Introduction: An important challenge physicians face when treating acute heart failure (AHF) patients in the emergency department (ED) is deciding whether to admit or discharge, with or without early follow-up. The overall goal of our project was to improve care for AHF patients seen in the ED while avoiding unnecessary hospital admissions. The specific goal was to introduce hospital rapid referral clinics to ensure AHF patients were seen within 7 days of ED discharge. **Methods:** This prospective before-after study was conducted at two campuses of a large tertiary care hospital, including the EDs and specialty outpatient clinics. We enrolled AHF patients ≥50 years who presented to the ED with shortness of breath (<7 days). The 12-month before (control) period was separated from the 12-month after (intervention) period by a 3-month implementation period. Implementation included creation of rapid access AHF clinics staffed by cardiology and internal medicine, and development of referral procedures. There was extensive in-servicing of all ED staff. The primary outcome measure was hospital admission at the index visit or within 30 days. Secondary outcomes included mortality and actual access to rapid follow-up. We used segmented autoregression analysis of the monthly proportions to determine whether there was a change in admissions coinciding with the introduction of the intervention and estimated a sample size of 700 patients. **Results:** The patients in the before period (N = 355) and the after period (N = 374) were similar for age (77.8 vs. 78.1 years), arrival by ambulance (48.7% vs 51.1%), comorbidities, current medications, and need for non-invasive ventilation (10.4% vs. 6.7%). Comparing the before to the after periods, we observed a decrease in hospital admissions on index visit (from 57.7% to 42.0%; P <0.01), as well as all admissions within 30 days (from 65.1% to 53.5% (P < 0.01). The autoregression analysis, however, demonstrated a pre-existing trend to fewer admissions and could not attribute this to the intervention (P = 0.91). Attendance at a specialty clinic, amongst those discharged increased from 17.8% to 42.1% (P < 0.01) and the median days to clinic decreased from 13 to 6 days (P < 0.01). 30-day mortality did not change (4.5% vs. 4.0%; P = 0.76). **Conclusion:** Implementation of rapid-access dedicated AHF clinics led to considerably increased access to specialist care, much reduced follow-up times, and possible reduction in hospital admissions. Widespread use of this approach can improve AHF care in Canada.

Keywords: emergency department, heart failure, quality improvement

LO15

Paramedic and allied health professional interventions at long-term care facilities to reduce emergency department visits: systematic review

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Introduction: Emergency department (ED) crowding, long waits for care, and paramedic offload delay are of increasing concern. Older adults living in long-term care (LTC) are more likely to utilize the ED and are vulnerable to adverse events. We sought to identify existing programs that seek to avoid ED visits from LTC facilities where allied health professionals are the primary providers of the intervention and, to evaluate their efficacy and safety. **Methods:** We completed this systematic review based on a protocol we published apriori and following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement. We systematically searched Medline, CINAHL and EMBASE with terms relating to long-term care, emergency services, hospitalization and allied health personnel. Two investigators independently selected studies and extracted data using a piloted standardized form and evaluated the risk of bias of included studies. We report a narrative synthesis grouped by intervention categories. **Results:** We reviewed 11,176 abstracts and included 22 studies. Most studies were observational and few assessed patient safety. We found five categories of interventions including: 1) use of advanced practice nursing; 2) a program called Interventions to Reduce Acute Care Transfers (INTERACT); 3) end-of-life care; 4) condition specific interventions; and 5) use of extended care paramedics. Of the 13 studies that reported ED visits, all (100%) reported a decrease, and of the 16/17 that reported hospitalization, 94.1% reported a decrease. Patient adverse events such as functional status and relapse were seldom reported (6/22) as were measures of emergency system function such as crowding/inability of paramedics to transfer care to the ED (1/22). Only 4/22 studies evaluated patient mortality and 3/4 found a non-statistically significant worsening. When measured, studies reported decreased hospital length of stay, more time spent with patients by allied health professionals and cost savings. **Conclusion:** We found five types of programs/interventions which all demonstrated a decrease in ED visits or hospitalization. Many identified programs focused on improved primary care for patients. Interventions addressing acute care issues such as those provided by community paramedics, patient preferences, and quality of life indicators all deserve more study.

