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A feasibility analysis for successful completion of IVC ultrasound in hypotensive emergency department patients

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Introduction: Determining fluid status prior to resuscitation provides a more accurate guide for appropriate fluid administration in the setting of undifferentiated hypotension. Emergency Department (ED) point of care ultrasound (PoCUS) has been proposed as a potential non-invasive, rapid, repeatable investigation to ascertain inferior vena cava (IVC) characteristics. Our goal was to determine the feasibility of using PoCUS to measure IVC size and collapsibility. **Methods:** This was a planned secondary analysis of data from a prospective multicentre international study investigating PoCUS in ED patients with undifferentiated hypotension. We prospectively collected data on IVC size and collapsibility using a standard data collection form in 6 centres. The primary outcome was the proportion of patients with a clinically useful (determinate) scan defined as a clearly visible intrahepatic IVC, measurable for size and collapse. Descriptive statistics are provided. **Results:** A total of 138 scans were attempted on 138 patients; 45.7% were women and the median age was 58 years old. Overall, one hundred twenty-nine scans (93.5%; 95% CI 87.9 to 96.7%) were determinate. 131 (94.9%; 89.7 to 97.7%) were determinate for IVC size, and 131 (94.9%; 89.7 to 97.7%) were determinate for collapsibility. **Conclusion:** In this analysis of 138 ED patients with undifferentiated hypotension, the vast majority of PoCUS scans to investigate IVC characteristics were determinate. Future work should include analysis of the value of IVC size and collapsibility in determining fluid status in this group.

Keywords: hypotension, inferior vena cava, point of care ultrasound

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Management algorithm for the treatment of intoxications with calcium channel blockers: a simulation trial (MATRICS)

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Introduction: Cardiotoxicants poisonings are rare but have the potential to be highly lethal. Given the precarious nature of these poisonings, the Quebec Poison Control Center (CAPQ) has established a management protocol for optimal treatment. This study seeks to evaluate whether CAPQ's Calcium Channel Blocker (CCB) poisoning management protocol improves treatment delivery by physicians using simulation. The primary outcome is whether the management protocol decreases time to delivery of calcium and insulin. The secondary outcome is whether use of the management protocol increases appropriate dosing. **Methods:** For this randomized AB / BA crossover trial, Emergency Medicine and Internal Medicine residents were randomly assigned to one of two groups; one group received the management protocol during the simulation and the other did not. The crossover occurred 3-months later whereby the groups were reversed. Inverse probability weighting was used to compensate for losses at follow-up. Differences in baseline characteristics, as well as carry-over effect, were evaluated. The outcomes were analyzed with a two-level hierarchical model. **Results:** Twenty-three residents were included in the study. No significant differences in baseline characteristics were noted between the AB / BA groups, and no carry-over effect was identified on statistical analysis for all variables. As for the primary outcomes, time to administration of IV calcium decreased by 87 seconds (CI -266 to 92), time to insulin bolus decreased by 52 seconds (-217 to 114), and time to insulin infusion decreased by 115 seconds (-213 to -18) when the protocol was used. As for the secondary outcomes, there were no statistically significant differences for the percentage of adequate doses of IV calcium (RR: 1.27; 95% CI: 0.80–2.02), insulin bolus (RR: 1.30; 95% CI: 0.80–2.12) and insulin infusion (RR: 1.37; 95% CI: 0.99–1.91). **Conclusion:** This randomized crossover study, which uses simulation to evaluate the performance of CAPQ's CCB poisoning management protocol, does not statistically demonstrate decreased time to administration or increased accuracy of dosing, due to the large confidence intervals. Unfortunately, we were not able to obtain the planned sample size due to limited participation. However, our results trend towards more optimal dosing and rapid dosing of treatments, and from a qualitative standpoint, the protocol appeared to increase the structure of patient care.

Keywords: calcium channel blocker, management protocol, simulation

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Reducing barriers to successful cardiac resuscitation: intervention in elementary schools

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Introduction: The incidence of out-of-hospital cardiac arrest (OHCA) in school is approximately 2.1 for 100,000 per year. Although rare, it is a devastating event for the local community. Schools with public access to automated external defibrillators (AED) and an emergency response plan have demonstrated increased survival rates of up to 70% for students who suffer cardiac arrest. Previous studies identified numerous barriers to successful cardiac resuscitation in public school systems. The main objectives of this study were to identify those barriers in the Quebec region elementary school system and to assess the impacts of an AED focused training session. **Methods:** A previously validated survey focused on the potential barriers to successful defibrillation in OHCA and on demographic variables was sent to 139 elementary schools. Later, 92 employees within three elementary schools who responded to the survey were evaluated before and after receiving training on the use of AED in a mock cardiac arrest scenario. The primary outcome was the time to first shock and the secondary outcomes included correct AED pad placement and safety of the procedure. **Results:** Survey response rate was 53%, which is comparable to previous studies assaying barriers to cardiac resuscitation in public school systems. 95% of school respondents reported the presence of an AED on the school premises but 46% stated that no formal AED training course was provided to employees. Out of the four schools who reported a previous OHCA, only one had access to an AED at the time of the event. Following focused AED training, 92% of school workers successfully completed a defibrillation sequence in a mock scenario, from 53% before ($p < 0.001$, McNemar test). The time to first shock went from 66 seconds (95% CI 63-70) to 47 seconds (95% CI 45-49; -29%, $p < 0.001$). Proper pad placement was the most problematic step for participants and personnel who reported previous training had better performance (OR 3.15, 95% CI 1.33-7.42, $p = 0.009$). **Conclusion:** Most elementary schools in the Quebec region have

https://doi.org/10.1017/cem.2020.203 Published online by Cambridge University Press

access to AEDs. However, inadequate AED training represents a significant barrier to successful defibrillation in the event of an OHCA. Our results showed that a simple focused AED training could improve the performance of school workers and optimize the chain of survival.
Keywords: Automated external defibrillators, Out-of-hospital cardiac arrest, Resuscitation

