

**Conclusion:** In infants 1 to 3 months of age undergoing urethral catheterization in the ED, administration of an oral sweet solution did not statistically decrease pain scores as measured by the FLACC and NIPS scales. Participants' heart rate variations and crying time were not significantly decreased when sucrose was provided.

**Keywords:** pain, pediatric

#### LO038

##### Evaluation of a midstream urine collection technique for infants in the emergency department

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**Introduction:** A novel bladder stimulation technique has been described for midstream urine (MSU) collection in well-feeding, inpatient newborns. We sought to determine the performance of this technique amongst infants presenting to the Emergency Department (ED). **Methods:** Our prospective ED-based study enrolled a convenience cohort of infants aged  $\leq 90$  days who required urine testing. Infants with significant feeding issues, moderate to severe dehydration, or critical illness were excluded. Bladder stimulation consisted of finger tapping on the lower abdomen with or without lower back massage while holding the child upright. Healthcare providers received standardized training in the technique. Primary outcome was the proportion of infants with successful MSU collection via the technique. Success was defined as adequate sample collection ( $\geq 1$  mL urine) within 5 minutes of initiating stimulation. Secondary outcomes included the proportion of contaminated MSU samples, time required for MSU collection and full protocol completion, and patient discomfort as perceived by parent/guardian using a 100 mm visual analog scale [VAS]. Assuming success *a priori* in 50% of infants, a sample size of 115 allowed a 95% confidence interval of  $\pm 9.1\%$  around the point estimate. **Results:** We enrolled 115 infants. Mean age was 53.0 days old (interquartile range [IQR] 26.7-68.0); 58.3% were male (69.2% uncircumcised). Midstream urine was successfully collected in 61 infants (53.0%; 95% CI 0.44,0.62). Thirty-one MSU samples (50.8%) were contaminated; uncircumcised males held the highest proportion (55.0%). Most contaminated samples (83.9%) were reported as "non-significant growth" or "growth of  $\geq 3$  organisms" and were easily identifiable as contaminants with minimal impact on clinical care. Only 4 (8.5%) of the 47 patients discharged home after successful MSU collection had a repeat ED visit for urine testing. Median stimulation time for MSU collection was 45 seconds (IQR 20-99 secs). Median time for full protocol completion was 30.83 minutes (IQR 24.42-46.83 mins). Mean VAS for infant discomfort was 20.2 mm (SD  $\pm 20.4$  mm). **Conclusion:** Our pragmatic, ED-based study found the success rate of this bladder stimulation technique to be significantly lower (53%) than its published rate (86%). The contamination rate was high but most contaminated specimens were easily identifiable as such and had minimal clinical impact.

**Keywords:** urine sample, infant, bladder stimulation

#### LO039

##### The effect of desaturations on subsequent medical visits in infants discharged from the emergency department with bronchiolitis

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**Introduction:** Bronchiolitis is the most common lower respiratory tract infection among infants, characterized by wheeze and respiratory

distress. Reliance on pulse oximetry has been associated with increased hospitalizations, prolonged hospital stay and escalation of care. The objectives were to determine if there is a difference in the proportion of unscheduled medical visits within 72 hours of emergency department discharge in infants with bronchiolitis who desaturate to  $<90\%$  for at least one minute during home oximetry monitoring versus those without desaturations. **Methods:** This is a prospective cohort study from 2008 to 2013 enrolling 118 otherwise healthy infant aged 6 weeks to 12 months discharged home from a tertiary care pediatric emergency department with a diagnosis of acute bronchiolitis. The primary outcome was unscheduled medical visits for bronchiolitis, a visit to any health care provider due to concerns about respiratory symptoms, within 72 hours of discharge in infants with and without desaturations. Secondary outcomes included examination of the severity and duration of the desaturations, delayed hospitalizations within 72 hours of discharge and the effect of activity on desaturations. **Results:** During a mean monitoring period of 19 hours, 75/118 (64%) infants had at least one desaturation event (median continuous duration 3.4 minutes). 59/118 infants (50%) had at least 3 desaturations, 12 (10%) desaturated for  $>10\%$  monitored time and 51(43%) had desaturations lasting  $\geq 3$  minutes continuously. 59/118 (50%) infants desaturated to  $\leq 80\%$  and 29 (24%) to  $\leq 70\%$  for  $\geq 1$  minute. A total 18/75 infants with desaturations (24.0%) had an unscheduled visit for bronchiolitis versus 11/43 of their non-desaturating counterparts (25.6%) [Difference - 1.6%; 95%CI -0.15 to  $\infty$ ,  $p = 0.66$ ]. One of 75 desaturating infants (1.3%) and 2/43 (4.6%) of those without desaturations were hospitalized within 72 hours [Difference of -3.3%; 95% CI -0.04 to 0.10,  $p = 0.27$ ]. Seventy seven percent of infants with desaturations experienced them during sleep or while feeding. **Conclusion:** The majority of infants with mild bronchiolitis experienced recurrent or sustained desaturations after discharge home. Children with and without desaturations had comparable rates of return for care, with no difference in unscheduled return medical visits and delayed hospitalizations.

