

A Study to Evaluate Modified Alvarado Score for Acute Appendicitis Diagnosis

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Abstract: ***Objective:** To evaluate Modified Alvarado Score in patients with right iliac fossa pain. **Design & duration:** Prospective study from April 2023 to May 2024. **Setting:** District Hospital, lohardaga. **Patients:** 48 patients with right right iliac fossa pain. Both male and female patients with ages >14 years were included. **Methodology:** Basic data of all the patients was collected. They were divided into two groups on the basis of modified Alvarado score. Group - I Alvarado score ≥ 7 . Group - II: Alvarado score ≤ 7 . **Results:** In Group - I 29 patients underwent surgery; amongst them 25 had acute appendicitis while 4 had other pathology. In Group - II there were 19 patients; amongst them six underwent surgery later on because of increase in their scores during observation, all of them had acute appendicitis. The negative appendicectomy rate was 14.75% and positive predictive value 85.21%. **Conclusion:** Alvarado Score is an easy and simple complementary aid in the diagnosis of acute appendicitis. It works well in patients with a score of ≥ 7 .*

Keywords: Acute Appendicitis, Appendicectomy, Alvarado Score

1. Introduction

Almost all of the surgeon are using modified Alvarado score for diagnosis of acute appendicitis and it helped them in reduction of the incidence of negative appendicectomies. Fitz described the classical sign and symptoms of acute appendicitis in 1886. The aim of our study was to evaluate the sensitivity of MASS in the diagnosis of acute appendicitis in adults. This score is mainly helpful in early stage of disease. Failure in diagnosis of disease may lead to progression of disease and may increase the morbidity and mortality rate.

A negative appendicectomy rate of 20 - 44% is not unusual in the surgical literature and many surgeons would accept a negative appendicectomy rate of up to 30% as inevitable (1). Although aids exist to enhance diagnosis, these are either complex or not easily available when most needed. A scoring system described recently by Alvarado (2) was designed to reduce the negative appendicectomy rate without increasing morbidity and mortality (3). This present study aims to evaluate the usefulness of this scoring system in patients with a provisional diagnosis of acute appendicitis in a district hospital lohardaga.

2. Material and Method

This prospective study was carried out on 48 consecutive patients of suspected acute appendicitis, admitted to the district hospital lohardaga. Patients of either sex, above from april 2023 to May 2024. 14 years of age were included in the study whereas those with urological, gynaeco - logical and other surgical problems were excluded.

A specially designed proforma containing general information about the patient and eight variables of modified Alvarado score was filled for each patient. The classic Alvarado Score included shift to the left of the neutrophils maturation was not available in our laboratory. Hence, a modified score substituting this parameter with extra signs like Rovsing's sign, cough test, etc. was developed (Table 1)

Variables	Clinical Feature	Score
Symptoms	Migratory Pain to RIF	1
	Anorexia	1
	Nausea/ Vomitting	1
	Tenderness RIF	2
Signs	Rebound tenderness RIF	1
	Temperature Elevation	1
	Extra Signs Rovsing's Sign, Cough Test, Rectal Tenderness	1
	Labs	Leucocytosis
Total		10

On this basis the patients were categorized into two groups: Group - I: Modified Alvarado Score ≥ 7 . Group - II: Modified Alvarado Score ≤ 7 .

In Group - I all the patients underwent surgery, while in Group - II all patients were kept under observation for 24 hours and re - assessed at six hourly intervals. Those who improved were sent home, with the instruction, to come back if symptoms persist or the condition deteriorates. Some cases belonging to the later group were operated because of deteriorating score.

The results of the modified Alvarado Score were compared with the operative and histopathological findings. Finally the negative appendicectomy rate, positive predictive value, sensitivity and specificity values were calculated to assess the reliability of Modified Alvarado Score.

3. Results

Amongst the 48 consecutive cases of suspected acute appendicitis, there were 26 males and 22 females with a sex incidence of 1.18: 1. Their ages ranged from 14 - 75 years, mean age being 18.26 years (Table II).

In Group - I 29 patients underwent surgery; amongst them 25 had acute appendicitis while 4 had other pathology. In Group - II there were 19 patients; amongst them three underwent surgery later on because of increase in their scores during observation, all of them had acute appendicitis. The negative

appendicectomy rate was 14.75% and positive predictive value 85.21%.

In Group - I there were 29 patients and all of them underwent surgery. Amongst them 25 had acute appendicitis on naked eye examination, which was later confirmed on histopathology.

Table III

Age Group	Number	%
14 - 20 years	26	55
21 - 40 years	15	32
41 - 60 years	5	10
61 - 80 years	2	3

However, four patients had a normal appendix with other diagnosis (Table III). In Group - II there were 19 cases. All except three were sent home after observation. The latter had to undergo surgery due to the increase in their scores; all of them had acute appendicitis histopathologically.

In our study the total number of operated patients was 32. Amongst these 25 had confirmed appendicitis and four normal appendix, giving a negative appendicectomy rate of 14.75%. Thus, the overall sensitivity of the Modified Alvarado Score was 89.65% and the specificity 77.5%, while the positive predictive value was 85.21% (Table IV).

Table IV

Final Diagnosis	No.	%
Acute Appendicitis	25	85.25
Normal Appendix (Other diagnosis)	4	14.75
Mesenteric adenitis	2	
Meckel's diverticulitis	1	
Caecal abscess	1	

4. Discussion

Acute appendicitis continues to be a diagnostic challenge because of its variable presentation. The negative appendicectomy rate reported in the surgical literature varies from 8 - 33%⁵. However, there is some improvement in the diagnosis of acute appendicitis due to modern imaging techniques and the development of different scoring systems, based on the clinical symptoms and signs, and laboratory investigations⁷. Amongst them the Alvarado Score is simple, cheap and easily applicable³.

Group	No.	Confirmed Appendicitis	Normal Appendix
(Alvarado score ≥ 7)	29	25 (True positive)	4 (False Positive)
II (Alvarado score ≤ 7)	19	3 (False negative)	16 (True negative)

Sensitivity=89.65%, Specificity=77.5%, Positive Predictive Value=85.21%

The +ve predictive value (85.24%) of this study is also similar to those studies in literature⁸.

5. Conclusion

The diagnosis of Acute Appendicitis depends on experience and clinical judgement. However, in equivocal cases scoring systems some modern imaging techniques are helpful. An

example of this is the Modified Alvarado Score, which is a simple and easily applicable complementary aid in the diagnosis of acute appendicitis. A score of ≥ 7 virtually confirms the condition and the patients should undergo surgery. Patients with score of 5 - 6 must be kept under observation and re-scored, while those with a score of 1 - 4 can be sent home.

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