

C-statistic was 0.88 (95% CI 0.86–0.90). Non-arrhythmia risk per day for the first 2 days was 0.5% for medium-risk, 2% for high-risk and very low thereafter. We recruited 31 physicians (14 ED, 7 cardiologists, 10 hospitalists/internists). 80% of physicians agreed that low risk patients can be discharged without specific follow-up with inconsistencies around length of ED observation. For cardiac monitoring of medium and high-risk, 64% indicated that they don't have access; 56% currently admit high-risk patients and an additional 20% agreed to this recommendation. A deeper exploration led to following refinement: discharge without specific follow-up for low-risk, a shared decision approach for medium-risk and short course of hospitalization for high-risk patients. **Conclusion:** The recommendations were developed (with online calculator) based on in-depth feedback from key stakeholders to improve uptake during implementation.

**Keywords:** practice recommendation, risk-stratification, syncope

#### LO07

##### Procainamide for the acute management of atrial fibrillation and flutter in the emergency department: a systematic review

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**Introduction:** Management of acute atrial fibrillation or flutter (AFF) in the emergency department (ED) can be performed with chemical or electrical cardioversion. Procainamide is the most common chemical agent used in Canada; however, there is substantial practice variation. The objective of this systematic review was to provide comparative evidence on return to normal sinus rhythm (NSR) and adverse events to better support clinical decisions. **Methods:** Systematic search of five electronic databases and grey literature. Randomized controlled trials (RCTs) and prospective controlled cohort studies including adults ( $\geq 17$  years) with recent-onset of AFF comparing intravenous procainamide with other cardioversion strategies (e.g., electrical cardioversion, placebo or other antiarrhythmic drugs) were eligible. Two independent reviewers performed study selection and data extraction. Relative risks (RR) with 95% confidence intervals (CIs) were calculated using a random-effects model. The protocol was registered with PROSPERO (CRD42019142080). **Results:** From 4060 potentially relevant citations, 7 studies were considered eligible and three RCTs and two cohort studies included in the analysis. Procainamide was less effective in promoting return to NSR at 1st attempt compared to other chemical (RR 0.76; 95% CI: 0.65 to 0.90) and electrical (RR 0.58; 95% CI: 0.53 to 0.64) options. Electrical cardioversion was more effective in restoring NSR compared to procainamide when used as 2nd attempt in one RCT (RR 0.46; 95% CI: 0.23 to 0.92). Pre-specified serious adverse events were assessed and reported by two studies showing that hypotension was more common in patients receiving procainamide in comparison with electrical cardioversion (RR 20.57; 95% CI: 1.59 to 265.63). Treatment discontinuation due to adverse events was infrequently reported with only two studies reporting that no patients withdrew from the study following treatment with procainamide. The remaining studies provided incomplete data reporting on adverse events. **Conclusion:** Shared decision-making for patients with acute AFF in the ED requires knowledge of the effectiveness and safety of comparative interventions. Overall, procainamide is less effective than other

chemical options and electrical cardioversion strategies to restore NSR. Evidence shows that hypotension is a concern when procainamide is administered; however, the overall adverse events information provided from the studies is suboptimal.

**Keywords:** atrial fibrillation, cardioversion, procainamide

#### LO08

##### A randomized, controlled comparison of electrical versus pharmacological cardioversion for emergency department patients with atrial flutter

