

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

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

B. Lam, BScH, H. Chaudry, MBBS, S. Kim, BScH, M. Nemnom, MSc, I. G. Stiell, MD, MSc, G. Hebert, MD, M. Taljaard, PhD, R. Beanlands, MD, G. A. Wells, PhD, R. Booth, BSc, MSc PhD, M. Mukarram, MBBS, V. Thiruganasambandamoorthy, MD, MSc, University of Ottawa, Ottawa, ON

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

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

A. D. McRae, MD, PhD, S. Vatanpour, PhD, J. Ji, PhD, H. Yang, MSc, D. Southern, MSc, D. Wang, MSc, I. Seiden-Long, PhD, L. DeKoning, PhD, M. Graham, MD, MSc, E. S. Lang, MDCM, G. Innes, MD, MSc, J. E. Andruchow, MD, MSc, P. Kavsak, PhD, M. James, MD, PhD, University of Calgary, Calgary, AB

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. 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). Currently 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/1.73m² 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

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

S. Stackhouse, BSc, G. Innes, MD, MHSc, E. Grafstein, MD, Vancouver Coastal Health, Vancouver, BC

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