal Intensive Care Unit, Dept. of Pediatrics- Catholic University Hospital, Rome, Italy

Background

In neonates, peripheral cannulas and peripherally inserted central catheters are placed using veins of limbs and scalp. The choice of the site most suitable for the insertion may be difficult and often relies upon an empiric decision, depending usually on the operator’s preference and experience, after a non-systematic assessment of the main superficial veins.

Objectives

Our purpose was to develop an easy and repeatable protocol for a rational and systematic evaluation of the veins in neonates.

Methods

Our protocol - RaSuVA (Rapid Superficial Veins Assessment) - includes the sequential assessment of seven sites, explored ‘from foot to head’, first on the right and then on the left side: (1) medial malleolus, (2) lateral malleolus, (3) popliteal fossa, (4) back of the hand and wrist, (5) antecubital fossa, (6) anterior scalp veins, (7) posterior scalp veins.

Conclusions/Results

Vein mapping using RaSuVA was performed in 20 consecutive neonates admitted to our intensive care unit, using direct clinical assessment of visible veins and/or vein visualization by with a device (Veinsite®) based on Near-Infra-Red (NIR) technology. The protocol proved to be easy to perform, easy to teach and easy to learn. Operators’ compliance was optimal, both for direct and NIR-guided visualization.

RaSuVA is a new and easy tool designed to build a detailed and complete map of the superficial veins of neonates, using a rational and systematic approach, in order to choose the best vein for cannulation and avoid unnecessary multiple venous punctures. References (if needed)
SUBCUTANEOUSLY ANCHORED SUTURELESS DEVICES FOR SECUREMENT OF CENTRAL LINES IN PEDIATRIC PATIENTS

M. Pittiruti¹, D. Celentano², L. Muscheri², G. Barone³, V. D'Andrea³

¹, Italy
²Pediatric Intensive Care Unit, Catholic University Hospital, Rome, Italy
³Neonatal Intensive Care Unit, Catholic University Hospital, Rome, Italy

Background

Accidental dislodgement of central venous access is a frequent complication in the pediatric population and it is often associated with the need of catheter replacement. Subcutaneously anchored sutureless devices (SAS) (Securacath) have been recently introduced in our hospital for securement of central lines in neonates and children.

Objectives

We used SAS for securement of tunneled central lines (centrally inserted – i.e. CICCs - or peripherally inserted – i.e. PICCs) in neonates and children requiring central venous access as elective procedure.

Methods

All catheters were inserted according to our insertion bundle for pediatric central lines (ultrasound guidance, modified Seldinger technique by micro-introducer, tip location by intracavitory ECG, cyanoacrylate glue for the closure of the puncture site and for the sealing of the exit site, transparent dressing). SAS was removed at the time of catheter removal.

Conclusions/Results

85 central lines (3-4Fr power injectable polyurethane catheters: 48 CICC + 37 PICC) were secured with SAS in 73 patients (age range 20 days to 12 years). All SAS were easy to place and the duration of the line (equal to the duration of the SAS) ranged from 5 day to 7 months (median 3 weeks). We had only one accidental removal (associated with skin erosion related to the SAS). SAS removal – performed by splitting in two halves with scissors - did not require sedation or local anesthesia and was easy and uneventful in all cases.

SAS was effective in preventing dislocation in 99% of patients. Complications at insertion, during maintenance and at removal were negligible.

References (if needed)
Background

Critically ill neonates often require a central line for hemodynamic monitoring, repeated blood sampling, infusion of high volumes of fluids, and/or infusion of drugs and solutions not appropriate for the peripheral route. Catheters inserted via superficial veins of the limbs and the scalp (epicutaneo-caval catheters – ECC) may not be appropriate for these purposes.

Objectives

We placed tunneled non-cuffed centrally inserted central catheters (CICC) in critically ill neonates requiring intensive care management.

Methods

The catheters were inserted according to our insertion bundle for pediatric central lines (ultrasound guidance, modified Seldinger technique by micro-introducer, tip location by intracavitary ECG, tunneling, cyanoacrylate glue for the closure of the puncture site and for the sealing of the exit site, securement by sutureless device, transparent dressing). In all neonates, catheters were inserted by ultrasound guided puncture of the brachio-cephalic vein (BCV).

Conclusions/Results

62 CICC were inserted in 58 neonates (age 2-30 days; weight 800-4500g), via ultrasound guided puncture and cannulation of the right (n=54) or the left (n=6) BCV. The BCV diameter ranged 2.7 - 5.1 mm. We used power injectable polyurethane catheters, either 3Fr single lumen (n=50) or 4Fr double lumen (n=12), the latter being inserted only if BCV diameter was 4mm or >. There were no insertion-related complications. All catheters were successfully used for infusion, blood sampling and hemodynamic monitoring.

While ECC are appropriate in neonates requiring only hydration and parenteral nutrition, critically ill neonates may benefit of CICC inserted by ultrasound guidance. Power injectable 3-4Fr polyurethane catheters have the best performance in this regard.

References (if needed)
Background

Congenital heart disease (CHD) is the most common cause of major congenital anomalies, representing a major global health problem. The delay recognition of CHD at this age is frequent and carries a serious risk of avoidable mortality, morbidity and handicap.

Objectives

Objective: Analyze the epidemiological and clinical profile, the circumstances of diagnosis of a CHD in neonates admitted to the unit and to evaluate initial therapeutic management.

Methods

Between 1 January 2012 and December 31st 2014, we conducted a retrospective chart review of all infants with CHD admitted to the intensive care unit (NICU) of Mohammed VI University Hospital of Marrakech, Morocco.

Conclusions/Results

Our study found 143 congenital heart disease, during the same period 1840 newborns are admitted to service (7.77%). The female sex was in 50.3%. 44.80% of newborns were premature, 34% were hypotrophic and 36.2% had associated congenital malformations. The consanguinity was in 18.2% of cases and 9 mothers were diabetic. Respiratory distress was in 50% of the cases. Cardiomegaly was objectified in 15.3%. 87.4% of the heart disease was non-cyanogenic: the patent ductus arteriosus: 34 cases, atrial septal defect: 31 cases and ventricular septal defect: 17 cases. Medical treatment was started in 21.1% of cases and surgery in 9.1% of cases. The the evolution was favorable in 53%

The diagnosis of CHD is not only important from an epidemiological point of view, it also allows an early treatment and monitoring. Limited infrastructure is the biggest problem that altered the management of CHD in Morocco,

References (if needed)
OPTIMAL AND EFFICIENT TRANSFER FROM THE NEONATAL INTENSIVE CARE TO A DISTRICT HOSPITAL

M. Bouman¹, A. Hoogen¹
¹Wilhelmina Children’s Hospital- University Medical Center Utrecht, Neonatology, Utrecht, The Netherlands

Background

To work safe and efficient, nurses are trained to change clinical care according to the Lean method. In our NICU there was no efficient flow of transferring infants to district hospitals. Therefore infants were unnecessarily transferred to our Medium/High Care. By doing so, beds are blocked for other infants in need of care and a high workflow emerged by unnecessary and ad hoc transfers.

‘Grip’ on length of stay was introduced, including discharge criteria, where infants are no longer transferred to the Medium/High Care, unless their medical condition requires staying in an academic centre.

Objectives

Aim of this project is that 65% of the transfers are known 24 hours before discharge and unnecessary transferring is kept to a minimum

Methods

Discharge criteria were established < 72 hours after admission, based on acquisition criteria of the district hospital. ‘Grip’ was implemented and base line characteristics were obtained. Data was compared with data 1 year after implementation of ‘Grip’. A data management program was used to collect data.

Conclusions/Results

A total of 607 infants were admitted in 2014 and 573 in 2016. Transfer data are presented in table

<table>
<thead>
<tr>
<th>Admission</th>
<th>2014 N = 607</th>
<th>2016 N= 573</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directly transferred to district</td>
<td>266 (43,8%)</td>
<td>266 (46,4%)</td>
</tr>
<tr>
<td>MC/HC</td>
<td>270 (44,4%)</td>
<td>286 (49,9%)</td>
</tr>
<tr>
<td>Duration MC/HC for 4 days as transfer period</td>
<td>33,3%</td>
<td>38,1%</td>
</tr>
</tbody>
</table>

Conclusions:

Since implementation of ‘Grip’ infants at our NICU had <72 h discharge criteria.

However, time of transfer was not 24 h in advanced known and infants were still unnecessary transferred to the MC/HC
References (if needed)
BEING SUPPORTED TO SAY GOODBYE

A. Butler¹, H. Hall¹, B. Copnell¹
¹Monash University, School of Nursing and Midwifery, Melbourne, Australia

Background

Saying goodbye to a dying child is one of the most difficult tasks any parent will ever have to do. The difficulties faced by parents during this time may be heightened in the PICU environment, designed to provide immediate and specialised care, rather than comfort and warmth at the end of life. How to best support parents in this environment to say goodbye to their child remains a constant challenge for healthcare providers.

Objectives

Methods

The ‘Bereaved PICU Parent’ Study utilised a grounded theory approach to explore the experiences of 30 parents when their child died in an Australian PICU, including their perceptions of support throughout their journey. Data were analysed utilising the constant comparative coding method and theoretical memoing.

Conclusions/Results

One sub-category, ‘Saying goodbye’, explored the various ways parents perceived support from healthcare providers as they were farewelling their child. During this time, support is most commonly provided by nursing staff, who lead parents through the process of saying goodbye. This support is demonstrated through elements such as 'Making keepsakes', 'Respecting time', 'Facilitating intimacy' and 'Maintaining continuity'. Elements which were considered distinctly unsupportive were limited, and mainly centred around inadequate provision of time or inappropriate creation of keepsakes. These findings suggest that supporting parents to farewell a dying child need not be a difficult or challenging task. Indeed, when nothing more can be done, the provision of privacy, intimacy, time and familiarity may mean everything.

References (if needed)
HOW DO BEREAVED PARENTS DEFINE SUPPORT AFTER A CHILD DIES IN PICU?

A. Butler\textsuperscript{1}, H. Hall\textsuperscript{1}, B. Copnell\textsuperscript{1}

\textsuperscript{1}Monash University, School of Nursing and Midwifery, Melbourne, Australia

Background

Whilst the concept of follow up care after the death of a child in PICU has long been recommended, its implementation into clinical practice has been haphazard at best. Bereaved parents’ need for bereavement support is well known, however our understandings of exactly what support means for them after their child has died is much more limited.

Objectives

Methods

The Bereaved PICU Parent Study explored the experiences of parents during and after the death of a child in PICU, and their experiences of follow up support, using a constructivist grounded theory approach. Interviews were conducted with 30 parents from 4 Australian PICUs. Data were analysed utilising constant comparative analysis, aided by theoretical memoing.

Conclusions/Results

Whilst ongoing contact and formal follow up from the hospital was important and highly desired, it was not the only way in which support was perceived. Parents’ definitions of bereavement support were broad, and included elements as simple as supporting a return to the hospital, or as significant as providing memorial days or formal, ongoing counselling. What was common, however, was the desire for support to be provided by someone who had shared their journey, extending continuity of care into bereavement.

Our findings suggest that although a formal hospital run follow-up service is important, it may not constitute all of what bereaved parents find supportive. Even in the absence of such a service, there are many ways in which healthcare providers can support a grieving family which may be just as important.

References (if needed)
UNCOMMON EXPRESSION OF A COMMON DISEASE

Background: Sinusitis is a common disease in children. Although benignity and good evolution of most cases, it may lead to central nervous system complications, due continuous focus of infection. Anaerobic agents are commonly associated; however, other agents can also be implicated.

Clinical case: A 12 years old girl, with previous rhinitis and dental caries presented with worsening right retroocular headache since six days before hospital admission associated to vomit, fever and decreased strength in left hemibody with occurrence of focal seizure. Blood tests and cultures were performed. CT scan revealed sinusitis with subdural empyema and left midline deviation. She was transferred to our hospital where left hemiparesis with ipsilateral facial paresis were observed, with pyramidal and extra pyramidal signs and decreased level of conscience. RMN confirmed pansinusitis, subdural empyema and right frontal cerebritis (Image 1). An emergent decompressive craniotomy was made, with drainage of subdural empyema and affected sinus.

Empiric antibiotics were started, as well as anti epileptic therapy and measures to control cerebral swelling. Drainage samples’ microbiology confirmed a Streptococcus intermedius. Blood cultures were sterile.

Neurologic deficits improvements were observed. A second surgical intervention was made three weeks after, to correct a cerebrospinal fluid fistula. Currently she has clonus of the left foot, with symmetric movements and strength of arms.

Conclusion: This case alerts to serious complication of a common disease in paediatric age. Streptococcus intermedius, a commensally organism of oropharynx, can cause significant morbidity. Urgent decompressive craniotomy and sinus drainage, associated to antibiotic therapy are essential to achieve good evolution.
ACCURACY OF PAEDIATRIC TRACK AND TRIGGER SYSTEM SCORES IN CHILDREN SUFFERING A CRITICAL DETERIORATION EVENT

S. Chapman¹, M. Peters², K. Oulton³, J. Wray³
¹Great Ormond Street Hospital for Children NHS Foundation Trust, International and Private Patients, London, United Kingdom
²Great Ormond Street Hospital for Children NHS Foundation Trust, Paediatric and Neonatal Intensive Care Unit, London, United Kingdom
³Great Ormond Street Hospital for Children NHS Foundation Trust, ORCHID, London, United Kingdom

Background

Paediatric track and trigger system (PTTS) scores are widely used to aid the detection of deterioration in hospitalised children. However inaccurate calculation of the PTTS score has been previously reported.

Objectives

To assess the accuracy of PTTS scores in hospitalised children who suffer a critical deterioration event.

Methods

Data was retrospectively collected from children who suffering a critical deterioration event over a 2-year period. PTTS scores were electronically calculated using available data in Excel. PTTS scores were considered to be accurate when the documented score matched the Excel-generated score.

Conclusions/Results

297 patients were identified in whom 8543 observations sets were recorded. The documented PTTS score matched the Excel-generated PTTS score in 6250 (73.2%) observation sets. 620 (7.3%) had no PTTS score documented and 1673 (19.6%) sets had an erroneous score. Of these, the majority (995/1673, 59.5%) were under-scored rather than over-scored. The erroneous PTTS score was considered to be clinically significant on 529 (6.1% overall) occasions, as it would have indicated a different escalation pathway to be followed.

A considerable proportion of PTTS scores are erroneous or missing and this may decrease their efficacy in detecting children at risk of deterioration.

References (if needed)
HIGH FLOW NASAL CANNULA THERAPY IN VERY LOW BIRTH WEIGHT INFANTS WITH RESPIRATORY DISTRESS SYNDROME

S. Cotugno\textsuperscript{1}, R. Panza\textsuperscript{1}, A. Di Mauro\textsuperscript{1}, M. Capozza\textsuperscript{1}, F. Bianchi\textsuperscript{2}

\textsuperscript{1}Neonatology and Neonatal Intensive Care, Department of Biochemical Science and Human Oncology, BARI, Italy
\textsuperscript{2}Section of Hygiene, Department of Biomedical Science and Human Oncology, Bari, Italy

Background

Respiratory distress represents one of the most common diagnoses in newborns admitted to Neonatal Intensive Care Units (NICU). The use of High Flow Nasal Cannula Therapy (HFNCT) is increasing as non-invasive respiratory support in newborns.

Objectives

To evaluate safety and effectiveness of HFNCT as first respiratory support for moderate-severe Respiratory Distress Syndrome (RDS) in very low birth weight (VLBW) and extremely low birth weight (ELBW) preterm newborns.

Methods

The medical records of preterm newborns with moderate-severe RDS admitted to our NICU and treated with HFNCT have been retrospectively reviewed. The main outcome was defined as “success rate”, i.e. no need for intubation within 72 hours after the start of HFNCT. Secondary outcomes were defined as bronchopulmonary dysplasia (BDP), air leaks, nasal injury, late onset sepsis (LOS) and exitus occurrences.

Conclusions/Results

Results: 64 VLBW preterm newborns were enrolled and the overall success rate was 93%. In a subgroup analysis, for newborns <28 weeks the success rate was 84.6% and for ELBW (<1000g BW) the success rate was 86.7%. BPD was diagnosed in 26.6% of preterms enrolled. In subgroup analysis, BPD was diagnosed in 61.5% of newborns with GA <28 weeks, in 53.3% of ELBW newborns and in 11.1% of small for gestational age (SGA) newborns. Neither air leaks nor nasal injury were recorded as well as no exitus occurred. LOS occurred in 16.1% of newborns.

Conclusion: HFNCT was effective as first respiratory support in preterm newborns. Further studies in a larger number of preterm newborns are required to confirm HFNCT effectiveness.

References (if needed)
EFFECTIVENESS OF OLFACTIVE STIMULATION FOR MANAGING PROCEDURAL PAIN IN PRETERM AND FULL-TERM NEONATES: A SYSTEMATIC REVIEW

G. De Clifford-Faugere¹, M. Aita¹, A. Lavallée¹
¹Université de Montréal, Faculty of Nursing, Montreal, Canada

Background

Preterm neonates undergo many painful procedures during their hospitalization in the neonatal intensive care unit (NICU), whereas unrelieved and repeated pain can have important repercussions on their motor and intellectual development. Pain management methods are limited for neonates. To our knowledge, no systematic review has evaluated the effectiveness of olfactive stimulation interventions on the pain response of neonates.

Objectives

This systematic review aim to evaluate the effectiveness of an olfactory stimulation to reduce procedural pain, by answering the following question: What is the effectiveness of olfactive stimulation interventions for managing procedural pain in preterm and full-term neonates compared to standard care?

Methods

An electronic search was conducted in PubMed, Medline, CINAHL, EMBASE, PsycInfo, Web of Science, and Cochrane. The selection of articles, the extraction of data and the assessment of the risk of bias (by the Cochrane Risk of Bias Tool) were done by two independent researchers. The quality of the evidence will be evaluated by the GRADE tool. According to the homogeneity of the data, a meta-analysis or a descriptive synthesis will be performed.

Conclusions/Results

During this communication, preliminary results will be presented. An olfactory stimulation intervention would relieve the pain in neonates. Among the different odors used, breast milk seems to be the most effective. This research will improve pain relief by guiding clinical practice and neonatology research.

References (if needed)
BACKGROUND

It is well known that preterm neonate can feel pain and expresses it through specific signs. The number of heel prick has declined over the last decade but remains high at almost one a day. Repeated and untreated pain has consequences for the preterm neonate such as hypersensitivity to pain, as well as important repercussions on their motor and intellectual development. The use of pharmacological and non-pharmacological interventions is very limited, hence the importance of investigating the effect of a new intervention: breast milk odor.

OBJECTIVES

This pilot study aims to assess feasibility and acceptability of an olfactory stimulation intervention with breast milk on pain response of preterm neonates.

METHODS

A pilot study of a randomized clinical trial was conducted with randomization by blocks interchanged. The experimental group was familiarized to the breast milk odor during nine hours (before the heel prick) and had this odor in addition to standard care for the heel prick. The control group received standard care during the heel prick (ethical consideration).

CONCLUSIONS/RESULTS

During this communication, preliminary results will be presented: the intervention is feasible and acceptable for mothers and nurses.

This research will improve pain relief by guiding a randomized clinical trial to evaluate the effectiveness of the intervention, thus guiding the clinical practice and research in neonatology.

REFERENCES (IF NEEDED)
Background

Pressure ulcers (PU) are a common problem in patients in intensive care units (ICU) associated with increased morbidity, mortality and economic costs. Almost 95% of PU are preventable if an early identification of the risk is made and a low incidence of this complication is a good indicator of the quality of care.

Objectives

Our aim was to try to prevent pressure ulcers by implementing a strategy of early identification of the patients at risk.

Methods

Prospective study including all patients admitted to our paediatric ICU in a 15 month period (January 2015 till March 2016). Braden Q Scale was used to identify and to evaluate the risk of developing PU.

Conclusions/Results

Results:
Over this period 197 children were admitted to our ICU; 100% were evaluated with the Braden Q Scale. Preventive measures were started in patients with high risk: decubitus alternation, skin hydration, pressure relief, application of hydrocolloid dressing. PU developed in 27 patients (14%), which were severe in almost one third of these patients. PU were more frequent in occipital, nostril, sacrococcygeal, trochanteric and malleolar regions. All these patients started treatment according to the PU severity. Patients with PU had a mean stay of 8.4 days vs 3.6 days in patients without ulcers.

Comments:
All patients were screened for the risk of PU and preventive measures were started whenever the risk was high. This allowed a reduced incidence of PU. Patients with PU had longer stays in the ICU, with inevitable increases in costs and morbidity.

References (if needed)
EFFECT OF MUSIC ON TERM BABIES IN NICU: A RANDOMIZED CONTROLLED TRIAL

B. Alay¹, F.I. Esenay²
¹Dr. Münnif İslamoğlu State Hospital, Kastamonu, Turkey
²Ankara University, Faculty of Health Sciences, ANKARA, Turkey

Background

Music is regarded as a subset of developmental care. It can reduce the stress response of the newborn and regulate its vital findings.

