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Evaluating the Diagnostic Accuracy of the RIPASA Score in Acute Appendicitis Detection

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ABSTRACT

Background: It might be challenging to diagnose acute appendicitis, despite its prevalence. To avoid complications and unproductive exploratory procedures, a prompt and accurate diagnosis is of the utmost importance.

Objective: The objective was to ascertain how well the RIPASA score could diagnose acute appendicitis.

Methods: This A cross-sectional comparative study was comprised of 180 patients with age 18-70 years. Patients experiencing pain in the right iliac fossa (RIF) were chosen in a sequential fashion. Each patient was evaluated using RIPASA and ALVARADO scores, with histopathology serving as the gold standard. The statistical analysis was carried out using SPSS version 24.

Results: The mean age of the presented cases was31.16±9.43 years. Frequency of males were 107 (59.4%) and females were 73 (40.6%). Frequency of RIPASA score for diagnosing acute appendicitis was 160 (90%), ALVARADO score in 26 (14.4%) cases and histopathological findings in 171 (95%) cases.The RIPASA score fared better than the ALVARADO score ($p < 0.005$) in terms of diagnostic accuracy, sensitivity, specificity, positive predictive value, and negative predictive value.

Conclusion: We found that compared to the ALVARADO score, the RIPASA score is better in predicting cases of acute appendicitis.

Keywords: *RIPASA, ALVARADO, Acute appendicitis, Pain*

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1. INTRODUCTION

Adverse appendix inflammation is one of the most common surgical emergencies treated on a daily basis around the world [1]. There is a range of 13% to 77% where it happens [2]. In a Pakistani investigation, acute appendicitis was found in 38 out of 75 patients (or 48% of the total) who reported severe stomach discomfort. Acute appendicitis symptoms might be similar to those of other inflammatory disorders, making diagnosis difficult, particularly in children.

Although acute appendicitis is common, a complete clinical evaluation is required for a proper diagnosis because it mimics symptoms of several other inflammatory diseases affecting the genitourinary and gynecological systems [3]. Various grading systems have been developed with the aim of enhancing the precision of diagnosis. They are also inexpensive, easy to replicate, non-invasive, and simple to use [4]. An innovative scoring method for the diagnosis of appendicular inflammation in Asian populations is the Raja IsteriPengiranAnakSaleha Appendicitis (RIPASA) [5].

Despite discussions about whether or not these scoring systems may enhance surgical results while cutting expenses, Clinical Prediction Rules (CPR) have been developed to anticipate the severity of AA and decrease negative appendectomy rates. With the most validations of any prediction model, Kalan's modified Alvarado score comes next [5]. The second scoring technique is considerably easier to execute, although it isn't quite as sensitive as the original Alvarado score. But both scoring systems are more useful as diagnostic "rule out" instruments than "rule in" techniques when dealing with reproductive-age female patients [7].

The reliability of these scores has been demonstrated by numerous research. Although AA is common in Western countries, similar studies have failed to find the same outcomes for other ethnic groups [8,9]. The variation in patient characteristics and the differing perspectives held by doctors in different contexts both contributed to the elucidation of the phenomenon. The RIPASA (Raja IsteriPengiranAnakSaleha Appendicitis) scoring system was introduced for the Asian population as a replacement for the inadequate ALVARADO ratings for acute appendicitis diagnosis [9].

Several grading systems have been created to improve the precision of appendicitis diagnoses. Using or duplicating these methods is simple, cheap, and does not involve any kind of invasiveness.[10] Symptoms and indications are described numerically. Kind, temperature, peritoneal irritation, nausea, vomiting, pain localization and mobility, and leukocytosis are common clinical indications of abdominal disease that are frequently used in conjunction with test results.[11]

Acute appendicitis can be quickly diagnosed with one of several trustworthy scoring systems; these systems are not only easy to use but also economical and do not require any invasive procedures. Recent technical developments have resulted in a 5-10% reduction in the incidence of unsatisfactory appendectomy. The Alvarado score has been clinically validated to be the gold standard among diagnostic techniques that are used widely. Thanks to its user-friendliness, affordability, and speed of processing, it has become the go-to score for surgeons. Prediction is based on eight clinical parameters; a score of 10 is considered good, while a score of seven is considered adequate.[11,12]

RIPASA is an internationally recognized scoring system for acute appendicitis in children. Fifteen different predictive features are available, with scores ranging from seven and a half to sixteen. In contrast to the Alvarado score, the RIPASA score considers additional variables when making predictions about cases of acute appendicitis. Since most scoring systems were developed with the population of Western nations in mind, the Alvarado score was initially not applicable to Asian countries. Distinct dietary and ethnic norms may influence the reliability of different grading systems.[11,12] An increase in the reliability of predictions of acute appendicitis could result from adopting these grading systems in the community. In order to better understand how acute appendicitis is diagnosed, this study will compare the RIPASA and ALVARADO scores.

