

régression logistique multivariée ajustant pour les variables sociodémographiques et cliniques pertinentes. **Results:** Un total de 1751 patients (1173 hommes et 578 femmes) d'un âge moyen de 69 ans ( $\pm 16$ ) ont été inclus dans l'analyse principale, parmi lesquels 603 (34%) avaient un RD. Un total de 663 autres patients ont vu leur ACEH témoigné directement par les paramédics. Un plus court délai avant l'initiation des manœuvres est associé à la présence d'un RD (rapport de cotes ajusté = 0,97 [intervalle de confiance à 95% 0,94-0,99],  $p = 0,016$ ). Cependant, cette relation n'est pas linéaire et la proportion de RD ne diminue pas avant notablement jusqu'à ce que 15 minutes s'écoulent avant le début de la réanimation (0 min = 35%, 1-5 min = 37%, 5-10 min = 35%, 10-15 min = 34%, +de 15 min = 16%). **Conclusion:** Bien que la proportion de patients avec un RD diminue lorsque le délai augmente avant l'initiation des manœuvres, cette relation ne semble pas linéaire. La baisse principale de la proportion de patients avec RD semble se produire suite à la quinzième minute de délai avant le début de la réanimation.

**Keywords:** cardiac rhythm, no-flow time, out-of-hospital cardiac arrest

#### LO07

##### Double sequential external defibrillation improves termination of ventricular fibrillation and return of spontaneous circulation in shock-refractory out-of-hospital cardiac arrest

S. Cheskes, MD, A. Wudwud, BSc, L. Turner, PhD, S. Mcleod, BSc, MSc, J. Summers, L. Morrison, MD, MSc, R. Verbeek, MD, University of Toronto, Toronto, ON

**Introduction:** Despite significant advances in resuscitation efforts, there are some patients who remain in ventricular fibrillation (VF) after multiple shocks during out-of-hospital cardiac arrest (OHCA). Double sequential external defibrillation (DSED) has been proposed as a treatment option for patients in shock refractory VF. We sought to compare DSED to standard therapy with regards to VF termination and return of spontaneous circulation (ROSC) for patients presenting in shock refractory VF. **Methods:** We performed a retrospective review of all treated adult OHCA who presented in VF and received a minimum of three successive shocks over a two year period beginning on Jan 1, 2015 in four Canadian EMS agencies. Using ambulance call reports and defibrillator files, we compared VF termination (defined as the absence of VF at the rhythm check following defibrillation and 2 minutes of CPR) and VF termination into a perfusing rhythm with ROSC between patients who received standard therapy (CPR, defibrillation, epinephrine and antiarrhythmics) and those who received DSED (after on-line medical consultation) for shock refractory VF. Cases of traumatic cardiac arrest and those who presented in VF but terminated VF prior to 3 successive shocks were excluded. **Results:** Among 197 patients who met the study criteria for shock refractory VF, 161 (81.7%) patients received standard therapy and 36 (18.3%) received DSED. For the primary outcome, VF termination was significantly higher for DSED compared to standard therapy (63.9% vs 18.0%;  $\Delta 45.9\%$ ; 95% CI: 28.3 to 60.5). For the secondary outcome of VF termination into ROSC, DSED was associated with significantly higher ROSC compared to standard care (33.3% vs 13%;  $\Delta 20.3\%$ ; 95% CI: 13.0 to 33.3). The median (IQR) number of failed standard shocks prior to DSED was 8 (6, 10). When DSED terminated VF, it did so with a single DSED shock in 69.6% of cases. **Conclusion:** Our observational findings suggest improved VF termination and ROSC are associated with DSED compared to standard therapy for shock refractory VF. An

appropriately powered randomized controlled trial is required to assess the impact of DSED on patient-important outcomes.

**Keywords:** cardiopulmonary resuscitation, double sequential external defibrillation, refractory ventricular fibrillation

#### LO08

##### Defibrillation energy dose during pediatric cardiac arrest: systematic review of human and animal model studies

E. Mercier, MD, MSc, E. Laroche, MD, B. Beck, PhD, N. Le Sage, MD, PhD, P. Cameron, MD, MBBS, M. Emond, MD, MSc, S. Berthelot, MD, MSc, B. Mitra, MD, PhD, J. Ouellet-Pelletier, MD, Hôpital de l'Enfant-Jésus - CHU de Québec, Québec, QC

