



Alvarado Score in Diagnosis of Acute Appendicitis

KEYWORDS

Appendicitis , Alvarodo scale, Appendectomy

Dr.P.Venkateshwar

Associate Professor of surgery, Osmania Medical college, Hyderabad, Telangana

Dr.B.Ramesh

Assistant Professor of Surgery, Osmania Medical College, Hyderabad, Telangana

ABSTRACT

Acute appendicitis is the most common cause of acute surgical abdomen. Appendectomy is the most commonly done emergency surgery. Acute appendicitis poses a clinical challenge especially in developing countries where advanced radiological investigations do not appear cost effective and so clinical parameters remain the main stay of diagnosis. This is a clinical study to correlate the Alvarado score in diagnosing preoperatively acute appendicitis with post operative histopathological reports. Alvarado score improves diagnostic accuracy and consequently reduce negative exploration. Alvarado score is practical, reliable and easy score. It can be helpful in safe and accurate decision making in patient with appendicitis. The results showed that Alvarado score is more sensitive in diagnosing acute appendicitis in comparing with histopathology.

INTRODUCTION

The vermiform appendix is considered by most to be a vestigial Organ; its importance in surgery results only from its propensity for inflammation, which results in the clinical syndrome known as acute appendicitis. Not with standing advances in modern radiographic imaging and diagnostic laboratory investigations, the diagnosis of appendicitis remains essentially clinical, requiring a mixture of observation, clinical acumen and surgical science [1]. The overall lifetime risk of developing appendicitis is estimated to be of 7% with the highest frequency occurring at ages from 10 to 30 years [2]. Its incidence is 1.5--1.9/1000 in male and female population [3]. Surgery for acute appendicitis is the most frequent operation performed. 10% of all emergency abdominal operations [4, 5]. Routine history and physical examination still remain most practical diagnostic modalities [6]. Absolute diagnosis is possible at operation and histopathological examination of specimen [7]. It is impractical to have a definitive preoperative diagnosis by gold standard, histopathology, which leads to an appreciable rate of negative appendectomy as reported in the world literature varying from 20--40% with its associated morbidity of around 10%, some surgeons even accept a negative appendectomy rate of 20%[8]. In order to reduce the negative appendectomy rates various scoring systems have been developed for supporting the diagnosis of acute appendicitis [9]. 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[10]. Decision making in cases of acute appendicitis poses a clinical challenge especially in developing countries where advanced radiological investigations do not appear cost effective and so clinical parameters remain the mainstay of diagnosis [11].It has been claimed that diagnostic aids can drastically reduce the number of appendectomies in patients without appendicitis , the number of perforation and the time spent in hospital[12]. These aids include laparoscopy scoring system, Ultra Sonography, CT Computed tomography scans, MRI (Magnetic Resonance Imaging), which are available in different settings and have various advantages and disadvantages. However, routine history and clinical examination both remain the most effective and practical diagnostic modalities [13].

MATERIAL AND METHODS

Patients who present with symptoms and signs of acute appendicitis Underwent an emergency Appendectomy at Osmania general hospital Hyderabad, during the period of Octo-

ber 2013 to June 2015.

The cases were taken up for study on admission after obtaining written consent and after explaining them the nature of operation, type of anaesthesia and the study being done. There was no recruitment of any volunteers, additional nursing or bio medical staff for this study; also there was no interference in the normal duty pattern of the hospital staff. During this study no remuneration in the form of cash was given to the study subjects or any staff involved. This study was not funded or help taken from drug companies in form of cash or drugs supplied from them.

It included the patients who presented with symptoms and signs of acute appendicitis both male and female patients .We excluded patients Age below 10 yr both female and male,. Diabetes mellitus., Immunocompromised patients. Pregnant patients and Appendicular mass. One Hundred cases underwent appendicetomy operation. Patients presenting to the Out Patient department or emergency department of Osmania general hospital, Hyderabad, with symptoms and signs suggestive of acute appendicitis between October 2013 to June 2015. All included patients were admitted and are initially subjected for detailed history taking, clinical examination and investigations. Following which they were evaluated using the Alvarado scoring.Then the total score is calculated for each patient and based on the results patients are divided into two groups .