Objectives

This study was designed as randomized controlled to investigate the influence of music on physiological measurements, length of hospitalization and stress symptoms of the term babies during the nursing care they received in the NICU.

Methods

The study was conducted as randomised controlled design with 45 babies (15 classic music, 15 lullaby and 15 control) in the NICU of Dr. Munif Islamoglu State Hospital between November 2014 and August 2015, with ethical permissions. The music (lullaby or classical) was listened throughout daily nursing care for 30 minutes. The precare, 10th-, 20th-, 30th- and 40th-minute body temperature, peak heart rate, respiration rate, saturation, blood pressure were recorded. Stress symptoms was recorded for all implementations before, during and after the care. The weight was recorded daily; height, head and chest circumferences were recorded weekly.

Conclusions/Results

No significant difference was observed in peak heart rate, blood pressure, respiration, growth values, hospitalization time between classical music, lullaby and control groups. The classical music increased the saturation and stabilised body temperature. The classical music and lullaby reduced stress symptoms. After care, mean stress scores of classical music and lullaby groups were significantly lower compared to the control group. In addition, classical music decreased the period of stress exposed during the care. In conclusion, it was determined that music and lullaby listened to preterm babies during the nursing care in NICU is an useful application.

References (if needed)
Background

Oral care (OC) is an intervention used for prevention of respiratory infections during neonatal intensive care hospitalization. There is a lack of studies providing evidences of the most appropriate technique for OC to be used for this population.

Objectives

To identify practices, beliefs and attitudes of professionals, regarding the performance of oral care in hospitalized neonates.

Methods

Descriptive and exploratory study, conducted in two NICUs in the city of São Paulo. The data were collected by means of a questionnaire and submitted to descriptive statistical analysis.

Conclusions/Results

Among 42 professionals, 92.8% reported performing OC in critically ill neonates. Patient comfort was the main reason (35.6%) and the severity of neonate the main difficulty (27.5%) for this practice. Most professionals perform the OC once per shift, using gauze and distilled water for intubated and non-intubated infants; and disagrees that this procedure is an unpleasant activity (68.2%) and difficult to perform in both intubated (41.46%) and non-intubated (75.61%) neonates.

Conclusions: Most of the professionals perform OC in critically ill neonates, mainly for comfort promotion, identifying the severity of neonate as a difficulty. Oral care is perceived as a priority intervention for intubated infants with influence on their clinical conditions. Participants’ interests in best OC practices in neonates were identified.

References (if needed)
TOXIC SHOCK SYNDROME IN A PAEDIATRIC INTENSIVE CARE UNIT
F. Furtado¹, A. Casimiro¹, V. Brites¹, J. Estrada¹, M.J. Brito¹, M. Santos¹
¹Paediatric Intensive Care Unit
²Paediatric Infectious Diseases Unit, Paediatric Department, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal

Background - Toxic shock syndrome (TSS) is an acute life-threatening illness, mediated by toxins produced by some strains of bacteria, most commonly Staphylococcus aureus and Streptococcus pyogenes. It’s a relatively rare but severe disease, which is more common in children than in adults.

Objectives: To describe and analyze clinical features, treatment and outcome of children with TSS.

Methods: Retrospective chart review, between 2005 and 2016, of children admitted in a paediatric intensive care unit with TSS (Centers for Disease Control case definition).

Results: In 3943 admitted patients, 11 fulfilled TSS criteria’s. Seven were male and the median age was two years (nine months to 18 years). Eight cases of streptococcal TSS (six confirmed) and three cases of staphylococcal TSS (two confirmed). Predisposing factors were identified in eight children [varicella(1), burn(1), postoperative(2), acute lower respiratory infection(1), influenza(2) and immunocompromised(1)].

In all cases, intensive treatments were required: invasive ventilatory support(n=4; mean 7.3 days), inotropic support(n=10; mean 10 days), a child needed extracorporeal membrane oxygenation. All patients did clindamycin and other antitoxin therapies were performed [intravenous immunoglobulin(3), steroids(3) and fresh frozen plasma(3)].

At admission, Paediatric risk of mortality score II(PRISM) presented an average of 11.7. In seven cases there were several complications due to TSS, despite this, all patients survived.

Conclusions: This study emphasize the importance of early recognition of TSS. The high PRISM II value at admission support the severity of these cases and the need for early treatment. A national prospective study is essential to understand the reality of TSS in Portugal.
DECOMPRESSIVE CRANIECTOMY FOR TREATMENT OF NONTRAUMATIC INTRACRANIAL HYPERTENSION

S. Gomes¹, M. Oliveira¹, G. Pereira¹, J. Estrada¹, M. Correia², A. Irañeta², M. Santos¹
¹Pediatric Intensive Care Unit, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal
²Neurosurgery Department, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal

Background: Decompressive craniectomy (DC) is a lifesaving procedure in patients with intracranial hypertension for whom medical treatment failed. However, evidence supporting this option is scarce especially in the paediatric population and in intracranial hypertension of nontraumatic origin.

Objectives: to analyse the clinical variables and outcomes of patients with nontraumatic refractory intracranial hypertension submitted to DC.

Methods: retrospective analysis of all patients admitted in the intensive care unit with nontraumatic refractory intracranial hypertension submitted to DC from 2009 until 2016. Demographic and clinical characteristics, complications and outcomes were evaluated.

Results: in 2728 admitted patients, 12 fulfilled the study's conditions. Patient's ages varied from 2 to 18 years old with an average of 9 years and no gender predilection. The underlying aetiologies were intracranial haemorrhage (5), central nervous system infection (3), occipitocervical transition malformation (2), ischemic stroke (1) and cerebral oedema secondary to neoplasia (1). One patient presenting with central nervous system infection was directly submitted to DC, the remaining craniectomies were performed after medical treatment and in some cases after CSF diversion procedures failed. Craniectomy related complications were present in only two patients and one death was registered which was unrelated with the procedure.

Conclusion: Decompressive craniectomy was effective for treating children with nontraumatic refractory intracranial hypertension. However, studies with higher statistical power are needed to evaluate effectiveness of DC in different settings of nontraumatic intracranial hypertension. Meanwhile individualized approach to all patients is crucial balancing the risk and potential outcomes of intracranial hypertension against those associated with any surgical intervention.
Background

Our tertiary neonatal unit (1700 admissions, 4000 intensive care days/annum) has previously described using checklists to reduce adverse events associated with intubation and elective extubation. However, unplanned, accidental extubations remain a hazard, associated with potential significant morbidity and mortality.

Objectives

To identify factors associated with accidental extubation, to develop best-practice guidance and reduce risk.

Methods

All accidental extubations between 1st June and 1st September 2016 included. Detailed analysis of cases was carried out. Best practice guidance was developed to highlight potential risk areas for staff caring for intubated neonates.

Conclusions/Results

There were 456 ventilation days with 73 babies being ventilated during this time. 15 accidental extubations were recorded.

Common infant factors included: previous history of accidental extubation, copious secretions, or high levels of movement/activity. Weight less than 1kg, or a known difficult airway were also important.

Common time of occurrence included: during procedures (particularly those by non-neonatal unit staff), during cares, and during named nurse’s break.

Introduction of multi-disciplinary feedback of any accidental intubations in the previous 24 hour period has led to increased staff awareness with motivation for prevention.

Our guidance highlights infants most at risk, and suggests: careful positioning, swaddling and comfort device use, supervision of non-neonatal or inexperienced staff, close supervision of Kangaroo care, 2 person-technique for head turns, appropriate use of sedation and analgesia, and a buddy-system for break times.

Conclusion:

Identification of common factors leading to accidental extubation has enabled development of best practice guidance with an aim to reduce this risk.

References (if needed)
INDICATIONS AND OUTCOME OF HIGH FLOW NASAL CANNULAE THERAPY IN PREMATURE AND FULL TERM INFANTS: A TUNISIAN NICU EXPERIENCE

S. Ibn Hadj Hassine\textsuperscript{1}, A. Bezzine\textsuperscript{1}, I. Ayadi\textsuperscript{1}, R. Boukhris\textsuperscript{1}, E. Benhmida\textsuperscript{1}, Z. Marrakchi\textsuperscript{1}

\textsuperscript{1}Hopital Charles Nicolle, neonatology, tunis, Tunisia

Background

High Flow Nasal Cannulae (HNFC) is an emerging non-invasive respiratory support for premature and full term infants. Even though it has been widely used in NICUs, the efficacy and safety are yet to be proven.

Objectives

The aim of this study was to evaluate the rate, indications and outcome of HNFC use in premature and full term infants.

Methods

A retrospective data analysis of NICU admissions between 01-01-2014 and 31-12-2015, at Charles Nicolle hospital of Tunis. Neonates who received HFNC support for more than 24 hours were included. Failure criteria were defined as the need to switch to another non-invasive, or invasive ventilatory support. Other secondary outcomes were also collected.

Conclusions/Results

A total of 199 infants met the inclusion criteria, 25 (12.5\%) were full term, and 174 were premature infants. HNFC were assigned as a primary support for 106 infants (53.2\%), after extubation for 73 infants (36.6\%), and after another device of non-invasive ventilation in 20 cases (10.1\%). Failure to establish efficacy occurred in 26.1\% (52 infants). The complications that were reported were apnea in 10.5\% (21 patients), air leak syndromes in 6.5\% (13 patients), sepsis in 4.5\% (9 patients), Necrotizing enterocolitis in 2.5\% (5 patients) with death occurring in 11.5\% (23 patients).

The mean duration of HFNC ventilatory support was 5 days [1-43 days], the mean hospital stay was 19.8 days [1-104 days]. Bronchopulmonary dysplasia was reported in 20.6\% (41 infants) and intraventricular hemorrhage in 6.5\% (13 infants).

Conclusion: The use of HFNC was associated with a high risk of death and increased morbidities.

References (if needed)
Background

Preventing pain in the ICU is an ethical responsibility and a daily challenge for the paediatric nursing staff, as the hospitalized children are frequently subject to a number of clinical procedures that induce pain, discomfort and suffering. It is also known that a repeated and prolonged pain experience affects the cognitive development, the behavioral responses and the pain perception in children, due to their immature central nervous system. Thus, pain management in the paediatric ICU is a complex process and a challenge for nurses.

Objectives

Identify non-pharmacological pain management strategies used by nurses while performing a set of predefined painful procedures on children in the ICU.

Methods

Population includes children admitted to the ICU, submitted to painful procedures. Sampling will be accidental. Observational quantitative study, using a spreadsheet to support direct observation, conducted in a natural environment during a period of two months. Data will focus on describing a set of predefined painful procedures and the non-pharmacological strategies used by nurses to prevent or reduce pain. Data will be submitted to descriptive statistical analysis.

Conclusions/Results

Non-pharmacological pain relief strategies are of uttermost importance in paediatric ICUs. Nurses use different strategies with the same goal. Most common strategies for each procedure are identified.

References (if needed)
DETERMINATION OF PAIN GENERATING LEVELS OF NURSING ACTIVITIES IN PEDIATRIC INTENSIVE CARE PATIENTS

D. Akgun¹, S. Inal²

¹Istanbul University, Intensive Care Unit, Istanbul, Turkey
²Istanbul University, Faculty of Health Sciences-Midwifery, Istanbul, Turkey

Background

It is generally thought that intensive care patients do not feel pain due to being sedated. It is very important that pediatric nurses working in the pediatric intensive care unit are aware of the fact that intensive care child's patients may be suffering from pain, can identify by reliable methods and make appropriate intervention.

Objectives

The study aims to determine the pain-generating levels of nursing activities in pediatric intensive care patients.

Methods

Date was obtained with 300 observations during the treatment and care activities of 30 pediatric intensive care patients. Pain levels of nursing practice of the patients were obtained by the researcher using the FLACC pain scale.

Conclusions/Results

Result: When we evaluated pain generation levels of nursing activities; it was found that the most painful activities were the invasive interventions, followed by the second painful activities were caring activities. Also it was found that the difference between the pain levels of the invasive interventions and caring activities and dressing was statistically significant.

Conclusion: In pediatric intensive care patients, nursing activities especially invasive procedures and caring activities are painful at various levels. Nurses should be able to manage painful procedures in pediatric intensive care patients using nonpharmacological methods as well as pharmacological methods.

References (if needed)
REDUCING DEVICE RELATED SKIN DAMAGE IN PAEDIATRIC INTENSIVE CARE

H. Jackson

1ROYAL MANCHESTER CHILDREN’S HOSPITAL, Paediatric Critical Care, Manchester, United Kingdom

Background

The presentation provides an overview of the service improvement work undertaken to reduce device related skin damage. The prompt for the project was a grade 4 pressure ulcer caused by a medical device. Root cause analysis identified medical devices to be the cause for a large percentage of pressure ulcers. Medical devices in use on paediatric intensive care (PICU) have the potential to cause skin damage. The risk is increased by the patients clinical condition, immature skin and the number of devices in use. The PICU harm free care team in conjunction with the tissue viability team looked at strategies to reduce the incidents.

Objectives

To instigate strategies with staff and families to reduce the incidents of pressure damage. To improve staff knowledge through education, to review the products currently in use and those available on the market aimed at reducing skin damage and develop a best practice protocol.

Methods

Service improvement was achieved by the implementation of a move and groove team aimed at getting the basics right. Pre audit data and questionnaires validated staff knowledge. Local standards were devised in accordance with NICE guidelines (2014) and incorporated into a skin care bundle with a specific care plan aimed at guiding practice. Staff engagement and training implemented with weekly audits against the standards.

Conclusions/Results

Post Move and Groove and the implementation of the skin care bundle the audits showed improved knowledge within the PICU team on maintaining skin integrity.

References (if needed)

NICE Pressure Ulcers: Prevention and Management (CG179) - April 2014
A NURSE-LED INITIATIVE TO IMPROVE CONTINUOUS RENAL REPLACEMENT THERAPY EFFICIENCY AND EDUCATION

C. Jennings1, D. Nicholls2, C. Ryan1
1Royal Manchester Children’s Hospital, Paediatric Critical Care, Manchester, United Kingdom
2ROYAL MANCHESTER CHILDREN’S HOSPITAL, PICU, Manchester, United Kingdom

Background

Continuous renal replacement therapy is a vital aspect of critical care nursing, requiring extensive knowledge and skills from the nursing staff. Due to its infrequent usage in Paediatric Critical Care, staff not using the equipment for long periods of time resulted in reduced confidence and competence. Additionally, there was increasing demand by clinicians for this therapy to continue specifically throughout the perioperative period, raising issues of training and support for staff delivering this care.

Objectives

• To set up a CRRT interest group within the nursing team
• To review the strategy for nurse education and maintaining competence and proficiency
• To develop a study day for staff to attend, focussing on nurse’s role and expectation in caring for child requiring CRRT
• Develop, implement and evaluate guidelines for intraoperative care

Methods

A literature review was undertaken to determine standards for education and training in continuous renal replacement therapy, and to determine what educational methods are used for a high-impact, low-frequency element of nursing care. Following which, pilot education study days were provided to staff, and they were asked to complete a survey using mixed method research questions to review their experiences and areas for further improvement. Thematic analysis was undertaken to collate topics that were seen as important in improving confidence and competence. Staff who had delivered intraoperative care were asked to give qualitative feedback to establish areas for development.

Conclusions/Results

A robust CRRT education programme is invaluable in ensuring knowledge and skills of staff are maintained, both within PICU and in the theatre environment

References (if needed)
THE SPHERE MANAGER ROLE – A SERVICE IMPROVEMENT MODEL WITHIN PAEDIATRIC CRITICAL CARE FOR SUPPORTED TEAMWORK
C. Jennings¹, C. Ryan¹
¹Royal Manchester Children's Hospital, Paediatric Critical Care, Manchester, United Kingdom

Background

Within Paediatric Critical Care, a cohort of patients (sphere) are supported by a senior staff nurse on each shift, and the role can be extensive and vary greatly, leading to inconsistency and poor communication throughout the ‘sphere’.

Objectives

- To evaluate current practices of the ‘sphere leader’ within the extensive nursing team
- To gain an understanding of the perceived and actual expectations of the role
- To define the role of the ‘Sphere Manager’

Methods

A literature review was undertaken to explore current practices of supported teamwork within the critical care area.

A questionnaire was sent to all staff to explore what their perception of the role were, both as being supported by, and undertaking the role itself. Using thematic analysis, a job description was developed for the sphere manager role, and a comprehensive guide to roles and responsibilities was prepared. A trial period of 4 weeks was used to implement the role.

A follow-up questionnaire was sent to all staff for evaluation and to discuss further recommendations.

Conclusions/Results

The role of the Sphere manager is an intrinsic aspect to ensure good communication and teamwork within a sphere/cohort, in a busy paediatric critical care unit, and aids supporting the Senior Nursing team in maintaining safety.

References (if needed)
Background

Previous studies of workplace violence suggest that health related professionals are the most frequently exposed workforce to various forms of violence. The authors present the results of the short survey in PICU about psychological violence against nurses by relatives. The short survey was conducted due to some critical events. The authors want to determine if the violence has been an increase.

Objectives

Psychological violence towards nurses in their workplace is a big problem, which is not acknowledge enough among the involved people. In many cases it is simply ignored.

Methods

The study was held from July to December 2016, and involved all nurses who work in PICU. The quantitative descriptive method used and the date were collected through a questionnaire. 59.6% had experienced psychological violence and they talk about it. Violence has increased, and this was confirmed by 94.3% respondents. The prevalence of psychological violence established in the present study is comparable to the results of previous studies in EU. The reason for the increase is because we started to talk about the problem and motivate and educate nurses about how important is to talk about that.

Conclusions

It is most important to convince nurses to talk about it and to not feel ashamed. They need to be were that there are people who can help them and they can trust. Talk about violence as much as possible and to point out the importance of education.

References (if needed)
PREVENTION OF VENTILATOR-ASSOCIATED PNEUMONIA DURING SECRETION SUCTION FROM TRACHEOSTOMY TUBE.

S. Kostylioviene¹, D. GRINKEVICIUTE², A. Vaskelyte³, R. Kevalas², J. Peciulyte²
¹Kauno Kolegija University of Applied Sciences, Department of Nursing, Kaunas, Lithuania
²Lithuanian University of Health Sciences, Pediatric Clinic- Pediatric Intensive Care, Kaunas, Lithuania
³Lithuanian University of Health Sciences, Department of Nursing and Care-, Kaunas, Lithuania

Background

Ventilator-associated pneumonia is common hospital-acquired infections, which results in increased patients with tracheostomy mortality, longer hospitalization time and increases health care costs. Nursing knowledge and practical skills in secretions suction from the tracheostomy tube help to minimize the risk of ventilator-associated pneumonia and ensure patient's safety.

Objectives

To analyze the nurses' knowledge and skills to ensure the prevention of ventilator-associated pneumonia during secretions suction from tracheostomy tube

Methods

The study was conducted in Hospital of Lithuanian University of Health Sciences Hospital. Before training 69 nurses were interviewed. After the training 32 secretion suction procedures observed. Research was permitted by Lithuanian University of Health Sciences Bioethics Comity.

Conclusions/Results

All nurses indicated that they use gloves, 15.9% use apron, 5.8% protective glasses, 2.9% mask during secretion suction. Observation showed that all nurses use gloves, and in 29.4% of the cases apron, mask or protective glasses were used ($\chi^2=15.555, df=1, p<0.0001$).

During the survey the majority (72.9%) of nurses stated that they first suck secretions from the mouth and nose, in practice, it was in 53.3% cases ($\chi^2=3.401, df=1, p=0.065$). One-third (27.5%) of nurses said that they consume one catheter, but in practice in 70.6% cases more than one catheter was used ($\chi^2=55.044, df=3, p<0.0001$).

The vast majority of nurses' knowledge about the use of protective measures, secretion suction sequence is insufficient. In practice, most of the nurses used more than one suction catheter, about half used a suitable suction action sequence, but only a third of the nurses used all the necessary security measures to ensure the prevention of ventilator-associated pneumonia during suction.

References (if needed)
THE IMPACT OF INTERRUPTIONS AND DELAYS ON MEDICATION PREPARATION AND ADMINISTRATION IN PAEDIATRIC INTENSIVE CARE (PIC)

S. Longman1, J. Menzies1, H. Winmill1, A. Nash1, S. Owen1, J. Martin1, A. Swift2

1Birmingham Children's Hospital, Paediatric Intensive Care, Birmingham, United Kingdom
2University of Birmingham, School of Nursing- College of Medical and Dental Sciences, Birmingham, United Kingdom

Background

Medication preparation and administration is vital in the care of critically ill children, however errors are common and can lead to patient harm. Interruptions to the medication process have been identified as a possible cause of error. Objectives were to collect data on the time spent preparing and administering medications and identify and quantify interruptions and delays to this process.

Objectives

A prospective observational study was conducted February-April, 2016. Preparation and administration of medications were timed by trained observers using a standardised coding system for delays and interruptions. A medication episode could incorporate single or multiple medications.

