



ORIGINAL RESEARCH PAPER

General Surgery

COMPARATIVE STUDY TO DETERMINE DIAGNOSTIC EFFICACY OF RIPASA SCORE VERSUS MODIFIED ALVARADO SCORE IN DIAGNOSIS OF ACUTE APPENDICITIS.

KEY WORDS: appendicitis, RIPASA score, modified Alvarado score, diagnostic efficacy.

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ABSTRACT

Background: Acute appendicitis is one of the most common surgical emergencies with an estimated lifetime prevalence of one in seven.¹The diagnosis is primarily clinical, and only contrast enhanced computed tomography has high sensitivity and specificity for the right diagnosis^{2,3}but these are not widely available in every setup of developing countries. Therefore, different scoring systems have been tried to reduce the number of negative appendectomies and delayed diagnosis. We have undertaken this study to compare the RIPASA and modified Alvarado score to determine which better predicts the diagnosis of acute appendicitis. **Methods:** Present study was diagnostic evaluation study conducted on 60 acute appendicitis patients. All patients fulfilling inclusion criteria and exclusion criteria were taken up for the study. **Results:** We found that for the detection of appendicitis, Sensitivity (88.46% vs 67.31%), Specificity (75% vs 25%), PPV (95.83% vs 85.37%), NPV (50% vs 10.53%) and Diagnostic accuracy (86.67% vs 61.67%) of RIPASA score was found to be more than modified Alvarado score. **Conclusion:** RIPASA is an overall better diagnostic scoring system than Alvarado score in predicting acute appendicitis.

INTRODUCTION:

Acute appendicitis is one of the most common surgical emergencies with an estimated lifetime prevalence of one in seven.¹The diagnosis is primarily clinical, and only contrast enhanced computed tomography has high sensitivity and specificity for the right diagnosis^{2,3}but these are not widely available in every setup of developing countries. Therefore, different scoring systems have been tried to reduce the number of negative appendectomies and delayed diagnosis.⁴The 2020 World Society of Emergency Surgery (WSES) recommend the use of the Alvarado score to aid in the diagnosis of acute appendicitis. Alvarado score, although used widely, has several disadvantages. It does not include C-reactive protein (CRP) as a variable, despite several studies demonstrating the usefulness of CRP in evaluating patients with acute appendicitis.⁵ CRP is an essential variable in the Acute Inflammatory Response (AIR) score. The AIR score may decrease unnecessary radiological and surgical interventions.⁶The Alvarado score contains 8, AIR score contains 7, and RIPASA score contains 16 variables. The optimal cut-off thresholds were accepted as ≥ 5 for a high probability of AA in the Alvarado scoring system, ≥ 7.5 for the RIPASA scoring system, and ≥ 5 for the AIR scoring system.^{7,8} Compared to the Alvarado or Modified Alvarado scores, the Raja Isteri Pengiran Saleh (RIPASA) score, a new diagnostic scoring system, has shown to have significantly higher sensitivity, specificity, and diagnostic accuracy in acute appendicitis compared to other two scoring system which is especially true in an Asian population.⁹⁻¹² It includes factors which are not included in Alvarado score such as age, gender, urinalysis, guarding, Rovsing sign, and Asian origin.¹³ Furthermore, very few studies have been conducted in India to compare the both these indices. Hence, we compared the RIPASA and modified Alvarado score to determine the scoring system which better predicts the diagnosis of acute appendicitis in our population.

OBJECTIVES

To compare diagnostic efficacy of RIPASA score versus Modified Alvarado score in the diagnosis of acute appendicitis.

MATERIALS AND METHODS

Longitudinal follow up study was conducted for evaluation of diagnostic test over a period of six months from December 2022 to May 2023 with the approval from the Institutional Ethical committee of the medical college and this study is consistent with all the ethical standards. Written

informed consent was taken from all study subjects. Patients presented to surgery OPD, emergency department with right iliac fossa pain and suspected to have acute appendicitis were included in the study. Patient with lump in right iliac fossa, peritonitis, history of trauma, elective appendectomy, already on treatment for pelvic inflammatory disease and urolithiasis & pregnant women were excluded from the study.

Detailed clinical history, general physical examination, investigation: a) Routine blood investigation- complete blood count, blood sugar, KFT, LFT, Bl. group, electrolytes etc. b) Urine analysis. c) Ultrasound abdomen. d) X-RAY chest and abdomen. e) CT abdomen wherever necessary were carried out. Following which they were evaluated using RIPASA scoring system¹⁴ and modified Alvarado scoring system¹⁴ but appendectomy done on the basis of clinical assessment and hospital protocol. Histopathological correlation was done with the score. A total score of 7.5 is considered as cutoff value for high probability of acute appendicitis in RIPASA scoring system and a total score of 7 is taken as high probability of acute appendicitis for modified Alvarado scoring system. Diagnosis of acute appendicitis was confirmed by intra-op findings and histopathological assessment of the appendectomy specimen. Finally, the reliability of RIPASA scoring system and modified Alvarado scoring system is assessed by calculating sensitivity, specificity, negative predictive value and positive predictive value.

