

There was no strong evidence indicating improved outcomes. However, the large amount of heterogeneity amongst studies has limited our ability to make a strong conclusion except that future research should focus on a uniform study design and patient focused outcomes.
Keywords: hypotension, point of care ultrasound, shock

MP06

Impact of anticoagulation on mortality and resource utilization among critically ill patients with major bleeding in the emergency department

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Introduction: Patients with major bleeding (e.g. gastrointestinal bleeding, and intracranial hemorrhage [ICH]) are commonly encountered in the Emergency Department (ED). A growing number of patients are on either oral or parenteral anticoagulation (AC), but the impact of AC on outcomes of patients with major bleeding is unknown. With regards to oral anticoagulation (OAC), we particularly sought to analyze differences between patients on Warfarin or Direct Oral Anticoagulants (DOACs). **Methods:** We analyzed a prospectively collected registry (2011-2016) of patients who presented to the ED with major bleeding at two academic hospitals. "Major bleeding" was defined by the International Society on Thrombosis and Haemostasis criteria. The primary outcome, in-hospital mortality, was analyzed using a multivariable logistic regression model. Secondary outcomes included discharge to long-term care among survivors, total hospital length of stay (LOS) among survivors, and total hospital costs. **Results:** 1,477 patients with major bleeding were included. AC use was found among 215 total patients (14.6%). Among OAC patients (n = 181), 141 (77.9%) had used Warfarin, and 40 (22.1%) had used a DOAC. 484 patients (32.8%) died in-hospital. AC use was associated with higher in-hospital mortality (adjusted odds ratio [OR]: 1.50 [1.17-1.93]). Among survivors to discharge, AC use was associated with higher discharge to long-term care (adjusted OR: 1.73 [1.18-2.57]), prolonged median LOS (19 days vs. 16 days, P = 0.03), and higher mean costs (\$69,273 vs. \$58,156, P = 0.02). With regards to OAC, a higher proportion of ICH was seen among patients on Warfarin (39.0% vs. 32.5%), as compared to DOACs. No difference in mortality was seen between DOACs and Warfarin (adjusted OR: 0.84 [0.40-1.72]). Patients with major bleeding on Warfarin had longer median LOS (11 days vs. 6 days, P = 0.03) and higher total costs (\$51,524 vs. \$35,176, P < 0.01) than patients on DOACs. **Conclusion:** AC use was associated with higher mortality among ED patients with major bleeding. Among survivors, AC use was associated with increased LOS, costs, and discharge to long-term care. Among OAC patients, no difference in mortality was found. Warfarin was associated with prolonged LOS and costs, likely secondary to higher incidence of ICH, as compared to DOACs.

Keywords: anticoagulation, critical care, hemorrhage

MP07

Diagnosis of elevated intracranial pressure in critically ill adults – a systematic review and meta-analysis

