

Research Article

Appendicectomy: to do or not

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ABSTRACT

Background: This study is to evaluate the reliability of modified Alvarado scoring system for diagnosis of acute appendicitis and correlate it with acute diagnostic modality. It helps to assess the discrimination and calibration performance of the Alvarado score. It is also useful in evaluating the importance of modified Alvarado scoring system in reducing the percentage of negative appendicitis.

Methods: The scoring system is based on three symptoms, three signs and one laboratory finding. The decision to operate is made independently by surgeon. All operated appendices are to be sent for histopathological examination. Then the MAS score is compared with pathology results.

Results: In our study we have divided the modified Alvarado scoring system into three groups. The persons with score from 7-10 are more likely to have appendicitis and they are termed as modified Alvarado score positive and other two groups are considered to be modified Alvarado score negative. Out of 50 patients, 32 were considered positive and they underwent appendicectomy irrespective of ultrasonographic findings. Histopathological results were obtained for these patients.

Conclusion: From present study, it is concluded that modified Alvarado score is better diagnostic tool than ultrasonography alone in diagnosis of acute appendicitis. It is easy, simple and cheap complementary aid for supporting the diagnosis of acute appendicitis. The overall modified Alvarado scoring system showed high sensitivity and specificity rate, high accuracy rate, high positive predictive value and low appendicectomy rate.

Keywords: Appendix, Appendicectomy

INTRODUCTION

Acute appendicitis is the common cause of abdominal pain and is difficult to diagnose, especially in early stages due to which there is still appreciable modality. It is a clinical diagnosis and so it's impossible to have a definite diagnosis Pre Operatively. Absolute diagnosis is possible only at operation and histopathological examination of specimen.^{1,3}

Although various aids exist facilitate more accurate diagnosis and reduce this negative rate, many are complex. Simple Scoring Systems are available but not have been widely tested. Modified Alvarado scoring system is one of them and is purely based on history,

clinical examination and few laboratory tests and is very easy to apply. Thus it can be used to stratify patients with symptoms of suspected appendicitis.^{1,2} In most First World Countries the lifetime incidence of appendicitis is considered to be around 7%. In Africa the incidence of appendicitis is much less of less than 1%. The prevalence of acute appendicitis is about 250000 cases in the United States and England each year.^{5,11}

The aim of this study is to evaluate the reliability of modified Alvarado scoring system for diagnosis of acute appendicitis and correlate it with acute diagnostic modality. It helps to assess the discrimination and calibration performance of the Alvarado score. It is also useful in evaluating the importance of modified Alvarado

scoring system in reducing the percentage of negative appendicitis.

METHODS

The study is designed in such a way that there is less strain to the people.

The scoring system is based on three symptoms, three signs and one laboratory finding.

Table 1: The scoring system.

Variables	Scores
Signs	
Tenderness right lower quadrant	2
Rebound tenderness right lower quadrant	1
Pyrexia	1
Symptoms	
Migrating right iliac fossa pain	1
Anorexia	1
Nausea/vomiting	1
Investigations	
Leukocytosis	2
Total	10

Patients are initially evaluated by history, physical examination; Total Leukocyte Count (TLC) and Modified Alvarado Scoring System (MASS) of each patient is calculated. For purpose of statistical analysis the patients are dividing into

Group 1 (Score of 1-4) - Appendicitis unlikely

Group 2 [Score of 5-6] - to have a diagnosis compatible with acute appendicitis but not convincing enough to warrant appendectomy

Group 3 [Score of 7-10] - almost definite Acute Appendicitis and were submitted to operation

The decision to operate is made independently by surgeon. All operated appendices are to be sent for histopathological examination. Then the MAS score is compared with pathology results.

RESULTS

The results are determined, statistically analyzed and tabulated.

- 1) Among the total 50 patients there were (24) 48% females and (26) 52% males.
- 2) Among the total 50, Rebound Tenderness in right lower quadrant was present in (30 patients) 60% and not present in (20 patients) 40% (Figure 1).

