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Quality assessment and improvement evaluation of return visits to the emergency department for ultrasound

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Introduction: Depending on the time and day of initial Emergency Department (ED) presentation, some patients may require a return to the ED the following day for ultrasound examination. Return visits for ultrasound may be time and resource intensive for both patients and the ED. Qualitative experience suggests that a percentage of return ultrasounds could be performed at a non-ED facility. Our objective was to undertake a retrospective audit of return for ultrasound usage, patterns and outcomes at 2 academic EDs. **Methods**: A retrospective review of all adult patients returning to the ED for ultrasound at both LHSC ED sites in 2016 was undertaken. Each chart was independently reviewed by two emergency medicine consultants. Charts were assessed for day and time of initial presentation and return, type of ultrasound ordered, and length of ED stay on initial presentation and return visit. Opinion based questions were considered by reviewers, including urgency of diagnosis clarification required, if symptoms were still present on return, and if any medical or surgical treatment or follow up was arranged based on ultrasound results. Agreement between reviewers was assessed. **Results**: After eliminating charts for which the return visit was not for a scheduled ultrasound examination, 328 patient charts were reviewed. 63% of patients were female and median [IQR] age was 40 years [27-56]. Abdomen/pelvis represented 50% of the ultrasounds; renal 24%; venous Doppler 15.9%. Symptoms were still present and documented in 79% of cases. 22% of cases required a medical intervention and 9% an immediate surgical intervention. 11% of patients were admitted to hospital on their return visit. Outpatient follow-up based on US results was initiated in 29% of cases. Median [IQR] combined LOS was 479.5 minutes [358.5-621.75]. Agreement between reviewers for opinion based questions was poor (63%-96%). **Conclusion**: Ideally, formal ultrasound should be available on a 24 hour basis for ED patients in order to avoid return visits. A percentage of return for ultrasound examinations do not result in any significant change in treatment. Emergency departments should consider the development of pathways to avoid return visits for follow up ultrasound when possible. The low incidence of surgical treatment in those returning for US suggests that this population could be served in a non-hospital setting. Further research is required to support this conclusion.

Keywords: quality assessment, ultrasound

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Is lumbar puncture mandatory in the workup of infants 22 to 60 days old presenting to the emergency department with a fever without a source?

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Introduction: Fever is a common presenting complaint in the emergency department (ED). Febrile infants are at particularly high risk of serious bacterial infection including bacterial meningitis. Unfortunately, recommendations as to when to perform a lumbar puncture in febrile infants older than 21 days remain conflicting. Our study seeks to establish the prevalence of bacterial meningitis in infants 22 to 60 days old and to evaluate the performance of our local fever without a source (FWS) workup protocol at identifying bacterial meningitis. **Methods**: This analysis represents the results of a retrospective cohort study which took place in an academic pediatric ED in Quebec City. Infants 22 to 60 days old investigated for FWS, were included in the study. Premature infants (<37 weeks), as well as infants with chronic diseases, immunodeficiency, previous antimicrobial therapy, in-dwelling catheters, or septic shock were excluded. We evaluated the performance of our local FWS workup protocol which includes the Yale Scale, a complete blood count, blood culture, C-reactive protein, urinalysis and urine culture. The protocol recommends a lumbar puncture in all febrile infants <1 month old, and in all infants <3 months old with either leukocytes <5.0 or >15.0 X 10^9cells/L, petechia, or a Yale between 11 and 16. **Results**: We reviewed 1261 charts from 2012 to 2017, of which 920 met our inclusion criteria. In our cohort, 171 infants were 22 to 30 days old, 369 were 31 to 45 days old, and 380 were 46 to 60 days old. The proportion of infants with cerebrospinal fluid analysis in these 3 groups was 76% (n = 130), 25% (n = 98) and 12% (n = 46) respectively. In the entire cohort, two infants were diagnosed with bacterial meningitis resulting in a prevalence of 0.2% (95%CI: 0-0.5%); viral meningitis had a prevalence of 4.7% (95%CI: 3.3-6.1%). Sensitivity and specificity of the protocol were 100% and 52.8%; positive and negative predictive values were 0.4% and 100%, respectively. All charts were reviewed for 2 weeks following the index visit to screen for missed cases of bacterial meningitis. **Conclusion**: Systematically performing a lumbar puncture for workup of fever without a source in infants 22 to 60 days old appears unwarranted given the low prevalence of bacterial meningitis in this population. Our FWS workup protocol correctly identified the 2 cases of bacterial meningitis in our cohort. This is an ongoing study and more cases will be recruited to better evaluate the safety and performance of our protocol.

Keywords: fever without a source, infants 22 to 60 days old, lumbar puncture

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Evidence-based medicine (EBM) simulation: teaching real-time literature searching to emergency medicine residents using a flipped classroom and high-fidelity simulation

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Innovation Conept: Evidence-based medicine (EBM), including literature search skills, is an objective of the Emergency Medicine (EM) residency curriculum. Traditional teaching of this topic utilized a classroom-based, librarian-lead session that presented an overview of many search engines. Feedback from past sessions indicated that learners retained little after the session. To be effective, EBM needs to be brought to the bedside. We created a session to engage EM residents and improve their efficiency in literature searching during an EM shift. **Methods**: We conducted a needs assessment among EM residents in our program. In response to this and to maximize impact of teaching, we created an EBM workshop on literature searching that used a flipped classroom approach and high-fidelity simulation. The session was designed for a small group (12 junior residents), with the goals of being interactive, engaging and practice-relevant. Feedback was collected on the simulation experience. **Curriculum, Tool or Material**: With a librarian, we created a brief list of EM-relevant databases. It included tips for searching and links to the corresponding

