PICU

Current Awareness Newsletter

November 2016
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**Training Calendar 2016**

*All sessions are 1 hour*

**October** (12pm)
- Fri 7th  Statistics
- Mon 10th Information resources
- Tue 18th Literature Searching
- Wed 26th Critical Appraisal

**November** (1pm)
- Thurs 3rd  Statistics
- Fri 11th Information resources
- Mon 14th Literature Searching
- Tues 22nd Critical Appraisal
- Wed 30th  Statistics
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### The Latest Evidence

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*OpenAthens login required. Register here: [https://openathens.nice.org.uk/](https://openathens.nice.org.uk/)*

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<th>Other – Behind the Headlines, Guidance</th>
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Journal Tables of Contents

The most recent issues of key journals. If you would like any of the papers in full text then please email the library: library@uhbristol.nhs.uk

**Journal of Critical Care** OCT 2016

**Interhospital Transfer of Children in Respiratory Failure: A Clinician Interview Qualitative Study**

To investigate the decision making underlying transfer of children with respiratory failure from Level II to Level I pediatric intensive care unit (PICU) care.

by Folafoluwa O. Ode... / 1d

**Mortality, length-of-stay, bloodstream and respiratory viral infections in a pediatric intensive care unit**

We investigated whether diagnostic categories and presence of infections were associated with increased mortality or length-of-stay in patients admitted to a pediatric intensive care unit (PICU).

by Kam Lun Hon, Man ... / 5d

**Early fluid resuscitation and volume therapy in venoarterial extracorporeal membrane oxygenation**

For circulatory support, venoarterial extracorporeal membrane oxygenation (VA-ECMO) is dependent on sufficient venous drainage ensured by fluid therapy. Volume overload however is linked to poor prognosis. This study therefore evaluates volume therapy in VA-ECMO.

by Dawid L. Staudach... / 9d

**Pediatrics Online Table of Contents Alert**

**October 2016, VOLUME 138 / ISSUE 4**

Articles

**Predicting Severe Pneumonia Outcomes in Children**

Quality Reports High Reliability Pediatric Septic Shock Quality Improvement Initiative and Decreasing Mortality

Roni D. Lane, Tomohiko Funai, Ron Reeder, and Gitte Y. Larsen

Executive Summary of the American Heart Association and American Thoracic Society Joint Guidelines for Pediatric Pulmonary Hypertension.

Authors: Abman SH, Ivy DD, Archer SL, Wilson K, AHA/ATS Joint Guidelines for Pediatric Pulmonary Hypertension Committee Abstract Although pulmonary hypertension (PH) contributes significantly to poor outcomes in diverse pediatric diseases, approaches toward the care of children with PH have been limited by the lack of consensus guidelines from experts in the field. In a joint effort from the American Journal...

Pediatric Anesthesia Volume 26, Issue 11 Pages 1031 - 1119, November 2016

Landmark papers in pediatric cardiac anesthesia: documenting the history of the specialty (pages 1047–1052)
Robert H. Friesen
Version of Record online: 13 OCT 2016 | DOI: 10.1111/pan.13011

Acta Paediatrica


Fontan Palliation

Reduced physical exercise and health-related quality of life after Fontan palliation (pages 1322–1328)
Eva R. Hedlund, Bo Lundell, Li Villard and Gunnar Sjöberg
Version of Record online: 8 SEP 2016 | DOI: 10.1111/apa.13544

Emergency Transport

Characteristics and outcomes of critically ill children following emergency transport by a specialist paediatric transport team (pages 1329–1334)
Tova Hannegård Hamrin, Jonas Berner, Staffan Eksborg, Peter J. Radell and Urban Fläring
Version of Record online: 24 JUN 2016 | DOI: 10.1111/apa.13492

More than a bus ride: quality and outcomes of paediatric specialty transport (page 1335)
Michael T. Bigham
Version of Record online: 12 AUG 2016 | DOI: 10.1111/apa.13534
Fly away with me (page 1336)
Brent McSharry
Version of Record online: 6 SEP 2016 | DOI: 10.1111/apa.13530

Bronchiolitis
Following up infant bronchiolitis patients provided new evidence for and against the united airway disease hypothesis (pages 1355–1360)
Eero Lauhkonen, Petri Koponen, Kirsi Nuolivirta, Merja Helminen, Marita Paassilta, Jyri Toikka and Matti Korppi
Version of Record online: 19 AUG 2016 | DOI: 10.1111/apa.13537

Down's syndrome is a risk factor for severe lower respiratory tract infection due to respiratory syncytial virus (pages e531–e535)
Constanza Galleguillos, Bárbara Galleguillos, Guillermo Larios, Gonzalo Menchaca, Louis Bont and Jose A. Castro-Rodriguez

Critical Care Medicine
November 2016 - Volume 44 - Issue 11

Pediatric Sepsis Biomarker Risk Model-II: Redefining the Pediatric Sepsis Biomarker Risk Model With Septic Shock Phenotype
Wong, Hector R.; Cvijanovich, Natalie Z.; Anas, Nick; Allen, Geoffrey L.; Thomas, Neal J.; Bigham, Michael T.; Weiss, Scott L.; Fitzgerald, Julie; Checchia, Paul A.; Meyer, Keith; Quasney, Michael; Hall, Mark; Gedeit, Rainer; Freishtat, Robert J.; Nowak, Jeffrey; Raj, Shekhar S.; Gertz, Shira; Howard, Kelli; Harmon, Kelli; Lahni, Patrick; Frank, Erin; Hart, Kimberly W.; Nguyen, Trung C.; Lindsell, Christopher J.

Pediatric Critical Care
Impact of Weight Extremes on Clinical Outcomes in Pediatric Acute Respiratory Distress Syndrome
Ward, Shan L.; Gildengorin, Virginia; Valentine, Stacey L.; Sapru, Anil; Curley, Martha A. Q.; Thomas, Neal; Willson, Douglas F.; Flori, Heidi R.

Validity of Different Delirium Assessment Tools for Critically Ill Children: Covariates Matter*
Luetz, Alawi; Gensel, Dennis; Müller, Judith; Weiss, Bjoern; Martiny, Viktoria; Heinz, Andreas; Wernecke, Klaus-Dieter; Spies, Claudia

Neuromuscular Blocking Agents and Neuromuscular Dysfunction Acquired in Critical Illness: A Systematic Review and Meta-Analysis
Price, David R.; Mikkelsen, Mark E.; Umscheid, Craig A.; Armstrong, Ehrin J.

Grangé, Steven; Buchonnet, Gérard; Besnier, Emmanuel; Artaud-Macari, Elise; Beduneau, Gaetan; Carpentier, Dorothée; Dehay, Julien; Girault, Christophe; Marchalot, Antoine; Guerrot, Dominique; Tamion, Fabienne

**Will the Use of Anthropometric Measurements Solely to Assess Nutritional Status in PICU Suffice?**

Zamberlan, Patricia; Delgado, Artur Figueiredo; Brunow de Carvalho, Werther
Exercise
Systematic Reviews

There are 7 key steps that need to be taken when carrying out a Systematic Review. Can you put them in order?

A. Quality assessment
B. Study selection
C. Synthesis
D. Data extraction
E. Define the question
F. Literature search
G. Writing up

For assistance with carrying out a systematic review search or a literature search, please email library@uhbristol.nhs.uk.
Current Awareness Database Articles

1. Management of neutropenic patients in the intensive care unit (NEWBORNS EXCLUDED) recommendations from an expert panel from the French Intensive Care Society (SRLF) with the French Group for Pediatric Intensive Care Emergencies (GFRUP), the French Society of Anesthesia and Intensive Care (SFAR), the French Society of Hematology (SFH), the French Society for Hospital Hygiene (SF2H), and the French Infectious Diseases Society (SPIF).

