



## Evaluation of Modified Alvarado Score in Diagnosis of Acute Appendicitis

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### Abstract

**Background:** Acute appendicitis is most common cause of pain abdomen. The diagnosis of which remain difficult in many cases.

**Methods:** A 100 consecutive patients suspected of acute appendicitis who were admitted in department of surgery. They were prospectively evaluated using the modified Alvarado scoring (MAS) to determine whether or not they had acute appendicitis. The MAS was correlated with histopathological findings.

**Results:** 78 (true positive) patients who had MAS 7 or more had appendicitis on histopathology while no patients (false positive) had a normal appendix; 15(false negative) patients with MAS less than 7 had appendicitis and 7(true negative) had a normal appendix removed.

**Conclusion:** This study shows that use of modified Alvarado scoring system in patients with acute appendicitis provides a high degree of diagnostic accuracy.

**Keywords:** Modified Alvarado Score(MAS), Acute appendicitis, false positive.

### Introduction

Acute appendicitis is one of the most common conditions treated by emergency operation. Physicians from a wide range of medical specialties including internal medicine and pediatrics, as well as surgeons, encounter patients with this condition in their daily practice. When it presents with typical symptoms, it is relatively easy to diagnose and treat. In young children, elderly persons, and those presenting with various atypical symptoms, however, the diagnosis may be delayed and treatment may become difficult.<sup>1</sup>

A scoring system for early diagnosis of acute appendicitis was developed by Alvarado in 1986; based on clinical sign, symptoms and with differential leucocyte count, with a left shift of neutrophil maturation yielding a total score of 10; known as Alvarado score. Kalan et al omitted the left shift to neutrophil maturation parameter and produced a modified Alvarado score. It is a 9 point scoring system that helps in increasing the accuracy of preoperative diagnosis and thus reducing negative appendicectomy rate, score of 7 or more were recommended for surgery.<sup>2</sup>

The aim of present study is to validate the user friendly pre-operative diagnostic method based on prospectively collected data from patients admitted for suspected appendicitis incorporating the modified Alvarado score.

**Material and Methods**

**Study design:** Hospital based prospective study.

**Study population:** patients presenting with pain in the right lower quadrant of Abdomen, lasting fewer than 7 days who after clinical examination will be provisionally diagnosed to have acute appendicitis.

**Sample size:** 78 patients reporting to the Surgery dept. within study duration and eligible as per inclusion criteria will be included in the study.

**Sampling Method:** Convenience sampling

**Inclusion Criteria**

Patients with provisional clinical diagnosis of acute appendicitis

**Exclusion Criteria**

1. Patients of age less than or equal to 12 years
2. Patients with generalised peritonitis due to appendicular perforation
3. Patients with appendicular mass or abscess

**Data Collection**

An excel sheet was used for data collection and statistical analysis was done.

**Results**

Table no.1. Overall Sensitivity and Specificity of Modified Alvarado Score.

	HPE positive	HPE negative	Total
MAS positive ( $\geq 7$ )	78	0	78
MAS negative ( $< 7$ )	15	7	22
Total	93	7	100

78 (true positive) patients who had MAS 7 or more had appendicitis on histopathology while no patients (false positive) had a normal appendix; 15(false negative) patients with MAS less than 7 had appendicitis and 7(true negative) had a normal appendix removed.

Sensitivity -83.87%

Specificity- 100%

Positive predictive value-100%

Negative predictive value-31.82%

**Discussion**

Modified Alvarado score of 7 and above had a positive predictive value of 100%. In this study 83.87% of the patients who were predicted to have appendicitis by a high score had confirmed appendicitis on histopathology. This gave a crude negative appendicectomy rate of 10% that is in keeping with what Ongaro<sup>3</sup> found in his study in 2007Year. A high Alvarado score was however unable to distinguish between appendicitis and other mimicking diagnosis in 5 cases.

A systematic review by Ohle et al<sup>4</sup> found out that a high Alvarado score was less sensitive as a 'rule in' score than as a 'rule out' for those below 5.48. Our study suggests that a high Alvarado score is a useful tool to set aside patients for immediate appendicectomy without further diagnostics. This contrasts with a study by Saidi and Chavda<sup>5</sup> that suggested that the scoring system has no value over clinical experience.

**Conclusion**

This study shows that use of modified Alvarado scoring system in patients with acute appendicitis provides a high degree of diagnostic accuracy.

**Reference**

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