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sites / apps. Students received the list 7 days prior and were instructed to set up the resources on their smartphones. Pre-readings also covered the hierarchy of evidence and formulating a good clinical (PICO) question. All students participated in the high-fidelity simulation, with one volunteer leader. The case involved a stable patient. Residents proceeded with initial case assessment until they faced a management decision that required a literature search. All residents participated on their smart phones. Collectively, it took 5 minutes to find a study that adequately addressed the clinical question. The patient was managed accordingly and symptoms resolved. Feedback on the simulation was abundantly positive. Students found it engaging, practical and realistic. It helped them learn to efficiently search the literature while managing a stable patient. **Conclusion**: Using a multi-modal teaching strategy that includes simulation makes teaching EBM literature searching more interesting, engaging and applicable to EM practice. Future work will look at creating further sessions to reinforce and promote retention of key concepts and integrate them into EM practice.

Keywords: evidence-based medicine, Innovations in EM education, simulation

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Impact of an early mobilization protocol on outcomes in trauma patients admitted to the intensive care unit: a retrospective cohort study

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Introduction: Long-term immobility has detrimental effects for critically ill patients admitted to the intensive care unit (ICU) including ICU-acquired weakness. Early mobilization of patients admitted to ICU has been demonstrated to be a safe, feasible and effective strategy to improve patient outcomes. The optimal mobilization of trauma ICU patients has not been extensively studied. Our objective was to determine the impact of an early mobilization protocol on outcomes among trauma patients admitted to the ICU. **Methods**: We analyzed all adult trauma patients (>18 years old) admitted to ICU over a 2-year period prior to and following implementation of an early mobilization protocol, allowing for a 1-year transition period. Data were collected from the Nova Scotia Trauma Registry. We compared patient characteristics and outcomes (mortality, length of stay [LOS], ventilator days) between the pre- and post-implementation groups. Associations between early mobilization and clinical outcomes were estimated using binary and linear regression models. **Results**: Overall, there were 526 patients included in the analysis (292 pre-implementation, 234 post-implementation). The study population ranged in age from 18 to 92 years (mean age 49.0 ± 20.4 years) and 74.3% of all patients were male. The pre- and post-implementation groups were similar in age, sex, and injury severity. In-hospital mortality was reduced in the post-implementation group (25.3% vs. 17.5%; p = 0.031). In addition, there was a reduction in ICU mortality in the post-implementation group (21.6% vs. 12.8%; p = 0.009). We did not observe any difference in overall hospital LOS, ICU LOS, or ventilator days between the two groups. Compared to the pre-implementation period, trauma patients admitted to the ICU following protocol implementation were less likely to die in-hospital (OR = 0.52, 95% CI 0.30-0.91; p = 0.021) or in the ICU (OR = 0.40, 95% CI 0.21- 0.76, p = 0.005). Results were similar following a sensitivity analysis limited to patients with blunt or penetrating injuries. There was no difference between the pre- and post-implementation groups with respect to in-hospital LOS, ICU LOS, or the number of ventilator days. **Conclusion**: We found that trauma patients admitted to ICU during the post-implementation period had decreased odds of in-hospital mortality and ICU mortality. Ours is the first study to demonstrate a significant reduction in trauma mortality following implementation of an ICU mobility protocol.

Keywords: intensive care unit, mobilization, trauma

P059

Early mobilization of trauma patients admitted to intensive care units: a systematic review and meta-analysis

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Introduction: Previous systematic reviews suggest early mobilization in the intensive care unit (ICU) population is feasible, safe, and may improve outcomes. Only one review investigated mobilization specifically in trauma ICU patients and failed to identify any relevant articles. The objective of the present systematic review was to conduct an up-to-date search of the literature to assess the effect of early mobilization in adult trauma ICU patients on mortality, length of stay (LOS) and duration of mechanical ventilation. **Methods**: We performed a systematic search of four electronic databases (Ovid MEDLINE, Embase, CINAHL, Cochrane Library) and the grey literature. To be included, studies must have compared early mobilization to delayed or no mobilization among trauma patients admitted to the ICU. Meta-analysis was performed to determine the effect of early mobilization on mortality, hospital LOS, ICU LOS, and duration of mechanical ventilation. **Results**: The search yielded 2,975 records from the 4 databases and 7 records from grey literature and bibliographic searches; of these, 9 articles met all eligibility criteria and were included in the analysis. There were 7 studies performed in the United States, 1 study from China and 1 study from Norway. Study populations included neurotrauma (3 studies), blunt abdominal trauma (2 studies), mixed injury types (2 studies) and burns (1 study). Cohorts ranged in size from 15 to 1,132 patients (median, 63) and varied in inclusion criteria. Most studies used some form of stepwise progressive mobility protocol. Two studies used simple ambulation as the mobilization measure, and 1 study employed upright sitting as their only intervention. Time to commencement of the intervention was variable across studies, and only 2 studies specified the timing of mobilization initiation. We did not detect a difference in mortality with early mobilization, although the pooled risk ratio (RR) was reduced (RR 0.90, 95% CI 0.74 to 1.09). Hospital LOS and ICU LOS were decreased with early mobilization, though this difference did not reach significance. Duration of mechanical ventilation was significantly shorter in the early mobilization group (mean difference −1.18. 95% CI −2.17 to −0.19). **Conclusion**: Our review identified few studies that examined mobilization of critically ill trauma patients in the ICU. On meta-analysis, early mobilization was found to reduce duration of mechanical ventilation, but the effects on mortality and LOS were not significant.

Keywords: intensive care unit, mobilization, trauma