

specialty and level of training of the health professional who performed the procedure was not associated with the incidence of at least one complication.

Keywords: chest tube, predictors, thoracostomy

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Kussmaul's sign for the diagnosis of right ventricular myocardial infarction

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Introduction: Kussmaul's sign, the absence of a drop in JVP or a paradoxical increase in JVP on inspiration, can be elicited clinically as an indicator of right ventricular myocardial infarction (RVMI). RVMI poses unique diagnostic and management challenges. It complicates 30-50% of inferior MI and is associated with increased mortality when compared to inferior MI without RV involvement. Early recognition allows maintenance of preload by avoiding use of nitroglycerin, diuretic and narcotic medication, and treatment with fluids and vasopressors. We reviewed the evidence for Kussmaul's sign for diagnosis of RVMI. **Methods:** We conducted a librarian assisted search using PubMed, Medline, Embase, the Cochrane database, relevant conference abstracts from 1965 to October 2019. No restrictions for language or study type were imposed. All studies with patients presenting with acute myocardial infarction were reviewed. Two independent reviewers extracted data from relevant studies. Studies were combined when similar study populations were present. Study quality was assessed using the QUADAS-2 tool. Random effects meta-analysis was performed using metaprop in Stata for the 3 reference standards combined. Subset analysis for each of the 3 reference standards was completed. **Results:** We identified 122 studies: 10 were selected for full text review. Eight studies had comparable populations with a total of 469 consecutive patients admitted to the coronary care unit with acute inferior myocardial infarction and were included in the analysis. Prevalence of RVMI was 36% (CI 95% 31.8-40.5). Reference standards for the diagnosis of RVMI included echocardiography, 16 lead ECG and haemodynamic studies. A gold standard for diagnosis of RVMI is lacking and thus the reference standards were combined. Kussmaul's sign had a sensitivity of 69.3% (CI 95% 46.3 - 85.5, I2- 86.7%), specificity of 95.1% (CI 95% 75.6 - 99.2, I2- 89.3%) and LR + 14.1 (CI 95% 2.6-73.2). Subset analysis of echocardiography, ECG and haemodynamic studies revealed sensitivity of 45%, 77% and 82% (I2- 62%, N/A, 70%) respectively and specificity of 92%, 84% and 92% (I2- 86%, N/A, 86%). **Conclusion:** Kussmaul's sign is specific for acute right ventricular myocardial infarction and may serve as an important clinical sign of right ventricular dysfunction requiring preload preserving management.

Keywords: clinical exam, Kussmaul's sign, right ventricular myocardial infarction

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Strengthening inter-professional collaboration in home-based community paramedic programs

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Introduction: Community paramedic programs are being implemented to leverage existing resources and contribute to a sustainable patient-centered healthcare system. Expanding the role of paramedics into home care requires new collaborative relationships with

healthcare providers such as nurses and physicians. Developing effective and productive collaborative relationships will enhance and support the integration of community paramedic programs. Our objective was to describe the barriers and facilitators to effective collaboration between nurses, physicians, and paramedics within home-based community paramedicine. **Methods:** We conducted semi-structured interviews with nurses, physicians, paramedics, and faculty who teach in paramedic programs. We explored the attitudes, perceptions, barriers, and enablers to collaboration in home-based community paramedic programs. Participants were recruited utilizing the professional networks of the researchers as well as snowball sampling. Recruitment in each group stopped when saturation was achieved. We conducted a thematic analysis of the interviews to generate findings related to our objectives. **Results:** We interviewed 33 participants with a typical cross-section of age, years of experience, and education. Overall, participants felt that collaboration was important for effective integration of community paramedics into home care and for ensuring a patient-centered approach to care. Currently, collaboration mostly occurs between physicians and paramedics and community paramedicine appears to be a siloed rather than integrated service. Few collaborative relationships exist between paramedics and nurses, despite the fact that nurses are highly involved in home care. We identified several barriers to effective collaboration including lack of understanding of the contributions of the different health providers, and regulatory and funding constraints. Inter-professional education that supports collaboration and facilitates dismantling of professional and service silos can support the effective integration of paramedics into home care. **Conclusion:** Strengthening networks of collaboration between nurses, physicians, and paramedics can help dismantle silos and enhance inter-professional collaboration to support appropriate integration of paramedics into home care. The willingness and positive attitudes for collaboration are assets that provide an excellent foundation upon which to move forward. Continuing education to support inter-professional collaboration is needed.

Keywords: community paramedicine, inter-professional collaboration

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Examining emergency physicians' self-reported opioid prescribing practices for the treatment of acute pain: A Newfoundland perspective

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Introduction: Canadians are the second largest consumers of prescription opioids per capita in the world. Emergency physicians tend to prescribe stronger and larger quantities of opioids, while family physicians write the most opioid prescriptions overall. These practices have been shown to precipitate future dependence, toxicity and the need for hospitalization. Despite this emerging evidence, there is a paucity of research on emergency physicians' opioid prescribing practices in Canada. The objectives of this study were to describe our local emergency physicians' opioid prescribing patterns both in the emergency department and upon discharge, and to explore factors that impact their prescribing decisions. **Methods:** Emergency physicians from two urban, adult emergency departments in St. John's, Newfoundland were anonymously surveyed using a web-based survey tool. All 42 physicians were invited to participate via email during the six-week study period and reminders were sent at weeks two and four. **Results:** A total of 21 participants responded to the survey. Over half

