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## Comparison of Ripasa and Alvarado scoring systems in diagnosis of acute appendicitis

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### Abstract

The diagnosis of acute appendicitis is mainly based on clinical examination and various diagnostic scores are available. We compared Alvarado and RIPASA scoring systems for the diagnosis of acute appendicitis and their negative appendectomy rate in 100 patients of appendicitis.

**Keywords:** Ripasa, Alvarado, acute appendicitis, diagnosis

### 1. Introduction

Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) is a new scoring system which has been developed for a better diagnosis of acute appendicitis. This score includes 14 clinical parameters which have higher sensitivity, specificity, and diagnostic accuracy than Alvarado scoring system, especially in the Asian population<sup>[1]</sup>.

It was developed in the Department of Surgery at Raja Isteri Pengiran Anak Saleha Hospital, Brunei Darussalam.

We compared RIPASA and ALVARADO scoring systems for the diagnosis of acute appendicitis their negative appendectomy rate.

### 2. Materials and Methods

**2.1 Study design:** Prospective observational comparative study in 100 patients admitted in RRMCH.

**2.2 Inclusion criteria:** All patients suspected clinically to have appendicitis.

#### Exclusion criteria:

1. Age <20 and >60 years excluded from the study
2. Patient with appendicular lump
3. Patient with appendicular perforation
4. Pregnancy with appendicitis

Confirmation of acute appendicitis as the final diagnosis was obtained from histopathological analysis of the resected appendix and data was analysed using Chi Square test and respective P (<0.005) values to draw conclusion

### 3. Results

In our study, 83% patients were of <40yrs of age and 67% were males. All the patients presented with complaint of pain in Right iliac fossa. Migration of pain to right iliac fossa, anorexia, nausea-vomiting and fever were present in 94%, 88%, 78% and 36% patients respectively. All the patients were having tenderness and rebound tenderness.

When ALVARADO score was applied to all patients, 80 patients had their score  $\geq 7$  i.e. 80% patients had acute appendicitis and when RIPASA score was applied, 99 patients had their score >7.5 indicating that 99% patients had acute appendicitis.

A total of 100 patients under study were operated for appendicitis and according to ALVARADO SCORING SYSTEM it was confirmed histopathologically in 91 patients. 9 patients did not have evidence of appendicitis and were considered to have normal appendix histopathology.

According to Alvarado score >7, 80 patients were diagnosed to have appendicitis. Out of these 80 patients, only 75 patients had evidence of appendicitis histopathologically. 5 patients were falsely diagnosed to have appendicitis by Alvarado scoring system  
 Out of 20 patients diagnosed by Alvarado score <7 as not having appendicitis, 16 patients were missed by this scoring system. However the findings were not statistically significant (Table no. 1).

According to RIPASA score >7.5, 99 patients were diagnosed to have appendicitis. Out of these 99, 91 patients had evidence of appendicitis histopathologically. 8 patients were falsely diagnosed to have appendicitis by RIPASA scoring system.  
 According to RIPASA score <7.5 Appendicitis was not found to be present in the only patient who was diagnosed on RIPASA scoring system as not having appendicitis. The findings were statistically significant (Table no. 1).

Table 1

P VALUE		0.0546 (< 0.05)		NOT SIGNIFICANT		P VALUE		0.001394 (< 0.05)		SIGNIFICANT	
Alvarado score	NO OF PATIENTS	HPE NORMAL APPENDIX	HPE APPENDICITIS	RIPASA SCORE	No of Patients	HPE NORMAL APPENDIX	HPE APPENDICITIS				
<7	20(100%)	4(20%)	16(80%)	<7.5	1(100%)	1(100%)	0(0.0%)				
≥7	80(100%)	5(6.3%)	75(93.8%)	≥7.5	99(100%)	8(8.1%)	91(91.9%)				
total	100(100%)	9(9%)	91(91%)	total	100(100%)	9(9%)	91(91%)				

Sensitivity of the Alvarado scoring system in the study was 82.42% and specificity came out to be 44.44%. The positive and negative predictive values were 93.75% and 20% respectively. Accuracy of the Alvarado scoring system was 79% in the studied population.  
 Sensitivity of the RIPASA scoring system in the study was 100% and specificity came out to be 11.11%. The positive

and negative predictive values were 91.92% and 100% respectively. Accuracy of the RIPASA scoring system was 92% in the studied population.  
 The negative appendectomy rate was higher for the RIPASA scoring system (8.1%) as compared to the Alvarado scoring system (6.3%) with respect to the histopathology findings (TABLE 2)