Methods

268 medication episodes were observed. During these there were 640 observed interruptions/delays; 187 (29%) during collection of medications, 391 (61%) occurred during preparation, and 63 (10%) during administration. The biggest cause of interruption/ delay was ‘communication’ (n= 406/640, 64%). Within this category the most frequent interruptions were by nursing staff (n=177, 43%) and parents (n=80, 20%). 81% of medication episodes were interrupted at least once and over a third are interrupted four or more times. There is a direct correlation between the number of delays and the time taken for overall procedure (r=0.457, p<0.001).

Conclusions/Results

Interruptions and delays are most likely to occur whilst preparing medications in the form of untimely communication by nursing colleagues or parents. These have a significant effect on the ability of staff to administer medications in a timely manner. Further work is being undertaken to describe and reduce ‘unnecessary’ interruptions.

References (if needed)
FAMILY INTEGRATED CARE - REDUCING NON-Routine HEALTHCARE ACCESS AFTER DISCHARGE FROM NEONATAL UNIT
A. Lu¹, L. McKechnie¹
¹Leeds Teaching Hospitals Trust, Centre for Newborn Care, Leeds, United Kingdom

Background

Family Integrated Care (FIC) is a recent innovation in neonatal care. The principle is focused on parents learning to become the mainstay of their infant's care. Nurses adopt the role of educators to coach and educate parents on delivering this care. Early studies have shown FIC improves breastfeeding rates and decreases parental stress [1].

Objectives

To identify whether decreased parental stress reduces the need to access non-routine healthcare services.

Methods

Retrospective matched cohort study of frequency of access to General Practice (GP) and Emergency department (ED) in the first 3 months post discharge.

Babies in the FIC group were identified from a register. Babies for comparison group received standard care in the year before FIC was introduced and were matched for gestation, gender and birth weight. Details of healthcare access were gathered from electronic patient records.

Conclusions/Results

In the first 3 months post discharge, significantly more FIC infants had no non-routine visits to their GPs compared to infants that received standard care, (p= 0.016). There were no significant differences in attendances to ED (Fig. 1).

<table>
<thead>
<tr>
<th>Number of Visits</th>
<th>General Practice (GP)</th>
<th>Emergency Department (ED)</th>
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<tr>
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<td>Standard Care</td>
</tr>
<tr>
<td>0</td>
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<td>3</td>
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<tr>
<td>≥1</td>
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<td>P value</td>
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Fig. 1

Conclusion

Decreasing parental stress using education and support increases confidence thereby decreasing interactions with primary care, which may have significant economic implications.

References (if needed)
Background

It is becoming increasingly difficult to fund quality assured, paediatric critical care education programmes for qualified nurses in the United Kingdom. Paediatric Critical Care is a low volume, high cost, high risk service, so it is essential that critically ill children and their families receive safe, high quality care from all staff. The Paediatric Critical Care Department in Royal Manchester Children’s Hospital offers a suite of education programmes, aimed at supporting the newly qualified nurse, on a post qualification ‘journey’ to become an expert practitioner in Paediatric Critical Care Nursing. The programmes are quality assured through the Paediatric Intensive Care Society. The Paediatric Intensive Care Unit (PICU) and Paediatric High Dependency Unit (PHDU) have merged into the Paediatric Critical Care (PCC) Unit. Education programmes are delivered to PCC staff, as nurses rotate through both units.

Objectives

It is essential that the education programmes are fit for purpose, enabling nurses to develop the required knowledge, skills and attitudes to become experts in the field of Paediatric Critical Care Nursing.

Methods

The education programmes have been formally evaluated by a range of staff, using Focus Group Interviews. Interviews were recorded, and the data was collated using Thematic Analysis.

Conclusions/Results

Quality assured programmes of education ensure confidence that Paediatric Critical Care Nurses are equipped with the specialised knowledge, skills and attitudes required to deliver high standards of care to critically ill children and their families.

References (if needed)
WHAT'S THAT SOUND? AN OBSERVATION STUDY OF NURSES' APPROACH TO SOUND IN A PEDIATRIC INTENSIVE CARE UNIT

J. Mattsson

1Red Cross University, Health and Technology Development, Huddinge, Sweden

Background

The noise levels in adult intensive care is a well-researched phenomenon which constantly exceeds international and national recommendations. In the pediatric intensive care, the caregivers of the children work in a high tech environment as they are surrounded by sound from several sources of various kinds. How they understand and acknowledges these sounds negative effect on the child’s well-being depend on their individual knowledge and awareness of how sound can affect children negatively. However, for a critically ill child who comes to the intensive care unit, this is in most cases a new experience which in itself means greater stress. Both the environment itself and the noise levels.

Objectives

This study intends to investigate the nurses’ approach to three sources of sound that contribute to high noise levels; alarms, doors that open and conversation. The theoretical perspective in the study is based on studies on caring culture.

Methods

Non Participation semi-structured qualitative observations were conducted in a pediatric intensive care unit of one of Sweden's metropolitan regions in the winter of 2014-2015.

Conclusions/Results

The results show that high noise levels are an overlooked phenomenon in the pediatric intensive care environment as it has given way to other priorities in the nurse’s work. It is also clear that this depends on the department's caring culture as it prioritizes other things which results in normalizing high levels of noise as a part of the pediatric intensive care environment.

References (if needed)
INCIDENTS REPORTING AS A PRACTICE FOR SAFETY IN PAEDIATRICS - CHALLENGES FOR A NURSE SPECIALIST IN THE INTENSIVE CARE SETTING

H.C.S.A. Oliveira¹, M.F. Sousa²

¹Hospital Professor Doutor Fernando Fonseca, PICU, Amadora, Portugal
²Escola Superior de Enfermagem de Lisboa, Departamento de Enfermagem da Criança e do Jovem, Lisboa, Portugal

Background

Nurses have an ethical duty of excellence and thus, to ensure safety in care, should act in accordance with best practices, actively participating in the control of potential risks. As security is a key pillar for children and youth development, nurses should take advocacy for safety as an intervention included in care.

Patient safety has been considered a priority area for health services. Scientific evidence states that there is no safety without good incident reporting processes. In a Paediatric Intensive Care Unit (PICU), a reporting system was created by the health team, but is insufficiently consolidated.

Objectives

To analyse the nurse specialist practice and required skills to provide specialized care in a safety scope.

To analyse the incident reporting system and recommend strategic guidelines to promote children and youth safety in the PICU.

Methods

Critical in and on-action thinking about the practice and a SWOT Analysis to the reporting system.

Conclusions/Results

In the contemporary society, quality and safety assumes particular relevance to the paediatric client which, due to its higher dependency and vulnerability, is more prone to the occurrence of health incidents. The applied reflective approach intends to be a catalyst resource for improving quality care towards safety.

The performed SWOT analysis gathered the strengths, weaknesses, opportunities and threats and determined the following major actions: increase education in incident analysis and evidence-based practice; include the incidents-related subjects in the local education program; review the existing report form; define strategies to motivate reporting; and assess the impact of measures taken to reduce incidents.

References (if needed)
VEIN OF GALEN ANEURYSMAL MALFORMATIONS: A CASE SERIES

T. Painho¹, A. Casimiro¹, S. Lamy¹, I. Fragata², J. Reis², A. Irañeta³, M. Santos¹
¹Pediatric Intensive Care Unit, Hospital Dona Estefânia, CHLC EPE, Lisbon, Portugal
²Neuroradiology Department, Hospital de São José, CHLC EPE, Lisbon, Portugal
³Neurosurgery Department, CHLC EPE, Lisbon, Portugal

Background: Vein of Galen Aneurysmal Malformations (VGAM) results from an aneurysmal malformation with an arteriovenous shunting of blood which can typically lead to high-output heart failure in the newborn or may present later with developmental delay, hydrocephalus and seizures. Associated findings include hemorrhages, cerebral ischemic changes such as strokes, or steal phenomena.

Objectives: Analyse the diagnosis, management and outcome of patients with VGAM admitted in our unit.

Methods: We retrospectively reviewed the records of all children with VGAM admitted in our unit in the last 5 years and analysed demographic data, clinical including symptoms at presentation, analytical, radiological and treatment features.

Results: We identified 4 patients, 2 boys and 2 girls, with median age at diagnosis of 31 days (age range: 1 day - 4 months). Causes of admission were: post-embolization (n=2), cardiac failure (n=1), seizures (n=1). All patients underwent MRI that confirmed diagnosis. Three patients underwent endovascular embolization within a median age of 2.5 months, 1 four times, 1 three times, 1 twice and 1 is still on clinical and radiological surveillance. Median follow-up time was 2.5 years. Two patients had an ischemic stroke after the embolization procedure. No deaths were registered.

Conclusions: The final goal of treatment for VGAM is complete obliteration of the lesion followed by normal development without neurological deficits. However immediate treatment goal depends on the age and clinical presentation. Endovascular embolization is the treatment of choice nevertheless adequate medical support is also essential in these patients.
Radiation Doses of Neonates Undergoing X-Ray Examinations in Intensive Care Units in Korea

M.J. Park1, S.S. Kim1, G.Y. Park1

1Soonchunhyang University, pediatrics, Bucheon, Republic of Korea

Background

With medical advances, the survival of preterm infants has increased and they often require multiple radiographic examinations.

Objectives

There are no reports on the radiation doses of neonates admitted to Neonatal Intensive Care Units (NICUs) in Korea. Therefore, this study evaluated the radiation dose of diagnostic x-rays performed in NICUs using mobile x-ray machines.

Methods

We retrospectively analyzed the radiographs of all low-birth-weight infants (Weight <1,500g) who were admitted to Soonchunhyang University Bucheon Hospital from 2011 to 2016. The entrance surface doses were calculated using the non-dosimeter dosimetry formula.

Conclusions/Results

Of 296 infants (birth weight 350–1490 g), all required at least one chest including abdomen radiograph. The subjects required a mean of 37.28 ± 6.19 radiographs per infant and 25% of the infants had more than 50 radiographs. The estimated entrance skin dose (ESD) varied between 0.059 and 14.5Gy and the calculated ESD per radiograph ranged from 0.029 to 0.069 μGy. The variation in number of radiographs taken might result from the birth weight, morbidity (e.g., respiratory distress syndrome, patent ductus arteriosus, bronchopulmonary dysplasia, necrotizing enterocolitis, and sepsis), and duration of central venous catheter insertion and hospital stay (all p <0.001). Low-birth-weight infants treated in our NICU had high radiation and gonad exposures compared with previous studies. Additional studies should examine how to minimize the cumulative exposure dose and how to achieve optimal image quality.

References (if needed)
EFFECTS OF THREE DIFFERENT SYRINGE INFUSION PUMPS ON RED BLOOD CELL INTEGRITY
L.P. Pardo¹, M.P.O. Pires¹, M.A.S. Peterlini¹, M.L.G. Pedreira¹
¹Federal University of São Paulo, Department of Pediatric Nursing - Paulista School of Nursing, Sao Paulo, Brazil

Background

Several syringe infusion pumps (SIP) are available in clinical practice and indicated by manufactures to the infusion of red blood cell (RBC). Despite possible impact on patient safety SIP are not consistently used by nurses during transfusions due to the presumed damage to RBC.

Objectives

To compare the levels of total hemoglobin(g/dl), hematocrit(%), free hemoglobin(g/dl), potassium(mmol/L), lactate dehydrogenase(LDH)(U/L), degree of hemolysis(%), pH and osmolality(mOms/kg) before and after RBC infusion by three different SIP.

Methods

Experimental study carried out with ethical approval, comprising 16 packed RBC from different donors, with storage time within recommendations. RBC hemolysis markers were measured before and after infusion in three SIP(A, B and C). Data were analyzed according to mean±SD, standard error, median, interquartile range, Levene and Kruskal Wallis tests(p≤0.05).

Conclusions/Results

Total hemoglobin levels decreased in SIP A(-3.9±6.01) and B(-3.28±3.43) and free hemoglobin increased in SIP A(0.01±0.04), B(0.01±0.02) and C(0.01±0.03), with no significant differences (p= 0.103; p=0.114, respectively). Potassium levels increased(p=0.003) in SIP A(3.05±5.5) compared with B(0.11±1.00) and C(0.64±0.96). Variations on hematocrit (p=0.750), degree of hemolysis (p=0.076), pH (p=0.097) and LDH (p=0.821) were not significant. Osmolality decreased(p=0.001) in SIP B(-5.33±5.02), compared to A(-2.5±4.62) and C(2.22±6.16).

In conclusion there were variations on the RBC integrity according to the type of SIP. The SIP A lead to potassium increase and SIP B resulted on reduced osmolality, demonstrating that the type of the equipment influenced the obtained results.


References (if needed)
LIFE-THREATENING BRONCHIAL OBSTRUCTION AND PNEUMOMEDIASTINUM: A VERY RARE PRESENTATION OF ANAPLASTIC LARGE CELL LYMPHOMA ALK +

L. Perry da Câmara¹, G. Pereira², G. Queirós², M. Oliveira², J. Oliveira Santos³, J. Eurico Reis⁴, R. Alves⁵, F. Pereira⁵, M. Santos²

¹Anesthesia Department, Hospital Curry Cabral, CHLC-EPE, Lisbon, Portugal
²Pediatric Intensive Care Unit, Pediatric Department, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal
³Pediatric Pneumology Unit, Pediatric Department, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal
⁴Cardiothoracic Surgery Department, Hospital de Santa Marta, CHLC-EPE, Lisbon, Portugal
⁵Pediatric Surgery Department, Hospital Dona Estefânia, CHLC-EPE, Lisbon, Portugal
⁶Pediatric Oncology Department, Instituto Português de Oncologia Francisco Gentil, Lisbon, Portugal

Anaplastic large cell lymphoma ALK + accounts for only 10-15% of childhood lymphomas¹. We present a 9 year old boy with no relevant past history and persistent cough without fever, for 4 weeks. He presented at the emergency room with severe dyspnea, hypoxemia and subcutaneous emphysema evolving his neck and face. His breathing sounds were diminished on the left hemithorax and bronchospasm was present. The X-ray and CT-scan showed thoracic subcutaneous emphysema, hyperinflated left lung, diffuse right lung infiltrate, right peribronchial lymphadenopaties and an anterior cardiac gas stripe suggesting pneumomediastinum. He was admitted in the ICU with stridor, worsening dyspnea and extended emphysema to the abdomen and genitals. He was intubated and submitted to rigid bronchoscopy, which showed an endobronchial mass obstructing the right bronchus and severe left bronchus stenosis, suggesting extrinsic compression. Biopsies were made and mediastinum and right chest tubes were placed. In the first 24 hours the mechanical ventilation was difficult and the emphysema exacerbated, maintaining air leak through the mediastinal tube. At day 4 doxorubicin was administered without diagnosis. Progressive improvement of emphysema and ventilation was verified at day 5. The biopsy revealed an anaplastic large cell lymphoma ALK + and targeted chemotherapy was started. He was submitted to another bronchoscopy, showing improvement of the left side stenosis and allowing the removal of the right side reduced endobronchial mass at day 11. He was extubated a day later with success.

STAFF PERCEPTIONS OF SOURCE AND IMPACT OF NOISE IN PAEDIATRIC INTENSIVE CARE

N. Read
1Birmingham Children's Hospital NHS Foundation Trust, PICU, Birmingham, United Kingdom

Background

Noise can be a significant issue within the PIC environment and impact patient recovery and wellbeing. In addition, it places nurses and other staff at risk for safety events and decreased job performance.

Objectives

In a 31 bed multi-disciplinary PICU: 1. Determine staff perceptions of main sources of noise; 2. Explore the impact of noise on staff and patients; 3. Explore suggestions for noise reduction.

Methods

A semi-structured questionnaire was distributed to 300 multidisciplinary PIC staff members during June-July 2016.

Conclusions/Results

Of 118 (40%) respondents, 74% felt that noise levels within PICU were too high. Monitor alarms, bedside talking and phones were perceived as main sources. Noise was felt to have a negative psychological impact on patients with 94% of staff (n=111) concerned patients are anxious and scared. Of respondents 92% (n=105) reported that noise made them feel stressed and distracted. Suggested solutions included promoting timely response to alarms and reduced lighting as this was observed by staff to reduce noise. However, reducing noise from staff talking was felt to be challenging due to patient acuity and, PICU size and lay-out. The biggest sources of noise are monitor alarms and bedside talking. Proposed noise reduction measures include introduction of reduced lighting with softer, more natural light sources and, promotion of timely review and actioning of monitor alarms.

PICU staff perceive noise to have a negative impact on patient wellbeing but also on staff ability to concentrate and on anxiety levels

References (if needed)
HYPOXIC ISCHAEMIC ENCEPHALOPATHY, RELATED COMPLICATIONS AND CASE REVIEW

R. Richards¹
¹Royal North Shore Hospital, Neonatal Intensive Care, Sydney, Australia

Background

Hypoxic-ischemic encephalopathy (HIE) is one of the most devastating complications in the newborn period. The rate of HIE is approximately 1-2/1000 term newborns in developed countries, with a mortality rate of 10%-20%. The advent of therapeutic cooling has led to a reduction in death and neurodevelopmental disability in treated newborns, and is now an accepted form of treatment.

Objectives

I aimed to review the complications of newborns in our institution who were cooled for HIE over a 5 year period to understand the myriad of complications that are encountered

Methods

The notes of newborns admitted to our hospital, with HIE who underwent therapeutic hypothermia between 2012-2016, were retrospectively reviewed to identify the myriad of complications encountered. There were 31 newborns, 24 inborn and 7 out born. Five newborns died, all from the outborn group. Other findings included a number of newborns with placental and cord complications, one found unresponsive on the mothers chest and 2 had subcutaneous fat necrosis. Of the newborns who survived, more than 50% had multi-organ dysfunction requiring individualised co-ordinated interventions. A case review of a newborn with HIE and multi-organ dysfunction will highlight the complexity of complications and management of these critical newborns

Conclusions/Results

With the increasing use of therapeutic hypothermia for neuroprotection, neonatal nurses need to be highly skilled in using the required treatment modalities as well as having a heightened awareness of the complications of HIE including the early signs of deterioration to ensure best possible outcomes.

References (if needed)
**Background**

National and International Neonatal Networks have been formed to use quality improvement methods to address variations in practice and outcomes.

**Objectives**

The role of the CNC is to be constantly evaluating care, identifying possible improvements in clinical practice, and promoting and encouraging involvement amongst all clinicians. All nurses have a responsibility to question our practice. But how do we do this? We need to: understand CPI methodology, identify areas for improvement by talking to colleagues across our specialty, question our practice daily, develop a culture of enquiry looking for ideas and solutions, undertake a literature search, present the evidence, write or get help to construct the research question, and finally undertaking the research.

**Methods**

In 2010 the Neonatal Clinical Nurse Consultant (CNC) Group developed a survey to identify potentially better practices in the management of PICC in NICU. In 2011 the NICUS CPI Group was established to develop strategies to decrease the incidence of blood stream infections (BSI) in extremely premature neonates <29 weeks gestation between day 3 to 35 from 7.8 to 3.8 per 100 bed days between 2012 and 2014 in NICU’s in NSW and ACT. Open, frank discussion during regular meetings, comparing practice variations and current practices had led to sustained practice improvements across NICU’s.

**Conclusions/Results**

Quality neonatal care is based on questioning practices and identifying the relationship between care delivered and patient outcomes.

**References (if needed)**

Bowen, J Callander I, Richards R, Lindrea K. Decreasing infection in neonatal intensive care units through quality improvement. *Arch Dis Child Fetal Neonatal Ed* 2016; 0:F1–F7
ARE POST-SURGICAL NEONATES IN PAIN ON OUR NICU?
S. Ritchie-McLean¹, Q. Mok¹
¹Great Ormond Street Hospital, NICU, LONDON, United Kingdom

Background

Increasing numbers of sick neonates undergo surgery. Effective analgesia is essential to reduce distress and physiological pain responses, and may improve outcomes.¹ The effects of analgesic drugs on the developing central nervous system are uncertain so it is essential to strike a balance between effective pain relief and excess drug administration.

Objectives

We wanted to find out whether we are effectively managing post-surgical pain in infants treated on our predominantly surgical neonatal intensive care unit.

Methods

We used the PICANET database to identify all infants undergoing surgery between January and July 2016 in our NICU. Electronic patient records were reviewed. Nurses use the neonatal Pain Assessment Tool to measure pain. This uses a range of physiological and behavioural observations to derive a score, with scores ≥9 suggesting severe pain. All pain scores and interventions to treat pain in the first 48-hours post-operatively were analysed.

Conclusions/Results

Data from 50 infants were analysed. 26 pain scores in 19 individuals were ≥9. Interventions included bolus analgesia, increasing background infusion, or both. Subsequent pain score was <9 on all but one occasion.
Our study has shown that a significant proportion of infants undergoing surgery experience pain post-operatively, but management of pain when it is identified is good.

