



# To Evaluate the Utility of RIPASA Scoring System in the Diagnosis of Acute Appendicitis and to Correlate Histopathological Finding with this Scoring System

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## Abstract

**Background and Aims:** Acute appendicitis is one of the most common surgical emergencies encountered by general surgeon. Early diagnosis and management is critical in order to prevent drastic complication. This study was done to analyze the applicability and accuracy of RIPASA scoring in diagnosing acute appendicitis. **Methods:** This prospective observational study included all the patients above the age of 12 years with clinical feature of acute appendicitis admitted in surgery department. Patients with palpable appendicular lump, appendicular abscess, previous history of urolithiasis and pelvic inflammatory disease were excluded from the study. All the patients were evaluated with complete history taking and clinical examination and subjected to baseline investigation. The patients were subjected to routine baseline investigations including abdominal ultrasonography. We used RIPASA scoring system for all our subject to reach the definitive diagnosis of acute appendicitis. The score has 14 parameters and each parameter is given a numerical value. We classified the patients into four groups according to the score; a) Score <5= Possibility of acute appendicitis is unlikely; b) Score 5-7= Low probability of acute appendicitis; c) Score 7.5-11.0= High probability of acute appendicitis; d) Score >12.0= Definite acute appendicitis. The patients were properly resuscitated before any surgical intervention. Informed written consent was taken and procedure details were explained to the patient and legal attendant. **Results:** Total of 100 patients was studied. Out of total 100 patients 93 patients (93%) were documented as having appendicitis by histopathology where as 7% of patients had no evidence of appendicitis on histopathology. The sensitivity and specificity of RIPASA scoring system in our study came out to be 92.47% and 86.92% respectively. The positive predictive value and negative predictive values were 86% and 93% respectively. The diagnostic accuracy rate and negative appendectomy rate were 85.56% and 7% respectively. **Conclusion:** The RIPASA scoring system is easy and simple to apply as majority of the parameters can be obtained from history, clinical examination and few laboratory tests and looked promising when applied to our setting with better sensitivity, specificity, and diagnostic accuracy.

## Keywords

RIPASA, Acute Appendicitis, Scoring; Surgical Emergency

## Introduction

Acute appendicitis is one of the most common surgical emergencies in clinical practice, with an estimated life time prevalence of approximately 01 in 07.<sup>[1]</sup> Despite being a common problem, acute appendicitis remains a difficult diagnosis to establish in some cases, particularly in young, elderly and female patients of reproductive age

group, where a host of other genitourinary and gynaecological inflammatory conditions can also present with similar signs and symptoms.<sup>[2]</sup>

On histopathology reports, the negative appendectomy rates have been found quite high. In order to reduce the

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negative appendectomy rates and associated surgical and anesthesia complications, number of scoring systems and recommendation has been given in scientific literature from time to time. The myriads of scoring system have been devised based on clinical history, physical examination and laboratory finding which help in early diagnosis and prompt management of acute appendicitis (e.g, Alvarado, Fenyo, Techer, Ramirez , Christian scores). The two promising scoring systems with increasing sensitivity and specificity in diagnosing acute appendicitis and to reduce the negative appendectomy rates are modified Alvarado and RIPASA score. The RIPASA Score is a new diagnostic scoring system developed for the diagnosis of acute appendicitis and has been shown to have significantly higher sensitivity, specificity and diagnostic accuracy compared to Alvarado Score, particularly when applied to Asian population<sup>13</sup>. The RIPASA scoring system is found to have sensitivity of (88%), specificity of (67%), positive predictive value of (93%), negative predictive value of (53%). The negative appendectomy rate decreased significantly from 16.3% to 6.9%, which was 9.4% reduction<sup>13</sup>. Since not many studies have been conducted on RIPASA scoring system in the diagnosis of acute appendicitis, we have prospectively studied RIPASA score by applying them to the patients attending our tertiary care hospital with right iliac fossa pain.

#### Material and Methods

This prospective observational study was conducted in the Post-graduate Department of General Surgery Govt. Medical College, Jammu; over a period of 12 months after taken ethical clearance from institutional ethical committee. All the patients above the age of 12 years with clinical feature of acute appendicitis were included in our study. Those patients with palpable appendicular lump, appendicular abscess, previous history of urolithiasis and pelvic inflammatory disease were excluded from the study.

All the patients were evaluated with complete history taking and clinical examination. The patients were subjected to routine baseline investigations including complete blood count, serum electrolyte, renal and liver

function test, urine routine, radiograph of abdomen and chest and abdominal ultrasonography.

We used RIPASA scoring system for all our subject to reach the definitive diagnosis of acute appendicitis. The score has 14 parameters and each parameter is given a numerical value. The parameters include ; Sex: Male (score 1.0), female(score 0.5), Age:<39.9 years (score1.0) and >40.0 years (score 0.5), RIF pain: (Score 0.5), Migration of pain to right lower quadrant of abdomen (Score 0.5), Anorexia:(Score of 1.0), Nausea and vomiting:(Score of 1.0), Duration of symptoms: (Score of 1 for duration <48 hrs and score of 0.5 for duration duration of >48hrs), RIF tenderness:(Score of 1.0), RIF guarding:(Score of 2.0), Rebound tenderness:(Score of 1.0), Rovsing's sign (Score of 2.0), Fever (score of 1.0), Raised TLC (Score of 1.0), Negative urinalysis:(Score of 1.0). We classified the patients into four groups according to the score and further management.