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**Introduction:** For rhythm control of acute atrial flutter (AAFL) in the emergency department (ED), choices include initial drug therapy or initial electrical cardioversion (ECV). We compared the strategies of pharmacological cardioversion followed by ECV if necessary (Drug-Shock), and ECV alone (Shock Only). **Methods:** We conducted a randomized, blinded, placebo-controlled trial (1:1 allocation) comparing two rhythm control strategies at 11 academic EDs. We included stable adult patients with AAFL, where onset of symptoms was  $< 48$  hours. Patients underwent central web-based randomization stratified by site. The Drug-Shock group received an infusion of procainamide (15mg/kg over 30 minutes) followed 30 minutes later, if necessary, by ECV at 200 joules x3 shocks. The Shock Only group received an infusion of saline followed, if necessary, by ECV x3 shocks. The primary outcome was conversion to sinus rhythm for  $\geq 30$  minutes at any time following onset of infusion. Patients were followed for 14 days. The primary outcome was evaluated on an intention-to-treat basis. Statistical significance was assessed using chi-squared tests and multivariable logistic regression. **Results:** We randomized 76 patients, and none was lost to follow-up. The Drug-Shock (N = 33) and Shock Only (N = 43) groups were similar for all characteristics including mean age (66.3 vs 63.4 yrs), duration of AAFL (30.1 vs 24.5 hrs), previous AAFL (72.7% vs 69.8%), median CHADS2 score (1 vs 1), and mean initial heart rate (128.9 vs 126.0 bpm). The Drug-Shock and Shock only groups were similar for the primary outcome of conversion (100% vs 93%; absolute difference 7.0%, 95% CI -0.6;14.6; P = 0.25). The multivariable analyses confirmed the similarity of the two strategies (P = 0.19). In the Drug-Shock group 21.2% of patients converted with the infusion. There were no statistically significant differences for time to conversion (84.2 vs 97.6 minutes), total ED length of stay (9.4 vs 7.5 hours), disposition home (100% vs 95.3%), and stroke within 14 days (0 vs 0). Premature discontinuation of infusion (usually for transient hypotension) was more common in the Drug-Shock group (9.1% vs 0.0%) but there were no serious adverse events. **Conclusion:** Both the Drug-Shock and Shock Only strategies were highly effective and safe in allowing AAFL patients to go home in sinus rhythm. IV procainamide alone was effective in only one fifth of patients, much less than for acute AF.

**Keywords:** atrial flutter, cardioversion

## LO09

**Role of hospitalization for detection of serious adverse events among emergency department patients with syncope: a propensity-score matched analysis of a multicenter prospective cohort**

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**Introduction:** Selecting appropriate patients for hospitalization following emergency department (ED) evaluation of syncope is critical for serious adverse event (SAE) identification. The primary objective of this study is to determine the association of hospitalization and SAE detection using propensity score (PS) matching. The secondary objective was to determine if SAE identification with hospitalization varied by the Canadian Syncope Risk Score (CSRS) risk-category. **Methods:** This was a secondary analysis of two large prospective cohort studies that enrolled adults (age  $\geq 16$  years) with syncope at 11 Canadian EDs. Patients with a serious condition identified during index ED evaluation were excluded. Outcome was a 30-day SAE identified either in-hospital for hospitalized patients or after ED disposition for discharged patients and included death, ventricular arrhythmia, non-lethal arrhythmia and non-arrhythmic SAE (myocardial infarction, structural heart disease, pulmonary embolism, hemorrhage). Patients were propensity matched using age, sex, blood pressure, prodrome, presumed ED diagnosis, ECG abnormalities, troponin, heart disease, hypertension, diabetes, arrival by ambulance and hospital site. Multivariable logistic regression assessed the interaction between CSRS and SAE detection and we report odds ratios (OR). **Results:** Of the 8183 patients enrolled, 743 (9.0%) patients were hospitalized and 658 (88.6%) were PS matched. The OR for SAE detection for hospitalized patients in comparison to those discharged from the ED was 5.0 (95%CI 3.3, 7.4), non-lethal arrhythmia 5.4 (95%CI 3.1, 9.6) and non-arrhythmic SAE 6.3 (95%CI 2.9, 13.5). Overall, the odds of any SAE identification, and specifically non-lethal arrhythmia and non-arrhythmia was significantly higher in-hospital among hospitalized patients than those discharged from the ED ( $p < 0.001$ ). There were no significant differences in 30-day mortality ( $p = 1.00$ ) or ventricular arrhythmia detection ( $p = 0.21$ ). The interaction between ED disposition and CSRS was significant ( $p = 0.04$ ) and the probability of 30-day SAEs while in-hospital was greater for medium and high risk CSRS patients. **Conclusion:** In this multicenter prospective cohort, 30-day SAE detection was greater for hospitalized compared with discharged patients. CSRS low-risk patients are least likely to have SAEs identified in-hospital; out-patient monitoring for moderate risk patients requires further study.

