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Research Paper

RETROSPECTIVE ANALYSIS OF PEDIATRIC APPENDICITIS SCORE

Medical Science

KEYWORDS : Pediatric Appendicitis Score (PAS), Acute appendicitis, Appendicectomy

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ABSTRACT

Evaluation of the pediatric appendicitis score (PAS), in all patients who had an appendicectomy over a one-year period.

Methods:

Retrospective study of 50 patients aged 4–16 years, who underwent an emergency appendicectomy. PAS was applied and patients were divided according to the PAS protocol into high probability and low probability groups. These results were then correlated with histology.

Results:

The PAS had sensitivity of 0.93, specificity of 0.52, positive predictive value of 0.72, and negative predictive value of 0.84. Had we used the PAS in the diagnosis of acute appendicitis in these 50 patients, our negative appendicectomy rate would have been reduced to 27%, but two patients with Acute appendicitis would have been deprived of early surgical treatment and may have been treated conservatively.

Conclusions:

The diagnosis of acute appendicitis and the need for surgery is still a matter of clinical judgment which can be built with practice, and although the PAS could provide useful diagnostic information in children with suspected acute appendicitis, it cannot be used as sole method for determining the need for surgery, as it would lead to unacceptable risk of wrongly discharging or delaying necessary surgery in significant number of patients with appendicitis.

INTRODUCTION

Acute appendicitis is one of the most common general surgical emergencies. [1] In many cases a careful history, simple bedside examination are all that required to make the diagnosis. [1]

Many children present with classical findings of right lower quadrant pain associated with nausea or vomiting and fever, But subtle features and difficult examinations can make identifying acute appendicitis in a child challenging, leaving surgeon struggling to distinguish this surgical emergency from less urgent conditions.

Definitive diagnosis of acute appendicitis is made in only 50-70% of children at the time of initial assessment (6) . This reflects the proportion of appendices that are normal on histological studies and negative appendicectomy rate of 10- 30% (7-9) .

Early diagnosis and prompt surgical intervention is the key for successful management of acute appendicitis. Misdiagnosis and delay can lead to complications like perforation and peritonitis. [2] Many surgeons advocate early intervention to avoid perforation accepting a negative appendicectomy rate of about 15-20%. [2]

Several studies have shown that many of appendicectomies being performed in patients, when not required (normal appendix at histological examination). Though various scoring systems have been introduced, none so far has been independently demonstrated to fulfill the basic requirements regarding sensitivity and specificity [2]

The aim of this study was to analyze the accuracy of the pediatric appendicitis score (PAS) [3] by retrospectively scoring pediatric patients who underwent an appendicectomy and comparing the patients' scores with their appendix histology.

PATIENTS AND METHODS

Hospital records of all patients aged 4–16 years who underwent an emergency appendicectomy as a sole procedure at Father Muller Medical Hospital over a one-year period were retrieved. Hospital records identified 50 patients that contained sufficient information to accurately apply the scoring system [Table 1]. After data analysis, the patients were placed into one of two groups: Either PAS ≤ 5 or PAS ≥ 6. The histology was not reviewed until after the final result had been recorded. The PAS for each patient was then compared with the true histology results.

TABLE 1 - Table showing diagnostic test characteristics of the PAS

Finding	Points
Nausea/Vomiting	1
Anorexia	1
Fever	1
Migration of pain	1
Leukocytosis	1
Neutrophilia	1
Right lower quadrant tenderness	2
Hopping/Percussion tenderness	2

RESULTS

The median age of these patients was 12 years (range 4 – 16) with 30 male and 20 female patients [Table 2].The PAS was applied to each patient's notes and they were classified into four groups according to PAS and histology: true positive score (PAS ≥ 6, histology positive), true negative score (PAS ≤ 5, histology negative), falsepositive score (PAS ≥ 6, histology negative), and false negative score (PAS ≤ 5, histology positive) as shown in [Table 3].

