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Training Calendar 2017

May (13.00-14.00)

8th: Critical Appraisal.
15th: Literature Searching.
26th: Interpreting Statistics.
31st: Critical Appraisal.

June (12.00-13.00)

1st: Literature Searching.
8th: Interpreting Statistics.
13th: Critical Appraisal.
29th: Literature Searching.
Journal Tables of Contents

The most recent issues of key journals. Click on the hyperlinked titles (+ Ctrl) to for contents tables. If you would like any of the papers in full text then get in touch: library@uhbristol.nhs.uk

**Critical Care** (2017, Volume 21)

**Critical Care Medicine** (May 2017, Volume 45, Issue 5)

**Current Opinion in Pediatrics** (June 2017 - Volume 29 - Issue 3)

Translation biomarkers from research to clinical use in pediatric neurocritical care: focus on traumatic brain injury and cardiac arrest

Prout, Andrew J.; Wolf, Michael S.; Fink, Ericka L.

Febrile infant update

Dorney, Kate; Bachur, Richard G.

Pediatric spinal cord injury without radiographic abnormality in the era of advanced imaging

Farrell, Caitlin A.; Hannon, Megan; Lee, Lois K.

High-flow nasal cannula therapy beyond the perinatal period

Lee, Michael Jr.; Nagler, Joshua

Influenza in children

Kondrich, Janienne; Rosenthal, Michele

Management of acute asthma exacerbations

Stenson, Erin K.; Tchou, Michael J.; Wheeler, Derek S.

The evolution of disease: chronic lung disease of infancy and pulmonary hypertension

Tracy, Michael C.; Cornfield, David N.

Respiratory complications, management and treatments for neuromuscular disease in children

Buu, MyMy C.
Current Awareness Database Articles

Below is a selection of articles recently added to the healthcare databases. If you would like any of the following articles in full text, or if you would like a more focused search on your own topic, then get in touch: library@uhbristol.nhs.uk

1. Diagnostic Values and Limitations of (1,3)-β-D-Glucans and Galactomannan Assays for Invasive Fungal Infection in Patients Admitted to Pediatric Intensive Care Unit.

**Author(s):** Zheng, Fang; Zha, Hui; Yang, Dandan; Deng, Jun; Zhang, Zhiquan

**Source:** Mycopathologia; Apr 2017; vol. 182 (no. 3-4); p. 331-338

**Publication Date:** Apr 2017

**Publication Type(s):** Comparative Study Journal Article Evaluation Studies

**Abstract:** The relationship among (1,3)-β-D-glucans (BG), galactomannan (GM), and the risk of developing invasive fungal infections (IFI) has been observed in adult ICU and in children with hematological malignancies. Only scant data evaluated the value of BG/GM assays for diagnosis of IFI in patients with nonhematological diseases in pediatric intensive care unit (PICU). In this study, we assessed the diagnostic value of these markers for IFI in PICU. The records of 230 patients were retrospectively evaluated. Out of 117 patients (7 proven, 23 probable, and 87
cases without evidence of IFI) performed GM and BG assays. The results showed many factors were associated with false-positive test results. Patients who aged over 3 years had higher levels of GM and BG than younger infants. The levels of BG were higher in subjects with dairy, human blood products, antibiotics, and corticosteroids therapy than in cases without these treatments. Unlike BG assay, GM assay was less susceptible to above-mentioned factors expect blood products. The levels of BG and GM in IFI cases were dramatically higher than in controls. The diagnostic performance of these assays showed that GM assay had better results when compared with BG assay. On the whole, negative predictive value in both GM and BG assays was dramatically higher than other diagnostic parameters. In conclusion, BG assay was highly susceptible to many factors, and GM assay could be useful for diagnosis of IFI for its high sensitivity, but the over benefit of this assay limited in its inadequate specificity. The comparative advantage of BG and BG assays lied in excluding IFI in non-hematological PICU patients.

1. Sex Differences in Inflammatory Response and Acid-Base Balance in Prepubertal Children with Severe Sepsis.

**Author(s):** Lefèvre, Nicolas; Noyon, Benjamin; Biarent, Dominique; Corazza, Francis; Duchateau, Jean; Casimir, Georges

