visits among seniors are frequently instigated by a fall at home. Some of these patients develop intracranial hemorrhage (ICH) because of falling. There has been little research on the frequency of ICH in elderly patients who fall, and on which clinical factors are associated with ICH in these patients. The aim of this study was to identify the incidence of ICH, and the clinical features which are associated with ICH, in seniors who present to the ED having fallen. **Methods**: This was a prospective cohort study conducted in three EDs. Patients were included if they were age >65 years, and presented to the ED within 48 hours of a fall on level ground, off a bed/chair/toilet or down one step. Patients were excluded if they fell from a height, were knocked over by a vehicle or were assaulted. ED physicians recorded predefined clinical findings (yes/no) before any head imaging was done. Head imaging was done at the ED physician's discretion. All patients were followed for 6 weeks (both by telephone call and chart review at 6 weeks) for evidence of ICH. Associations between baseline clinical findings and the presence of ICH were assessed with multivariable logistic regression. **Results**: In total, 1753 patients were enrolled. The prevalence of ICH was 5.0% (88 patients), of whom 74 patients had ICH on the ED CT scan and 14 had ICH diagnosed during follow-up. 61% were female and the median age was 82 (interquartile range 75-88). History included hypertension in 76%, diabetes in 29%, dementia in 27%, stroke/TIA in 19%, major bleeding in 11% and chronic kidney disease in 11%. 35% were on antiplatelet therapy and 25% were on an anticoagulant. Only 4 clinical variables were independently associated with ICH: bruise/laceration on the head (odds ratio (OR): 4.3; 95% CI 2.7-7.0), new abnormalities on neurological examination (OR: 4.4; 2.4-8.1), chronic kidney disease (OR: 2.4; 1.3-4.6) and reduced GCS from baseline (OR: 1.9; 1.0-3.4). Neither anticoagulation (OR: 0.9; 0.5-1.6) nor antiplatelet use (OR: 1.1; 0.6-1.8) appeared to be associated with ICH. **Conclusion**: This prospective study found a prevalence of ICH of 5.0% in seniors after a fall, and that bruising on the head, abnormal neurological examination, abnormal GCS and chronic kidney disease were predictive of ICH.
Keywords: intracranial hemorrhage, predictors, seniors

PL04

Comparison of the cost and the quality of the care provided to low acuity patients in an emergency department and a walk-in clinic

S. Berthelot, MD, MSc, M. Mallet, MA, D. Simonyan, MSc, J. Guertin, PhD, L. Moore, PhD, C. Boilard, BSc, J. Boulet, BSc, C. Fortier, BSc, P. Olivier, BSc, B. Huard, BSc, K. Vachon, BSc, A. Lesage, BSc, É. Lévesque, BSc, A. Mokhtari, BSc, L. Baril, MD, O. Yip, BSc, M. Bouchard, BSc, M. Létourneau, BA, A. Pineault, BA, M. Lafrenière, MD, S. Blais, MBA, Université Laval, Québec, QC

Introduction: Low acuity patients have been controversially tagged as a source of emergency department (ED) misuse. Authorities for many Canadian health regions have set up policies so these patients preferably present to walk-in clinics (WIC). We compared the cost and quality of the care given to low acuity patients in an academic ED and a WIC of Québec City during fiscal year 2015-16. **Methods**: We conducted an ambidirectional (prospective and retrospective) cohort study using a time-driven activity-based costing method. This method uses duration of care processes (e.g., triage) to allocate to patient care all direct costs (e.g., personnel, consumables), overheads (e.g., building maintenance) and physician charges. We included consecutive adult patients, ambulatory at all time and discharged from the ED or WIC with a diagnosis of upper respiratory tract infection (URTI), urinary tract infection (UTI) or low back pain. Mean cost [95%CI] per patient per condition was compared between settings after risk-adjustment for age, sex, vital signs, number of regular medications and co-morbidities using generalized log-gamma regression models. Proportions [95% CI] of antibiotic prescription and chest X-Ray use in URTI, compliance with provincial guidelines on use of antibiotics in UTI, and column X-Ray use in low back pain were compared between settings using a Pearson Chi-Square test. **Results**: A total of 409 patients were included. ED and WIC groups were similar in terms of age, sex and vital signs on presentation, but ED patients had a greater burden of comorbidities. Adjusted mean cost (2016 CAN$) of care was significantly higher in the ED than in the WIC ($p < 0.0001$) for URTI (78.42[64.85-94.82] vs. 59.43[50.43-70.06]), UTI (78.88 [69.53-89.48] vs. 53.29[43.68-65.03]), and low back pain (87.97 [68.30-113.32] vs. 61.71[47.90-79.51]). For URTI, antibiotics were more frequently prescribed in the WIC (44.1%[34.3-54.3] vs. 5.8% [1.2-16.0]; $p < 0.0001$) and chest X-Rays, more frequently used in the ED (26.9%[15.6-41.0] vs. 13.7%[7.7-22.0]; $p = 0.05$). No significant differences were observed in the compliance with guidelines on use of antibiotics in UTI and in the use of column X-Ray in low back pain. **Conclusion**: Total cost of care for low acuity patients is lower in walk-in clinics than in EDs. However, our results suggest that quality-of-care issues should be considered in determining the best alternate setting for treating ambulatory emergency patients.
Keywords: healthcare costs, low-acuity patients, quality of healthcare

