

Introduction: Electronic health record (EHR) implementation can be associated with a slowdown in performance and delayed return to pre go-live productivity. The objective of this study is to describe the impact of a go-live strategy including diversion, public advertising of the go-live, and extra physician staffing to mitigate productivity loss. **Methods:** Lions Gate Hospital (LGH), an urban community hospital and rural referral centre with 250 beds and 65,000 annual ED visits went live with Cerner HER (Cerner Corporation, Kansas, MO) on April 28, 2018. The implementation included complete electronic ordering and electronic physician documentation. We compared patients seen per hour, time to physician (TTMD), ED length of stay (EDLOS), patients per hour left without being seen (LWBS), and admission rate (AR) for the 6 weeks prior to implementation (Pre), 2 weeks during (Imp), and 6 weeks after (Post) for LGH and a control hospital (Richmond Hospital – comparable in size/acuity) for the same periods. Medians were compared using the Mann-Whitney test for patients/hour, EDLOS and TTMD, and chi-square for AR and LWBS. **Results:** Patients/hour seen went from 2.1/hour in the pre phase, but dropped to 1.7/hr in the 2 week period following implementation ($P < 0.05$). During weeks 2-8 post implementation, 2,3 patients per hour were seen ($P = 0.38$ compared to Pre phase). At the control hospital, patients per hour were comparable across all time periods ($P_s > 0.3$). Median time to physician was 54, 56, and 54 minutes at LGH for the Pre, Imp, and Post time periods ($P_s > 0.3$). Median EDLOS was 184, 196, and 184 minutes in the pre, Imp, and post phases (P Imp versus pre = 0.11; Pre versus post = 0.54). LWBS rate was 1.3%, 2.9, and 2.4% (P_s for Imp and Post versus pre < 0.05) at LGH, but the pattern was similar for the control hospital (2.9%, 4.1% and 4.0% $P_s < 0.05$). There was no significant change in ambulance arrivals or admission rate at either hospital ($P_s > 0.2$). **Conclusion:** A deliberate implementation strategy that focuses on ED physician upstaffing and visit diversion can smooth the impact of the implementation of an EHR so that patient care is not impacted significantly. Return to normal productivity occurred by 8 weeks post go-live. We demonstrate a strategy that may support easier implementation at other sites.

Keywords: physician productivity, electronic health record, patient volumes

MP04

rEDirect: safety and compliance of an emergency department diversion protocol for mental health and addictions patients

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Introduction: Transportation of patients better served at an alternative destinations (diversion) is part of a proposed solution to emergency department (ED) overcrowding. We evaluated the pilot implementation of the “Mental Health and Addiction Triage and Transport Protocol”. This is the first Canadian diversion protocol that allows paramedics to transport intoxicated or mental health patients to an alternative facility, bypassing the ED. Our aim was to implement a safe diversion protocol to allow patients to access more appropriate service without transportation to the emergency department. **Methods:** A retrospective analysis was conducted on patients presenting to EMS with intoxication or psychiatric issues. Study outcomes were protocol compliance, determined through missed protocol opportunities, noncompliance, and protocol failure (presentation to ED within 48 hours of appropriate diversion); and protocol safety, determined through patient morbidity (hospital admission

within 48 hours of diversion) and mortality. Data was abstracted from EMS reports, hospital records, and discharge forms from alternative facilities. Data was analyzed qualitatively and quantitatively. **Results:** From June 1st, 2015 to May 31st, 2016 Greater Sudbury Paramedic Services responded to 1376 calls for mental health or intoxicated patients. 241 (17.5%) met diversion criteria, 158 (12.9%) patients were diverted and 83 (4.6%) met diversion criteria but were transported to the ED. Of the diverted patients 9 (5.6%) represented to the ED <48rs later and were admitted. Of the 158 diversions, 113 (72%) were transported to Withdrawal Management Services (WMS) and 45 (28%) were taken to Crisis Intervention (CI). There was protocol noncompliance in 77 cases, 69 (89.6%) were due to incomplete recording of vital signs; 6 (10.3%) were direct protocol violations of being transferred with vital signs outside the acceptable range. **Conclusion:** The Mental Health and Addiction Triage and Transport Protocol has the potential to safely divert 1 in 6 mental health or addiction patients to an alternative facility.

Keywords: emergency medical service, mental health, quality improvement and patient safety

MP05

Diagnostic accuracy of point of care ultrasound in undifferentiated hypotension presenting to the emergency department: a systematic review

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Introduction: Undifferentiated hypotension remains one of the most life-threatening presentations to emergency departments (ED) around the world. An accurate and rapid initial assessment is essential, as shock carries a high mortality with multiple unique etiologies and management plans. Point of care ultrasound (PoCUS) has emerged as a promising tool to improve these diagnostic and management challenges, yet its reliability in this setting remains unclear. **Methods:** We performed a systematic review of Medline, EMBASE, CINAHL, Cochrane, and clinicaltrials.gov databases from inception to June 8, 2018. Databases were reviewed by two independent researchers and all languages were included. The methodological quality of included studies were evaluated using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool. Our primary outcome was diagnostic accuracy of PoCUS in hypotension, with secondary outcomes including patient outcomes and changes to management. **Results:** Our literature search revealed 5345 articles after duplicates were removed, leaving 235 articles for full article review. Following full article review, 9 studies remained and were included in the systematic review. There were 2 randomized control trials, 6 prospective cohort trials, and 1 retrospective cohort trial. For our primary outcome of diagnostic accuracy, eight studies were included; we extracted Kappa values ranging from 0.70 to 0.971, pooled sensitivity ranging from 69% to 88%, and pooled specificity ranging from 88% to 96%. Four studies reported on management change including results reporting shorter time to disposition, change in diagnostic test ordering (18% to 31%), change in consultation (13.6%), change in admission location (12%) and change in management plan (25% to 40%). Only one study reported on patient outcomes, which revealed no survival or length of stay benefit. **Conclusion:** When assessing for the diagnostic accuracy of PoCUS in the setting of undifferentiated hypotension presenting to the emergency department, we found fair consistency between PoCUS and final diagnosis with high Kappa values, fair to good pooled sensitivities, and good to excellent specificities.

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 ≥ 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) ≤ 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 ≥ 1 cm 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