Keywords: community paramedic, long-term care, reducing emergency department visits

LO16

Predicting survival from out-of-hospital cardiac arrest

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Introduction: Prognostication is a significant challenge early in the post-cardiac arrest period. Common prognostic factors for neurological survival are unreliable (high false positive rates) until 72 hours post-cardiac arrest. It is not known whether there are a combination of factors that can be utilized earlier in the post-cardiac arrest period to accurately predict patient outcome. Our objective was to predict neurological outcome utilizing a novel combination of patient factors early in the post-cardiac arrest period. **Methods:** We conducted a retrospective cohort study using data from our local cardiac arrest registry. We included adult patients who obtained a return of spontaneous circulation (ROSC) after out-of-hospital cardiac arrest (OHCA). We excluded patients who did not survive for at least 24 hours post-ROSC and those who had a do not resuscitate (DNR) order within 2 hours of ROSC. We performed an ordinal regression analysis using the proportional odds model to predict neurological outcome (modified rankin score (mRS)). We included a good neurological outcome (mRS 0-2), poor neurological outcome (mRS 3-5), and dead (mRS 6) as an ordinal outcome. We included a number of patient demographics, intra- and post-cardiac arrest factors as covariates in our model. The predictive performance of our model was analyzed using receiver operating characteristic (ROC) curves for discrimination and Brier statistic for calibration. **Results:** We included 3448 patients in our analysis. We found that an initial shockable rhythm (odds ratio (OR) 4.1; 95% confidence interval (CI) 3.6, 5.4), the absence of pupillary reflexes (OR 3.5; 95% CI 2.4,4.8) and

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maximum motor score on the Glasgow Coma Scale (GCS) (OR 1.5; 95% CI 1.4,1.6) had the greatest association with improved neurologic outcome. Longer duration of resuscitation was associate with worse outcomes (OR 0.84, 95% CI 0.82,0.87). The overall performance of our model was excellent with an area under the ROC curve of 0.89 and a Brier statistic of 0.13. **Conclusion:** Our model predicted good neurological outcome with a high rate of accuracy, however external validation of the model is required. This model may be useful in providing initial risk stratification of patients in clinical practice and future research on post-cardiac arrest care.

Keywords: out-of-hospital cardiac arrest, post-cardiac arrest, prognostication

LO17

Major adverse cardiac events in patients ruled-out by a validated high-sensitivity troponin algorithm for acute myocardial infarction

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Introduction: Chest pain and symptoms of acute coronary syndrome are a leading cause of emergency department (ED) visits in Canada. Validated 2-hour high-sensitivity troponin algorithms can rapidly and accurately rule-in or rule-out myocardial infarction (MI) in most patients. The objective of this study was to quantify the incidence and timing of major adverse cardiac events (MACE: MI, death, or urgent revascularization) in the 30-days following the index ED encounter among patients who had MI ruled out using a 2-hour high-sensitivity troponin T (hs-cTnT) algorithm. We also sought to identify patient characteristics associated with very low risk of MACE. **Methods:** This was a secondary analysis of data prospectively collected from adult patients presenting with a primary complaint of chest pain or symptoms of ACS. This analysis focused on patients who had an MI ruled out using a validated 2-hour serial hs-cTnT diagnostic algorithm. Incidence of 30-day MACE was quantified. Sex-specific Kaplan-Meier curves were constructed to describe timing of MACE events after MI rule-out. Demographic and clinical variables of patients who did or did not have MACE were compared using simple bivariable analyses. **Results:** This analysis included 550 patients with serial 2h hs-cTnT testing. Of these, MI was ruled out in 344 (62.5% of patients), ruled in 67 (12.2%), and 139 (25.3%) had non-diagnostic hs-cTnT results. Among the 344 patients who had MI ruled out, 11 (3.2%) experienced a MACE in the 30 days following their index ED encounter. These included 10 (2.9%) unplanned revascularizations and 1 (0.3%) fatal MI. MACE occurred at a median of 5 days (range: 0-23 days) after the index ED encounter. Of the 11 patients experiencing MACE, 9 (81.8%) had a normal ECG at their index ED encounter. None of the 93 (27.0%) ruled-out patients under the age of 50 experienced a MACE in the follow-up period. Patients experiencing MACE were more likely to have a history of coronary disease and multiple vascular risk factors compared to those not experiencing MACE. **Conclusion:** The validated 2h hs-cTnT AMI algorithm ruled-out MI in a large proportion of patients. The 30-day MACE incidence after MI rule-out was 3%. Most MACE events were unplanned revascularizations. We determined that age < 50 was associated with event-free survival and may be of value in identifying patients who do not need additional cardiac testing after MI has been ruled out using high-sensitivity troponin testing.

