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Research Article

Analysis of application and diagnostic importance of Alvarado scoring system in patients with right lower quadrant abdominal pain

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ABSTRACT

Background: Acute Appendicitis is a common emergency condition requiring surgical intervention. Accurate diagnosis is the deciding factor in reducing the morbidity and mortality associated with the illness and is also the key to avoid unnecessary appendectomies. In this study we analyse the clinical efficacy of modified Alvarado scoring in diagnosing acute appendicitis
Methods: In a prospective non-randomized study including 99 patients presenting with acute onset right lower abdominal pain from to were included in study in whom the alvarado score was obtained at admission and categorized into three groups and group 3 and group 2 patients with deterioration underwent emergency appendicectomy compared with histo-pathological diagnosis. Sensitivity, specificity, positive predictive value, negative predictive value and negative appendicectomy rate calculated.
Results: In our study, overall sensitivity and specificity were 98.50% and 87.09% respectively. Positive and negative predictive values were 94.36% and 96.42 respectively. Overall Negative appendicectomy rate in our study was 5.9%.
Conclusions: We conclude that Alvarado scoring system is easy, simple, cheap and useful tool in pre-operative diagnosis of acute appendicitis which can be used in the community by general practitioner and residents in the referral hospitals. Scores more than seven virtually confirm the diagnosis of acute appendicitis and early operation is indicated.

Keywords: Appendicitis scoring, Perforated appendix, Faecal peritonitis, Ultrasound abdomen, Right lower quadrant pain

INTRODUCTION

Right lower quadrant abdominal pain is one of the most common presenting symptoms in surgical outpatient department. Acute appendicitis is the most frequent diagnosis in these patients. Clinical diagnosis is the crux in these patients despite advances in imaging modalities. In 1886 Fitz described classical sign and symptoms of acute appendicitis.[1] Earlier approach was when in doubt take it out. Overall negative appendicectomy rate prevailed at 20% for decades.[2] This has led to increased morbidity and financial cost of treatment. Investigations including Ultrasound, CT scan and even diagnostic laparoscopy have been suggested to reduce the negative appendicectomy rate. Alvarado scoring system was introduced in 1986.[3] It is based purely on history, clinical examination; simple laboratory tests and is easy to apply.

METHODS

This study was carried out at the Department of General Surgery, Rural Medical College, Loni, from 12/8/12 to

9/8/13. All patients with pain in Right Iliac Fossa (RIF) were considered for the study irrespective of signs and severity. Alvarado scoring (Table 1) was documented by the Surgery resident in every case at presentation, subsequently patients were divided into three groups based on score obtained. Group I - score one to four, Group II score five to six, Group III score seven to. Group I: Patients were treated on outpatient basis and asked to follow up. Group II: Admitted and observed for 24 hours, treated with Oshner - sherian (O-S) regimen. Deterioration in scores by more than two was taken up for surgery. Group III: Taken up for emergency surgery. All specimens were sent for histo-pathological examination and confirmation of diagnosis. The sensitivity, positive predictive value, specificity, negative predictive value, negative appendectomy rate was calculated out in order to assess the reliability of Alvarado score.

We aimed at analysing the Alvarado Score in patients with right iliac fossa pain to diagnose acute appendicitis accurately and its importance in ruling out negative appendicectomy.

RESULTS

Table 1: Alvarado scoring system.

Criteria	Score
Symptoms	
Migratory RIF pain	1
Nausea and vomiting	1
Anorexia	1
Signs	
RIF Tenderness	2
Fever	1
Rebound RIF tenderness	1
Laboratory Tests	
Leukocytosis	2
Neutrophilic Left Shift	1
Total Score	10

Group - I; score 1-4, Group - II; score 5-6, Group -III; score 7-10.

Table 2: Age distribution of patients in our study.

AGE	Number of patients
0-10	5
11-20	27
21-30	30
31-40	11
41-50	16
51-60	4
61-70	4
71-80	2
Total	99

Table 3: Operative findings and histopathology reports in our study.

Histopathology report	Number of patients
Acute appendicitis	51
Gangrenous appendicitis	1
Chronic appendicitis	10
Perforated appendicitis	2
Appendicular abscess	3
No specific pathology	2
Gangrenous intestine	1
Salpingo-oophoritis	1
Total	71

Table 4: Statistical analysis in male patients.