Table 2

STATISTICAL PARAMETERS	ALVARADO SCORE	RIPASA SCORE	CHANG et al (N=144)
Sensitivity	82.42%	100%	97.47%
Specificity	44.44%	11.11%	81.82%
Positive predictive value	93.75%	91.92%	86.52%
Negative predictive value	20%	100%	96.43%
Accuracy	79%	92%	91.79%
Negative Appendectomy Rate	6.3%	8.1%	13.5%

#### 4. Discussion

Appendicitis is a condition characterized by inflammation of appendix and prevalence rate of approximately 1 in 7 [2].

The first description of a case of appendicitis was by Fennel in 1554 [3]. In our study, the most common type of appendicitis was periappendicitis.

Several scoring systems, such as the Alvarado and modified Alvarado scoring system, have been introduced since 1986 to help with the clinical decision-making process in achieving an accurate diagnosis of acute appendicitis in the fastest and cheapest way [4, 5].

However, these two scoring systems were created in the West, and when applied in different environments, such as the Middle East and Asia, the sensitivity and specificity levels achieved were very low [6, 7].

Khan *et al* applied the Alvarado scoring system in an Asian population and only achieved a sensitivity and specificity of 59% and 23%, respectively, with a negative appendectomy rate of 15.6% [7].

the Accuracy in ALVARADO score was 79% which was similar to the studies done by Jawaid *et al* and Erdem *et al* and lower in the study done by Chong *et al*. Similarly and accuracy RIPASA score was 92% which was similar to the studies done by Chong *et al* and Alnjadat *et al* and higher than in the studies done by Erdem *et al* [8, 9, 10].

Both the Alvarado and modified Alvarado scores lack parameters that have been shown to be important determinants in the diagnosis of acute appendicitis, such as age, gender and the duration of symptoms. Wani *et al* have shown that the sensitivity and specificity of the Alvarado scoring system vary with age, gender and the duration of symptoms [11].

RIPASA scoring system was more sensitive but less specific than ALVARADO scoring system in diagnosis of acute appendicitis.

#### 5. References

1. Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med*; 1986; 15:557-64.
2. Stephens PL, Mazzucco JJ. Comparison of ultrasound and the Alvarado score for the diagnosis of acute appendicitis. *Conn Med*, 1999; 63:137-40.
3. Seal A. Appendicitis: A historical review. *Can J Surg*; 1981; 24:427-33.
4. Kalan M, Talbot D, Cunliffe WJ, Rich AJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study. *Ann R Coll Surg Engl* 1994; 76:418-9.
5. Alvarado A. A practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 1986; 15:557-64.
6. Al-Hashemy AM, Seleem MI. Appraisal of the modified Alvarado Score for acute appendicitis in adults. *Saudi Med J*. 2004; 25:1229-31.
7. Khan I, ur Rehman A. Application of alvarado scoring system in diagnosis of acute appendicitis. *J Ayub Med Coll Abbottabad*. 2005; 17:41-4.
8. Alnjadat I, Abdallah B. Alvarado verses RIPASA score in diagnosing acute appendicitis. *RMJ*. 2013; 38(2):147-51.
9. Erdem H, Centinkunar S, Das K, Reyhan E, Deger C, Aziret M *et al*. Alvarado, Eskelinen, Ohhmann and Raja Isteri Pengiran Anak Saleha Appendicitis scores for diagnosis of acute appendicitis. *World J Gastroenterol*. 2013; 19(47):9057-62.

10. Chong CF, Thein A, Mackie AJ, Tin AS, Tripathi S, Ahmad MA *et al*. Comparison of RIPASA and Alvarado scores for the diagnosis of acute appendicitis. *Singapore Med J*. 2011; 52(5):340-5.
11. Wani MM, Yousaf MN, Khan MA. Usefulness of the Alvarado scoring system with respect to age, sex and time of presentation, with regression analysis of individual parameters. *Internet J Surg* [serial online]. 2007, 11(2).