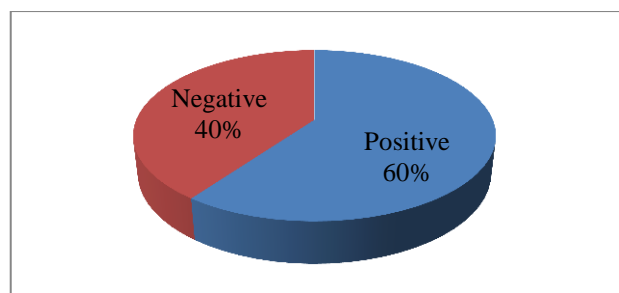


Figure 1: Percentage of rebound tenderness in right lower quadrant.

- 3) Among the total 50, Tenderness was present in (41 patients) 82% and not presents in (9 patients) 18% (Figure 2).

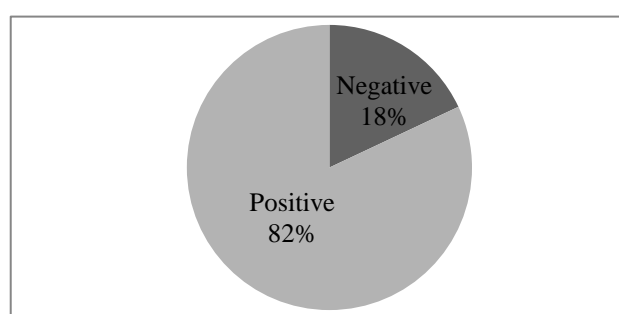


Figure 2: Tenderness in right lower quadrant.

- 4) Among the total 50, Pyrexia was present in (33 patients) 66% and not presents in (17 patients) 34% (Figure 3).

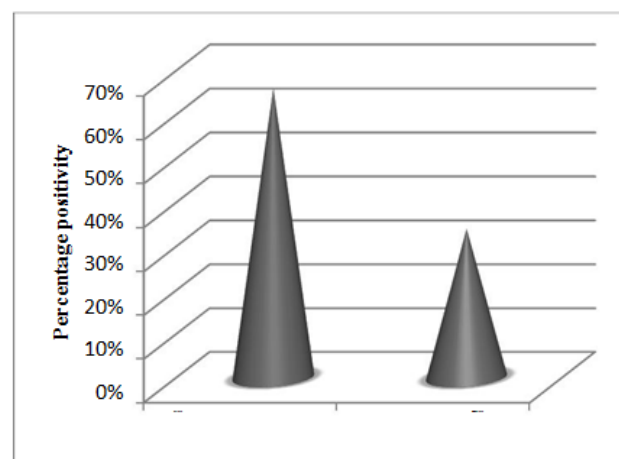


Figure 3: Percentage description of pyrexia.

- 5) Among the total 50, Migrating right iliac fossa pain was present in (45 patients) 90% and not present in (5 patients) 10% (Figure 4).
- 6) Among the total 50, Anorexia was present in (30 patients) 60% and not presents in (20 patients) 40% (Figure 5).

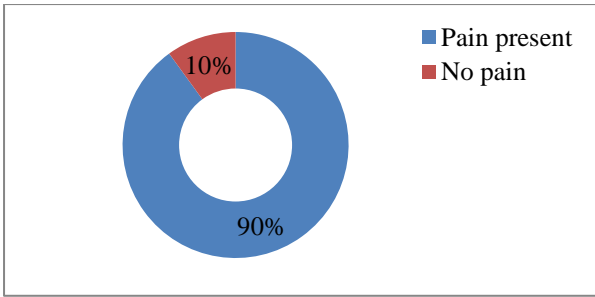


Figure 4: Migrating right iliac fossa pain.

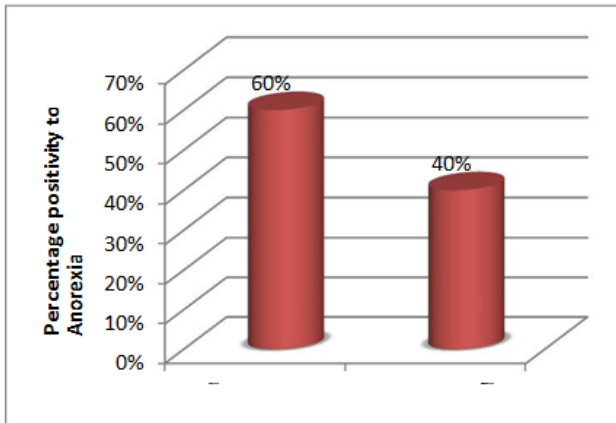


Figure 5: Percentage description of anorexia.