Diagnostic test result	Conformed appendicitis	No-appendicitis	Total
Positive	True Positive - 36	False positive - 0	36
Negative	False Negative - 1	True Negative-17	18
Total	37	17	54

Sensitivity: 97.29%
Predictive value of positive test: 100%
Specificity: 100%
Predictive value of negative test: 94.44%
Negative appendicectomy rate: 0%

Table 5: Statistical analysis in female patients.

Diagnostic test result	Confirmed appendicitis	No - appendicitis	Total
Positive	True positive -31	False positive -4	35
Negative	False negative - 0	True negative - 10	10
Total	31	14	45

Sensitivity: 100%
Predictive Value of Positive Test: 88.5%
Specificity: 71.42%
Predictive Value of Negative test: 100%
Negative Appendicectomy Rate:11.4%

Table 6: Observed overall indices of our study.

Diagnostic Test Result	Confirmed Appendicitis	No – Appendicitis	Total
Positive	True Positive (67)	False Positive (4)	71
Negative	False Negative (1)	True Negative (27)	28
Total	68	31	99

Sensitivity: 98.5%; Predictive Value of Positive Test: 94.36%
Specificity: 87.09%; Predictive Value of Negative Test: 96.42%
Negative Appendicectomy Rate: 5.9%

Total of 99 patients included in the study, with 54 male 54.54% and 45 female 45.45%. Mean age of Patients was 30.8 with a range of 0-80 years (Table 2). Based on Alvarado scoring at presentation, 15 patients (15.15%) were categorized into Group I. Number of patients in Group II were 13 (13.13%). Group III had a total 71 patients (71.71%). Sex distribution was 10 males (66.6%) and five (33.33%) females in Group I, nine males (69.3%) and four females 30.7% in Group II, 35 (50.7%) males and 36 (49.29%) females in Group III. All 71 patients in Group III were operated. Acute appendicitis was confirmed histo-pathologically in 67 patients. No pathology was detected in two female patients, gangrenous intestine in one female patient and salpingo-oophritis in one female patient (Table 3). In Group II 7 out of 13 patients were operated. Acute appendicitis was confirmed in one patient, psoas abscess in three patients (two female and one male), and intussusception in one female patient and tubercular peritonitis in two patients (one male and one female). In males the sensitivity and specificity were 97.29% and 100% and positive and negative predictive value was 100% and 94.44% respectively (Table 4). In females the sensitivity and specificity were 100% and 71.42%, positive and negative predictive values were 88.5% and 100% respectively. Negative appendectomy rate in males 0% and in females 11.4% (Table 5). The Overall sensitivity and specificity was 98.50% and 87.09% and positive and negative predictive value was 94.36% and 96.42 respectively (Table 6). Overall Negative appendicectomy rate in our study was 5.9%.

DISCUSSION

Decision making in acute appendicitis poses a challenge in developing countries where radiological investigations are not available/cost effective. Negative appendicectomy rate of 25% and 35-45% in males and females respectively have been found in studies conducted earlier by Dunn et al, Lewis et al with diagnostic accuracy (75 %) much less than our study and negative appendicectomy rate much more than our study in males and females.[4,5] Clinical scoring systems devised by Teicher et al, Lindberg and Feyo, Ramirez and Dens J, all had sensitivity ranging from 48 to 77% while specificity of 73 to 87%, which is less than Sensitivity of our study (98.5%) while specificity is nearly (87.09%).[6-8] Kalan et al using modified version of Alvarado score found negative.[9] Appendicectomy of 14.6%, sensitivity of 93% in males and 67 % in female. Our study shows a positive predictive value of (94.36%) comparable with literature reports of 97 % ,97.6%, 83.5%.[10-12] We had a negative appendicitis rate of 5.9%, Similar results were reported in literature 21%,15.6%, 7%.[10-12] This is a simple scoring system which can be easily interpreted by non-surgicalresidents.[13]

CONCLUSION

Acute appendicitis is a diagnostic challenge for the surgeon in spite of having radiological investigations in the modern era; there is no laboratory or radiological test which can reliably diagnose the condition. Alvarado scoring system is easy, simple, cheap, useful tool in pre-operative diagnosis of acute appendicitis. Scores more than seven virtual confirm the diagnosis of acute appendicitis and early operation is indicated. For this reason the scoring system could be safely used by general practitioners in deciding whether to refer a patient to hospital for surgical treatment. Patients with score five-six must be admitted and observed by frequent assessment of Alvarado scoring.

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