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Contents

1: Tables of Contents from July’s Paediatric journals

2: New NICE Guidance

3: Latest relevant Systematic Reviews from the Cochrane Library

4: New activity in Uptodate

5: Current Awareness database articles
Tables of Contents from Paediatric & Critical Care journals

If you require full articles please email: library@uhbristol.nhs.uk

Paediatric Critical Care Medicine
June 2016, Volume 17, Issue 6

Feature Articles
The Association of Central-Line–Associated Bloodstream Infections With Central-Line Utilization Rate and Maintenance Bundle Compliance Among Types of PICUs*
Affolter, Jeremy T. et al.

Hemodynamic Bedside Ultrasound Image Quality and Interpretation After Implementation of a Training Curriculum for Pediatric Critical Care Medicine Providers*
Conlon, Thomas W. et al.

Dugan, Mark C.; McCracken, Courtney E.; Hebbar, Kiran B.

Cardiac Intensive Care
Severe Acute Kidney Injury Following Stage 1 Norwood Palliation: Effect on Outcomes and Risk of Severe Acute Kidney Injury at Subsequent Surgical Stages*
Wong, Joshua H. et al.

Procalcitonin in the Early Course Post Pediatric Cardiac Surgery
Zant, Robert; Stocker, Christian; Schlapbach, Luregn Jan; Mayfield, Sara; Karl, Tom; Schibler, Andreas

Learning From Experience: Improving Early Tracheal Extubation Success After Congenital Cardiac Surgery*
Winch, Peter D. et al.

Neurocritical Care
Serum Biomarkers Help Predict Attention Problems in Critically Ill Children With Traumatic Brain Injury
Wilkinson, Amy A. et al.

Variation in Anticonvulsant Selection and Electroencephalographic Monitoring Following Severe Traumatic Brain Injury in Children—Understanding Resource Availability in Sites Participating in a Comparative Effectiveness Study
Kurz, Jonathan E. et al.

Postdischarge Care of Pediatric Traumatic Brain Injury in Argentina: A Multicenter Randomized Controlled Trial*
Carney, Nancy A. et al.
Early Electroencephalographic Findings Correlate With Neurologic Outcome in Children Following Cardiac Arrest
Ostendorf, Adam P.; Hartman, Mary E.; Friess, Stuart H.

Quality and Safety
Improving Communication During Cardiac ICU Multidisciplinary Rounds Through Visual Display of Patient Daily Goals*
Justice, Lindsey B. et al.

Association of Hospital Structure and Complications With Mortality After Pediatric Extracorporeal Membrane Oxygenation
Nasr, Viviane G.; Faraoni, David; DiNardo, James A.; Thiagarajan, Ravi R.

Editorials
Getting to “Zero” on Central-Line Infections in the PICU*
Wheeler, Derek S.

Intensivist-Driven Ultrasound in the PICU: Can Pediatric Intensivists Decipher the Heart’s Mysteries?*
Su, Erik

Improving Outcomes of Critically Ill Children With Simulation-Based Education: Where Are We Now in the Year 2016?*
Hsieh, Ting-Chang; Nishisaki, Akira

Acute Kidney Injury Has a Long-Term Impact on Survival After Stage 1 Palliation of Univentricular Hearts—It’s Not Just Just One and Done*
Cooper, David S.; Goldstein, Stuart L.; Kwiatkowski, David M.

Early Extubation: Unintended Consequences and Missed Opportunities?*
Klugman, Darren

Supporting Families After Traumatic Brain Injury, Is This a Way of Improving Results?*
Schnitzler, Eduardo; Iolster, Thomas

Well-“Rounded” Medical Teams—What Does It Take?*
Rehder, Kyle J.; Turner, David A.

Caring for the Team Is Caring for the Patient (and the Future)*
Morrison, Wynne E.; Berg, Robert A.

Letters to the Editor
Severe Hyperbilirubinemia in Exchange Transfusion: Less Indication and Lower Mortality
Durante, Patricia Prado; Krebs, Vera Lúcia Jornada; Brunow de Carvalho, Werther

The authors reply
Olusanya, Bolajoko O.; Mabogunje, Cecilia A.; Emokpae, Abiyewu A.

About Intracranial Hypertension in Pediatric Patients: Good News About Treatment...But What About the Role of Optic Nerve Sheath Diameter Measurement in the Diagnosis?
Suzuki, Adriana Stama
The authors reply
Shein, Steven L.; Bell, Michael J.

Online Clinical Investigations
A Qualitative Study Exploring Moral Distress Among Pediatric Resuscitation Team Clinicians: Challenges to Professional Integrity*
Thomas, Tessy A.; Thammasitboon, Satid; Balmer, Dorene F.; Roy, Kevin; McCullough, Laurence B.

The Development of Tracheal Intubation Proficiency Outside the Operating Suite During Pediatric Critical Care Medicine Fellowship Training: A Retrospective Cohort Study Using Cumulative Sum Analysis
Ishizuka, Maki et al.

Effect of Ondansetron on QT Interval in Patients Cared for in the PICU
Trivedi, Sangita et al.

Pediatrics
July 2016, Volume 138, Issue 1

Trends in Congenital Heart Defects in Infants With Down Syndrome
Sofie Bergström, Hanna Carr, Gunnar Petersson, Olof Stephansson, Anna-Karin Edstedt Bonamy, Anders Dahlström, Cecilia Pegelow Halvorsen, and Stefan Johansson

Current Opinion in Pediatrics
August 2016, Volume 28, Issue 4

Advancement in management of epidermolysis bullosa
Cohn, Heather I.; Teng, Joyce M.C.

