

What are the Most Clinically Useful Cutoffs for the Alvarado and Pediatric Appendicitis scores? A Systematic Review

Mark H. Ebell, MD, Joana Shinhosler, BSHP

Introduction

We commonly use clinical decision rules (CDRs) to guide our work up and support our diagnosis in the ED. CDRs use pertinent findings from the medical history and physical exam, as well as simple laboratory tests, to predict the likelihood of a disease. There are several CDRs for appendicitis, and according to these authors, the most widely studied are the Alvarado and Pediatric Appendicitis scores. The goal of these CDRs is to guide disposition. Patients who are below the test threshold may be discharged home without additional diagnostic tests. Those who have a high probability can be treated with immediate appendectomy. Those with an intermediate risk might undergo imaging or observation.

Study objective

Look at the accuracy of the Alvarado score and Pediatric Appendicitis Score and identify optimal cutoffs for low-and high-risk populations.

Methods

The authors performed a systematic review of the literature. 544 studies were identified, but only 29 of those met inclusion criteria. Data were obtained only from parallel, and prospective, cohort studies that avoided verification bias, which eliminated another 3 studies. They calculated likelihood ratios for low, moderate, and high-risk groups. They used all possible cutoffs from the available data, even if it was not included in the original study.

Results

The pretest probability of appendicitis was approximately 33% in child studies and approximately 66% in studies of adults. Likelihood ratios at different cutoffs for the Alvarado score in adults were 0.03 (<4 points), 0.42 (4 to 6 points), and 3.4 (greater than or equal to 7 points); and 0.01 (< 5 points), 0.98 (5 to 8 points), and 6.7 (greater than or equal to 9 points). Likelihood ratios for the Alvarado score in children were 0.02 (<4 points), 0.27 (4 to 6 points), and 4.2 (greater than or equal to 7 points); and 0.04 (<5 points), 1.2 (5 to 8 points), and 8.5 (greater than or equal to 9 points). For the Pediatric Appendicitis Score, likelihood ratios were 0.13 (<4 points), 0.70 (4 to 7 points), and 8.1 (greater than or equal to 8 points).

Conclusion

In adults with a pretest probability greater than or equal to 60%, an Alvarado score of 8 or higher ruled in the diagnosis; whereas, a score of 9 or higher rules in the diagnosis at pretest scores of 40% or greater. In children with a pretest probability of acute appendicitis of 60% or less, an Alvarado score below 4 rules out the diagnosis. Additionally, this is also true in children with pretest probability of approximately 40% or less, for a score less than 5.
