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Original Research Article

VALIDATION OF RIPASA SCORING SYSTEM FOR DIAGNOSING ACUTE APPENDICITIS: A PROSPECTIVE ANALYSIS

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ABSTRACT

Background: Acute appendicitis is a leading cause of abdominal pain that frequently necessitates emergency surgery. The RIPASA scoring system was developed to enhance diagnostic accuracy, particularly for patients presenting with atypical clinical features.

Materials and Methods: This prospective study included 150 patients presenting with right iliac fossa pain over a one-year period. RIPASA scores were calculated, and clinical decisions were made based on the attending surgeon's judgment. Data on demographics, clinical symptoms, and histopathological outcomes were analyzed to assess the scoring system's diagnostic performance using sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV).

Results: The analysis revealed a sensitivity of 92%, specificity of 63%, PPV of 88%, and NPV of 74%. Most patients (56.6%) scored between 7.5 and 11.5, which strongly correlated with acute appendicitis. Among the 100 patients who underwent surgery, 59% were confirmed to have acute appendicitis, 38% had appendicular perforation, and 3% had a normal appendix. The negative appendectomy rate was 3%.

Conclusion: The RIPASA scoring system demonstrates high reliability in diagnosing acute appendicitis, particularly in younger patients. Its use in clinical practice can enhance diagnostic precision, reducing unnecessary surgical procedures and associated complications.

Keywords: Acute appendicitis, RIPASA score, diagnostic performance, histopathology, appendectomy.

INTRODUCTION

Acute appendicitis is one of the most prevalent causes of acute abdominal pain that necessitates urgent surgical intervention. It is characterized by the inflammation of the vermiform appendix, often presenting with clinical features such as right lower quadrant pain, nausea, vomiting, and fever. The global lifetime risk of acute appendicitis is estimated at approximately 7%, with the highest incidence occurring in individuals aged 10 to 30 years.[1]

Despite its relatively straightforward presentation in some patients, diagnosing acute appendicitis remains a challenge due to its overlapping symptoms with other abdominal conditions. This difficulty is particularly pronounced in specific populations, such as children, the elderly, and women, who may present with atypical symptoms or concurrent conditions that obscure the clinical picture.[2]

Misdiagnosis or delays in identifying this condition can lead to severe complications, including perforation, abscess formation, and peritonitis, emphasizing the need for accurate and timely diagnosis. Imaging techniques such as ultrasonography and computed tomography (CT) scans have significantly enhanced diagnostic precision. However, in many resource-limited settings, access to such advanced imaging modalities is restricted, making clinical scoring systems an

invaluable tool for early diagnosis and management.[3,4]

The Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) score has emerged as a promising diagnostic tool that aims to enhance the accuracy of clinical assessment. Unlike other scoring systems, such as the Alvarado score, the RIPASA scoring system integrates a wider range of parameters, including demographic details, specific clinical symptoms, and laboratory findings.[5] This comprehensive approach allows for better stratification of patients based on their likelihood of having acute appendicitis, particularly in populations with diverse clinical presentations.

Several studies have suggested that the RIPASA score demonstrates superior sensitivity and specificity compared to traditional scoring methods, particularly in Asian populations.[6] However, its broader applicability across various demographic settings remains underexplored. This study aims to bridge this gap by evaluating the diagnostic performance of the RIPASA scoring system in a prospective cohort of patients. By correlating RIPASA scores with histopathological findings—the gold standard for diagnosing acute appendicitis—the study seeks to establish the reliability, sensitivity, and specificity of this scoring system.

MATERIALS AND METHODS

This study was a prospective observational study, that was conducted over a one-year period, from January 2024 to December 2024 in the Department of General Surgery at Government Medical college & Hospital, Jangaon. A total of 150 patients presenting with right iliac fossa pain were enrolled. These patients were suspected to have acute appendicitis based on clinical evaluation and met the inclusion criteria. The study population included individuals aged between 15 and 59 years, regardless of gender, to ensure a representative demographic sample. Patients outside this age range, pregnant women, and those with alternative causes of right iliac fossa pain, such as trauma, pelvic inflammatory disease, or urolithiasis, were excluded to maintain the focus on acute appendicitis.