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Introduction: Elevated intracranial pressure (ICP) is a devastating complication of brain injury, such as traumatic brain injury, subarachnoid hemorrhage, intracerebral hemorrhage, ischemic stroke, and other conditions. Delay to diagnosis and treatment are associated with increased morbidity and mortality. For Emergency Department (ED) physicians, invasive ICP measurement is typically not available. We sought to summarize and compare the accuracy of physical examination, imaging, and ultrasonography of the optic nerve sheath diameter (ONSD) for diagnosis of elevated ICP. **Methods:** We searched Medline, EMBASE and 4 other databases from inception through August 2018. We included only English studies (randomized controlled trials, cohort and case-control studies). Gold standard was ICP \geq 20 mmHg on invasive ICP monitoring. Two reviewers independently screened studies and extracted data. We assessed risk of bias using Quality Assessment of Diagnostic Accuracy Studies 2 criteria. Hierarchical Summary Receiver Operating Characteristic model generated summary diagnostic accuracy estimates. **Results:** We included 37 studies (n = 4,768, kappa = 0.96). Of exam signs, pooled sensitivity and specificity for increased ICP were: mydriasis (28.2% [95% CI: 16.0-44.8], 85.9.0% [95% CI: 74.9-92.5]), motor posturing (54.3% [95% CI: 36.6-71.0], 63.6% [95% CI: 46.5-77.8]) and Glasgow Coma Scale (GCS) \leq 8 (75.8% [95% CI: 62.4-85.5], 39.9% [95% CI: 26.9-54.5]). Computed tomography findings: compression of basal cisterns had 85.9% [95% CI: 58.0-96.4] sensitivity and 61.0% [95% CI: 29.1-85.6] specificity; any midline shift had 80.9% [95% CI: 64.3-90.9] sensitivity and 42.7% [95% CI: 24.0-63.7] specificity; midline shift \geq 1cm had 20.7% [95% CI: 13.0-31.3] sensitivity and 89.2% [95% CI: 77.5-95.2] specificity. Finally, pooled area under the ROC curve describing accuracy for ONSD sonography for ICP was 0.94 (95% CI: 0.91-0.96). **Conclusion:** The absence of any one physical exam feature (e.g. mydriasis, posturing, or decreased GCS) is not sufficient to rule-out elevated ICP. Significant midline shift is highly suggestive of elevated ICP, but absence of shift does not rule it out. ONSD sonography may be useful in diagnosing elevated ICP. High suspicion of elevated ICP may necessitate treatment and transfer to a centre capable of invasive ICP monitoring.

Keywords: intracranial hemorrhage, intracranial pressure, traumatic brain injury

MP08

The frequency of emergency departments visits for patients with end-of-life conditions: a call for action

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Introduction: An increasing number of patients with end-stage diseases present to emergency departments (EDs) for physical, spiritual, psychological and social care. The objective of this study was to identify patients with end-stage diseases with palliative care (PC) needs and document their frequency of ED visits. **Methods:** This prospective cohort study was conducted in two Canadian EDs. Using a

modified palliative care screening tool, volunteer ED physicians were asked to identify adult patients with end-stage, chronic conditions including cancer, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), heart failure (HF), cirrhosis, dementia and/or progressive central nervous system (PCNS) disease. Demographic data were collected from these tools and data regarding patients' visits in both the 6 months prior to and 30 days following their index visits were collected from the ED Information System. Bivariate analyses were completed using Student's *t* and chi-square test. **Results:** A total of 663 patients with end-stage illness were identified; 338 (51%) were female and the median age was 76 (IQR: 63, 85). Cancer was the most common presentation (41%), followed by dementia (23%), COPD (16%), HF (9%), CKD (9%), PCNS disease (9%) and cirrhosis (7%). These patients made a total of 1277 visits in the 6 months prior to and 288 in the 30 days following the index visit. Patients presenting to the EDs with cancer ($p = 0.001$), cirrhosis ($p = 0.005$) and CKD ($p = 0.03$) were more likely to visit an ED in the 6 months prior to their index visit. In contrast, patients presenting with dementia ($p < 0.0001$) and PCNS disease ($p = 0.02$) were significantly less likely to present to an ED in the 6 months prior to their index visit. Patients presenting with cirrhosis or CKD had the highest average number of ED visits in the 6 months prior to their index visit (cirrhosis: 4.59 visits, SD: 3.8, $p < 0.0001$; CKD: 4.39 visits, SD: 3.8, $p = 0.0001$). Of these patients, those presenting with end-stage cirrhosis were significantly more likely to make a return visit to an ED within 30 days after their index visit ($p = 0.014$). **Conclusion:** Cancer is the most common condition for patients with end-stage, chronic illnesses in these EDs. Those presenting with cirrhosis or CKD are at a significantly higher risk of repeat visits to the EDs. This study has identified potential deficits in care and can serve as a baseline for future intervention studies.