Current Opinion in Critical Care
August 2016, Volume 22, Issue 4

The science and art of pediatric critical care nutrition
Martinez, Enid E.; Mehta, Nilesh M.

Critical Care Medicine
July 2016, Volume 44, Issue 7
Dexmedetomidine for the Treatment of Hyperactive Delirium Refractory to Haloperidol in Nonintubated ICU Patients: A Nonrandomized Controlled Trial*
Carrasco, Genís et al.

**Pediatric Anesthesia**
**August 2016, Volume 26, Issue 8**

An institutional approach to the management of the ‘Can't Intubate, Can't Oxygenate’ emergency in children (pages 784–793)
Stefano C. Sabato and Elliot Long

Arterial blood pressure in anesthetized neonates and infants: a retrospective analysis of 1091 cases (pages 815–822)
Frank Weber, Gijsbert H. M. Honing and Gail P. Scoones

Femoral arterial cannulation performed by residents: a comparison between ultrasound-guided and palpation technique in infants and children undergoing cardiac surgery (pages 823–830)
Sahar M. Siddik-Sayyid, Marie T. Aouad, Muhammad H. Ibrahim, Samar K. Taha, Maud F. Nawfal, Youssef J. Tfaili and Roland N. Kaddoum

**Journal of Pediatrics**
**July 2016, Volume 174**

The Impact of Neurodevelopmental and Psychosocial Outcomes on Health-Related Quality of Life in Survivors of Congenital Heart Disease
Bradley S. Marino, Amy Cassedy, Dennis Drotar, Jo Wray

Death Scene Investigation and Autopsy Practices in Sudden Unexpected Infant Deaths
Alexa B. Erck Lambert, Sharyn E. Parks, Lena Camperlengo, Carri Cottengim, Rebecca L. Anderson, Theresa M. Covington, Carrie K. Shapiro-Mendoza

Impact of Tight Glycemic Control on Neurodevelopmental Outcomes at 1 Year of Age for Children with Congenital Heart Disease: A Randomized Controlled Trial
Anjali Sadhwani, Lisa A. Asaro, Caren Goldberg, Janice Ware, Jennifer Butcher, Michael Gaies, Cynthia Smith, Jamin L. Alexander, David Wypij, Michael S.D. Agus

Myocardial Response to Milrinone in Single Right Ventricle Heart Disease
Stephanie J. Nakano, Penny Nelson, Carmen C. Sucharov, Shelley D. Miyamoto

**American Journal of Respiratory and Critical Care Medicine**
**July 2016, Volume 194, Issue 1**

Inflammation and Organ Failure Severely Affect Midazolam Clearance in Critically Ill Children
Nienke J. Vet et al.
A Critical Care Societies Collaborative Statement: Burnout Syndrome in Critical Care Health-care Professionals. A Call for Action
Marc Moss et al.

Critical Care
July 2016, Volume 20
Hyperoxemia as a risk factor for ventilator-associated pneumonia
Sophie Six, Karim Jaffal, Geoffrey Ledoux, Emmanuelle Jaillette, Frédéric Wallet and Saad Nseir

Antibiotic strategies in the era of multidrug resistance
George Karam, Jean Chastre, Mark H. Wilcox and Jean-Louis Vincent

Lidocaine can reduce the pain of intra-osseous fluid infusion
Jonathan Ilicki and Jesper Scholander

The accuracy of blood pressure measured by arterial line and non-invasive cuff in critically ill children
Rachel Joffe, Jonathan Duff, Gonzalo Garcia Guerra, Jodie Pugh and Ari R. Joffe

We need to optimize piperacillin-tazobactam dosing in critically ill patients—but how?
Menino Osbert Cotta, Jason A. Roberts and Jeffrey Lipman

Structural equation modelling exploration of the key pathophysiological processes involved in cardiac surgery-related acute kidney injury in infants
Mirela Bojan et al.

Acta Paediatrica
July 2016, Volume 105, Issue 7

Randomised controlled studies are needed to evaluate the use of high-flow nasal cannula therapy in bronchiolitis
Matti Korppi and Paula Heikkilä
Version of Record online: 6 JUL 2016 | DOI: 10.1111/apa.13446

A ten-year retrospective case series of glucocorticoid treatment of bacterial meningitis in children
Sofia Ygberg, Annelie Brauner, Benedict J. Chambers, Claes Wiklund and Anna Nilsson
Version of Record online: 23 MAY 2016 | DOI: 10.1111/apa.13443

European Journal of Pediatrics
July 2016, Volume 175, Issue 7

Pediatric pre-hospital emergencies in Belgium: a 2-year national descriptive study
Pierre Demaret, Frédéric Lebrun, Philippe Devos... Pages 921-930

Impact of healthcare-associated sepsis on mortality in critically ill infants
Evelien Hilde Verstraete, Ludo Mahieu, Kris De Coen... Pages 943-952

Cardiac arrest in infants, children, and adolescents: long-term emotional and behavioral functioning
Lennart van Zellem, Elisabeth M. Utens, Marlous Madderom... Pages 977-986

**Cardiology in the Young**
August 2016, Volume 26, Issue 6

Management of hypoplastic left heart syndrome with intact atrial septum: a two-centre experience

Surgical ligation of patent ductus arteriosus in premature infants: trends and practice variation

Parental perceptions of congenital cardiovascular malformations in their children

**Intensive Care Medicine**
August 2016, Volume 42, Issue 8

Focus on paediatrics
Mark J. Peters, Warwick Butt & Robert C. Tasker

Pediatric extubation readiness tests should not use pressure support
Robinder G. Khemani et al.

