

ORIGINAL Research Article

# Comparison of acute inflammatory response and ALVARADO scoring system for diagnosis of acute appendicitis: a prospective and observational study

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**Abstract:**

**Background & Method:** The aim of this study is to compare of acute inflammatory response and ALVARADO scoring system for diagnosis of acute appendicitis: a prospective and observational study. All patient undergone routine laboratory and ultrasound investigation. No CT scan was done for any of the patient. Surgical residents calculated the results of the Alvarado & AIR scoring system, and data were entered in pre-prepared forms. The specialist surgeon on duty decided to operate on admitted patients. Histopathology samples were sent for confirmation of acute appendicitis, the results were correlated with preoperative scores.

**Result:** The present study included 100 patients with suspicion of appendicitis. There were 54% males and 46%) of females with male preponderance in the study. The mean age of the male was 34 years with a range of 7-84 years and female was 31 years with a range of 12-74 years. The most common age group in the study was 16-25 years (34%) followed by 26-35 years (28%). In the study, 38 cases of 100 (38%) were diagnosed pathologically as appendicitis

**Conclusion:** To conclude, AIR scoring performed well almost equally with Alvarado system with high specificity and high negative predictive value preventing unnecessary negative appendectomies. Follow up of these cases will help in deciding surgical intervention in unnecessary cases. It has high specificity when analyzing patients who fell under low-risk group (score < 8). The score has high negative predictive value there by reducing negative appendectomies. This scoring system also prevents unnecessary and costly radiological investigations thereby reducing the financial burden to the patients.

**Keywords:** inflammatory, acute, ALVARADO & appendicitis.

**Study Designed:** Prospective Observational Study.

## 1. INTRODUCTION

Acute appendicitis is the most common diagnosed cause of acute abdominal pain requiring an urgent surgical intervention to remove the appendix, with an estimated lifetime incidence ranging from 7% to 9% [1]. To avoid severe and progressive inflammation as well as subsequent perforation of the appendix, surgical resection of the appendix has been the treatment of choice for more than a

century [2, 3]. However, despite many advances that have been made to improve diagnostic accuracy, the vague and atypical onset of signs and symptoms of appendicitis prohibit the early diagnosis and intervention [4,5].

However, the hazardous idea of the a ruptured appendix complications, like hole, phlegmon development, and peritonitis, has brought about an expanded number of negative appendectomies, considering its lower horribleness and death rate contrasted with difficulties [6]. On this premise, a careful demonstrative device is expected in pediatric patients with a ruptured appendix to precisely separate the patients who require careful treatment from the patients who could be overseen safely [7]. A few scoring frameworks and models have been proposed to assume a part in working on the symptomatic precision among patients with intense an infected appendix, including the Alvarado, Lintula, Fenyo-Lindberg, and RIPASA scoring frameworks [8]. Albeit these scoring frameworks and calculations have been acquainted with the grouping of the patients with an infected appendix as the primary determination as indicated by clinical and paraclinical discoveries, using them among pediatric patients stays testing because of the variety of the clinical signs. Also, scant information on the pediatric populace has forestalled the improvement of demonstrative rules and models for treating little patients with an infected appendix.

## 2. MATERIAL & METHOD

Present study is conducted at Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh from Jan 2022 to Dec 2022 on 100 patients. The current study was a prospective observational study.

All patient undergone routine laboratory and ultrasound investigation. No CT scan was done for any of the patient. Surgical residents calculated the results of the Alvarado & AIR scoring system, and data were entered in pre-prepared forms. The specialist surgeon on duty decided to operate on admitted patients. Histopathology samples were sent for confirmation of acute appendicitis, the results were correlated with preoperative scores.

### **Inclusion criteria**

All consecutive patients admitted under general surgery with suspected acute appendicitis during the study period were included for observation.

