



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3906748>Available online at: <http://www.iajps.com>

Research Article

**IMPORTANCE OF ALVARADO SCORE IN THE ACUTE
APPENDICITIS DIAGNOSIS**

Dr. Amna Arif, Dr. Madiha Safdar, Dr. Asma Nazir

Ganga Ram Hospital, Lahore

Article Received: April 2020

Accepted: May 2020

Published: June 2020

Abstract:

Aim: To assess the effectiveness of the Alvarado result in the diagnosis of acute appendicitis and to link it to the histopathological and surgical findings.

Study design: A prospective cross-sectional study.

Place and duration: In the Surgical department of Sir Ganga Ram Hospital Lahore for one year duration from March 2019 to March 2020.

Methods: A total of 100 patients were enrolled in the study and were diagnosed with acute appendicitis during the study. After collecting basic and clinical data, patients were divided into three groups according to the Alvarado scoring. Conservative treatment was applied to patients in group I (scores 1-4) and sent home, while patients in group II (score 5-6) were re-evaluated and conservative treatment was re-established a few hours later. While the settlers were discharged and when the results of Alvarado increased, those patients were operated. Group III patients were operated on after necessary preparations. The modified Alvarado result was correlated with surgical and histopathological findings.

Results: The study included 100 subjects, including 62 men and 38 women. The majority (67%) are young or 20 years old. Among them, 89 patients, group I and 80 group III, underwent appendicitis. These 16 cases had normal appendix.

Conclusion: The Alvarado result is an easy, inexpensive, simple and effective help in the diagnosis of acute appendicitis.

Key Words: acute appendicitis, Appendectomy, scoring system, Alvarado score.

Corresponding author:**Dr. Amna Arif,**

Ganga Ram Hospital, Lahore

QR code



Please cite this article in press Amna Arif et al., **Importance Of Alvarado Score In The Acute Appendicitis Diagnosis**, Indo Am. J. P. Sci, 2020; 07(06).

INTRODUCTION:

The classic signs and symptoms of acute appendicitis were first described by Fitz in 1886. Since then, it remains the most common diagnosis for treatment in a hospital requiring laparotomy. Since then, acute appendicitis remains the most common clinical symptom that requires urgent surgery¹⁻³. About 6% of the population will have acute appendicitis all their lives. Although diagnosis is very common, it remains a -challenge, leading to a negative appendix rate of 20-40%. Misdiagnosis and delayed surgical perforation can ultimately lead to complications such as peritonitis⁴⁻⁵. Various diagnostic tests have been used to attempt to reduce negative appendages with variable occupancy, such as laparoscopy, evaluation systems, computer programs, ultrasound, computed tomography and magnetic resonance imaging⁶⁻⁷. These efforts have effectively reduced mortality to less than 0.1% for uncomplicated appendicitis, to 0.6% in gangrenous sites and to 5% in perforated cases⁸.

In 1986, Alvarado proposed a scoring system for diagnosing acute appendicitis. His system is based solely on history, clinical trials and several laboratory tests and is very easy to apply⁹⁻¹⁰. Alvarado proposed surgery for patients above 7 or 10. This study was conducted to evaluate the practicality of the Alvarado assessment system in our environment.

MATERIALS AND METHODS:

This prospective cross-sectional study was held in the Surgical department of Sir Ganga Ram Hospital Lahore for one year duration from March 2019 to March 2020. This study included 100 patients who had reported to the surgical ward with a clinical diagnosis of acute appendicitis. The study included patients of any age group and of both sexes who came to the emergency room with pain in the right lower abdomen. Patients with urological, gynecological or surgical problems other than appendicitis, especially those in the right iliac hip were excluded.

All enrolled patients were admitted, pre-evaluated by surgeons, and basic research was performed. The doctor then completed a properly trained form that was specifically designed for each patient. These proforma had eight variables based on general patient information and the Alvarado scoring system. Then the sum of all results for each patient was calculated and divided into three groups according to the results. Total score of 7-10 (emergency surgery group): These patients were prepared and all underwent emergency appendectomy. Overall assessment 5-6 (observation group): These patients were followed for 24 hours with frequent re-evaluation of clinical data and new assessment application. The condition of some patients improved, which resulted in a decrease in the result, and therefore was released from the instructions, which should return if the symptoms persist or worsen.