Mind over matter? Pain, withdrawal and sedation in paediatric critical care
Rachel S. Agbeko, Andrew Argent & Graeme MacLaren

Into the out: safety issues in interhospital transport of the critically ill
Andreas Valentin & Carole Schwebel

Is this bereaved relative at risk of prolonged grief?
Nancy Kentish-Barnes & Holly G. Prigerson

Pre-oxygenation with high-flow nasal cannula oxygen therapy and non-invasive ventilation for intubation in the intensive care unit
Emmanuel Besnier et al.
New Nice Guidance

Bronchiolitis in children

Reference: QS122

Latest relevant Systematic Reviews from the Cochrane Library

Inhaled nitric oxide for acute respiratory distress syndrome (ARDS) in children and adults
Fabienne Gebistorf, Oliver Karam, Jørn Wetterslev, Arash Afshari

Radiotherapy for diffuse brainstem glioma in children and young adults
Xin Hu, Yuan Fang, Xuhui Hui, Yan Jv, Chao You

Integrated management of childhood illness (IMCI) strategy for children under five
Tarun Gera, Dheeraj Shah, Paul Garner, Marty Richardson, Harshpal S Sachdev

New activity in Uptodate

Nebulized hypertonic saline does not reduce length of stay in children with bronchiolitis (June 2016)

In previous meta-analyses, compared with a placebo (nebulized normal saline), nebulized hypertonic saline appeared to reduce the length of stay in children hospitalized with bronchiolitis, but the findings were limited by heterogeneity. A new meta-analysis reanalyzed the data controlling for the major sources of heterogeneity (imbalance in duration of illness between treatment groups and a widely divergent outcome definition in one study population) [50]. In the reanalysis, nebulized hypertonic saline had no effect on length of stay. This finding supports our suggestion against the routine use of nebulized hypertonic saline in hospitalized children with bronchiolitis. Maintenance of adequate hydration, provision of oxygen and respiratory support as necessary, monitoring disease progression, and anticipatory guidance are the mainstays of management of severe bronchiolitis. (See "Bronchiolitis in infants and children: Treatment; outcome; and prevention", section on 'Nebulized hypertonic saline'.)
Title: Children with dermatological conditions admitted to paediatric intensive care: analysis of a national clinical audit database.

Citation: Clinical and experimental dermatology, Jun 2016, vol. 41, no. 4, p. 403-406, 1365-2230 (June 2016)

Author(s): George, S M C, Sen, S M, Harrison, D A, McShane, P, Patel, K, Darley, C R

Abstract: There is little published literature about dermatological conditions in paediatric intensive care units (PICUs). The aim of this study was to describe the range of skin disorders in children admitted to PICUs in the UK and Ireland using data from a national audit. An analysis was conducted using data for 2002 - 2010 from the Paediatric Intensive Care Audit Network (PICANet). In total, 999 admissions of 882 children were identified, representing 0.8% of all PICU admissions. The most frequent dermatological conditions were skin infections, including cellulitis and necrotizing fasciitis, and inflammatory conditions. In 28% of cases, the dermatological diagnosis was considered the reason for PICU admission, in 35% it was a manifestation of systemic disease and in 37% it was considered incidental. Overall mortality was similar to the general PICU population, with 52 deaths (5.2%), but was greater in children with vascular/haematological conditions.

Title: Dose Reduction of Caspofungin in Intensive Care Unit Patients with Child Pugh B Will Result in Suboptimal Exposure.

Citation: Clinical pharmacokinetics, Jun 2016, vol. 55, no. 6, p. 723-733, 1179-1926 (June 2016)


Abstract: Caspofungin is an echinocandin antifungal agent used as first-line therapy for the treatment of invasive candidiasis. The maintenance dose is adapted to body weight (BW) or liver function (Child-Pugh score B or C). We aimed to study the pharmacokinetics of caspofungin and assess pharmacokinetic target attainment for various dosing strategies. Caspofungin pharmacokinetic data from 21 intensive care unit (ICU) patients was available. A population pharmacokinetic model was developed. Various dosing regimens (loading dose/maintenance dose) were simulated: licensed regimens (I) 70/50 mg (for BW <80 kg) or 70/70 mg (for BW >80 kg); and (II) 70/35 mg (for Child-Pugh score B); and adapted regimens (III) 100/50 mg (for Child-Pugh score B); (IV) 100/70 mg; and (V) 100/100 mg. Target attainment based on a preclinical pharmacokinetic target for Candida albicans was assessed for relevant minimal inhibitory concentrations (MICs). A two-compartment model best fitted the data. Clearance was 0.55 L/h and the apparent volumes of distribution in the central and peripheral compartments were 8.9 and 5.0 L, respectively. The median area under the plasma concentration-time curve from time zero to 24 h on day 14 for regimens I-V were 105, 65, 93, 130, and 186 mg·h/L, respectively. Pharmacokinetic target attainment was 100 % (MIC 0.03 μg/mL) irrespective of dosing regimen but decreased to (I) 47 %, (II) 14 %, (III)
36 %, (IV) 69 %, and (V) 94 % for MIC 0.125 μg/mL. The caspofungin maintenance dose should not be reduced in non-cirrhotic ICU patients based on the Child-Pugh score if this classification is driven by hypoalbuminemia as it results in significantly lower exposure. A higher maintenance dose of 70 mg in ICU patients results in target attainment of >90 % of the ICU patients with species with an MIC of up to 0.125 μg/mL.

