

Original Research Article


# Comparative study of management of acute appendicitis with special consideration of “Alvarado Score”

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## Abstract

**Background:** Acute appendicitis is a common still with appreciable morbidity and occasional mortality which may possibly be related to failure to make early diagnosis. As a result, surgeons have learned over the decades to accept a high negative laparotomy rate in an attempt to avoid mortality. This has stimulated formulation of simple scoring systems to aid in early diagnosis which are in vague for a decade but hardly been evaluated thoroughly. The aim was to evaluate existing scoring system that is Alvarado score, and to study the clinical, laboratory and imaging modalities used in diagnosis of this disease and its management.

**Materials and methods:** This review was based on the study of 50 selected cases of acute appendicitis treated in our institution by random sampling. All the patients were observed clinically for operation and not by scoring. Scoring was and added exercise for these patient evaluation. They were correlated with USG, operative findings and histopathological examination.

**Results:** 86% patients had right iliac fossa (RIF) pain which when combined with vomiting was highly suggestive of acute appendicitis and resulted in higher scores. 86% patients had tenderness in RIF which was present in higher scores of appendicitis and highly suggestive of appendicitis when combined with rebound tenderness. 80% patients had leukocytosis >10000/cu.mm. That was more common in higher score. In my study of 50 cases of clinically acute appendicitis proved that Alvarado score 9-10 that was 22 patients out of 50 with 100% accuracy and scores 7-8 that was 19 patient, 11 patients had acute appendicitis. Thus the score increases sensitivity of accuracy increases. Score below 6 patients can be treated with conservative treatment without major complications and thereby decreases negative appendectomy rate.

**Conclusion:** Alvarado score is useful in specific diagnosis of acute appendicitis. It is better in terms of lower rate of negative appendicectomy and thereby decreasing morbidity and mortality. There is no much added advantage of USG over clinical scoring system in this study.

## Key words

Acute appendicitis, Alvarado score, Compilation.

## Introduction

Appendicitis though once thought to be rare condition has, by the advance of civilization, become a commonest disease which has forward the keen and Patient observation of every qualified medical man. It is a challenge to every surgeon both as and yardstick of his ability to diagnose at the proper time and with the proper line of treatment. It is the test pin of the surgeon whose decision correctly counts his as well as has Patient’s fate. With the Steady reduction in the deaths from acute appendicitis and its complication due to early diagnosis and use of higher antibiotics, the interest in this subject is waning, yet it remains the commonest cause of “Acute abdomen”.

Acute appendicitis [1] is a common still with appreciable morbidity and occasional mortality which may possibly be related to failure to make early diagnosis. As a result, surgeons have learned over the decades to accept a high negative laparotomy rate in an attempt to avoid mortality. This has stimulated formulation of simple scoring systems to aid in early diagnosis which are in vague for a decade but hardly been evaluated thoroughly [2].

## Aim

To evaluate existing scoring system that is Alvarado score [3], and to study the clinical, laboratory and imaging modalities used in diagnosis of this disease and its management.

## Materials and methods

This review was based on the study of 50 selected cases of acute appendicitis treated in our institution by random sampling. All the patients were observed clinically for operation and not by

scoring. Scoring was and added exercise for these patient evaluation. They are correlated with USG, operative findings and histopathological examination.

Alvarado score is a good score for this purpose, it give comparative weightage to 3 symptom, 3 signs, 2 laboratory findings to form scoring of 1-10. (Table - 1, 2)

**Table – 1:** Alvarado score.

Features	Score
Migratory RIF Pain	1
Anorexia (Recent)	1
Nausea/ Vomiting	1
RIF tenderness	2
Rebound tenderness	1
Elevation of Temperature $\geq 37.5^{\circ}\text{C}$	1
Leukocytosis	2
Shift to left of neutrophils maturation	1
Total	10
Leukocytosis is fixed as $\geq 10 \times 10^9/l$	

**Table – 2:** Interpretations and plan of action.

S. No.	Interpretation Predictive inference	Plan of action
1-4	Very unlikely to be acute appendicitis	Observe
5-6	Diagnosis is compatible with acute appendicitis but does not warrant surgery	Observe
7-8	Probable diagnosis of acute appendicitis	Surgery
9-10	Absolute definite diagnosis of acute appendicitis	Surgery

Per-operative criteria for proof of acute appendicitis were: Gangrenous or perforated

appendix, Loss of serosal shine with dilatation, Fibropurulent exudates over serosa, Local peritonitis, Palpable fecolith in lumen of appendix. An absence of above criteria is considered for non-inflamed or non-acute appendicitis.

