

# ACUTE APPENDICITIS: ROLE OF ALVERADO SCORING SYSTEM IN THE DIAGNOSIS

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## ABSTRACT

**Background:** Acute appendicitis is a common surgical emergency. This study was conducted to evaluate the role of Alverado scoring system in diagnosing acute appendicitis.

**Material & Methods:** It was an observational study conducted at Surgical Ward, DHQ Teaching Hospital, D.I.Khan, from 1st April 2008 to 31st March 2009. Two hundred consecutive adult patients admitted through emergency and OPD suspected of having acute appendicitis were analyzed. The role of Alverado scoring system in diagnosis was evaluated. The operative findings were recorded and appendices were subjected to histopathological examination for confirmation of the diagnosis.

**Results:** On Alverado scoring 76 patients were having score of 7-10 and underwent emergency surgery. Ninety-four patients were having score of 5-6 and were observed. Twenty of these improved and were discharged home, while 74 remained with the same score and underwent surgery. Thirty patients were having score of 1-4 and were discharged home. Out of 50 patients discharged home, 10 were re-admitted with increased score and underwent surgery. Eight of these were confirmed by histopathology as having appendicitis. The sensitivity of the system was calculated as 94.16% and specificity 66.66%, with a positive predictive value of 86% and negative predictive value of 84%.

**Conclusion:** Alverado Scoring System is a simple and effective system for the diagnosis of acute appendicitis, especially in periphery hospitals where modern investigative facilities are not available.

**Key words:** Appendicitis, Diagnosis, Alverado scoring system.

## INTRODUCTION

Acute appendicitis is a common surgical emergency.<sup>1</sup> It is one of the most common gastrointestinal diseases and the most common cause of acute abdomen. Its incidence is 1.5 and 1.9 per 1,000 in male and female population respectively.<sup>2</sup>

Acute appendicitis is often difficult to diagnose clinically,<sup>3</sup> although early diagnosis and prompt appendectomy is the goal. Despite all the modern laboratory and imaging modalities, it is essentially a clinical diagnosis even today.<sup>4</sup>

Different scoring systems are designed to help in the diagnosis.<sup>5</sup> Alverado scoring system is one of them, developed by Alverado in 1886 for the diagnosis of acute appendicitis in emergency situation.<sup>6</sup> It is easy to apply because it relies purely on clinical history, examination and a few simple laboratory tests.

This study was conducted to evaluate the role of Alverado scoring system in diagnosing acute appendicitis.

## MATERIAL AND METHODS

This study was carried out on 200 consecutive adult patients presenting to surgical ward, DHQ Teaching Hospital, D.I.Khan, with signs and symptoms referring to the diagnosis of acute appendicitis, from 1<sup>st</sup> April 2008 to 31<sup>st</sup> March 2009.

The study was based on Alverado scoring system. (Table-1)

Patients were admitted through emergency and out patient department. The history was taken and examination performed.

Scoring was performed and recorded. All the patients were divided in three groups according to the score.

Group 1: Patients with score 7-10. All underwent emergency appendectomy.

Group 2: Patients with score 5-6. These patients were observed for 24 hours and re-evaluated. Patients with increased score underwent surgery and those with decreased score were discharged home.

**Table 1: Alverado scoring system**

Variable	Score
<b>Symptoms</b>	
Migratory right iliac fossa pain	1
Anorexia	1
Nausea /vomiting	1
<b>Signs</b>	
Right lower quadrant tenderness	2
Rebound pain in right iliac fossa	1
Fever (>38.5°C)	1
<b>Laboratory Tests</b>	
Leucocytosis ( >10,000/mm <sup>3</sup> )	2
Left shift of neutrophils (>10% )	1

Group 3: Patients with score 1-4. All were discharged home and followed up for 4 weeks.

All the appendices removed were subjected to histopathological examination. Interval appendicectomies were excluded from the study. Patients with absent histopathology report were excluded. Similarly, patients with mass in the right iliac fossa were excluded from the study.

**RESULTS**

During the study period of one year, 200 patients were assessed; 120 (60%) males and 80 (40%) females with a male to female ratio of 1.5:1. The age distribution was 15-76 years with mean age being 23.8 years.

Out of 200 patients, 160 (80%) underwent appendicectomy and 137 (85.8%) were confirmed having acute appendicitis on histopathological examination.

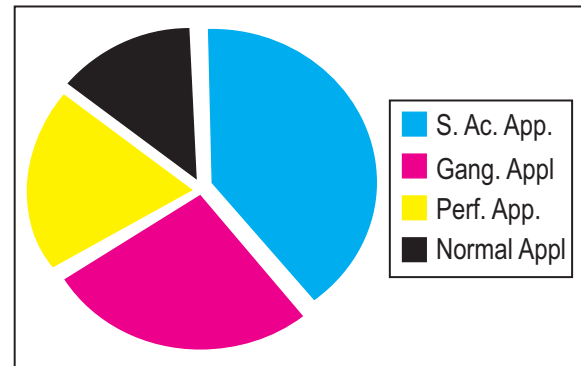
On Alverado scoring 76 patients were having score of 7-10 and underwent emergency surgery.

Ninety-four patients were having score of 5-6 and were observed and re-assessed. Twenty of these improved and were discharged home, while 74 patients showed increased score or remained with the same score and underwent surgery.

Thirty patients were having score of 1-4 and were discharged home.

Out of 50 patients discharged home, 10 were re-admitted with increased score and underwent surgery. Eight of these were confirmed by histopathology as having appendicitis.

All the appendices were subjected to histopathology and the pattern of inflammation is shown in the figure below.



The overall performance of Alverado Scoring System is given in the Table-2.

**Table 2: Performance of Alverado Scoring System**

Score	Diseased	Not Diseased	Total
5-10	129	21	150
1-4	8	42	50
Total	137	63	200

The sensitivity of the system was calculated as 94.16% and specificity 66.66%, with a positive predictive value of 86% and negative predictive value of 84%.

**DISCUSSION**

The management of acute right iliac fossa pain remains a difficult clinical problem as the differential diagnosis of such patients is not always straight forward. Clinical review of practice is continuously needed to avoid complacency and deteriorating patient care.<sup>7</sup> The main concern relates to delay in diagnosis with consequent risk of perforation, abscess formation and morbidity. There is no doubt that surgeon with greater experience has more accuracy of diagnosis. However, the need for a complementary aid in questionable acute appendicitis is self evident. In recent years considerable attention has been devoted to the development of novel diagnostic techniques such as C-reactive protein, peritoneal aspiration cytology, graded compression ultrasonography, CT scan and laparoscopy.<sup>8,9</sup> However, these techniques may involve additional costs and lack of free availability.

In our study, the role of Alverado scoring system in the diagnosis of acute appendicitis was

assessed. The study showed that the use of scoring system in patients suspected of having acute appendicitis provided a high degree of sensitivity and specificity. The sensitivity of the system was 94.16% with a specificity of 66.66%. These results are comparable with the results of various other studies.<sup>10-12</sup>

### CONCLUSION

Alverado Scoring System is a simple and effective system for the diagnosis of acute appendicitis, especially in periphery hospitals where modern investigative facilities are not available.

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