Data was entered in MS Excel and analyzed using Statistical package for social science version 22 software and Chi-square test was applied to the data. P <0.05 was taken as significant.

RESULTS:

In the present study we have compared diagnostic efficacy of RIPASA score versus Modified Alvarado score in the diagnosis of acute appendicitis among 60 appendicitis cases. Majority, 29 (48.33%) of the cases were from the age group of 21-40 years with the mean age of 42+14 years. Most, 49 (81.67%) of the patients were males. Comorbidities seen in our study were hypertension in 13 (21.67%) followed by diabetes mellitus in 08 (13.33%) and IHD in 03 (5%) cases. Most common presenting complaint in our study was pain in abdomen reported by 56 (93.33%) patients followed by fever in 49 (81.67%), vomiting in 46 (76.67%), altered consciousness in 39 (65%), hematemesis 32 (53.33%), breathlessness in 9 (15%), headache and hematuria among 4 (6.67%) each. (Table 1)

Table 1. Association Of Short-term Outcomes With Baseline Characteristics. (n=60)

Baseline characteristic	No.	(%)	
Age (years)	<20	03	5
	21-40	29	48.33
	41-60	22	36.67
	61-80	06	10
	Mean ± SD	42±14 years	
Gender	Male	38	63.33
	Female	22	36.67
	DM	08	13.33
	HTN	13	21.67
	IHD	03	5
Presenting complaint	Anorexia	28	46.67
	Fever	35	58.33
	Migrating pain	24	40
	Nausea	25	41.67
	Pain in right iliac fossa	44	73.33
Vomiting	25	41.67	

In the present study, out of 52 positive cases as per HPE report, 46 (88.46%) correctly identified by RIPASA score and out of 08 negative cases as per HPE report, 06 (75%) correctly identified by RIPASA score. While, 35 (67.31%) positive & 02 (25%) negative correctly identified by ALVARADO score. SO, for the detection of appendicitis, Sensitivity (88.46% vs 67.31%), Specificity (75% vs 25%), PPV (95.83% vs 85.37%), NPV (50% vs 10.53%) and Diagnostic accuracy (86.67% vs 61.67%) of RIPASA score was found to be more than modified Alvarado score. (Table 2)

Table 2. Comparison Of Diagnostic Efficacy Of RPASA And Modified ALVARADO Score With Gold Standard HPE Report.

HPE report	RIPASA score		Modified ALVARADO score		Total
	Positive	Negative	Positive	Negative	
Positive	46 (88.46)	06 (11.54)	35 (67.31)	17 (32.69)	52 (86.67)
Negative	02 (25)	06 (75)	06 (75)	02 (25)	08 (13.33)
Total	48 (80)	12 (20)	41 (68.33)	19 (31.67)	60 (100)

DISCUSSION:

Acute appendicitis is a commonest surgical emergency that demands early and prompt diagnosis. It is mainly diagnosed by history and physical examination with 75 to 90% accuracy, and supportive laboratory tests. However, imaging techniques like ultrasound and computed tomography can increase the diagnostic accuracy up to 20 - 40%. Unfortunately, these are not available in every healthcare facility. Delayed or misdiagnosed cases can lead to appendicular abscess, gangrene and perforation. Therefore, in order to avoid diagnostic dilemma, these scores can be helpful. Both scores can be easily calculated.

In the present study, majority (48.33%) of the cases were in 2nd - 4th. Most (81.67%) cases were males. Similarly, Muhammad Zeb et al¹⁵ noted most patients in 2nd decade with majority of males (59.8%), Syed Shams Ud Din et al¹⁶ reported 66% were males, with 71% under the age of 40 years and Suman Baral et al¹⁷ found 53.64% males with most in 2nd-3rd decade of life. Consistent presenting complaints as our study reported by Rohat Ak et al¹⁸ who noted nausea, vomiting, loss of appetite and migratory pain as common clinical features.

For the detection of appendicitis, Sensitivity (88.46% vs 67.31%), Specificity (75% vs 25%), PPV (95.83% vs 85.37%), NPV (50% vs 10.53%) and Diagnostic accuracy (86.67% vs 61.67%) of RIPASA score was found to be more than modified Alvarado score. This is consistent with Hina Abdul Qayoom

Khan et al¹⁹ who noted that sensitivity of RIPASA score was 98.3%, with specificity of 100%, a positive predictive value of 100%, and negative predictive value of 80% while that of Alvarado score was 65.6% and 75.0%, respectively. The diagnostic accuracy of RIPASA was 98.4% and of modified Alvarado score was 66.15%. Nanjundaiah N et al²⁰ observed sensitivity and specificity of RIPASA score were 96.2% and 90.5% respectively as opposed to 58.9% and 85.7% of Alvarado score respectively.

CONCLUSION:

RIPASA is an overall better diagnostic scoring system than Alvarado score in predicting acute appendicitis. The score also can be helpful in setups where radiological investigations are not readily available.

Declaration:

There was no source of funding in our study and there was no any conflict of interest in this study.

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