Source: Annals of intensive care; Dec 2016; vol. 6 (no. 1); p. 90
Publication Date: Dec 2016
Publication Type(s): Journal Article Review
Author(s): Schnell, David; Azoulay, Elie; Benoit, Dominique; Clouzeau, Benjamin; Demaret, Pierre; Ducassou, Stéphane; Frange, Pierre; Lafaurie, Matthieu; Legrand, Matthieu; Meert, Anne-Pascale; Mokart, Djamel; Naudin, Jérôme; Pene, Frédéric; Rabbat, Antoine; Raffoux, Emmanuel; Ribaud, Patricia; Richard, Jean-Christophe; Vincent, François; Zahar, Jean-Ralph; Darmon, Michael
Available in full text at Annals of Intensive Care - from ProQuest
Available in full text at Annals of Intensive Care - from BioMed Central
Abstract: Neutropenia is defined by either an absolute or functional defect (acute myeloid leukemia or myelodysplastic syndrome) of polymorphonuclear neutrophils and is associated with high risk of specific complications that may require intensive care unit (ICU) admission. Specificities in the management of critically ill neutropenic patients prompted the establishment of guidelines dedicated to intensivists. These recommendations were drawn up by a panel of experts brought together by the French Intensive Care Society in collaboration with the French Group for Pediatric Intensive Care Emergencies, the French Society of Anesthesia and Intensive Care, the French Society of Hematology, the French Society for Hospital Hygiene, and the French Infectious Diseases Society. Literature review and formulation of recommendations were performed using the Grading of Recommendations Assessment, Development and Evaluation system. Each recommendation was then evaluated and rated by each expert using a methodology derived from the RAND/UCLA Appropriateness Method. Six fields are covered by the provided recommendations: (1) ICU admission and prognosis, (2) protective isolation and prophylaxis, (3) management of acute respiratory failure, (4) organ failure and organ support, (5) antibiotic management and source control, and (6) hematological management. Most of the provided recommendations are obtained from low levels of evidence, however, suggesting a need for additional studies. Seven recommendations were, however, associated with high level of evidences and are related to protective isolation, diagnostic workup of acute respiratory failure, medical management, and timing surgery in patients with typhlitis.
Database: Medline

2. Experts' recommendations for the management of cardiogenic shock in children.
Source: Annals of intensive care; Dec 2016; vol. 6 (no. 1); p. 14
Publication Date: Dec 2016
Publication Type(s): Journal Article
Author(s): Brissaud, Olivier; Botte, Astrid; Cambonie, Gilles; Dauger, Stéphane; de Saint Blanquat, Laure; Durand, Philippe; Gournay, Véronique; Guillet, Elodie; Laux, Daniela; Leclerc, Francis; Mauriat, Philippe; Boulain, Thierry; Kutolfan, Khaldoun
Available in full text at Annals of Intensive Care - from ProQuest
Abstract: Cardiogenic shock which corresponds to an acute state of circulatory failure due to impairment of myocardial contractility is a very rare disease in children, even more than in adults. To date, no international recommendations regarding its management in critically ill children are available. An experts’ recommendations in adult population have recently been made (Levy et al. Ann Intensive Care 5(1):52, 2015; Levy et al. Ann Intensive Care 5(1):26, 2015). We present herein recommendations for the management of cardiogenic shock in children, developed with the grading of recommendations’ assessment, development, and evaluation system by an expert group of the Groupe Francophone de Réanimation et Urgences Pédiatriques (French Group for Pediatric Intensive Care and Emergencies). The recommendations cover four major fields of application such as: recognition of early signs of shock and the patient pathway, management principles and therapeutic goals, monitoring hemodynamic and biological variables, and circulatory support (indications, techniques, organization, and transfer criteria). Major principle care for children with cardiogenic shock is primarily based on clinical and echocardiographic assessment. There are few drugs reported as effective in childhood in the medical literature. The use of circulatory support should be facilitated in terms of organization and reflected in the centers that support these children. Children with cardiogenic shock are vulnerable and should be followed regularly by intensivist cardiologists and pediatricians. The experts emphasize the multidisciplinary nature of management of children with cardiogenic shock and the importance of effective communication between emergency medical assistance teams (SAMU), mobile pediatric emergency units (SMUR), pediatric emergency departments, pediatric cardiology and cardiac surgery departments, and pediatric intensive care units.

Database: Medline


Source: The Journal of asthma : official journal of the Association for the Care of Asthma; Dec 2016; vol. 53 (no. 10); p. 1006-1011

Publication Date: Dec 2016

Publication Type(s): Journal Article

Author(s): Carroll, Christopher L; Faustino, Edward Vincent S; Pinto, Matthew G; Sala, Kathleen A; Canarie, Michael F; Li, Simon; Giuliano, John S; The Northeast Pediatric Critical Care Research Consortium

Abstract: To describe the treatment practices in critically ill children with RSV bronchiolitis across four regional PICUs in the northeastern United States, and to determine the factors associated with increased ICU length of stay in this population. We conducted a retrospective cohort study of children who were admitted with RSV bronchiolitis between July 2009 and July 2011 to the PICUs of Connecticut Children's Medical Center, Yale-New Haven Children's Hospital, Maria Fareri Children's Hospital, and Baystate Children's Hospital. Data were collected regarding clinical characteristics and intensive care course among these hospitals. During the study period, 323 children were admitted to one of the four ICUs with RSV bronchiolitis. Despite similar mortality risk scores among ICUs, there was considerable variation in the use of therapies, particularly intubation and mechanical ventilation, in which there was greater than a 3.5-fold increased risk of intubation between sites with the highest and lowest frequency of intubation (odds ratio: 3.8; 95% confidence interval: 2.2-6.4). Albuterol was the most commonly used respiratory treatment, followed by chest physiotherapy, high-flow nasal cannula, and hypertonic saline. Longer stays in the ICU were associated with more frequent use of therapies, specifically invasive mechanical ventilation, inhaled corticosteroids, intrapulmonary percussive ventilation, and chest physiotherapy. Even within a close geographic region, there is significant variation in the treatment provided to critically ill children with bronchiolitis.
RSV bronchiolitis. None of these treatments were associated with shorter durations of hospitalization in this population and some, such as mechanical ventilation, were associated with longer ICU lengths of stay.

