RESEARCH PAPER | Medical Science | Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

Evaluation of the Pediatric Appendicitis Score in Younger Children: A Retrospective Study

KEYWORDS: Appendicitis, Age, Young Children

Dr. Gyaneshwar Rao
Assistant Professor, Department of Surgery, Gujarat Adani Institute of Medical Science, Bhuj, Gujarat.

Dr. Prakash Galani
Associate Professor, Department of Surgery, Gujarat Adani Institute of Medical Science, Bhuj, Gujarat.

ABSTRACT

Introduction: *Acute appendicitis is acute inflammation and infection of the vermiform appendix, which is most commonly referred to simply as the appendix. The appendix is a blind-ending structure arising from the cecum. Acute appendicitis is one of the most common causes of abdominal pain and is the most frequent condition leading to emergent abdominal surgery in children.*

Materials & Methods: *150 children, between 1 and 18 years, operated on with appendectomy for suspected appendicitis, were retrospectively analyzed. The cohort was divided into two age groups: ≥8 years (= 110) and < 8 years (= 40).*

Results: *The mean PAS was lower among the younger compared with the older patients despite the fact that younger children had more severe appendicitis. PAS had low sensitivity in both groups, with a significantly lower sensitivity among the younger patients. Parent and doctor delay were confirmed in children < 8 years of age with appendicitis. PAS did not aid in patients with doctor delay. Parameters in patient history, symptoms, and abdominal examination were more diffuse in younger children.*

Conclusion *PAS should be used with caution when examining children younger than 8 years of age. Diffuse symptoms in younger children with acute appendicitis lead to delay and to later diagnosis and more complicated appendicitis.*

Introduction

Acute appendicitis is acute inflammation and infection of the vermiform appendix, which is most commonly referred to simply as the appendix. The appendix is a blind-ending structure arising from the cecum. Acute appendicitis is one of the most common causes of abdominal pain and is the most frequent condition leading to emergent abdominal surgery in children. The appendix may be involved in other infectious, inflammatory, or chronic processes that can lead to appendectomy; however, this article focuses on acute appendicitis. Appendicitis and acute appendicitis are used interchangeably.[1]

Common symptoms of acute appendicitis include abdominal pain, fever, and vomiting. The diagnosis of appendicitis can be difficult in children because the classic symptoms are often not present.[2]

A delay in the diagnosis of appendicitis is associated with rupture and associated complications, especially in young children. Improvements in rupture rates have been made with advanced radiologic imaging. Appendicitis is a clinical diagnosis with imaging used to confirm equivocal cases.[3]

Key to any evaluation and treatment plan are the following: relieve the patient's pain and discomfort early and consistently; communicate with the patient and family about the plans; repeat the examination often; adjust the differential diagnosis as appropriate; and keep the patient for observation if a firm diagnosis is not made.[4]

The most widely used antibiotic regimen is a penecillin based regimen such as piperacillin/tazobactam or ampicillin/clavulanic acid or the combination of ampicillin, clindamycin (or metronidazole), and gentamicin. If a penicillin allergy exists, regimens incluidng cephalosporins, aminoglycosides and clindamycin may be used.[5]

In this systematic review, the Alvarado score and the Pediatric Appendicitis Score (PAS) were considered the most reliable.[6] PAS is the only score specifically developed for children, composed by Samuel in 2002 when analyzing children between 8 and 15 years of age. PAS has been validated and recommended by some authors, but only one of these studies has included children less than 8 years of age. Further, no study has compared PAS between older and younger children. We hypothesized that PAS could be helpful in diagnosing young children with appendicitis and that we would find both parent delay and doctor delay contributing to the often late diagnosis in this age group. The aims of this study were to evaluate PAS in children.

Materials & Method

This study is an institution-based, retrospective study. All children <15 years of age who underwent appendectomy between January 2005 and March 2010 were searched. The endpoint of the study was the completion of the appendectomy and the following 30 days. Charts including notes from the operation, laboratory tests, radiology, and histopathological analysis were retrospectively studied. The diagnosis of appendicitis was based on operative findings and, in most cases, combined with the histopathological analysis. Medical records were examined and the following characteristics were recorded: age, sex, time from onset of symptoms to seeking care (parent delay), how often the child was evaluated by a doctor and sent home without suspicion of appendicitis and without a rescheduled follow-up (doctor delay), which diagnosis was presumed in patients with doctor delay, presenting symptoms, notes

Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

from the abdominal examination, presence of leukocytosis and/or neutrophilia, type of radiology used, surgeon's description of the severity of the appendicitis, results from the histopathological analysis, days of in-patient care, and complications. With the information on patient history, abdominal examination, and laboratory tests, PAS was calculated for each patient. PAS consists of eight parameters: (1) migration of pain, (2) anorexia, (3) nausea/vomiting, (8) right lower quadrant (RLQ) tenderness, (5) cough/percussion/hopping tenderness in the RLQ, (6) elevated temperature, (7) leukocytosis, and (8) polymorphonuclear neutrophilia. Each parameter is assigned 1 point except the physical signs (8 and 5) which are assigned 2 points, giving a maximum score of 10. A score ≥6 is said to indicate a high risk of appendicitis. The patients were divided into two groups according to their age: ≥8 years of age and <8 years of age.

The statistical analysis was performed by a statistician. Each child <8 years of age was compared with five children between 8 and 15 years of age. SPSS Statistics was used for statistical calculations. Fisher's twotailed exact test was used for dichotomous variables and the Mann-Whitney -test for ranked results. A value < 0.05 was considered statistically significant.

