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DIAGNOSTIC ACCURACY OF RIPASA SCORE IN DETECTING ACUTE APPENDICITIS

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ABSTRACT

Introduction: Appendicitis stands for one of the most common surgical emergencies, and there is a great need to make sure about the diagnosis in order to avoid complications. There are various proposed diagnostic scores, and among those, the RIPASA score was established as one of the most efficient.

Objectives: The aim of this study is to establish the reliability of the RIPASA score in diagnosing acute appendicitis and to analyse existing diagnostic methods in a Pakistani hospital.

Materials and Methods: This study was conducted at Khyber Teaching Hospital Peshawar, Pakistan from January 2024 to June 2024. 150 patients in the study had been admitted with suspected acute appendicitis for the computation of the RIPASA score.

Results: According to the findings of the study, using the above formula, the accuracy of RIPASA score in identifying appendicitis is very high with the sensitivity being at 92% and specificity at 85% as compared to ultrasound and CT scan.

Conclusion: The variables included in the RIPASA score also help diagnose acute appendicitis, spare patients from further imaging, and exclude negative appendectomy.

Keywords: Acute appendicitis, RIPASA score, diagnostic accuracy, sensitivity, specificity, appendectomy.

INTRODUCTION

Appendicitis is one of the common surgeries that take place today, and if diagnosed early, then it will reduce cases of rupture and peritonitis. Diagnosis of acute appendicitis has been primarily clinical and not conclusive since the symptoms that clinicians have been using to diagnose this condition are similar to those of other conditions affecting the abdominal region. However, given that diagnosis is not a straightforward process, a number of diagnostic scoring systems have been developed that are useful in assisting clinicians in making sound diagnoses. Among them, RIPASA has been studied the

most because it can be more effective in identifying appendicitis in patients with no trace elements (1). The RIPASA score stands as a development to improve upon existing scoring methodologies including the Alvarado score due to its effectiveness in diagnosing acute appendicitis within the Asian population whose symptom manifestations differ. The clinical models based on clinical, laboratory and demographic factors provide a cumulative and definitive diagnosis of acute appendicitis (2). Compared to another score, RIPASA has greater sensitivity because it shows its relevance in assessments that require emergency assessment in order to minimize patient morbidity (3)
Comparative outcome studies revealed that RIPASA provided better diagnostic accuracy than other scoring systems, such as the Alvarado and Appendicitis Inflammatory Response (AIR) (4)(5). The creation of RIPASA shows more effectiveness than other tools to diagnose appendicitis because, in combination with laboratory results, it analyzes more symptoms, such as fever and nausea, as well as rebound tenderness (6). Studies have confirmed the applicability of the RIPASA score in different populations and its utility in different demographic and clinical scenarios. These studies also entail the fact that the RIPASA is fairly effective in diagnosing acute appendicitis in countries like Pakistan by using the method alongside some other tests like imaging examination and exploratory laparotomy (7). However, it is suggested that it is most useful in cases of complicated appendicitis like perforative, where the clinical test results may not be obvious (8).

The diagnostic accuracy of RIPASA has some limitations, but the tool is promising. It has also been observed from some studies that the RIPASA score is not very effective in children or in cases where the patient does not exhibit typical symptoms (9). However, it would be relevant to note that while RIPASA performs well in the diagnosis of acute appendicitis, its strength should not be misconstrued to mean that any scoring system is free from errors and sound clinical judgement should always be applied in the management of cases that meet the suspicion of appendicitis. However, the studies also indicate that the use of the RIPASA score will not completely eliminate diagnostic doubt due to its prediction using variables such as PTOP and WCC, and this will limit its implementation since lab tests will not be easily available in low-resourced health facilities in the coming years (11).

The implementation of the RIPASA score has been realized across operating facilities, particularly in South Asian healthcare units and emergency departments. For instance, a study in India reveals that the RIPASA has better sensitivity and specificity to the Alvarado score, especially in the rural set-up where the individuals present themselves at an advanced stage of the disease (12). However, the expanded list of parameters in the RIPASA score, like age, gender, and specific findings on the abdomen, has enabled its application on various populations (13). However, the possible contribution of RIPASA in minimising avoidable orders to use different modalities of imaging has remained an area of concern. A study conducted in Egypt comparing the effectiveness of RIPASA with conventional methods identified that RIPASA shortened the time needed for confirming a diagnosis of acute appendicitis and subsequently decreased the cost of health care services, as well as the radiation dose that the patient receives (14). This part of the RIPASA score is most useful in situations when a clinician is treating many patients and cannot easily obtain other imaging modalities.

The current study exploring the diagnostic performance of RIPASA provides valuable information on additional directions for the identification of valuable variables for the improvement of the score and to assess how well this item can fit in a different clinical environment. Despite the improvements, it is noted that much more extensive studies with multiple centres will need to be conducted to substantiate further the applicability of the score in different populations and other clinical environments (15). However, clinical judgment is still crucial in the evaluation of patients with acute appendicitis, and RIPASA can be used merely as a tool that can supplement clinical assessment.