2. MATERIALS AND METHODS

A cross-sectional comparative study was performed at the department of surgery, Gomal Medical College DI Khan from January 2023 to June 2025 who presented with right iliac fossa (RIF) pain were consecutively selected. The study excluded participants with the following conditions: urolithiasis, a history of pelvic inflammatory sickness, pregnancy, mass in the right iliac fossa, or lack of RIF pain. Since there was right iliac fossa pain, it was concluded that acute appendicitis was the cause. The total RIPASA score is16, which is based on 15 individual components. A score of 7.5 or higher is considered to be satisfactory. To arrive at the ALVARADO score, eight criteria are considered, with a maximum possible value of 10. An ALVARADO score of 7.0 or higher was used to confirm acute appendicitis.

We were able to get detailed medical records for every single patient. For every patient, we ran their results through the RIPASA and ALVARADO scores, and when in doubt, we turned to histopathology, the diagnostic gold standard, to back up our diagnoses. The Chi-square test was employed for the purpose of data comparison. Statistical significance was determined by a p-value lower than 0.005. The data reported here were analyzed using SPSS version 25, which is statistical software for the social sciences.

3. RESULTS

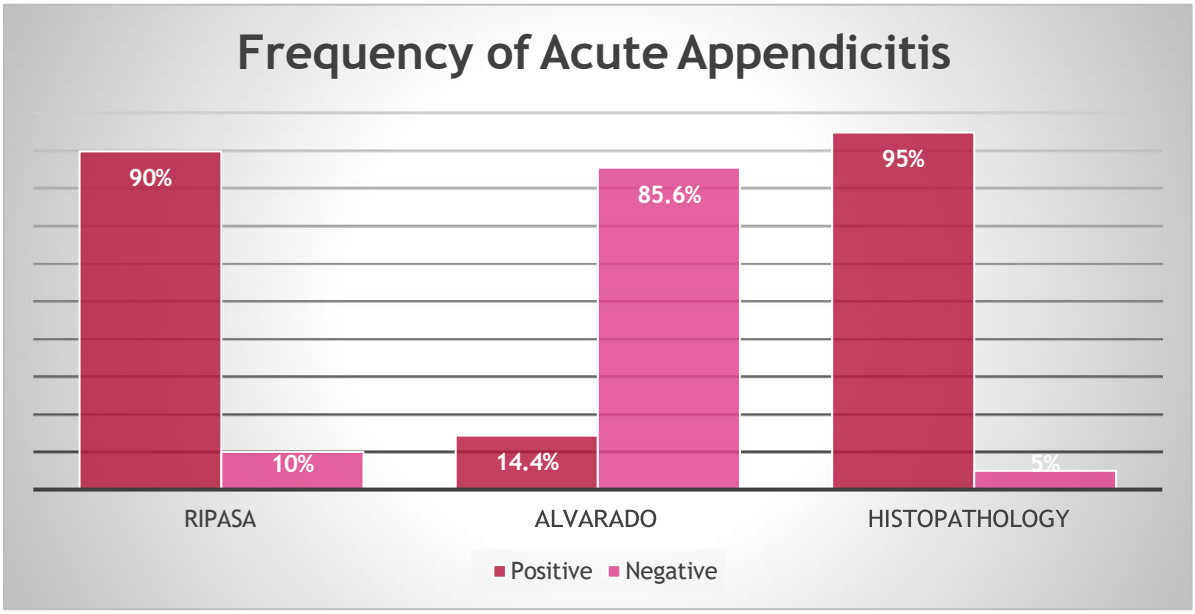
The mean age of the presented cases was31.16±9.43 years. Frequency of males were 107 (59.4%) and females were 73 (40.6%). 87 (43.3%) cases were from urban areas. 121 (67.2%) cases were married.(table 1)

