LO043

Is there an association between resuscitation effort and the use of cardiac ultrasound in patients arriving to the emergency department in cardiac arrest? The second Sonography in Hypotension and Cardiac Arrest in the Emergency Department (SHOC-ED 2) Study

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Introduction: The use of cardiac point of care ultrasound (PoCUS) to assess cardiac arrest patients is widespread, although not mandated by advanced cardiac life support (ACLS) guidelines. This study aims to examine if the use of ultrasound is associated with a difference in the length of resuscitation and the frequency of interventions during ACLS in the emergency department (ED). **Methods:** A retrospective database and chart analysis was completed for patients arriving to a tertiary ED in cardiac arrest, between 2010 and 2014. Patients were excluded if aged under 19, or with a previous DNR order. Patients were grouped based on whether PoCUS was used during ACLS (PoCUS group) and those without PoCUS (control group). Multiple data were abstracted from charts using a standardized form. Data was analyzed for the length of resuscitation, frequency of common ACLS interventions such as endotracheal intubation, administration of epinephrine, and defibrillation, as well as initial cardiac activity findings on PoCUS. **Results:** 263 patients met the study inclusion criteria, with 51 (19%) in the control group, and 212 (81%) in the PoCUS group. In the PoCUS group 23 (11%) had cardiac activity (Positive PoCUS) and 189 (89%) had no cardiac activity recorded. Positive PoCUS patients had longer mean resuscitation times (26.13 min, 95% CI 17.80-34.46 min) compared to patients with no PoCUS cardiac activity (12.63 min, 95% CI 11.07-14.19 min, $p < 0.05$) as well as to the control group (14.20 min, 95% CI 10.30-18.09 min, $p < 0.05$). Positive PoCUS patients were more likely to receive endotracheal intubation (91%, 95% CI 72-99%), and epinephrine (100%, 95% CI 85-100%) than patients with no PoCUS cardiac activity (ET: 47%, 95% CI 40-54%, $p < 0.0001$; Epi: 81%, 95% CI 75-86%, $p < 0.0172$) and than the control group (ET: 65%, 95% CI 50-78%, $p < 0.0227$; Epi: 80%, 95% CI 67-90%, $p < 0.0258$). There was no difference in numbers receiving defibrillation between groups. **Conclusion:** Our results suggest emergency physicians may be making increased resuscitative effort for patients with positive cardiac activity findings on PoCUS compared to those with negative findings or when no PoCUS was performed.

Keywords: point-of-care ultrasound (PoCUS), cardiac arrest, advanced cardiac life support

LO044

Stress-testing the resuscitation room: latent threats to patient safety identified during interprofessional in-situ simulation in the emergency department

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Introduction: Emergency Department (ED) resuscitation is a complex, high-stakes procedure where positive outcomes depend upon effective interactions between the healthcare team, the patient, and the environment. To this end, resuscitation teams work in spaces designed to optimize workflows and ensure that necessary treatments and skillsets are available when required. However, systematic failures in this environment cannot always be adequately anticipated, exposing patients to opportunities for harm. As part of a new interprofessional education initiative, this prospective, observational study sought to characterize latent threats to patient safety (LST's) identified during the delivery of in-situ, simulated resuscitations in two Canadian, tertiary care, academic Emergency Departments. **Methods:** In-situ simulation sessions were delivered on a monthly basis in the EDs of each hospital campus, during which a variety of simulated resuscitation scenarios were run with distinct teams of ED healthcare professionals. A research assistant was present throughout each session and documented LST's identified by simulation facilitators and participants during the case and debriefing. Data were entered into a master table and grouped thematically for analysis. **Results:** After a pilot run-in, 10 in-situ simulation sessions were delivered, involving 27 cases and reaching 180 ED healthcare professionals (25 attending MD, 37 resident MD, 59 RN, 24 RT). 83 latent safety threats were identified through these sessions (mean 3.1 LSTs per case) of which 52 were determined to be "actionable". Corrective mechanisms have been initiated in 72% of these cases (e.g., new education campaigns and in-servicing, equipment provisioning, equipment checklists). **Conclusion:** In-situ simulation, beyond its role as a training tool for developing Non-Technical and Crisis Resource Management skills, can be effectively used to identify systematic deficits and knowledge gaps that could expose critically ill patients to harm. Effective quality improvement and continuing education programs are essential to translate these findings into more resilient patient care.

Keywords: in-situ simulation, patient safety, quality

LO045

Sonography in Hypotension and Cardiac Arrest (SHoC) - Cardiac Arrest: A consensus on the integration of point of care ultrasound into advanced cardiac life support during cardiac arrest

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Introduction: Point of care ultrasound (PoCUS) provides invaluable information during resuscitation efforts in cardiac arrest by determining presence/absence of cardiac activity and identifying reversible causes such as pericardial tamponade. There is no agreed guideline on how to safely and effectively incorporate PoCUS into the advanced cardiac life support (ACLS) algorithm. We consider that a consensus-based priority checklist using a "4 F's" approach (Fluid; Form; Function; Filling), would provide a better algorithm during ACLS. **Methods:** The ultrasound subcommittee of the Australasian College for

Emergency Medicine (ACEM) drafted a checklist incorporating PoCUS into the ACLS algorithm. This was further developed using the input of 24 international experts associated with five professional organizations led by the International Federation of Emergency Medicine. A modified Delphi tool was developed to reach an international consensus on how to integrate ultrasound into cardiac arrest algorithms for emergency department patients. **Results:** Consensus was reached following 3 rounds. The agreed protocol focuses on the timing of PoCUS as well as the specific clinical questions. **Core** cardiac windows performed during the rhythm check pause in chest compressions are the sub-xiphoid and parasternal cardiac views. Either view should be used to detect pericardial *fluid*, as well as examining ventricular *form* (e.g. right heart strain) and *function*, (e.g. asystole versus organized cardiac activity). **Supplementary** views include lung views (for absent lung sliding in pneumothorax and for pleural fluid), and IVC views for *filling*. **Additional** ultrasound applications are for endotracheal tube confirmation, proximal leg veins for DVT, or for sources of blood loss (AAA, peritoneal/pelvic fluid). **Conclusion:** The authors hope that this process will lead to a consensus-based *SHoC-cardiac arrest* guideline on incorporating PoCUS into the ACLS algorithm.

