Plenary Oral Presentations

PL01
Creation of the Canadian Heart Failure Risk Scale for acute heart failure patients

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Introduction: Acute heart failure (AHF) is a common, serious condition that frequently results in morbidity and death and is a leading cause for hospital admissions. There is little evidence to guide ED physician disposition decisions for AHF patients. We sought to create a risk-stratification tool for use by ED physicians to determine which AHF patients are at high risk for poor outcomes. **Methods:** We conducted a prospective cohort study in 9 tertiary hospital EDs and enrolled adult patients presenting with shortness of breath due to AHF. Patients were assessed for standardized clinical and laboratory variables and then followed to determine short-term serious outcome (SSO), defined as death, intubation, myocardial infarction, or relapse requiring admission within 14 days. We identified predictors of SSO by stepwise logistic regression and then rounded beta coefficients to create a risk scale. **Results:** We enrolled 1,733 patients with mean age 77.1 years, male 54.5%, and initially admitted 50.1%. SSOs occurred in 202 (11.7%) cases (14.0% in those admitted and 9.3% in those discharged from the ED). We created the CHFRS consisting of:1. Initial Assessment a) History of valvular heart disease b) On anti-arrhythmic c) Arrival heart rate $\geq$ 110d) Treated with non-invasive ventilation2. Investigations a) Urea > 12 mmol/L or Cr > 150 µmol/L b) Serum CO2 > 35 mmol/L or pCO2 > 60 mmHg (VBG or ABG) c) Troponin $> 5x$ Upper Reference Level 3. Fails reassessment after ED treatment:(i) Resting vital signs abnormal, (SaO2 < 90% on room air or usual O2, or HR > 110, or RR > 28); OR(ii) Unable to complete 3-minute walk test. The risk of SSO varied from 5.0% for a score of 0, to 77.4% for a score of 9. Discrimination between SSO and no SSO cases was good with an area under the ROC curve of 0.70 (95% CI 0.66-0.74). There was good calibration between the observed and expected probability of SSO and internal validation showed the risk scores to be very accurate across 1,000 replications using the bootstrap method. **Conclusion:** We have created the CHFRS tool which consists of 8 simple variables and which estimates the short-term risk of SSOs in AHF patients. CHFRS should help improve and standardize admission practices, diminishing both unnecessary admissions for low-risk patients and unsafe discharge decisions for high-risk patients. This will ultimately lead to better safety for patients and more efficient use of hospital resources. **Keywords:** heart failure, risk stratification, patient safety

PL02
Derivation and validation of a feasible emergency department specific frailty index to predict adverse outcomes

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Introduction: Frailty is an overarching concept in geriatric medicine. However its utility in the emergency department (ED) was not well understood. Objectives were to derive and validate an ED specific frailty index (FI-ED), using a cumulative deficits model; and to evaluate its ability to predict adverse outcomes. **Methods:** This was a large multi-national prospective cohort study using data from: The Management of Older Persons in Emergency Departments (MOPED) and the interRAI study. The FI-ED was derived from the Canadian sample and validated in the multinational sample. Inclusion criteria were all patients ≥ 75 years old presenting to an ED. The FI-ED used 24 variables identified in the interRAI ED-Contact Assessment tool, a brief focussed geriatric assessment. Its ability to predict adverse outcomes were analysed by logistic regression with odds ratio (OR). **Results:** There were 3903 participants: 2153 in the derivation sample and 1750 in the validation sample. In the derivation sample, increasing FI-ED was significantly associated with admission (OR 1.43 [95% CI 1.34-1.52]), death in hospital (OR 1.55 [1.38-1.73]), prolonged hospital stay (OR 1.37 [1.22-1.54]), needs for Comprehensive Geriatric Assessment (OR 1.51 [1.41-1.60]) and discharge to long-term care (OR 1.30 [1.16-1.47]). In the validation sample, results were similar except for long-term care disposition (OR 0.84 [0.75 0.85]). **Conclusion:** The FI-ED conformed to characteristics previously reported in other geriatric populations. It was accurately derived and validated from a brief geriatric assessment feasible in the ED and can be used to predict adverse outcomes. **Keywords:** frailty, geriatric, emergency

PL03
Implementation of the Canadian C-Spine Rule by paramedics: a safety evaluation

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Introduction: The Canadian C-Spine Rule (CCR) was validated by emergency physicians and triage nurses to determine the need for radiography in alert and stable Emergency Department trauma patients. It was modified and validated for use by paramedics in 1,949 patients. The pre-hospital CCR calls for evaluation of active neck rotation if patients have none of 3 high-risk criteria and at least 1 of 4 low-risk criteria. This study evaluated the impact and safety of the implementation of the CCR by paramedics. **Methods:** This single-centre prospective cohort implementation study took place in Ottawa, Canada. Advanced and primary care paramedics received on-line and in-person training on the CCR, allowing them to use the CCR to evaluate eligible patients and selectively transport them without immobilization. We evaluated all consecutive eligible adult patients (GCS 15, stable vital signs) at risk for neck injury. Paramedics were required to complete a standardized study data form for each eligible patient evaluated. Study staff reviewed paramedic documentation and corresponding hospital records and diagnostic imaging reports. We followed all patients without initial radiologic evaluation for 30 days for referral to our spine service, or subsequent visit with radiologic evaluation. Analyses included sensitivity, specificity, kappa coefficient, t-test, and descriptive statistics with 95% CIs. **Results:** The 4,034 patients enrolled between Jan. 2011 and Aug. 2015 were: mean age 43 (range 16-99), female 53.3%, motor vehicle collision 51.9%, fall 23.8%, admitted to hospital 7.0%, acute c-spine injury 0.8%, and clinically important c-spine injury (0.3%). The CCR classified patients for 11 important injuries with sensitivity 91% (95% CI 58-100%), and specificity 67% (95% CI 65-68%). Kappa agreement for