Database: Medline


Source: Annals of intensive care; Dec 2016; vol. 6 (no. 1); p. 40

Publication Date: Dec 2016

Publication Type(s): Journal Article

Author(s): Villeneuve, Andréanne; Joyal, Jean-Sébastien; Proulx, François; Ducruet, Thierry; Poitras, Nicole; Lacroix, Jacques

Available in full text at Annals of Intensive Care - from ProQuest

Available in full text at Annals of Intensive Care - from BioMed Central

Abstract: Two sets of diagnostic criteria of paediatric multiple organ dysfunction syndrome (MODS) were published by Proulx in 1996 and by Goldstein in 2005. We hypothesized that this changes the epidemiology of MODS. Thus, we determined the epidemiology of MODS, according to these two sets of diagnostic criteria, we studied the intra- and inter-observer reproducibility of each set of diagnostic criteria, and we compared the association between cases of MODS at paediatric intensive care unit (PICU) entry, as diagnosed by each set of diagnostic criteria, and 90-day all-cause mortality. All consecutive patients admitted to the tertiary care PICU of Sainte-Justine Hospital, from April 21, 2009 to April 20, 2010, were considered eligible for enrolment into this prospective observational cohort study. The exclusion criteria were gestational age < 40 weeks, age < 3 days or > 18 years at PICU entry, pregnancy, admission immediately after delivery. No patients were censored. Daily monitoring using medical chart ended when the patient died or was discharged from PICU. Mortality was monitored up to death, hospital discharge, or 90 days post PICU entry, whatever happened first. Concordance rate and kappa score were calculated to assess reproducibility. The number of MODS identified with Proulx and Goldstein definitions was compared using 2-by-2 contingency tables. Student’s t test or Wilcoxon signed-ranked test was used to compare continuous variables with normal or abnormal distribution, respectively. We performed a Kaplan-Meier survival analysis to assess the association between MODS at PICU entry and 90-day mortality. The occurrence of MODS was monitored daily and prospectively in 842 consecutive patients admitted to the PICU of Sainte-Justine Hospital over 1 year. According to Proulx and Goldstein diagnostic criteria, 180 (21.4 %) and 314 patients (37.3 %) had MODS over PICU stay, respectively. Concordance of MODS diagnosis over PICU stay was 81.3 % (95 % CI 78.6-83.9 %), and kappa score was 0.56 (95 % CI 0.50-0.61). Discordance was mainly attributable to cardiovascular or neurological dysfunction criteria. The proportion of patients with MODS at PICU entry who died within 90 days was higher with MODS diagnosed with Proulx criteria (17.8 vs. 11.5 %, p = 0.038), as well as the likelihood ratio of death (4.84 vs. 2.37). On the other hand, 90-day survival rate of patients without MODS at PICU entry was similar (98.6 vs. 98.9 % (p = 0.73). Proulx and Goldstein diagnostic criteria of paediatric MODS are not equivalent. The epidemiology of paediatric MODS varies depending on which set of diagnostic criteria is applied.

Database: Medline


Source: Transfusion medicine reviews; Oct 2016; vol. 30 (no. 4); p. 223-229

Publication Date: Oct 2016
Publication Type(s): Journal Article Review

Author(s): Andrews, Jennifer; Winkler, Anne M

Abstract: For the past four decades, extracorporeal life support (ECLS) has been used to treat critically ill adult and pediatric patients with cardiac and/or respiratory failure, and there are increasingly numbers of centers worldwide performing ECLS for numerous indications. Despite the progress with advancing the technology, hemorrhagic and thrombotic complications are frequently reported and associated with worse outcomes, but the exact cause is often elusive or multifactorial. As a result of the interaction between blood and an artificial circuit, anticoagulation is necessary and there is resultant activation of coagulation, fibrinolysis, as well as, an increased inflammatory response. While unfractionated heparin (UFH) remains the mainstay anticoagulant used during ECLS, there is a paucity of published data to develop a universal anticoagulation guideline and centers are forced to create individualized protocols to guide anticoagulation management while lacking expertise. From an international survey, centers often use a combination of tests, which in turn result in discordant results and confused management. Studies are urgently needed to investigate optimization of current anticoagulation strategies with UFH, as well as, use of alternative anticoagulants and non-thrombogenic biomaterials. Blood transfusion during extracorporeal support typically occurs for several reasons, which includes circuit priming, restoration of oxygen carrying capacity, maintenance of a hemostatic balance, and treatment of hemorrhagic complications. As a result, the majority of patients will have been exposed to at least one blood product during extracorporeal support and transfusion utilization is high. ECLS Centers have adopted transfusion thresholds based upon practice rather than evidence as there have been no prospective studies investigating the efficacy of red cell (RBC) transfusion in patients receiving extracorporeal support. In addition, RBC transfusion has been associated with increased mortality in ECLS in several retrospective studies. Additional studies are needed to establish evidence based thresholds for transfusion support and diagnostics to guide transfusion therapy to assess efficacy of transfusion in this population, as well as, exploration of alternatives to transfusion. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline


Source: The Journal of surgical research; Oct 2016; vol. 205 (no. 2); p. 456-463

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Naseem, Hibbut-Ur-Rauf; Dorman, Robert Michael; Bass, Kathryn D; Rothstein, David H

Abstract: Hospital readmission in adult trauma is associated with significant morbidity, mortality, and resource utilization. In this study, we examine pediatric intensive care unit (PICU) admission as a risk factor for hospital readmission in pediatric trauma. This was a retrospective cohort study of patients aged 1 through 19 y in the Pediatric Health Information System database discharged with a trauma diagnosis. Patient and clinical variables included demographics, payer status, length of stay, chronic comorbid conditions, presence of mechanical ventilation, all-patient refined diagnosis-related group and calculated severity of illness, and discharge disposition. The main outcome variable was hospital readmission within 30 d of discharge. Odds ratios (ORs) were calculated in both univariate and multivariate analyses with corresponding 95% confidence intervals (CIs). During the 5-year study period, 90,467 patients were admitted with a trauma diagnosis, of which 16,279 (18.0%) were admitted to the PICU. Hospital readmissions occurred in 3.1% of patients. On univariate analysis, patients admitted to the PICU on the first day of hospital admission (direct PICU admission), and those first admitted to the PICU after the day of hospital admission (delayed PICU admission), had 2-3 times the risk of hospital readmission compared with those never admitted to the PICU (4.8%
versus 7.2% versus 2.7%, respectively, P < 0.001). On multivariate analysis, controlling for demographic and clinical variables, the adjusted ORs for hospital readmission in patients with direct and delayed PICU admission were 1.34 (95% CI 1.20-1.50) and 1.88 (95% CI 1.50-2.35) versus no PICU admission, respectively. PICU admission, either direct or delayed, during hospitalization for trauma care is an independent risk factor for hospital readmission within 30 d of discharge. Further risk stratification may help focus resources on high-risk patients to improve clinical outcomes and reduce readmissions. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

9. Safety of the Manchester Triage System to Detect Critically Ill Children at the Emergency Department.

Source: The Journal of pediatrics; Oct 2016; vol. 177; p. 232

Publication Date: Oct 2016
Publication Type(s): Journal Article

Author(s): Zachariasse, Joany M; Kuiper, Jan Willem; de Hoog, Matthijs; Moll, Henriëtte A; van Veen, Mirjam

Abstract: To assess the safety of the Manchester Triage System in pediatric emergency care for children who require admission to the intensive care unit (ICU). Between 2006 and 2013, 50 062 consecutive emergency department visits of children younger than the age of 16 years were included. We determined the percentage of undertriage, defined as the proportion of children admitted to ICU triaged as low urgent according to the Manchester Triage System, and diagnostic performance measures, including sensitivity, specificity, and diagnostic OR. Characteristics of undertriaged patients were compared with correctly triaged patients. In a logistic regression model, risk factors for undertriage were determined. In total, 238 (28.7%) of the 830 children admitted to ICU during the study period were undertriaged. Sensitivity of high Manchester Triage System urgency levels to detect ICU admission was 71% (95% CI 68%-74%) and specificity 85% (95% CI 85%-85%). Severity of illness was lower in undertriaged children than correctly triaged children admitted to ICU. Risk factors for undertriage were age <3 months, medical presenting problem, comorbidity, referral by a medical specialist or emergency medical services, and presentation during the evening or night shift. The Manchester Triage System misclassifies a substantial number of children who require ICU admission. Modifications targeted at young children and children with a comorbid condition could possibly improve safety of the Manchester Triage System in pediatric emergency care. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

