

“Modified Alvarado Scoring System” In Diagnosis Of “Acute Appendicitis” In Adults

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Abstract

Introduction: The most common cause of surgical emergencies in the world is Acute Appendicitis. Appendicitis when progressing to perforation, has a higher mortality and morbidity, hence appendicitis has to be operated if the diagnosis is probable but not to wait still it is certain. Acute appendicitis is diagnosed by thorough clinical examination. Modified Alvarado scoring system was designed so that to reduce negative Appendectomy rate hence to reduce the morbidity and mortality.

Aim Of The Study : To evaluate sensitivity and efficiency of “Modified Alvarado Scoring System” in diagnosis of “Acute Appendicitis” in Adults.

Methodology: A prospective study of 100 patients, with a clinical diagnosis of Acute Appendicitis admitted in the Department of General Surgery of Tirunelveli Medical College, was conducted during a period from December 2012 To August 2013.

Conclusion: From present study it can be concluded that high scores of 7-9 in Modified Alvarado score is dependable aid in early diagnosis of acute appendicitis in men but it is not the same far as women are concerned due to other conditions mimicking appendicitis like ureteric colic, mesenteric adenitis, ruptured ectopic pregnancy, pelvic inflammatory disease, etc.

Key words: Acute Appendicitis, Modified Alvarado score, early diagnosis.

I. Introduction

The most common cause of emergency surgeries in the world is Acute Appendicitis. Appendicitis when progressing to perforation, has a higher mortality and morbidity, hence appendicitis has to be operated if the diagnosis is probable but not to wait still it is certain. The principle that when acute appendicitis is in doubt, take it out, is not correct due to the various major and minor complications following appendectomy. The accurate diagnosis of acute appendicitis still difficult for the surgeon in spite of more than 100 years of experience. Acute Appendicitis is difficult to diagnose due to its myriad presentations. Acute appendicitis is diagnosed by thorough clinical examination. The accuracy of clinical examination depends on the examiner and it has to be reported between 71% to 97%. The most common cause for hospital admission requiring surgery is acute appendicitis. The diagnosis of acute appendicitis is often difficult for the most experienced surgeon. Most of the doubtful cases require hospital admission and observation. The delay in diagnosis increases the mortality and morbidity[5]. The diagnostic accuracy of Acute Appendicitis has been increased with the help of imaging by USG Abdomen and Pelvis, CT scan Abdomen and Pelvis, laparoscopy, and even radioactive isotope imaging[4]. There are number of scoring system available which aid in diagnosis of Acute Appendicitis. In 1986, the Alvarado score was introduced and has been used in practice to diagnose Acute Appendicitis for adults and children. Alvarado scoring system was designed so that to reduce negative Appendectomy rate hence to reduce the morbidity and mortality which was modified by M. Kalan, D. Talbat, W. J. Cunliffe and A. J. Rich. This system is not a substitute for clinical evaluation but it is an aid to diagnose acute appendicitis and assists in arriving at a conclusion whether a case should be taken up for surgery or not hence the number of negative appendectomies could be reduced[3].

Aim Of The Study

1. To evaluate sensitivity of “Modified Alvarado Scoring System” in diagnosis of “Acute Appendicitis” in adults.
2. To evaluate efficiency of “Modified Alvarado Score” in diagnosis of “Acute Appendicitis” and to reduce unwanted appendectomies

Methodology

A prospective study of 100 patients, with a clinical diagnosis of Acute Appendicitis admitted in the Department of General Surgery of Tirunelveli Medical College, was conducted during a period from December 2012 To August 2013.

Inclusion Criteria

All adult patients of both the sex with clinical suspicion of Acute Appendicitis aged between 18 – 60 years admitted to the Department of General Surgery of Tirunelveli Medical College

Exclusion Criteria

- Patients older than 60 years,
- pregnant females,
- appendicular mass ,appendicular abscess,
- children,
- Appendicitis mimicking conditions of gastrointestinal, urologic or gynaecological origin suspected, as diagnosed by ultrasound scan. Depending on individual presentation of signs and symptoms, a score was calculated for each case of suspected appendicitis from 9 values (based on Modified Alvarado scoring system) depicted in Table - 1.

