**LO55**

**Role of n-terminal pro brain natriuretic peptide (NT Pro-BNP) in emergency department syncope risk stratification: a multicenter study**

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**Introduction:** Two published studies reported natriuretic peptides can aid in risk-stratification of Emergency Department (ED) syncope. We sought to assess the role of N-Terminal pro Brain Natriuretic Peptide (NT pro-BNP) to identify syncope patients at risk for serious adverse events (SAE) within 30 days of the ED visit, and its value above that of the Canadian Syncope Risk Score (CSRS). **Methods:** We conducted a multicenter prospective cohort study at 6 large Canadian EDs from Nov 2011 to Feb 2015. We enrolled adults who presented within 24-hours of syncope and excluded those with persistent altered mentation, obvious seizure, and intoxication. We collected patient characteristics, nine CSRS predictors (includes troponin), ED management and NT pro-BNP levels. Adjudicated serious adverse events (SAE) included death, cardiac SAE (arrhythmias, myocardial infarction, serious structural heart disease) and non-cardiac SAE (pulmonary embolism, severe hemorrhage and procedural interventions within 30-days). We used two tailed t-test and logistic regression analysis. **Results:** Of the 1359 patients (mean age 57.2 years, 54.7% females, 13.3% hospitalized) enrolled, 148 patients (10.9%; 0.7% deaths, 7.9% cardiac SAE including 6.1% arrhythmia) suffered SAE within 30-days. The mean NT pro-BNP values, when compared to the patients with no SAE (499.8ng/L) was significantly higher among the 56 patients who suffered SAE after ED disposition (3147ng/L, $p = 0.001$), and among the 35 patients with cardiac SAE after ED disposition (2016.2ng/L, $p = 0.02$). While there was a trend to higher levels among patients who suffered arrhythmia after the ED visit, it was not statistically significant (1776.4ng/L, $p = 0.07$). In a model with CSRS predictors, the adjusted odds ratio for NT pro-BNP was 8.0 (95% CI 1.8, 35.9) and troponin was 3.8 (95% CI 1.7, 8.8). The addition of NT pro-BNP did not significantly improve the classification performance ($p = 0.76$) with areas under the curves for CSRS was 0.91 (95% CI 0.88, 0.95) and CSRS with NT pro-BNP was 0.92 (95% CI 0.88, 0.95). **Conclusion:** In this multicenter study, mean NT pro-BNP levels were significantly higher among ED syncope patients who suffered SAE including cardiac SAE after ED disposition. Though NT pro-BNP was a significant independent predictor of SAE after ED disposition, it did not improve accuracy in ED syncope risk-stratification when compared to CSRS. Hence, we do not recommend NT pro-BNP measurement for ED syncope management.

**Keywords:** syncope, risk stratification, n-terminal pro brain natriuretic peptide

**LO56**

**External validation of a 1-hour rapid diagnostic algorithm for ruling out acute myocardial infarction in emergency department patients with chest pain using a high-sensitivity troponin-T assay**

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**Introduction:** Ruling out acute myocardial infarction (AMI) using serial troponin testing is central to the care of many emergency department (ED) patients with chest pain. While diagnostic strategies using conventional troponin assays require repeat sampling over many hours to avoid missed diagnoses, serial high-sensitivity troponin (hs-cTn) assays may be able to exclude AMI in most patients within 1 or 2 hours. However, many of the initial studies deriving and validating these rapid diagnostic algorithms had all hs-cTn samples analyzed in a central core lab likely representing optimal assay performance. This objective of this study is to validate a 1-hour rapid diagnostic algorithm to exclude AMI in ED chest pain patients using an hs-cTn assay in real world practice. **Methods:** This prospective cohort study was conducted at a single urban tertiary center and regional percutaneous coronary intervention site in Calgary, Alberta. Patients were eligible for enrolment if they presented to the ED with chest pain, were 25-years or older and required biomarker testing to rule out AMI at the discretion of the attending emergency physician. Patients were excluded if they had clear acute ischemic ECG changes, new arrhythmia or renal failure requiring hemodialysis. A high-sensitivity troponin result (Roche Elecsys hs-cTnT) was obtained in all patients at ED presentation and 1-hour later. The primary outcome was AMI on the index visit. Secondary outcomes included 30-day AMI and 30-day major adverse cardiac events (MACE - including AMI, revascularization or cardiac death). Electronic medical records were reviewed and telephone follow-up was obtained for all patients at 30-days to ensure relevant events were captured. Two physician adjudication (board-certified emergency physician and cardiologist) was obtained for all outcomes. The study was REB approved. **Results:** A total of 350 patients were enrolled from August 2014 September 2016 with 1-hour serial hs-cTnT results, of which 219 (62.6%) met the 1-hour rapid diagnostic algorithm low risk criteria (time 0h hs-cTnT <12ng/L and delta 1h <3ng/L). The sensitivity of the 1-hour low risk criteria for index AMI was 97.2% (95% CI 85.5%-99.9%) and for 30-day AMI was 97.3% (95% CI 85.8-99.9%). The sensitivity of the low risk criteria for 30-day MACE was lower 80.9% (95% CI 66.7-90.9%) but maintained a high negative predictive value, 95.9% (95% CI 92.3-98.1%). **Conclusion:** A 1-hour rapid diagnostic algorithm using an hs-cTnT assay was highly sensitive for AMI on the index visit and successfully identified patients at low risk of 30-day AMI; however, sensitivity for 30-day MACE was much lower. Of note, the 1-hour algorithm appears to be less sensitive for both AMI and 30-day MACE than a 2-hour algorithm validated in the same population.