10. Pediatric Critical Care Resource Use by Children with Medical Complexity.

Source: The Journal of pediatrics; Oct 2016; vol. 177; p. 197

Publication Date: Oct 2016
Publication Type(s): Journal Article

Author(s): Chan, Titus; Rodean, Jonathan; Richardson, Troy; Farris, Reid W D; Bratton, Susan L; Di Gennaro, Jane L; Simon, Tamara D

Abstract: To examine the proportionate use of critical care resources among children of differing medical complexity admitted to pediatric intensive care units (ICUs) in tertiary-care children’s hospitals. This is a retrospective, cross-sectional study of all children (<19 years of age) admitted to a pediatric ICU between January 1, 2012, and December 31, 2013, in the Pediatric Health Information Systems database. Using the Pediatric Medical Complexity Algorithm, we assigned patients to 1 of 3
categories: no chronic disease, noncomplex chronic disease (NC-CD), or complex chronic disease (C-CD). Baseline demographics, hospital costs, and critical care resource use were stratified by these groups and summarized. Of 136,133 children with pediatric ICU admissions, 53.0% were categorized as having C-CD. At the individual-encounter level, ICU resource use was greatest among patients with C-CD compared with children with NC-CD and no chronic disease. At the hospital level, patients with C-CD accounted for more than 75% of all examined ICU resources, including ventilation days, ICU costs, extracorporeal membrane oxygenation runs, and arterial and central venous catheters. Children with a progressive condition accounted for one-half of all ICU resources. In contrast, patients with no chronic disease and NC-CD accounted for less than one-quarter of all ICU therapies. Children with medical complexity disproportionately use the majority of ICU resources in children’s hospitals. Efforts to improve quality and provide cost-effective care should focus on this population.

Database: Medline

19. Red Blood Cell Transfusion in the Postoperative Care of Pediatric Cardiac Surgery: Survey on Stated Practice.

Source: Pediatric cardiology; Oct 2016; vol. 37 (no. 7); p. 1266-1273

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Tremblay-Roy, Jean-Sébastien; Poirier, Nancy; Ducruet, Thierry; Lacroix, Jacques; Harrington, Karen

Abstract: The optimal red blood cell transfusion threshold for postoperative pediatric cardiac surgery patients is unknown. This study describes the stated red blood cell transfusion practice of physicians who treat postoperative pediatric cardiac surgery patients in intensive care units. A scenario-based survey was sent to physicians involved in postoperative intensive care of pediatric cardiac surgery patients in all Canadian centers that perform such surgery. Respondents reported their red blood cell transfusion practice in four postoperative scenarios: acyanotic or cyanotic cardiac lesion, in a neonate or an infant. In part A of each scenario, the patient was critically ill, but stabilized; in part B, the patient became unstable. Response rate was 58% (71 of 123), with 45 respondents indicating direct involvement in postoperative intensive care. There was a wide variability in stated transfusion threshold, ranging from <7.0-14.0 g/dL for stabilized cases. There was no significant difference between neonates and infants in stated transfusion threshold. The mean hemoglobin level below which respondents would transfuse a stabilized patient was 9 g/dL for acyanotic and 11.2 g/dL for cyanotic patients, a statistically significant difference (2.2 ± 0.9 g/dL, p < 0.001). All clinical determinants of instability significantly increased transfusion threshold. Hemodynamic instability increased transfusion threshold by 2.3 ± 1.3 g/dL in acyanotic patients and by 1.3 ± 1.1 g/dL in cyanotic patients. Cyanotic lesion and clinical instability, but not patient age, increased stated red blood cell transfusion threshold. Significant variation in reported red blood cell transfusion practice exists among physicians treating pediatric patients in intensive care following cardiac surgery.

Database: Medline

20. Problems With Optimal Energy and Protein Delivery in the Pediatric Intensive Care Unit.

Source: Nutrition in clinical practice : official publication of the American Society for Parenteral and Enteral Nutrition; Oct 2016; vol. 31 (no. 5); p. 673-680

Publication Date: Oct 2016

Publication Type(s): Journal Article
Author(s): Moreno, Yara M F; Hauschild, Daniela B; Barbosa, Eliana; Bresolin, Nilzete L; Mehta, Nilesh M

Abstract: Optimal nutrition therapy (NT) delivery is associated with improved outcomes in critically ill children. However, avoidable barriers impede delivery of optimal energy and protein in the pediatric intensive care unit (PICU). This study aims to describe the gap between energy and protein prescription and actual intake. Single-center prospective cohort study, including consecutive children (age: 1 month to 15 years) admitted to the PICU in southern Brazil. Demographics, clinical characteristics, and NT details were recorded. We enrolled 130 patients: 37% female; median (interquartile range) age, 29.43 months (4.03, 100.63); PICU length of stay, 6 days (4, 13). Median predicted energy expenditure by Schofield equation and prescribed and actual energy intake were 47.13 kcal/kg/d (38.60, 55.38), 31.94 kcal/kg/d (13.99, 51.90), and 25.06 kcal/kg/d (10.21, 46.92), respectively. On average, actual energy intake was 47% of the predicted energy expenditure, and 68% of patients were underfed. Actual protein intake was 49% of the estimated requirement. NT was interrupted in 64% of patients. There were significant gaps among the predicted requirement, prescription, and actual delivery of energy and protein in the PICU. Suboptimal prescription and multiple feeding interruptions resulted in underfeeding. © 2016 American Society for Parenteral and Enteral Nutrition.

Database: Medline

21. Dialytic dose in pediatric continuous renal replacement therapy patients.
Source: Minerva pediatrica; Oct 2016; vol. 68 (no. 5); p. 366-373
Publication Date: Oct 2016
Publication Type(s): Journal Article
Author(s): Ricci, Zaccaria; Guzzi, Francesco; Tuccinardi, Germana; Romagnoli, Stefano

Abstract: Although universally recognized as a crucial component of renal replacement therapy (RRT), dialytic dose has not been investigated in children with renal failure, differently from the adult population. Consequently, clear indications on the adequacy of continuous RRT in pediatric population is currently missing and wide variations in clinical practice exist worldwide. Fluid balance has been identified as a key factor in affecting outcomes these patients. Nonetheless, the concept and the precise evaluation of the dialytic dose for continuous pediatric RRT seems crucial, especially in light of the small body surface area of neonates and infants that might result into a difficult dose calculation. The present review clearly demonstrates that dialytic dose in pediatric RRT has been underestimated by scientific literature. Nowadays, the absence of any specific dedicated prospective study and the tendency to overlook theoretical basis of pediatric dialytic dose have led to the absence of a standard prescription: worldwide clinical practice ranges from very high doses to lower ones, also depending on different ways of estimating patients' sizes and solutes' volume of distribution. Large structured studies are warranted in order to define a reference dialytic dose for critically ill children, capable to cope an adequate solute control to gentle and safe treatments.

