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Inna Eikashvili, Ee Tein Tay, James W Tsung. The Effect of Point-of-care Ultrasound on Emergency Department Length of Stay and Computed Tomography Utilization in Children with Suspected Appendicitis. Academic Emergency Medicine, 2014; 21(2): 163-170.

CLINICAL QUESTION: Can point-of-care (POC) ultrasound (US) for acute appendicitis in the pediatric population decrease length of stay (LOS)?

INTRODUCTION: Previous studies have established that US has high specificity for ruling in the diagnosis of appendicitis, and multiple guidelines advocate sequential imaging with US first, followed by CT only if US is inconclusive. However, the role of clinician-performed US in the ED is unclear. Recent studies suggest that POC US performed by emergency physicians may have similar test characteristics to radiology department ultrasound. This study aimed to evaluate effect of point-of-care (POC) US in children and its effect on length of stay (LOS) and utilization of computed tomography (CT) for diagnosis, as well as calculate test performance statistics for each imaging modality: POC US, Radiology US, and CT.

METHODS: This was a prospective observational study using a convenience sample of children with suspected appendicitis requiring imaging evaluation and meeting criteria set by Standards for Reporting of Diagnostic Accuracy (STARD). Outcomes were determined by operative or pathology report in patients diagnosed with appendicitis and 3-week phone follow-up in patients who were non-operative. Differences in LOS were analyzed by ANOVA between patients receiving dispositions after POC US, Radiology US, and CT. Test performance characteristics were calculated for all imaging modalities.

RESULTS: Of 150 participants, 50 (33%) were diagnosed with appendicitis. There were no missed cases of appendicitis in discharged patients at 3-week follow-up and no negative laparotomies in those going to the operating room. Those who received dispositions after POC US had significantly decreased ED LOS (154 minutes, 95% CI = 115 to 193 min) compared to radiology US (288 min, 257-319 min) and CT (487 min, 434-540 min). The sensitivity, specificity, and positive LR were as follows: POC US 60%/94%/10; Radiology US 63%/99%/94; CT 83%/98%/45.

LIMITATIONS: This study used a convenience sample was only performed in the ED at a single academic pediatric hospital and additional studies are needed to establish reproducibility of these results.

DISCUSSION: Multiple guidelines advocate imaging with US first due to its specificity for appendicitis, and this study shows that the specificity of POC US is similar to Radiology US. Additionally, ED LOS during this study was shorter on average for POC US than Radiology US or CT. Given these characteristics of POC US, the study supports use of POC US in place of Radiology US as the first-line imaging modality prior to CT. However, additional studies across different hospitals/healthcare systems need to be performed to establish external validity of these findings. Additionally, the study does not take into account use of physician time as a resource in the ED, and although POC US may decrease LOS for patients with possible appendicitis, this study does not comment on how increased time spent on POC US affects overall work flow in the ED.