References (if needed)

A Pediatric Early Deterioration Indicator for Prediction of Transfer From the General Ward to the Pediatric Intensive Care Unit

J. Rubin¹, C. Potes¹, M. Xu-Wilson¹, A. Rahman¹
¹Philips Research North America, Acute Care Solutions, Cambridge, USA

Background

Approximately 1% - 3% of pediatric patients admitted to the general ward of a hospital will be transferred to the pediatric intensive care unit (PICU) due to a deterioration in health. Early deterioration indicators have the potential to alert hospital care staff in advance of adverse events, such as patients requiring an increased level of care, or the need for rapid response teams to be called.

Objectives

The development of an early deterioration indicator for pediatric patients with the purpose of predicting encounters where transfer from the general ward to the PICU is likely.

Methods

A total of 18,881 pediatric patient encounters collected from two medical centers were used to train and evaluate age-specific prediction models. Using six-hour observation windows of physiologic measurements, models were trained using gradient boosted decision trees for predicting transfer versus non-transfer. We evaluate the produced models by training on data collected from one hospital facility and testing on unseen data collected from a separate facility.

Conclusions/Results

Retrospective evaluation on unseen data gives average area under the ROC curve (AUC) values of 93.56% for models including trend information and 74.09% for models excluding trend (physiologic values only) when predicting transfer from 6 hour observation windows. Our results show that classification performance is high when trend information is included in the model. However, care must be taken to ensure that the model learns an appropriate strategy for classification and is not overly affected by measurement frequency information.

References (if needed)
END OF LIFE CARE: BABIES, CHILDREN AND YOUNG PERSON’S JOURNEY

C. Ryan¹
¹ROYAL MANCHESTER CHILDREN’S HOSPITAL, Paediatric Paediatric Critical Care, Manchester, United Kingdom

Background

This presentation provides an overview of the planning and management of end of life for babies, children and young persons with life-limiting/life threatening conditions. The work responded to the needs identified locally in Manchester, UK which resonated with the national perception of end of life care for infants, children and young people and fulfils the recently published guidance by NICE (2016). It aims to involve children, young people and their families in decisions about their care, and improve the support that is available to them at the end of life in order to respect their wishes. The work was undertaken in collaboration with a leading UK based children’s charity, Together for Short Lives.

Objectives

Documentation was designed to outline and capture the care progression throughout the end of life journey. Documentation was specifically adapted for electronic use, with the availability of hard copy versions for non-intensive care area use. To ensure personalised care there are supportive individualised care plans, implementation was underpinned by a programme of training and quality of care provided was monitored through clinical audit.

Methods

Service improvement programme with third party collaboration and public involvement. Review of standards of care available nationally, design of electronic documentation, staff engagement, training programme implementation, audit outcomes against standards.

Conclusions/Results

Respecting the wishes of children, young people and their family is paramount when delivering end of life care to ensure sensitive personalised care.

References (if needed)

NICE: End of life care for infants, children and young people with life-limiting conditions: planning and management (NG61); 7th December 2016.
END OF LIFE CARE: BABIES, CHILDREN AND YOUNG PERSON’S JOURNEY

C. Ryan

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Respecting the wishes of children, young people and their family is paramount when delivering end of life care to ensure sensitive personalised care.

References (if needed)

NICE: End of life care for infants, children and young people with life-limiting conditions: planning and management (NG61); 7th December 2016.
STABILITY OF CAPTOPRIL TABLETS AFTER TRITURATION, DILUTION AND DOSE FRACTIONATION

S. Pereira-Kushiyama¹, T. Calegari¹, D. Porto Barros¹, P. Sete de Carvalho Onofre¹, M. da Luz Gonçalves Pedreira¹, P. César Pires Rosa², D. Miyuki Kusahara¹, M.A. Sorgini Peterlini¹

¹Federal University of São Paulo, Paulista Nursing School, Sao Paulo, Brazil
²State University of Campinas, Faculty of Pharmaceutical Sciences, Campinas, Brazil

Background

Introduction: Captopril is widely used in children for the treatment of hypertension. Children often require lower doses than those provided in the pharmaceutical presentation commercialized, mainly in developing countries, being carried out grinding, dilution and dose fractionation prior to administration. Nurses are aware for the risk of dose errors.

Objectives

Objective: To check the stability of captopril tablets after grinding, dilution and fractionation performed by three pediatric nurses.

Methods

Methods: Experimental study developed in controlled environmental conditions. Each professional ranched three captopril tablets (25 mg), diluted in 5 mL of purified water and each dilution removed with syringe, 2 mL aliquot (10 mg) The analysis of concentration was held immediately after the preparation by High Performance Liquid Chromatography (HPLC). Data was analyzed according to average and standard deviation.

Conclusions/Results

Results: Immediately after dilution the compressed content was aspirated, and for the intended dose 54.98 (±3.57)% could be aspirated by one nurse, 55.04% (± 1.66) % by the second and 55.43 (± 1.35) % by the third

Conclusion: There was change in concentration between the professionals who prepared the drug, not showed loss of stability after the handling of the pills and the dose was 50% of the vacuumed prescribed.

References (if needed)

Acknowledgments: Capes Coordination Improvement Higher Level Personnel
PARENTAL SATISFACTION WITH NURSING CARE – APPLYING NURSE PARENT SUPPORT TOOL IN A PORTUGUESE NEONATAL AND PEDIATRIC INTENSIVE CARE UNIT
M. Sousa¹, D. Ferreira¹
¹Hospital Prof. Doutor Fernando Fonseca, UCIENP, Amadora, Portugal

Background

Parental satisfaction with nursing care is a quality and nursing-sensitive indicator in pediatric nursing care, essential to the provision of family centered care. Measurement of this indicator may lead to the development of strategies to improve quality care, parental satisfaction and decreasing stress.

Objectives

In order to analyse parental satisfaction with nursing care as a tool and quality indicator, we applied the Portuguese adaptation of the Nurse Parent Support Tool (NPST).

Methods

This semi-structured questionnaire of 21 items was responded by 141 parents of children admitted to Neonatal and Pediatric Intensive Care Unit (UCIENP) of Hospital Professor Dr Fernando Fonseca, for more then 72 hours, during 2015 and 2016, who were asked to rate the amount of support received from nurses.

Conclusions/Results

The overall assessment of support reveals that parents felt most of the time and almost always supported by nurses [Mean (M)=4.58, Standard Deviation (SD) = 0.71]. Parents were satisfied with the quality of the physical and psychosocial care to their child, although the information domain of support was the area in which the parents felt less satisfied (M=4.50, SD= 0.81) and “Include me in discussions when decisions are made” was the item with lower support perceived by parents (M=4.24, SD= 0.99). The results allied with the evidence, demands us a change of attitude, through a better understanding of the parents’ perspective. Nurses need to find strategies to create a truly partnership with parents by including them in the decision making, that must influence the education and practice in UCIENP.

References (if needed)
PROFILE AND THE MAIN CAUSES OF DEATH OF NEWBORNS IN A HOSPITAL IN THE INTERIOR OF SAO PAULO-BRAZIL

S. Tavares¹, C. Braz da Silva², T. Aparecida Maciel da Silveira², D. Porto Barros¹
¹Universidade de Sorocaba, Pediatria - professor, Sorocaba, Brazil
²Universidade de Sorocaba, enfermeira, Sorocaba, Brazil

Background

Currently, neonatal mortality accounts for almost 70% of deaths in the first year of life.

Objectives

To outline the profile of neonatal deaths in a hospital in the interior of São Paulo-Brazil.

Methods

Descriptive and retrospective, documentary research in a hospital in the interior of São Paulo-Brazil, using the Medical Archive and Statistical Service and subsequent quantitative analysis. Medical records of neonates who died at Hospital Sorocaba between January 2014 and January 2016 were analyzed to verify the main causes of death.

Conclusions/Results

Results: The sample consists of the analysis of 54 medical records. Of these, 28 (50.9%) were male and 26 (47.2%) female. Regarding the gestational age at birth, 26 (48.1%) were born between 30-39 weeks, 24 (44.4%) between 20-29, 2 (3.7%) of 40 weeks and 2 (3.7%) were born less than 20 weeks. Regarding the type of delivery, 30 (55.5%) were cesarean, 23 (42.5%) normal and 1 (1.8%) forceps delivery. Concerning causes of death, 37 (68.5%) reported prematurity, followed by neonatal infection in 17 (31.4%), septic shock 15 (27.7%), neonatal sepsis 11 (20.3%), respiratory distress syndrome 9 (16.6%), pulmonary hemorrhage 7 (12.9%), and cardiogenic shock 6 (11.1%). Regarding the maternal age, 1 (1.8%) mother with 14 years, 2 (3.4%) with 15, 8 (14.8%) between 16 and 20, 14 (25.9%) between 21 and 29 and 14 (25.9%) between 30 and 39 years.

Conclusion: Adequate care for the newborn has been one of the challenges to reduce infant mortality rates in Brazil.

References (if needed)
Background

Preterm infants are at risk of suffering respiratory problems and concomitant diseases due to their immature systems increasing the risk of developmental disorders.

Objectives

Our objective was to check if Vojta therapy can reduce perinatal risk in preterm infants with respiratory distress syndrome (RDS).

Methods

Sixty preterm infants with gestational age (GA) ≤ 32 weeks and a diagnosis of RDS were randomly allocated into two groups: experimental group (EG, N=32), and a control group (CG, N=28). Both groups received standard care in the neonatal intensive care unit (NICU), additionally the EG received two daily sessions of 5 minutes of Vojta therapy during 30 days. There were no significant differences between the groups in GA [EG: 28.2 weeks, CG: 28.9 weeks, p-value=0.218], birth weight [EG: 1122.56 g, CG: 1160.35 g, p-value=0.630] and gender distribution [p-value=0.554]. All infants were assessed with the Perinatal Risk Inventory (PERI) when discharged.

A t-Student test was carried out of mean differences for independent samples between the scores of perinatal risk of both groups. $D$ statistic was calculated to determine the effect size.

Our findings reveal significant differences between both groups, with significantly better outcome among the infants who received Vojta Therapy; infants in EG obtained lower PERI scores [p-value<0.001] when compared to the CG. The effect size was large among the EG in the reduction of perinatal risk (d=0.95).

Conclusions/Results

The Vojta therapy has high clinical relevance; it is effective in reducing PERI scores of preterm infants with RDS.

References (if needed)
PHYSIOTHERAPY EFFECT ON THE REDUCTION OF DAYS OF VENTILATORY SUPPORT IN PRETERM INFANTS WITH RESPIRATORY DISTRESS SYNDROME

F.J. Fernández Rego¹, G. Torró Ferrero², J. Agüera Arenas³, A. Gómez Conesa²
¹Lorca, Spain
²University of Murcia, Physiotherapy, Murcia, Spain
³Virgen de la Arrixaca Hospital, Neonatal Intensive Care Unit, Murcia, Spain

Background

Bronchopulmonary Dysplasia (BPD), which is a consequence of perinatal Respiratory Distress Syndrome (RDS) and ventilation extended beyond 28 days, is a very frequent pathology in preterm infants and a risk factor that may affect the child’s development.

Objectives

Our objective was to ascertain if physiotherapy, using Vojta therapy, applied in the Neonatal Intensive Care Unit (NICU), can reduce the days of ventilatory support in preterm infants with RDS.

Methods

Sixty preterm infants with gestational age (GA) ≤ 32 weeks and a diagnosis of RDS were randomly allocated into two groups: experimental group (EG, N=32), and a control group (CG, N=28). Both groups received standard care in the neonatal intensive care unit (NICU), additionally the EG received two daily sessions of 5 minutes of Vojta therapy during 30 days. There were no significant differences between the groups in GA [EG: 28.2 weeks, CG: 28.9 weeks, p-value=0.218], birth weight [EG: 1122.56 g, CG: 1160.35 g, p-value=0.630] and gender distribution [p-value=0.554].

A t-Student test was carried out of mean differences for independent samples between the days of ventilatory support of both groups. D statistic was calculated to determine the effect size.

Our findings reveal significant differences between both groups, with significantly better outcome among the infants who received Vojta Therapy [p-value=0.003]. The effect size was large in the reduction of days of ventilatory support (d=1.76).

Conclusions/Results

The physiotherapy, using Vojta therapy, has high clinical relevance; it is effective in reducing the days of ventilatory support in preterm infants with RDS.

References (if needed)
HOW DO PARENTS OF CHRONICALLY ILL CHILDREN ADMITTED TO THE PICU PERCEIVE THEIR PARENTAL EXPERTISE?

K. van der Leeden¹

¹Wilhelmina Children’s Hospital- University Medical Center Utrecht, Department of Paediatric Intensive Care, Utrecht, The Netherlands

Background

Of the children admitted to the Paediatric Intensive Care Unit (PICU) a growing extend are chronically ill. Parents have parental expertise about their chronically ill child. This parental expertise is not always heard, appreciated or used by professional caregivers. When parental expertise is not fully recognized, parents experience that they fail in the care for their chronically ill child (1).

Objectives

To investigate how parents perceive their parental expertise in daily care for their chronically ill child at the PICU.

Methods

Qualitative research by open interviews about the stay on the PICU. Criteria for inclusion: admission to the PICU for more than 5 days and meet the criteria for chronically ill children (2).

Conclusions/Results

In total 6 parents were included. Parents see themselves as experts and consider their parental expertise very important in daily care. Parents want to continue their expertise to remain their parental role at the PICU. Furthermore they consider it as important that there is sincere attention and involvement to themselves and their child. They experience no difference between expertise, attention and involvement. For parents these 3 factors are equally important for good clinical care.

Conclusion

Parents of chronically ill children admitted to the PICU need recognition of their parental expertise so they can continue their parental role. They perceive sincere attention and involvement as important in daily care.

References (if needed)

VENTILATION PRACTITIONER A NEW PROFESSIONAL IN PICU: THE SURVEY

M. Van Poppel\(^1\), E.S. Veldhoen\(^1\)
\(^1\)University Medical Center Utrecht, WKZ/ children's hospital /PICU, Utrecht, The Netherlands

Background

Two Ventilation Practitioners (VP) are working in the department, consisting of pediatric cardiology ward, pediatric intensive care unit (PICU) and respiratory care unit (RCU), of the Wilhemina Children’s Hospital. The VP takes care of ventilation and other modes of respiratory support, thereby aiming to increase the quality of care.

This prospective study reviewed the role of the VP experienced by the medical and nursing team, as well as future perspectives.

Objectives

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<th>Aspect</th>
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<th>very important, n(%)</th>
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Methods

A questionnaire was sent to medical (n=25) and nursing staff (n=102) with 9 questions about the current and desired role of the VP in the team. Questionnaire could only be replied to within 4 days.

Conclusions/Results

We had a response rate of 68% in medical team and 30% in the nursing team, mainly PICU nurses (80% of total response of nursing staff).

The role of the VP in the clinical setting is rated most important (table 1); research is rated less important. Overall, the VP scores 8.1 on scale of 10. The influence of non-response bias is unknown.

Future roles that are proposed by the team are: standard involvement in changing ventilation settings or weaning, more collaboration with NICU, RCU and general wards.

Conclusion:
The VP plays an important role in our PICU. In future more extensive involvement in PICU as well as in other departments is desired.

References (if needed)
VENTILATION PRACTITIONER A NEW PROFESSIONAL IN PICU

M. Van Poppel\textsuperscript{1}, A. Duyndam\textsuperscript{2}, M. Tinnevelt\textsuperscript{1}, E. Veldhoen\textsuperscript{1}
\textsuperscript{1}University Medical Center Utrecht, WKZ/ PICU, Utrecht, The Netherlands
\textsuperscript{2}Erasmus Medical center, Sophia kinderziekenhuis/ PICU, Rotterdam, The Netherlands

Background

Pediatric and neonatal intensive care units take care of severely ill children with threatened vital functions, requiring to take over these functions partially or completely.

In March 2002 training to become ventilation practitioner (VP) started in The Netherlands; the first group with nine adult ICU nurses from 5 different hospitals.

Currently, 11 VPs are working on different pediatric and neonatal intensive care units in The Netherlands and Belgium.

The VP has an important role in management and care regarding respiratory support and ventilation. Aim is to increase quality of care.

Objectives

In our PICU the VP takes care of the respiratory support in all children, together with the medical staff.

The VP gives advice and bedside-teaching on request or spontaneously to nursing and medical staff in PICU and the general wards. This probably increases the knowledge and expertise of the whole medical and nursing team. The VP is also involved in research by defining research questions as well as doing research themselves and helping others with their research projects. By focussing exclusively on ventilation instead of all vital problems in PICU, it is easier to keep up-to-date on new developments by reading literature, visiting conferences and by contacting experts in this field.

Methods

The society of VP takes care of quality of her members. Medical and nursing heads of departments are informed about the activities of their VP.

Conclusions/Results

There is an important role for the ventilation practitioner in the PICU
AN INTERNATIONAL SURVEY OF PICU NURSES’ ENDOTRACHEAL SUCTIONING PRACTICES: PRELIMINARY ANALYSIS

L. Walsh1, L. Tume2, B. Carter3, M. Curley4, B. Copnell5
1Alder Hey Childrens Hospital, PICU / RESEARCH, Liverpool, United Kingdom
2Alder Hey Childrens Hospital, Senior Research Fellow/ Nurse Scientist PICU, Liverpool, United Kingdom
3Alder Hey Childrens Hospital, Professor of Children's Nursing, Liverpool, United Kingdom
4University of Pennsylvania, School of Nursing, Philadelphia, USA
5Monash University, School of Nursing and Midwifery, Clayton, Australia

Background

Endotracheal suctioning (ETS) is one of the most common nursing procedures performed in paediatric intensive care units (PICU).

Objectives

In this study, we aimed to examine international ETS practices.

Methods

In two time periods, we conducted an international e-survey. PICU nurse participants were identified by membership in professional organizations. PICU nurses were instructed to complete the e-survey after ETS so that data could be associated with an individual patient.

Conclusions/Results

446 surveys were returned from 20 countries (Table 1). Most children (60%; 267/446) were less than 1 year of age and the top three categories of patients were respiratory failure (20%; 91/446), respiratory infection (20%; 88/446), post-operative cardiac (8%; 37/446). Most patients (92%; 412/446) were conventionally ventilated. The primary reason for ETS was audible/visible secretions (44%). 57% (252/446) of nurses used closed-circuit ETS. 63% (282/446) patients were pre-oxygenated prior to suction. 58% (257/446) ETS were performed by 1 nurse, 40% (179/446) involved 2 people. The majority (65%; 290/446) of patients showed no deterioration during or after ETS; 32% (143/446) showed mild deterioration and 3% (13/446) had severe deterioration. The respondents practiced in the PICU for 9 years (SD 7.9) and most (54%; 242/446) had an additional PICU qualification. 82% (367/446) nurses stated their unit had guidelines for endotracheal suctioning.

This is the first international survey of ETS in PICU. Most PICU patients tolerated ETS well with minimal deterioration. Initial analyses show some variations in practice. Further in-depth analysis of cross country
differences will be explored.

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<td><strong>Total responses</strong></td>
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</table>
ALARM BELLs OF HYPEROXIA – ARE WE LISTENING?

M. Zoha¹, D. Duffy²
¹St George's University Hospitals NHS Foundation Trust., Regional Neonatal Unit, London, United Kingdom
²St George's University Hospitals NHS Foundation Trust, Regional Neonatal Unit., London, United Kingdom

Background

Appropriate guidelines and their adherence are crucial to prevent the unintended consequences of supplemental oxygen in preterm infants. While studies suggest increased mortality in preterms with oxygen saturation below 90%, there is increased risk of morbidity with pulse oximetry saturation readings above 95%.

Objectives

1. To investigate the staff’s response, when oxygen saturation alarms are set off [in neonates requiring supplemental oxygen].
2. To review the extent of adherence to current guidelines.

Methods

The limits of pulse oxygen saturation alarm settings on the monitor are predefined in the local guidelines according to the gestational age and clinical condition of the baby.
We analysed events, the response of cot side staff to alarms, and reviewed the alarm settings on the monitor.
This prospective audit was done in August 2016.

Conclusions/Results

Results:
Eighteen monitored neonates were observed. All were born preterm, and were on supplemental oxygen with respiratory support.

Alarms were set, out of guidance on 7 monitors[40%]. The upper limits of the, incorrectly set alarms, were set higher.

Among those [60%], where the alarms were set as per guidance, 41 episodes of alarm off sets were observed. Twenty one alarms were due to high saturation. There was no response by the cot side staff in 67% episodes when saturation read high, compared to 20% when low.

Conclusion:

Neonatal cot-side staffs are less responsive to hyperoxia, compared to low saturation alarms on the monitor. Appropriate alarm settings, periodic checks and increased awareness to limit supplemental oxygen to only as necessary, can prevent oxygen toxicity and its sequelae.