Database: Medline

24. Use of Indirect Calorimetry to Detect Overfeeding in Critically Ill Children: Finding the Appropriate Definition.
Source: Journal of pediatric gastroenterology and nutrition; Oct 2016; vol. 63 (no. 4); p. 445-450
Publication Date: Oct 2016
Publication Type(s): Journal Article
Author(s): Kerklaan, Dorian; Hulst, Jessie M; Verhoeven, Jennifer J; Verbruggen, Sascha C A T; Joosten, Koen F M

Abstract: Overfeeding during critical illness is associated with adverse effects such as metabolic disturbances and increased risk of infection. Because of the lack of sound studies with clinical endpoints, overfeeding is arbitrarily defined as the ratio caloric intake/measured resting energy expenditure (mREE) or alternatively as a comparison of measured respiratory quotient (RQ) to the predicted RQ based on the macronutrient intake (RQmacr). We aimed to compare definitions of overfeeding in critically ill mechanically ventilated children based on mREE, RQ, and caloric intake to find an appropriate definition. Indirect calorimetry measurements were performed in 78 mechanically ventilated children, median age 6.3 months. Enteral and/or parenteral nutrition was provided according to the local guidelines. Definitions used to indicate overfeeding were the ratio caloric intake/mREE of >110% and >120% and by the measured RQ > RQmacr + 0.05. The proportion of patients identified as overfed varied widely depending on the definition used, ranging from 22% (RQ > RQmacr + 0.05), to 40% and 50% (caloric intake/mREE of >120% and >110%, respectively). Linear regression analysis showed that all patients would be identified as overfed with the definition RQ > RQmacr + 0.05 when the ratio caloric intake/mREE exceeded 165%. Caloric intake was higher in children with a standard deviation-score weight for age < -2. The proportion of mechanically ventilated patients identified as overfed ranged widely depending on the definition applied. These currently used definitions fail to take into account several relevant factors affecting metabolism during critical illness and are therefore not generally applicable to the pediatric intensive care unit population.

Database: Medline

25. Comparison of ultrasound guided brachiocephalic and internal jugular vein cannulation in critically ill children.

Source: Journal of critical care; Oct 2016; vol. 35 ; p. 133-137

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Oulego-Erroz, Ignacio; Muñoz-Lozón, Ana; Alonso-Quintela, Paula; Rodríguez-Nuñez, Antonio

Abstract: To determine whether ultrasound (US)-guided longitudinal in-plane supraclavicular cannulation of the brachiocephalic vein (BCV) improves cannulation success rates compared to transverse out-of-plane internal jugular vein (IJV) cannulation in urgent insertion of temporary central venous catheters (CVC) in critically ill children. Prospective open pilot (non-randomized) comparative study carried out in a pediatric intensive care unit (PICU) of a university-affiliated hospital. Newborns and children aged 0 to 14 years admitted to the PICU in whom an urgent CVC was clinically indicated and was inserted in the IJV or BCV by US guidance were eligible. First-attempt success rate, overall success rate, number of puncture attempts, and cannulation time were compared between IJV and BCV techniques. Forty-six procedures (24 IJV and 22 BCV) in 38 patients were included. Full-sample median (range) age and weight were 13 (0.6-160) months and 9.5 (0.94-50) kg. No significant differences between IJV and BCV groups were observed for sex, age, weight, admission diagnosis, intra-procedural mechanical ventilation and sedation protocol. First-attempt success rate was higher in the BCV than the IJV group (73 vs 37.5%, P= .017). Overall success rate was slightly higher in the BCV group (95 vs 83%, P = nonsignificant). Median (range) number of cannulation attempts [1 (1-3) vs 2 (1-4)] and cannulation time [66 (25-300) vs 170 (40-500) seconds] were significantly lower in the BCV group (P< .05). Patient’s weight was inversely related to the number of cannulation attempts (Pearson coefficient -0.537, P=. .007) and cannulation time (Pearson coefficient -0.495, P= .014) in the IJV but not in the BCV group. No major complications were
observed. Ultrasound-guided supraclavicular in-plane BCV cannulation improved first attempt CVC cannulation success rates and reduced puncture attempts and cannulation time compared to US-guided out-of-plane IJV in critically ill children. A large randomized clinical trial is warranted to confirm our results. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

Source: International journal of nursing studies; Oct 2016; vol. 62 ; p. 207-225
Publication Date: Oct 2016
Publication Type(s): Journal Article Review
Author(s): Foronda, Cynthia; VanGraafeiland, Brigit; Quon, Robert; Davidson, Patricia
Available in full text at International Journal of Advanced Nursing Studies - from ProQuest

Abstract: The handover and transport of critically ill pediatric patients requires communication amongst multiple disciplines. Poor communication is a leading cause of sentinel events and human factors affect handover and transport. To synthesize published data on pediatric handover and transport and identify gaps to provide direction for future investigation. Integrative literature review. Forty research studies were reviewed and revealed the following themes: risk for patient complications, standardized communication, and specialized teams and teamwork were associated with improved outcomes. No articles were identified regarding transportation of critically ill pediatric patients from the emergency room to the intensive care unit. There was a knowledge gap in best practices in handover and transport within the unique subsets of the pediatric population including neonate, toddler, school-aged, and adolescents. Research supported a combined approach of specialized teams using standardized communication in the handover and transport of the pediatric patient to improve outcomes. Further study is warranted on interprofessional (team to team) handover practices, select subsets of the pediatric population, and the handover and transport of critically ill patients from the emergency room to the intensive care unit. Copyright © 2016 Elsevier Ltd. All rights reserved.

Database: Medline

Source: Infection control and hospital epidemiology; Oct 2016; vol. 37 (no. 10); p. 1186-1194
Publication Date: Oct 2016
Publication Type(s): Journal Article
Author(s): Li, Lynne; Fortin, Elise; Tremblay, Claude; Ngenda-Muadi, Muleka; Quach, Caroline; for SPIN-BACC

Abstract: BACKGROUND Following implementation of bundled practices in 2009 in Quebec and Canadian intensive care units (ICUs), we describe CLABSI epidemiology during the last 8 years in the province of Québec (Canada) and compare rates with Canadian and American benchmarks. METHODS CLABSI incidence rates (IRs) and central venous catheter utilization ratios (CVCURs) by year and ICU type were calculated using 2007-2014 data from the Surveillance Provinciale des Infections Nosocomiales (SPIN) program. Using American and Canadian surveillance data, we compared SPIN IRs to rates in other jurisdictions using standardized incidence ratios (SIRs). RESULTS In total, 1,355 lab-confirmed CLABSIs over 911,205 central venous catheter days (CVC days) were recorded. The overall pooled incidence rate (IR) was 1.49 cases per 1,000 CVC days. IRs for adult
teaching ICUs, nonteaching ICUs, neonatal ICUs (NICUs), and pediatric ICUs (PICUs) were 1.04, 0.91, 4.20, and 2.15 cases per 1,000 CVC days, respectively. Using fixed SPIN 2007-2009 benchmarks, CLABSI rates had decreased significantly in all ICUs except for PICUs by 2014. Rates declined by 55% in adult teaching ICUs, 52% in adult nonteaching ICUs, and 38% in NICUs. Using dynamic American and Canadian CLABSI rates as benchmarks, SPIN adult teaching ICU rates were significantly lower and adult nonteaching ICUs had lower or comparable rates, whereas NICU and PICU rates were higher. CONCLUSION Québec ICU CLABSI surveillance shows declining CLABSI rates in adult ICUs. The absence of a decrease in CLABSI rate in NICUs and PICUs highlights the need for continued surveillance and analysis of factors contributing to higher rates in these populations. Infect Control Hosp Epidemiol 2016;1-9.

