

checklist. Following participation in the scenarios, participants completed either a 26-item (control group), or 35-item (checklist group) paper-based survey comprised of multiple-choice, Likert-type, rank-list and open-ended questions exploring their perceptions of the airway checklist (checklist group only) and simulation as a learning modality (all participants). **Results:** Fifty-four EM practitioners completed the questionnaire. Most control group participants ($n=24/25$, 96.0%) believed an airway checklist would have been helpful (scored 5/7 or greater) for the scenarios. The majority of checklist group participants ($n=29$) believed that the checklist was helpful for equipment (27, 93.1%) and patient (26, 89.6%) preparation, and post-intubation care (21, 82.8%), but that the checklist delayed definitive airway management and was not helpful for airway assessment, medication selection, or choosing to perform a surgical airway. This group also believed that using the airway checklist would reduce errors during intubation (27, 93.1%) and that the simulated scenarios were beneficial for adopting the use of the checklist (28, 96.6%). Fifty-three participants (98.1%) believed that simulation is beneficial for continuing medical education and 51 respondents (94.4%) thought that skills learned in this simulation were transferable. **Conclusion:** EM practitioners participating in a simulation-based RCT of an airway checklist had positive attitudes towards both the utility of airway checklists and simulation as a learning modality. Thus, simulation may be an effective process to train practitioners to use airway checklists prior to clinical implementation. **Keywords:** checklist, airway, simulation

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Optimizing skill retention in radiograph interpretation: a multicentre randomized control trial

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Introduction: Simulation-based education systems have increased physician skill in radiograph interpretation. However, the degree of skill retention and the factors that influence it are relatively unknown. The main objective of this research was to determine the rate and quantity of skill decay in post-graduate trainee physicians who completed a simulation-based learning intervention of radiograph interpretation. The impact of testing and refresher education on skill decay was also examined. **Methods:** This was a prospective, multicenter, analysis-blinded, four arm randomized control trial conducted from November 2014 to June 2016. Study interventions were administered using an on-line learning and measurement platform. Pediatric and emergency medicine residents in the United States and Canada were eligible for study participation. Participants were randomized to one of four groups. All participants completed an 80-case deliberately practiced learning set of pediatric elbow radiographs followed by an immediate 20-case post-test. Following this, Group 1 had no testing until 12 months; Groups 2, 3, and 4 had testing (20 cases without feedback) every 2 months until 12 months, but Group 3 also had refresher education (20 cases with feedback) at six months while Group 4 had refresher education at two, six, and ten months. The main outcome measure was accuracy at 12 months, adjusted for immediate post-test score, days to completion of 12 month test, and time on case. Based on prior data, we assumed the smallest important difference between groups in learning decay is 10%, a between-participant/within-group standard deviation of 17%, a type I error probability of 5%, a power of 80% and adjusted for three tests with a Bonferroni correction. For the primary analysis of Group 1 versus 2, 3, 4, this resulted in a minimal total sample size of 56, with 14 participants per group. **Results:** We enrolled 106 participants that completed all study interventions. The sample sizes in

Groups 1, 2, 3, and 4 were 42, 22, 22, and 20 respectively. Overall, accuracy increased by 11.8% (95% CI 9.8, 13.8) with the 80-case learning set and then decreased by 5.5% (95% CI 2.5, 8.5) at 12 months. The difference in learning decay in Group 1 vs. Groups 2, 3, 4 was -8.1% (95% CI 2.5, 13.5), $p=0.005$. For Group 2 vs. Group 3 and 4, it was +0.8% (95% CI -7.2, 7.3), $p=0.8$, and between Group 3 vs. Group 4 it was +0.8% (95% CI -7.3, 10.1), $p=0.8$. **Conclusion:** Skill decay was significantly reduced by testing with 20 cases every two months. Refresher education had no additional effect to testing on reducing learning decay. **Keywords:** retention, radiographs, experience curves

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Incidence of delayed intracranial hemorrhage following a mild traumatic brain injury in patients taking anticoagulants or anti-platelets therapies: systematic review and meta-analysis

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Introduction: Head injury is a common presentation to all emergency departments. Previous research has shown that such injuries may be complicated by delayed intracranial hemorrhage (D-ICH) after the initial scan is negative. Exposure to anticoagulant or anti-platelet medications (ACAP) may be a risk factor for D-ICH. We have conducted a systematic review and meta-analysis to determine the incidence of delayed traumatic intracranial hemorrhage in patients taking anticoagulants, anti-platelets or both. **Methods:** The literature search was conducted in March 2017 with an update in April 2017. Keyword and MeSH terms were used to search OVID Medline, Embase and the Cochrane database as well as grey literature sources. All cohort and experimental studies were eligible for selection. Inclusion criteria included pre-injury exposure to oral anticoagulant and / or anti-platelet medication and a negative initial CT scan of the brain (CT1). The primary outcome was delayed intracranial hemorrhage present on repeat CT scan (CT2) within 48 hours of the presentation. Only patients who were rescanned or observed minimally were included. Clinically significant D-ICH were those that required neurosurgery, caused death or necessitated a change in management strategy, such as admission. **Results:** Fifteen primary studies were ultimately identified, comprising a total of 3801 patients. Of this number, 2111 had a control CT scan. 39 cases of D-ICH were identified, with the incidence of D-ICH calculated to be 1.31% (95% CI [0.56, 2.27]). No more than 12 of these patients had a clinically significant D-ICH representing 0.09% (95% CI [0.00, 0.31]). 10 of them were on warfarin and two on aspirin. There were three deaths recorded and three patients needed neurosurgery. **Conclusion:** The relatively low incidence suggests that repeat CT should not be mandatory for patients without ICH on first CT. This is further supported by the negligibly low rate of clinically significant D-ICH. Evidence-based assessments should be utilised to indicate the appropriate discharge plan, with further research required to guide the balance between clinical observation and repeat CT.

Keywords: traumatic brain injury, anticoagulation, delayed intracranial hemorrhage

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Sex-based differences in concussion symptom reporting and self-reported outcomes in a general adult ED population

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