References (if needed)
WARFARIN EMBRYOPATHY: BALANCING MATERNAL AND FETAL RISKS WITH ANTICOAGULATION THERAPY

S. Ferreira¹, R. Costa², D. Malheiro¹, F. Vieira¹, M. Tuna¹
¹Centro Hospitalar de Lisboa Ocidental, Neonatal Intensive Care Unit, Lisbon, Portugal
²Hospital Espírito Santo, Pediatrics Department, Évora, Portugal

Background

Warfarin embryopathy is a rare condition characterized by nasal hypoplasia and skeletal abnormalities due to fetal exposure to warfarin. Anticoagulation with low molecular weight heparin (LMWH) is an option, but may not be as effective in reducing thromboembolic events. The European Society of Cardiology recommends substituting warfarin for LMWH at 6-weeks gestational age to minimize the risk of congenital malformations.

Objectives

To describe a case of warfarin embryopathy after a pregnancy anticoagulation regimen compliant with European guidelines, showing there is still risk in this approach.

Methods

Case Report:
A male newborn, weighing 3170g, was born to a 21-year-old gravida 2 para 0 woman, at 39-weeks gestational age. The mother had history of rheumatic heart disease with mechanical mitral valve replacement and was on warfarin for thrombotic prophylaxis. A multidisciplinary team decided to switch anticoagulation to LMWH from 6 to 12 weeks and to maintain warfarin therapy for the rest of the pregnancy. This decision followed a complicated first pregnancy, with a transient ischemic attack at 23-weeks gestational age, on LMWH anticoagulation, that lead to miscarriage. The baby presented with nasal hypoplasia and x-ray study showed absence of nasal bones and stippling of both femurs. He developed respiratory distress and needed high-flow oxygen therapy by nasal cannula with favorable outcome.

Conclusions/Results

Embryopathy can occur even when best practices are adopted. An optimal anticoagulation regimen for pregnant women with mechanical heart valves is still controversial. Despite warfarin’s known teratogenic effect, it’s still needed when the risk of thromboembolic events outweighs the risk of fetal malformations.

References (If needed)
PHARMACOLOGY

ESPN7-0258

EFFECTIVE THROMBOLYSIS WITH DALTEPARIN CONTINUOUS INTRAVENOUS INFUSION IN CHILDREN WITH SEVERE VENOUS THROMBOSIS AND THROMBOEMBOLISM

C. Martin1, K. Laabs1, L. Kiechle1, O. Beck1, R.G. Huth1, H. Schinzel2, S. Gehring1

1University Medical Center Mainz, Children's Hospital, Mainz, Germany
2Outpatient Coagulation Center, CardioCentrum Mainz, Mainz, Germany

Background

In children with severe thrombotic or thromboembolic complications conventional thrombolytic therapy is often not indicated because they are diagnosed outside of the recommended therapeutic time window or due to contraindications. Currently these patients are treated with unfractionated heparin (UFH) as a continuous infusion in the acute phase. A reliable prevention of further thrombosis can be achieved, but a reduction of thrombus size is rarely seen. In contrast to UFH, low-molecular-weight heparins (LMWH) have a thrombolytic effect in addition to antithrombotic activity. [1]

Objectives

To assess the thrombolytic activity of LMWH dalteparin was used as a continuous intravenous infusion targeting high anti Xa levels (0.6-1.0).

Methods

Since 2011 more than 10 patients between 1-18 years with severe thrombotic and thromboembolic events have been treated with dalteparin with continuous intravenous infusion. The underlying diagnoses were sinus thromboses, severe deep venous thromboses, pulmonary embolism and catheter-associated thrombi. In all patients a significant reduction of the thrombus size was observed, in some patients even complete dissolution of the thrombi without secondary embolism could be achieved. Severe bleeding complications did not occur.

Conclusions/Results

Dalteparin administered as a continuous intravenous infusion could be a safe and effective therapy option for thrombolysis if there are contraindications to a conventional thrombolytic therapy.

References (if needed)

PHARMACOLOGY

ESPN7-0129

FACTORS ASSOCIATED WITH SUCCESSFUL PATENT DUCTUS ARTERIOSUS CLOSURE AMONG EXTREMELY LOW BIRTH WEIGHT INFANTS TREATED WITH INDOMETHACIN

J. Pham1, K. Moran2

1University of Illinois at Chicago College of Pharmacy, Pharmacy Practice, Chicago, USA
2University of Illinois at Chicago College of Pharmacy, Department of Pharmacy Systems- Outcomes and Policy, Chicago, USA

Background

Premature infants have a higher risk of patent ductus arteriosus (PDA) due to their sensitivity to the vasodilatory effects of prostaglandins. About 20% to 30% of PDA fails to close with pharmacologic treatment.

Objectives

To identify maternal and neonatal factors associated with successful closure of PDA in extremely-low-birth-weight (ELBW) infants treated with intravenous indomethacin and to compare subsequent neonatal comorbidities

Methods

This was a retrospective single-center study of ELBW infants with a PDA between 2011 and 2013. Clinical characteristics of infants with successful closure of PDA were compared to those without closure. Predictors of PDA closure were identified using uni- and multivariable logistic regression.

Conclusions/Results

Results: A total of 74 infants were identified with a PDA; 45 infants had a hemodynamically significant PDA and were treated with indomethacin. Successful PDA closure with a first course of indomethacin occurred in 64.4% (n=29) of infants. Infants with PDA closure were more likely to be male (odds ratio 11.7; 95% confidence interval: 1.35-101.4; p = 0.02) and less likely to receive indomethacin prophylaxis (odds ratio 0.05; 95% confidence interval: 0.005-0.53; p = 0.01) compared to those without successful PDA closure. Ten (62.5%) infants who failed indomethacin required ligation. Compared to infants with PDA closure, those who failed indomethacin were significantly more likely to have moderate-to-severe bronchopulmonary dysplasia (87.5% vs 58.6%, p = 0.04) and a longer hospital stay (108 days vs 86 days, p = 0.05).

Conclusions: Male gender and not receiving prophylactic indomethacin are predictors for PDA closure in ELBW infants treated with indomethacin.

References (if needed)
TOXIC EPIDERMAL NECROLYSIS (TEN) AFTER USE OF LAMOTRIGINE IN A CHILD - CASE REPORT

F. Rezende Caino de Oliveira1, F. Lima2, M.D. Barauna2, M. Borges Gavaza Barbosa2
1University Hospital, Pediatric intensive care unit, Sao Paulo, Brazil
2Santa Izabel hospital, PICU, Salvador, Brazil

Background

Toxic epidermal necrolysis (TEN) is the most severe cutaneous adverse reactions to medications. In TEN the epidermal detachment is more than 10% of the body surface area. Mortality rates is approximately 5%. More than 220 medications have been implicated.

Objectives

Case report of Lamotrigine induced TEN in a child

Methods

RMSA, male, 12 years old, 43 kg, with diagnosis of autism in the regular use of risperidone. One month after the onset of symptoms, the use of lamotrigine was initiated. Minor admitted to PICU on 11/8/16. He was evaluated by dermatology, presented erythema in the face, exulceration in the region of the nose on the right, exulcerations and bleeding in the lips, papules on the legs, edema and erythema in the region of the right scrotal sac. Diagnosis of TEN presumably by use medication (Lamotrigine). Made use of human immunoglobulin 1.5 g / kg. It was oriented not to debride the lesions and avoid use of corticosteroids and medications that may induce worsen the picture. Total parenteral nutrition was initiated due to the impossibility of using the digestive route due to oropharyngeal lesions. An oral liquid diet was started after debridement of the lesions in the face even with previous contraindications. Several antibiotics were used during PICU stay guided by antibiograms. It evolved to discharge from PICU eighteen days of the admittance

Conclusions/Results

The use of lamotrigine in psychiatry has increased significantly after its approval by the FDA. Therefore not only pediatricians but also psychiatric clinicians should keep concern about this issue.

References (if needed)
Background

Haemolytic uraemic syndrome (HUS) is characterised by microangiopathic haemolytic anaemia, thrombocytopenia and acute kidney injury.

Typical HUS is associated with gastrointestinal infection with Shiga toxin-producing enterohaemorrhagic Escherichia coli strains. Atypical HUS (aHUS) is associated with complement dysregulation due to mutations or autoantibodies, or to infections, drugs and systemic diseases.

The management of HUS remains supportive, including renal replacement therapy (RRT) in some cases. Recently, patients with aHUS can be effectively treated with the monoclonal anti-C5 inhibitor eculizumab.

Objectives

In Table 1 we show 4 cases.

Methods
Conclusions/Results

Severity and damage in HUS differs according to etiology. Eculizumab can be an alternative to plasmapheresis in aSHU, and in cases with neurological injury. Any patient needs a long-term renal follow-up.

References (if needed)
PSEUDOMONAS AERUGINOSA FORMS BIOFILMS IN FLUIDS USED IN DIALYSIS FACILITIES

R.H. Pires¹, P. Bianchi Costa¹, L. Teodoro Oliveira¹, L. Almeida Czonka¹
¹University of Franca, Postgraduate Program in Health Promotion, Franca, Brazil

Background

Hemodialysis is a therapeutic option for patients with acute or chronic renal failure that use a machine where concentrated (acidic and basic) electrolyte solutions are diluted with water to make up the dialysate, allowing the substances exchange with the patient's blood. Infections, including those related to biofilms have contributed to the increase in the morbidity and mortality rate in this population. Biofilms are microbial communities embedded by extracellular polymeric material secreted by the organisms themselves, in which the proximity between the microorganisms allows the transfer of antimicrobial resistance genes.

Objectives

It was proposed to evaluate the ability of biofilm formation by Pseudomonas aeruginosa in fluids used in hemodialysis and in standard culture medium in both aerobiose and microaerophilic

Methods

Strains recovered from the water circuit of a dialysis facility were used for biofilm formation in 96-well microplates. The violet crystal methodology determined the biofilm biomass.

Conclusions/Results

After 24h at 37 °C, P. aeruginosa formed biofilm in all nutrient media tested, both aerobic and microaerophilic. A higher amount of biomass was observed in the culture medium and, among the dialysis fluids, the acid solution was the fluid that most favored the growth of biofilms. Thus, this study can collaborate with information and knowledge regarding the P. aeruginosa biofilms in the dialytic environment, alerting to the inclusion of biofilms in the standardizations for fluids used in Dialysis Services by the regulatory agencies, since these are currently focused only in bacteria in the free form of growth.

References (if needed)

Acknowledgments: We thank FAPESP for financial support (project 2015/19090-5).
Background

Pulmonary alveolar proteinosis (PAP) is a rare interstitial lung disease with abnormal accumulation of surfactant proteins and fosfolipids within the alveoli. It can lead to respiratory failure. The standard treatment is whole lung lavage (WLL). Techniques of lung isolation during WLL used in adults must be modified in children with small airways’ diameter and coexisting respiratory failure. Up today the standard management doesn’t exist. The aim of this report is to support safety and efficacy of lung isolation technique possible to use in infants.

Case presentation. An infant with PAP and progressive respiratory failure fulfilled criteria for WLL at 9 months. We decided to use technique with Swan-Ganz catheter (SGC) described previously in older children: the main bronchus of one lung is occluded with the SGC balloon, WLL of that lung is performed through SGC and selective ventilation of the other lung is accomplished by the endotracheal tube. We performed 10 procedures within 15 months, then for 2 years no WLL was required. Gradual improvement in respiratory function and radiological imaging was observed. The complications were balloon displacement, balloon rupture and fluid leak around it. The significant hypoxia or hypercapnia didn’t occur.

Objectives

The aim of this report is to support safety and efficacy of lung isolation technique possible to use in infants.

Methods

Technique of lung isolation in infant with the use of Swan-Ganz catheter

Conclusions/Results

The described technique of lung isolation with Swan-Ganz catheter enables effective and safe WLL even in small infants with severe respiratory failure due to PAP.

References (if needed)
Background

Large numbers of blood gases are taken on a daily basis in PICU's. Whilst blood gas analysis is important, a considered approach to the frequency with which they are obtained should be taken, to balance clinical need with negative effects including pain of sampling, iatrogenic anaemia, and rising costs.

Objectives

To record information regarding blood gas sampling throughout a patient's PICU admission, and to inform our practice to reduce unnecessary blood gas analysis.

Methods

24 patient PICU charts were reviewed between October to December 2016.

Conclusions/Results

The median duration of admission was 48.5 hours (range 9-544 hours). The duration of mechanical ventilation was 24 hours (range 0-525 hours). A total of 453 blood gases underwent analysis. 35.8% of blood gases were taken within the first 24 hours of admission. 53.2% of blood gas pCO₂'s were within 10mmHg of the end-tidal CO₂. An identifiable action was taken following 219 samples (48.3%). Blood gases were more likely to be taken at specific times of the day.

Conclusions: As capnography is universal on our PICU, one strategy to minimise sampling could include increasing focus on end tidal CO₂'s. Sampling appears to peak around the time of nursing handover. It is difficult to draw conclusions about the reason at the time for obtaining a blood gas. However, reinforcing education with PICU staff to have greater consideration as to when to perform blood gas analysis may be necessary.

References (if needed)
RESPIRATORY FAILURE part 1

ESPN7-0087

SURFACTANT ACTIVITY DURING WHOLE BODY HYPOThERMIA IN NEONATES WITH OR WITHOUT LUNG INJURY

D. De Luca¹, C. Autilio², M. Echaide², L. De Martino¹, V. Dell'Orto¹, J. Perez-Gil²

¹South Paris University Hospitals, Pediatrics- Neonatal Critical Care and Transportation, Clamart Paris, France
²Faculty of Biology and Research Institut Hospital 12 de Octubre- Complutense University- Madrid- Spain,
Department of Biochemistry-, Madrid, Spain

Background

Whole-body hypothermia (WBH) is used to improve neurological outcomes in perinatal asphyxia. Recent studies suggested a beneficial effect of hypothermia in some acute respiratory failures [1,2,3]. However, scanty data are available about the biophysical function of human surfactant during WBH. We previously shown that WBH improves surfactant interfacial adsorption. [4]

Objectives

To clarify whether WBH improves surfactant activity in asphyxiated neonates with or without meconium aspiration syndrome (MAS) with a complete biophysical study.

Methods

Nonbronchoscopic bronchoalveolar lavage (BAL) has been collected from 10 asphyxiated neonates (2 with MAS, 8 without lung disease) at different time-points (pre-WBH, 24h, 48h, 72h of WBH and post-WBH). Surfactant was extracted and tested by captive bubble surfactometer (CBS) in triplicate, at 37°C and 33.5°C, through initial adsorption and dynamic compression-expansion cycling. Choline and cholesterol were assayed using enzymatic methods.

Conclusions/Results

Minimum surface tension under dynamic testing was significantly lower at 33.5°C than at 37°C: the difference was evident after 48h of WBH and remained significant at 6h after rewarming (48h: p=0.031; 72h: p=0.015; rewarming: p=0.002, Fig.1). Cholesterol showed a trend to decrease during WBH. Similar results were obtained in MAS patients, who had best gas exchange when surface tension and cholesterol were maximally reduced. Surfactant activity improves after 48h of WBH in asphyxiated neonates and this is maintained shortly after rewarming.

References (if needed)

THE SAFETY OF USING HEATED HUMIDIFIED HIGH FLOW NASAL CANNULA OXYGEN (HHHFNC) AT 3L/KG/MIN IN CHILDREN WITH SEVERE BRONCHIOLITIS

R. Derrick¹, P. Alport¹, K. Patel²
¹Brighton and Sussex Medical School, Department of Medicine, Brighton, United Kingdom
²Royal Alexandra Children's Hospital, High Dependency Unit, Brighton, United Kingdom

Background

Currently, 2L/kg/min is the maximum recommended flow rate for Heated Humidified High Flow Nasal Cannula Oxygen (HHHFNC). The High Dependency Care Unit in Brighton, UK has been using 3L/kg/min as a substitute for CPAP.

Objectives

To determine if 3L/kg/min HHHFNC is safe and tolerated in the management of severe bronchiolitis children aged 0-2 years.

Methods

A retrospective detailed case note analysis of 124 children, admitted to HDU between October 2015 to March 2016. An additional set of 108 patients from a 2014/15 database was included.

Data collected included flow rate, HR, RR, SaO2/FiO2 ratio every hour sedation use, length of stay, prematurity, virology and complications.

Conclusions/Results

Since 2014, 86/193 (45%) infants were given a maximum treatment of HHHFNC at 3L/kg/min, evenly distributed across 0-2yr age. The escalation of respiratory support (i.e. HHHFNC at 2L/kg/min, 3L/kg/min NIV and intubation), increased with prematurity,(p<0.001). More intensive treatments were associated with longer hospital stays,(p<0.001). Children on 3L/kg/min beyond 3 days were more likely to escalate to NIV than children with a shorter hospital stay,(p<0.001). In the 2015/16 cohort escalation to NIV was higher in children who started HHHFNC at 3L/kg/min (56%,14/25), compared to those starting at 1-2L/kg/min (24%,9/37),(p<0.05). Mean total sedation dose doubled between the 2L/kg/min group (n=55), 3 L/kg/min (n=87) and NIV (n=39),(p<0.05). Vomiting without sequelae was the only side effect, in 6/94 of cases.

HHHFNC at 3L/kg/min appears to be a safe substitute for CPAP in managing severe bronchiolitis and requires far less sedation than CPAP.

References (if needed)
HELIUM-OXYGEN MIXTURE: CLINICAL APPLICABILITY IN A PEDIATRIC INTENSIVE CARE UNIT

C. do Prado1, M. Siciliano Nascimento1, A. Stape1, E. Santos1
1Hospital Israelita Albert Einstein, Maternal Child, Sao Paulo, Brazil

Background

Helium-oxygen mixtures have been proposed in the treatment of children with upper airway obstructions.

Objectives

To evaluate if the distress score diminishes with the use of helium-oxygen mixture in 30, 60 and 120 min in pediatric patients diagnosed with bronchospasm.

Methods

Retrospective, non-randomized study, which included patients diagnosed with bronchospasm who received a helium-oxygen mixture, according to the institution's protocols. The institution's protocol for the use of helium-oxygen mixture includes patients with bronchospasm who sustain a modified Wood score of moderate to severe (>5), after one hour of conventional treatment. The children were evaluated using the respiratory distress score, respiratory rate (RR) and heart rate (HR). Two children were excluded from study after 30 min, and one after 60 min, due to treatment failure.

Conclusions/Results

Results: A total of 20 children were enrolled in the study, from January 2012 to December 2013. The respiratory distress score at the initial moment was mean (±SD) 6.2±2.7 and at moment 120 min was mean (±SD) of 3.4±2.0. At the initial moment the average RR was of 55rpm and 40rpm at the moment 120 min. Both, the respiratory distress score and RR showed a significant improvement as from 30 min, p<0.001. Conclusion: The use of helium-oxygen mixture proved to be effective in diminishing the score for respiratory distress and the RR for children with airway obstructions and should be considered a complementary therapeutic option, together with drug therapy, in specific clinical situations.

References (if needed)
THE USE OF SPONTANEOUS BREATHING TEST IN PEDIATRIC INTENSIVE CARE UNIT

C. do Prado¹, M. Siciliano Nascimento¹, L. Andrade Vale¹, C. Moura Rebello¹, E. Santos¹
¹Hospital Israelita Albert Einstein, Maternal Child, Sao Paulo, Brazil

Background

The spontaneous breathing test (SBT) was developed as an attempt to identify patients who are ready to discontinue mechanical ventilation.

Objectives

To assess whether the SBT can predict the extubation failure in pediatric population.

Methods

In a prospective and observational study, data from patients admitted to the pediatric intensive care unit (PICU) between May 2011 and August 2013, receiving mechanical ventilation (MV) for at least 24 hs followed by extubation. The patients were classified in two groups, Test Group: the patients extubated after SBT, and Control Group: the patients extubated without SBT.

Conclusions/Results

Results: A total of 95 children were enrolled in the study, 71 were in the Test Group and 24 in the Control Group. A direct comparison was made between the two groups regarding the gender, age, ventilation time, mechanical ventilation indication and respiratory parameters before extubation (Control Group) and before the SBT test in the Test Group. There was no difference between the parameters analyzed. According to the analysis of probability of extubation failure between the two groups, the chance of extubation failure in the Control Group was 1.412 higher than in the Test Group, nevertheless, this range did not reach significance (p=0.706). This model was considered well-adjusted according to the Hosmer and Lemeshow test (p=0.758). Conclusion: The SBT was not be able to predict the extubation failure in pediatric population.

References (if needed)
REAL TIME VISUALIZATION OF LUNG ATELECTASIS RELIEF IN A NEONATE USING LUNG POINT OF CARE ULTRASOUND
S. Friedman, E. Sadot, Y. Sivan
"Dana-Dwek" children hospital- Tel Aviv Sourasky Medical Center,
Division of Pediatric pulmonology- intensive care and sleep medicine, Tel-Aviv, Israel

Background

Lung point of care ultrasound (L-POCUS) is a viable tool in adult and pediatric emergency and critical care and facilitates a reliable and rapid diagnosis of pneumothorax, interstitial syndrome, pleural effusion and lung consolidation. The main L-POCUS imaging patterns are normal lung aeration with A lines and lung sliding, interstitial syndrome with multiple yet separated B lines and decreased lung aeration ranging from confluent B lines up to subpleural echo-poor region with or without tissue-like appearance which characterizes lung consolidation.