31. Outcome of Encephalitis in Pediatric Intensive Care Unit.

Source: Indian journal of pediatrics; Oct 2016; vol. 83 (no. 10); p. 1098-1103

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Hon, Kam-Lun Ellis; Tsang, Yin Ching K; Chan, Lawrence C N; Tsang, Hing Wing; Wong, Kit Ying Kitty; Wu, Yuet Hong Gordon; Chan, Paul K S; Cheung, Kam Lau; Ng, Eric Y K; Totapally, Balagangadhar R

Abstract: To review pathogens, morbidity and mortality in pediatric intensive care unit (PICU) patients with viral and infectious encephalitis. Retrospective chart review of all patients with encephalitis admitted to the PICU between 2002 and 2014 was done. Encephalitis (n = 46) accounted for 2.7 % of PICU admissions, but 11.8 % PICU mortality over a 12-y period. A microorganism (primarily virus) was identified in 59 % of encephalitis patients in the PICU. Enteroviruses and herpes viruses were isolated from the cerebrospinal fluid (CSF). Respiratory viruses [such as respiratory syncytial virus (RSV) and influenza viruses] and enteric viruses (such as rotavirus and norovirus) were obtained in the nasopharyngeal aspirate and stool respectively, but undetectable from the CSF. More than one-fourth patients with encephalitis died in the PICU. Boys accounted for 85 % of nonsurvivors and 52 % survivors (p = 0.038). Mechanical ventilation, inotrope, intravenous immunoglobulin (IVIG) and corticosteroid usage were significantly higher among nonsurvivors (p 0.001-0.044). Binomial logistic regression showed that patients who received corticosteroid had a lower chance of survival than those who did not after adjusting for gender, IVIG and mechanical ventilation (adjusted odd ratio = 0.071, 95 % CI 0.006-0.881; p 0.039). Eighteen (55 %) of the survivors had moderate-to-severe neurodevelopmental impairments. Encephalitis is associated with significant mortality despite intensive care. Over 25 % case died and 55 % of survivors had moderate-to-severe neurodevelopmental impairments. There appeared to be no emerging outbreaks of encephalitis during the 15-y study period.

Database: Medline

37. Effect of Continuous Renal Replacement Therapy on Outcome in Pediatric Acute Liver Failure.

Source: Critical care medicine; Oct 2016; vol. 44 (no. 10); p. 1910-1919

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Deep, Akash; Stewart, Claire E; Dhawan, Anil; Douiri, Abdel

Available in full text at Critical Care Medicine - from Ovid

Abstract: To establish the effect of continuous renal replacement therapy on outcome in pediatric acute liver failure. Retrospective cohort study. Sixteen-bed PICU in a university-affiliated tertiary
care hospital and specialist liver centre. All children (0-18 yr) admitted to PICU with pediatric acute liver failure between January 2003 and December 2013. Children with pediatric acute liver failure were managed according to a set protocol. The guidelines for continuous renal replacement therapy in pediatric acute liver failure were changed in 2011 following preliminary results to indicate the earlier use of continuous renal replacement therapy for both renal dysfunction and detoxification. Of 165 children admitted with pediatric acute liver failure, 136 met the inclusion criteria and 45 of these received continuous renal replacement therapy prior to transplantation or recovery. Of the children managed with continuous renal replacement therapy, 26 (58%) survived: 19 were successfully bridged to liver transplantation and 7 spontaneously recovered. Cox proportional hazards regression model clearly showed reducing hyperammonemia by 48 hours after initiating continuous renal replacement therapy significantly improved survival (HR, 1.04; 95% CI, 1.013-1.073; p = 0.004). On average, for every 10% decrease in ammonia from baseline at 48 hours, the likelihood of survival increased by 50%. Time to initiate continuous renal replacement therapy from PICU admission was lower in survivors compared to nonsurvivors (HR, 0.96; 95% CI, 0.916-1.007; p = 0.095). Change in practice to initiate early and high-dose continuous renal replacement therapy led to increased survival with maximum effect being visible in the first 14 days (HR, 3; 95% CI, 1.0-10.3; p = 0.063). Among children with pediatric acute liver failure who did not receive a liver transplant, use of continuous renal replacement therapy significantly improved survival (HR, 4; 95% CI, 1.5-11.6; p = 0.006). Continuous renal replacement therapy can be used successfully in critically ill children with pediatric acute liver failure to provide stability and bridge to transplantation. Inability to reduce ammonia by 48 hours confers poor prognosis. Continuous renal replacement therapy should be considered at an early stage to help prevent further deterioration and buy time for potential spontaneous recovery or bridge to liver transplantation.

**Database:** Medline

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**Source:** Biology of blood and marrow transplantation : journal of the American Society for Blood and Marrow Transplantation; Oct 2016; vol. 22 (no. 10); p. 1823-1828

**Publication Date:** Oct 2016

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

**Author(s):** Skeens, Micah A; McArthur, Jennifer; Cheifetz, Ira M; Duncan, Christine; Randolph, Adrienne G; Stanek, Joseph; Lehman, Leslie; Bajwa, Rajinder; HSCT subgroup of the Pediatric Acute Lung Injury & Sepsis Investigators (PALISI)

**Abstract:** Veno-occlusive disease (VOD) is a potentially fatal complication of hematopoietic stem cell transplantation (HSCT). Patients with VOD are often critically ill and require close collaboration between transplant physicians and intensivists. We surveyed members of a consortium of pediatric intensive care unit (PICU) and transplant physicians to assess variability in the self-reported approach to the diagnosis and management of VOD. An internet-based self-administered survey was sent to pediatric HSCT and PICU providers from September 2014 to February 2015. The survey contained questions relating to the diagnosis and treatment of VOD. The response rate was 41% of 382 providers surveyed. We found significant variability in the diagnostic and management approaches to VOD in children. Even though ultrasound is not part of the diagnostic criteria, providers reported using reversal of portal venous flow seen on abdominal ultrasound in addition to Seattle criteria (70%) or Baltimore criteria to make the diagnosis of VOD. Almost 40% of respondents did not diagnose VOD in anicteric patients (bilirubin < 2 mg/dL). Most providers (75%) initiated treatment with defibrotide at the time of diagnosis, but 14%, 7%, and 6% of the providers waited for reversal of portal venous flow, renal dysfunction, or pulmonary dysfunction, respectively, to develop
before initiating therapy. Only 50% of the providers restricted fluids to 75% of the daily maintenance, whereas 21% did not restrict fluids at all. Albumin with diuretics was used by 95% of respondents. Platelets counts were maintained at 20,000 to 50,000/mm(3) and 10,000 to 20,000/mm(3) by 64% and 20% of the respondents, respectively. Paracentesis was generally initiated in the setting of oliguria or hypoxia, and nearly 50% of the providers used continuous drainage to gravity, whereas the remainder used an intermittent drainage approach. Nearly 73% of the transplant providers used VOD prophylaxis, whereas the remainder did not use any medications for VOD prophylaxis. There was also considerable variation in the management strategies among the transplant and critical care providers. We conclude that there is considerable self-reported variability in the diagnosis and management of VOD in children. The practice variations reported in this study should encourage the development of standard practice guidelines, which will be helpful in improving the outcome of this potentially fatal complication. Copyright © 2016 The American Society for Blood and Marrow Transplantation. Published by Elsevier Inc. All rights reserved.

Database: Medline

39. KIF5A mutations cause an infantile onset phenotype including severe myoclonus with evidence of mitochondrial dysfunction.

Source: Annals of neurology; Oct 2016; vol. 80 (no. 4); p. 633-637

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Duis, Jessica; Dean, Shannon; Applegate, Carolyn; Harper, Amy; Xiao, Rui; He, Weimin; Dollar, James D; Sun, Lisa R; Waberski, Marta Biderman; Crawford, Thomas O; Hamosh, Ada; Stafstrom, Carl E

Abstract: Missense mutations in kinesin family member 5A (KIF5A) cause spastic paraplegia 10. We report on 2 patients with de novo stop-loss frameshift variants in KIF5A resulting in a novel phenotype that includes severe infantile onset myoclonus, hypotonia, optic nerve abnormalities, dysphagia, apnea, and early developmental arrest. We propose that alteration and elongation of the carboxy-terminus of the protein has a dominant-negative effect, causing mitochondrial dysfunction in the setting of an abnormal kinesin "motor." These results highlight the role of expanded testing and whole-exome sequencing in critically ill infants and emphasize the importance of accurate test interpretation. Ann Neurol 2016;80:633-637. © 2016 American Neurological Association.