1. Score<5= Possibility of acute appendicitis is unlikely and managed conservatively.
2. Score 5-7= Low probability of acute appendicitis, observe the patient in emergency and repeat the score after 4-6 hours or perform abdominal ultrasound to rule out acute appendicitis.
3. Score 7.5-11.0= High probability of acute appendicitis. Repeat score after 4-6 hours. If it remains high, prepare the patient for surgery
4. Score >12.0= Definite acute appendicitis. Patient straight way taken for emergency surgery.

All the patient were properly resuscitated before any surgical intervention. Informed written consent was taken and procedure details were explained to the patient and legal attendant before the procedure.

#### Results

Total of 100 patients including 61 males and 39 females with male female ratio 1.56. Maximum number(38%) of patients were in the age group of 20-29 years followed by 30-39 (29%), 40-49(9%), 50-59(7%). 15% patients were less than 20years of age and 4% were above 60 years. The mean age in our study was  $30.41 \pm 11.3$ . In our study out of 100 patients maximum number of patients (59 patients) presented to emergency within 48 hours

**Table 1: All the parameter included in Ripasa scoring.**

Parameter	Present	Positive Result(Appendicitis present)	Negative result(Appendicitis absent)
Migration of pain	60	55(91.67%)	4(8.33%)
Anorexia	59	55(93.22%)	4(6.78%)
Nausea/Vomiting	84	77(91.67%)	7(8.33%)
RIF Tenderness	96	90(93.75%)	6(6.25%)
Rebound Tenderness	78	72((92.71)	6(7.69%)
Guarding	46	44(95.65%)	2(4.35%)
Rovsing Sign	32	28(87.50%)	4(12.50%)
Fever	34	32(94.12%)	2(5.88%)
Raised WBC	59	56(94.92%)	3(5.08%)
Urine Analysis	84	79(94.05%)	5(5.95%)

and 41 patients presented after 48 hours. Out of those 59 patients who presented within 48 hours 54(91.53%) patients showed positive result and those who presented after 48 hours, 39(95.12%) were positive cases. The analysis of other parameters in our study is shown in *Table 1*.

In our study out of total 100 patients, RIPASA score of >7.5 was present in 94 patients and the remaining 6 patients showed a score of <7.5. Shown in *Table 2*.

In our study, the sensitivity of RIPASA Scoring system was 92.47%, specificity 86.92%, positive predictive value 86% and negative predictive value of 93%. The diagnostic accuracy was 89.50%.

#### Discussion

In our clinical practice the most common surgical emergencies encountered is acute appendicitis. Despite being a common problem, in some cases it is difficult to diagnose acute appendicitis. The superiority and reliability of history and clinical examination is most important in differentiating acute appendicitis from other disease. It has been observed that many patient undergoing appendectomy prove to be negative on histopathology of

surgically removed appendix. In order to improve the accuracy of diagnosing acute appendicitis many scoring system have been given. RIPASA score is a new diagnostic scoring system developed for the diagnosis of acute Appendicitis and has been shown to have higher sensitivity, specificity and diagnostic accuracy. This study was done to analyze the applicability of RIPASA scoring for diagnosing acute appendicitis in our tertiary care hospital.

In our study the male gender was found to have higher probability then female gender for acute appendicitis. We found 61% of male patients and 39% of female patients with male female ratio of 1.56. Our findings were comparable to studies done by Butt M Q *et al*<sup>[4]</sup> and Srikantaiar H C *et al*<sup>[5]</sup>.

Majority of patients in our study were in the age group of 20-29 years with mean age distribution of 30.41±11.37 years. The mean age of the patients were 28.28±12.34 years in the study done by Bhabatosh D *et al*. in 2016<sup>[6]</sup>. In our study, out of 100 patients 93 were positive for appendicitis in histopathological report and 7 patients were negative.

**Table 2: Distribution of Patients as Positive and Negative Results in relation to RIPASA Score.**

RIPASA Score	Number of patients (%)	
	Appendicitis (+)	Appendicitis (-)
>7.5	88 (93.62)	6 (6.38)
<7.5	5 (83.33)	1 (16.67)

Out of 100 patients, 6 patients had score of less than 7.5 and they underwent appendectomy on the basis of ultrasonography documented acute appendicitis. Comparing the histopathology finding with the RIPASA score we noted that in our study sensitivity were 92.47% and specificity were 86.92%. While the positive predictive value and negative predictive value were 86% and 93% respectively. The diagnostic accuracy and negative appendectomy rate were 89.50% and 07% respectively. Our study results were comparable to study done by Khadda S *et al.*<sup>[7]</sup> which has sensitivity and specificity of 97.73% and 77.47% respectively. Their positive predictive value and negative predictive value were 86.00% and 96% respectively. Negative appendectomy rate was 13.7% which is almost double then our study. The study conducted by Chong C F *et al.*<sup>[8]</sup> on RIPASA scoring system shows a sensitivity and specificity of 88% and 67% respectively. The positive predictive value and negative predictive value were 93% and 53% respectively. The diagnostic accuracy was 81% and negative appendectomy rate was 6.9%, which is comparable to our study.

### Conclusion

From this study we concluded that the RIPASA scoring system is easy and simple to apply as majority of the parameters can be obtained from history, clinical examination and few laboratory tests. This new scoring system looked promising when applied to our setting and have better sensitivity, specificity, and diagnostic accuracy. A significant reduction in negative appendectomy rate was also seen. Unwanted admission and expensive imaging studies can also be avoided by using RIPASA score.

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### Conflicts of Interest

There are no conflicts of interest.

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