Abbreviations:
PL = Plenary; LO = Lightning oral; MP = Moderated poster; P = Poster

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Plenary Oral Presentations

PL01

Creation of a risk scoring system for emergency department patients with acute heart failure

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Introduction: Acute heart failure (AHF) is a common emergency department (ED) presentation and may be associated with poor outcomes. Conversely, many patients rapidly improve with ED treatment and may not need hospital admission. Because there is little evidence to guide disposition decisions by ED and admitting physicians, we sought to create a risk score for predicting short-term serious outcomes (SSO) in patients with AHF. **Methods:** We conducted prospective cohort studies at 9 tertiary care hospital EDs from 2007 to 2019, and enrolled adult patients who required treatment for AHF. Each patient was assessed for standardized real-time clinical and laboratory variables, as well as for SSO (defined as death within 30 days or intubation, non-invasive ventilation (NIV), myocardial infarction, coronary bypass surgery, or new hemodialysis after admission). The fully pre-specified, logistic regression model with 13 predictors (age, pCO2, and SaO2 were modeled using spline functions with 3 knots and heart rate and creatinine with 5 knots) was fitted to the 10 multiple imputation datasets. Harrell's fast step-down 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 170 SSOs. **Results:** The 2,246 patients had mean age 77.4 years, male sex 54.5%, EMS arrival 41.1%, IV NTG 3.1%, ED NIV 5.2%, admission on initial visit 48.6%. Overall there were 174 (7.8%) SSOs including 70 deaths (3.1%). The final risk scale is comprised of five variables (points) and had c-statistic of 0.76 (95% CI: 0.73-0.80): 1.Valvular heart disease (1) 2.ED non-invasive ventilation (2) 3.Creatinine 150-300 (1) ≥300 (2) 4.Troponin 2x-4x URL (1) ≥5x URL (2) 5.Walk test failed (2) The probability of SSO ranged from 2.0% for a total score of 0 to 90.2% for a score of 10, showing good calibration. The model was stable over 1,000 bootstrap samples. Choosing a risk model total point admission threshold of >2 would yield a sensitivity of 80.5% (95% CI 73.9-86.1) for SSO with no change in admissions from current practice (48.6% vs 48.7%). **Conclusion:** Using a large prospectively collected dataset, we created a concise and sensitive risk scale to assist with admission decisions for patients with AHF in the ED. Implementation of this risk scoring 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

PL02

Double Sequential External Defibrillation for Refractory Ventricular Fibrillation: the DOSE VF pilot randomized controlled trial

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Introduction: Despite recent advances in resuscitation, some patients remain in ventricular fibrillation (VF) after multiple defibrillation attempts during out-of-hospital cardiac arrest (OHCA). Vector change defibrillation (VC) and double sequential external defibrillation (DSED) have been proposed as alternate therapeutic strategies for OHCA patients with refractory VF. The primary objective was to determine the feasibility, safety and sample size required for a future cluster randomized controlled trial (RCT) with crossover comparing VC or DSED to standard defibrillation for patients experiencing refractory VF. Secondary objectives were to evaluate the intervention effect on VF termination and return of spontaneous circulation (ROSC). **Methods:** We conducted a pilot cluster RCT with crossover in four Canadian paramedic services and included all treated adult OHCA patients who presented in VF and received a minimum of three defibrillation attempts. In addition to standard cardiac arrest care, each EMS service was randomly assigned to provide continued standard defibrillation (control), VC or DSED. Services crossed over to an alternate defibrillation strategy after six months. Prior to the launch of the trial, 2,500 paramedics received in-person training for VC and DSED defibrillation using a combination of didactic, video and simulated scenarios. **Results:** Between March 2018 and September 2019, 152 patients were enrolled. Monthly enrollment varied from 1.4 to 6.1 cases per service. With respect to feasibility, 89.5% of cases received the defibrillation strategy they were randomly allocated to, and 93.1% of cases received a VC or DSED shock prior to the sixth defibrillation attempt. There were no reported cases of defibrillator malfunction, skin burns, difficulty with pad placement or concerns expressed by paramedics, patients, families, or ED staff about the trial. In the standard defibrillation group, 66.6% of cases resulted in VF termination, compared to 82.0% in VC and 76.3% of cases in the DSED group. ROSC was achieved in 25.0%, 39.3% and 40.0% of standard, VC and DSED groups, respectively. **Conclusion:** Findings from our pilot RCT suggest the DOSE VF protocol is feasible and safe. VF termination and ROSC were higher with VC and DSED compared to standard defibrillation. The results of this pilot trial will allow us to inform a multicenter cluster RCT with crossover to determine if alternate defibrillation strategies for refractory VF may impact patient-centered, clinical outcomes

Keywords: double sequential external defibrillation, refractory ventricular fibrillation, vector change defibrillation

PL03

Thromboembolic events following cardioversion for acute atrial fibrillation and flutter: a systematic review and meta-analysis

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Introduction: Several recent observational studies have presented concerning data regarding the safety of cardioversion (CV) for acute