Oral Presentations

LO01

Development and validation of an adjustment score for ruling out MI using a single high-sensitivity cardiac troponin T assay in patients with chest pain and kidney dysfunction

A. McRae, MD, PhD, S. Vatanpour, PhD, J. Ma, MSc, E. Lang, MD, J. Andruchow, MD, MSc, G. Innes, MD, MSc, M. James, MD, PhD, A. Worster, MD, MSc, P. Kavsak, PhD, University of Calgary, Calgary, AB

Introduction: Very low concentrations of high-sensitivity cardiac troponin can rule-out myocardial infarction (MI) at ED arrival in patients with chest pain. However, this single troponin rule-out strategy works poorly in patients with renal impairment and elevated baseline troponin levels. The objective of this study was to develop and validate a troponin adjustment strategy to accurately rule-out MI with a single hs-cTnTmeasurement in patients with kidney dysfunction. **Methods**: We used data from three cohorts of ED chest pain patients to develop an adjustment score for a high-sensitivity troponin T (hs-cTnT) assay in patients with kidney dysfunction. The derivation cohort (n = 8846) used administrative and registry data. Two validation cohorts (n = 1187 and 1092) were prospectively-collected. The score assigned points for increasing hs-cTnT levels and subtracted points for lower estimated glomerular filtration rate (eGFR). In the derivation cohort, hs-cTnT concentrations achieving 98.5% sensitivity in of patients with eGFR ≥60, 45-59, 30-44, 15-29 and <15 were assigned ascending positive integer values. Negative integer values were assigned to eGFR values 45-59, 30-44, 15-29 and <15. The scpres for troponin and eGFR were summed for each patient, with scores ranging from −4 to +5. The proportion of patients with 7-day MI ruled out by a score ≤0, sensitivity, NPV, negative likelihood ratio (LR-) and area under the curve (AUC) were quantified

https://doi.org/10.1017/cem.2019.44 Published online by Cambridge University Press

in each study cohort. **Results**: The derivation and validation cohorts had 7-day MI rates of 5.7, 8.6 and 9.1%. In the derivation cohort, a score ≤0 ruled out MI in 35% of patients, with a sensitivity for 7-day MI of 99.5% (95% CI 98-100), NPV of 99.9% (95% CI 98.4-99.9), LR- of 0.02 (95% CI 0.01-0.05) and AUC of 0.88. In the first validation cohort, a score ≤0 ruled out MI in 45% of patients, with a sensitivity for 7-day MI of 97% (95% CI 90-100%), NPV of 99% (95% CI 98-100%), LR- 0.06 (0.02-0.18) and AUC of 0.89. In the second validation cohort, a score ≤0 ruled out MI in 20% of patients, with a sensitivity for 7-day MI of 96% (95% CI 93-99%), NPV of 98% (95% CI 96-100%), LR- of 0.16 (95% CI 0.07-0.39) and AUC of 0.78. **Conclusion**: We developed and validated a simple scoring system to adjust hs-cTnT concentrations for a patient's kidney function that enables MI to be ruled out in a large proportion of chest pain patients using a single measurement on ED presentation.
Keywords: kidney disease, myocardial infarction, troponin

LO02
Development of the HEARTRISK6 Scale for emergency department patients with acute heart failure

I. Stiell, MD, MSc, A. McRae, MD, PhD, B. Rowe, MD, MSc, J. Dreyer, MD, L. Mielniczuk, MD, B. Borgundvaag, MD, PhD, J. Yan, BSc, MD, MSc, S. Sibley, MD, M. Nemnom, MSc, C. Clement, J. Brinkhurst, C. Sheehan, BA, J. Perry, MD, MSc, M. Taljaard, PhD, University of Ottawa, Department of Emergency Medicine, Ottawa, ON