Title: Guidelines for the Appropriate Use of Bedside General and Cardiac Ultrasonography in the Evaluation of Critically Ill Patients-Part II: Cardiac Ultrasonography.

Citation: Critical care medicine, Jun 2016, vol. 44, no. 6, p. 1206-1227, 1530-0293 (June 2016)

Author(s): Levitov, Alexander, Frankel, Heidi L, Blaivas, Michael, Kirkpatrick, Andrew W, Su, Erik, Evans, David, Summerfield, Douglas T, Slonim, Anthony, Breitkreutz, Raoul, Price, Susanna, McLaughlin, Matthew, Marik, Paul E, Elbarbary, Mahmoud

Abstract: To establish evidence-based guidelines for the use of bedside cardiac ultrasound, echocardiography, in the ICU and equivalent care sites. Grading of Recommendations, Assessment, Development and Evaluation system was used to rank the "levels" of quality of evidence into high (A), moderate (B), or low (C) and to determine the "strength" of recommendations as either strong (strength class 1) or conditional/weak (strength class 2), thus generating six "grades" of recommendations (1A-1B-1C-2A-2B-2C). Grading of Recommendations, Assessment, Development and Evaluation was used for all questions with clinically relevant outcomes. RAND Appropriateness Method, incorporating the modified Delphi technique, was used in formulating recommendations related to terminology or definitions or in those based purely on expert consensus. The process was conducted by teleconference and electronic-based discussion, following clear rules for establishing consensus and agreement/disagreement. Individual panel members provided full disclosure and were judged to be free of any commercial bias. Forty-five statements were considered. Among these statements, six did not achieve agreement based on RAND appropriateness method rules (majority of at least 70%). Fifteen statements were approved as conditional recommendations (strength class 2). The rest (24 statements) were approved as strong recommendations (strength class 1). Each recommendation was also linked to its level of quality of evidence and the required level of echo expertise of the intensivist. Key recommendations, listed by category, included the use of cardiac ultrasonography to assess preload responsiveness in mechanically ventilated (1B) patients, left ventricular (LV) systolic (1C) and diastolic (2C) function, acute cor pulmonale (ACP) (1C), pulmonary hypertension (1B), symptomatic pulmonary embolism (PE) (1C), right ventricular (RV) infarct (1C), the efficacy of fluid resuscitation (1C) and inotropic therapy (2C), presence of RV dysfunction (2C) in septic shock, the reason for cardiac arrest to assist in cardiopulmonary resuscitation (1B-2C depending on rhythm), status in acute coronary syndromes (ACS) (1C), the presence of pericardial effusion (1C), cardiac tamponade (1B), valvular dysfunction (1C), endocarditis in native (2C) or mechanical valves (1B), great vessel disease and injury (2C), penetrating chest trauma (1C) and for use of contrast (1B-2C depending on indication). Finally, several recommendations were made regarding the use of bedside cardiac ultrasound in pediatric patients ranging from 1B for preload responsiveness to no recommendation for RV dysfunction. There was strong agreement among a large cohort of international experts regarding several class 1 recommendations for the use of bedside cardiac ultrasound, echocardiography, in the ICU. Evidence-based recommendations regarding the appropriate use of this technology are a step toward improving patient outcomes in relevant patients and guiding appropriate integration of ultrasound into critical care practice.

Full Text: Available from Ovid in Critical Care Medicine
Title: Clinical recommendations for pain, sedation, withdrawal and delirium assessment in critically ill infants and children: an ESPNIC position statement for healthcare professionals.

Citation: Intensive care medicine, Jun 2016, vol. 42, no. 6, p. 972-986, 1432-1238 (June 2016)

Author(s): Harris, Julia, Ramelet, Anne-Sylvie, van Dijk, Monique, Pokorna, Pavla, Wielenga, Joke, Tume, Lyvonne, Tibboel, Dick, Ista, Erwin

Abstract: This position statement provides clinical recommendations for the assessment of pain, level of sedation, iatrogenic withdrawal syndrome and delirium in critically ill infants and children. Admission to a neonatal or paediatric intensive care unit (NICU, PICU) exposes a child to a series of painful and stressful events. Accurate assessment of the presence of pain and non-pain-related distress (adequacy of sedation, iatrogenic withdrawal syndrome and delirium) is essential to good clinical management and to monitoring the effectiveness of interventions to relieve or prevent pain and distress in the individual patient. A multidisciplinary group of experts was recruited from the members of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC). The group formulated clinical questions regarding assessment of pain and non-pain-related distress in critically ill and nonverbal children, and searched the PubMed/Medline, CINAHL and Embase databases for studies describing the psychometric properties of assessment instruments. Furthermore, level of evidence of selected studies was assigned and recommendations were formulated, and grade or recommendations were added on the basis of the level of evidence. An ESPNIC position statement was drafted which provides clinical recommendations on assessment of pain (n = 5), distress and/or level of sedation (n = 4), iatrogenic withdrawal syndrome (n = 3) and delirium (n = 3). These recommendations were based on the available evidence and consensus amongst the experts and other members of ESPNIC. This multidisciplinary ESPNIC position statement guides professionals in the assessment and reassessment of the effectiveness of treatment interventions for pain, distress, inadequate sedation, withdrawal syndrome and delirium.