**Source:** Shock (Augusta, Ga.); Apr 2017; vol. 47 (no. 4); p. 422-428

**Publication Date:** Apr 2017

**Publication Type(s):** Journal Article

**Abstract:** PURPOSE AND METHODSThe severity and prognosis of various acute inflammatory conditions, such as sepsis, differ between males and females. The mechanisms underlying these sex differences probably involve both hormonal and genetic factors. In order to evaluate a possible genetic influence, we reviewed clinical signs and biological inflammatory markers of prepubertal children with severe sepsis admitted to the pediatric intensive care unit (PICU). FINDINGS A total of 142 prepubertal children, 66 girls and 76 boys, suffering from severe sepsis and admitted to the PICU were included. The survival rate demonstrated a tendency to be higher in females (P = 0.14). Maximum white blood cell count (23,800 cells/μL [15,110-34,600] in girls vs. 19,025 cells/μL [12,358-26,098] in boys, P = 0.02), neutrophil count (16,944 cells/μL [10,620-27,540] vs. 13,756 cells/μL [8410-20,110], P = 0.03), and C-reactive protein level (26.2 mg/dL [15.7-33.6] vs. 18.8 mg/dL [11.1-30.0], P = 0.04) were all significantly higher in girls. Girls also exhibited significantly longer fever duration (2 days [1-6] vs. 1 day [1-3] for the boys, P <0.01), lower pH on admission (7.32 [7.25-7.39] vs. 7.37 [7.31-7.43] P =0.03), and lower base excess (-6 mEq/L [-10.7 to -0.8] vs. -2.3 mEq/L [-6.6 to -2.6], P<0.01), as well as lower bicarbonate levels (19.1 mEq/l [15.9-24.0] vs. 21.15 mEq/l [18.3-26.68], P = 0.04), when compared with the boys. CONCLUSIONSOur study revealed higher neutrophilic inflammation, as well as lower pH on admission, in girls with severe sepsis; associated with longer fever duration, which could contribute to better pathogen clearance. However, further studies are needed to demonstrate the link between acidosis and modulation of the immune response.


**Author(s):** Sethi, Sidharth Kumar; Maxvold, Norma; Bunchman, Timothy; Jha, Pranaw; Kher, Vijay; Raina, Rupesh

**Source:** Pediatric nephrology (Berlin, Germany); Apr 2017; vol. 32 (no. 4); p. 589-601

**Publication Date:** Apr 2017

**Publication Type(s):** Journal Article Review
Abstract: Acute kidney injury (AKI) in critically ill children is frequently a component of the multiple organ failure syndrome. It occurs within the framework of the severe catabolic phase determined by critical illness and is intensified by metabolic derangements. Nutritional support is a must for these children to improve outcomes. Meeting the special nutritional needs of these children often requires nutritional supplementation by either the enteral or the parenteral route. Since critically ill children with AKI comprise a heterogeneous group of subjects with varying nutrient needs, nutritional requirements should be frequently reassessed, individualized and carefully integrated with renal replacement therapy. This article is a state-of-the-art review of nutrition in critically ill children with AKI.

Author(s): Farias-Moeller, Raquel; Bartolini, Luca; Pasupuleti, Archana; Brittany Cines, R D; Kao, Amy; Carpenter, Jessica L
Source: Neurocritical care; Apr 2017; vol. 26 (no. 2); p. 267-272
Publication Date: Apr 2017
Publication Type(s): Journal Article
Abstract: BACKGROUND Super-refractory status epilepticus (SRSE) ensues when there is no improvement of seizure control in response to anesthetic therapy or seizure recurrence after reduction of anesthetic agents. There is no consensus on standard of care for SRSE. Ketogenic diet (KD) has reported success, but technical challenges exist including inability to feed patients, concomitant steroid use, acidotic states, and lack of dieticians with experience. The optimal protocol for KD is yet to be determined. We describe our approach to initiation of KD in the pediatric intensive care unit (PICU). METHODS Patients with SRSE who had KD initiation in the PICU were identified. Data from the hospital course were supplemented by review of the electronic medical record. RESULTS Nine children with SRSE who had KD initiated in the PICU were identified. Descriptive analysis was performed. Mean age was 5.4 years (SD 2.24). Median number of days to start KD from detection of seizures was 13 [interquartile range (IQR) 10-16]. Mean time to achieve ketosis was 4.2 days (SD 3.4). The median number of antiepileptic drugs (AEDs) trialed before KD was started was 4 [IQR 3-4], and the median number of continuous infusions was 2 [IQR 2-3]. After initiation of KD, most patients were weaned off anesthetic infusions by 1 week. Outcomes were variable. CONCLUSIONS We demonstrated the feasibility of a practical approach to initiation of KD for children with SRSE. These children were successfully weaned off continuous anesthetic infusions. Larger studies are needed to determine effectiveness, safety, and tolerability of KD in the management of SRSE as well as ease of implementation.