Table-1 Modified Alvarado Score

Symptoms	Score
Migratory RIF pain	1
Anorexia	1
Nausea/vomiting	1
Signs	
Tenderness in RIF	2
Rebound tenderness in RIF	1
Elevated temperature	1
Lab investigation	
Leucocytosis	2
Total	9

The observed values in each case were added and expressed as end-score. According to the end score: Cases with score of 1-4 were observed and not operated and were discharged and followed up for next six months for development of acute appendicitis. Cases with score 5-6 were observed for next 24 hours and revision of scoring was done. If score became ≥ 7 or clinical condition was highly suspicious of acute appendicitis they were subjected for appendicectomy. All patients who were considered for appendicectomy underwent Ultrasonography of abdomen and pelvis primarily to rule out other conditions mimicking acute appendicitis. Patients with score of 7-9 who were considered candidates for appendicectomy were assessed again after Ultrasonography. If any other conditions mimicking acute appendicitis was found in them, they were not operated and were considered as false positive cases. All the specimens of appendix were sent for histopathological confirmation of acute appendicitis. Final correlation between the scoring system and final diagnosis was made. All necessary investigations were done in all patients. The cases subjected to emergency surgery were adequately prepared. Parenteral fluids, electrolyte supplementation broad spectrum antibiotics were administered. Hourly temperature, pulse chart were maintained. Surgery was done under general anaesthesia or spinal anaesthesia. After appendicectomy specimen was sent for histopathological examination. Then a study of the observations was done and an attempt was made to correlate the clinical presentation in each case with the pathological findings. The results of conservative management, operative finding and histopathological examination reviewed. Accuracy of diagnosis by Modified Alvarado Scoring System was assessed.

Observations And Results

A prospective study consisting of 100 acute abdomen cases with a clinical diagnosis of acute appendicitis were undertaken to evaluate the sensitivity of Modified Alvarado scoring system with respect to its diagnostic accuracy. The following results were obtained in the study shown in Table -2.

Table- 2 Male, Female incidence

Age in yrs	Male	Female	Total
18-30	28	42	70
31-40	10	7	17
41-50	5	3	8
51-60	3	2	5
Total	46	54	100

Appendicitis occurred commonly between 18 and 30 years. It is clear that incidence is less in younger and older age groups with peak incidence in 2nd and 3rd decade. In the present series females are more than males in the ratio of 1.2:1. Pain was commonest presenting symptom and has been seen in all cases (100%) in present series. The classical shifting of pain from umbilical region to RIF was seen in all cases. Next common symptoms observed were nausea/ vomiting in 70% of cases and anorexia in 54% of cases. Fever was of

low grade and was seen in 56% of cases. RIF tenderness was the commonest sign (100%). Rebound tenderness was seen in 80%. Leucocytosis was seen in 31%. For assessment, patients were categorized into 2 groups male and female. Out of 100 cases studied, 46 were male and 54 were female. Out of 46males, score of 7 – 9 were 20, score of 5 – 6 were 23 & 3 had score of 1–4. Out of 56 female patients, 26 had score 7 – 9, 26 had score 5 – 6 and 2 had score 1 – 4. In 20 males having score of 7 – 9, 19 had acute appendicitis. In 23Male patients having score of 5 – 6, 17 had acute appendicitis. In 26 female patients having score 7 – 9, 23 had acute appendicitis. In 26 females with score 5 – 6,17 had acute appendicitis. USG Abdomen and Pelvis was done for all the patients with Alvarado score>5 Which to rule out certain conditions mimicking appendicitis who were not to be operated. 19 patients of Modified Alvarado>5 had other diagnosis. 4 of them where from Modified Alvarado7-9,of which 2 had Meckels Diverticulitis,1had ruptured ectopic, 1 had ruptured ovarian cyst. 15 of them were from Modified Alvarado 5-6, of which 6 had ureteric colic, 2 had mesenteric adenitis, 4 had ovarian cyst, 2 had pelvic inflammatory disease, 1 had Meckels Diverticulitis. The result of present study showed that a high score (≥ 7) in men was a satisfactory aid in early diagnosis of acute appendicitis.