of respondents (57.14%) reported that they “often” prescribe opioids for the treatment of acute pain in the emergency department, and an equal number of respondents reported doing so “sometimes” at discharge. Eighty-five percent of respondents reported most commonly prescribing intravenous morphine for acute pain in the emergency department, and over thirty-five percent reported most commonly prescribing oral morphine upon discharge. Patient age and risk of misuse were the most frequently cited factors that influenced respondents’ prescribing decisions. Only 4 of the 22 respondents reported using evidence-based guidelines to tailor their opioid prescribing practices, while an overwhelming majority (80.95%) believe there is a need for evidence-based opioid prescribing guidelines for the treatment of acute pain. Sixty percent of respondents completed additional training in safe opioid prescribing, yet less than half of respondents (42.86%) felt they could help to mitigate the opioid crisis by prescribing fewer opioids in the emergency department. **Conclusion:** Emergency physicians frequently prescribe opioids for the treatment of acute pain and new evidence suggests that this practice can lead to significant morbidity. While further research is needed to better understand emergency physicians’ opioid prescribing practices, our findings support the need for evidence-based guidelines for the treatment of acute pain to ensure patient safety.

Keywords: acute pain, opioid prescribing guidelines, opioid prescription

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Barriers and facilitators affecting implementation of a decision aid for the diagnosis of acute aortic syndrome: a qualitative study
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Introduction: Acute aortic syndrome (AAS) is an uncommon, life-threatening emergency that is frequently misdiagnosed. The Canadian clinical practice guidelines for the diagnosis of AAS were developed in order to reduce the frequency of misdiagnoses and number of diagnostic tests. As part of the guidelines, a clinical decision aid was developed in order to facilitate clinician decision-making based on practice recommendations. The objective of this study was to identify barriers and facilitators among physicians to implementation of the decision aid. **Methods:** We conducted semi-structured interviews with emergency room physicians working at 5 sites distributed between urban academic and rural settings. We used purposive sampling, contacting ED physicians until data saturation was reached. Interview questions were designed to understand potential barriers and facilitators affecting the probability of decision aid uptake and accurate application of the tool. Two independent raters coded interview transcripts using an integrative approach to theme identification, combining an inductive approach to identification of themes within an organizing framework (Theoretical Domains Framework), discrepancies in coding were resolved through discussion until consensus was reached. **Results:** A majority of interviewees anticipated that the decision aid would support clinical decision making and risk stratification while reducing resource use and missed diagnoses. Facilitators identified included validation and publication of the guidelines as well as adoption by peers. Barriers to implementation and application of the tool included the fact that the use of D-dimer and knowledge of the rationale for its use in the investigation of AAS were not widespread. Furthermore, scoring components were, at times, out of alignment with clinician practices and understanding of risk factors. The complexity of the decision aid was also identified as a potential barrier

to accurate use. **Conclusion:** Physicians were amenable to using the AAS decision aid to support clinical decision-making and to reduce resource use, particularly within rural contexts. Key barriers identified included the complexity of scoring and inclusion criteria, and the variable acceptance of D-dimer among clinicians. These barriers should be addressed prior to implementation of the decision aid during validation studies of the clinical practice guidelines.

Keywords: decision tool, acute aortic syndrome, aortic dissection

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Improving the diagnosis of pulmonary embolism in the emergency department

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Background: Emergency physicians (EPs) can choose from several evidence-based pathways to diagnose pulmonary embolism (PE), however literature suggests that EPs frequently use computer tomography (CT) scanning as a stand-alone test for PE. This is a program of research to improve adherence to evidence-based PE diagnosis in the emergency department (ED). **Aim Statement:** To create a novel approach to PE diagnosis in the ED based on a framework explaining EP diagnostic PE behaviour and barriers to using evidence-based PE testing. **Measures & Design:** We conducted two types of qualitative interviews: 1). EPs in 5 Canadian cities watched videos of 2 simulated cases and then explained how they would test the patient. 2). Semi-structured EP interviews using the theoretical domains framework (TDF). The results of our analyses informed the construction of an explanatory framework for common EP diagnostic PE behaviours. Barriers to evidence-based behaviour were classified into domains. A Canadian EP expert group reviewed these results along with the existing evidence on ED PE diagnostic implementation. We developed a new approach to diagnosis of PE in the ED which addresses each of our domains. **Evaluation/Results:** We conducted 71 interviews. We identified 4 domains, each addressed in our pathway. ‘PE in a mythical and deadly beast’ PE kills and can masquerade so EPs look for PE in places where it does not exist and are rewarded for ‘over-testing’. Response: Creating a departmental conversation about missing PE, talking about the facts, busting the myths. EP feedback on PE testing including positive rate. ‘The end goal is CTPE’ PE creates anxiety for EPs and ordering a CTPE hands over responsibility to the radiologist. Response: A departmental protocol for PE testing which starts with D-dimer for every patient. Shifting focus to ruling out PE with D-dimer. Protocol is automated once initiated by EP. ‘PERC eases anxiety’ PERC is documented when it is negative and allows EP to stop. Response: EPs can choose to use and document PERC. ‘No-one has been fighting for the Wells score’ Poor understanding of purpose and function. Often at odds to Gestalt. Response: Protocol does not use Wells score. **Discussion/Impact:** We have developed a new diagnostic PE pathway which addresses current barriers to evidence-based practice which we will evaluate further.

Keywords: computer tomography scan, pulmonary embolism, quality improvement and patient safety

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Colder, but no less safe: A comparison of bicycle related traumas in winter compared to summer cyclists

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