Database: Medline

41. Pediatric Patient Blood Management Programs: Not Just Transfusing Little Adults.

Source: Transfusion medicine reviews; Oct 2016; vol. 30 (no. 4); p. 235-241

Publication Date: Oct 2016

Publication Type(s): Journal Article Review

Author(s): Goel, Ruchika; Cushing, Melissa M; Tobian, Aaron A R

Abstract: Red blood cell transfusions are a common life-saving intervention for neonates and children with anemia, but transfusion decisions, indications, and doses in neonates and children are different from those of adults. Patient blood management (PBM) programs are designed to assist clinicians with appropriately transfusing patients. Although PBM programs are well recognized and appreciated in the adult setting, they are quite far from standard of care in the pediatric patient population. Adult PBM standards cannot be uniformly applied to children, and there currently is significant variation in transfusion practices. Because transfusing unnecessarily can expose children to increased risk without benefit, it is important to design PBM programs to standardize transfusion
decisions. This article assesses the key elements necessary for a successful pediatric PBM program, systematically explores various possible pediatric specific blood conservation strategies and the current available literature supporting them, and outlines the gaps in the evidence suggesting need for further/improved research. Pediatric PBM programs are critically important initiatives that not only involve a cooperative effort between pediatric surgery, anesthesia, perfusion, critical care, and transfusion medicine services but also need operational support from administration, clinical leadership, finance, and the hospital information technology personnel. These programs also expand the scope for high-quality collaborative research. A key component of pediatric PBM programs is monitoring pediatric blood utilization and assessing adherence to transfusion guidelines. Data suggest that restrictive transfusion strategies should be used for neonates and children similar to adults, but further research is needed to assess the best oxygenation requirements, hemoglobin threshold, and transfusion strategy for patients with active bleeding, hemodynamic instability, unstable cardiac disease, and cyanotic cardiac disease. Perioperative blood management strategies include minimizing blood draws, restricting transfusions, intraoperative cell salvage, acute normovolemic hemodilution, antifibrinolytic agents, and using point-of-care tests to guide transfusion decisions. However, further research is needed for the use of intravenous iron, erythropoiesis-stimulating agents, and possible use of whole blood and pathogen inactivation. There are numerous areas where newly formed collaborations could be used to investigate pediatric transfusion, and these studies would provide critical data to support vital pediatric PBM programs to optimize neonatal and pediatric care. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

42. Survival status and functional outcome of children who required prolonged intensive care after cardiac surgery.

Source: The Journal of thoracic and cardiovascular surgery; Oct 2016; vol. 152 (no. 4); p. 1104

Publication Date: Oct 2016

Publication Type(s): Journal Article

Author(s): Namachivayam, Siva P; d’Udekem, Yves; Millar, Johnny; Cheung, Michael M; Butt, Warwick

Abstract: Children who require prolonged intensive care after cardiac surgery are at risk of high mortality. The long-term survival and functional outcome of these children have not been studied in detail. Children who stayed in intensive care for >28 days after cardiac surgery from 1997 to 2012 were studied in a single institution. A total of 116 patients were identified; 107 (92%) were <1 year of age and 63 (54%) had univentricular physiology. The incidence of children requiring prolonged intensive care increased from 1.01/100 undergoing cardiac surgery in 1997 to 2000 to 2.66/100 in 2009 to 2012 (P trend = .002). This increase coincided with an increase in the number of children with hypoplastic left heart syndrome having prolonged intensive care during the same period (0.13/100 in 1997-2000 to 1.0/100 in 2009-2012; P trend = .001). Survival to pediatric intensive care unit (PICU) discharge was 74% (95% confidence interval [CI], 65-82) and 51% (95% CI, 41-59) at 3 years. Factors associated with mortality were univentricular repair (hazard ratio [HR], 2.12; 95% CI, 1.21-3.70; P = .008) and acute renal failure (HR, 3.01; 95% CI, 1.77-5.12; P < .001), but era did not influence mortality (1997-2005 vs 2006-2012; log-rank P = .66). Among PICU survivors, 3-year survival in those who did not need early reoperation was 81% (95% CI, 66-90), compared with 58% (95% CI, 42-71) in those who required early reoperation (log-rank P = .01). Among survivors, 36% had either moderate or severe disability and 13% had poor quality of life. The incidence of children requiring prolonged intensive care after cardiac surgery has increased in our institution. Our data suggest that the long-term outcome for most of these children is poor, especially after univentricular
43. Safe intravenous administration in pediatrics: A 5-year Pediatric Intensive Care Unit experience with smart pumps.

**Source:** Medicina intensiva / Sociedad Española de Medicina Intensiva y Unidades Coronarias; Oct 2016; vol. 40 (no. 7); p. 411-421

**Publication Date:** Oct 2016

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

**Author(s):** Manrique-Rodríguez, S; Sánchez-Galindo, A C; Fernández-Llamazares, C M; Calvo-Calvo, M M; Carrillo-Álvarez, Á; Sanjurjo-Sáez, M

**Abstract:** To estimate the impact of smart pump implementation in a pediatric intensive care unit in terms of number and type of administration errors intercepted. Observational, prospective study carried out from January 2010 to March 2015 with syringe and great volumen infusion pumps available in the hospital. A tertiary level hospital pediatric intensive care unit. Infusions delivered with infusion pumps in all pediatric intensive care unit patients. Design of a drug library with safety limits for all intravenous drugs prescribed. Users’ compliance with drug library as well as number and type of errors prevented were analyzed. Two hundred and eighty-three errors were intercepted during 62 months of study. A high risk drug was involved in 58% of prevented errors, such as adrenergic agonists and antagonists, sedatives, analgesics, neuromuscular blockers, opioids, potassium and insulin. Users’ average compliance with the safety software was 84%. Smart pumps implementation has proven effective in intercepting high risk drugs programming errors. These results might be exportable to other critical care units, involving pediatric or adult patients. Interdisciplinary collaboration is key to succeed in this process. Copyright © 2016 Elsevier España, S.L.U. y SEMICYUC. All rights reserved.

**Database:** Medline

44. A Valuable Tool in Predicting Poor Outcome due to Sepsis in Pediatric Intensive Care Unit: Tp-e/QT Ratio.

**Source:** Journal of tropical pediatrics; Oct 2016; vol. 62 (no. 5); p. 377-384

**Publication Date:** Oct 2016

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

**Author(s):** Ozdemir, Rahmi; Isguder, Rana; Kucuk, Mehmet; Karadeniz, Cem; Ceylan, Gokhan; Katipoglu, Nagehan; Yilmazer, Murat Muhtar; Yozgat, Yilmaz; Mese, Timur; Agin, Hasan

**Abstract:** To assess the feasibility of 12-lead electrocardiographic (ECG) measures such as P wave dispersion (PWd), QT interval, QT dispersion (QTD), Tp-e interval, Tp-e/QT and Tp-e/QTc ratio in predicting poor outcome in patients diagnosed with sepsis in pediatric intensive care unit (PICU). Ninety-three patients diagnosed with sepsis, severe sepsis or septic shock and 103 age- and sex-matched healthy children were enrolled into the study. PWd, QT interval, QTd, Tp-e interval and Tp-e/QT, Tp-e/QTc ratios were obtained from a 12-lead electrocardiogram. PWd, QTd, Tp-e interval and Tp-e/QT, Tp-e/QTc ratios were significantly higher in septic patients compared with the controls.
During the study period, 41 patients had died. In multivariate logistic regression analyses, only Tp-e/QT ratio was found to be an independent predictor of mortality. The ECG measurements can predict the poor outcome in patients with sepsis. The Tp-e/QT ratio may be a valuable tool in predicting mortality for patients with sepsis in the PICU. © The Author [2016]. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