Objectives

To demonstrate the clinical efficacy in assessing lung aeration when treating ventilated patients suffering from atelectasis.

Methods

Clinical case presentation.

Conclusions/Results

A 3 weeks old male neonate, ventilated since birth, was admitted to our PICU. He was delivered at 38 weeks in cesarean section due to polyhyramnios and required intubation for apnea and bradycardia. On admission extreme cachexia was noted and after 2 weeks of parenteral feeding and weight gain he was extubated. 36 hours postextubation he developed severe dyspnea and L-POCUS demonstrated echo poor region without tissue like appearance suspected as atelectasis of the entire left lung (Figure 1) confirmed by chest radiography (Figure 2).

Figure 1:
Selective intubation of the left bronchus guided by L-POCUS was performed with an immediate relief of the consolidation and restoration of normal lung aeration pattern (Figure 3) confirming the diagnosis of lung atelectasis.

Figure 2:

Figure 3:
Conclusion: We suggest that L-POCUS is a safe, fast and reliable method for real time assessment of lung aeration in ventilated patients in the PICU.

References (if needed)
HEPATIC TRANSAMINASE LEVELS REFLECT DISEASE SEVERITY IN CHILDREN WITH SEVERE RESPIRATORY SYNCYTIAL VIRUS (RSV) BRONCHIOLITIS
C. Fulton¹, K. Thorburn¹, C. King², D. Ramaneswaran², A. Abdulaziz², P. McNamara³
¹Alder Hey Children's NHS Foundation Trust, PICU, Liverpool, United Kingdom
²Liverpool University, School of Medicine, Liverpool, United Kingdom
³Liverpool University, Women and Children's Health, Liverpool, United Kingdom

Background
Elevated hepatic transaminases are recognised in some children requiring mechanical ventilation on paediatric intensive care unit (PICU) for RSV bronchiolitis – thought to be consequential to hepatic congestion or ischaemia due to right heart strain, itself secondary to parenchymal lung disease and/or pulmonary hypertension. It has been suggested that children with raised transaminases have increased disease severity.

Objectives
To compare disease severity as judged by duration of ventilation, length of PICU admission, respiratory indices and mortality in children mechanically ventilated for RSV bronchiolitis with and without elevated hepatic transaminases.

Methods
Retrospective data collection from a large 22-bed UK tertiary PICU on all patients mechanically ventilated with RSV positive bronchiolitis over an 11-year period (Oct. 2002 – March 2013). All participants had transaminase levels (AST and ALT) taken daily. Levels considered elevated when ALT > 36u/L and AST > 58u/L. Children with comorbidities were excluded to remove non-RSV disease as a confounding factor.

Conclusions/Results
556 children with RSV bronchiolitis were ventilated – No comorbidities n=330; comorbidities n=226 (excluded).

144 (44%) of the 330 children with no comorbidities had elevated hepatic transaminase levels.

The characteristics of this patient group are shown in Table 1.

RSV bronchiolitis was more severe in children admitted with elevated hepatic transaminase levels.

Elevated transaminase levels could be used as a predictor for disease severity in RSV bronchiolitis.

References (if needed)
THE “BAY OF BISCAY EFFECT” ON SEVERE ACUTE ASTHMA TREATMENT: SURVEY OF PRACTICE VARIABILITY ACROSS SPAIN, UK AND IRELAND

M. Garcia Cusco1,2, K. Morris2, J. Mayordomo Colunga3, A. Medina Villanueva3, R. Mildner2
1Nottingham Children’s Hospital, Paediatric Critical Care, Nottingham, United Kingdom
2Birmingham Children’s Hospital, Paediatric intensive care, Birmingham, United Kingdom
3Hospital Universitario Central de Asturias, Unidad de Cuidados Intensivos, Oviedo, Spain

Background
Evidence regarding severe acute asthma treatment in paediatrics is poor. Guidelines are generally consensus-based, derived from adult population data and focused on pre-ICU care.

Objectives
To assess current severe asthma treatment preferences between European countries to inform further multinational research.

Methods
We performed an online survey regarding critical care treatment preferences for status asthmaticus amongst all public PICU’s in Spain, UK and Ireland (UK-I). One response per centre was required from a senior medical member of staff.

Conclusions/Results
Response rate was 84% in Spain and 77% in UK-I; local and national guidelines are generally followed in both, with little use of international recommendations.
Regarding medication, despite a similar usage of ipratropium bromide and magnesium sulphate, there is a difference in escalation to intravenous salbutamol (UK-I 80% vs Spain 19%) and aminophylline (UK-I 60% vs Spain 3%).
If respiratory support is needed, bi-level non-invasive ventilation (NIV) is used uncommonly in UK-I (15%) in contraposition to Spain (80%). Dedicated NIV ventilators are used frequently in Spain (74%) versus 18% in UK-I. In intubated patients, volume control mode is preferred in Spain (55%) with pressure control mode more common in UK-I (60%). Practices regarding maximum pressure levels allowed and initial PEEP setting varied significantly, with use of physiotherapy being more prevalent in UK-I.

Conclusion
Currently, paediatric severe asthma treatment is not homogeneous across European countries; further research to inform more evidence-based paediatric international consensus guidelines is recommended.

Acknowledgements
Grupo de respiratorio SECIP (Spain) and PICS study group (UK and Ireland).

References (if needed)
RESPIRATORY FAILURE part 2

ESPN7-0374

PRENATAL ALCOHOL EXPOSURE AS THE CAUSE OF ADVERSE BIRTH OUTCOME

E. Gluszczak-Idziakowska¹, M. Wilińska¹, M. Składanowska², R. Wysocki³

¹CENTRE OF POSTGRADUATE MEDICAL EDUCATION, DEPARTMENT OF NEONATOLOGY, WARSAW, Poland
²SPSK im.prof.W.Orłowskiego, DEPARTMENT OF NEONATOLOGY, WARSAW, Poland
³Medical University of Warsaw, I Faculty of Medicine, WARSAW, Poland

Background

Maternal alcohol use during pregnancy exposes premature and term newborns to the toxicity of alcohol and its metabolites. Prenatal alcohol exposure (PAE) is a risk factor for fetal mortality, stillbirth and newborn and child mortality. Studying mothers who delivered VLBW (<1500g at birth) newborns admitted to the Neonatal Intensive Care Unit, Lester demonstrated that one third of the mothers confessed to drink alcohol during pregnancy. Recent studies have shown that FASD in Poland is observed in not less than 2% of children.

Objectives

The effects of prenatal exposure to alcohol on neonatal health, physical features are reviewed here to provide information that will facilitate recognition of fetal alcohol effects in neonates.

Methods

9 newborns with confirmed PAE were hospitalized in our NICU between August 2014 - November 2016. We have made a detailed analysis of the clinical manifestation of prenatal alcohol exposure in newborns.

Conclusions/Results

All children required respiratory support at birth. Three of them were intubated. Two of them died. Only two were without respiratory failure after admission to the NICU.

References (if needed)

Most patients affected by PAE do not have physical features of FAS. Other fetal alcohol effects can have dramatic impact on neonates. There is limited knowledge about the fact that alcohol may affect multiple organs in developing newborn, eg. lung. It should be mentioned, that mothers deny drinking. When a physician knows about maternal addiction, the likelihood of detecting a prenatal alcohol-affected infant is higher. Neonatologists and obstetricians should be aware of maternal problem drinking.
RESPIRATORY FAILURE part 3

ESPN7-0338

PRACTICE SURVEY ON PRONE POSITIONING IN FRENCH-SPEAKING PEDIATRIC INTENSIVE CARE UNITS

P. L. Leger¹,², J. Rambaud³, J. Denot³, A. Amblard³, R. Carbajal³

¹APHP-Trousseau Hospital, PICU, PARIS, France
²INSERM, U1141- DHU PROTECT, Paris, France
³APHP- Trousseau Hospital, PICU, Paris, France

Background

The prone positioning (PP) is a strategy widely used in the treatment of severe forms of acute respiratory distress syndrome (ARDS) in adults. Its early use significantly reduces mortality. However, the studies do not strongly demonstrate its prognostic impact in pediatric ARDS.

Objectives

The aim of this study was to describe the prone positioning practices in the French-speaking pediatric intensive care units (PICU).

Methods

This survey was conducted by email questionnaire to French pediatric intensivists, from February to May 2016.

Conclusions/Results

Ten percent of the PICU have a PP medical protocol. Fifty percent of interviewed persons frequently use PP during medical care and 30% systematically use it. Thirty-six percent begin PP at the early phase of ARDS during conventional ventilation, while 42% before the introduction of unconventional ventilatory strategies (OHF). Seventy-three percent report that PP is used with prolonged periods (> 12 h/day), 22% with short periods (<12 h/day) and only 14% with very long periods (> 20 h/day). Finally, despite a low level of scientific evidence in children, 87% of respondents gave a strong recommendation for PP as standard care in severe pediatric ARDS.

The survey confirmed the prone positioning is a strategy commonly used in pediatric intensive care units for the severe pediatric ARDS. The timing of the PP beginning can be different according to children, early and prior to use of the conventional ventilation strategy in most cases. The duration of PP seems more consensual. Most of the centers use extended period longer than 12 h/day.

References (if needed)
INCIDENCE AND RISK FACTORS OF INAPPROPRIATELY DEEP TIP POSITION OF CUFFED ENDOTRACHEAL TUBES IN PEDIATRIC INTENSIVE CARE UNIT

W. Matsuoka¹, K. Ide¹, T. Matsudo¹, Y. Miyahara¹, N. Nishimura¹, S. Nakagawa¹
¹National Center for Child Health and Development, Critical Care Medicine, Tokyo, Japan

Background

Cuffed endotracheal tubes (ETTs) have been widely used in pediatric intensive care unit (PICU). Generally, it is recommended that depth marking to be placed at the vocal cords in order to avoid vocal cord damage by ETT cuffs. But as a result of this recommendation, the tip of ETTs sometimes can be placed inappropriately deep, such as bronchial intubation.

Objectives

The purpose of this study was to assess the incidence and risk factors of inappropriately deep tip position of cuffed ETTs in PICU.

Methods

We conducted a retrospective cohort study for intubated children with cuffed ETTs between February 2015 and July 2016. We defined inappropriately deep ETT tip position as distance between ETT tip and tracheal bifurcation less than 5mm on X-rays.

Conclusions/Results

There were 1754 PICU admission and 683 required mechanical ventilation. We analyzed 179 events in 157 patients intubated with the Microcuff®(Kimberly-Clark). Forty-two patients (23.5%) with inappropriately deep tip position of ETTs were younger, had shorter height, and had less body weight. They also had more abdominal distension and longer days of intubation. Upon multiple logistic regression analysis, shorter height, abdominal distension, and oversized ETT were associated with inappropriately deep tip position of ETTs (Table).

We may be careful for inappropriate tip position of ETTs when cuffed ETTs are used for children with risk factors.

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References (if needed)
RESPIRATORY FAILURE part 4

ESPN7-0264

EUROPEAN SURVEY ON PEDIATRIC NON-INVASIVE VENTILATION USE (PEDNIVES)
J. Mayordomo-Colunga1, A. Medina1, C. Rey1, C. Miles2, M. Pons-Odena3, M. García-Cuscó4, M. Kallio5, D. Demirkol6, A. Vivanco1, M. García7
1Hospital Universitario Central de Asturias, Pediatric Intensive Care Unit. Dept of Pediatrics, Oviedo, Spain
2Hopital Arnaud de Villeneuve, Service de réanimation pédiatrique, Monpellier, France
3Hospital Sant Joan de Deu, Pediatric Intensive Care Unit, Barcelona, Spain
4Nottingham Children's Hospital, Pediatric Intensive Care Unit, Nottingham, United Kingdom
5Oulu University Hospital, Department of Pediatrics, Oulu, Finland
6Bezmialem Vakif University, Department of Pediatric Intensive Care, Istanbul, Turkey
7Hospital Sao Joao, Pediatric Intensive Care Unit, Oporto, Portugal

Background

Although use of non-invasive ventilation (NIV) in children with acute respiratory failure (ARF) has greatly increased in the last decades, no European surveys have been performed in order to know how NIV is delivered in pediatric intensive care units (PICUs).

Objectives

To describe the use of NIV in European PICUs.

Methods

A questionnaire to obtain data about NIV was developed.

Conclusions/Results

Results: One-hundred twenty-four PICUS from 23 different countries answered the questionnaire. All PICUs used NIV as a standard of care. NIV was used as initial respiratory support in all PICUs, as part of the weaning process in high risk patients in 96.5%, in ARF after extubation in 99%. Regarding ARF cause, NIV is delivered in bronchiolitis (95.6%), bronchospasm (75.2%), pneumonia (96.5%), acute pulmonary edema (84.1%), upper airway obstruction (76.1%), and in acute respiratory distress syndrome: 85.8% if mild, 53.1% if moderate, and 5.3% if severe. Conventional ventilators with NIV option were the most frequent devices (87.2%), followed by home NIV ventilators (69.7%) and ICU NIV ventilators (54.1%). Oronasal masks (43.1%) were the most frequently used when delivering bilevel positive airway pressure, followed by total face (35.8%) and nasal masks (16.5%). To deliver CPAP, nasal cannulas are the most frequent (39.5%), then nasal masks (35.8%) and oronasal masks (15.6%). Synchrony issues were considered to be more frequent in infants under 3 months in 41.1%, under 6 months in 20.6%, and under 12 months in 38.3%.

Conclusion: The present study shows that NIV is a widespread technique in European PICUs, describing the current characteristics of NIV use.

References (if needed)
RESPIRATORY FAILURE part 4

ESPN7-0295

TIDAL VOLUME AND SYNCHRONY IN INFANTS ON NON-INVASIVE VENTILATION WITH TOTAL FACE MASK. A PRELIMINARY STUDY

J. Mayordomo-Colunga¹, L. Rodríguez¹, A. Medina¹, C. Rey¹, A. Vivanco¹, A. Concha¹, S. Menéndez¹, S. Gutiérrez¹, B. Fernández¹

¹Hospital Universitario Central de Asturias, Pediatric Intensive Care Unit. Dept of Pediatrics, Oviedo, Spain

Background

Non-invasive ventilation (NIV) is frequently used in infants with acute respiratory failure, although specific material for this age group is scarce. A relatively new mask is increasingly being used, but no data regarding tidal volumes (Vt), leaks and synchrony are currently available.

Objectives

To describe Vt, leaks, pressures applied and clinically assessed synchrony.

Methods

Infants under 12 months receiving bilevel positive airway pressure (BLPAP) by means of a non-vented total face mask (Respironics PerforMax) and Philips v60 ventilator (featuring an improved inspiratory sensitivity) were included. Patients were assessed during a 2-minutes period, while being calm. First assessment was made within the first 24 hours from BLPAP initiation, and then at 2, 4 and 8 hours. Synchrony was clinically assessed, and considered to be good if more than 80% of the child’s inspiratory efforts were synchronized with the ventilator and without waveforms anomalies, fair if 50-80%, and bad if less than 50% were synchronized.

Conclusions/Results

Results: Eleven infants diagnosed with bronchiolitis were included, with a median age of 1.8 months (IQR 1.6-4.6) and weight 4.7 kg (IQR 3.3-7.3). Median Vt was 9.2 ml/kg (IQR 8.2-11.6), with a mean leakage of 22±5.7 L/min. Mean pressures applied were 9.5±0.6 (inspiratory) and 5.6±0.5 (expiratory) cmH2O. Overall synchrony was good in 51.3% and bad in 15.4% of assessments. Fair or bad synchrony was significantly more frequent in infants under 3 months than those older (71.4% VS. 25%, p=0.03).

Conclusion: The present study describes relevant new information about NIV use in infants with total face masks.

References (if needed)
RESPIRATORY FAILURE part 4

ESPN7-0418

FACTORS AND OUTCOME OF PERSISTENT PULMONARY HYPERTENSION OF THE NEWBORN-ASSOCIATED ACUTE KIDNEY INJURY IN THAI NEONATE

N. Nakwan1, W. Kamolvisit1, S. Jaroensri1

1Hat Yai Hospital, Department of Pediatrics, Hat Yai, Thailand

Background

Acute kidney injury (AKI) is common complication following critically ill neonatal patients in the NICU and leading to increased length of mechanical ventilation, length of hospital stay, morbidity, and mortality, and much higher incidence in the infants with persistent pulmonary hypertension of the newborn (PPHN).

Objectives

To determine the risk factors and outcomes on PPHN-caused AKI in the major neonatal tertiary care in southern Thailand.

Methods

The clinical data of infants diagnosed with PPHN at Hat Yai Hospital from January 2012 to December 2016 were retrospectively reviewed. Logistic regression analysis was performed to assess factors associated with AKI in PPHN infants.

Conclusions/Results

The records of 109 infants were analyzed. Of these, 28.4% (31/109) died, and AKI was found in 31 (28.4%) infants following neonatal KDIGO classification. Nineteen (61.3%) reached stage 1, 3 (9.7%) stage 2, and 9 (29.0%) stage 3. AKI (all stages combined) was significantly associated with increased mortality with OR of 8.71 (95% CI 3.37-22.49, p<0.01). Multivariate logistic regression analysis indicated that male gender (adjusted OR=15.4 (95% CI 1.05-227.89), oliguria at 24 h before AKI onset (adjusted OR=6.98 (95% CI 1.22-39.89), urine output of <1 mL/kg/h within 12 h of NICU admission (adjusted OR=13.48 (95% CI 1.93-94.12), and infants who born by non-cesarean section (adjusted OR=0.08 (95% CI 0.10-0.70) were factors associated with an increased risk for AKI. Conclusion: AKI in PPHN was high and an increased of mortality. AKI should be closely monitored in male gender, infants who delivery by non-cesarean section, and in the presence of oliguria.

References (if needed)
Background

Respiratory syncytial virus (RSV) is a significant cause of morbidity, especially in those who are immunocompromised. In immunocompromised children with RSV infection, the immune system may be supported with a number of therapeutic modalities, including ribavirin, palivizumab, corticosteroids, and immunoglobulins (IV Ig).[1] The routine use of these agents is not supported by evidence in the current literature, with palivizumab’s use largely confined to RSV immunisation in vulnerable and immunocompromised children.

We report a case of a 4 month-old infant who presented with RSV bronchiolitis, and subsequently required emergency airway surgery. Following her surgery, she developed acute respiratory distress syndrome (ARDS). She required high frequency oscillation ventilation and nitric oxide administration to manage hypoxia. Her RSV infection was treated using enteral ribavirin and IV Ig over a ten day period. Her RSV cycle threshold (CT) values were used to track responsiveness to therapy. She made a good recovery and was subsequently discharged from Intensive Care.

Anaesthesia and surgery has an immunosuppressive effect, which predisposed this infant to the development of severe RSV-associated ARDS. Aggressive support of her immune system with oral ribavirin and IV Ig may have assisted her recovery without additional morbidity. This combination of agents has not been previously described in an infant or child recovering from major surgery.

Objectives

n/a

Methods

n/a

Conclusions/Results

n/a

References (if needed)

Background

Acute bronchiolitis is the most common lower respiratory tract infection in the first year of life. General supportive measures and respiratory support are the mainstay of treatment. In recent years, noninvasive ventilation (NIV) has been used for respiratory support in acute respiratory failure.

Objectives

Retrospective study of hospitalized children with acute bronchiolitis submitted to NIV in a Pediatric intermediate care unit of a level II hospital between February 2010 and December 2016.

Methods

Demographic and clinical data, etiologic agent, NIV features and associated therapeutics were analyzed.

Conclusions/Results

Admitted 823 children for acute bronchiolitis (median age 2.6 months, mean length of stay 5.0±3.5 days). Submitted to NIV 131 children (15.9%), 54.2% males, median age 1.8 (min 0.3, max 10.2) months, mean length of stay 6.7±3.2 days. Respiratory syncytial virus (RSV) prevalence was 79.4%. All had clinical criteria for NIV, 73 (55.7%) had hypercapnia, 48 (36.6%) hypoxemia. 64.1% started NIV on first hospitalization day, mean duration 2.8±1.5 days. CPAP was the first ventilatory choice in 96.9%, average duration of supplemental oxygen 3.7±2.3 days. Fourteen patients (10.7%) were transferred to intensive care due to ineffective NIV. Less than one month of age was associated with more NIV days (p=0.009). There was no mortality.

Treatment with NIV proved to be safe and effective in most cases. Acute bronchiolitis may be severe in newborns and require NIV for a longer period.

References (if needed)
MONITORING OF CEREBRAL OXYGENATION IN CAFFEINE FOR APNEA IN PRETERM INFANTS: A PRELIMINARY STUDY

W.H. Seo¹, Y.S. Hong², J. Shin¹

¹Korea University Ansan Hospital, Department of Pediatrics, Ansan, Republic of Korea
²Korea University College of Medicine, Department of Pediatrics, Seoul, Republic of Korea

Background

Apnea is frequently occurred in premature infants which can cause damage to the infant's developing brain. Caffeine is the most commonly used in the treatment of apnea of prematurity. And caffeine has potential effect on cerebral vasoconstriction via reducing vasodilatation by adenosine. Near infrared spectroscopy has been used to measure cerebral oxygenation and cerebral hemodynamic.

