

and death. Endoscopy is important in the management of LGIB, however gastroenterologists have limited resources to safe endoscopy. Risk stratification of LGIB patients can aid physicians in disposition decisions. **Objective:** to develop a clinical decision tool to accurately identify LGIB patients presenting to the emergency department (ED) who are at risk for 30-day serious adverse events. **Methods:** We conducted a health records review and included 372 adult ED patients who presented with an acute LGIB. The outcome was a 30-day composite outcome consisting of all-cause death, recurrent LGIB, need for intervention to control the bleed and ICU admission. A second researcher confirmed data-collection of 10% of the data and we calculated a κ -value for inter-rater reliability. We analyzed the data using stepwise backwards selection and SELECTION=SCORE option and calculated the diagnostic accuracy of the final model. **Results:** Age 75 years, hemoglobin 100 g/L, INR 2.0, a bloody stool in the ED and a past medical history of colorectal polyps were significant predictors in the multivariable regression analysis. The AUC was 0.83 (95% CI 0.77-0.89), sensitivity 0.96 (0.90-1.00), specificity 0.53 (0.48-0.59), and negative likelihood ratio 0.08 (0.02-0.30) for a cut-off score of 1. **Conclusion:** This model showed good ability to identify LGIB patients at low risk for adverse events as evidenced by the high AUC, sensitivity and negative likelihood ratio. Future, large prospective studies should be done to confirm the data, after which it should be validated and implemented.

Keywords: lower gastrointestinal bleeding, decision tool, risk stratification

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Ready for the story? A mixed methods systematic review of factors that influence handovers between prehospital personnel and emergency department nurses receiving patients arriving by ambulance

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Introduction: Safe and efficient handovers between emergency medical services (EMS) practitioners and emergency nurses are vital as poor transitions may lead to loss of information and place patients at risk for adverse events. We conducted a mixed methods systematic review to a) examine factors that disrupt or improve handovers from EMS practitioners to emergency department nurses, and b) investigate the effectiveness of interventional strategies that lead to improvements in communication and fewer adverse events. **Methods:** We searched electronic databases (DARE, MEDLINE, EMBASE, Cochrane, CINAHL, Joanna Briggs Institute EBP; Communication Abstracts); grey literature (grey literature databases, organization websites, querying experts in emergency medicine); and reference lists of the included studies. Citation tracking was conducted for the included studies. Two reviewers independently screened titles/abstracts and full-texts for inclusion and methodological quality using the Effective Public Health Practice Project Quality Assessment Tool for quantitative studies and the Joanna Briggs Institute Critic Appraisal Checklist for Qualitative Research. Narrative and thematic synthesis were conducted to integrate and explore relationships within the data. **Results:** Twenty-two studies were included in this review from the 6150 records initially retrieved. Our analysis suggests that qualitative, quantitative, and mixed methods research approaches have been utilized to explore handovers. Studies ($n=11$) have predominantly explored existing patterns of handovers focusing on barriers and facilitators. Interventions (e.g. multimedia transmission of pre-hospital information, tailored e-learning program) were investigated in five studies. Results suggest that lack of formal

handover training, workflow interruptions, workload, and strained working relationships between EMS and nursing are perceived threats to optimal handovers. **Conclusion:** The findings from this review can inform the development of handover interventions and contribute to a more rigorous approach to researching handovers between EMS practitioners and emergency nurses. Furthermore, there is a need for studies in which specific interventions to optimize handovers are examined.

Keywords: handovers, emergency medical services, emergency department nurses

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Mental practice for technical skills training in emergency medicine: a scoping review

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Introduction: Emergency physicians must achieve and maintain competence in numerous procedural skills, many of which are high stakes, time dependent, and used infrequently in clinical practice. Mental practice (MP) is the systematic use of mental imagery to see and feel an action in ones imagination without engaging in actual physical movement, and has been shown to enhance skill acquisition and performance in music and athletics. In this scoping review, we describe the utility and effectiveness of MP as a tool for procedural skill acquisition in medicine. **Methods:** An electronic search of MEDLINE, EMBASE, the Cochrane Library, CINAHL, PsycINFO, Open Grey, Conference Proceedings Index, ProQuest Dissertations and Theses and Google Scholar was conducted. Included studies evaluated MP for learning medically related technical skills using any method of mental training (script memorization, hypo-therapy, psychotherapy). Two independent reviewers screened articles for inclusion, and data was extracted using a standardized tool. **Results:** Our search returned 2028 results, of which 61 were eligible for inclusion. Forty-three studies evaluated MP interventions for technical skill development. Of these, 69.6% focused on minimally invasive surgical skills. The most common outcome measure was quantitative evaluation of skill via observer-scored checklist (69.6%). Other outcomes included stress, time to task completion, and haptic and movement data from surgical simulators. 82.6% of studies demonstrated a positive effect of MP on skill acquisition or performance. The quality of the trials was modest, and only 34.7% of published work provided clear detail on specific MP strategies. **Conclusion:** MP is an effective tool for procedural skills training. Areas outside of minimally invasive surgery are under-represented, and more data is needed on MP for rare or emergent procedures that typify emergency care. The minority of studies reviewed reported methods for developing and validating MP interventions in sufficient detail, a practice that should be adopted in future trials.

Keywords: mental practice, airway, cricothyroidotomy

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A new in-skates balance error scoring system for the sideline assessment of concussion in hockey players

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Introduction: During a hockey game, athletes who are suspected of having sustained a concussion are removed from the game and evaluated. The modified balance error scoring system (MBESS) assessment, an essential part of the concussion evaluation, is performed in the dressing room, barefoot on a hard surface after equipment removal.

