identified patients at low risk of 30-day AMI. Sensitivity for MACE was lower, reminding us that while biomarker-only rapid diagnostic algorithms excel at ruling out AMI, careful clinical risk stratification is needed to avoid missed MACE events.
Keywords: high-sensitivity troponin, myocardial infarction, rapid diagnostic algorithm

LO60

Diagnostic utility of creatine kinase in the diagnosis and management of non-ST elevation myocardial infarction

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Introduction: Creatine kinase (CK) measurement, despite not being recommended for the diagnosis of a Non-ST Elevation Myocardial Infarction (NSTEMI) is still routinely performed in the emergency department (ED) for the workup of NSTEMI. The diagnostic utility of CK among ED patients with suspected NSTEMI is still not well understood. The objectives of this study were to assess: the additional value of CK in NSTEMI diagnosis and the correlation between the highest CK/TNI values and ejection fraction (EF) on follow-up echocardiography among patients with suspected NSTEMI. **Methods:** This was a prospective cohort study conducted at the Civic and General Campuses of The Ottawa Hospital from March 2014 to March 2016. We enrolled adults (18 years) for whom troponin (TNI) and CK were ordered for chest pain or non-chest pain symptoms within the past 24 hours concerning for NSTEMI and excluded those with suspected ST-Elevation Myocardial Infarction (STEMI). Primary outcome was a 30-day NSTEMI adjudicated by two blinded physicians. Demographics, medical history, and ED CK/TNI values were collected. We used descriptive statistics and report test diagnostic characteristics. **Results:** Of the 1,663 patients enrolled, 84 patients (5.1%) suffered NSTEMI. The sensitivity and specificity of CK was 30.9% (95% CI 21.1, 40.8) and 91.4% (95% CI 90.0, 92.8) respectively. The sensitivity and specificity of troponin was 96.4% (95% CI 92.4, 100) and 88.1% (95% CI 86.5, 89.7) respectively. Among 3 (0.2%) patients with missed NSTEMI diagnosis with TNI, CK measurements did not add value. The mean CK values were not significantly different between those with normal and abnormal EF on follow-up (132.4 U/L and 146.3 U/L respectively; $p = 0.44$), whereas the mean TNI values were significantly different (0.5 µg/L and 1.3 µg/L respectively; $p = 0.046$). **Conclusion:** CK measurements neither provide any additional value in the work-up of NSTEMI in the ED nor correlate with EF on follow-up. Discontinuing routine CK measurements would reduce overall costs and improve resource utilization in the ED, and streamline the management of patients in the ED with chest pain.
Keywords: chest pain, creatine kinase, non-ST elevated myocardial infarction

LO61

Test characteristics of high sensitivity troponin T performed at emergency department arrival for acute myocardial infarction in patients with reduced kidney function

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Introduction: Patients with chronic kidney disease (CKD) are at high risk of cardiovascular events, and have worse outcomes following acute myocardial infarction (AMI). Cardiac troponin is often elevated in CKD, making the diagnosis of AMI challenging in this population. We sought to quantify test characteristics for AMI of a high-sensitivity troponin T (hsTnT) assay performed at emergency department (ED) arrival in CKD patients with chest pain, and to derive rule-out cutoffs specific to patient subgroups stratified by estimated glomerular filtration rate (eGFR). We also quantified the sensitivity and classification performance of the assays limit of detection (5 ng/L) and the FDA-approved limit of quantitation (6 ng/L) for ruling out AMI at ED arrival. **Methods:** Consecutive patients in four urban EDs from the 2013 calendar year with suspected cardiac chest pain who had a Roche Elecsys hsTnT assay performed on arrival were included f. This analysis was restricted to patients with an eGFR <60 ml/min/1.73m2. The primary outcome was 7-day AMI. Secondary outcomes included major adverse cardiac events (death, AMI and revascularization). Test characteristics were calculated and ROC curves were generated for eGFR subgroups. **Results:** 1416 patients were included. 7-day AMI incidence was 10.1%. 73% of patients had an initial hsTnT concentration greater than the assays 99th percentile (14 ng/L). TCurrently accepted cutoffs to rule out MI at ED arrival (5 ng/L and 6 ng/L) had 100% sensitivity for AMI, but no patients with an eGFR less than 30 ml/min/1.73M had hsTnT concentrations below these thresholds. We derived eGFR-adjusted cutoffs to rule out MI with sensitivity >98% at ED arrival, which were able to rule out 6-42% of patients, depending on eGFR category. The proportion of patients able to be accurately ruled-in with a single hsTnT assay was substantially lower among patients with an eGFR <30 ml/min/1.73m2 (6-20% vs. 25-43%). We also derived eGFR-adjusted cutoffs to rule-in AMI with specificity >90%, which accurately ruled-in up to 18% of patients. **Conclusion:** Cutoffs achieving acceptable diagnostic performance for AMI using single hsTnT sampling on ED arrival may have limited clinical utility, particularly among patients with very low eGFR. The ideal diagnostic strategy for AMI in patients with CKD likely involves serial high-sensitivity troponin testing with diagnostic thresholds customized to different eGFR categories.
Keywords: myocardial infarction, troponin, kidney disease