**Introduction:** Prompt defibrillation is critical during paediatric cardiac arrest. The main objective of this systematic review was to determine the initial defibrillation energy dose for ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) that is associated with sustained return of spontaneous circulation (ROSC) during paediatric cardiac arrest. Associations between initial defibrillation energy dose with any ROSC, survival and defibrillation-induced complications were also assessed. **Methods:** A systematic review was performed using four databases (Medline, Embase, Web of Science, Cochrane Library) (PROSPERO: CRD42016036734). Human studies (cohort studies or controlled trials) and animal model studies (controlled trials) of pediatric cardiac arrest involving assessment of external defibrillation energy dosing were considered. The primary outcome was sustained ROSC. Two researchers independently reviewed all the titles and abstracts of the retrieved citations, selected the studies and extracted the data using a standardized template. Risk of bias of human non-randomised studies were assessed using the ROBIN-I tool (formerly ACROBAT-NRSI) tool proposed by the Cochrane Collaboration group. **Results:** The search strategy identified 14,471 citations of which 232 manuscripts were reviewed. Ten human and 10 animal model studies met the inclusion criteria. Human studies were prospective ( $n = 6$ ) or retrospective ( $n = 4$ ) cohort studies and included between 11 and 266 patients (median = 46 patients). Sustained ROSC rates ranged from 0 to 61% ( $n = 7$ ). No studies reported a statistically significant association between the initial defibrillation energy dose and the rate of sustained ROSC ( $n = 7$ ) or survival ( $n = 6$ ). No human studies reported defibrillation-induced complications. Meta-analysis was not considered appropriate due to clinical heterogeneity. The overall risk of bias was moderate. All animal studies were randomized controlled trials with 8 and 52 (median = 27) piglets. ROSC was frequently achieved (more than 85%) with energy dose ranging from 2 to 7 joules/kg ( $n = 7$ ). The defibrillation threshold varied according to the body weight and appears to be higher in infant models. **Conclusion:** Defibrillation energy doses and thresholds varied according to the body weight and trended higher for infants. No definitive association between initial defibrillation doses and the outcomes of sustained ROSC or survival could be demonstrated.

**Keywords:** cardiac arrest, defibrillation, pediatric

#### LO09

##### Variation entre les taux de retour de circulation spontané pré-hospitalier et les délais de réanimation avant ceux-ci en fonction du rythme initial chez les patients souffrant d'un arrêt cardiaque extrahospitalier

A. Cournoyer, MD, S. Cossette, PhD, R. Daoust, MD, MSc, J. Chauny, MD, MSc, B. Potter, MD, MSc, M. Marquis, MSc,

J. Morris, MD, MSc, L. de Montigny, PhD, D. Ross, MD, Y. Lamarche, MD, MSc, L. Londei-Leduc, MD, J. Paquet, PhD, É. Notebaert, MD, MSc, M. Albert, MD, F. Bernard, MD, É. Piette, MD, MSc, Y. Cavayas, MD, MSc, A. Denault, MD, PhD, Université de Montréal, Montréal, QC

**Introduction:** Les patients ayant un retour de circulation spontanée (RCS) durant la phase préhospitalière de leur réanimation suite à un arrêt cardiaque extrahospitalier (ACEH) ont un meilleur taux de survie que ceux n'en ayant pas. La durée des efforts de réanimation avant l'initiation d'un transport ne varie généralement pas en fonction du rythme initial observé. Cette étude vise à comparer la durée des manœuvres de réanimation nécessaire afin de générer la majorité des RCS préhospitaliers et des RCS préhospitaliers menant à une survie en fonction du rythme initial. **Methods:** La présente étude de cohorte a été réalisée à partir des bases de données collectées de la Corporation d'Urgences-santé dans la région de Montréal entre 2010 et 2015. Les patients avec un ACEH d'origine médicale ont été inclus. Les patients dont l'ACEH était témoigné par les paramédics ont été exclus, tout comme ceux dont le rythme initial était inconnu. Nous avons comparé entre les groupes (rythme défibrillable [RD], activité électrique sans pouls [AESP] et asystolie) les taux de RCS préhospitalier et le temps nécessaires pour obtenir une majorité des RCS préhospitaliers et des RCS préhospitaliers menant à une survie. **Results:** Un total de 6002 patients (3851 hommes et 2151 femmes) d'un âge moyen de 52 ans ( $\pm 10$ ) ont été inclus dans l'étude, parmi lesquels 563 (9%) ont survécu jusqu'à leur congé hospitalier et 1310 (22%) ont obtenu un RCS préhospitalier. Un total de 1545 (26%) patients avaient un RD, 1654 (28%) une AESP et 2803 (47%) une asystolie. Les patients avec un RD ont obtenu plus fréquemment un RCS préhospitalier et un RCS préhospitalier menant à une survie que les patients avec une AESP qui eux même avaient un meilleur pronostic que ceux avec une asystolie initiale (777 patients [55%] vs 385 [23%] vs 148 [5%],  $p < 0,001$ ; 431 [28%] vs 85 [5%] vs 7 [0,2%],  $p < 0,001$ , respectivement). Les RCS survenaient également plus rapidement lorsque le rythme initial était un RD (13 minutes [ $\pm 12$ ] vs 18 [ $\pm 13$ ] vs 25 [ $\pm 12$ ],  $p < 0,001$ ). Cependant, une période de réanimation plus longue était nécessaire afin d'obtenir 95% des RCS préhospitaliers menant à une survie pour les patients avec un RD (26 minutes vs 21 minutes vs 21 minutes). **Conclusion:** Les patients avec un rythme initial défibrillable suite à leur ACEH sont à meilleur pronostic. Il serait envisageable de transporter plus rapidement vers l'hôpital les patients avec une AESP ou une asystolie que ceux avec un rythme défibrillable si l'arrêt des manœuvres n'est pas envisagé.