While, players that pass the concussion assessment may re-dress and return to play, the equipment removal and re-dressing delays their return into the game. The objective of our study was to develop and evaluate a new in-skates balance error scoring system (SBESS) to reduce the delay in returning to the game. **Methods:** A prospective randomized single blinded study was conducted with 80 healthy university hockey players split into two groups. An at-rest group performed the SBESS assessment at rest on two separate occasions. A post-exercise group performed the test once at rest and once after exercise. The SBESS consisted of performing 4 different stances for 20 seconds each without equipment removal. The assessments were video recorded, and 3 independent reviewers scored the videos. For both the at-rest and post-exercise groups, the primary outcome measured was the number of balance errors. The secondary outcome was the number of falls. Statistics: For the primary outcome, both inter-rater and intra-rater reliability were calculated. The concordance between the SBESS and the currently used baseline pre-season balance score (MBESS) was also assessed. **Results:** The number of cumulative balance errors for all four stances varied between 4 and 7 for both groups without any significant exercise effect. No athletes fell. For inter-rater reliability, the intra-class correlation (ICC) was above 0.86, ranging from 0.86-0.92 for most stances except for the easiest stance, for which it was 0.66. For intra-rater reliability, the ICC ranged from 0.88 to 1 for all stances and raters. There was a lack of concordance between the SBESS and MBESS. **Conclusion:** The SBESS is a reliable balance test that can be safely performed in healthy athletes wearing their full equipment. The next step will be to evaluate the use of this test on concussed hockey athletes.

Keywords: concussion, balance, hockey

P125

Introduction of extracorporeal cardiopulmonary resuscitation (ECPR) into emergency care: a feasibility study

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Introduction: Traditionally, out of hospital cardiac arrests (CA) have poor outcomes. Incorporation of extracorporeal cardiopulmonary resuscitation (ECPR) is being used increasingly to supplement ACLS to provide better outcomes for patients. Current literature suggests potentially improved outcomes, including neurological function. We assessed the feasibility of introduction of ECPR to a regional hospital using a 4-phase study. We report phase-1, an estimation of the number of potential candidates for ECPR in our setting. **Methods:** Following development and agreement on local criteria for selection of patients for ECPR using a modified Delphi Technique, inclusion and exclusion criteria were applied retrospectively, to a database comprising 4 years of emergency department (ED) cardiac arrests (n=395). This provided estimates of the number of patients who would have qualified for EMS transport for ECPR and initiation of ECPR in the ED. **Results:** Application of criteria would result in 20.0% (95% CI 16.2-24.3%) of CA being transported to the ED for ECPR (mean 18.5 patients per year). In the ED 4.6% (95% CI 2.83-7.26%) would be eligible to receive ECPR (4.3 patients per year). Incorporating downtime criteria, 3.0% (95% CI 1.6-5.3%) qualify. After considering local in-house cardiac catheterization hours 9.4% (95% CI 6.8-12.9%) and 5.4% (95% CI 3.5-8.2%), without and with EMS rhythm assumptions respectively, would be eligible for transport. For placement on pump, 3.0% (95% CI 1.6-5.3%) and 2.4% (95% CI 1.2-4.6%), without and with use of total downtime respectively, were eligible. **Conclusion:** If historical patterns of CA were to continue, we believe that an ECPR program may be feasible in

our regional hospital setting, with a small number of selected cardiac arrest patients meeting eligibility for transportation and initiation of ECPR. These numbers suggest that an ECPR program would not be resource intensive, yet would be sufficiently busy to maintain adequate team competency.

Keywords: extracorporeal cardiopulmonary resuscitation, resuscitation, cardiac arrest

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Development of inclusion and exclusion criteria for ECPR in a regional hospital

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Introduction: Extracorporeal cardiopulmonary resuscitation (ECPR), a method of cardiopulmonary bypass, is increasingly being used to supplement traditional CPR to improve outcomes for cardiac arrest (CA). CA and particularly out of hospital CA (OHCA) have poor outcomes. Prior to development of a 3 phase ECPR program in a Canadian regional hospital, we wished to identify and optimize a practical selection process (inclusion and exclusion criteria) for patients who may benefit from ECPR. **Methods:** Using a locally modified Delphi technique, we followed a literature review to construct a proposed set of evidence based criteria with a questionnaire, where inclusion and exclusion criteria were scored by a selected group of 13 experts. Following 3 rounds, and additional review by an international expert in the field of ECPR, consensus was achieved for patient selection criterion. **Results:** First round responses achieved 87.5% agreement for selection of exclusion criteria. Inclusion criteria had agreement 62.5%. Responses to the second round for selection of inclusion criteria were unanimous at 100% with the exception of age parameters (<65 years vs. <70 years). The third and final set of criteria achieved 100% consensus though subsequent expert review refined a single exclusion criteria (asystole). Agreed inclusion criteria were: witnessed CA, age <70, refractory arrest, no flow time <10min, total downtime <60min, and a cardiac or select non-cardiac etiology (PE, drug OD, poisoning, hypothermia). Exclusion criteria were: unwitnessed arrest, asystole, certain etiologies (uncontrolled bleeding, irreversible brain damage, trauma), and comorbidities (severe disability limiting ADLs, standing DNR, palliation). Simplified criteria for EMS transport included witnessed OHCA, age, and no flow time. **Conclusion:** Selection criteria of candidates for ECPR are important components for any program. Expert consensus review of current evidence is an effective method for development of ECPR selection criteria.

Keywords: extracorporeal cardiopulmonary resuscitation, resuscitation, selection

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A prospective study of the management and outcomes of patients with symptomatic atrial fibrillation and/or flutter presenting to emergency departments

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Introduction: Patients with new onset and chronic atrial fibrillation and/or flutter (AFF) present to emergency departments (ED) with symptoms requiring acute management decisions. Most research has