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Introduction

Acute appendicitis is the most common paediatric intra-abdominal surgical emergency [1,2]. Its classical presentation is straight-forward to diagnose, even among the most junior of surgeons. However, subtle clinical features in the early stages of the disease process are often vague and atypical, posing challenges even to experienced surgeons [3]. Failure to make an early diagnosis is a primary reason for morbidity and mortality associated with perforation and gangrene, which can occur within 24-48 hrs of untreated appendicitis [4,5]. On the other hand, studies have shown misdiagnoses in 1 in 5 cases of acute appendicitis, and up to 40% have normal appendices following emergency appendectomy [6]. In an attempt to increase the diagnostic accuracy of the disease, the Alvarado score is one of many scoring systems employed by surgeons. The authors aim to assess the diagnostic accuracy of the Alvarado parameters and based on this scoring system with the addition of other indicators, aim to devise a simple, cost-effective, evidence-based scoring algorithm to reduce the rate of negative appendectomies whilst minimising the fatal risk of perforation and gangrene.

Methodology

The study included male and female patients between the ages of 5 and 16 presenting with acute appendicitis and subsequently undergoing appendectomy with histopathological analyses of resected specimens.

Percentages were compared by employing chi-square test and a p<0.05 was regarded as statistically significant.

Results

Overview:

Out of the 311 patients, n=193 (62%) were males and n=118 (38%) were females. The mean age was 13.3 ± 0.47. The largest age group was represented by 13 to 16 years old patients, n=193 (62.1%) (Table 1).

Characteristic	Value
Age (years)	
Mean	13.3 ± 0.47
Median	13.2
Gender	
Males	193 (62%)
Females	118 (38%)
Age incidence (years)	
5-8	31 (10%)
9-12	87 (28%)
13-16	193 (62%)

Table 1:

Symptoms at presentation included: Right iliac fossa (RIF) pain (n=199, 64.0%), LIF pain (n=62, 20.0%), migratory RIF pain (n=265, 85.2%), nausea/vomiting (n=265, 85.2%), anorexia (n=212, 68.2%). Clinical examination included: elevated temperature of more than 38°C per SIRS criteria (n=56, 18.0%) [7]. RIF tenderness (n=308, 99.0%) and LIF tenderness (n=101, 32.5%).

Laboratory tests included: Raised white cell counts (n=217, 69.8%), raised neutrophils/leucocytes (n=212, 68.2%), as well as elevated CRP levels (n=267, 85.9%). Of the 311 patients, n=270 (86.2%) were confirmed to have acute appendicitis on histopathological analyses of resected appendiceal specimens: Simple (n=188), suppurative (n=35), perforated (n=28), gangrenous (n=13) and abscess (n=6) (Table 2). Of the 41 patients with normal appendices, the underlying pathologies were: ovarian cyst pathology (n=12; 3 were ruptured), pelvic inflammatory disease/pain due to retrograde menstruation (n=9), and 'no surgical diagnosis' (n=20). Of the 20 patients without a surgical diagnosis, 8 had mesenteric adenitis, 6 had urinary tract infection (all of them went on to have a positive urine cultures), 2 had gastroenteritis, 2 had constipation, 1 had acute pancreatitis and 1 showed signs of lower lobe pneumonia.

Evaluation of findings

To analyse and evaluate the data, a 2 * 2 table was designed for each clinical feature serving as a diagnostic indicator. From these tables, probabilities, sensitivities and predictive values were calculated (Table 3). For a 'perfect test', the sensitivities and predicted values should be 100%. In such cases, the total joint probability (the total sample size divided by the number of true positives or true negatives) which statistically serves as the diagnostic weight should be equal to 1.0 for that particular clinical indicator.

Clinical features

RIF pain: This symptom had a good positive predicted value (0.87) but poor sensitivity (0.51).

LIF pain: Pain in the LIF has been reported in some cases of acute appendicitis [8]. In our study, it has both poor sensitivity and positive predicted values (0.45 and 0.32 respectively).

Migratory RIF pain: The so-called 'migratory' or 'migrating' RIF pain is a well-documented symptom of acute appendicitis. This symptom had good positive predicted and sensitivity values (0.83 and 0.93 respectively).

Nausea/vomiting: This symptom had good positive predicted and sensitivity values (0.83 and 0.93 respectively). This symptom is often complex and is reported in other causes of acute abdomen [8].

Anorexia: This is a recognised feature of most intra-abdominal pathologies [8,9]. In our study, it had a fair positive predicted and sensitivity result (0.71 and 0.73 respectively).

Pyrexia: It had poor positive predicted value and sensitivity values (0.61 and 0.55 respectively).

Tenderness: One of the most common clinical signs of acute appendicitis is tenderness in the RIF. In our study, if tenderness was in the RIF, sensitivity was excellent (1.0) and positive predicted value was very good (0.98). In persisting RIF tenderness i.e., tenderness lasting for more than >24 hrs, both positive predicted and sensitivity values

single study test which remains a limitation.

References

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