Total score 1-4 (discharged from the homegroup): These patients were discharged after receiving the first symptomatic treatment and were sent home with instructions to return if the symptoms persist or worsen. The diagnosis of acute appendicitis was confirmed by the surgical results and histopathological evaluation of the appendix sample. Finally, the reliability of the Alvarado scoring system was assessed by calculating the negative appendix index (percentage of patients operated on with normal appendix removed) and positive predictive value (the proportion of patients with a positive test result who actually have the disease).

RESULTS:

A total of 100 cases were included in this study, out of these 62% (n=62) patients were male and 38% (n=38) were female with a male to female ratio of 6:4. Their ages ranged from 13 to 50 years with the maximum patients (43) in the 2nd and 3rd decade of life.

While most patients have the right iliac (n = 100), pain around the umbilicus followed by fever (n = 93) 93%, anorexia (n = 82) 82%, nausea (n = 68) 68% and vomiting (n = 44) 44% as given in Table-1.

Table I. Alvarado Scoring System

Symptoms	Score
Migratory right iliac fossa pain	1
Nausea / Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Elevated temperature	1
Laboratory findings	
Leucocytosis	2
Shift to the left of neutrophils	1
Total	10

7% of these 100 patients had an Alvarado score of 1-4, 13% had a score of 5-6, and 80% had a score of 7-10. All patients with Alvarado 1-4 results were conservatively treated and sent home. Patients who scored 5-6 points were subjected to conservative treatment and then re-evaluated. Four patients with an Alvarado score of 5-6 improved after conservative treatment and were sent back home and followed for one month to prevent symptoms from returning. These patients were marked as 11% without appendicitis (n = 11) without histopathology. Appendicitis was not detected in

any of the patients in the 0-4 scoring range. Of the 13 patients in the 5-6 points range, all 4 conservatively treated patients were not designated as appendicitis. Of the remaining 9 patients, 5 were proven cases of appendicitis (acute, gangrenous, perforated appendicitis). The remaining 4 patients did not have appendicitis on HP. The operation was performed on all 80 patients in the 7-10 scoring range, and HP was done to the samples. While 85% of patients (n = 68) had changes in appendicitis, 15% of 12 patients (n = 12) did not have appendicitis in HP, as shown in Table II.

Table II. Alvarado Score (n=100)

Alvarado Score	No.	Appendicitis	No Appendicitis
1 - 4	7	0	0
5 - 6	13	5	5
7 - 10	80	68	68
Total	100	73	73

At cutoff point of 7 and above the Alvarado score, sensitivity was 93%, specificity 55%, and positive predictive value 85%, as shown in Table III.

Alvarado Score Cutoff Point	Appendicitis	No Appendicitis
> 7	68	12
< 7	5	15
Total	73	27

For the Alvarado cutoff point 5 and above, the sensitivity of the result increased to 100%, but the specificity decreased to 26%. This increases the likelihood of choosing false negative cases. The positive predictive value at this cutoff point is 78%, as shown in Table IV.

Table IV. Comparison of Sensitivity, Specificity, 1-Specificity and PPV values of Cutoff 5 and Cutoff 7.

Alvarado Score Cut off Point	Sensitivity	Specificity	1-Specificity	PPV
7	0.93	0.55	0.45	0.85
5	1.00	0.26	0.74	0.78

DISCUSSION:

Diagnosis of acute appendicitis remains difficult due to the variable presentation of the disease and the lack of reliable diagnostic tests. Although there has been some improvement in the diagnosis of acute appendicitis in recent decades, the percentage of normal appendages reported in different series ranges from 8 to 33%. Clinical scoring systems have been proven to help treat surgical conditions¹¹⁻¹². Similarly, many scoring systems have been developed to improve the diagnosis of acute

appendicitis, such as Ramírez, Teicher and Ohmann. However, the Alvarado scoring system is widely used. The results of our study can be compared with the results of other studies. The negative appendix index in our study was 16%. In the literature, various studies can be compared with the numbers shown as 14.3%, 16.1%, 17.5%, 14%, 11% and 20%, respectively¹³. Similarly, in a prospective study involving 215 adults and children in Cardiff, the use of the Alvarado result reduced the unusually high percentage of false positive appendix sections from

44% to 14%. The removal of some normal appendages is designed to reduce the perforation rate and thus mortality¹⁴. The literature shows that if the negative appendix index is less than 10-15%, the surgeon can operate with a very small number of patients and increase the risk of complications. Some centers have reduced negative appendix rates below 10% by periodic appendicitis tests. For a scoring system to be useful, it must be precise and specific. The sensitivity and specificity found in our study is also same to Fenyo study showed 90.2% sensitivity and 91.4% specificity, while others reported 73% sensitivity and 87% specificity. Our study shows that the use of the Alvarado scoring system in the diagnosis of acute appendicitis can provide highly positive predictive value and therefore diagnostic accuracy¹⁵. The positive predictive value (82%) shown in our study can be compared with the reporting literature of 83.5%, 87.5%, 85.3% and 87.4%.