**Keywords:** Canadian Syncope Risk Score, hospitalization, syncope

## LO10

**Low high-sensitivity troponin concentrations identify low-risk chest pain patients unlikely to benefit from further risk stratification**

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**Introduction:** Very low high-sensitivity troponin-T (hs-cTnT) concentrations on presentation can rule out acute myocardial infarction (AMI),

but the ability to identify patients at low risk of 30-day major adverse cardiac events (MACE) is less clear. This study examines the sensitivity of low concentrations of hs-cTnT on presentation to rule out 30-day MACE. **Methods:** This prospective cohort study enrolled emergency department chest pain patients with non-ischemic ECGs who underwent AMI rule-out with an hs-cTnT assay. The primary outcome was 30-day MACE; secondary outcomes were individual MACE components. Because guidelines recommend using a single hs-cTnT strategy only for patients with more than 3-hours since symptom onset, a subgroup analysis was performed for this population. Outcomes were adjudicated based on review of medical records and telephone follow-up. **Results:** Of 1,167 patients enrolled, 125 (10.7%) experienced 30-day MACE and 97 (8.3%) suffered AMI on the index visit. More than one-third (35.6%) had presenting hs-cTnT concentrations below the limit of detection (5ng/L), which was 94.4% (95%CI 88.8-97.7%) sensitive for 30-day MACE and 99.0% (95%CI 94.5-100%) sensitive for index AMI. Of 292 (25.0%) patients with hs-cTnT  $< 5$ ng/L and at least 3-hours since symptom onset, only 3 experienced 30-day MACE (sensitivity 97.6%, 95%CI 93.2-100%) and none suffered AMI within 30-days (sensitivity 100%, 95%CI 96.3-100%). **Conclusion:** Among patients with non-ischemic ECGs and  $>3$ -hours since symptom onset, low hs-cTnT concentrations on presentation confer a very low risk of 30-day MACE. In the absence of a high risk clinical presentation, further risk stratification is likely to be low yield.

**Keywords:** high-sensitivity troponin, myocardial infarction, risk stratification

## LO11

**STAR-EM: An innovative summer research program for medical students in an urban Canadian academic emergency department**  
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**Innovation Concept:** Research training programs for students, especially in emergency medicine (EM), may be difficult to initiate due to lack of protected time, resources, and mentors (Chang Y, Ramnanan CJ. Academic Medicine 2015). We developed a ten-week summer program for medical students aimed at cultivating research skills through mentorship, clinical enrichment, and immersion in EM research culture through shadowing and project support. **Methods:** Five second year Ontario medical students were recruited to participate in the Summer Training and Research in Emergency Medicine (STAR-EM) program at University Health Network, Toronto, from June - Aug, 2019. Program design followed review of existing summer research programs and literature regarding challenges to EM research (McRae, Perry, Brehaut et al. CJEM 2018). The program had broad emergency physician (EP) engagement, with five EP research project mentors, and over ten EPs delivering academic sessions. Curriculum development was collaborative and iterative. All projects were approved by the hospital Research Ethics Board (REB). **Curriculum, Tool or Material:** Each weekly academic morning comprised small group teaching (topics including research methodology, manuscript preparation, health equity, quality improvement, and wellness), followed by EP-led group progress review of each student's project. Each student spent one half day per week in the emergency department (ED), shadowing an EP and identifying