**Keywords:** bronchiolitis, oxygen saturation, healthcare utilization

#### LO040

##### Do combined electrocardiogram rhythm and point of care ultrasound findings predict outcome during cardiac arrest? The second Sonography in Hypotension and Cardiac Arrest in the Emergency Department (SHOC-ED 2) Study

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**Introduction:** Survival to hospital discharge is better for PEA than asystole in out-of-hospital cardiac arrest. Point of care ultrasound (PoCUS) is widely used in cardiac arrest, although not mandated by ACLS guidelines. This study examines if initial PoCUS findings combined with cardiac rhythm are predictive of outcomes including return of spontaneous circulation (ROSC), survival to hospital admission (SHA), and hospital discharge (SHD). **Methods:** A database review was completed for patients arriving to a tertiary ED in asystole or PEA arrest from 2010 to 2014. Patients under 19y or with a previous DNR were excluded. Patients were grouped into those with cardiac activity on PoCUS and PEA on ECG (Positive group); those with no cardiac activity recorded on PoCUS and asystole on ECG (Negative group); and those with a mix of positive and negative findings (Indeterminate group). Data was analyzed for the frequency of ROSC, SHA, and SHD. **Results:** 186 patients met the study criteria, with 14 (8%) in the positive group, 134 (72%) in the negative group,

and 38 (20%) in the indeterminate group. The positive group had significantly better initial outcomes than the negative group: ROSC: 78% (95% CI 49-95%) vs 17% (11-25%); OR 17.70 (4.57-168.5;  $p < 0.0001$ ) and SHA: 29% (8-58%) vs 7% (3-12%); OR 5.56 (1.45-21.28;  $p = 0.022$ ), and then the combined negative and indeterminate groups: ROSC: 22% (16-29%), OR 12.93 (3.43-48.73;  $p < 0.0001$ ; SHA: 8% (5-13%); OR 4.51 (1.25-16.27;  $p = 0.033$ ). There was no difference between the positive group and either the negative or combined groups for final outcome of SHD: 0% (0-23%) vs 1% (0-5%); OR 1.83 (0.08-39.97;  $p = 1.00$ ; and vs 1% (0-5%); OR 1.67 (0.08-33.96;  $p = 1.00$ ). The negative group had worse initial outcomes than the combined positive and indeterminate groups: ROSC 17% (11-25%) vs. 50% (36-64%) OR 0.21 (0.10-0.42;  $p < 0.0001$ ); SHA 6% (3-12%) vs. 8% (5-13%) OR 0.34 (0.13-0.92;  $p = 0.0490$ ). There was no difference in SHD: 1% (0-5%) vs. 1% (0-5%) OR 0.77 (0.07-8.71;  $p = 1.00$ ). **Conclusion:** Our results suggest that although finding positive cardiac activity on ECG (PEA) and also on PoCUS is associated with greater ROSC and SHA, it does not identify patients with a final outcome of SHD.

