ORIGINAL ARTICLE

Validate the Precision of the RIPASA Grading System for the Diagnosis of Acute Appendicitis: A Cross-Sectional Study

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ABSTRACT

Aim: To determine the accuracy of the RIPASA (Raja Isteri Pengiran Anak Saleha Appendicitis) grading system for the diagnosis of acute appendicitis.

Study design: A cross-sectional study

Place and Duration: This study was conducted at Jinnah Postgraduate Medical Centre Karachi Pakistan from March 2020 to November 2021.

Methodology: A total of 150 patients with clinical signs of acute appendicitis were studied. To determine the RIPASA score's validity, testing was assessed for acute appendicitis. Patients with gynecological and urological disorders, appendicular lumps, were excluded from the study. The RIPASA Score chart was employed, and the findings of additional clinical studies corroborated the findings.

Results: Among the 150 patients, 80 (53.3%) were males, and 70 (46.66%) were females. The participants' average age was 22 ± 5.4 years. At a cut-off score of 7.5, the RIPASA scoring system exhibited good validation testing. The majority of the population (n=135, 90 %) was under the age of 40, with the minority (n=15, 10%) being over 40. The incidence of appendicitis increases dramatically in the second and third decades. There is no case below the age of ten and no case over the age of sixty years.

Conclusion: For the diagnosis of AA, the RIPASA score is more sensitive and specific. This Scoring system is a valid and significant selective power in the diagnosis of appendicitis and in reducing unnecessary admissions and abdominal explorations, especially in the Asian race.

Keywords: Acute appendicitis, Histopathology, RIPASA, Validation study

INTRODUCTION

With a global incidence of 1.17 per 1000 and a lifetime risk of 8.6% in men and 6.7 % in women, acute appendicitis (AA) is the most prevalent reason for emergency surgery. (1) The incidence is highest in teenagers and young adults, although there is little difference in the incidence of complex appendicitis across age groups. (2, 3) Eastern and Western populations have similar rates of occurrence, with lifetime risks of about 6 and 8%, respectively. (4) Furthermore, the presentation, degree of disease, radiological workup, and surgical therapy of individuals with AA differ greatly depending on the country's income. (5)

Table 1, i: RIPASA scoring system

1	Male	1.0
	Female	0.5
2	Age <39.9 yrs	1.0
	Age > 40 yrs	0.5
	Symptoms	
3	Rif pain	0.5
4	Pain migration to Rif	0.5
5	Anorexia	1.0
6	Nausea and vomiting	1.0
7	Duration of symptoms < 48hrs	1.0
	Duration of symptoms > 48hrs	0.5
	Signs	
8	RIF tenderness	1.0
9	RIF Guarding	2.0
10	Rebound tenderness	1.0
11	Rovsing sign	2.0
12	Fever > 37°C < 39°C	1.0
	Investigation	
13	Raised WBC	1.0
14	Negative urine analysis	1.0
	Additional score	
15	Foreign NIC	1.0
Total score	17.5	

Making an early and accurate diagnosis of AA, which leads to early appendicectomy and avoids problems from damage (6) A higher white blood count is a significant result in AA and also a useful predictor in AA (7) Diagnosing AA can be challenging for the experienced doctors. Ultrasonography has recently increased skepticism due to its moderate sensitivity (86%) and specificity (81%) and thus poor diagnostic capabilities. The use of ultrasound, multi-detector CT scans, and diagnostic laparoscopy in the differential diagnosis of acute abdominal discomfort have been useful, although expensive. (8, 9) In young and fertile women, laparoscopy is an important tool for diagnosing and treating lower abdominal pain. (10)

When used for Asian populations, the RIPASA score was found to have higher specificity and sensitivity than the other score. Age, gender, pain to the RIF, nausea, anorexia, and negative urine findings were all factors in the new appendicitis scoring system. A RIPASA score of 7.5 or higher indicates probable acute appendicitis, while a score of <7.5 indicates less likely acute appendicitis. (7) **(As shown in Table 1)**

Table 1, ii: RIPASA Scoring Systen Interpretation

Total RIPASA score	Decision Making Guidelines
< 5.0	Probability of Acute Appendicitis is unlikely
5.0-7.0	Low probability of Acute Appendicitis
7.5-11.5	Probability of Acute Appendicitis is High
>12	Definite Acute Appendicitis

This study aimed to assess how accurate the RIPASA grading system was for diagnosing AA in patients undergoing emergency appendectomy.

METHODOLOGY

A total of 150 individuals (80 men and 70 women) aged 14 to 60 were included in the study. Individuals undergoing appendectomy who had RF pain suggestive of AA were included in the trial. Patients with gynecological and urological disorders, appendicular lumps, were excluded from the study. The RIPASA Score chart was employed, and the findings of additional clinical studies corroborated the findings. Permission was taken from the ethical review committee of the institute. SPSS version 22 was used for data analysis.