Diagnostic Value Of Modified Aharado Score

Table-3

VARIABLES	RESULTS
TOTAL	SENSITIVITY
MODIFIED ALVARADO SCORE	91.30%
7-9	69.38%
5-6	
MALES	
MODIFIED ALVARADO SCORE	SENSITIVITY
7-9	95.0%
5-6	73.91%
FEMALES MODIFIED ALVARADO SCORE	SENSITIVITY
7-9	88.46%
5-6	65.38%

II. Discussion

Acute appendicitis is a common abdominal emergency in the world. The diagnosis of acute appendicitis is difficult due to the varied presentation of disease and lack of reliable diagnostic test. Acute appendicitis is a clinical diagnosis. Investigations like USG, CT, MRI can not conclusively diagnose appendicitis. Even now a thorough clinical examination with basic investigations like WBC count remains cornerstone in diagnosis of acute appendicitis. With this and different scoring systems diagnosis of acute appendicitis is made to decrease negative appendicectomy. Many diagnostic scores are being advocated, most of them are complex and difficult to implement in clinical situation. The Alvarado score is a simple scoring system which can be done easily. To be useful, a scoring system must be both sensitive and specific. The modified Alvarado scoring system is simple to use and easy to apply, as it depends on history, clinical examination and basic lab investigations. The present study was done to evaluate the use of Modified Alvarado scoring system in reducing the number of negative appendicectomy and to evaluate the sensitivity of MASS in diagnosis of Acute Appendicitis. Our results and observations were discussed and compared with various studies. The age group in which acute appendicitis occurred commonly was between 12 and 30 years[10]. The result of present study showed that a high score (≥ 7) in men was a satisfactory aid in early diagnosis of acute appendicitis , the overall sensitivity in men with scores ≥ 7 was 91.30% . Sensitivity of acute appendicitis 95.0% for males in present study with Modified Alvarado score of 7 to 9 correlates well with figures of studies by Kalan M, Rich AJ, Talbot D, Cunliffe WJ (who have reported 93%) and P.K. Bhattacharjee, T. Chowdhary, D.Roy (who have reported 94.1%).Sensitivity of acute appendicitis 88.46% for females in present study with score of 7 to 9 correlates well with figures of studies by Kalan M, Rich AJ, Talbot D, Cunliffe WJ (reported 67%) and P.K. Bhattacharjee, T. Chowdhary, D.Roy (reported 71.9%).The overall sensitivity of acute appendicitis being 91.30% in present study with score of 7 to 9 correlates well with figures of studies by Kalan, Rich A.J, Talbot D, Cunliffe WJ (reported 83.7%) and P.K. Bhattacharjee, T. Chowdhary, D. Roy (reported 82.7%) as depicted in Table no 3. A negative rate of appendicetomy of 20-40% is usual in surgical literature[12] depicted in Table-4.

Comparison of Modified Alvarado Score (7-9)

TABLE-4

Category	Present Study	Kalan M, Rich AJ, Talbot D, Cunliffe W J	P.K.Bhattacharjee, T.Chowdhary, D.Roy
Male	95.0%	93%	94.1%
Female	88.46%	67%	71.9%
Total	91.30%	83.7%	82.7%

III. Conclusion

From present study it can be concluded that high scores of 7-9 in Modified Alvarado score is dependable aid in early diagnosis of acute appendicitis in men but it is not the same far as women are concerned due to other conditions mimicking appendicitis like ureteric colic, mesenteric adenitis, ruptured ectopic pregnancy, pelvic inflammatory disease, etc. Ultrasonography of abdomen and pelvis [6,7] is a useful tool in avoiding negative appendectomy rates particularly in females. Applicability of this scoring system is a simple, reliable, cheap, non invasive safe diagnostic modality without expense and complications. It is easy to follow in peripheral hospitals where back up facilities are minimal.

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