Upon admission, each patient underwent a systematic diagnostic protocol designed to ensure a comprehensive evaluation. This included a detailed clinical examination, routine hematological investigations, urine analysis, and imaging studies such as chest and abdominal X-rays and abdominal ultrasonography. In cases where initial findings were inconclusive, computed tomography (CT) scans were performed to provide additional diagnostic clarity.

The RIPASA scoring system was employed to stratify patients based on their likelihood of having acute appendicitis. The scoring system integrates various parameters, including patient age, gender, clinical symptoms such as nausea, vomiting, and migration of pain, physical findings like guarding and rebound tenderness, and laboratory results. Patients were classified into four categories according to their scores:

1. **Score <5.0:** Patients in this category were deemed to have a minimal probability of acute appendicitis. They were closely monitored and re-evaluated after a short observation period.
2. **Score 5.0–7.0:** This range indicated a low probability of appendicitis. These patients were either observed further or subjected to additional radiological investigations to confirm or rule out the diagnosis.
3. **Score 7.5–11.5:** This group represented a high probability of acute appendicitis. Patients in this category were admitted for observation, and their scores were reassessed periodically. Surgery was performed if the scores remained consistently high.
4. **Score >12:** Patients scoring above 12 were considered to have a definitive diagnosis of acute appendicitis and underwent immediate surgical intervention.

Special attention was given to female patients, who underwent ultrasonography to exclude gynecological causes of right iliac fossa pain. For all patients who proceeded to surgery, the diagnosis was confirmed intraoperatively and subsequently through histopathological examination of the excised appendix.

The diagnostic accuracy of the RIPASA scoring system was evaluated by calculating its sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) in relation to histopathological findings. These metrics were then analyzed to assess the reliability and utility of the scoring system in clinical practice.

RESULTS

The study included 150 patients presenting with suspected acute appendicitis, with a male-to-female ratio of approximately 1.27:1. Male patients constituted 56% (n = 84) of the cohort, while 44% (n = 66) were female. The highest incidence of cases was observed in the 21–30 years age group, accounting for 41.3% of patients, followed by individuals under 20 years (27.3%). Patients in the 31–40 years age group represented 24% of the study population, while the age groups of 41–50 years and 51–60 years contributed 5.3% and 2% of cases, respectively.

Table 1: Demographic details of patients

Variable		Frequency
Age (Years)	<20	41 (27.3%)
	21-30 years	62 (41.3%)

	31-40 years	36 (24%)
	41-50 years	8 (5.3%)
	51-60 years	3 (2%)
Gender	males	84 (56%)
	females	66 (44%)

RIPASA score distribution revealed that a majority of patients (56.6%) fell within the high-probability range of 7.5–11.5. Lower scores of <5.0, indicating minimal probability of appendicitis, were recorded in 13.3% of patients, while 20% scored between 5.0 and 7.5, reflecting a low probability of appendicitis. The highest probability category, with scores >12, was observed in 10% of the cases.

Table 2: RIPASA score distribution

Score	frequency
<5.0	20 (13.3%)
5.0-7.5	30 (20%)
7.0-11.5	85 (56.6%)
>12	15 (10%)

Clinically, pain localized to the right iliac fossa (RIF) was the most frequent symptom, reported in 96.67% of patients. This was followed by nausea and vomiting in 80%, and migration of pain to the RIF in 66.7% of patients. Physical examination revealed RIF tenderness in 66.7%, guarding in 62.67%, and rebound tenderness in 40%. Additional symptoms such as anorexia were noted in 65.33%, fever in 56.7%, and a positive Rovsing's sign in 50% of cases. Laboratory findings showed an elevated white blood cell (WBC) count in 36.67% of patients, while a negative urine analysis was observed in 20%.

