Original Research Article

New Indian Journal of Surgery
Volume 11 Number 2 / April – June 2020
DOI: https://dx.doi.org/10.21088/nijs.0976.4747.11220.12

Application of Modified Alvarado Scores in Acute Appendicitis

Jignesh Joshi[1], Firdaus Afzalhusein Dekhaiya[2]

Author's Affiliation: [1]Resident, [2]Associate Professor, Department of Surgery, Government Medical College, Bhavnagar, Gujarat 364001, India.

How to cite this article:
Jignesh Joshi, Firdaus Afzalhusein Dekhaiya. Application of Modified Alvarado Scores in Acute Appendicitis. New Indian J Surg. 2020;11(2):155–157.

Abstract:

Context: Acute Appendicitis is a commonest surgical emergency. Manytimes, the diagnosis is made by clinical examination only. There is no definitive diagnosis preoperatively. The definitive diagnosis of acute appendicitis confirmed at time of surgery and after histopathologic examination of the appendix specimen. However, Investigations like USG, CT scan are used in diagnosis. Despite this, negative appendectomy rates are high. Hence better diagnostic tool, a scoring system was explored to diagnose appendicitis. Present study was conducted for evaluation of Modified Alvarado Scoring System for diagnosis of acute appendicitis. Alvarado scoring systemis based on history, clinical examination of patient and certain laboratory findings.

Aims: To evaluate the diagnostic value of Modified Alvarado Scoring System in patients with acute appendicitis.

Settings and Design: Prospective study

Methods and Material: A prospective study was conducted on 100 patients with sign and symptom suggestive of acute appendicitis and were subsequently underwent operative management from November 2018 to November 2019 over a period of one years at Sir T. Hospital Bhavnagar. All patients underwent surgery and grouped according to the variables of Alvarado scoring system and then divided into two groups. Group I patients (score 7 or more), group II patients (score ≤6). Diagnosis was confirmed by histopathological examination.

Results: Pre-operatively Modified Alvarado Score was assigned to all patients and the results were compared with operative and histopathological diagnosis reports. The sensitivity and specificity of MASS in this study counted accordingly.

Conclusions: This scoring system is Reliable and more accurate diagnostic modality in the diagnosis of acute appendicitis, thus avoiding unnecessary surgery.

Keywords: Acute Appendicitis; Alvarado score.

Corresponding: Firdaus Afzalhusein Dekhaiya, Associate Professor, Department of Surgery, Government Medical College, Bhavnagar, Gujarat 364001, India.

E-mail: drfirdausd@gmail.com

Received on 27.12.2019, **Accepted on** 28.01.2020

Introduction

Acute appendicitis is one of the most common causes of acute abdomen with a lifetime prevalence of approximately 1 in 7 worldwide. The traditional signs and symptoms of acute appendicitis first described by Reginald Heber Fitz in 1886.[3]

It is estimated that as much as 6% to 7% of the general population will develop appendicitis during their period of lifetime, with more incidence in the second decade of life. The diagnosis of acute appendicitis is mainly clinical depending on history, clinical examination of patient and certain laboratory investigations (such as total leukocyte count, CRP). Imaging modalities are not done on routine basis as it provide little information in early stage of disease unless there are complications. The definitive diagnosis of acute appendicitis confirmedat time of surgery and after histopathologic examination of the appendix specimen.[1]

Early diagnosis and immediate operative

intervention is the key for successful management of acute appendicitis.[2]

Delay in diagnosis and management of acute appendicitis may result in significant morbidity and, mortality due to its complications. A number of scoring systems have been developed for aiding early diagnosis of acute appendicitis.[4]

The modified Alvarado score is presently in use for establishing diagnosis of acute appendicitis. Alvarado scoring system, introduced in 1986, is one of these systems whichis based on history, clinical examination of patient and laboratory findings.

Table 1: Modified Alvarado Scoring System (MASS)

Symptoms	Score
Migratory right iliac fossa pain	1
Nausea/Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Elevated temperature	1
Laboratory findings	
Leucocytosis	2
Shift to left	1
Total	10

Materials and Methods

This study was carried out on 100 patients admitted to the Surgical Ward of Sir T. Hospital Bhavnagar with the sign and symptoms suggestive of acute appendicitis and were subsequently operated from November 2018 to November 2019. Data included age, sex, sign, symptoms and laboratory findings such as total leukocyte count, differential leukocyte count, CRP etc. were recorded.

In addition, urine for routine and microscopic examination and Plain X-Ray KUB was done in certain cases. USG of abdomen and pelvis was performed when the diagnosis of appendicitis was doubtful especially in female patients to exclude any other gynecological etiology. Diagnosis of acute appendicitis made clinically and decision for appendectomy was taken.