Table-1: Demographics of the presented cases

Variables	**No./ Percentage (180)**
Mean age (years)	31.16±9.43
Gender	
Male	107 (59.4%)
Female	73 (40.6%)
Residence	
Urban	87 (43.3%)
Rural	93 (56.7%)
Marital Status	
Married	121 (67.2%)
Unmarried	59 (32.8%)

Frequency of RIPASA score for diagnosing acute appendicitis was 160 (90%), ALVARADO score in 26 (14.4%) cases and histopathological findings in 171 (95%) cases.(figure 1)

Figure-1: Frequency of positive values of RIPASA, ALVARADO and histopathology



There was a significant difference between the RIPASA and ALVARADO scores ($p<0.005$) in terms of diagnostic accuracy, positive predictive value, specificity, specificity, and sensitivity.(table 2)

Table-2: A comparing diagnostic accuracy and sensitivity

Variables	**RIPASA**	**ALVARADO**	**P Value**
sensitivity	93%	14%	<0.003

specificity	52.1%	92.7%	<0.005
PPV	98%	95%	<0.002
NPV	34%	7%	<0.003
DA	90%	14.4%	<0.005

4. DISCUSSION

Acute appendicitis is notoriously difficult to diagnose for emergency room doctors. Despite the need for a comprehensive patient history, laboratory tests, and clinical signs and symptoms, it is still considered a diagnostic mystery. Because of this, numerous diagnostic scoring algorithms for acute appendicitis were developed.

Acute appendicitis can be more accurately diagnosed with the use of one of several established grading systems [13]. A score of 10 was produced by one of them, the conventional Alvarado score, by include the left shift of neutrophil maturation. But in 1994, Kalan et al. removed this requirement from their revised score. Results showed that the Modified Alvarado Score (MASS) was as sensitive and specific as the standard Alvarado score when applied to different demographics and clinical scenarios, although it frequently produced lower yields when applied to groups other than its original target [14].

Acute appendicitis grading was established in 2010 by the RIPASA. From the moment it was introduced, researchers from both the East and the West have been studying the system. Many foreign workers in Brunei Darussalam are required by law to pay for their own medical care at RIPAS Hospital. The result is typically a later onset of more severe symptoms among foreign nationals. Because of this, the score for these countries was adjusted to include the foreign NRIC component. An amended RIPASA was developed following the demonstration of comparable results upon removal of the foreign identity card parameter [15].

Hematology, the most reliable method for identifying acute appendicitis, validated the diagnosis in 95% of the patients enrolled in this study. Contrarily, 90% of patients were correctly diagnosed with acute appendicitis using the RIPASA score, whereas only 14.4% of patients were diagnosed using the inappropriate ALVARADO score. Exact same as earlier research. [16,17] utilizing the ALVARADO score, 91.1% of patients having acute appendicitis in 2016. Damani SAAR also reported that percentage utilizing the RIPASA score and the histology score was 91.1% [18]. The RIPASA score and histopathology findings are very comparable; nonetheless, histopathology is still considered the best method for detecting acute appendicitis.

The RIPASA score was far higher than the ALVARADO score in terms of diagnostic accuracy, positivity and negativity predictive values, specificity, sensitivity, and a p-value less than 0.005. Furthermore, as per Davis GN 2019 [19], the RIPASA score demonstrated superior sensitivity (96.7%), specificity (93.0%), PPV (94.8%), and NPV (95.54%). Previous research has shown that the RIPASA score can increase the accuracy, specificity, and precision of diagnostic tests [20,21].

To diagnose acute appendicitis, however, no laboratory test or diagnostic score system is 100% accurate. A higher RIPASA and ALVARADO score is closely linked to the accuracy of detecting acute appendicitis, according to the results of our study. Compared to ALVARADO, the RIPASA grading system is more dependable and can be used to determine whether to treat patients conservatively or with surgery. Surgery should be used to treat patients with a score of 7.5 or higher who are suspected of having acute appendicitis. Conservative treatment and ongoing monitoring are recommended for patients with a score of seven or lower. Surgery will be performed on the patient if the score is 7.5 or higher. If the patient's scor e is less than 5, they will be released from the hospital and told to return right away if their symptoms worsen or continue.

5. CONCLUSION

We found that compared to the ALVARADO score, the RIPASA score is better in predicting cases of acute appendicitis.

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