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Does point-of-care ultrasonography improve diagnostic accuracy in emergency department patients with undifferentiated hypotension? An international randomized controlled trial from the SHoC-ED investigators

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Introduction: Point of care ultrasound has been reported to improve diagnosis in non-traumatic hypotensive ED patients. We compared diagnostic performance of physicians with and without PoCUS in undifferentiated hypotensive patients as part of an international prospective randomized controlled study. The primary outcome was diagnostic performance of PoCUS for cardiogenic vs. non-cardiogenic shock. **Methods:** SHoC-ED recruited hypotensive patients (SBP < 100 mmHg or shock index > 1) in 6 centres in Canada and South Africa. We describe previously unreported secondary outcomes relating to diagnostic accuracy. Patients were randomized to standard clinical assessment (No PoCUS) or PoCUS groups. PoCUS-trained physicians performed scans after initial assessment. Demographics, clinical details and findings were collected prospectively. Initial and secondary diagnoses including shock category were recorded at 0 and 60 minutes. Final diagnosis was determined by independent blinded chart review. Standard statistical tests were employed. Sample size was powered at 0.80 ($\alpha:0.05$) for a moderate difference. **Results:** 273 patients were enrolled with follow-up for primary outcome completed for 270. Baseline demographics and perceived category of shock were similar between groups. 11% of patients were determined to have cardiogenic shock. PoCUS had a sensitivity of 80.0% (95% CI 54.8 to 93.0%), specificity 95.5% (90.0 to 98.1%), LR+ve 17.9 (7.34 to 43.8), LR-ve 0.21 (0.08 to 0.58), Diagnostic OR 85.6 (18.2 to 403.6) and accuracy 93.7% (88.0 to 97.2%) for cardiogenic shock. Standard assessment without PoCUS had a sensitivity of 91.7% (64.6 to 98.5%), specificity 93.8% (87.8 to 97.0%), LR+ve 14.8 (7.1 to 30.9), LR- of 0.09 (0.01 to 0.58), Diagnostic OR 166.6 (18.7 to 1481) and accuracy of 93.6% (87.8 to 97.2%). There was no significant difference in sensitivity (-11.7% (-37.8 to 18.3%)) or specificity (1.73% (-4.67 to 8.29%)). Diagnostic performance was also similar between other shock subcategories. **Conclusion:** As reported in other studies, PoCUS based assessment performed well diagnostically in undifferentiated hypotensive patients, especially as a rule-in test. However performance was similar to standard (non-PoCUS) assessment, which was excellent in this study.

Keywords: diagnosis, hypotension, point of care ultrasonography (PoCUS)

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Identifying patient values and expectations for pulmonary embolism CT scanning in the emergency department

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Introduction: There is an evidence-practice gap between guidelines for diagnosing pulmonary embolism (PE) and emergency physician

practice. Computed tomography (CT) scanning is being overused to exclude PE in Canadian emergency departments (EDs) and current guidelines do not fit well with the ED model of patient care. There is a lack of research on patient opinions on PE testing, and a poor physician understanding of patient-specific goals in the ED. We are addressing this by conducting patient interviews to identify patient-specific values and opinions on PE testing in the ED. These will be used to develop patient-centered educational tools which physicians and patients can use to discuss the decision to order a CT PE scan. The aim of this study is to identify patient expectations and priorities on PE testing in the ED. **Methods:** This qualitative study uses constructivist grounded theory to analyze patient values and opinions on PE testing in ED patients from two hospitals. Participants are screened by monitoring the ED patient tracker. If a patient is being tested for PE, they are approached and consented by a researcher to take part in a 30-minute semi-structured interview. Each interview is transcribed verbatim and independently analyzed by four researchers using constant comparative coding. The researchers meet weekly to compare codes and agree on common coding terms. The codes are grouped into themes, and the interview script is modified to maximize information on emerging themes. From this, major themes with associated subthemes will be derived, each representing an opportunity, barrier or value which must be addressed in our new patient education tools. We have performed 23 interviews and expect to reach theme saturation at 30 interviews. Full results will be available by the 2019 CAEP conference. **Results:** From the patient interviews conducted so far, we have mapped four major themes: patient satisfaction comes from addressing their primary concern (for example, their pain); patients expect individualized care; patients prefer imaging over clinical examination when testing for PE; and patients expect 100% confidence from their ED physician when given a diagnosis. **Conclusion:** These four domains will be used to create a new patient-centered approach to PE testing in the ED which will include physician education, patient information and organizational changes to patient processing. This study incorporates evidence-based medicine with ethical and social implications to improve patient outcomes.

Keywords: decision making, patient-centred care, pulmonary embolism

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What patients need early surgical intervention for acute ureteric colic?

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Introduction: Ureteral colic is a common painful disorder. Early surgical intervention is an attractive management option but existing evidence does not clarify which patients benefit. Based on lack of evidence, current national specialty guidelines provide conflicting recommendations regarding who is a candidate for early intervention. We compared treatment failure rates in patients receiving early intervention to those in patients offered spontaneous passage to identify subgroups that benefit from early intervention. **Methods:** We used administrative data and structured chart review to study consecutive patients attending one of nine hospitals in two provinces with an index emergency department (ED) visit and a confirmed 2.0-9.9 mm ureteral stone. We described patient, stone and treatment variables, and used multivariable regression to identify factors associated with treatment failure, defined as the need for rescue intervention or hospitalization within 60 days. Our secondary