Objectives

This study is aimed to examine the effects of 10mg/kg intravenous caffeine loading on cerebral oxygenation and thermodynamically change.

Methods

Preterm neonates < 37 weeks gestation were investigated for cerebral oxygenation, blood pressure and cardiac output. We used the near infrared spectroscopy system, the NIRO-300 to measure cerebral regional oxygen saturation (crSO₂).

CrSO₂ were assessed before 30 min, during loading dose caffeine administration (over 30min) and after 2, 4 hours using near-infrared spectroscopy (NIRS). Simultaneously, blood pressure, heart rate and peripheral oxygen saturation (SpO₂) were investigated before, during administration and after 2hrs, 4 hrs.

Conclusions/Results

Thirty three infants were studied with a mean gestational age of 29.39 ±2.15 weeks and body weight is 1369.88±314.47 g.

Cerebral regional oxygenation saturation didn’t show significant changes before and after 2, 4 hours of caffeine loading (76.15±10.61 vs 73.91±7.97 vs 74.28±8.76, P=0.20). And no significant changes in heart rate, mean blood pressure, and Spo2 were not observed (P>0.05).

Conclusion: Our study demonstrates that intravenous loading dose of 10mg /kg caffeine is not associated with significant changes in cerebral oxygenation. This result suggests that intravenous caffeine loading is not harmful to developing brain.

References (if needed)
RESPIRATORY FAILURE part 5

ESPN7-0192

RISK FACTORS FOR PROLONGED INTENSIVE CARE UNIT STAY IN CHILDREN WITH BRONCHIOLITIS
M. Tan1, J.J.M. Wong1,2, S.L. Chong1,2, Y.H. Mok1,2, J.H. Lee1,2
1KK Women and Childrens Hospital, Pediatrics, 229899, Singapore
2Duke-NUS Medical School, Pediatrics, Singapore, Singapore

Background

Bronchiolitis is a common indication for hospital admission in children under 2 years and up to 30% require admission to the pediatric intensive care unit (PICU).

Objectives

We aim to determine risk factors for prolonged PICU stay as a surrogate for poor outcome.

Methods

This is a retrospective study between 2009 and 2014. Children admitted to the PICU with a primary diagnosis of acute bronchiolitis were included. The primary outcome was a prolonged PICU stay of >7 days. We performed logistic regression to analyze the association between early risk prognostic variables present on admission with prolonged PICU stay.

Conclusions/Results

77 patients were included of which 25/77 (32%) children had a prolonged PICU stay. The most common virus isolated was RSV 55/77 (71%). Long stayers were more likely to have an underlying comorbidity [14/25 (56%) vs. 13/52 (25%); p=0.011] and bacterial co-detection [9/25 (36%) vs. 5/52 (10%); p=0.01] compared to short stayers. Oxygen saturation/ fraction of inspired oxygen ratio was lower and oxygen saturation index was higher throughout the first week in long stayers. Comorbidities [adjusted odds ratio (aOR) 3.6 (95% confidence interval [CI] 1.2, 11.0); p=0.024], lower SF ratio [aOR 1.1 (95%CI 1.0, 1.1); p=0.040] and viral-bacterial co-detection [aOR 4.3 (95%CI 1.1, 16.7); p=0.034] were independently associated with a prolonged PICU stay.

Conclusion: The presence of comorbidities, low SF ratio and viral-bacterial co-detections were early prognostic variables independently associated with a prolonged PICU stay.

References (if needed)
PULMONARY HYPERTENSION IN PRETERM INFANTS WITH BRONCHOPULMONARY DYSPLASIA

V. Tomova¹, D. Vlahova¹, R. Georgieva¹, Z. Malinova¹, R. Marinov²
¹Specialized Hospital for Active Treatment of Pediatric Diseases, +359898892651, Sofia, Bulgaria
²National Cardiology Hospital, Clinic of Pediatric Cardiology, Sofia, Bulgaria

Background

Pulmonary hypertension frequently complicates the course of bronchopulmonary dysplasia in preterm infants.

Objectives

The goal of this study is to analyze the results of the echocardiograms in preterm infants with bronchopulmonary dysplasia and to assess the clinical significance of the pulmonary hypertension in this group.

Methods

We reviewed echocardiograms of 63 preterm infants with gestational age <32 weeks and with bronchopulmonary dysplasia, admitted in the Clinic of neonatology at the University Pediatric Hospital in Sofia for the period 2011-2016. Echocardiograms were performed between 10-20 day after birth and on 36 week postmenstrual age.

Conclusions/Results

17 infants /26.9%/ had pulmonary hypertension – 8 between 10-20 day and 11 on 36 week PMA. 2 infants had PH on both exams. Infants with pulmonary hypertension had lower birth weight, longer mechanical ventilation, oxygen supplementation and stay in NICU, increased BPD severity (p< 0.05). Pulmonary hypertension is most prevalent in infants with severe BPD – 40%. Treatment for pulmonary hypertension was performed in 9 patients. 3 infants /17.6%/ died.

Screening for pulmonary hypertension should be performed by echocardiography in premature infants with bronchopulmonary dysplasia in order to reassess the therapy and to estimate the prognosis.

References (if needed)
RESPIRATORY FAILURE part 5

USE OF NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA) IN PEDIATRIC DIFFICULT VENTILATORY WEANING: REPORT OF TWO CASES AND BIBLIOGRAPHIC REVIEW

M. Tonelotto¹, L. Braz¹, T. Renattini¹, L. Naspitz¹, A.C. Alves¹, R. Felgueira¹, A. Bousso¹
¹Hospital Municipal Vila Santa Catarina / Hospital Israelita Albert Einstein, PICU, São Paulo, Brazil

Background

Neurally Adjusted Ventilatory Assist (NAVA) is an invasive ventilation mode which provides ventilator support proportional to the electrical activity of the diaphragm. It was designed to improve synchrony. With NAVA, gas delivery is triggered, controlled and cycled by the diaphragmatic electromyogram signal, promoting a more synchronized and intense use of the patient's respiratory muscles. Asynchrony is a challenging problem in mechanically ventilated children that induces muscular dysfunction complicating ventilatory weaning.

Objectives

Describe the use of NAVA in difficult weaning of two children admitted to our PICU, emphasizing another possible use of this technology apart of its capacity to synchronize ventilation.

Methods

Report of two cases using medical records during PICU stay. Informed consent was obtained for both cases.

Two infants, one and eight months old, were admitted with bronchiolitis and acute respiratory distress syndrome. Both babies required aggressive and prolonged invasive respiratory support followed by difficult weaning from mechanical ventilation. With the use of NAVA, we were immediately able to start sedation withdrawal, reduction of the FiO2, MAP and start CPAP training. In both cases successful extubation was achieved in less than a week and noninvasive NAVA ventilation mode was applied for a few days thereafter. Both children were discharged without supplemental oxygen.

Conclusions/Results

There is convincing evidence that NAVA is an effective tool to improve patient-ventilation synchrony during mechanical ventilation. In these two cases NAVA was also an important adjuvant to help overcome difficult weaning in children submitted to highly aggressive and prolonged mechanical ventilation. Large pediatric series may confirm these findings.

References (if needed)
TREATMENT OF ACUTE RESPIRATORY DISTRESS SECONDARY TO TUBERCULOSIS INFECTION WITH NONINVASIVE PRESSURE SUPPORT VENTILATION

M. Çeleğen¹, B. bayrakçı¹, Z. öztürk¹, E. koçkuzu¹, M. uysal yazıcı¹, S. göncü¹
¹Hacettepe University Faculty of Medicine, pediatric intensive care unit, ANKARA, Turkey

Background

Tuberculosis (TB) is the most common cause of infection-related death in the world, and pulmonary TB is the most common presentation of this infection. Rarely, pulmonary TB presents as acute respiratory distress syndrome (ARDS). ARDS caused by pulmonary tuberculosis is a high mortality even while receiving mechanical ventilatory support. We reported acute respiratory failure in patient with active TB infection. A 13-year-old girl presented with fever, cough and fatigue for a week. On admission, she had a bad general condition, with the following vital signs: blood pressure of 95/55 mmHg, heart rate of 150 bpm, respiratory rate of 45 breaths per minute, and core body temperature of 37.5°C. In her physical examination, she had a cachectic appearance and signs of respiratory distress including tachypnea, subcostal, intercostal withdrawal and accessory muscle use, in osculation bilateral fine crepitation rallies were present. Chest X-ray showed bilateral inflammatory necrotizing lesion with a cavity and calcification in left apex. A computed pulmonary tomographic show left pulmonary artery thrombosus. Pulmonary tuberculosis was confirmed with positive sputum culture for Mycobacterium tuberculosis resistant to isoniazid. The oxygenation index (OI) was 16. She was treated with isoniazid, rifampicin, ethambutol, pyrazinamide, streptomycin, warfarin and noninvasive pressure support ventilation.

Objectives

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Methods

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Conclusions/Results

She was treated with isoniazid, rifampicin, ethambutol, pyrazinamide, streptomycin, warfarin and noninvasive pressure support ventilation.

References (if needed)
FACTORS AFFECTING DEVELOPMENT OF PNEUMOTHORAX IN CRITICALLY ILL CHILDREN
M. uyysal yazici¹, S. sahin², G. Ayar³, M.N. Azili³, B. Bayrakci¹
¹Hacettepe University Faculty of Medicine, Pediatric intensive care unit, ANKARA, Turkey
²Ankara Hematology and Oncology Children's Hospital, Pediatric intensive care unit, Ankara, Turkey
³Ankara Hematology and Oncology Children's Hospital, Pediatric Surgery, Ankara, Turkey

Background

Objectives

To determine the factors affecting the development of pneumothorax in critically ill children admitted to a tertiary PICU and to highlight the risk factors

Methods

50 children who developed pneumothorax and 30 control cases who were admitted from April 2012 to August 2015 were analysed. Demographic data PRISM, PELOD score, MODS criteria, the type of mechanical ventilation (MV), serum levels of albumin, creatine and lactate, length of stay (LOS) in the PICU, total LOS in the hospital were recorded.

Conclusions/Results

Results

Total 2850 patients were screened and 1140 of them were mechanically ventilated and 4.4% (n=50) of patients have developed pneumothorax. Patients with pneumothorax were found to have median PRISM:26, PELOD:22 and MODS:3 whereas in the control group they were 15.5, 12, and 3 respectively. The difference in PRISM and PELOD scores in between two groups were significant (p<0.001, p=0.002). Pneumothorax was observed on the 11.6th day of MV. Sepsis was detected in 24 patients in the pneumothorax group. In terms of MV parameters, the risk of pneumothorax was significantly higher if P-Mean was >14 cm H2O and tidal volume was >10 ml/kg (p<0.05). In pneumothorax group mean albumin level was 2.7 gr/dl significantly higher compared with 3.6 gr/dl in the control group (p<0.001). In pneumothorax group LOS on MV, in PICU and hospital stay were statistically significant compared with control group (p<0.05).

Conclusion

Pneumothorax in critically ill children still remains as an important issue related to increased morbidity, mortality and prolonged LOS in hospital. Higher PRISM and PELOD scores, P-Mean and tidal volume were associated with increased pneumothorax. Hypoalbuminemia might be a risk factor

References (if needed)
CAUSES AND CONSEQUENCES OF POSTTEXTUBATION STRIDOR IN THE PICU: A RETROSPECTIVE OBSERVATIONAL COHORT STUDY

E. Van Hemeldonck¹, J.M. Smit¹, B. Pullens², K.F.M. Joosten¹
¹Erasmus University Medical Center - Sophia Children's Hospital, Pediatric Intensive Care Unit, Rotterdam, The Netherlands
²Erasmus University Medical Center - Sophia Children's Hospital, Department of Otorhinolaryngology, Rotterdam, The Netherlands

Background

Endotracheal intubation in children can be complicated by laryngeal injury and eventually resulting in a laryngeal stenosis. Postextubation stridor in children can be used as an indicator for laryngeal injury.

Objectives

1. To determine the incidence of postextubation stridor necessitating nebulized adrenaline.
2. To investigate risk factors contributing to the development of postextubation stridor.

Methods

A 'triggertool' was used to detect the existence of postextubation stridor necessitating nebulized adrenaline in a period from January 2014 to November 2016. Several risk factors for postextubation stridor such as weight at time of intubation, gender, setting of intubation, tube characteristics, tube changes, infection, reintubation, auto-extubation and duration of intubation were evaluated.

Conclusions/Results

Results: In the study period 1186 children got an endotracheal tube and in 62 children a postextubation stridor was noticed (incidence 5.2%): 67.7% was male and 69.3% was <1yr of age. Seventeen (27.4%) children required reintubation. Nine (14.5%) children underwent a laryngoscopy to evaluate the cause of the stridor, all showed signs of mild laryngeal injury but none of them had a laryngeal stenosis. None of the children with stridor required surgical intervention.

Conclusion: A low incidence of postextubation stridor necessitating reintubation and laryngoscopy was seen. Male sex and age under 1 year could be contributing to the development of stridor.

References (if needed)
Background

Regular assessment of pulmonary function is paramount to the management of the critically ill patient. Current bedside monitoring techniques do not inform us on the regional distribution of lung ventilation, or global expansion. Electrical Impedance Tomography (EIT) is a non-invasive, radiation-free, medical imaging technique that continuously monitors regional lung function. Although previous studies focusing on paediatric patients have explored the potential of EIT as a bedside monitoring technique in children, very few have translated this into the intensive care setting.

Objectives

We evaluated the use of EIT in a paediatric intensive care setting and assess whether EIT can aid patient management.

Methods

EIT was performed using a Draeger Pulmoxvista 500. The device was applied to paediatric patients using self-adhesive electrodes or using belts. Data obtained from 8 patients was analysed using the Draeger EIT Data Analysis Tool 6.3 software. Parents and staff were questioned on the efficacy of the device.

Conclusions/Results

Results:

EIT showed strong potential to be used in the paediatric intensive care setting, allowing determination of optimal ventilation parameters and the visualisation of regional ventilation distribution. The effect of suctioning, position changes, and ventilator pressure changes can be assessed. Management decisions taken on the bases of EIT information seemed to be robust. Using self-adhesive electrodes caused some potential complications, including the loss of electrode contact and reddening to the skin of the patient.

Conclusions:

EIT is functional and useful in children, and can give excellent input to clinical decisions at the bedside.

References (if needed)
RESUSCITATION & EMERGENCY MEDICINE part 1

ESPN7-0268

SEVERE BLUNT HEPATIC TRAUMA IN CHILDREN - DIFFERENT APPROACHES.
A. Felizes1, J. Albuquerque1, V. Martins1, M. Gonçalves1
1Centro Hospitalar Lisboa Norte - Hospital de Santa Maria, Pediatrics - Pediatric Surgery Service, Lisboa, Portugal

Background

In children with blunt abdominal trauma, the liver is the second organ most commonly injured. Nonoperative approach has been increasingly advocated and surgery is only recommended if hemodynamic instability is present and persistent.

Objectives

Present and compare two grade IV liver injury cases, with different therapeutic approaches: conservative and surgical.

Methods

Case 1 refers to a 12-year-old boy involved in a motor vehicle accident (MVA) who suffered severe head trauma and blunt thoracoabdominal trauma with pulmonary contusion, grade IV liver injury, grade IV splenic injury and grade II left kidney injury. Due to sustained hemodynamic instability in spite of resuscitation measures he underwent exploratory laparotomy with splenectomy and hepatic packing. Subsequently, he required a second surgery to review the packing and a third surgery in which a branch of the left hepatic artery was ligated. He later developed thrombosis of the right iliac vein and a low-output biliary fistula that were treated with no long-term sequelae.

Case 2 refers to a 14-year-old girl, victim of a MVA, who suffered severe head trauma, blunt thoracoabdominal trauma with hypertensive pneumothorax, grade IV liver injury and grade III right kidney injury. Hemodynamic instability was managed conservatively. The hepatic injury and associated hemoperitoneum were observed and progressively resolved without associated complications.

Conclusions/Results

These cases represents severe liver injury, associated with hemodynamic instability, one of which responded to conservative measures. Multidisciplinary follow-up, particularly by surgeons and intensivists, is essential in making therapeutic decisions, with key outcomes in the survival and morbidity of these patients.

References (if needed)
RESUSCITATION & EMERGENCY MEDICINE part 1

ESP7-0266

DOES PAEDIATRIC EARLY WARNING SCORE PREDICT THE SEVERITY OF ICU ADMISSION?
P. Katta¹, R. Mathews², R. Marion², C. Haines², R. Fish³, P. Davis³
¹Bristol Royal Hospital for Children, Paediatric High Dependancy care, Bristol, United Kingdom
²Bristol Royal Hospital for Children, Paediatrics, Bristol, United Kingdom
³Bristol Royal Hospital for Children, Paediatric intensive care, Bristol, United Kingdom
⁴Bristol Royal Hospital for Children, Paediatric High Dependency Care, Bristol, United Kingdom

Background

Paediatric early warning scores (PEWS) are widely used to aid the early recognition of a deteriorating child and escalate management to reduce death or serious morbidity. We hypothesised that the paediatric early warning score prior to PICU admission can determine the severity of ICU admission. If the association is shown to be of statistical significance, it could help the intensive care units plan patient care.

Objectives

To identify if higher PEWS prior to PICU admission predicts a severe course of ICU admission

Methods

We retrospectively analysed the PEWS from unplanned admissions to PICU in Bristol Royal hospital for children over a period of one year (April 2015 – April 2016). We excluded patients with a known neurological or cardiac abnormality. Healthcare resource groups (HRG) scores were collected to determine the level of care needed in PICU. HRG score of HD1, HD2, ICU 1-5 indicate the levels of high dependency care and ICU care. Logistic Regression was used to determine if PEWS scores prior to admission predicted the level of ICU care given. Results: 30 children were identified. 10 patients were excluded due to incomplete data. There was no significant association between PEWS and the severity of ICU stay as indicated by the HRG score. There was a weak statistical significance between the PEWS taken one hour prior to admission to PICU and the severity of ICU stay showing a p value of 0.08.

Conclusions/Results

Conclusion: Our study showed weak association between PEWS one hour prior to PICU admission and the severity of ICU admission.

References (if needed)
Background

Healthy 13-year old boy involved in a bicycle traffic accident, resulting in a exposed pelvis fracture, lumbar and intertrochanteric femur fracture, left lower limb degloving injury and perineal laceration with urethral fracture.

Objectives

Transferred to our Center, submitted to immediate surgery - multidisciplinary approach under Massive Transfusion Protocol: pelvis external fixator stabilization, debridement and flap closure of limb, cystostomy and perineal wound closure. Diversion right colostomy 48h later.

Intensive Care support for 10 days and then admitted to the Burn Unit for inferior limb dressing under general anesthesia where he developed a post-traumatic myositis ossificans. After 2 months, he was transferred to the Pediatric Surgery ward showing a progressive severe myositis ossificans involving the entire left pelvis and thigh, causing functional impotence of the limb, muscular atrophy and pain.

Methods

6 months after, a multidisciplinary surgical approach in a 3 day staged surgery was planned with the support of the Intensive Care Unit: day 1 and 2 – anesthetic, urological and vascular procedures (risk of tissue necrosis) ; day 3 – left hemipelvectomy with disarticulation of the lower limb (balloon aortic transitory occlusion) and soft tissue graft closure.

During the post-operative period stayed in the Intensive Care for 9 days. Latter was submitted to multiple skin grafts at the amputation stump and Pain Unit intervention was needed.

Conclusions/Results

After 6 months of surgery, the boy was transferred to a Rehabilitation Center with good subsequent evolution.

References (if needed)
INCIDENCE OF CENTRAL VENOUS CATHETER-RELATED VENOUS THROMBOSIS IN A GENERAL PAEDIATRIC POPULATION

Background

Central venous catheters (CVC) are frequently used to establish reliable vascular access in hospitalized children, but CVCs are also the most important risk factor for paediatric venous thrombosis. More data is needed regarding the incidence of CVC-related venous thrombosis and associated risk factors.

Objectives

To investigate the incidence of CVC-related venous thrombosis in a general population of hospitalized children and to describe associated risk factors.

Methods

This single-center prospective cohort study included 211 CVCs placed during 12 months at a tertiary paediatric hospital. Patients were followed for signs of CVC-related thrombosis, and ultrasonography was used to detect asymptomatic thrombosis at the time of CVC removal. CVC-related thrombi were classified as symptomatic/asymptomatic and occlusive/non-occlusive.