Table 3: Clinical features and histopathological outcomes

Characteristic		Frequency
Clinical features	Pain in the right iliac fossa	145 (96.67%)
	Anorexia	98 (65.33%)
	Nausea, vomiting	120 (80%)
	Migration of pain to RIF	100 (66.7%)
	RIF tenderness	100 (66.7%)
	Guarding	94 (62.67%)
	Rebound tenderness	60 (40%)
	Rovsing's sign	75 (50%)
	fever	85 (56.7%)
Duration of symptoms	<48 hours	94 (62.6%)
	>48hours	56 (37.3%)
Laboratory	Raised WBC count	55 (36.67%)
	Negative urine analysis	30 (20%)
Surgical Outcome (n = 100)	Acute Appendicitis	59 (59%)
	Appendicular Perforation	38 (38%)
	Normal Appendix	3 (3%)

Histopathological examination of the appendix provided definitive diagnoses for the surgically treated patients. Among the 100 operated cases, 59% were confirmed as acute appendicitis, while 38% demonstrated appendicular perforation. A normal appendix was identified in 3% of cases, resulting in a negative appendectomy rate of 3%.

The diagnostic performance of the RIPASA scoring system was evaluated against these findings. The score demonstrated a sensitivity of 92%, a specificity of 63%, a positive predictive value (PPV) of 88%, and a negative predictive value (NPV) of 74%. These results underscore the reliability of the RIPASA scoring system in identifying acute appendicitis and its utility in minimizing unnecessary surgical interventions.

Table 4: Diagnostic Performance of RIPASA score

Metric	Value (%)
Sensitivity	92%
Specificity	63%
Positive Predictive Value	88%
Negative Predictive Value	74%

DISCUSSIONS

The present study highlights the diagnostic efficacy of the RIPASA scoring system for acute appendicitis, with sensitivity and specificity values of 92% and 63%, respectively. These findings are in agreement with those reported by Gupta et al,[7] who found a sensitivity of 94% and specificity of 65% for the RIPASA score in their prospective study, emphasizing its reliability in diagnosing acute

appendicitis. Similarly, Malik et al,[8] reported a sensitivity of 91% and a specificity of 62%, further reinforcing the utility of the RIPASA score in clinical settings. The positive predictive value (PPV) of 88% and negative predictive value (NPV) of 74% observed in our study are comparable to those reported by Prasetyo et al,[9] who noted a PPV of 87% and NPV of 76% in a similar cohort.

The demographic trends in this study, with a peak incidence in the 21–30 years age group and a male-to-female ratio of 1.27:1, are consistent with findings from Rathore et al,[10] who observed a similar age distribution and a slightly higher male predominance (1.3:1). Right iliac fossa (RIF) pain was the most prevalent symptom (96.67%), in line with the observations of Abo et al,[11] who also reported RIF pain as the leading presenting complaint in 95% of cases.

However, the specificity in this study (63%) is slightly lower than that reported by Kumar et al,[12] who found a specificity of 70%. This difference could be attributed to variations in sample composition, with our study including patients with atypical presentations or overlapping conditions, such as pelvic inflammatory disease in females. Additionally, the negative appendectomy rate in our study (3%) is lower than the 5% reported by Qureshi et al,[13] reflecting the effectiveness of combining the RIPASA score with clinical judgment.

CONCLUSION

This study validates the RIPASA scoring system as an effective tool for diagnosing acute appendicitis, with high sensitivity and positive predictive value. Its implementation in clinical settings can reduce diagnostic delays, improve surgical outcomes, and minimize unnecessary appendectomies. The demographic findings and diagnostic performance highlight its reliability, particularly in younger populations. While specificity was moderate, combining the RIPASA score with clinical judgment ensures better accuracy. Further refinements and validation in diverse populations are recommended to optimize its utility.

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Conflicts of Interest: The authors declare no conflicts of interest related to this study.

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