Keywords: emergency department, palliative care

MP09

Critical care skills training day for emergency medicine residents: A curriculum in evolution

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Introduction: Emergency medicine (EM) residents are expected become proficient in a number of rarely performed, high risk procedures. We developed Critical Care Skills Training Day for senior FRCP and CCFP EM residents at a single university program to fill a gap in resident confidence with these procedures. The day applies principles of deliberate practice with focused feedback using simulation-based training for several rarely performed procedures including thoracotomy, fibre-optic intubation, pericardiocentesis, resuscitative hysterotomy and central line insertion. The objectives of this work was to improve the residents' scores of self-perceived comfort independently performing these procedures by completion of the training day. **Methods:** Clinician educators, residency program directors and simulation specialists designed and taught the curriculum. We used pre- and post-training day surveys blending Likert, multiple choice and free text comments to measure comfort performing each procedure, overall satisfaction and usefulness of this training. Descriptive statistics were used to analyze results. Pre-post differences were assessed using paired sample *T*-tests. Comments and themes from course evaluations were used to make yearly iterative changes.

Results: A total of 95 residents completed the curriculum between 2016-2018. 89 completed evaluations (93%). Residents reported significant ($p < 0.05$) improvement in comfort independently performing fibre optic intubation, thoracotomy and central line insertion. The day was rated very highly, 9.4/10 (SD, 0.72), over 3 years. Feedback was positive with participants identifying opportunities for repeated practice, feedback from instructors and practical tips to improve performance as valuable aspects. Iterative changes were made yearly in response to resident feedback including introduction of new procedures, incorporating skills into sim-based cases, and different training models for skill training. **Conclusion:** Critical Care Skills Training Day for EM residents was created using the principle of deliberate practice to fill a perceived gap in resident training. Residents who completed the annual curriculum showed a marked increase in comfort independently performing several of the procedures. Ongoing challenges include the length of the day, economies of scale, and training models available for the rare procedures. Future directions include the integration of longitudinal objective performance evaluations to align with the competency by design curriculum.

Keywords: deliberate practice, procedural skills, simulation

MP10

Does early intervention improve outcomes for patients with acute ureteral colic?

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Introduction: The optimal initial management approach for ureteral colic is unclear. Guidelines recommend spontaneous passage for most patients, but early stone intervention may rapidly terminate acute episodes. We compared 60-day treatment failure rates in matched patients undergoing early intervention versus spontaneous passage. **Methods:** We used administrative data and structured chart review to study all emergency department (ED) patients at nine Canadian hospitals who had an index ureteral colic visit and a computed tomography (CT) confirmed 2.0-9.9 mm stone during 2014. Using Cox Proportional Hazards models, we assessed 60-day treatment failure, defined as hospitalization or rescue intervention, in patients undergoing early intervention compared to propensity-score matched controls undergoing trial of spontaneous passage. **Results:** From 3,081 eligible patients, mean age 51 years and 70% male, we matched 577 patients in each group (total 1154). Control and intervention cohorts were balanced on all parameters and propensity scores, which reflect the conditional probability a patient would undergo early intervention, were similarly distributed. In the time to event analysis, 21.8% in both groups experienced the composite primary outcome of treatment failure (difference = 0%; 95% CI, -4.8 to 4.8%). Early intervention patients required more ED revisits (36.1% v. 25.5%; difference 10.6%; 95% CI 5.3 to 15.9%) and more 60-day hospitalizations (20.1% v. 12.8%). The strongest predictors of adverse outcome were stone size, proximal or middle stone location, and ED length of stay. **Conclusion:** If applied broadly to patients with 2.0-9.9mm ureteral stones, an early interventional approach was associated with similar rates of treatment failure, but more hospitalizations and emergency revisits. Research clarifying subgroups most likely to benefit will facilitate better targeting of early intervention, potentially reducing patient morbidity and improving system utilization.

Keywords: intervention, outcomes, renal colic