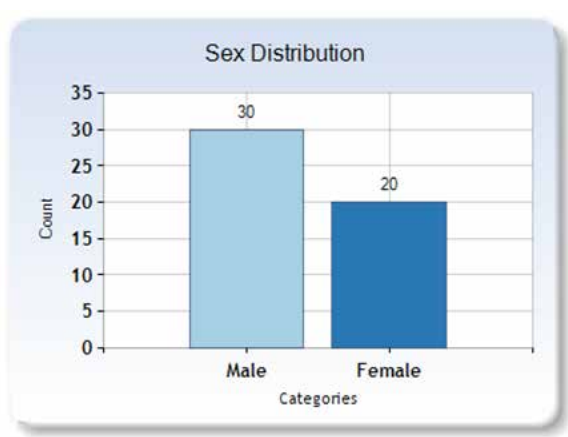

Table 2: Sex Distribution

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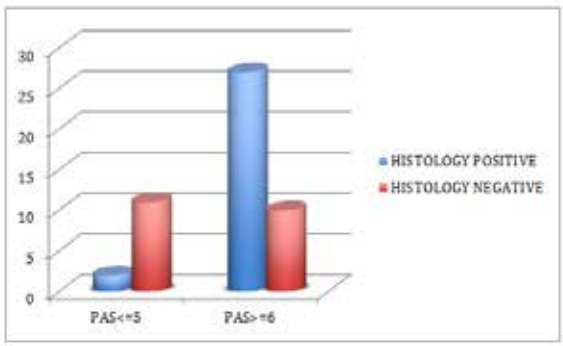
Table 3:PAS compared to Histology

	HISTOLOGY POSITIVE	HISTOLOGY NEGATIVE
PAS<=5	2	11
PAS>=6	27	10



The PAS had sensitivity of 0.93, specificity of 0.52, positive predictive value of 0.72, and negative predictive value of 0.84. Had we used the PAS in the diagnosis of acute appendicitis in these 50 patients, our negative appendicectomy rate would have been reduced to 27%, but two patients with Acute appendicitis would have been deprived of early surgical treatment and may have been treated conservatively

DISCUSSION

The PAS is a relatively new scoring system, which relies upon simple points in the history and examination of a patient. It is scored out of ten with a score of five or less excluding appendicitis, and a score of six or above making a true case of appendicitis highly likely. [2]

The prospective data set provided by Samuel [3] was collectedthroughout a 5-year period at Southampton General Hospital,Southampton, and St George's Hospital, London, England,before the article was published in 2002.[3] A total of 1,170

children aged 4 to 15 years and presenting with abdominal painsuggestive of appendicitis were studied. Patients who had appendicular mass or periappendiceal abscess were excluded.

The author of the study introducing this scoring system reported a sensitivity of 1, specificity of 0.92 positive predictive value 0.96, and negative predictive value of 0.99. This would result in a 4% negativeappendicectomy rate, and no patients with appendicitis being discharged or receiving delayed treatment as every case of appendicitis would be diagnosed accurately.

Goldman et al in Toronto prospectively tested the PAS on unselected children with abdominal pain. Based on the scoring system, they noted that if they had sent kids with a score less than or equal to 2 home, there would have been a 2.5% missed appendicitis rate. On the other hand, if they took anyone with a score greater or equal to 7 to the Operating room, the rate of negative appendectomies would have been 4%. [4]

Another study by Bhatt et al looked at the use of PAS on children suspected of having appendicitis and noted that sending home children with a PAS of 4 or less would have resulted in a missed appendicitis rate of 2.4%, while operating on those with a PAS greater or equal to 8 would have resulted in a negative appendectomy rate of 8.8%.[5] In our study here, we found PAS scoring applied to 50 patients who underwent appendicectomy in the year 2014, showed sensitivity of 93% , specificity of 52%, positive predictive value of 72%, and negative predictive value of 84%. From these results, if the PAS were introduced and used as the sole factor in deciding whether or not to operate in cases of suspected appendicitis, the negative appendicectomy rate would be 27%. More worryingly, however, using this scoring system would result in 15% of all cases of appendicitis being missed and potentially discharged.

The negative appendicectomy rate in the pediatric population is significantly higher than that in any other age group, and can be up to 46%. (7)

Reading through the papers, it is clear that the PAS is not perfect.The PAS is a diagnostic tool, which is simple to apply and requires no additional resources. PAS helps to standardize the way we communicate the level of suspicion for appendicitis, and may have a role in developing pathways to help surgeons decide on whom to image, and whom not to.

PAS may be helpful more in Community hospitals where ultrasound and CT operators do not have substantial pediatric exposure and where pediatric surgeon is unavailable. PAS can be proposedas a guide to decide which patients to transfer from one facility to another when a pediatric surgeon consultation is needed.

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