TABLE – 1
ALVARADO (MANTRELS) SCORING SYSTEM

Symptom	Score
1.Migratory Right iliac fossa RIF Pain	1
2.Anorexia	1
3.Nausea & Vomiting	1
Sign	
1.Tenderness Over RIF	2
2.Rebound Tenderness RIF	1
3.Elevated Temperature	1
Lab findings	
1.Leucocytosis	2
2.Shift To Left	1
TOTAL	10

The Alvarado score is dynamic and patients score can in-

crease or decrease .On reassessment those patients with score 7-10 underwent Appendectomy. Those patients with scores of less than 7 not considered for surgery unless there were compelling reasons. If after 24 hr observation ,regardless of score, who were thought on clinical grounds to require Appendectomy, it was performed .Patient less than 14 yrs of age taken into the group of children. Pain around the umbilicus or pain upper abdomen later shifted to right lower quadrant was taken as migratory RIF pain The laboratory finding of leucocytosis is defined as a white cell count in excess of 10×10^9 /lit ($10,000/\text{mm}^3$).Elevated temperature is taken as a temperature of more than 100 F. Diagnosis of acute appendicitis is confirmed by operative findings and histopathological assessment of the Appendectomy specimen one of more of following is observed. Neutrophilic infiltration of all the coats of appendix. Necrosis of mucosa leading to mucosal ulcers. Perforated of appendix. Final data was collected in a specially designed proforma filled in for each patient. Finally the reliability of Alvarado scoring system is assessed by calculating. Negative Appendectomy rate (the proportion of operated patients having normal appendix removed) and Positive predictive value (the proportion of patients with a positive test result who actually have the disease) was assessed.

RESULTS

In Our study age of patient ranged from 11 yrs to 58 yrs with majority of them in second decade and followed by third decade. Out of 100 patients male 32 (64%), female 18 (36%), male: female ratio 1.7:1. All specimen of 100 patients were sent for histopathology. 46 patients were in second decade followed by 19 patients in third decade. Acute inflammation was present in 50 cases, 8 had perforation and 6 had gangrenous appendix. Rest of 36 cases were ovarian cyst, salpingitis mesenteric adenopathy.

TABLE-2
SENSITIVITY OF MODIFIED ALVARADO SCORE LESS THAN 7 GROUP A

Sex	No of patient score less than 7	Acute appendicitis	Normal appendix	Sensitivity
Male	30	12	18	40%
Female	8	02	06	25%
Total	38	14	24	36%

TABLE-3
SENSITIVITY OF MODIFIED ALVARADO SCORE LESS THAN 7 AND ABOVE GROUP A

Sex	No of patient score above 7	Acute appendicitis	Normal appendix	Sensitivity
Male	34	32	2	94.11%
Female	28	24	4	85.71%
Total	62	56	6	90.32%

DISCUSSION

The aim and objective of this study was to evaluate the sensitivity of Alvarado scoring system in the diagnosis of acute appendicitis, to reduce the rate of negative appendectomy and to reduce the direct complications of acute appendicitis due to misdiagnosis and delay in surgery. The main aim of clinical decision making process is to reach an accurate diagnosis fast and cheapest way. Cases of acute appendicitis pose a clinical challenge especially in developing countries where advanced radiological investigations do not appear cost effective and so clinical parameters remain the mainstay of diagnosis [14]. Through history and clinical examination still remains the mainstay for the diagnosis, but misdiagnosis and negative appendectomy still do occur at quite a high rate. It is the surgeon who has to decide the best management and at a cost effective manner. The decision to operate or not is very important as surgical intervention in acute appendicitis is not without the risk of morbidity and mortality. Even though, a negative appendectomy has a negligible mortality and morbidity of around 10% [15]. We conducted a study in Osmania General Hospital applying Alvarado score to 100 clinically suspected cases of acute appendicitis and operated and evaluated histopathologically. We divided the patients into two groups: Group A with Alvarado score less than 7 and are 62 in number. Group B with Alvarado score more than 7 and are 38 in number.

The present study included 100 patients with suspected acute appendicitis out of 100 patients 64 were male (64%) and 36 were females (36%). In our study, male: female 1.7:1. Our study revealed that Alvarado scoring system is more helping in male patients by showing lower negative appendectomy rate and high positive predictive value for male patient as compared to females. In females additional investigation may be required to confirm the diagnosis. Literature also support this observation. The results showed that Alvarado score is more sensitive in diagnosing acute appendicitis in comparing with histopathology .

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