Title: Prolonged suppression of monocytic human leukocyte antigen-DR expression correlates with mortality in pediatric septic patients in a pediatric tertiary Intensive Care Unit.

Citation: Journal of critical care, Jun 2016, vol. 33, p. 84-89, 1557-8615 (June 2016)

Author(s): Manzoli, Talita Freitas, Troster, Eduardo Juan, Ferranti, Juliana Ferreira, Sales, Maria Mirtes

Abstract: Immunoparalysis is a syndrome with no clinical symptoms that occurs in some septic patients. Monocytic human leukocyte antigen-DR (mHLA-DR) expression has been used to identify patients in immunoparalysis and prolonged periods of reduced mHLA-DR expression have been correlated with a poor prognosis in sepsis. However, there is a lack of studies investigating mHLA-DR expression in pediatric septic patients. To determine if mHLA-DR expression correlates with mortality in pediatric septic patients using the QuantiBRITE Anti HLA-DR/Anti-Monocyte,a Bechton Dickinson novel reagent that standardizes flow cytometry values. We determined mHLA-DR expression in 30 patients with severe sepsis or septic shock admitted to the pediatric intensive care unit at Hospital das Clinicas da Faculdade de Medicina da Universidade de São Paulo, São Paulo, Brazil, between January 2013 and February 2015. mHLA-DR expression was quantified between days 3 to 5 and 5 to 7 after the onset of sepsis and the ΔmHLA-DR (mHLA-DR2 - mHLA-DR1) was calculated. We also measured mHLA-DR levels in 21 healthy control patients. Mean mHLA-DR
expression was significantly lower in septic patients than in controls (P = .0001). Mortality was 46% in patients with negative ΔHLA-DR or <1000 mAb/cell and 7% in patients with positive ΔHLA-DR or >1000 mAb/cell. Mean ΔmHLA-DR levels were significantly different between survivors and non-survivors (P = .023). ΔHLA-DR correlates with mortality in pediatric patients with septic shock or severe sepsis. This is the first study to have used the QuantiBRITE Anti HLA-DR/Anti-Monocyte reagent to quantify monocyte HLA-DR expression in pediatric septic patients.

Title: Children with Down syndrome: Clinical course and mortality-associated factors in a French medical paediatric intensive care unit.

Citation: Journal of paediatrics and child health, Jun 2016, vol. 52, no. 6, p. 595-599, 1440-1754 (June 2016)

Author(s): Joffre, Christelle, Lesage, Fabrice, Bustarret, Olivier, Hubert, Philippe, Oualha, Mehdi

Abstract: To investigate clinical course and mortality-associated factors in children with Down syndrome (DS) managed in a medical paediatric intensive care unit. A single-centre, retrospective study conducted between 2001 and 2010 in DS children aged 1 month to 16 years. Sixty-six patients with a median age of 24 months (1-192) and a male/female ratio of 1.5 were analysed. Patients presented with history of congenital heart disease (n = 52, 78.8%), mechanical ventilation (n = 40, 60.6%) and chronic upper airway obstruction (n = 10, 15.1%). The primary reason for admission was respiratory failure (n = 56, 84.8%). Pulmonary arterial hypertension (PAH) (n = 19, 28.8%), acute respiratory distress syndrome (ARDS) (n = 18, 27.2%) and sepsis (n = 14, 21.2%) were observed during their clinical course. Twenty-six patients died (39.4%). Mortality-associated factors included the following: (i) baseline characteristics: history of mechanical ventilation, chronic upper airway obstruction and congenital heart disease; (ii) clinical course during paediatric intensive care unit stay: sepsis, catecholamine support, ARDS, PAH and nosocomial infection. In multivariate logistic analysis, history of mechanical ventilation, ARDS and PAH remained independently associated with death. The mortality rate in critically ill DS children admitted for medical reasons is high and is predominantly associated with respiratory conditions.

Title: The pharmacokinetics of dexmedetomidine during long-term infusion in critically ill pediatric patients. A Bayesian approach with informative priors.

Citation: Journal of pharmacokinetics and pharmacodynamics, Jun 2016, vol. 43, no. 3, p. 315-324, 1573-8744 (June 2016)

Author(s): Wiczling, Paweł, Bartkowska-Śniatkowska, Alicja, Szerkus, Oliwia, Siluk, Danuta, Rosada-Kurasinska, Jowita, Warzybok, Justyna, Borsuk, Agnieszka, Kalisz, Roman, Grześkowiak, Edmund, Bienert, Agnieszka

Abstract: The purpose of this study was to assess the pharmacokinetics of dexmedetomidine in the ICU settings during the prolonged infusion and to compare it with the existing literature data using the Bayesian population modeling with literature-based informative priors. Thirty-eight patients were included in the analysis with concentration measurements obtained at two occasions: first from 0 to 24 h after infusion initiation and second from 0 to 8 h after infusion end. Data analysis was conducted using WinBUGS software. The prior information on dexmedetomidine pharmacokinetics was elicited from the literature study pooling results from a relatively large group of 95 children. A two compartment PK model, with allometrically scaled parameters, maturation of clearance and t-
student residual distribution on a log-scale was used to describe the data. The incorporation of time-dependent (different between two occasions) PK parameters improved the model. It was observed that volume of distribution is 1.5-fold higher during the second occasion. There was also an evidence of increased (1.3-fold) clearance for the second occasion with posterior probability equal to 62%. This work demonstrated the usefulness of Bayesian modeling with informative priors in analyzing pharmacokinetic data and comparing it with existing literature knowledge.

