

LO81**Optimizing the use of CT scanning for pulmonary embolism in the emergency department**

S. Sharif, MD, C. Kearon, MB, M. Li, BSc, M. Eventov, BSc, P.E. Sneath, MD, R. Leung, BHSc, R. Jiang, HBSc, K. de Wit, MBChB, MD, MSc, McMaster University, Hamilton, ON

Introduction: Diagnosing pulmonary embolism (PE) can be challenging because the signs and symptoms are often non-specific. Studies have shown that evidence-based diagnostic algorithms are not always adhered to in the Emergency Department (ED), which leads to unnecessary CT scanning. In 2013, the American College of Chest Physicians identified CT pulmonary angiography as one of the top five avoidable tests. One solution is to use a clinical prediction rule combined with the D-dimer, which safely reduces the use of CT scanning. The objective of this study was to compare the proportion of patients tested for PE in two emergency departments, who 1) had a CT-PE and 2) whose diagnosis of PE was missed. We compared these rates to those if the Wells rule and D-dimer had been applied as standard. **Methods:** This was a retrospective chart review of ED patients investigated for PE at two hospitals from April 2013 to March 2015 (24 months). Inclusion criteria were the ED physician ordered CT-PE, Ventilation-Perfusion (VQ) scan or D-dimer for investigation of PE. Patients under the age of 18 were excluded. PE was defined as CT/VQ diagnosis of acute PE or acute PE/DVT in 30-day follow-up. Trained researchers extracted anonymized data. The rate of CT/VQ imaging and the false-negative rates were calculated. The false-negative rate was calculated as the number of patients diagnosed with PE within 30 days as a proportion of those patients who did not have a CT/VQ scan at initial presentation. **Results:** There were 1,189 patients included in this study. 55/1,189 patients (4.6%; 95%CI 3.6-6.0%) were ultimately diagnosed with PE within 30 days. 397/1,189 patients (33.4%; 95%CI 30.8-36.1%) had CT/VQ scans for PE. 3 out of 792 who were not scanned had a missed PE resulting in a false-negative rate of 0.4% (95% CI 0.1-1.1%). 80 patients had an elevated D-dimer or high Wells score but were not imaged. Furthermore, 75 patients who did not have an elevated D-dimer nor a high Wells score were imaged. Had Wells rule/D-dimer been adhered to, 402/1,189 patients (33.8%; 95%CI 31.9-36.6%) would have undergone imaging and the false negative rate would be 0/727, 0% (95%CI 0.0-0.5%). **Conclusion:** If the Wells rule and D-dimer was used in all patients tested for PE, a similar proportion would have a CT scan but fewer PEs would be missed.

Keywords: pulmonary embolism, D-dimer, diagnosis

LO82**The accuracy and prognostic value of point-of-care ultrasound for renal colic: a systematic review**

C. Wong, MD, P. Young, MD, M. Ross, MD, H. Lee Robertson, MLIS, E. Lang, MD, University of Calgary, Calgary, AB

Introduction: Point-of-care ultrasound (POCUS) has been suggested as an initial investigation in the management of renal colic. Our objectives were: 1) to determine the accuracy of POCUS for the diagnosis of nephrolithiasis, and 2) to assess its prognostic value in the management of renal colic (PROSPERO: 42016035331). **Methods:** An electronic database search of MEDLINE, EMBASE, and PubMed was conducted utilizing subject headings, keywords, and synonyms that address our research question. Bibliographies of included studies and narrative reviews were manually examined. Studies of adult emergency department patients with renal colic symptoms were included. Any degree of hydronephrosis was considered a positive POCUS finding. Accepted

criterion standards were CT evidence of renal stone or hydronephrosis, direct stone visualization, or surgical findings. Screening of abstracts, quality assessment with the QUADAS-2 instrument, and data extraction were performed by two reviewers, with discrepancies resolved by conference with a third reviewer. Test performance was assessed by pooled sensitivity and specificity, calculated likelihood ratios, and a summary receiver operator curve (SROC). The secondary outcome of prognostic value was reported as a narrative summary. **Results:** The electronic search yielded 627 unique titles. After relevance screening, 25 papers underwent full-text review, and 8 articles met all inclusion criteria. Of these, 5 high-quality studies (N = 1773) were included in the meta-analysis for diagnostic accuracy, and three yielded data on prognostic value. The pooled results for sensitivity and specificity were 70.2% (95% CI = 67.1% to 73.2%) and 75.4% (95% CI = 72.5% to 78.2%), respectively. The calculated positive and negative likelihood ratios were 2.85 and 0.39. The SROC generated did not show evidence of a threshold effect. Three studies examining prognostic value noted a higher likelihood of a large stone or surgical intervention with positive POCUS findings. The largest randomized trial showed lower cumulative radiation exposure and no increase in adverse events in those who received POCUS investigation as the initial renal colic investigation. **Conclusion:** Point-of-care ultrasound is of modest accuracy for the diagnosis of nephrolithiasis. While positive POCUS findings are associated with larger stones and greater likelihood for intervention, the clinical importance of this is unclear.

Keywords: point-of-care ultrasound, nephrolithiasis

LO83**Effectiveness of implementing evidence based interventions to reduce C-spine imaging in the emergency department: a systematic review**

S. Desai, BSc, C. Lui, BSc, L. Krebs, MPP, MSc, S.W. Kirkland, MSc, D. Keto-Lambert, MLIS, B.H. Rowe, MD, MSc, University of Alberta, Edmonton, AB

Introduction: Unnecessary imaging of adult cervical spine (C-spine) injury patients in the Emergency Department (ED) is a concern. Guidance for C-spine image ordering exists; however, the effectiveness and safety of their implementation in the ED is not well studied. This review examines their implementation and effectiveness at reducing C-spine imaging in adults presenting to the ED with stable neck trauma. **Methods:** Six electronic databases and the grey literature were searched. Comparative studies examining interventions to reduce C-spine imaging were eligible for inclusion. Two independent reviewers screened for study eligibility, assessed study quality, and extracted data. Data were analyzed using RevMan (Version 5.3) to explore the effectiveness of these interventions in safely reducing C-Spine radiography. **Results:** A total of 848 unique citations were screened of which six before-after studies and one randomized controlled trial were included. The study population varied with respect to injury severity (i.e., stability status). None of the studies were assessed as high quality. The interventions employed included locally developed guidelines and clinical decision rules, specifically the National X-radiography Utilization Study (NEXUS) criteria and the Canadian C-Spine Rule (CCR). Various implementation strategies, such as teaching sessions, pocket reminder cards, posters and computerized decision support were used. Several studies used multi-faceted interventions. Overall, of the five study groups that examined change in x-ray ordering, three groups reported a significant reduction in c-spine radiography. The remaining two showed no change in imaging. A pooled estimate of the effectiveness of the interventions was prohibited by significant heterogeneity.