Results:

A total of 200 patients who underwent surgery were identified. Thirty-eight patients were excluded, due to the appendectomy being performed en passant or as an interval appendectomy, leaving a total of 150 patients to analyze. Of these, 30 patients were further excluded due to lack of data for calculating PAS. Seven of the excluded patients were 8 years of age, 20 of which had appendicitis and three had a negative appendectomy. Thus, a total of 150 patients, 78 boys and 72 girls, were finally included in the study. There were 40 patients <8 years of age (mean 2.6 years) and 110 patients between the ages of 8 and 18 years (mean 10.5 years). The excluded patients did not differ in the severity of the appendicitis when compared with the included patients. Mean PAS was significantly lower among the younger patients than among the older patients. The sensitivity of PAS with a cutoff at six points was low in both groups but significantly lower in the younger group. With a cutoff at five points, no significant difference in sensitivity was observed. The specificity, PPV, and NPV varied with different cutoffs and between the two age groups. Generally, the specificity and PPV were high, and the NPV was low. The specificity among the younger patients with a cutoff at six points was 100%. The PAS in patients with doctor delay showed lower values compared with patients without doctor delay. All patients under < 8 years and with a doctor delay had a score < 6. No differences in postoperative complications such as abscess, wound infection, and intestinal obstruction were found.

Discussion

The classic history of anorexia and vague periumbilical pain, followed by migration of pain to the right lower quadrant (RLQ) and onset of fever and vomiting, is observed in fewer than 60% of patients. If the appendix perforates, an interval of pain relief is followed by development of generalized abdominal pain and peritonitis.[7] Although some patients progress in the classical fashion, some patients deviate from the classic model. Atypical presentations are common in neurologically impaired and immune compromised patients, as well as in children who are already on antibiotics for another illness.[8]

The PAS was significantly lower among the younger compared with the older patients, despite the fact that younger children had more severe appendicitis.[9] Furthermore, PAS had low sensitivity in both groups with a significantly lower sensitivity among the younger patients. Both parent delay and doctor delay were found in younger children with appendicitis. Parameters in patient history, symptoms, and abdominal examination were more diffuse in younger children. We hypothesized that PAS would be helpful in diagnosing acute appendicitis in younger children. However, the mean value of PAS at the time of the first doctor examination was significantly lower for younger children than for older children. The original study describing PAS did not include younger children. To our knowledge, only one study evaluating PAS has included younger children. This study included patients between 1 and 17 years of age who sought medical care with a chief complaint of abdominal pain lasting less than 7 days.

Considering that younger children had more severe appendicitis, a higher PAS value in this group would be expected. Because this was not the case, one could speculate about the reasons for such a finding.[6] Regarding patient history, the younger patients "lose points" for not being able to describe pain migration. A history of typical pain migration was observed in 50% of the older patients but was absent among younger patients. This may be explained by the difficulty, among younger children, to localize and describe the pain. Regarding physical examination, tenderness in the RLQ was significantly less among younger patients, a finding that was also described by others. One explanation may be that many of the children had perforated appendicitis at consultation, a condition that presents with more diffuse pain. The difficulty for the younger children to describe pain migration, as well as the absence of RLQ tenderness, is thus a limitation in using PAS in young children because pain migration and RLQ tenderness are included in the score.[10] On the other hand, fever was more common among younger children, largely due to a higher rate of severe appendicitis. This probably increased the mean PAS in the younger group, which raises the question of whether PAS would have been even lower if the groups were matched based on the severity of the appendicitis.

Conclusion

The PAS scoring system turned out to be a weak tool in diagnosing appendicitis in children, especially in younger children. Furthermore, PAS did not aid in patients with doctor delay. Parent delay and doctor delay were confirmed as contributing factors in the delayed diagnosis of appendicitis in younger children, which may explain the higher rate of complicated appendicitis in this group. More studies, including prospective studies, of children with suspected appendicitis are needed, especially with a focus on younger children.

Volume : 5 | Issue : 12 | December 2015 | ISSN - 2249-555X

REFERENCE [1] Minkes RK, Bechtel K, Billmire D: Pediatric appendicitis. 2011. [2] Graham JM, Pokorny WJ, Harberg FJ: Acute appendicitis in preschool age children. The American Journal of Surgery 1980, 139:247-50. [3] Wijetunga R, Tan BS, Rouse JC, Bigg-Wither GW, Doust BD: Diagnostic Accuracy of Focused Appendiceal CT in Clinically Equivocal Cases of Acute Appendicitis 1. Radiology 2001, 221:747-53. [4] Organization WH: Cancer pain relief: with a guide to opioid availability: World Health Organization, 1996. [5] French L, Smaill FM: Antibiotic regimens for endometritis after delivery. The Cochrane Library 2004. [6] Salö M, Friman G, Stenström P, Ohlsson B, Arnbjörnsson E: Appendicitis in children: evaluation of the pediatric appendicitis score in younger and older children. Surgery research and practice 2014, 2014. [7] Weber TR, Keller MA, Bower RJ, Spinner G, Vierling K: Is delayed operative treatment worth the trouble with perforated appendicitis is children? The American journal of surgery 2003, 186:685-9. [8] Irish MS, Pearl RH, Caty MG, Glick PL: The approach to common abdominal diagnoses in infants and children. Pediatric Clinics of North America 1998, 45:729-72. [9] Hale DA, Molloy M, Pearl RH, Schutt DC, Jaques DP: Appendectomy: a contemporary appraisal. Annals of surgery 1997, 225:252. [10] Maldonado N: Evidence-based management of suspected appendicitis in the emergency department. Emergency medicine practice 2011:2.