**Keywords:** high-sensitivity troponin, myocardial infarction, rapid diagnostic algorithm

**LO57**

**Very low concentrations of high-sensitivity troponin T at presentation can rapidly exclude acute myocardial infarction in a significant proportion of ED chest pain patients**

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**Introduction:** Chest pain is one of the most common presenting complaints to emergency departments (EDs) across the world, and the exclusion of acute myocardial infarction (AMI) using troponin testing is central to the care of many of these patients. While testing strategies using conventional troponin assays require repeat testing over many hours to avoid missed diagnoses, high-sensitivity troponin (hs-cTn) assays may be able to exclude AMI in a large proportion of patients with a single result at presentation. This objective of this study is to validate the ability of very low concentrations of hs-cTn at presentation to exclude AMI in ED chest pain patients. **Methods:** This prospective cohort study was conducted at a single urban tertiary center and regional



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percutaneous coronary intervention site in Calgary, Alberta. Patients were eligible for enrolment if they presented to the ED with chest pain, were 25-years or older and required biomarker testing to rule out AMI at the discretion of the attending emergency physician. Patients were excluded if they had clear acute ischemic ECG changes, new arrhythmia or renal failure requiring hemodialysis. A high-sensitivity troponin result (Roche Elecsys hs-cTnT) was obtained in all patients at presentation. The primary outcome was AMI on the index visit. Secondary outcomes included 30-day AMI and major adverse cardiac events (MACE - including AMI, revascularization or cardiac death). Electronic medical records were reviewed and telephone follow-up was obtained for all patients at 30-days to ensure relevant events were captured. Two physician adjudication (board-certified emergency physician and cardiologist) was obtained for all outcomes. This study was REB approved. **Results:** A total of 1,167 patients were enrolled from August 2014 September 2016, of which 191 (16.3%) patients had an initial troponin below the limit of blank (LoB, <3 ng/L) and 416 (32.8%) were below the limit of detection (LoD, <5 ng/L). The sensitivity of a single troponin below the LoB (<3 ng/L) for index AMI was 100% (95% CI 96.2%-100%) and for 30-day AMI was 100% (95% CI 96.4-100%). The sensitivity of a troponin below the LoD (<5 ng/L) for index AMI was 97.9% (95% CI 92.7%-99.8%) and for 30-day AMI was 98.0% (95% CI 93.0-99.8%). Sensitivity for 30-day MACE at both cutoffs was lower: 98.4% (95% CI 94.3-99.8%) for <3 ng/L, and 94.4% (95% CI 88.8-97.7%) for <5 ng/L, respectively; however, negative predictive values remained high at both cutoffs: <3 ng/L, 99.0% (95% CI 96.3-99.9%) and <5 ng/L, 98.3% (95% CI 96.6-99.3%). **Conclusion:** A high sensitivity troponin T result below the LoB (<3 ng/L) is highly sensitive for excluding AMI and identifies patients at low risk of 30-day MACE. A result below the LoB (<5 ng/L) will identify a larger population of patients as low risk but has a greater risk of missed AMI and MACE.
**Keywords:** high-sensitivity troponin, acute myocardial infarction, chest pain