Title: PICU Volume and Outcome: A Severity-Adjusted Analysis.

Citation: Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, Jun 2016, vol. 17, no. 6, p. 483-489, 1529-7535 (June 2016)

Author(s): Markovitz, Barry P, Kukuyeva, Irina, Soto-Campos, Gerardo, Khemani, Robinder G

Abstract: To determine the relationship between PICU volume and severity-adjusted mortality in a large, national dataset. Retrospective cohort study. The VPS database (VPS, LLC, Los Angeles, CA), a national multicenter clinical PICU database. All patients with discharge dates between September 2009 and March 2012 and valid Pediatric Index of Mortality 2 and Pediatric Risk of Mortality III scores, who were not transferred to another ICU and were seen in an ICU that collected at least three quarters of data. None. Anonymized data received included ICU mortality, hospital and patient demographics, and Pediatric Index of Mortality 2 and Pediatric Risk of Mortality III scores. PICU volume/quarter was determined (VPS sites submit data quarterly) per PICU and was divided by 100 to assess the impact per 100 discharges per quarter (volume). A mixed-effects logistic regression model accounting for repeated measures of patients within ICUs was performed to assess the association of volume on severity-adjusted mortality, adjusting for patient and unit characteristics. Multiplicative interactions between volume and severity of illness were also modeled. We analyzed 186,643 patients from 92 PICUs, with an overall ICU mortality rate of 2.6%. Volume ranged from 0.24 to 8.89 per ICU per quarter; the mean volume was 2.61. The mixed-effects logistic regression model found a small but nonlinear relationship between volume and mortality that varied based on the severity of illness. When severity of illness is low, there is no clear relationship between volume and mortality up to a Pediatric Index of Mortality 2 risk of mortality of 10%; for patients with a higher severity of illness, severity of illness-adjusted mortality is directly proportional to a unit's volume. For patients with low severity of illness, ICU volume is not associated with mortality. As patient severity of illness rises, higher volume units have higher severity of illness-adjusted mortality. This may be related to differences in quality of care, issues with unmeasured confounding, or calibration of existing severity of illness scores.

Title: Development of a Prediction Model of Early Acute Kidney Injury in Critically Ill Children Using Electronic Health Record Data.

Citation: Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, Jun 2016, vol. 17, no. 6, p. 508-515, 1529-7535 (June 2016)

Author(s): Sanchez-Pinto, L Nelson, Khemani, Robinder G

Abstract: Acute kidney injury is independently associated with poor outcomes in critically ill children. However, the main biomarker of acute kidney injury, serum creatinine, is a late marker of injury and
can cause a delay in diagnosis. Our goal was to develop and validate a data-driven multivariable clinical prediction model of acute kidney injury in a general PICU using electronic health record data. Derivation and validation of a prediction model using retrospective data. All patients 1 month to 21 years old admitted between May 2003 and March 2015 without acute kidney injury at admission and alive and in the ICU for at least 24 hours. A multidisciplinary, tertiary PICU. The primary outcome was early acute kidney injury, which was defined as new acute kidney injury developed in the ICU within 72 hours of admission. Multivariable logistic regression was performed to derive the Pediatric Early AKI Risk Score using electronic health record data from the first 12 hours of ICU stay. A total of 9,396 patients were included in the analysis, of whom 4% had early acute kidney injury, and these had significantly higher mortality than those without early acute kidney injury (26% vs 3.3%; \( p < 0.001 \)). Thirty-three candidate variables were tested. The final model had seven predictors and had good discrimination (area under the curve 0.84) and appropriate calibration. The model was validated in two validation sets and maintained good discrimination (area under the curves, 0.81 and 0.86). We developed and validated the Pediatric Early AKI Risk Score, a data-driven acute kidney injury clinical prediction model that has good discrimination and calibration in a general PICU population using only electronic health record data that is objective, available in real time during the first 12 hours of ICU care and generalizable across PICUs. This prediction model was designed to be implemented in the form of an automated clinical decision support system and could be used to guide preventive, therapeutic, and research strategies.

**Title:** Description of PICU Unplanned Readmission.

**Citation:** Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, Jun 2016, vol. 17, no. 6, p. 558-562, 1529-7535 (June 2016)

**Author(s):** Kotsakis, Afrothite, Stevens, Derek, Frndova, Helena, Neal, Richard, Williamson, Grace, Mohseni-Bod, Hadi, Parshuram, Christopher S

**Abstract:** ICU readmission within 48 hours of discharge is associated with increased mortality. The objectives of this study were to describe the frequency of, factors associated with, and outcomes associated with unplanned PICU readmission. A retrospective case-control study was performed. We evaluated 13 candidate risk factors and report patient outcomes following readmission. Subgroup analyses were performed for patients discharged from the cardiac PICU and medical-surgical PICU. The study was undertaken at the Hospital for Sick Children, Department of Critical Care Medicine. Eligible patients were discharged from the PICU to an inpatient ward between December 2006 and January 2013. Case patients were readmitted to the PICU within 48 hours of discharge. There were 10,422 eligible patient discharges; 264 (2.5%) were readmitted within 48 hours. In the univariable analysis, unplanned readmission was associated with PICU patient admissions of younger age, lower weight, greater duration of PICU stay, greater cumulative stay in PICU in the past 2 years, higher Pediatric Logistic Organ Dysfunction score on PICU discharge, discharge outside goal discharge time (06:00-11:59 hr), use of extracorporeal organ support during ICU stay, greater Bedside Pediatric Early Warning Score, at discharge and discharge from the cardiac PICU. In the multivariable analysis, the factors most significantly associated with unplanned PICU readmission were length of stay more than 48 hours, greater cumulative length of PICU stay in the past 2 years, discharge from cardiac PICU, and higher Pediatric Logistic Organ Dysfunction and Bedside Pediatric Early Warning Scores on index discharge. Mortality was 1.8 times (\( p = 0.03 \)) higher in patients with an unplanned PICU readmission compared with patients during their index PICU admission. The only potentially modifiable factors we found associated with PICU readmission within 48 hours of discharge were
The Challenges of Caring for Long-Stay Patients in the PICU.

