

Evaluation of Modified Alvarado Score in Diagnosis of Acute Appendicitis at Tertiary Care Hospital

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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, SMS medical college jaipur, Rajasthan. 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.¹

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 appendectomy rate, score of 7 or more were recommended for surgery.²

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: 100 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 1: Distribution of cases according to Age (N=100 cases)

Age group (years)	No.	Percentage
13-20 years	16	16%
21-30 years	34	34%
31-40 years	28	28%
41-50 years	12	12%
51-60 years	8	8%
>60 years	2	2%
Total	100	100%
Means age (years)	30.20	
SD	11.57	

In present study, maximum 34% patients belonged to age group was 21-30 years followed by 28(28%) in 31-40 age group, 2 (2%) cases in >60yrs age group.

Table 2: Distribution of cases according to Sex (N=100 cases)

Sex	No.	Percentage
Male	64	64%
Female	36	36%
Total	100	100%

Table 2: shows that male patients (64%) contributed to larger proportion of our study population as compared to females (36%). Male and female ratio was 1.77.

Table 3: Distribution of cases according to Modified Alvarado Scoring (N=100 cases)

Modified Alvarado Scoring (MAS)	No.	Percentage
1-4	2	2%
5-6	20	20%
7-9	78	78%

In present study, out of total 100 patients 78(78%) were have MAS score 7-9, 20% were have 5-6 and 2% have MAS score 1-4.

Table 4 : Overall Sensitivity and Specificity of Modified Alvarado Score.

	HPE positive	HPE negative	Total
MAS positive	78	0	78
MAS negative	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

In present study, out of total 100 patients 78(78%) were have MAS score 7-9, 20% were have 5-6 and 2% have MAS score 1-4. Similar result were observed by Thabit et al³ and Vandakudri AB et al⁴.

Modified Alvarado score of 7 and above had a positive predictive value of 100%. In this study 78% of the patients who were predicted to have appendicitis by a high score had confirmed appendicitis on histopathology. This gave a crude negative appendectomy rate of 12% that is in keeping with what Ongaro⁵ found in his study in 2007 Year. A high Alvarado score was however unable to distinguish between appendicitis and other mimicking diagnosis in 5 cases. A systematic review by Ohle et al⁶ 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 appendectomy without further diagnostics.

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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