Keywords: point-of-care ultrasound (PoCUS), cardiac arrest, consensus

LO046

Factors associated with hospital admission following asthma exacerbations: a systematic review

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Introduction: Patients with asthma frequently present to the emergency department (ED) with exacerbations; however, a select number of patients require admission to hospital. The objective of this study was to summarize the evidence regarding asthma-related hospital admissions and factors associated with these admissions following ED presentation. **Methods:** Comprehensive literature searches were conducted in seven electronic databases (database inception to 2015); manual and grey literature searches were also performed. Studies reporting disposition for adults after ED presentation were included. Study quality was assessed using the Newcastle-Ottawa Scale (NOS); standardized data-collection forms were used for data extraction. Admission proportions and factors associated with admission at a statistical significance level ($p < 0.05$) were reported. **Results:** Out of an initial 5865 identified articles, 37 articles met full inclusion criteria. Admission proportions were reported in 25/37 studies, ranged from 1% to 37%, and collectively demonstrated a decline of ~9% in admissions between 1993 and 2012. Studies including a >50% Caucasian ethnicity were found to have a median admission proportion of 13% (interquartile range [IQR] = 7, 20) versus studies with >50% non-Caucasian ethnicity at 22% (IQR = 20, 28). Age, female sex, and previous hospitalizations for asthma exacerbation were the most individually identifiable factors associated with admission. Presenting features and medication profile were the most frequent domains associated with admission. **Conclusion:** Admission rates have decreased approximately 9% in a nearly 20-year span and seem to be higher in studies involving mostly non-Caucasian ethnic groups. Demographic factors, markers of severity obtained by history or at ED presentation, and medication profile could be assessed by ED clinicians to effectively discern patients at high risk for admission.

Keywords: asthma, admissions, knowledge synthesis

LO047

Predictors of treatment failure in renal colic patients discharged from the emergency department

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Introduction: Most patients with acute renal colic are discharged from the ED after initial diagnosis and symptom control, but 20-30% require repeat ED visits for ongoing pain, and 15-25% require rescue intervention (ureteroscopic intervention or lithotripsy). If patients destined for failure of outpatient management could be identified based on information available during their ED visits, they could be prioritized early for intervention to reduce short term pain and disability. Our objective was to identify predictors of outpatient treatment failure, defined as the need for hospitalization or rescue intervention within 60 days of ED discharge. **Methods:** We collated prospectively gathered administrative data from all Calgary region patients with an ED diagnosis of renal colic over a one-year period. Demographics, arrival mode, triage category, vital signs, pain scores, analgesic use and ED disposition were recorded. Research assistants reviewed imaging reports and documented stone characteristics. These data were linked with regional hospital databases to identify ED revisits, hospital admissions, and surgical procedures. The primary outcome was hospitalization or rescue intervention within 60 days of ED discharge. **Results:** Of 3104 patients with first ED visit for acute renal colic, 1296 had CT or US imaging and were discharged without intervention. Median age was 50 years and 69% were male. 325 patients (25.1%) required an ED re-visit and 11.8% required admission or rescue intervention. Patients with small (<5mm), medium (5-7mm) and large (>7mm) stones failed in 9.0%, 14.4% and 9.9% of cases respectively. The only factor predictive of treatment failure in multivariable models was stone position in the proximal or mid-ureter. Age, sex, vital signs, pain score, WBC, creatinine, history of prior stone or intervention, stone side, stone size, presence of stranding and degree of hydronephrosis were not associated with outpatient failure. **Conclusion:** Outpatient treatment failure could not be predicted based on any of the predictors studied.

Keywords: renal colic, treatment failure, pain management

LO048

Systematic review of the use of low-dose ketamine for analgesia in the emergency department

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Introduction: Ketamine is a popular sedative agent for painful procedures. It is not widely used at sub-dissociative analgesic doses in the emergency department (ED). We sought to determine the performance of low-dose ketamine (LDK) as an analgesic for acute pain management in adult patients in the ED. **Methods:** We systematically reviewed electronic databases (MEDLINE, EMBASE, AMED, CINAHL, PubMed and Cochrane database of systematic reviews), grey literature, conference proceedings and clinical trials registries. Two independent reviewers identified eligible studies using pre-determined criteria. We included peer-reviewed studies that used LDK (< 1 mg/kg IV or < 2mg/kg IM) in adult patients (>18 yo) requiring acute pain management for any condition in the ED. Our outcome measures included analgesic effect of LDK compared to any opioids, need for rescue analgesia, and neuropsychological adverse events. We assessed inter-rater agreement using kappa statistics, risk of bias using the Cochrane Collaboration's Tool, and propose a treatment recommendation using GRADE. Heterogeneity among studies precluded meta-analysis.