## LO58

### Long-term outcomes among emergency department syncope patients: a systematic review

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**Introduction:** Approximately 50% of patients discharged from the Emergency Department (ED) after syncope have no cause found. Long-term outcomes among syncope patients are not well studied, to guide physicians regarding outpatient testing and follow-up. The objective of this study was to conduct a systematic review for long-term (one year) outcomes among ED patients with syncope. We aim to use the results of this review to guide us in prospective analysis of one year outcomes with our large database of syncope patients. **Methods:** We searched Cochrane Central Register of Controlled Trials, Medline and Medline in Process, PubMed, Embase, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) from the inception to June, 2017. We included studies that reported long-term outcomes among adult ED patients (16 years or older) with syncope. We excluded studies on pediatric patients, and studies that included syncope mimickers: pre-syncope, seizure, intoxication, loss of consciousness after head trauma. We also excluded case reports, letters to the editor and review articles. Outcomes included death, syncope recurrence requiring hospitalization, arrhythmias and procedural interventions for arrhythmias. We selected articles based on title and abstract review during phase-1 and conducted full article review during phase-2. Meta-analysis was performed by pooling the outcomes using random effects model (RevMan v.5.3; Cochrane Collaboration). **Results:** Initial literature search generated 2094 articles after duplicate removal. 50 articles remained after phase-1 (=0.85) and 16 articles were included in the systematic review after phase-2 (=0.86). The 16 included studies enrolled a total of 44,755 patients. Pooled analysis at 1-year follow-up showed the following outcomes: 7% mortality; 14% recurrence of syncope requiring hospitalization; one study reported that 0.6% of patients had a pacemaker inserted; and two studies reported 0.8 11.5% of patients suffered new arrhythmias. **Conclusion:** An important proportion of ED patients with syncope suffer outcomes at 1-year. Appropriate follow-up is needed to prevent long-term adverse outcomes. Further prospective research to identify patients at risk for long-term important cardiac outcomes and death is needed.
**Keywords:** syncope, long-term outcomes, mortality

## LO59

### External validation of a 2-hour rapid diagnostic algorithm for ruling out acute myocardial infarction in emergency department patients with chest pain using a high-sensitivity troponin-T assay

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**Introduction:** Ruling out acute myocardial infarction (AMI) using serial troponin testing is central to the care of many emergency department (ED) patients with chest pain. While diagnostic strategies using conventional troponin assays require repeat sampling over many hours to avoid missed diagnoses, serial high-sensitivity troponin (hs-cTn) assays may be able to exclude AMI in most patients within 1 or 2 hours. However, many of the initial studies deriving and validating these rapid diagnostic algorithms had all hs-cTn samples analyzed in a central core lab likely representing optimal assay performance. This objective of this study is to validate a 2-hour rapid diagnostic algorithm to exclude AMI in ED chest pain patients using an hs-cTn assay in real world practice. **Methods:** This prospective cohort study was conducted at a single urban tertiary center and regional percutaneous coronary intervention site in Calgary, Alberta. Patients were eligible for enrolment if they presented to the ED with chest pain, were 25-years or older and required biomarker testing to rule out AMI at the discretion of the attending emergency physician. Patients were excluded if they had clear acute ischemic ECG changes, new arrhythmia or renal failure requiring hemodialysis. A high-sensitivity troponin result (Roche Elecsys hs-cTnT) was obtained in all patients at ED presentation and 2-hours later. The primary outcome was AMI on the index visit. Secondary outcomes included 30-day AMI and 30-day major adverse cardiac events (MACE - including AMI, revascularization or cardiac death). Electronic medical records were reviewed and telephone follow-up was obtained for all patients at 30-days to ensure relevant events were captured. Two physician adjudication (board-certified emergency physician and cardiologist) was obtained for all outcomes. This study was REB approved. **Results:** A total of 549 patients were enrolled from August 2014 September 2016 with 2-hour serial hs-cTnT results, of which 349 (63.6%) met the 2-hour rapid diagnostic algorithm low risk criteria (time 0 h/2 h hs-cTnT <14 ng/L and delta 2 h <4 ng/L). The sensitivity of the 2-hour low risk criteria for index AMI was 98.4% (95% CI 91.3%-100%) and for 30-day AMI was 98.4% (95% CI 91.6-100%). The sensitivity for 30day MACE was lower 84.4% (95% CI 74.4-91.7%) but maintained a high negative predictive value, 96.6% (95% CI 94.1-98.2%). **Conclusion:** A 2-hour rapid diagnostic algorithm using an hs-cTnT assay was highly sensitive for AMI on the index visit and successfully



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