**Database:** Medline

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**45. Paramyxovirus Infection: Mortality and Morbidity in a Pediatric Intensive Care Unit.**

**Source:** Journal of tropical pediatrics; Oct 2016; vol. 62 (no. 5); p. 352-360

**Publication Date:** Oct 2016

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

**Author(s):** Tong, Alice S W; Hon, Kam Lun; Tsang, Yin Ching K; Chan, Renee Wan Yi; Chan, Ching Ching; Leung, Ting Fan; Chan, Paul K S

**Abstract:** We investigated mortality and morbidity of patients admitted to a pediatric intensive care unit (PICU) with paramyxovirus infection. A retrospective study between October 2002 and March 2015 of children with a laboratory-confirmed paramyxovirus infection was included. In all, 98 (5%) PICU admissions were tested positive to have paramyxovirus infection (respiratory syncytial virus = 66, parainfluenza = 27 and metapneumovirus = 5). The majority of admissions were young patients (median age 1.05 years). Bacteremia and bacterial isolation in any site were present in 10% and 28%, respectively; 41% were mechanically ventilated, and 20% received inotropes. The three respiratory viruses caused similar mortality and morbidity in the PICU. Fatality (seven patients) was associated with malignancy, positive bacterial culture in blood, the use of mechanical ventilation, inotrope use, lower blood white cell count and higher C reactive protein (p = 0.02-0.0005). Backward binary logistic regression for these variables showed bacteremia (odds ratio [OR]: 31.7; 95% CI: 2.3-427.8; p = 0.009), malignancy (OR: 45.5; 95% CI: 1.4-1467.7; p = 0.031) and use of inotropes (OR: 15.0; 95% CI: 1.1-196.1; p = 0.039) were independently associated with non-survival. March and July appeared to be the two peak months for PICU hospitalizations with paramyxovirus infection. Infections with paramyxoviruses account for 5% of PICU admissions and significant morbidity. Patient with premorbid history of malignancy and co-morbidity of bacteremia are associated with non-survival. March and July appeared to be the two peak months for PICU admissions with paramyxoviruses. © The Author [2016]. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

**Database:** Medline

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**46. Preventable pediatric intensive care unit admissions over a 13-year period at a level 1 pediatric trauma center.**

**Source:** Journal of pediatric surgery; Oct 2016; vol. 51 (no. 10); p. 1688-1692

**Publication Date:** Oct 2016

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

**Author(s):** Fenton, Stephen J; Campbell, Stephen J; Stevens, Austin M; Zhang, Chong; Presson, Angela P; Lee, Justin H

**Abstract:** No formal criteria exist to determine the need for admission of injured children to the pediatric intensive care unit. Our objective was to analyze trauma patient admissions to the PICU at a level 1 pediatric trauma center. The trauma registry was analyzed between 2002 and 2015. A preventable PICU admission was defined as a child discharged home or transferred out of the PICU within 30h without surgical intervention, blood transfusion, or ventilator support. Of 16,209
children, 19% were admitted to the PICU: mean age 7.3 years, median ISS 17, and overall mortality 7%. Per our definition, 36% were preventable PICU admissions of which 83% suffered a head injury. The preventable admissions were younger (6.9 vs. 7.6 years, p<0.001) with a lower median ISS (16 vs. 21, p<0.001), shorter median PICU LOS (17 vs. 41 h, p<0.001) and shorter median hospital LOS (51 vs. 121 h, p<0.001). These admissions resulted in total facility charges of $9,981,454.76 with 54% produced by children with an isolated head injury. A significant number of children admitted to our PICU were classified as preventable. They carry a substantial economic burden to the health care system with an overutilization of resources. Methods to limit such admissions should be actively pursued. Copyright © 2016 Elsevier Inc. All rights reserved.

Database: Medline

47. Intermittent Demand Forecasting in a Tertiary Pediatric Intensive Care Unit.
Source: Journal of medical systems; Oct 2016; vol. 40 (no. 10); p. 217
Publication Date: Oct 2016
Publication Type(s): Journal Article
Author(s): Cheng, Chen-Yang; Chiang, Kuo-Liang; Chen, Meng-Yin
Abstract: Forecasts of the demand for medical supplies both directly and indirectly affect the operating costs and the quality of the care provided by health care institutions. Specifically, overestimating demand induces an inventory surplus, whereas underestimating demand possibly compromises patient safety. Uncertainty in forecasting the consumption of medical supplies generates intermittent demand events. The intermittent demand patterns for medical supplies are generally classified as lumpy, erratic, smooth, and slow-moving demand. This study was conducted with the purpose of advancing a tertiary pediatric intensive care unit’s efforts to achieve a high level of accuracy in its forecasting of the demand for medical supplies. On this point, several demand forecasting methods were compared in terms of the forecast accuracy of each. The results confirm that applying Croston’s method combined with a single exponential smoothing method yields the most accurate results for forecasting lumpy, erratic, smooth, and slow-moving demand, whereas the Simple Moving Average (SMA) method is the most suitable for forecasting smooth demand. In addition, when the classification of demand consumption patterns were combined with the demand forecasting models, the forecasting errors were minimized, indicating that this classification framework can play a role in improving patient safety and reducing inventory management costs in health care institutions.
Database: Medline

48. Effect of early vs. late tracheostomy on clinical outcomes in critically ill pediatric patients.
Source: Acta anaesthesiologica Scandinavica; Oct 2016; vol. 60 (no. 9); p. 1281-1288
Publication Date: Oct 2016
Publication Type(s): Journal Article
Author(s): Lee, J-H; Koo, C-H; Lee, S-Y; Kim, E-H; Song, I-K; Kim, H-S; Kim, C-S; Kim, J-T
Abstract: Few studies investigated the optimal timing for tracheostomy and its influence on the clinical outcomes in critically ill pediatric patients. This study evaluated the differences in clinical outcomes between early and late tracheostomy in pediatric intensive care unit (ICU) patients. We assessed 111 pediatric patients. Patients who underwent a tracheostomy within 14 days of mechanical ventilation (MV) were assigned to the early tracheostomy group, whereas those who underwent tracheostomy after 14 days of MV were included in the late tracheostomy group. Clinical outcomes, including mortality, duration of MV, length of ICU and hospital stays, and incidence of
ventilator-associated pneumonia (VAP) were compared between the groups. Of the 111 pediatric patients, 61 and 50 were included in the early and late tracheostomy groups, respectively. Total MV duration and the length of ICU and hospital stay were significantly longer in the late tracheostomy group than in the early tracheostomy group (all P < 0.01). The VAP rate per 1000 ventilator days before tracheostomy was 2.6 and 3.8 in the early and late tracheostomy groups, respectively. There were no significant differences in mortality rate between the groups. No severe complications were associated with tracheostomy itself. Tracheostomy performed within 14 days after the initiation of MV was associated with reduced duration of MV and length of ICU and hospital stay. Although there was no effect on mortality rate, children may benefit from early tracheostomy without severe complications. © 2016 The Acta Anaesthesiologica Scandinavica Foundation. Published by John Wiley & Sons Ltd.

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