The sums of all the scores were calculated for each patient and according to the score, patients were divided into two groups according to their score:

Group I patients→ Score >6

Group II patients→ Score ≤6

All the patients underwent appendectomy kept under observation for certain period of time, and the surgical specimens were sent for histopathological examination.

Diagnosis was confirmed by histopathological examination of resected appendix specimen.

Results

Study was conducted on 100 patients with clinical features of acute appendicitis. Among these patients 34 were female (34%) and 66 were male (66%).

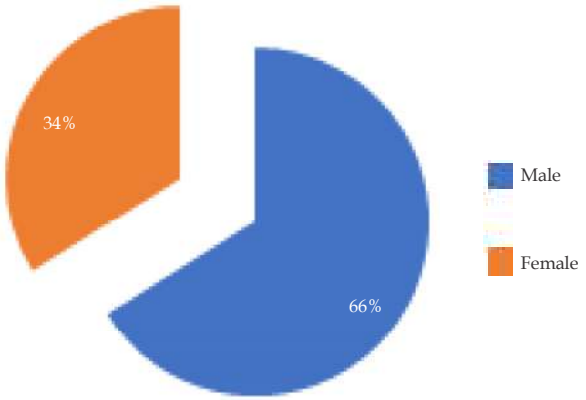

Fig. 1: Gender-wise Distribution

Table 2: Patient group according to Alvarado score

Alvarado Score	Number of patient
>6	72
≤6	28
Total	100

Table 3: Histopathological confirmation of appendicitis according to Alvarado score

Modified Alvarado Score	Histopathology report		Total
	Positive	Negative	
>6	69	3	72
≤6	5	23	28
Total	74	26	100

Table 4: Pathology types in 100 appendix specimens

Type	Number of case
Gangrenous	9
Purulent	12
Perforated	7
Inflamed	46
Normal	26

In this study, 72 patients had a MASS of more than six and the remaining 28 patients had MASS six

and below six. All patients in this study underwent appendectomy. In all of these, inflammed appendix was the most common intra-operative findings affecting 46 patients. Seven patients had perforated appendix, Nine patients had gangrenous appendix and twelve patients had purulent appendix.

Histological examination confirmed appendicitis in 74 patients (74%). The remaining 26 patients were found to have normal appendix giving a negative appendicectomy rate of 26%.

The sensitivity and specificity of MASS in this study was 93.24% and 88.46% respectively. The PPV was 95.83% and NPV was 82.14%. The accuracy of MASS was 92.00%.

Discussion

Although Acute appendicitis is the most common cause of acute abdomen, it is remains a challenging diagnosis because it is primarily based on clinical diagnosis with much differential diagnosis to rule out other condition mimic as appendicitis. However now-a-days most of the clinician prefer CT scan or ultrasonography prior to evaluation.

Alvarado scoring systems can be safely used by general practitioners and primary health care medical personnel to determine need for referral to a qualified surgeon. In present study we observed that the acute appendicitis has male preponderance wit male and female ratio is 2:1.

The use of modified Alvarado scoring system in the diagnosis of acute appendicitis has been reported to improve the diagnostic accuracy and thereby reduces negative appendectomy and complication rates. This study was conducted for evaluation of diagnostic value of Modified Alvarado Scoring System in patients with acute appendicitis in our hospital.

In this study, the course of illness in most of patients was three days and most of patients were admittedafter 24 hours at onset of illness. The reasons for delay in intervention in this study due to delay in referral from peripheral hospitals, lack of money to for the medical services and for transport and lack of awareness regarding to such disease.

Delayed presentation is associated with higher rate of morbidity and mortality due to appendicular perforations and peritonitis. The rate of perforation in our study was 7%.

Delayed presentation, delay in diagnosis, or failure to accept surgical intervention, are contributory factors for high appendicular perforation rates.

The overall negative appendicectomy rate in our study was 26%. The reason for high negative appendectomy rate in our hospital may be due to appendectomies that were done to patients who presented with other conditions mimicking acute appendicitis.

Conclusion

The diagnosis of acute appendicitis is primarily a clinical that is based on proper history and repeated clinical examination of patient.

The Modified Alvarado scoring system is is easy, simple, cheap, non invasive reliable diagnostic modality with increase the accuracy in the diagnosis of acute appendicitis, thus avoiding unnecessary surgery, Thus the application of this scoring system improves diagnostic accuracy and thereby reduces reduce negative appendectomy and complication rates.

Acknowledgement: Nil

Conflict of Interest: Nil

Key Messages: Nil

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