## Results

Appendix is disease of young majority, It mostly occurs in 13-49 years of age group. There was no appreciate difference of sex incidence but in 20-49 years of age group patients, there was slight higher incidence of appendicitis in females (which is 32% in male as compared to 24% in female). 86% patients had right iliac fossa (RIF) pain which when combined with vomiting was highly suggestive of acute appendicitis and resulted in higher scores. 86% patients had tenderness in RIF which was present in higher scores of appendicitis and highly suggestive of appendicitis when combined with rebound tenderness. 80% patients had Leukocytosis >10000/cu.mm. That was more common in higher score. 54% of patients only had USG finding suggestive of acute appendicitis and USG positive findings were also higher in lower scores which suggests it's less diagnostic value in acute appendicitis, although appendicular abscess and pelvic peritonitis are better visualized in USG. (Table – 3)

**Table – 3:** Gross projection of study.

Score	USG +VE	Per-op +VE	HPE+VE
3	1	0	0
4	4	1	1
5	1	0	0
6	2	1	0
7	6	2	2
8	5	9	9
9	5	14	14
10	3	8	8
Total	27	35	34

In my study of 50 cases of clinically acute appendicitis proved that Alvarado score 9-10 that was 22 patients out of 50 with 100% accuracy

and scores 7-8 that was 19 patient, 11 patients had acute appendicitis. (Table – 4) Thus the score increases sensitivity of accuracy increases. Score below 6 patients can be treated with conservative treatment without major complications and thereby decreases negative appendicectomy rate.

**Table – 4:** Patients proved having acute appendicitis.

Score	Total No. of patients	Patient proved having acute appendicitis
≤6	9	1
7-8	19	11
9-10	22	22
Total	50	34

## Discussion

We have different clinical scores for early and accurate diagnosis of acute appendicitis. A negative appendicectomy rate of about 20-38% is found in different studies with clinical judgment alone [4]. This is probably due to over diagnosis to prevent complication of appendicitis. Studies suggest that when appendicectomy is done for normal appendix it has higher complication rate as compared to appendicectomy done for acute non perforated appendicitis. So a more discriminate diagnosis of acute appendicitis will lower the incidence of unnecessary appendicectomy without increasing the morbidity from unrecognized appendicular disease.

Alvarado score is dynamic and a patient's and a patient's score can decrease or increase on reassessment. The Alvarado score is modified by excluding the shift to left of maturation of neutrophils examination as this is technically difficult and user dependent and is not available in some of the centers. Alvarado score has on useful way of studying in terms of scores ≤ and scores ≥ 7 [5].

There is false positive appendicectomy rate (10-20%) in different studies [6]. The sensitivity and

specificity were higher for higher score value as compared to lower score value. Each criterion used singly showed a low specificity and sensitivity but score with combination of these criteria is better in results. Leukocytosis is very helpful but exceptions are found in different studies. Overall results for male and females are better by using Alvarado score as compared to clinical judgment alone [7].

The sensitivity and specificity is lower for children in most of the studies but some studies have shown equally good result in children as in adult [8]. The lower results in children may be due to overlooking the symptoms by a distress child and difficulty in eliciting the signs.

The sensitivity and specificity were higher for males as compared to females for any total of score [9]. This is explained on additional pelvic inflammatory diseases and diseases of urogenital organs in females.

Symptoms other than the three used in Alvarado score are also seen in acute appendicitis but the typical symptoms of acute appendicitis are far more common than these atypical symptoms.

## Conclusion

This study of management of 50 cases of acute appendicitis is done to evaluate Alvarado score as a tool for accurate diagnosis and surgical intervention of acute appendicitis. Appendix is disease of young. Alvarado score is useful in specific diagnosis of acute appendicitis [10]. It is better in terms of lower rate of negative appendectomy and thereby decreasing morbidity and mortality [11]. There is no much added advantage of USG over clinical scoring system in this study.

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