RESULTS

In the surgical department, 150 patients underwent appendectomy, 80 (53.3%) were males, and 70 (46.66%) were females. The

participants' average age was 22±5.4 years. The majority of the population (n=135, 90 %) was under the age of 40, with the minority (n=15, 10%) being over 40. The incidence of appendicitis increases dramatically in the second and third decades. There is no case below the age of ten and no case over the age of sixty years. **(As shown in Table 2)**

Table 2 displays the study population's RIPASA ratings for histopathological reports of appendix specimens. A total of 25 patients were determined to be histologically negative (normal) for AA out of a total of 110. Those 25 patients had a RIPASA score of <7.5. RIPASA score of >7.5 was found in 80 patients with histologically proven acute appendicitis. There were three patients with a score of <7.5, however, their tissues were histologically positive for acute appendicitis. There were two patients with a score of > 7.5 who were histopathologically negative. **(As shown in Table 3)**

Furthermore, the validation analysis reveals that 95 genuine positive instances were observed, 55 of which are men and 40 of which are females. There are five false positive cases, three of which are men and two of which are women. There are eight true negative cases, five men and three females. There are just two false negative cases, one male and one female. True positive cases had 27.45 years ±16.7 mean age, while true negative cases have 33 years ±23.4 mean age. The RIPASA scoring system exhibited 96.5 % sensitivity, 93.6 % specificity, 97.9 % PPV, 83.5 % NPV, and 97.2 % DA at a cutoff score of 7.5 **(As shown in Table 4).** Both genders had identical RIPASA scores (p>0.05), while the two age groups had different RIPASA scores (p=0.04).

Table 2: Characteristics of the study participants

Characteristics	No of Patients (n=150)	%
Age (Mean)	22 ± 5.4	
Gender		
Male	80	53.3
Female	70	46.6
Age groups (years)		
11-20	55	36
21-30	35	23
31-40	45	30
41-50	10	6.6
51-60	5	3.3

Table 3: RIPASA Score Frequency Distribution with Histopathology (HP).

RIPASA Score	HP		Total
	Normal Appendix	Acute Appendicitis	
RIPASA ≥ 7.5	2 (1.8%)	80 (72%)	82 (74%)
RIPASA< 7.5	25 (22.7%)	3 (2.7%)	28 (25%)
Total	27 (24.5%)	83 (75.45%)	110 (100%)

Table 4: Validation efficacy of the individuals in the study

Diagnosis Efficacy	Male %	Female %	Combined %
Sensitivity	96.5	96.1	96.5
Specificity	91.5	92.9	93.6
Positive Predictive Value (PPV)	96.9	98.5	97.9
Negative Predictive Value (NPV)	80.3	82.2	83.5
Diagnostic Accuracy (DA)	96.5	96.6	97.7

DISCUSSION

Among surgical emergencies, AA is notable for posing a challenge to the emergency room surgeon since it necessitates good clinical judgment for diagnosis and necessitates a swift and firm decision on whether or not to operate. (11) Ultrasound, CT, and MRI, which are used to aid with AA diagnosis, have costs, need expertise, and are not available out of hours in most institutions. (12) Scoring systems like Alvarado and RIPASA have been created throughout time to address all of these difficulties and increase diagnosis accuracy, with RIPASA being the most recent innovation. (13)

A total of 53.3% of them were males and 46.66% of whom were females. The participants' average age was 22±5.4 years. The majority of the population (90%) was under the age of 40. These figures are similar to those of other studies conducted in Peshawar, Pakistan. (14)

In our study, the outcomes of the RIPASA system showed 96.5 % sensitivity, 93.6 % specificity, 97.9% PPV, 83.5 NPV, and 97.2 DA at a cut-off score of 7.5, which were exactly equivalent to statistics described by two studies. (15) (16) The RIPASA score has a sensitivity of 97.98 % at a cut-off value of 8.0, a specificity of 77 %, a PPV of 97.52 %, and an NPV of 86.3 %, according to another study conducted in Peshawar. (17)

RIPASA has been used for the diagnosis of AA in numerous national and international comparative studies, and so can be used by surgeons in the emergency setting. (18-21) According to Nanjundaiah et al., the RIPASA score is now a better diagnostic grading system for AA than the Alvarado score (22), Both of these trials support our findings, Frountzas and colleagues (23) and Dezfuli et al. (24) demonstrated that RIPASA scoring is a lot more sensitive diagnostic scoring method for AA than Alvarado scoring.

Our results are comparable to those of a Peshawar, Pakistan-based study, which found that the RIPASA score can be used to detect AA in our population and, more importantly, to avoid negative appendicectomies. (25) More research with a larger patient group is needed to corroborate the findings of this study.

CONCLUSION

For the diagnosis of AA, the RIPASA score is more sensitive and specific.This Scoring system is a valid and significant selective power in the diagnosis of appendicitis and in reducing unnecessary admissions and abdominal explorations, especially in the Asian race.

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