4. Diagnostic Values and Limitations of (1,3)-β-D-Glucans and Galactomannan Assays for Invasive Fungal Infection in Patients Admitted to Pediatric Intensive Care Unit.
Author(s): Zheng, Fang; Zha, Hui; Yang, Dandan; Deng, Jun; Zhang, Zhiquan
Source: Mycopathologia; Apr 2017; vol. 182 (no. 3-4); p. 331-338
Publication Date: Apr 2017
Publication Type(s): Journal Article
Abstract: The relationship among (1,3)-β-D-glucans (BG), galactomannan (GM), and the risk of developing invasive fungal infections (IFI) has been observed in adult ICU and in children with hematological malignancies. Only scant data evaluated the value of BG/GM assays for diagnosis
of IFI in patients with nonhematological diseases in pediatric intensive care unit (PICU). In this study, we assessed the diagnostic value of these markers for IFI in PICU. The records of 230 patients were retrospectively evaluated. Out of 117 patients (7 proven, 23 probable, and 87 cases without evidence of IFI) performed GM and BG assays. The results showed many factors were associated with false-positive test results. Patients who aged over 3 years had higher levels of GM and BG than younger infants. The levels of BG were higher in subjects with dairy, human blood products, antibiotics, and corticosteroids therapy than in cases without these treatments. Unlike BG assay, GM assay was less susceptible to above-mentioned factors expect blood products. The levels of BG and GM in IFI cases were dramatically higher than in controls. The diagnostic performance of these assays showed that GM assay had better results when compared with BG assay. On the whole, negative predictive value in both GM and BG assays was dramatically higher than other diagnostic parameters. In conclusion, BG assay was highly susceptible to many factors, and GM assay could be useful for diagnosis of IFI for its high sensitivity, but the over benefit of this assay limited in its inadequate specificity. The comparative advantage of BG and BG assays lied in excluding IFI in non-hematological PICU patients.

7. Outcomes following electrographic seizures and electrographic status epilepticus in the pediatric and neonatal ICUs.

**Author(s):** Pinchefsky, Elana F; Hahn, Cecil D

**Source:** Current opinion in neurology; Apr 2017; vol. 30 (no. 2); p. 156-164

**Publication Date:** Apr 2017

**Publication Type(s):** Journal Article

**Abstract:** PURPOSE OF REVIEW Increasing recognition of electrographic seizures and electrographic status epilepticus in critically ill neonates and children has highlighted the importance of identifying their potential contributions to neurological outcomes to guide optimal management. RECENT FINDINGS Recent studies in children and neonates have found an independent association between increasing seizure burden and worse short-term and long-term outcomes, even after adjusting for other important contributors to outcome such as seizure cause and illness severity. The risk of worse neurological outcome has been shown to increase above a seizure burden threshold of 12-13 min/h, which is considerably lower than the conventional definition of status epilepticus of 30 min/h. Randomized controlled trials in neonates have demonstrated that electroencephalography-targeted therapy can successfully reduce seizure burden, but due to their small size these trials have not been able to demonstrate that more aggressive electroencephalography-targeted treatment of both subclinical and clinical seizures results in improved outcome. SUMMARY Despite mounting evidence for an independent association between increasing seizure burden and worse outcome, further study is needed to determine whether early seizure identification and aggressive antiseizure treatment can improve neurodevelopmental outcomes.


**Author(s):** Traube, Chani; Silver, Gabrielle; Reeder, Ron W; Doyle, Hannah; Hegel, Emily; Wolfe, Heather A; Schneller, Christopher; Chung, Melissa G; Dervan, Leslie A; DiGennaro, Jane L; Buttram, Sandra D W; Kudchadkar, Sapna R; Madden, Kate; Hartman, Mary E; deAlmeida, Mary L; Watson, Karen; Ista, Erwin; Baarslag, Manuel A; Salonia, Rosanne; Beca, John; Long, Debbie; Kawai, Yu; Cheifetz, Ira M; Gelvez, Javier; Truempier, Edward J; Smith, Rebecca L; Peters, Megan
OBJECTIVES
To determine prevalence of delirium in critically ill children and explore associated risk factors.

DESIGN
Multi-institutional point prevalence study.

SETTING
Twenty-five pediatric critical care units in the United States, the Netherlands, New Zealand, Australia, and Saudi Arabia.

PATIENTS
All children admitted to the pediatric critical care units on designated study days (n = 994).

INTERVENTION
Children were screened for delirium using the Cornell Assessment of Pediatric Delirium by the bedside nurse. Demographic and treatment-related variables were collected.

MEASUREMENTS AND MAIN RESULTS
Primary study outcome measure was prevalence of delirium. In 159 children, a final determination of mental status could not be ascertained. Of the 835 remaining subjects, 25% screened positive for delirium, 13% were classified as comatose, and 62% were delirium-free and coma-free. Delirium prevalence rates varied significantly with reason for ICU admission, with highest delirium rates found in children admitted with an infectious or inflammatory disorder. For children who were in the PICU for 6 or more days, delirium prevalence rate was 38%. In a multivariate model, risk factors independently associated with development of delirium included age less than 2 years, mechanical ventilation, benzodiazepines, narcotics, use of physical restraints, and exposure to vasopressors and antiepileptics.