MP56

Intraosseous versus intravenous access in pediatric out-of-hospital cardiac arrest: an examination of prehospital vascular access methods and survival rates

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Introduction: Intraosseous (IO) and intravenous (IV) access to the vascular system for the delivery of fluid and medication is a component of advanced pediatric resuscitation. Data describing the use of IV or IO vascular access methods and outcomes of pediatric out-of-hospital cardiac arrest (OHCA) are limited. **Methods:** We analyzed prospectively collected data of non-traumatic OHCA of the Resuscitation Outcomes Consortium registry in Canada and the USA (2011-2015). We included patients 17 years of age and younger who were treated by emergency medical services (EMS). We described the vascular access routes utilized, and the success rate of these attempts. We performed a logistic regression model, to evaluate the association of vascular access route and survival, adjusting for age, sex, shockable initial rhythm, witnessed status, public location, EMS arrival interval and time from 911 call to vascular access. In this model, we excluded patients with failed, multiple site or no vascular access attempts during the resuscitation. **Results:** Of 1549 non-traumatic pediatric OHCA, 822/895 (92%) and 345/488 (71%) had successful IO and IV vascular access attempts, respectively. IO access was more common in younger cases. Of 761 cases included in the regression model, 30/601 (5%) of IO-treated cases survived to hospital discharge, in comparison to 40/160 (25%) of IV-treated cases. Intraosseous access was associated with a decreased survival to hospital discharge (adjusted OR 0.46; 95% CI 0.21 to 0.98). **Conclusion:** In pediatric patients with OHCA, intraosseous vascular access was more commonly successful than IV placement and more common among younger cases. However, in cases with successful vascular access, IO use was associated with lower survival to hospital discharge.
Keywords: intravascular access, out-of-hospital cardiac arrest, pediatrics

MP57

Effect of grip strength measured in the emergency department on the risk of functional decline following a minor trauma in robust elderly: a pan-Canadian study

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Introduction: The elderly (65 yo and more) increase in Canada is well documented along with a disproportionate use of Emergency Departments after a minor injury. These patients requires specific care given a 16% risk of functional decline following a visit to ED. To prevent functional decline, a multidimensional assessment of the elderly is recommended in the emergency department. Objective: To determine if ED grip strength can predict functional decline at 3 or 6 months post-injury. **Methods:** A multicentre prospective study in 5 ED across Canada was realized between 2013 and 16. Patients 65 years old and over, autonomous in daily living activities and consulting the emergency department for minor trauma were recruited 7 days a week. Clinical-demographic data, functional status, fear of falling, number of falls in the last month, grip strength measurement were collected in the ED. Functional decline (loss of at least points to functional status) was calculated at 3 and 6 months. Descriptive statistics and linear regression model with repeated measurements were used to determine if the grip strength was predictive of functional decline at 3 or 6 months. **Results:** 387 patient were recruited. Mean age was 74 ± 7 years old, 52% were male. XXX experienced a fall in the last month. The initial maximum grip strength was (24 ± 10 intervention vs. 28 ± 13 control; $p \leq 0.05$). grip strength is associated with pre-injury functional status ($p < 0.0001$) and fear of falling ($p = 0.0001$) but does not predict 3 or 6 month functional decline. **Conclusion:** Given the strong association with fear of falling and functional status at initial ED evaluation, we recommend that grip strength measurement could be included in a multidisciplinary geriatric emergency department assessment as needed.
Keywords: elderly, functional decline, grip strength

MP58

Have opioid prescription by emergency physicians changed significantly over five years?

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Introduction: It is believed by some that emergency physicians prescribe more opioids than required to manage patients' pain, and this may contribute to opioid misuse. The objective of our study was to assess if there has been a change in opioid prescribing practices by emergency physicians over time for undifferentiated abdominal pain. **Methods:** A medical record review for adult patients presenting at two urban academic tertiary care emergency departments was conducted for two distinct time periods; the years of 2012 and 2017. The first 500 patients within each time period with a discharge diagnosis of "abdominal pain" or "abdominal pain not yet diagnosed" were included. Data were collected regarding analgesia received in the emergency department and opioid prescriptions written. Opioids were standardized into morphine equivalent doses to compare quantities of opioids prescribed. Analyses included t-test for continuous and chi-square for categorical data. **Results:** 1,000 patients were included in our study. The mean age was 42.0 years and 69.6% of patients were female. Comparing 2017 to 2012, there was a non-significant decrease in opioid prescriptions written for patients discharged directly by emergency physicians, from 17.8% to 14.4% ($p = 0.14$). Mean opioid quantities per prescription decreased from 130.4 milligrams of morphine equivalents per prescription to 98.9 milligrams per prescription ($p = 0.002$). 13.9% of opioid prescriptions in 2017 were for more than 3 days, which is a decrease from 28.1% in 2012. During the emergency department care, there was an increase in foundational analgesia use prior to initiating opioids from 17.6% to 26.8% ($p = 0.001$). There was also a decrease for within ED opioid analgesia use from 40.0% to 32.8% ($p = 0.018$). **Conclusion:** Opioid prescription rates did not change significantly during our study. However, physicians reduced the quantity of opioids per prescription and used less opioid analgesia in the emergency department for abdominal pain of undetermined etiology.
Keywords: analgesia, opioids