

Role Of Modified Alvarado Score In The Diagnosis Of Acute Appendicitis.

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Citation

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Abstract

Acute appendicitis is one of the most common causes of right iliac fossa pain that require emergent surgical intervention. The diagnosis is made predominantly on the basis of clinical criteria. The diagnosis may be elusive in a few cases, thus leading to a negative appendicectomy. The Alvarado scoring system, which is based on a set of clinical and laboratory criteria, has therefore been developed to make the diagnosis of this condition easier and more accurate. The present study aims at studying the role of the Alvarado score in the diagnosis of acute appendicitis warranting emergency appendicectomy.

INTRODUCTION

Acute appendicitis, though one of the commonest conditions in surgical practice, can at times pose a challenge to the best of surgeons. Failure to diagnose the condition early during the course of the disease can lead to complications, resulting in an increase in morbidity and even occasional mortality. A negative appendicectomy rate ranging from 20 to 40% has been described in the literature. Thus, the surgeon's main aim is to decrease the negative appendicectomy rate to a bare minimum. Various scoring systems have been proposed in order to facilitate this. Alvarado score, which takes into consideration various simple variables, is one such system. [1] The present study evaluates the efficacy of this scoring system in accurately diagnosing acute appendicitis preoperatively.

THE ALVARADO SCORE

The scoring system described by Alvarado is based on three symptoms, three signs and two laboratory tests. Patients are classified into groups depending upon their scores. Patients with a score of 1-4 are not considered likely to have acute appendicitis; those with a score of 5-6 are considered to have a possible diagnosis of appendicitis that is not convincing enough to warrant immediate surgery. Those with a score of 9-10 are considered to have a definitive diagnosis of acute appendicitis and undergo surgery.

MATERIALS AND METHODS

Forty consecutive patients presenting with symptoms and signs related to the right iliac fossa (suggestive of acute

appendicitis warranting surgery) were studied prospectively. The original Alvarado scoring system was modified. The criterion of 'shift to the left of neutrophils' was not considered, as the facility to evaluate this investigation was not available for emergency cases. The remaining criteria were the same. Patients with a score of 7 or more were subjected to surgery. All patients having a score of less than 7 were monitored and operated upon only in the event of worsening of abdominal signs.

RESULTS

The mean age of the patients studied was 26 years (range: 19 to 33 years). Out of the forty patients studied, twenty patients were male and twenty were female. Seventeen of the male patients had a score greater than or equal to 7 and underwent appendicectomy. Patients with scores less than 7 were treated conservatively and responded well. None of these patients required any surgical intervention. Amongst the females, 16 had a score greater than or equal to 7 and underwent appendicectomy. The specimens were examined grossly as well as microscopically. The diagnosis of acute appendicitis was confirmed histologically in all 17 male patients while in the female group only 14 had histological confirmation out of the 16 who underwent appendicectomy. Thus, the negative appendicectomy rate in the female group was 12.5%.

Figure 1

Table 1: The Alvarado score

Symptoms	Score
Migratory right iliac fossa pain	1
Anorexia	1
Nausea/Vomiting	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness	1
Elevated temperature	1
Laboratory Findings	
Leucocytosis	2
Shift to the left of neutrophils	1
Total score	10

Figure 2

Table 2: Interpretation of Alvarado score

Score	Significance
1-4	Unlikely to be acute appendicitis
5-6	Possible diagnosis of acute appendicitis
7-8	Acute appendicitis present
9-10	Definite acute appendicitis requiring surgery

Figure 3

Table 3: Results

Sex	No. of patients	Score (>7)	Appendicitis confirmed	Negative appendectomy rate	Sensitivity
Men	20	17	17	Nil	100%
Women	20	16	14	12.5%	87%

DISCUSSION

Acute appendicitis is a condition which is diagnosed clinically, and imaging modalities and laboratory tests are a useful adjunct to such diagnosis. Diagnostic scoring systems

aim at simplifying variables and making the criteria easy and reproducible at the same time, thereby serving the purpose of diagnosis. [2] Utilizing a scoring system should aid in the early preoperative diagnosis of this condition. Depending upon the range of score into which a particular patient fits into, other ancillary investigations can be added in order to increase the diagnostic efficacy. This is particularly pertinent to the female population, wherein the spectrum of differential diagnosis is extensive.

The Alvarado score is an easy and comprehensive system of scoring, since it takes into consideration symptoms, signs and laboratory reports. The gamut of symptoms and signs included in the scoring system are ones that constitute the traditional Murphy’s triad. It also includes laboratory investigations. Neutrophilic leucocytosis is the major criteria accompanied by evaluation of shift of the cellular count to the left. In the present study this was not studied due technical non-availability of the facility. It was the leucocyte count which was studied instead. The system is reproducible and can even be assessed by the junior surgical residents. It is helpful for preparing patients for early surgery thereby preventing a delay in surgical intervention, which increases the complication rate in appendicitis. Despite all attempts to make an accurate preoperative diagnosis a negative appendectomy rate continues to prevail. The negative appendectomy rates in most studies are in the range of 22-33%. [3, 4] In the present study the negative appendectomy rate was 12.5%, mainly in the female group. The sample size was inadequate for optimum statistical evaluation, yet an inference can still be drawn from the study with respect to the female population. Laparoscopy is perhaps an answer to the problem of high negative appendectomy rates in females. In the present study laparoscopic appendectomy was performed only in those patients who underwent surgery during office hours. For those who underwent surgery after office hours or at night the open method of appendectomy was performed.

This perhaps could be an attributable cause for a high negative appendectomy rate in females, as the two female patients who did not show histological evidence of appendicitis had undergone open appendectomy. Laparoscopy can help decrease the negative appendectomy rate as the appendix can be visualized properly to confirm the morphological features of acute appendicitis before removing it. In addition, it also helps to rule out any adnexal pathology, which closely mimics appendicitis in females. In the male population of patients the scoring system is fairly

acceptable, with no significant failure rates as was seen in the present study. [5, 6] This could be due to a narrow spectrum of differential diagnoses in males as compared to females. Combining Alvarado scoring with radiological methods like USG or preferably CT scanning can lead to accurate preoperative diagnosis of the condition. However, the cost factor with imaging needs to be given a serious thought, especially in the developing world where financial constraints significantly guide the investigative approach to a patient. Hence, in such a scenario Alvarado scoring is of great diagnostic significance. [5]

CONCLUSION

The Alvarado score is definitely a useful and simple way to identify patients for emergency appendectomy. Performing laparoscopic appendectomy on these selected patients will further help in decreasing the negative appendectomy rate to a bare minimum. This can avoid costly radiological investigations like CT scan for diagnosing this condition, which is a significant benefit in the developing world.

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