CONCLUSIONS
Delirium is a prevalent complication of critical illness in children, with identifiable risk factors. Further multi-institutional, longitudinal studies are required to investigate effect of delirium on long-term outcomes and possible preventive and treatment measures. Universal delirium screening is practical and can be implemented in pediatric critical care units.


Author(s): Kerklaan, Dorian; Augustus, Marjolein E; Hulst, Jessie M; van Rosmalen, Joost; Verbruggen, Sascha C A T; Joosten, Koen F M

Source: Clinical nutrition (Edinburgh, Scotland); Apr 2017; vol. 36 (no. 2); p. 452-457

Abstract: BACKGROUND & AIMS
Indirect calorimetry (IC) is considered the gold standard to determine resting energy expenditure (REE) but its availability in PICUs worldwide is limited. Ventilator-derived VCO2 could potentially improve the possibility of performing REE measurements. We investigated whether ventilator-derived VCO2 values are comparable to IC-derived VCO2 values and can clinically be used in clinical practice to determine REE.

METHODS
VCO2-values were simultaneously collected in mechanically ventilated children from IC (Deltatrac®) and Servo-I® ventilator on a minute base over at least 10 min period of steady state. REE was calculated using the modified Weir formula (for IC) or REE = 5.5*VCO2 (L/min)*1440 (for the Servo-I values) and compared with frequently used predictive equations by Schofield and the WHO to calculate REE.

RESULTS
Measurements were performed in 41 children; median age 2 years. The mean relative difference between VCO2 measured by IC and
Servo-I® was 15.6% (p = 0.002), and limits of agreement in the Bland-Altman analysis were wide. Comparable measurements, defined as a difference ≤10% between IC and Servo-I® VCO2 values, were seen in 18 (44%) children, but this proportion was 70% in children ≥15 kg. In this group, REE could be accurately predicted using Servo-I® derived VCO2 values and this method was superior to the use of predictive equations. The Servo-I® derived VCO2 values were not sufficiently accurate for the large proportion of children weighing <15 kg. CONCLUSIONS In children ≥15 kg, VCO2 measurements of the Servo-I® seem sufficiently accurate for use in clinical practice and may be used to determine energy expenditure in the future.

11. The intensive care medicine clinical research agenda in paediatrics.

Author(s): Peters, Mark J; Argent, Andrew; Festa, Marino; Leteurtre, Stéphane; Piva, Jefferson; Thompson, Ann; Willson, Douglas; Tissières, Pierre; Tucci, Marisa; Lacroix, Jacques

Source: Intensive care medicine; Mar 2017

Publication Date: Mar 2017

Publication Type(s): Journal Article Review

Abstract: BACKGROUND Intensive Care Medicine set us the task of outlining a global clinical research agenda for paediatric intensive care (PIC). In line with the clinical focus of this journal, we have limited this to research that may directly influence patient care. METHODS Clinician researchers from PIC research networks of varying degrees of formality from around the world were invited to answer two main questions: (1) What have been the major recent advances in paediatric critical care research? (2) What are the top 10 studies for the next 10 years? RESULTS (1) Inclusive databases are well established in many countries. These registries allow detailed observational studies and feasibility testing of clinical trial protocols. Recent trials are larger and more valuable, and (2) most common interventions in PIC are not evidence-based. Clinical studies for the next 10 years should address this deficit, including: ventilation techniques and interfaces; fluid, transfusion and feeding strategies; optimal targets for vital signs; multiple organ failure definitions, mechanisms and treatments; trauma, prevention and treatment; improving safety; comfort of the patient and their family; appropriate care in the face of medical complexity; defining post-PICU outcomes; and improving knowledge generation and adoption, with novel trial design and implementation strategies. The group specifically highlighted the need for research in resource-limited environments wherein mortality remains often tenfold higher than in well-resourced settings. CONCLUSION Paediatric intensive care research has never been healthier, but many gaps in knowledge remain. We need to close these urgently. The impact of new knowledge will be greatest in resource-limited environments.
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# Latest Evidence

## Mitochondrial disorders in children: Co-enzyme Q10 (ES11) March 2017

**NICE National Institute for Health and Care Excellence**

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## Interventions for improving sleep quality in people with chronic kidney disease

**Cochrane Library**

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<tr>
<td>Patrizia Natale, Marinella Ruospo, Valeria M Saglimbene, Suetonia C Palmer, Giovanni FM Strippoli</td>
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<td>Online Publication Date: April 2017</td>
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