7) Among the total 50, Nausea/ Vomiting were present in (38 patients) 76% and not present in (12 patients) 24% (Figure 6).

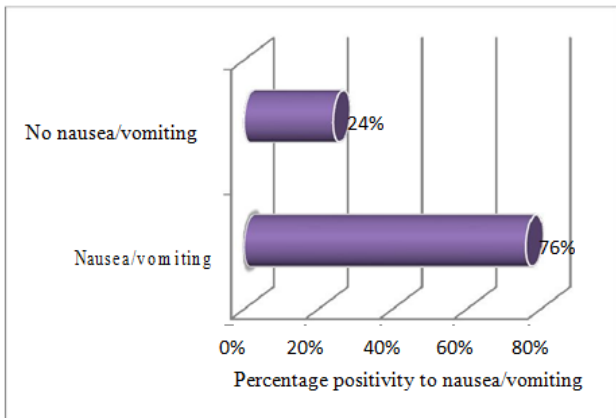


Figure 6: Percentage description of nausea/vomiting.

8) Among the total 50, leukocytosis was present in (25 patients) 50% and not present in (25 patients) 50% (Figure 7).

9) Emergency appendicectomy was done for all 50 patients (Table 2).

10) Among the 50 cases screened, score of 1-4 was obtained in (14%) 7 cases, score of 5-6 was obtained

in (28%) 14 cases and score of 7-10 was obtained in (58%) 29 cases (Table 3).

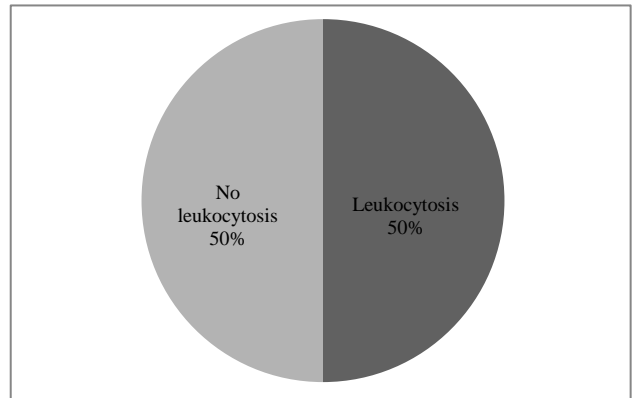


Figure 7: Percentage description of leukocytosis.

Table 2: Emergency appendicectomy.

Emergency appendicectomy				
	Frequency	Percent	Valid percent	Cumulative percent
Valid	50	100.0	100.0	100.0

Table 3: Percentage obtained based on scoring.

No. of cases screened	Scores					
	1-4	%	5-6	%	7-10	%
50	7	14	14	28	29	58

11) When histopathological report was compared with scores obtained, 4% of cases having between 1-4 and 8% of cases having score between 5-6 and 0% of cases having score between 7-10 were found to have gangrenous appendicitis. Chronic appendicitis was found in 2% of cases having score between 1-4, 4% of cases having score between 5-6 and 0% of cases having score between 7-10. Acute appendicitis was found in 0% of cases having score between 1-4, 3% of cases having score between 5-6 and 29% of cases having score between 7-10 (Table 4).

Table 4: Scores vs. histopathological finding.

Histopathological findings	Scores		
	1-4%	5-6%	7-10%
Gangrenous appendicitis	4	8	0
Chronic appendicitis	2	4	0
Acute appendicitis	0	3	29
Total	6	15	29

12) Figure 8 shows the number of persons having gangrenous appendicitis, chronic appendicitis, and acute appendicitis.

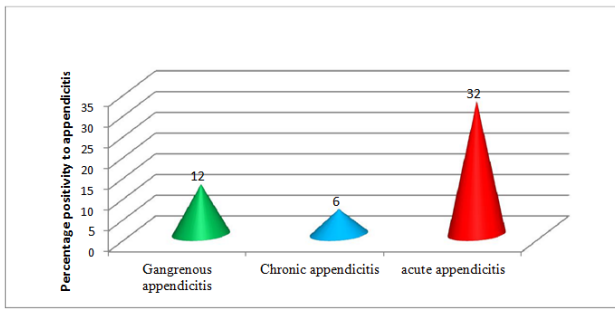


Figure 8: Types of appendicitis.