Citation: Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, Jun 2016, vol. 17, no. 6, p. e266., 1529-7535 (June 2016)

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Abstract: Compared to shorter-stay patients, caring for long-stay patients in the ICU entails a disproportionate burden for staff. Our objective was to gain a deeper understanding of the impact on staff of caring for children who have a prolonged stay on the PICU. Qualitative study based on semi-structured interviews. Data were analyzed using the Framework approach. Children’s tertiary hospital. Seventeen members of staff (7 psychosocial staff, 7 nurses, 3 consultants) working in the PICU, neonatal ICU, or cardiac ICU (PICU will be used to encompass neonatal ICU, cardiac ICU, and PICU for the remainder of this article). Semi-structured, tape-recorded interviews. Staff reported both positive and challenging aspects of caring for long-stay patients in the PICU. Five key areas relating to the challenges of caring for long-stay patients were identified: staff expectations about their work, characteristics of the patient group, the impact on staff, the impact on the wider unit, and the availability of support. Staff views were often compounded by individual cases they had been involved with or had heard about which fell at either end of the spectrum of "good" and "bad". Whilst there are reported benefits associated with caring for long-stay patients, there are a number of challenges reported that may have implications for staff and the wider unit. When caring for a particular sub-group of long-stay patients, staff may be more likely to experience negative impacts. A key priority for the PICU is to ensure that support mechanisms are timely, accessible, and allow staff to explore their own reactions to their work.

Construct Validity and Responsiveness of the Pediatric Quality of Life Inventory 4.0 Generic Core Scales and Infant Scales in the PICU.

Citation: Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, Jun 2016, vol. 17, no. 6, p. e272., 1529-7535 (June 2016)

Author(s): Aspesberro, François, Fesinmeyer, Megan D, Zhou, Chuan, Zimmerman, Jerry J, Mangione-Smith, Rita

Abstract: To assess the construct validity and the responsiveness of the Pediatric Quality of Life Inventory 4.0 Generic Core Scales and Infant Scales in the medical-surgical (PICU) and cardiac PICU. Prospective cohort study of 367 inpatients admitted either to the PICU or the cardiac ICU at Seattle Children’s Hospital from January 2012 to June 2013. Parent/caregiver and child (≥ 8 yr old, developmentally appropriate, and critical illness resolved) Pediatric Quality of Life Inventory scores were obtained within 24 hours of PICU/cardiac ICU discharge and subsequently at 4-12 weeks following hospital discharge. Of the 491 eligible participants invited to participate, 367 (74.7% response rate) completed the Pediatric Quality of Life Inventory survey at ICU discharge, and of these, 263 (71.7% follow-up response rate) completed the follow-up survey 4-12 weeks after hospital discharge. Responsiveness was assessed by calculating improvement scores (difference
between follow-up and ICU discharge scores, Δ Pediatric Quality of Life Inventory). Construct validity was examined by comparing mean improvement scores for known groups differing by medical complexity. At follow-up, [INCREMENT] Pediatric Quality of Life Inventory scores were as follows (mean ± SD): physical domain, 34.8 ± 32.0; and psychosocial domain, 23.1 ± 23.5. Patients with complex chronic or noncomplex chronic disease had physical functioning improvement scores that were 17.4 points (95% CI, -28.3 to -6.5; p < 0.001) and 19.5 points (95% CI, -30.4 to -8.5; p < 0.002) lower than children with no chronic illness, respectively. Patients with complex chronic disease exhibited psychosocial improvement scores that were 9.6 points (95% CI, -18.4 to -0.8; p < 0.033) lower than patients without chronic disease. Patients with noncomplex chronic disease had similar psychosocial improvement scores when compared with patients without chronic disease. As a measure of health-related quality of live, Pediatric Quality of Life Inventory demonstrated responsiveness and construct validity in a broad population of critically ill children. This measure represents a patient-centered clinically meaningful patient-or-parent-reported outcome measure for pediatric research assessing the clinical effectiveness of PICU/cardiac ICU interventions. When using health-related quality of life recovery as an outcome measure to assess clinical effectiveness in the PICU/cardiac ICU setting, measuring and controlling for the level of medical complexity is important in order to understand the true impact of clinical interventions.

Title: Safety and effectiveness of percutaneous cholecystostomy in critically ill children who are immune compromised.

