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Evaluation of Modified Alvarado Score and Ultrasonography for the Diagnosis of Acute Appendicitis at Rajah Muthiah Medical College and Hospital, Chidambaram

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Abstract

Background: Acute appendicitis, a quotidian diagnosis for acute abdomen, the diagnosis of which remains arduous.

Methods: A 70 consecutive patients suspected of acute appendicitis who were admitted in department of surgery, Rajah Muthiah Medical College and Hospital. They were prospectively assessed by the modified Alvarado scoring (MAS) to diagnose acute appendicitis. The MAS was compared with USG and histopathological findings.

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

Conclusion: The MAS should be combined with USG for the diagnosis of acute appendicitis, although clinical evaluation remains the cornerstone of diagnosis of acute appendicitis.

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

INTRODUCTION

Acute abdomen is one of the commonest reasons for which a surgeon is summoned, for which there is a plethora of causes, the quotidian differential remains acute appendicitis. The occurrence of the said condition in the general population hovers around 6%. Though there are a multitude of investigations available at the disposal of a surgeon, his clinical expertise remains the cornerstone for the diagnosis of acute appendicitis, we fall back on various haemotological and radiological investigations to further ascertain the diagnosis, although the diagnosis can be confirmed only by histopathological examination. In an emergency setting the universal radiological tool at one's disposal remains the ultrasonogram. An abundance of clinical scoring systems are available, of which the modified Alvarado scoring is the most ubiquitous. In this study, we try to correlate the accuracy of these modalities in assessing this common ailment.

MATERIAL AND METHODS

Study Design: Hospital based prospective study.

Study Duration: 1 Year

Study Place: Dept of Surgery, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram.

Study Population: Patients presenting with the clinical triad of acute appendicitis, suspected to have acute appendicitis.

SampleSize:70 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

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Exclusion Criteria

1. Patients with generalized peritonitis due to appendicular perforation
2. Patients with appendicular mass or abscess

Data Collection

Suspect acute appendicitis who were admitted, investigated and treated were taken for the study. After detailed examination and investigations a modified Alvarado score was applied to each case.

RESULTS

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

	HPE positive	HPE negative	Total
MAS positive	57	0	57
MAS negative	7	6	13
Total	64	6	70

57 (true positive) patients who had MAS 7 or more had appendicitis on histopathology while no Patients (false positive) had a normal appendix; 7 (false negative) patients with MAS less than 7 had appendicitis and 6(true negative) had a normal appendix removed.

Sensitivity - 89.06%
Specificity - 100%
Positive predictive value - 100%
Negative predictive value - 46.15%

Table no.2 Overall Sensitivity and Specificity of Ultrasonography

	HPE positive	HPE negative	Total
USG finding positive	55	3	58
USG finding negative	5	7	12
Total	60		70

Out of 60 patients who actually had appendicitis, 55 (true positive) were positive on USG while 5 (false negative) were missed; while 3 patients (false positive) patients were positive on USG who had a normal appendix.

Sensitivity - 91.66%
Specificity - 70%
Positive predictive value - 94.82%
Negative predictive value - 58.33%

Table 3 Comparison of diagnostic variables of MAS and USG

	MAS	USG
Sensitivity	89.06%	91.66%
Specificity	100%	70%
Positive predict value	100%	94.82%
Negative predict value	46.15%	58.33%

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USG (91.66%) is more sensitive than modified Alvarado score (89.06%). Specificity (100%) and Positive predict value (100%) was greater in the clinical ALVARADO SCORE compared to specificity (70.00%) and positive predictive value (94.82).

DISCUSSION

The study was done to assess the role of a clinical score in the era of radiographic diagnosis and to ascertain the efficacy of the modified Alvardo score, which was done in Rajah Muthiah Medical College and Hospital.

Modified Alvarado score of 7 and above had a positive predictive value of 100%. In this study 100% 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 which was lower than what Ongaro found in his study in *2007 Year*.

A systematic review by Ohle et al 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.

This study reiterates that a high clinical suspicion of acute appendicitis based on MAS, is adequate to proceed for surgery without subjecting the patient to further diagnostics which contrasts with a study by Saidi and Chavda that suggested that the scoring system has no value over clinical acumen.

In our study out of 70 patients who actually had appendicitis, 55 (true positive) were positive on USG while 5 (false negative) were missed; while 3 (false positive) patients were positive on USG who had a normal appendix.

The role of USG in equivocal cases wherein the diagnosis is a quagmire, it stands an able tool to ascertain and confirm diagnosis and to rule out differentials in the emergency setting improve. and to identify cases that require further investigative modalities.

In a study by Rasoul, et al in Iran, ultrasonography had a PPV of 90.4% and a sensitivity of 55.4%. In our study Sensitivity- 91.66%, Specificity-70%, Positive predictive value-94.82% and Negative predictive value- 58.33%.

Kimaro, a diagnostic radiology resident in 2011 did a study on the correlation of ultrasonography as compared to clinical and surgical findings among patients in KNH. His study revealed sensitivity, specificity, PPV and NPV values of 92%, 58.3%, 95% and 47% respectively. "Our study in comparison had values of Sensitivity - 89.06%, Specificity-100%, Positive predictive value -100% and Negative predictive value - 46.15% respectively. The sensitivities in both studies were comparable. In our study the ability to pick the true negatives was quite low. This may be explained in part by the different methodology used in the two studies. Kimaro conducted the Ultrasonography in all the patients in his series showed a negative appendicectomy rate of 10.7%. In our study the ultrasonography was done by the different ultrasonographers or radiology residents on call.

CONCLUSION

We conclude that the clinical acumen of a surgeon supersedes the various imaging modalities and

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diagnosing case of acute of appendicitis. At the same time the role of ultrasound should not the understated in cases where the diagnosis is in quandary.

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