Introduction: We previously derived (N = 559) and validated (N = 1,100) the 10-item Ottawa Heart Failure Risk Scale (OHFRS), to assist with disposition decisions for patients with acute heart failure (AHF) in the emergency department (ED). In the current study we sought to use a larger dataset to develop a more concise and more accurate risk scale. **Methods**: We analyzed data from the prior two studies and from a new cohort. For all 3 groups we conducted prospective cohort studies that enrolled patients who required treatment for AHF at 8 tertiary care hospital EDs. Patients were followed for 30 days. The primary outcome was short-term serious outcome (SSO), defined as death within 30 days, intubation or non-invasive ventilation (NIV) after admission, myocardial infarction, or relapse resulting in hospital admission within 14 days. The fully pre-specified logistic regression model with 13 predictors (where age, pCO2, and SaO2 were modeled using spline functions) was fitted to 10 multiple imputation datasets. Harrell's fast stepdown procedure reduced the number of variables. We calculated the potential impact on sensitivity (95% CI) for SSO and hospital admissions, and estimated a sample size of 2,000 patients. **Results**: The 1,986 patients had mean age 77.3 years, male 54.1%, EMS arrival 41.2%, IV NTG 3.3%, ED NIV 5.4%, admission on initial visit 49.5%. Overall there were 236 (11.9%) SSOs including 61 deaths (3.1%), meaning that current admission practice sensitivity for SSO was only 59.7%. The final HEARTRISK6 scale is comprised of 6 variables (points) (C-statistic 0.68): Valvular heart disease (2) Antiarrhythmic medication (2) ED non-invasive ventilation (3) Creatinine 80–150 (1); ≥150 (3) Troponin ≥3x URL (2) Walk test failed (1). The probability of SSO ranged from 4.8% for a total score of 0 to 62.4% for a score of 10, showing good calibration. Choosing a HEARTRISK6 total point admission threshold of ≥3 would yield sensitivity of 70.8% (95%CI 64.5-76.5) for SSO with a slight decrease in admissions to 47.9%. Choosing a threshold of ≥2 would yield a sensitivity of 84.3% (95%CI 79.0-88.7) but require 66.6% admissions. **Conclusion**: Using a large prospectively collected dataset, we created a more concise and more sensitive risk scale to assist with admission decisions for patients with AHF in the ED. Implementation of the HEARTRISK6 scale should lead to safer and more efficient disposition decisions, with more high-risk patients being admitted and more low-risk patients being discharged.
Keywords: heart failure, risk scale, safety

LO03
Validation of The Ottawa Troponin Pathway

B. Lam, BSc, J. Li, BSc, M. Mukarram, MPH, MBBS, M. Nemnom, MSc, R. Booth, BSc, MSc, PhD, V. Thiruganasambandamoorthy, MSc, MBBS, University of Ottawa, Department of Emergency Medicine, Ottawa, ON

Introduction: Our team developed "The Ottawa Troponin Pathway" (OTP) for Non-ST Elevation Myocardial Infarction (NSTEMI) diagnosis using serial conventional troponin (cTnI) 3 hours apart to aid in safe and early disposition of ED patients. The primary objective of this study is to validate the diagnostic accuracy of the OTP in the cohort of patients with cTnI values above the 99th percentile (>45ng/L). **Methods**: This study is a health records review conducted at the Civic and General Campuses of The Ottawa Hospital from August 2017 to December 2017. Adults (≥18 years) who presented to the ED with symptoms of ACS, and who had serial cTnI (at least two values 3 hours ±15 minutes apart) performed for diagnosis of NSTEMI and at least one cTnI value >45ng/L were included. Patients with cardiac arrest, STEMI, unstable angina or those with TnI values ≤45ng/L were excluded. The outcomes were death due to unknown cause or NSTEMI adjudicated by two blinded investigators within 30 days. Data collected include baseline characteristics, ED management, length of stay, cTnI values and times of measurement, disposition, and outcome. We used descriptive statistics and test diagnostic characteristics to analyze our data. **Results**: We screened 53,077 patients, of whom 635 patients were included in the study (mean age 71.6 years; 57.6% males; 59.7% hospitalized; median ED length of stay 4.7 hours.). 107 patients (16.9%; 95%CI 14.1%-20.0%) were diagnosed with NSTEMI within 30 days. Among patients with TNI values above the 99th percentile, the OTP did not miss any patients diagnosed with NSTEMI. The sensitivity and the specificity of the OTP were 100% (95%CI 96.6%-100%) and 32.2% (95%CI 28.2%-36.4%) respectively. **Conclusion**: Our results show that the OTP is diagnostically accurate in ruling out NSTEMI among patients with cTNI values above the 99th percentile with symptoms concerning for ACS. Using the OTP will allow for early referral to consulting services for management, safe and early discharge home, and improve ED crowding.
Keywords: chest pain, non-ST elevated myocardial infarction (NSTEMI), troponin

LO04
Canadian best practice diagnostic algorithm for acute aortic syndrome

R. Ohle, MBChB, MSc, S. McIsaac, MBChB, MEd, J. Yan, MD, MSc, K. Yadav, MD, MSc, P. Jetty, MD, R. Atoui, MD, N. Fortino, MD, B. Wilson, MD, N. Coffey, MD, T. Scott, BN, A. Cournoyer, MD, F. Rubens, MD, D. Savage, MD, PhD, D. Ansell, MD, J. Middaugh, MD, A. Gupta, MD, B. Bittira, MD, Y. Callaway, MD, S. Bignucolo, MD, B. Mc Ardle, MD, E. Lang, MD, Health Science North, Sudbury, ON

Introduction: Acute aortic syndrome (AAS) is a time sensitive aortic catastrophe that is often misdiagnosed. There are currently no

https://doi.org/10.1017/cem.2019.44 Published online by Cambridge University Press