LO62

Variability in triage performance for chest pain patients in two Canadian cities

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Introduction: CTAS triage acuity determinations are used to prioritize patients, describe illness acuity, and compare casemix across institutions. The latter functions assume reliable application in diverse settings, but no studies have evaluated this using actual triage data. **Methods:** This administrative database study included all patients with a triage complaint of chest pain (CP) in Vancouver (2012-16) and Calgary (2016). We stratified patients into high vs. non-high severity groups based on discharge diagnoses. High severity diagnoses included all patients with aortic pathology, ACS, shock or arrest states, as well as patients requiring admission because of pulmonary embolism, dysrhythmias, CHF, neurologic or respiratory conditions. We dichotomized patient triage assignments to high (CTAS 1,2) vs. low (3,4,5) acuity, then constructed 2x2 tables correlating CTAS acuity with disease severity. Main outcomes included the proportion of CP patients triaged to high acuity categories and CTAS sensitivity for high severity conditions. **Results:** We studied 97,277 Vancouver and 18,622 Calgary patients. Age (mean, 54.8 years), sex (53.5% male) and casemix

distributions were similar between cities, although Calgary had more high severity conditions (15.0% v. 10.5%) and a higher admission rate (22.5% v. 21.4%). Calgary triage nurses placed more patients in high acuity triage categories (85.1% vs. 45.2%) and achieved higher sensitivity for severe illness (96.2% vs. 76.2%); however, they were less accurate (28.7% vs. 60.3%) and less specific (16.8% vs. 58.4%). The proportion of CP patients triaged into high acuity categories ranged from 79% to 87% across four Calgary hospitals and from 28% to 62% at five Vancouver hospitals. **Conclusion:** This study shows profoundly different triage categorization at different sites seeing similar patient populations. Triage nurses are taught to strive for high sensitivity, but there may be operational consequences if specificity drops too low and large numbers of non-severe patients are triaged into high acuity categories. It is not clear which approach is better but these data suggest CTAS should not be used to compare patient acuity or complexity across different hospitals or regions.

Keywords: quality improvement and patient safety, Canadian Triage and Acuity Scale, chest pain

LO63

Decision fatigue in the emergency department: how does emergency physician decision making change over an eight-hour shift?