Conclusions/Results

Results: 211 CVCs were included in the analysis. The median age of patients was 2.54 years and the median length of stay was 12 days. The incidence of CVC-related venous thrombosis was 30.3%, corresponding to 29.3 cases/1000 catheter days. Of the 64 thrombotic events, 53 (82.8%) were asymptomatic and 11 (17.2%) symptomatic. Thrombosis was more frequent with CVC placement in the internal jugular vein compared to the femoral vein (p-value < 0.0001). However, thrombotic events in the femoral vein were more likely to be symptomatic or occlusive compared to those in the internal jugular vein (p-value < 0.0001). Conclusion: Venous thrombosis occurred in 30.3% of CVCs, thrombotic events were more common with CVC-placement in the internal jugular vein but femoral vein placement increased the risk of symptomatic or occlusive thrombosis.

References (if needed)
TWIN REVERSED ARTERIAL PERFUSION SYNDROME IN A MONOCHORIONIC MONOAMNIOTIC TWIN PREGNANCY

H. Yapicioglu Yildizdas¹, U. Ece², M. Sucu³, H. Simsek¹, F. Ozlu¹
¹Çukurova university, NEONATOLOGY, ADANA, Turkey
²Adana Algomed Hospital, NEONATOLOGY, Adana, Turkey
³Çukurova university, obstetrics and gynecology, ADANA, Turkey

Background

Twin reversed arterial perfusion syndrome in a monochorionic monoamniotic pregnancy.

Objectives

Twin reversed arterial perfusion (TRAP) syndrome is mostly seen in monochorionic diamniotic twin pregnancies with an estimated incidence of 1/9500-11000 pregnancies

Methods

One of the twin is acardiac with various abnormalities especially with upper part of the body, and mortality is 100%.

Conclusions/Results

The other twin functions as a pump twin and mostly has polyhydramnios and heart failure; and mortality rate is high due to prematurity and heart failure

References (if needed)
SINGLE CENTER EXPERIENCES WITH ENOXIMONE IN CHILDREN SUFFERING CATECHOLAMINE REFRACTORY CARDIOPULMONARY ARREST UNDER CPR

H. Ringe¹, M. Engelbarts², H. Krude³
¹Charité, Humboldt Universität Berlin, Pediatric Intensive Care and Emergency Medicine, Berlin, Germany
²Universitäts Klinikum Mainz, HNO, Mainz, Germany
³Charite, Humboldt Universität Berlin, Pediatric Endocrinology, Germany

Background
The guidelines of the European Resuscitation Council show an algorithm explaining necessary measures during cardiopulmonary resuscitation (CPR) in children. Sometimes, additional medications are applied following an unsuccessful resuscitation under compassionate use. One of these medications is enoximone.

Methods
All children with CPR during the time period 2000 to 2010 at the intensive care unit of the Charité children's hospital or those admitted immediately after out-of-hospital cardiac arrest were included. The evaluation of measures, timing, particularly the application of enoximone, during CPR, their success and effects were investigated with regard to the "return of a spontaneous circulation" (ROSC) and outcome using the "Glasgow Outcome Scale" (GOS).

Results
Altogether, 145 children were included. 31.7% of the patients had an out-of-hospital CPR. 80% of all patients had preexisting illnesses. After every step of the algorithm increasingly more often ROSC was reached, 71.7% at the end of the standard algorithm. Patients with ROSC were more likely to have shorter CPR duration (median 10/86 min). The additional treatment with enoximone lead to further 17(62.9%) ROSC`s in the 27 treated children with enoximone (median CPR time until ROSC 54.5 min), resulting in an overall ROSC of 83.4%. In other words, related to the implementation of enoximone more than 10% additional ROSC was reached. Of the 17 responders to enoximone treatment 5 survived and had a favorable outcome GOS(4/5).

Conclusions
These results suggest a beneficial effect of the application of enoximone during CPR in children. Further studies are required to evaluate the role of enoximone in paediatric CPR.
OUT-OF HOSPITAL SEIZURES IN CHILDREN: A POPULATION-BASED STUDY
H. Salmi1, H. Harve-Rytsälä2, E. Rahiala3, M. Kuisma4
1HUCH Children’s Hospital, Emergency department, Helsinki, Finland
2University of Helsinki and Helsinki University Hospital, Helsinki, Finland
3Emergency Medical Services - Department of Emergency Care, Helsinki, Finland
4University of Helsinki and Helsinki University Hospital, Emergency Medical Services - Department of Emergency Care, Helsinki, Finland

Background

The incidence, acute management and outcomes of paediatric seizures have not been investigated on a population level, even if acute seizures are a relatively common cause for paediatric out-of-hospital (OOH) and emergency room (ER) treatment.

Objectives

Our aim was to study the incidence, OOH and ER management and outcomes of paediatric seizures necessitating out-of-hospital (OOH) emergency medical (EM) care. We also investigated whether the diagnosis stays consistent throughout the process from the EM call to possible specialist care.

Methods

We studied the OOH and ER management and immediate and 2-year outcomes of all (n = 259) EM-treated cases of paediatric (0-16 y) seizures in the paediatric population of Helsinki, Finland, in 2012 (population 603 968, paediatric population 92742). Data about all performed measurements, medication, procedures, laboratory or imaging investigations, prescriptions, hospitalization, diagnoses and follow-up were available.

Conclusions/Results

The incidence of EM-treated acute seizures was 2.8 / 1000/ y in the paediatric population. Less than half were due to febrile seizures. Intubation or intensive care were needed only in single cases. 9.6 % of patients received anticonvulsive medication OOH and 17 % at ER. Still, 24.3 % of patients required hospitalisation, 30.9 % follow-up visits, and nearly half received new prescriptions. There were no on-scene or in-hospital deaths. The EM personnel’s suspicion of a paediatric seizure was finally confirmed in 87.3 %.

In conclusion, acute seizures in children are relatively common and, mostly, manageable without highly specialised care; still, hospitalisation, follow-up visits and complementary studies are often needed.

References (if needed)
OUT OF HOSPITAL PAEDIATRIC CARDIAC ARREST (OHCA): PARAMEDICS’ EXPERIENCE

C. Silvestre¹, S. Alurkar¹, R. Hastings¹, K. Element¹
¹Nottingham Children’s Hospital, PICU, Nottingham, United Kingdom

Background

The incidence of children admitted to a PICU after an OHCA is 0.7%. Outcomes are poor with a mortality of 50% and severe neurological consequences. Earlier use of adrenaline is associated with increased rate of return of spontaneous circulation.

Objectives

Evaluate the administration of adrenaline in pre-hospital.

Methods

The Emergency Department (ED) at our hospital is one of the largest in the United Kingdom. A questionnaire was sent to the paramedics of East Midlands Ambulance Service. The questions covered demographics, level of paediatric life support training: BLS/APLS, use of intraosseous (IO) needles and administration of adrenaline.

Conclusions/Results

60 questionnaires were applied. 38.3% were paramedics and 33.3% technicians; 30% had less than two years of experience. All individuals had undertaken paediatric BLS, 61.7% had APLS. 33 had experience of resuscitating a paediatric OHCA, of those 5 (8.3%) had defibrillated, 7 had used an IO, and 6 (10%) had administered adrenaline in children. 90% of first response vehicles have an IO needle and about 60% of the ambulance staff is willing to use it in children. 23% said that need training before using it and 20% responded that is not in their job role. Similar responses were obtained with adrenaline administration; 52% would be willing to use it and 30.8% would do so following training.

Early administration of adrenaline is crucial to survival and intact neurological outcome. In our hospital, the EMAS does not insert IO needles or administer adrenaline but with training are willing to do it. Addressing this need could improve the management of OHCA.

References (if needed)
APPROPRIATE PREDICTORS AND ALVARADO SCORE OF PERFORATION FOR PEDIATRIC PATIENTS WITH ACUTE APPENDICITIS IN THE EMERGENCY DEPARTMENT

S.H. Woo

The Catholic University of Korea - Incheon St. Mary's Hospital, Incheon, Republic of Korea

Background

Acute appendicitis is the most common surgical condition of abdominal pain in pediatrics diagnosed in the emergency department (ED).

Objectives

This study sought to investigate the effectiveness of each index in predicting the perforation of pediatric patients with acute appendicitis (AA) in ED.

Methods

A total of 564 pediatric patients (<15 years) who were admitted for appendectomy for AA via the ED between January 2005 and December 2014 were reviewed retrospectively. Perforation was identified based on histopathology. Patient's age, sex, body temperature and initial laboratory results, including the white blood cell (WBC) count, neutrophil count, lymphocyte count, neutrophil to lymphocyte count ratio (NLR), serum levels of CRP and Alvarado score in the ED were assessed.

Conclusions/Results

Perforation due to acute appendicitis was identified in 204 (36.2%) patients. Median WBC count, neutrophil count and NLR were significantly higher in the perforated group compared to the non-perforated group (p < 0.001, p < 0.001 and p < 0.001) in the ED. But, in multivariate logistic analysis, ESR >15 mm/h [odds ratio (OR) 2.253, p = 0.026] and WBC > 13.53 (10^9/L) (OR 3.571 p < 0.001) were significant independent factors for AA perforation in pediatrics. The Alvarado score (> 5) alone about prediction of the perforation group showed 76.0% sensitivity and 43.9 specificity. The Alvarado score with WBC count (>13.5) was showed 85.2% sensitivity and 35.1% specificity.

We suggest that the initial WBC with Alvarado score should be considered more powerful predictive factor for the diagnosis of AA perforation of pediatrics in the ED.

References (if needed)
A QUALITATIVE FEASIBILITY STUDY TO INFORM A PILOT RANDOMISED CONTROLLED TRIAL OF FLUID BOLUS THERAPY IN SEPTIC SHOCK


1University of Liverpool, Liverpool, United Kingdom
2University of Liverpool, Institute of Psychology - Health and Society, Liverpool, United Kingdom
3St Mary’s Hospital - Imperial College Healthcare NHS Trust, Paediatric Intensive Care Unit, London, United Kingdom
4Intensive Care National Audit & Research Centre, ICNARC, London, United Kingdom
5Patient Partner, PPI, Watford, United Kingdom
6Patient Partner, PPI, Leeds, United Kingdom
7Bristol Royal Hospital for Children and University of the West of England, Emergency Department and Faculty of Health and Applied Sciences, Bristol, United Kingdom
8University College London and Great Ormond Street Hospital NHS Foundation Trust, Institute of Child Health, London, United Kingdom

Background

There is increasing evidence that fluid overload may be associated with harm in paediatric critical illness. Fluids in Shock (FiSh) is a combined feasibility and pilot randomised controlled trial (RCT) to determine if restrictive fluid bolus therapy (10 ml/kg) is more beneficial than current recommended fluid bolus therapy (20 ml/kg) in the resuscitation of children with presumed septic shock.

Objectives

This qualitative feasibility study aimed to explore acceptability of the proposed pilot RCT, including the prospect of research without prior consent (RWPC or deferred consent).

Methods

A qualitative interview study involving 21 parents (18 mothers, 3 fathers, 7 were bereaved) with children admitted to a UK emergency department or intensive care unit with presumed septic shock in the last three years.

Conclusions

All parents would have provided permission for the use of their child's data in the pilot RCT. The majority of parents were unfamiliar with RWPC, yet supported its use in FiSh and other critical care trials. Parents were concerned about the change from currently recommended treatment; yet were reassured by an explanation of the current evidence base, fluid bolus therapy and monitoring procedures. Parents made recommendations about the timing of the research discussion and participant information materials. Bereaved parents supported a personalised postal ‘opt out’ approach to RWPC.

Our qualitative feasibility study findings support the proposed FiSh pilot RCT, including the use of RWPC, amongst parents whose child has experienced septic shock. Our findings will inform the FiSh RCT including participant information materials and site initiation training.

References (if needed)
FUTURE PROOFING OUR AMBULANCES

F. Bickell¹, K. Starkie¹, S. Riphagen¹, N. McErlain¹
¹Guy’s and St Thomas’ Foundation Trust, Paediatric Intensive Care, London, United Kingdom

Background

With the opportunity to design the patient compartment of our new intensive care ambulances we were keen to provide a safe working environment and to ensure the vehicles were prepared and adaptable to meet the future challenges of healthcare in the UK.

Objectives

Primarily the new ambulances had to be safe for the patient and the team, (Marshall & Lee 2013, Lee et al 2013). We were very conscious that some of the patients transferred will have infections, often with the organism remaining unidentified until a few days later, (Perkins 2016). Another challenge is the increasingly obese population, (National Statistic Office 2016). We must ensure patients are transferred safely with dignity and without potential staff injury. Lastly the vehicles must be adaptable for new kit as technological advances improve the equipment we can utilise for transfers.

Methods

By working with the ambulance design team we have been able to create a vehicle which is both safe and versatile. We have utilised a fogging system to enable speedy and comprehensive disinfecting of all areas of the vehicle. We have installed a sturdy electric trolley with a mechanical winch to safely transfer patients. By employing a new ambulance wall racking system we are able to alter the position of equipment or introduce new equipment, while still complying with transportation regulations for safety.

Conclusions/Results

We are proud of our revolutionary design and strongly believe we have safe, functional ambulances which are adaptable. We have thus future proofed our vehicles for the coming years.

References (if needed)
Background

Animals can play a valuable part in alleviating stress in many situations. Paediatric Intensive Care Transport Medicine poses a unique set of challenges.

At NWTS, we appreciate that we give large amounts of information to families who are often stressed and tired and trying to explain to siblings and relatives what is happening.

To address this problem, we have produced a photo book for families to read to their children. This book tells the story of a curious pug, Alfie, who is invited to join the NWTS team to find out what happens when a child is ill and needs to go to hospital or even intensive care.

Alfie is a therapy dog registered with Pets As Therapy UK. As well as helping us to communicate with our young patients and their siblings, we are also able to offer Alfie’s help to team members who need help and support coping with stressful situations that they have found themselves in.

Objectives

To share our experiences using a Therapy Dog in our service and to demonstrate the benefits that this can bring to staff and patients

Methods

Feedback questionnaires following distribution of the book and following staff sessions with Alfie

Conclusions

A registered therapy animal can be beneficial to both staff and patients in a Paediatric Intensive care Transport setting

References (if needed)

2. Perceptions of a hospital-based animal assisted intervention program: An exploratory study -Kathleen Abrahamson
NEAR-INFRARED SPECTROSCOPY (NIRS) AS A MONITORING TOOL FOR REGIONAL OXYGEN SATURATION IN PEDIATRIC TRANSPORT MEDICINE – A METHODOLOGICAL STUDY

T. Hannegård-Hamrin, P. Radell, J. Berner, S. Eksborg

1Karolinska Institutet, Section of Anesthesiology and Intensive Care - Department of Physiology and Pharmacology, Stockholm, Sweden
2Karolinska Institutet, Childhood Cancer Research Unit Q6:05 - Department of Women’s and Children’s Health, Stockholm, Sweden

Background

NIRS measures regional oxygen saturation (rSO2) of the underlying tissue. Values are usually read using real time monitor readings on-line but data can be electronically stored by the monitor, for example during the period of transport, and extracted and examined afterwards.

Objectives

Investigate the applicability of the electronically stored NIRS data during inter-hospital transport of critically ill children in air ambulance.

Methods

The electronically stored NIRS signal was examined in 37 patients. A smoothing process, using a mathematical algorithm for curve fitting, was applied to the unprocessed signal data to eliminate noise. A 2nd order of smoothing polynomial in combination with 20-100 neighboring points used for the moving average procedure to eliminate noise without detailed information being erased was performed.

Conclusions/Results

The Savitzky-Golay smoothing algorithm is a feasible technique to sort out the significance of changes in NIRS curves in relation to physiological change of the patient which provides unique opportunities to detailed evaluation of physiological patterns during transport.

References (if needed)

SURVEY OF ECLS (EXTRACORPOREAL LIFE SUPPORT) REFERRALS TO A REGIONAL PAEDIATRIC TRANSFER SERVICE

J. Macrae¹, Z. Intikhab²

¹Imperial School of Anaesthetics, Anaesthetics, London, United Kingdom
²Birmingham Children's Hospital, Paediatric Intensive Care, Birmingham, United Kingdom

Background

KIDS (Kids' Intensive Care and Decision Support) is a consultant-led interhospital stabilisation, transfer and advice service, transferring approximately 650 children and neonates annually. Based at Birmingham Children’s Hospital (BCH) we work alongside our 30-bed paediatric intensive care unit (PICU), a designated cardiac and respiratory ECLS centre.

Objectives

1. To evaluate the current demands for ECLS from our hospitals within the West Midlands and beyond.
2. To review the outcomes to hospital discharge of patients transferred to BCH for ECLS.

Methods

Retrospective case series review of all referrals from July 2015 to April 2017, generating queries to interrogate our transport (KIDSNTS) electronic database. Patients’ health records were reviewed and data collated on a predesigned proforma.

Conclusions/Results

32/1133 (2.8%) cases were referred for ECLS consideration. They were predominately male neonates, referred for respiratory ECLS. 16/32 referrals were accepted with 11/32 admitted. Clinical parameters reflect significant illness severity. Of 11 patients admitted, 6 received ECLS with a median run of 4.75 days. Most suffered a major complication. 7/11 were discharged alive from PICU.

KIDS is providing an ECLS retrieval service predominantly for neonatal respiratory conditions. Complication rates are high, however many patients survive to discharge.
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<tbody>
<tr>
<td>Total Number referrals</td>
<td>1133</td>
</tr>
<tr>
<td>ECLS referrals</td>
<td>32</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
</tr>
<tr>
<td>Age</td>
<td>Median, IQR 1.5 (1 day – 13 months)</td>
</tr>
<tr>
<td>Neonates (frequency)</td>
<td>20</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>Median, IQR 3.6 (2.9 – 7.6)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Respiratory 28</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>3</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRANSFERS IN n=11</th>
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</thead>
<tbody>
<tr>
<td>Referrals</td>
</tr>
<tr>
<td>Admitted 11</td>
</tr>
<tr>
<td>Out of Region</td>
</tr>
<tr>
<td>Daytime (0800 – 2000)</td>
</tr>
<tr>
<td>Consultant Present on Transfer</td>
</tr>
<tr>
<td>Distance (miles) (Median, IQR)</td>
</tr>
<tr>
<td>Stabilisation time at referring hospital (minutes) (Median, IQR)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLINICAL n=11</th>
<th>PICU OUTCOMES n=11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>Respiratory 9</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2</td>
</tr>
<tr>
<td>PIM mortality score (%) (median, IQR)</td>
<td>44.9 (8.95 – 80.95)</td>
</tr>
<tr>
<td>Ventilation Mode</td>
<td>HFOV 7</td>
</tr>
<tr>
<td>Pre transfer (high frequency oscillatory ventilation)</td>
<td>Conventional 11</td>
</tr>
<tr>
<td>Ventilation mode inter transfer</td>
<td>HFOV 1</td>
</tr>
<tr>
<td>Conventional 7</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>PaO2 (mmHg/FiO2) (median, IQR)</td>
<td>58 (31 - 71.5)</td>
</tr>
<tr>
<td>Mortality</td>
<td>Died prior to ECLS initiation 2</td>
</tr>
<tr>
<td>Inotropes</td>
<td>2</td>
</tr>
<tr>
<td>&gt;=3</td>
<td>8</td>
</tr>
<tr>
<td>Lactate mmol/L (median, IQR)</td>
<td>3.3 (1.8 – 6.2)</td>
</tr>
<tr>
<td>Survived to PIC discharge (with ECLS)</td>
<td>4</td>
</tr>
<tr>
<td>Survived to PIC discharge (no ECLS)</td>
<td>3</td>
</tr>
<tr>
<td>Inhaled Nitric Oxide used</td>
<td>9</td>
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</tbody>
</table>

References (if needed)
A REVIEW OF PALLIATIVE TRANSFERS IN PAEDIATRIC CRITICAL CARE TRANSPORT

L. Pritchard¹, R. Savidge¹

¹CMFT, NWTS, Warrington, United Kingdom

Background

As collaboration between palliative and intensive care services increases, so does the ability to discuss end of life plans in advance of deterioration. This discussion may include the preferred location for end of life care – for example a hospice or the patient's own home.

The North West and North Wales Paediatric Transport Service (NWTS) is funded to advise upon, stabilise and transfer paediatric critical care patients from district general hospitals to paediatric intensive care units. Occasionally NWTS are asked to provide a team / team members to facilitate transfers from the region’s PICUs to hospices or home for end of life care. This is an infrequent occurrence and plans are made on a patient by patient basis.

Objectives

This study aimed to analyse all palliative transfers carried out by the NWTS service, reviewing the team composition, background of team members (including drivers) and immediate outcome.

Methods

All palliative care transfers involving the service over 12 months were reviewed.

Conclusions/Results

The lead clinician was NWTS-trained in the majority of cases and the nurse NWTS-trained in all cases. In 60% of cases, both nurse and physician were working a PICU shift at the time of transfer, minimising the impact on NWTS and enabling continuity of care. In 60% of cases the driver was not blue-light trained. In all cases an appropriate team was awaiting to obtain handover and parallel planning had been made.

Although all transfers were well planned, as our involvement with these transfers increases, a service guideline will ensure consistency.

References (if needed)