

## Alvarado Score: Is it still relevant in our set-up?

BARZA AFZAL<sup>1</sup>, WASIM HAYAT KHAN<sup>2</sup>, USMAN ISMAT BUTT<sup>3</sup>, MUHAMMAD UMAR<sup>4</sup>, MUHAMMAD NAEEM AFZAL<sup>5</sup>, ABDUL WADOOD<sup>6</sup>

### ABSTRACT

**Background:** Appendicitis is one of the most common surgical intervention carried out. However the diagnosis of appendicitis is often difficult. Various scoring systems are used. Diagnostic imaging although helpful is often not available.

**Aim:** To evaluate the efficacy of Alvarado score in the diagnosis of appendicitis.

**Methodology:** This observational study was carried out in department of Surgery, Services Hospital, Lahore. This study was a retrospective, observational, descriptive-analytical and cross-sectional analysis. We obtained records of patients who had histopathologically proven appendicitis. All records of patients who underwent appendectomy over a period of 1 year from 1st July, 2017 to 30th June, 2018 were included in the study. Alvarado scores were obtained from blinded evaluators that rated patients that presented with acute abdominal pain to the Emergency Department. If appendicitis was diagnosed, an appendectomy was performed and the appendix tissues were examined by a pathologist so to verify diagnosis.

**Results:** A total of 206 patients were included in the study. Of these 107 (51.94 %) were females and 93 (45.15%) were male. Appendicitis were histopathology present in 190(90.22%) patients having score of 6 or more. Tenderness (100%) and rebound tenderness (97.08%) were present in almost all cases.

**Conclusion:** Alvarado score continues to be an effective tool in the diagnosis of acute appendicitis.

**Keywords:** Acute appendicitis, Alvarado Score, Histopathology

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### INTRODUCTION

The appendix is a vestigial organ. It is a blind ended tube which is connected to the caecum. It is present usually in the right iliac fossa of the abdomen. Inflammation of the appendix results in appendicitis. Pain usually originates in the center of the abdomen before shifting to the right iliac fossa. Although classical presentation is not often seen and this condition often mimics a variety of other pathologies<sup>1</sup>.

Acute appendicitis is one of the most common causes of abdominal pain which requires surgery. Life time risk of acute appendicitis has been documented to be 7%<sup>2</sup>. In Pakistan 10-30% of acute abdominal conditions are noted to be due to acute appendicitis<sup>3,4</sup>. Despite advances in diagnostic modalities and being a common surgical problem, acute appendicitis still remains a difficult diagnosis to establish particularly in the children, elderly and females of reproductive age<sup>5</sup>.

Described in 1986 by Alvarado, the Alvarado score is a 10-point clinical scoring system that is based on symptoms, signs and diagnostic tests in suspected patients of acute appendicitis. It is also known by the acronym MANTRELS<sup>6</sup>. Although it has been designed almost 3 decades ago the exact usefulness of this system is still unclear<sup>7</sup>.

Due to advances ultrasound and CT are now increasingly being used to make diagnosis of acute appendicitis. As a result the rate of negative appendectomy has decreased<sup>3</sup>. However these investigations are not often available in developing countries especially in public sector<sup>9,10</sup>. Hence the need and necessity to still rely on

scoring system to help in the making of decisions in the management of patients with acute appendicitis.

In this study we evaluated the efficacy of the Alvarado score in the diagnosis of acute appendicitis.

The objective of the study was to compare Alvarado score in the diagnosis of acute appendicitis with use of histopathology as gold standard.

### MATERIAL AND METHODOLOGY

This observational study was carried out in department of Surgery, Services Hospital, Lahore. This study was approved by the institutional Ethical Committee. This study was a retrospective, observational, descriptive-analytical and cross-sectional analysis. We obtained records of patients who had histopathologically proven appendicitis. All records of patients who underwent appendectomy over a period of 1 year from 1<sup>st</sup> July, 2017 to 30<sup>th</sup> June, 2018 were included in the study. Alvarado scores were obtained from blinded evaluators that rated patients that presented with acute abdominal pain to the Emergency Department. However the final decision of diagnosis and operation rested with the senior registrar on call in the emergency department. If appendicitis was diagnosed, an appendectomy was performed and the appendix tissues were examined by a pathologist so to verify diagnosis.

### RESULTS

A total of 206 patients were included in the study. Out of 107(51.94%) were females and 93(45.15%) were male. Appendicitis were histopathology present in 190(90.22%) patients having score of 6 or more. Tenderness (100%) and rebound tenderness (97.08%) were present in almost all cases. Results are summarized in the tables.

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<sup>1</sup>PGR, <sup>2</sup>Associate Professor Surgery, <sup>3,4,5,6</sup>SR  
Department of Surgery, Services Hospital, Lahore  
Correspondence to Dr. Usman Ismat Butt, Email:  
usmanismatbutt@yahoo.com Cell: 0342-4343806

Table 1: Breakdown of biopsy proven appendicitis compared to Alvarado score

Alvarado score	n	%age
>7	106	51.45
5-7	84	40.77
<4	16	7.77

Table 2: Breakdown according to gender

Gender	Cases	%age
Male	61(out of 93)	65.59
Female	45(out of 113)	39.82

Table 3: Percentage of various findings in all cases

Finding	Cases	%age
Migratory pain	96	46.6
Anorexia	136	66.01
Nausea	150	72.81
Tenderness	206	100
Rebound tenderness	200	97.08
Elevated temperature	7	36.4
Leucocytosis	97	47.08
Shift to left	97	47.08

## DISCUSSION

In our study we had a total of 206 case of which 107 were female (51.94%) and 93 were male (45.15%). This is in contrast to other studies where male formed the majority<sup>11,12</sup>.

Overall taking a value of 7 or more as positive Alvarado score was positive in 106 patients. However if the score of 5 to 7 was also considered this value increased to 190 patients. Only 10 patients having score less than 4 turned out to have appendicitis. Similarly other researchers have also noted that the higher the score the more likely is the diagnosis<sup>13</sup>.

Furthermore it has been recommended that for high Alvarado scores the chances of having false positive cases are reduced, implying the need for further evaluation and observation in the <6 score group. A fact that almost 40.77% of the appendectomies in our study had a score of 5-7<sup>14</sup>.

Gender breakdown was done and it was seen that Alvarado was more accurate in predicting appendicitis in males as compared to females. These findings have been noted by various other researchers who found that Alvarado was better in diagnosis of appendicitis in males as compared to females<sup>15,16</sup>.

Among the various components of Alvarado score it was found the clinical examination findings: tenderness (100%) and rebound tenderness (97.08%) were present in almost all cases. However our study is in contrast to other studies who didn't find such high percentages in their patients<sup>17</sup>.

## CONCLUSION

On the basis of these results we would recommend that Alvarado is still a useful tool especially in countries such as our where advances studies are not readily available. A score more than 4 should warrant a period of observation

as these patients often turn out to be having appendicitis later on. Any patients having tenderness or rebound tenderness should not be discharged until appendicitis is ruled out.

The drawback of our study were that is has a small sample size. Furthermore we carried out a retrospective analysis of our cases. A more powered and prospective study can further help to elaborate these results.

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