DISCUSSION

Acute appendicitis is a condition which is diagnosed clinically and Imaging modalities and laboratory tests are a useful adjunct to such disease. The diagnostic accuracy in case of acute appendicitis should be high because negative appendicectomy carries a significant morbidity as there is greater risk post-operatively.^{4,12} Diagnostic scoring system aims at simplifying variables and making the criteria easy and reproducible at the same time, thereby serving the purpose of diagnosis.¹⁰ Depending upon the range of score into which a particular patient fits into other ancillary investigations can be added in order to increase the diagnostic efficacy especially in females wherein the spectrum of differential diagnosis is extensive.^{15, 61} The Alvarado Score is an easy and comprehensive system of scoring, since it takes into consideration symptoms, signs and laboratory reports.¹⁷

Various studies conducted on modified Alvarado scoring system found that MASS can reduce the negative appendicectomy rate. The study suggested 60 patients out of which 40% had modified Alvarado score. 38.33% had acute appendicitis and 38.33% patients were ultrasonographically positive. He proposed that MASS has sensitivity of 78.26%, specificity 83.78%, diagnostic accuracy 81.11% thus revealed that MASS is useful tool in clinical decision making.¹³

A cross sectional study involving all patients suspected to have acute appendicitis at Bugando medical centre between November 2008 and April 2009. Out of 127 patients 85 were confirmed appendicitis by histopathological examination and remaining 42 patients had normal appendix giving negative appendicectomy rate of 33.1%. Sensitivity and specificity of MASS were 94% and 90.4%.¹²

A retrospective study between June 2000 and May 2002 supported the same. In 128 patients 88 patients had score between 5-10 out of which 8 were normal thus giving a negative appendicectomy of this retrospective study was 26.4% and 19.05%.⁹

A study on 100 patients out of which 58 patients were operated based on MASS showed positive outcome. Of 58, 52 had appendicitis thus yielding a positive predictive

value of 89.66% and negative appendicectomy was 7.69%. He thus proposed that frequency of negative appendicectomies can be reduced through standardization of diagnostic procedure by applying modified Alvarado scoring system.¹⁵

A study conducted on 100 patients in emergency surgical service at SK institute of medical science, Srinagar, Kashmir, India. Out of 106, 91 patients were diagnosed with appendicitis using MASS.¹⁴

A series of 49 patients in Gateshead and Sunderland hospital and found out that false positive rate for appendicitis in women was unacceptably high.⁵

A study with 228 patients from September 2004 to December 2006 in which patients with score of 7 or more were included and patients with score of 6 or less were excluded. Out of 228, 60% of patients had confirmed diagnosis of acute appendicitis.¹⁶

A study on 118 patients (58 boys, 64 girls) and gave results of overall sensitivity and specificity of MASS of 76.3% and 78.8%.¹⁷

In our study we have divided the modified Alvarado scoring system into three groups. The persons with score from 7-10 are more likely to have appendicitis and they are termed as Modified Alvarado score positive and other two groups are considered to be Modified Alvarado Score negative.⁷ Out of 50 patients, 32 were considered positive and they underwent appendicectomy irrespective of ultrasonographic findings. Histopathological results were obtained for these patients. The sensitivity and specificity of this present study is 100%. Similar results with sensitivity and specificity of 88.8% and 75%.¹⁸ Pairat Sracorn documented sensitivity and specificity of 98% and 92%. The finding of some study showed the sensitivity 94.14%,⁸ which is in agreement with the present study, but the specificity was 66.66% which was lower than the finding of present study.

From present study, it is concluded that modified Alvarado score is better diagnostic tool than ultrasonography alone in diagnosis of acute appendicitis. It is easy, simple and cheap complementary aid for supporting the diagnosis of acute appendicitis. The overall modified Alvarado scoring system showed high sensitivity and specificity rate, high accuracy rate, high positive predictive value and low appendicectomy rate.

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Ethical approval: The study was approved by the institutional ethics committee

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