Citation: Pediatric radiology, Jun 2016, vol. 46, no. 7, p. 1040-1045, 1432-1998 (June 2016)

Author(s): Schaefer, Carrie M, Towbin, Richard B, Aria, David J, Kaye, Robin D

Abstract: Acalculous cholecystitis is known to develop in critically ill patients without cystic duct obstruction. In the past, treatment for acalculous cholecystitis has been cholecystectomy; however, many children who are critically ill are Pericutaneous cholecystostomy is likely the procedure of choice in this subgroup of patients. To assess the safety and effectiveness of percutaneous cholecystostomy in critically ill and immune-compromised children with acalculous cholecystitis. Retrospective review of immune-compromised and critically ill children who underwent percutaneous cholecystostomy between 2006 and 2013. Diagnostic imaging performed included ultrasound, CT and hepatobiliary scintigraphy. Every percutaneous cholecystostomy was performed using imaging guidance. Ten critically ill and immune-compromised children with acalculous cholecystitis underwent percutaneous cholecystostomy. Seven boys and 3 girls, ranging in age from 10 months to 15 years 8 months, were treated. Six of the immune-compromised children had received a bone marrow transplant for leukemia (5 children) or severe combined immunodeficiency (SCID) (1 child), and ranged from 18 to 307 days post bone marrow transplant at the time of their percutaneous cholecystostomy. Of the remaining four immune-compromised children with acalculous cholecystitis who underwent percutaneous cholecystostomy, two had leukemia, one had SCID and lymphoma, and the fourth was undergoing treatment for undifferentiated germ cell tumor. The 10 percutaneous gallbladder drains were placed using a transhepatic approach, except one unintentional transperitoneal approach. There were no complications. Three gallbladder drains were removed in Interventional Radiology. Those three patients had a return to normal gallbladder function and didn’t require cholecystectomy. Two drains were removed during cholecystectomy and another as an outpatient. Four patients died in the hospital due to multiorgan system failure, with indwelling gallbladder drains. Percutaneous cholecystostomy is a safe procedure in immune-compromised and critically ill children with acalculous cholecystitis. Percutaneous cholecystostomy may obviate the need for future cholecystectomy.
Title: Effectiveness of insertion and maintenance bundles to prevent central-line-associated bloodstream infections in critically ill patients of all ages: a systematic review and meta-analysis.

Citation: The Lancet. Infectious diseases, Jun 2016, vol. 16, no. 6, p. 724-734, 1474-1485 (June 2016)

Author(s): Ista, Erwin, van der Hoven, Ben, Kornelisse, René F, van der Starre, Cynthia, Vos, Margreet C, Boersma, Eric, Helder, Onno K

Abstract: Central-line-associated bloodstream infections (CLABSIs) are a major problem in intensive care units (ICUs) worldwide. We aimed to quantify the effectiveness of central-line bundles (insertion or maintenance or both) to prevent these infections. We searched Embase, MEDLINE OvidSP, Web-of-Science, and Cochrane Library to identify studies reporting the implementation of central-line bundles in adult ICU, paediatric ICU (PICU), or neonatal ICU (NICU) patients. We searched for studies published between Jan 1, 1990, and June 30, 2015. For the meta-analysis, crude estimates of infections were pooled by use of a DerSimonian and Laird random effect model. The primary outcome was the number of CLABSIs per 1000 catheter-days before and after implementation. Incidence risk ratios (IRRs) were obtained by use of random-effects models. We initially identified 4337 records, and after excluding duplicates and those ineligible, 96 studies met the eligibility criteria, 79 of which contained sufficient information for a meta-analysis. Median CLABSIs incidence were 5·7 per 1000 catheter-days (range 1·2-46·3; IQR 3·1-9·5) on adult ICUs; 5·9 per 1000 catheter-days (range 2·6-31·1; 4·8-9·4) on PICUs; and 8·4 per 1000 catheter-days (range 2·6-24·1; 3·7-16·0) on NICUs. After implementation of central-line bundles the CLABSI incidence ranged from 0 to 19·5 per 1000 catheter-days (median 2·6, IQR 1·2-4·4) in all types of ICUs. In our meta-analysis the incidence of infections decreased significantly from median 6·4 per 1000 catheter-days (IQR 3·8-10·9) to 2·5 per 1000 catheter-days (1·4-4·8) after implementation of bundles (IRR 0·44, 95% CI 0·39-0·50, p<0·0001; I(2)=89%). Implementation of central-line bundles has the potential to reduce the incidence of CLABSIs.

Title: Fate of Central Venous Catheters Used for Acute Extracorporeal Treatment in Critically Ill Pediatric Patients: A Single Center Experience.

Citation: Therapeutic apheresis and dialysis : official peer-reviewed journal of the International Society for Apheresis, the Japanese Society for Apheresis, the Japanese Society for Dialysis Therapy, Jun 2016, vol. 20, no. 3, p. 308-311, 1744-1787 (June 2016)

Author(s): Rus, Rina R, Premru, Vladimir, Novljan, Gregor, Grošelj-Grenc, Mojca, Ponikvar, Rafael

Abstract: Renal replacement treatment (RRT) is required in severe acute kidney injury, and a functioning central venous catheter (CVC) is crucial. Twenty-eight children younger than 16 years have been treated at the University Medical Centre Ljubljana between 2003 and 2012 with either acute hemodialysis (HD) and/or plasma exchange (PE), and were included in our study. The age of the patients ranged from 2 days to 14.1 years. Sixty-six CVCs were inserted (52% de novo, 48% guide wire). The sites of insertion were the jugular vein in 20% and the femoral vein in 80%. Catheters were in function from 1 day to 27 days. The most common cause for CVC removal or exchange was catheter dysfunction (50%). CVCs were mostly inserted in the femoral vein, which is the preferred site of insertion in acute HD/PE because of the smaller number of complications.
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