**Keywords:** point-of-care ultrasound (PoCUS), cardiac arrest, electrocardiogram (ECG)

#### LO041

##### Predicting the return of spontaneous circulation using near-infrared spectroscopy monitoring: a systematic review and meta-analysis

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**Introduction:** Tissue oximetry using near-infrared spectroscopy (NIRS) is a non-invasive monitor of cerebral oxygenation. This new technology has been used during cardiac arrest because of its ability to give measures in low blood flow situations. The aim of this systematic review was to assess the evidence regarding the association between NIRS values and resuscitation outcomes in patients undergoing cardiopulmonary resuscitation. We hypothesized that higher NIRS values would be associated with better outcomes and that the strength of that association would differ depending on the timing of the NIRS measurements. **Methods:** This review was registered (Prospero CRD42015017380) and is reported as per the PRISMA guidelines. Medline, Embase and CENTRAL were searched from their inception to September 18<sup>th</sup>, 2015 using a specifically designed search strategy. Grey literature was also searched using Web of Science and Google Scholar. NIRS manufacturers and authors of included citations were contacted to inquire on unpublished results. Finally, the references of all retained articles were reviewed in search of additional relevant studies. Studies reporting NIRS monitoring in adults during cardiac arrest were eligible for inclusion. Case reports and case series of fewer than five patients were automatically excluded. Two reviewers assessed the quality of included articles and extracted the data. **Results:** Out of 3275 unique citations, 19 non-randomized observational studies (15 articles and four conference abstracts) were included in this review, for a total of 2436 patients. Six studies were evaluated at low risk of bias, nine at intermediate risk and four at high risk. We found a stronger association between the return of spontaneous circulation (ROSC) and the highest NIRS value measured during resuscitation (standard mean deviation (SMD) 3.46 (95%CI 2.31-4.62)) than between ROSC and the mean NIRS measures (SMD 1.33 (95%CI 0.92-1.74)) which was superior to the one between ROSC and initial measures (SMD 0.45 (95%CI 0.02-0.88)). **Conclusion:** Patients with good

outcomes have significantly higher NIRS value during resuscitation than their counterparts. The association between ROSC and NIRS measurements was influenced the timing of measurements during resuscitation.

**Keywords:** cardiopulmonary resuscitation, near-infrared spectroscopy, prognosis

#### LO042

##### Sonography in Hypotension and Cardiac Arrest (SHoC) - Hypotension: derivation of an evidence-based consensus algorithm for the integration of point of care ultrasound into resuscitation of hypotensive patients

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**Introduction:** Point of care ultrasound has become an established tool in the initial management of patients with undifferentiated hypotension. Current established protocols (RUSH, ACES, etc) were developed by expert user opinion, rather than objective, prospective data. We wished to use reported disease incidence to develop an informed approach to PoCUS in hypotension using a "4 F's" approach: Fluid; Form; Function; Filling. **Methods:** We summarized the incidence of PoCUS findings from an international multicentre RCT, and using a modified Delphi approach incorporating this data we obtained the input of 24 international experts associated with five professional organizations led by the International Federation of Emergency Medicine. The modified Delphi tool was developed to reach an international consensus on how to integrate PoCUS for hypotensive emergency department patients. **Results:** Rates of abnormal PoCUS findings from 151 patients with undifferentiated hypotension included left ventricular dynamic changes (43%), IVC abnormalities (27%), pericardial effusion (16%), and pleural fluid (8%). Abdominal pathology was rare (fluid 5%, AAA 2%). After two rounds of the survey, using majority consensus, agreement was reached on a SHoC-hypotension protocol comprising: **A. Core:** 1. Cardiac views (Sub-xiphoid and parasternal windows for pericardial *fluid*, cardiac *form* and ventricular *function*); 2. Lung views for pleural *fluid* and B-lines for *filling* status; and 3. IVC views for *filling* status; **B. Supplementary:** Additional cardiac views; and **C. Additional** views (when indicated) including peritoneal fluid, aorta, pelvic for IUP, and proximal leg veins for DVT. **Conclusion:** An international consensus process based on prospectively collected disease incidence has led to a proposed SHoC-hypotension PoCUS protocol comprising a stepwise clinical-indication based approach of Core, Supplementary and Additional PoCUS views.

**Keywords:** point-of-care ultrasound (PoCUS), shock, consensus