

## John Trentini CAT--Block 9 2014

Leeuwenburgh, M., et al. **A Simple Clinical Decision Rule to Rule Out Appendicitis in Patients with Non-diagnostic Ultrasound Results.** Acad Emerg Med. 2014 May;21(5):488-96.

**Objectives:** To evaluate an effective clinical decision rule (CDR) to minimize abdominal CT in the setting of a non-diagnostic US.

### **Background:**

Clinical decision tools to adequately risk stratify patients for acute appendicitis in light of non-diagnostic imaging continues to be a challenge to the medical community.

### **Methods:**

Adults- prospective cohort study- pre-specified variables prospectively collected, divided into a development and a validation cohort. CDR determined on 4 factors – male, migration to RLQ, vomiting, WBC > 12.0  $\times 10^9$ /L. Applied to the validation set, and re-eval'd, outcome was appendicitis.

### **Results:**

The CDR selected patients after negative or inconclusive US for discharge and next-day reevaluation without initial CT or MRI if fewer than two of the following predictors were present: male sex, migration of pain to the right lower quadrant, vomiting, and white blood cell (WBC) count higher than 12.0  $\times 10^9$ /L. Applying the CDR in the development set selected 126 of 199 (63%) patients with negative or inconclusive US results for discharge without further imaging. This rule reduced the probability of appendicitis from 26% (51 of 199) in the total group of patients with negative or inconclusive US results to 12% (15 of 126) in the group that would be discharged based on the rule ( $p = 0.001$ ). In the validation set ( $n = 120$ ), the decision rule selected 72 (60%) patients for discharge and next day reevaluation and reduced the probability of appendicitis from 20% (24 of 120) in the total group to 6% (4 of 72) in the patients selected on the rule ( $p = 0.001$ ). The negative predictive value of the decision rule in the validation set was 94% (95% confidence interval [CI] = 87% to 98%). In comparison, the negative predictive value of CT in the same group was 99% (95% CI = 93% to 100%,  $p = 0.14$ ), and that of MRI was 99% (95% CI = 94% to 100%,  $p = 0.12$ ).

### **Discussion:**

CDR's are valuable in guiding clinical decisions and have the potential to avoid expensive and potentially harmful or unnecessary testing. In this study, the CDR was only applied to nondiagnostic US, which can be, in large part, technician dependent and is subject to variability. This is evident by the variability in inconclusive US results between cohorts within this individual study (22% vs 47%). Given that variability, applying this CDR to the general population seems unrealistic. Within the cohort, there was still a 1/10 chance of discharging someone home with appendicitis. While this study provides some more clinical guidance in the most common clinical signs of appendicitis, the risks of inadvertently sending a patient home with acute appendicitis appear higher than the risks of a harmful CT scan, although the conclusive data is still emerging regarding the risks of radiation from abdominal CT scans. While CDRs are useful, I would not hang my hat on this one in particular to reliably discharge patient's home with confidence.

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