Keywords: chest pain, high-sensitivity cardiac troponin, rapid rule-out algorithm

LO18

The state of the evidence for emergency medical services (EMS) care of prehospital hypoglycemia: an analysis of appraised research from the Prehospital Evidence-based Practice Program

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Introduction: The Prehospital Evidence-based Practice (PEP) program is an online, freely accessible, continuously updated repository of appraised EMS research evidence. This report is an analysis of published evidence for EMS interventions used to assess and treat patients suffering from hypoglycemia. **Methods:** PubMed was systematically searched in June 2019. One author screened titles, abstracts and full-texts for relevance. Trained appraisers reviewed full text articles, scored each on a three-point Level of Evidence (LOE) scale (based on study design and quality) and three-point Direction of Evidence (DOE) scale (supportive, neutral, or opposing findings for each intervention's primary outcome), abstracted the primary outcome, setting and assigned an outcome category (patient or process). Second party appraisal was conducted for all included studies. The level and direction of each intervention was plotted in an evidence matrix, based on appraisals. **Results:** Twenty-nine studies were included and appraised for seven interventions: 5 drugs (Dextrose 50% (D50), Dextrose 10% (D10), glucagon, oral glucose and thiamine), one assessment tool (point-of-care (POC) glucose testing) and one call disposition (treat-and-release). The most frequently reported study primary outcomes were related to: clinical improvement (n = 15, 51.7%), feasibility/safety (n = 8, 27.6%), and diagnostics (n = 6, 20.7%). The majority of outcomes were patient focused (n = 18, 62.0%). **Conclusion:** EMS interventions for treating hypoglycemia are informed by high-quality supportive evidence. Both D50 and D10 are supported by high-quality evidence; suggesting D10 may be an effective alternative to the standard D50. "Treat-and-release" practices for hypoglycemia are supported by moderate-quality evidence for the patient related outcomes of relapse, patient preference and complications. This body of evidence is high-quality, patient-focused and conducted in the prehospital setting thus generalizable paramedic practice.

Keywords: emergency medical services, hypoglycaemia, prehospital

LO19

AED on the fly: A drone delivery feasibility study for rural and remote out-of-hospital cardiac arrest

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Introduction: Time-to-treatment plays a pivotal role in survival from sudden cardiac arrest (SCA). Every minute delay in defibrillation results in a 7-10% reduction in survival. This is particularly problematic in rural and remote regions, where bystander and EMS response is often prolonged and automated external defibrillators (AED) are often not available. Our objective was to examine the feasibility of a novel AED drone delivery method for rural and remote SCA. A secondary objective was to compare times between AED drone delivery and ambulance response to various mock SCA resuscitations. **Methods:** We conducted 6 simulations in two different rural communities in southern Ontario. During phase 1 (4 simulations) a "mock" call was placed to 911 and a single AED drone and an ambulance were simultaneously dispatched from the same location to a pre-determined destination. Once on scene, trained first responders retrieved the AED