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atrial fibrillation and flutter (AAFF). We conducted this systematic review to determine whether it is safe to cardiovert AAFF patients without prescribing oral anticoagulation (OAC) post-CV for those who are CHADS-65 negative. **Methods:** We conducted a librarian assisted search of MEDLINE, Embase, and Cochrane from inception through November 23, 2019. We included observational studies and randomized trials reporting thromboembolic (TE) events (i.e. stroke, transient ischemic attack, or systemic thromboembolism) within 30 days following CV in patients with AAFF, where onset of symptoms was <48 hours. Two reviewers independently screened studies and extracted data. The main outcome was risk of TE events within 30 days post-CV, stratified by OAC use. Risk of bias was assessed with the Quality in Prognostic Studies (QUIPS) tool. The primary analysis was based on prospective studies and the secondary analysis was based on retrospective studies. We performed meta-analyses for TE events where 2 or more studies were available, by applying the DerSimonian-Laird random-effects model. We implemented analyses stratified by study design using Open MetaAnalyst and generated the forest plots. **Results:** Our search yielded 969 titles; 74 were selected for full-text review and 20 studies were included in the review. The primary meta-analysis of 6 prospective studies, including two randomized trials, found a TE event rate of 0.15% (2 TE events/1,314 CVs). Within this prospective group, lack of OAC use was associated with a decreased risk of TE events (RR = 2.15 where RR >1 indicates increased risk of TE events with OAC compared to no OAC; 95% CI 0.50 to 9.31; I2 = 0%). Five of the 6 prospective studies had a low or moderate risk of bias in all QUIPS domains. Secondary meta-analysis of 6 retrospective studies revealed a TE event rate of 0.53% (56 TE events/10,521 CVs). This subgroup showed a trend favouring OAC use with decreased risk of TE events (RR = 0.34 where RR <1 suggests decreased risk of TE events with OAC; 95% CI 0.17 to 0.72; I2 = 0%). **Conclusion:** In the primary analysis of prospective studies, we found a low TE event rate following CV of AAFF, irrespective of OAC use. This contradicts previous analyses of retrospective studies. Our study supports the longstanding practice of not necessarily prescribing OAC post-CV in the ED for AAFF patients who are CHADS-65 negative.

Keywords: atrial fibrillation, cardioversion, thromboembolism

PL04

A randomized controlled trial comparing prescribed light exercise to standard management for emergency department patients with acute mild traumatic brain injury

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Introduction: The emergency department (ED) is often the first point of health care contact for patients with mild traumatic brain injury (MTBI). Spontaneous resolution occurs in most patients within 7 days, yet 15-30% will develop post-concussion syndrome (PCS). Given the paucity of effective management strategies to prevent PCS and emerging evidence supporting exercise, the objective of this study was to evaluate the impact of prescribed early light exercise compared to standard discharge instructions for acute MTBI patients in the ED. **Methods:** This was a randomized controlled trial conducted in three Canadian EDs. Consecutive, adult (18-64 years) ED patients with a MTBI sustained within the preceding 48 hours were eligible for enrollment. The intervention group received discharge instructions prescribing 30 minutes of daily light exercise (e.g., walking), and the control group was given standard MTBI instructions advising gradual return to exercise following symptom resolution. Participants documented their daily physical activities and completed follow-up questionnaires at 7, 14, and 30 days. The primary outcome was the proportion of patients with PCS at 30 days, defined as the presence of ≥ 3 symptoms on the Rivermead Post-concussion Symptoms Questionnaire (RPQ) at 30 days. **Results:** 367 patients were enrolled (control n = 184; intervention n = 183). Median age was 32 years and 201 (57.6%) were female. There was no difference in the proportion of patients with PCS at 30 days (control 13.4 vs intervention 14.6; Δ1.2, 95% CI: -6.2 to 8.5). There were no differences in median change of RPQ scores (control 14 vs intervention 13; Δ1, 95% CI: -1 to 4), median number of return health care provider visits (control 1 vs intervention 1; Δ0, 95% CI: 0 to 0), or median number of missed school or work days (control 2 vs intervention 2; Δ0, 95% CI: 0 to 1) at 30 days. There was a nonsignificant difference in unplanned return ED visits within 30 days (control 9.9% vs intervention 5.6%; Δ1, 95% CI: -1.4 to 10.3). Participants in the control group reported fewer minutes of light exercise at 7 days (30 vs 35; Δ5, 95% CI: 2 to 15). **Conclusion:** To our knowledge, this is the first randomized trial of prescribed early light exercise for adults with acute MTBI. There were no differences in recovery or healthcare utilization outcomes. Results suggest prescribed early light exercise should be encouraged as tolerated at ED discharge following MTBI, but exercise prescription alone is not sufficient to prevent PCS.

Keywords: concussion, exercise prescription, mild traumatic brain injury

Oral Presentations

LO01

What presenting features predict obstetrical outcomes in women who present to the emergency department with early pregnancy bleeding?

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Introduction: Vaginal bleeding in early pregnancy is a common emergency department (ED) presentation, with many of these episodes resulting in poor obstetrical outcome. These outcomes have been extensively studied, but there have been few evaluations of what variables are associated predictors. This study aimed to identify predictors of less than optimal obstetrical outcomes for women who present to the ED with early pregnancy bleeding. **Methods:** A regional centre health records review included pregnant females who presented to the ED with vaginal bleeding at <20 weeks gestation. This study investigated differences in presenting features between groups with subsequent optimal outcomes (OO; defined as a full-term live birth >37 weeks) and less than optimal outcomes (LOO; defined as a miscarriage, stillbirth or pre-term live birth). Predictor variables included: maternal age, gestational age at presentation, number of return ED visits, socioeconomic status (SES), gravida-para-abortus status, Rh status, Hgb level and presence of cramping. Rates and results of point of care ultrasound (PoCUS) and ultrasound (US) by radiology were also considered. **Results:** Records for 422 patients from Jan 2017 to Nov 2018 were screened and 180 patients were included. Overall, 58.3% of study participants had a LOO. The only strong predictor of outcome was seeing an Intra-Uterine Pregnancy (IUP) with Fetal Heart Beat (FHB) on US; OO rate 74.3%

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