CONCLUSION:

The Alvarado scoring system is easy to use, does not require expensive equipment or experience. It can be used anywhere in the world, assessment is easy and helps reduce the incidence of negative appendix.

REFERENCES:

- Sharma D, Koujalagi RS. A comparative study to assess efficacy of Tzanakis score and Alvarado score for effective diagnosis of patients with acute appendicitis at a tertiary care centre in North Karnataka: a one-year prospective analytical study. *International Surgery Journal*. 2020 May 19.
- Mitra PK, Jha NK, Jana D. EVALUATION OF MODIFIED ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS AT SURGERY DEPARTMENT OF NMC, SASARAM, BIHAR. *International Journal of Scientific Research*. 2020 Jan 29;9(1).
- Rahman MM, Shahid SM, Azom MS. Sensitivity and Specificity of Modified Alvarado Score in the Diagnosis of Acute Appendicitis.
- Reddy MG, Reddy VM. Raja Isteri Pengiran Anak Saleha Appendicitis score for the diagnosis of acute appendicitis in comparison with the Alvarado score. *International Surgery Journal*. 2020 Jan 27;7(2):459-64.
- Alvarado A. Improved alvarado score (MANTRELS) for the early diagnosis of acute appendicitis. *Int J Surg Res Pract*. 2019;6:98.
- Nikandam Modabber B, Pouya M. Investigation Study the Specificity and Sensitivity of Ripasa and Alvarado Score in the Diagnosis of Acute Appendicitis in Patients Referred to Shaheed Rajaei Hospital [2016-2018]. *Journal of North Khorasan University of Medical Sciences*. 2019 Oct 10;11(2):31-5.
- AbouZeid AE, El Sayed ZM, Fouda SA, Mostafa MS. Comparison between the Alvarado score and RIPASA score for Diagnosis of Acute Appendicitis in Patients Attending to Emergency Department in Suez Canal University Hospital. *International Journal of Surgery and Medicine*. 2020;6(1):22-7.
- Umar MM, Abubakar IU, Agbo SP. Comparative study of alvarado score and its modifications in the preoperative diagnosis of acute appendicitis at a tertiary center in Sokoto, Nigeria. *Nigerian Journal of Surgery: Official Publication of the Nigerian Surgical Research Society*. 2020 Jan;26(1):16.
- Noor S, Wahab A, Afridi G, Ullah K. COMPARING RIPASA SCORE AND ALVARADO SCORE IN AN ACCURATE DIAGNOSIS OF ACUTE APPENDICITIS. *Journal of Ayub Medical College Abbottabad*. 2020 Jan 23;32(1):38-41.
- Naik AT. An observational comparative study between RIPASA & modified Alvarado scoring in the diagnosis of acute appendicitis. *International Journal of Surgery*. 2019;3(4):510-3.
- Al Awayshih MM, Nofal MN, Yousef AJ. Evaluation of Alvarado score in diagnosing acute appendicitis. *The Pan African Medical Journal*. 2019;34.
- Poptani M, Soni A, Sharma S, Kumar S. Augmentation of modified Alvarado score with abdominal ultrasound in diagnosis of acute appendicitis. *International Surgery Journal*. 2020 Feb 26;7(3):853-6.
- Sridhar L, Chennaiah M. Comparative study between modified Alvarado score and abdominal ultrasound in the diagnosis of acute appendicitis. *International Journal of Surgery*. 2019;3(4):163-8.
- Manoj SK, Rajachidamaram K, Hussain AZ, Thaejesvi S. Evaluation of modified alvarado scoring system regarding early diagnosis of acute appendicitis and in reduction of negative appendicectomies. *International Journal of Surgery*. 2019;3(4):397-9.
- Seshadri LN, Mohan LN. Alvarado score in acute appendicitis: revisited. *International Surgery Journal*. 2019 Apr 29;6(5):1637-40.