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Procedural sedation in Canadian emergency departments a national survey of airway management, patient monitoring, and adverse events

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Introduction: Emergency department (ED) physicians strive to provide analgesia, amnesia and sedation for patients undergoing painful procedures through the use of procedural sedation (PS). While, PS is generally safe and effective in the ED, there is institutional variability and clinician disagreement with respect to the bedside equipment required for airway management and the monitoring of adverse events. The primary goal of this research project was to describe the variability of the bedside setup utilized by Canadian ED physicians preforming PS in conjunction with self-reported adverse events. **Methods:** An electronic survey was distributed through the Canadian Association of Emergency Physicians (CAEP). Practicing physician members of CAEP were invited to complete the survey. The 20 question survey encompassed various aspects of PS including physician choices regarding bedside setup of airway equipment, and prevalence of self-reported adverse events. The primary outcome was the quantification of variability among ED physicians with respect to the above listed aspects of PS. Data was presented with simple descriptive statistics. **Results:** 278 ED physicians responded to our survey (response rate 20.9%). Respondents were primarily academic (53.2%) or community hospital based (38.2%). With emergency medicine training as: CCFP-EM (55.2%), FRCPC (30.1%), and CCFP (9.0%). The ED area in which PS was carried out varied; bedside (30.5%), procedure room (37.1%), resuscitation area (31.2%). The basic equipment set utilized appears to be a bag valve mask, suction, and an oral airway. These 3 items were present 95.4%, 95.9%, and 86.3% of the time respectively. The preparation of other items such as capnography and difficult airway equipment is highly variable and appears to be physician specific rather than clinical situation specific. The most common physician self-reported adverse events associated with PS appear to be hypoxia (Spo2 < 90%), hypotension (sBP < 90), and prolonged sedation which occurred in 10.7%, 8.3%, and 8.1% of PS performed. **Conclusion:** There appears to be significant practice variability with respect to the clinical setting as well as the equipment ED physicians prefer when administering PS. Given that causal relationships cannot be inferred between airway/monitoring equipment preferences and adverse events, future studies should be targeted at identifying optimal bedside set ups which minimize adverse events.

Keywords: procedural sedation, airway management, survey

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The effect of patient positioning on ultrasound landmarking for cricothyrotomy

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Introduction: The cricothyroid membrane is used as a landmark for emergent surgical airway access. Ultrasound identification of the cricothyroid membrane is more accurate than landmarking by palpation. The objective of this study was to determine whether head of bed elevation affects the position of the cricothyroid membrane as identified by ultrasound. **Methods:** This was a prospective, observational study on a convenience sample of adult patients presenting to the emergency department. Participants underwent ultrasound scans by trained physicians at 0, 30 and 90 degrees head of bed elevation to identify the cricothyroid membrane. The cricothyroid membrane position identified at 0 degrees was used as a reference, and the change in position of the external landmark of the cricothyroid membrane with the patient at 30 and 90 degrees was measured. Additionally, the patients gender, age, body mass index (BMI) and Mallampati score were recorded for comparison. Linear mixed effects models with 95% confidence intervals were used to determine the effect of head of bed elevation, age, BMI and Mallampati score on the differences between measured distances. **Results:** One hundred and two patients were enrolled in the study. The average change in position from reference was statistically significant for both 30 degrees [2.72 ± 0.77mm ($p < 0.01$)] and 90 degrees [4.23 ± 0.77mm ($p < 0.01$)] head of bed elevation. The adjusted linear mixed effects model showed age greater than 70, BMI over 30 and higher Mallampati score were associated with greater change in distance between cricothyroid membrane landmarks. **Conclusion:** There was a statistically significant difference in the position of the cricothyroid membrane comparing 0 degrees to 30 and 90 degrees head of bed elevation. However, the relatively small differences suggest that this finding is not clinically relevant. Further study is required to evaluate if these differences impact the actual successful performance of cricothyrotomy.

Keywords: cricothyrotomy, ultrasound, position

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The use of a pediatric pre-arrival and pre-departure trauma checklist to improve clinical care in a simulated trauma resuscitation: a randomized trial.

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Introduction: The purpose of this study is to determine if the introduction of a pre-arrival and pre-departure Trauma Checklist as a cognitive aid, coupled with an educational session, will improve clinical performance in a simulated environment. The Trauma Checklist was developed in response to a quality assurance review of high-acuity trauma activations. It focuses on pre-arrival preparation and a pre-departure review prior to patient transfer to diagnostic imaging or the operating room. We conducted a pilot, randomized control trial assessing the impact of the Trauma Checklist on time to critical interventions on a simulated pediatric patient by multidisciplinary teams. **Methods:** Emergency department teams composed of 2 physicians, 2 nurses and 2 confederate actors were enrolled in our study. In the intervention arm, participants watched a 10-minute educational video modelling the use of the trauma checklist prior to their simulation scenario and were provided a copy of the checklist. Teams participated in a standardized simulation scenario caring for a severely injured adolescent patient with hemorrhagic shock, respiratory failure and increased intracranial pressure. Our primary outcome of interest was time measurement to initiation of key clinical interventions, including intubation, first blood product administration, massive transfusion protocol activation, initiation of hyperosmolar therapy and others. Secondary outcome measures included a Trauma Task Performance score and checklist completion scores. **Results:** We enrolled 14 multidisciplinary teams ($n = 56$ participants) into our study. There was a statistically significant decrease in median time to initiation of hyperosmolar therapy by teams in the intervention arm compared to the control arm (581 seconds, [509-680] vs. 884 seconds, [588-1144], $p = 0.03$). Time to initiation of other clinical interventions was not statistically significant. There was a trend to higher Trauma Task Performance scores in the intervention group however this did not reach statistical significant ($p = 0.09$). Pre-arrival and pre-departure checklist scores were higher in the intervention group (9.0 [9.0-10.0] vs. 7.0 [6.0-8.0], $p = 0.17$ and 12.0 [11.5-12.0] vs. 7.5 [6.0-8.5], $p = 0.01$). **Conclusion:** Teams using the Trauma Checklist

https://doi.org/10.1017/cem.2018.286 Published online by Cambridge University Press