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Introduction: Decision fatigue is a well-characterized phenomenon that has rarely been studied in the medical field. Emergency department (ED) physicians make many clinical decisions every shift. In this study, we examined ED physician decisions in computed tomography (CT) ordering, consultations, and discharges over time in an eight-hour shift. **Methods:** We performed a cohort study of adult patients presenting to two EDs of an academic, tertiary care hospital over a two-year period using the hospital administrative database. Patients triaged to the Urgent Care (minor acuity) area of the ED were excluded. Patients were analyzed based on the hour of the shift that they were initially assessed by an ED physician. For each hour, we evaluated the proportion of patients who had CTs, consultations, discharges, consultations not resulting in admission, returns within 72 hours of discharge, and median ED length of stay (LOS). Patients under the care of more than one ED physician (i.e. handovers) were analyzed as the time seen by the initial physician. Statistical significance of outcomes over time was assessed using random effects logistic regression. **Results:** 87,752 patients were included in the study period. 42,146 patients (48.0%) received consultations, of which, 29,347 (69.6%) were admitted. 45,470 patients (51.8%) were discharged without consultation, of which, 4102 (9.0%) returned within 72 hours. The median ED LOS for all non-consulted discharged patients was 4.9 hours. There was a statistically significant decline in the hourly rates of CT head and CT abdomen ordering as the shift progressed. CT head ordering declined significantly from 15.8% in the first hour to 12.2% in the last hour ($p < 0.0001$) while CT abdomen declined significantly from 9.6% to 7.6% ($p < 0.0001$). There were no significant differences in the hourly rates of consultations, consultations not resulting in admission, discharges, discharges returning within 72 hours, or ED LOS. **Conclusion:** ED physician decisions about patient disposition did not change in relation to hours into the shift. Interestingly, the rates of CT head and CT abdomen declined as the shift progressed. The lower CT ordering rates do not seem to be associated with any differences in patient disposition or ED LOS. In this large patient sample, we did not find evidence of decision fatigue among ED physicians.

Keywords: decision fatigue, computed tomography ordering

LO64

Variation in Alberta emergency department patient populations

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Introduction: Increasing pressures on the health care system, particularly in emergency departments (EDs), make it critical to understand changing ED case-mix, patient demographics and care needs, and resource utilization. Our objective is to assess Alberta (AB) ED volumes, utilization and case mix, stratified by ED type. This knowledge will help identify opportunities for system change and quality improvement. **Methods:** Data from Alberta Health Services administrative databases, including the National Ambulatory Care Reporting System, ED Admission/Discharge/Transfer data, and Comprehensive Ambulatory Care Classification System codes, were linked for all ED visits from 2010-17. Data were stratified by seven facility categories: tertiary referral (TR), regional referral (RR), community $< 5{,}000$ inpatient discharges (CL), community > 600 inpatient discharges (CM), community < 600 inpatient discharges (CS), community ambulatory care (CA), and free-standing EDs (FS). **Results:** We analyzed 11,327,258 adult patient visits: 13% at TR, 34 % at RR, 24% at CL, 16% at CM, 9% at CS, 1% at CA, and 3% at FS sites. Acuity was highest at TR and RR hospitals, with 76%, 63%, 25%, 26%, 22%, 12% and 55% of patients falling into CTAS levels 1-3, for TR, RR, CL, CM, CS, CA, and FS respectively. Admission rates were highest at TR and RR hospitals, (23%, 13%, 5%, 5%, 4%, 0% and 0%), as were left without being seen rates, (5%, 4%, 1%, 2%, 1%, 0% and 5%). The most common ICD-10 diagnoses were chest pain/abdominal pain in TR and RR centres, and IV (antibiotic) therapy in all levels of community and FS EDs. **Conclusion:** Acuity and case-mix are highly variable across ED categories. Acuity, admission rates and LWBS rates are highest in TR and RR centres. Administrative data can reveal opportunities for health system re-engineering, e.g. potentially avoidable IV antibiotic visits. Further investigation will clarify the type of ED care provided, variability in resource utilization by case-mix, and allocation, and will help identify the optimal metrics to describe ED case-mix.

Keywords: case-mix, emergency department, triage

LO65

Safety and satisfaction of a new program redirecting low-acuity emergency department patients to medical clinic: a prospective cohort study

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Introduction: Overcrowding in emergency departments (EDs) is a constant problem. One of the major factors contributing to this situation is the inappropriate ED use by patients with low-acuity problems. In order to reduce overuse, EDs have developed agreements with clinics to reorient low-acuity ambulatory patients toward them. These agreements often leave the burden of decision on the triage personnel as to which patients can be safely redirected. The aim of this study was to evaluate the safety of redirecting patients to nearby medical clinics and to evaluate their satisfaction with this program. **Methods:** In the ED of a tertiary care facility, a computer-based algorithm allowing triage personnel to reorient patients presenting with one of 52 medical complaints, was implemented in 2016. Our prospective cohort study was composed

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