### **Exclusion criteria**

- Pregnant females
- Patients with known abdominal malignancies

- Patients who refused to undergo surgical intervention or were managed conservatively
- Incidental and valentino appendectomy
- Patients with appendicular lump

### 3. RESULTS

**Table 1: Age and sex distribution of cases in the study.**

Age (in years)	No	Percentage
<15	09	09
16-25	34	34
26-35	28	28
36-45	18	18
46-55	08	08
>55	03	03
<b>Sex</b>		
Male	54	54
Female	46	46

The present study included 100 patients with suspicion of appendicitis. There were 54% males and 46% of females with male preponderance in the study. The mean age of the male was 34 years with a range of 7-84 years and female was 31 years with a range of 12-74 years. The most common age group in the study was 16-25 years (34%) followed by 26-35 years (28%)

**Table 2: Alternate diagnosis of patients on follow-up.**

Diagnosis	After follow-up	At surgery
Pelvic inflammatory disease	6	4
Gastro enteritis	6	
Ulcerative colitis	2	
Diverticulitis	3	
Mesenteric adenitis	3	
Cholecystitis	2	
Urinary tract infection	6	
Genitourinary calculi	4	
Others	2	

In the study, 38 cases of 100 (38%) were diagnosed pathologically as appendicitis

**Table 3: Comparison of validity, predictive values and reliability of the two risk scores**

Diagnostic value	AIR score (%)		Alvarado score (%)	
	> 4 points	> 8 points	> 4 points	> 8 points
Sensitivity	96.91	98.08	94.30	97.73
Specificity	24.53	14.06	15.25	9.83
Positive predictive value	79.70	51.26	74.87	21.61

Negative predictive value	72.22	88.89	50.00	94.44
Accuracy	79.07	54.38	72.81	27.65

#### 4. DISCUSSION

Acute appendicitis appendix is a typical careful crisis with a frequency of 1.17/1000 populace and a lifetime chance of 8.6% in men and 6.7% in ladies, with most elevated occurrence in juvenile age[9]. The greater part of the circumstances which copy a ruptured appendix might make disarray in precise finding and the executives. Consequently the greater part of the specialists depend on imaging concentrates on which gives significant data with respect to the determination. Yet, as referenced in many examinations, tomographic studies are related with expanded radiation danger and inflated cost in low pay nations. Subsequently misleading analysis and postpone in finding might bring about superfluous appendectomies and expanded difficulties and morbidity[10].

The majority of the instances of finding in intense a ruptured appendix depends upon specialist's information and involvement in comparable cases. Thus the downsides could be overwhelmed by utilizing a clinical scoring framework which can help in conclusion as well as forecast of the ongoing patient from those giving comparative clinical situation. In emerging nations and low-pay nations, a straightforward and compelling scoring framework without tomographic or imaging studies could help in forestalling misdiagnosis and decline the pace of negative appendectomies.

The broadly applied scoring framework was Alvarado scoring framework which was approved in many examinations around the world with few constraints and drawbacks[11]. A few changes of Alvarado scoring framework were created. Subsequently to defeat the impediments of Alvarado scoring framework, A ruptured appendix fiery reaction score (AIR) was created in Sweden in 2008 in view of tentatively gathered information of factors with free prognostic worth. This scoring framework due to its basic plan and application could gauge the likelihood of an infected appendix and acts a steady guide in dynamic course of intense appendicitis[12].

The current review was led to contrast the AIR score and Alvarado scoring framework in cases thought with intense a ruptured appendix. One more benefit in AIR scoring isn't just in precise conclusion yet in addition in segregating equitably the need to work or not to work with a development. In our review there was a decent measurable relationship of AIR score in instances of intense an infected appendix when contrasted with Alvarado scoring system[13].

Not many of the examinations which utilized Alvarado scoring framework did exclude C responsive protein in the review gathering and tracked down no distinction in the paces of punctured supplement, negative appendectomies and entanglements between the gatherings. They likewise found a deferred appendectomy rate (2 versus 8%) and a lower postponed release rate (11 versus 22%) in the gathering. In the current review, Responsiveness of AIR scoring framework was 94% (At score of >4 focuses) when contrasted with Alvarado scoring framework in both Phlegmonous and high level a ruptured appendix cases and 12% for AIR scoring and 26% for Alvarado scoring when looked at score of >8 focuses in the review.

## 5. CONCLUSION

To conclude, AIR scoring performed well almost equally with Alvarado system with high specificity and high negative predictive value preventing unnecessary negative appendectomies. Follow up of these cases will help in deciding surgical intervention in unnecessary cases. It has high specificity when analyzing patients who fell under low-risk group (score < 8). The score has high negative predictive value there by reducing negative appendectomies. This scoring system also prevents unnecessary and costly radiological investigations thereby reducing the financial burden to the patients.

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