

A Study of Modified Alvarado Score and Rovsing's Sign in Diagnosis of Acute Appendicitis

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Abstract

Background: Acute appendicitis remains a common abdominal emergency throughout the world. The diagnosis of acute appendicitis continues to be difficult due to the variable presentation of the disease and the lack of reliable diagnostic test. None of the investigations such as ultrasonography and computed tomography can conclusively diagnose appendicitis. Hence, even to date, a thorough clinical examination with basic investigations like white blood cells count remains cornerstone in the diagnosis of acute appendicitis. This study aims to evaluate the usefulness of modified Alvarado score and Rovsing's sign in diagnosing acute appendicitis.

Materials and Methods: Patients presenting with pain in the right iliac fossa and suspected to have appendicitis into unit 4 of general surgery, Osmania General Hospital, during the period of December 2017–June 2018 are included in the study,

Results: Migratory pain, nausea, and anorexia are presented in only up to half of the patients having inflamed appendix and Rovsing's sign was positive in 93.7% of patients. 31% of patients with scores <7 have inflamed appendix.

Conclusion: The study shows the need for downgrading the value given to anorexia, nausea, migratory pain, and inclusion of Rovsing's sign in diagnosing acute appendicitis.

Key words: Acute appendicitis, Migratory pain, Modified Alvarado score, Rovsing's sign

INTRODUCTION

Appendicitis is the most common surgical emergency attended by surgeon across the world. Appendicitis is the most common surgical emergency attended by surgeon across the world. Appendicitis has been a topic of discussion since the inception of diagnosis and various methods have been used to diagnose the disease. It has always posed a challenge in the diagnosis, however with the advent of radiology the accuracy has improved. Yet the clinical methods of detecting appendicitis should not be underestimated(1,2) as the radiology reports are often operator dependent and appendix might also be not visualized at times due to various factors. Patients also

often afford and cannot be always exposed to ionizing radiation. Hence, this study tries to identify the accuracy of modified Alvarado score when added with a Rovsing's sign in diagnosing acute appendicitis.

Aim of Study

The aim of the study was to study the modified Alvarado score and the Rovsing's sign in aiding the diagnosis of acute appendicitis.

METHODS

Patients presenting with pain in the right iliac fossa and suspected to have appendicitis into unit 4 of general surgery, Osmania General Hospital, during the period of December 2017–June 2018 are included in the study, and decision regarding surgery for appendicitis has been taken on clinical and radiological grounds. Those with low suspicion have been excluded from the study and put under observation and none of them needed surgical care [Table 1].

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Month of Submission : 08-2018
Month of Peer Review : 09-2018
Month of Acceptance : 09-2018
Month of Publishing : 10-2018

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Table 1: Modified Alvarado score

Migratory pain	1
Anorexia	1
Nausea	1
Right iliac fossa tenderness	2
Rebound tenderness	1
Fever	1
Leukocytosis	2
Additional criteria added in this study	
Rovsing's sign	1

Table 2: Percentage of patients presenting with the parameters in modified Alvarado score

Criteria	Percentage of patients
Migratory pain	28.1
Anorexia	42
Nausea	51.5
Right iliac fossa tenderness	100
Rebound tenderness	95.3
Fever	65.6
Leukocytosis	65.6
Rovsing's sign	93.7

Modified Alvarado score, as shown above, is taken into consideration and an extra criteria, i.e. Rovsing's sign has been added to it. Rovsing's sign when present is given a value of 1.

RESULTS

Percentage of patients with positive parameter has been shown in Table 2.

Percentage of patients with different scores shown in Table 3, percentage of patients having normal appendix at surgery with scores <7 and scores ≥7 are shown in Table 4.

Percentage of patients with inflamed Appendix at surgery with scores <7 is 31%.

DISCUSSION

Acute appendicitis remains a common abdominal emergency throughout the world. The diagnosis of acute appendicitis continues to be difficult due to the variable presentation of the disease and the lack of reliable diagnostic test. None of the investigations such as ultrasonography and computed tomography can conclusively diagnose appendicitis. Hence, even to date, a thorough clinical examination with basic investigations like white blood cells count^[3,4] remains cornerstone in the diagnosis of acute appendicitis.

The percentage of normal appendices reported in various series varies from 8% to 33%.^[5]

Table 3: Percentage of patients based on the modified Alvarado score of the study

Score	Percentage
4	1.5
5	10.9
6	23.4
7	26.5
8	23.4
9	7.8
10	6.25

Table 4: Negative appendectomy

Score	Percentage
<7	4.6
≥7	3.1

A score of 7 or more is generally considered as a predictive score for the diagnosis of acute appendicitis, and in the present study, it a score of ≥7 included only 65.55% of patients, thus again it is proving the need for better evaluation techniques.

Six of seven patients with score of 5 have inflamed appendix in spite of a low score, and similarly, 14 patients with a score of 6 had appendicitis, right iliac fossa tenderness, and rebound tenderness and Rovsing's sign is presented in most cases, whereas fever and migratory pain are presented in less than half of the patients, thus need for considering these criteria if to be retained or score to these parameters be decreased has to evaluated; however, fever and leukocytosis were presented in all cases of perforated appendix.

Patients of score 5 and 6 with appendicitis were evaluated and none reported migratory pain or fever, but they have tenderness, rebound tenderness, and anorexia or nausea and of the patients operated on this combination, only one patient was found to have normal appendix.

Patient with score of 6 has tenderness and rebound tenderness Rovsing's sign with a combination of two of the four parameters (fever, nausea, and anorexia/migratory pain), but only one had elevated leukocytosis. Patients operated on this combination, only one patient was found to have normal appendix.

Thus, a combination of tenderness rebound tenderness and Rovsing's sign is most important for the diagnosis with a high negative predictive value and positive predictive value.

Rovsing's sign even has more negative predictive value than the other where only one of 60 patients with positive Rovsing's sign has a normal appendix. Percentage of

patients with inflamed appendix at surgery with scores <7 is 31%. Percentage of patients with normal appendix at surgery with scores ≥ 7 is 3.1%.

CONCLUSION

Rovsing's sign being presents in 93.7 patients and only one patient of 60 patients has a normal appendix, and this study recommends its inclusion into the scoring systems after further evaluation.

Migratory pain, fever, anorexia, and nausea are presented in less number of patients and are skewing the results toward low scores in spite of an inflamed appendix and there in need for further multicentric larger study to downgrade

the value given to them. However, when migratory pain is presented, it is a definite pointer toward the diagnosis except in some cases; thus, it cannot be omitted. Moreover, all patients with perforation have fever and leukocytosis.

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How to cite this article: Kumar GA, Nagendar B. A Study of Modified Alvarado Score and Rovsing's Sign in Diagnosis of Acute Appendicitis. *Int J Sci Stud* 2018;6(7):80-82.

Source of Support: Nil, **Conflict of Interest:** None declared.