**Keywords:** cardiac rhythm, out-of-hospital cardiac arrest, return of spontaneous circulation

#### LO10

**Associations between ED crowding metrics and 72h-hour ED re-visits: Which crowding metrics are most highly associated with patient-oriented adverse outcomes?**

A. McRae, MD, PhD, G. Innes, MD, MSc, M. Schull, MD, MSc, E. Lang, MD, E. Grafstein, MD, MSc, B. Rowe, MD, MSc, R. Rosychuk, PhD, University of Calgary, Calgary, AB

**Introduction:** Emergency Department (ED) crowding is a pervasive problem and is associated with adverse patient outcomes. Yet, there are no widely accepted, universal ED crowding metrics. The objective of this study is to identify ED crowding metrics with the strongest association to the risk of ED revisits within 72 hours, which is a

patient-oriented adverse outcome. **Methods:** Crowding metrics, patient characteristics and outcomes were obtained from administrative data for all ED encounters from 2011-2014 for three adult EDs in Calgary, AB. The data were randomly divided into three partitions for cross-validation, and further divided by CTAS category 1, 2/3 and 4/5. Twenty unique ED crowding metrics were calculated and assigned to each patient seen on each calendar day or shift, to standardize the exposure. Logistic regression models were fitted with 72h ED revisit as the dependent variable, and an individual crowding metric along with a common list of confounders as independent variables. Adjusted odds ratios (OR) for the 72h return visits were obtained for each crowding metric. The strength of associations between 72h revisits and crowding metrics were compared using Akaike's Information Criterion and Akaike weights. **Results:** This analysis is based on 1,149,939 ED encounters. Across all CTAS groups, INPUT metrics (ED census, ED occupancy, waiting time, EMS offload delay, LWBS%) were only weakly associated with the risk of 72h re-visit. Among THROUGHPUT metrics, ED Length of Stay and MD Care Time had similar adjusted ORs for 72h ED re-visit (range 0.99-1.15). Akaike weights ranging from 0.3/1.00 to 0.4/1.00 indicate that both THROUGHPUT metrics are reasonable predictors of 72h ED re-visits. All OUTPUT metrics (boarding time, # of boarded patients, % of beds occupied by boarded patients, hospital occupancy) had statistically significant ORs for 72h ED re-visits. The median boarding time had the highest adjusted OR for 72h ED re-visit (adjusted OR 1.40, 95% CI 1.33-1.47) and highest Akaike weight (0.97/1.00) compared to all other OUTPUT metrics, indicating that median boarding time had the strongest association with 72h re-visits. **Conclusion:** ED THROUGHPUT and OUTPUT metrics had consistent associations with 72h ED re-visits, while INPUT metrics had little to no association with 72h re-visits. Median boarding time is the strongest predictor of 72h re-visits, indicating that this may be the most meaningful measure of ED crowding.

**Keywords:** emergency department crowding

#### LO11

**Influence of fear of falling on return to emergency department and further falls in community-dwelling elderly presenting for minor trauma**

M. Lanoue, MDCM, M. Sirois, PhD, A. Worster, MD, MDCM, MSc, J. Perry, MD, MSc, J. Lee, MD, MSc, R. Daoust, MD, MSc, S. Hegg, PhD, P. Carmichael, Biostatisticien, M. Émond, MD, MDCM, MSc, Laval, Quebec, QC

**Introduction:** According to WHO, one third of patients aged  $\geq 65$  fall every year. Those falls account for 25% of all geriatric emergency department (ED) visits. Fear of falling (FOF) is common in older patients who sustained a fall and is associated with a decline in mobility and health issues for patients. We hypothesized that there is an association between FOF and return to ED (RTED) and future falls.

**Objective:** To assess the relation between FOF and RTED and subsequent falls in older ED patients **Methods:** This research was conducted as part of the Canadian Emergency Team Initiative in elderly (CETIE) multicenter prospective cohort study from 2011 to 2016. **Participants:** Patients 65 years or older were assessed and discharged from ED following a minor trauma. They had to be independent in all basic activities of daily living and being able to communicate in English or French. **Measures:** Primary outcome was RTED and secondary outcome was subsequent falls. Both were self-reported at 3 and 6 months. Patients were stratified according