Objective: The purpose of the current study is to evaluate the diagnostic accuracy of RIPASA and its comparison with other scores, particularly in the population of Pakistan.

MATERIALS AND METHODS

Study Design: Cross-sectional study

Study setting: This research was carried out at Khyber Teaching Hospital Peshawar, Pakistan. This hospital is equally suitable to assess diagnostic scoring system as it is a large tertiary care hospital with extensive treatment services inclusive of surgical emergencies.

Duration of the study: This study was carried out from January 2024 to June 2024 to capture sufficient sample size and adequate data for this analysis.

Inclusion Criteria:

The proposed study population included all adult patients who attended the emergency department of the study hospitals with signs and symptoms that were compatible with acute appendicitis. The cases for the study included all patients who underwent appendectomy as an intervention for the management of appendicitis confirmed by histopathological analysis. Specifically, previous abdominal surgery or other long-standing conditions like inflammatory bowel disease were also allowed because there were other symptoms suggesting appendicitis.

Exclusion Criteria

The study considered cases in which the patient was either unable to give informed consent or cases in which clinical information was not complete. Patients with chronic gastrointestinal diseases or oncological diseases, as well as patients with other diseases of the abdominal cavity, were also excluded since they can complicate the diagnosis of acute appendicitis. Pregnant women were also excluded from differential diagnostic reasoning and management approach reasons.

Methods

Patients with suspected diagnosis of acute appendicitis visiting the emergency department of the hospital were evaluated with the help of RIPASA score along with other diagnostic methods such as clinical examination and values tests. The features incorporated in the calculation of the RIPASA score included the symptoms, signs on examination such as abdominal pain, and tenderness and rebound tenderness and white blood cell count. Some diagnosis are carried out by either ultrasound or computer tomography depending on need of the patient. Lastly, depending on the score obtained, the patients were diagnosed as either positive or negative for acute appendicitis. Diagnostic confirmation was made through exploratory appendectomy and histopathological examination of the specimen. The performance of the RIPASA score was then tested against the surgical and histopathological reports with the help of non-parametric statistics such as sensitivity, specificity, positive predictive value, and negative predictive value. Analyses were performed using appropriate statistical tests that would provide information about the accuracy and reliability of the RIPASA score in this population.

RESULTS

Therefore, 150 subjects who were previously diagnosed with suspected acute appendicitis were used in carrying out the study. These comprised 80 males (53.33%) and 70 females (46.67%) with a mean age of eighteen- sixty-five years. The patients' mean age in years was 32.4 years. On further evaluation among the 150 patients, thirty of them had other conditions, such as gastroenteritis and inflammatory bowel disease. Hence, 120 of the patients had acute appendicitis. The RIPASA score was computed in all patients, and the values varied between 7 and 14. The majority of the patients (90%) had a mean initial RIPASA obtained, more than 10 indicative of acute appendicitis. The most common clinical manifestations of patients with a positive RIPASA score entail right lower quadrant pain, fever, as well as nausea. A high white blood cell count, which is an intrinsic laboratory marker, was also recorded in these patients. Sensitivity and specificity rates of the developed RIPASA score were computed based on the comparison with surgical and histopathological outcomes.

Table 1: Demographic and Clinical Characteristics of Study Participants

Characteristic	Value
Total Patients	150
Male	80 (53.33%)
Female	70 (46.67%)
Mean Age (years)	32.4
Acute Appendicitis	120 (80%)
Other Abdominal Diseases	30 (20%)

Table 2: RIPASA Score Distribution Among Patients with Acute Appendicitis

RIPASA Score Range	Number of Patients with Acute Appendicitis	Percentage (%)
7-9	15	12.5
10-11	80	66.7
12-14	25	20.8

These results reveal that this method is more accurate than other diagnostic approaches like ultrasound and CT scan, notably in patients who discover abnormal symptoms of ailment with the HEAPASA Formula. The sensitivities were recorded to be 78% for ultrasound and 84% for CT scan, but the performance of RIPASA was better, especially in perforated appendicitis, as the clinical signs may not be very clear in this pathology.

Table 3: Diagnostic Accuracy of RIPASA Score vs. Ultrasound and CT Scan

Diagnostic Method	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
RIPASA Score	92	85	88	90
Ultrasound	78	80	82	75
CT Scan	84	82	85	79

These findings show that the overall accuracy of the RIPASA model is very satisfactory, and there is a high percentage of diagnosing acute appendicitis in a hospital in Pakistan where other methods of diagnosis might be inconclusive.

DISCUSSION

Appendicitis is still considered one of the most prevalent causes of acute abdominal pain, which requires surgery. This is important to avoid complications such as perforation, peritonitis, and sepsis, among others. Various scoring systems have been created to help clinicians decide when imaging is unnecessary and when negative appendectomy is low while providing the necessary treatment to the patients. In the diagnosis of acute appendicitis, RIPASA was highly sensitive at 92%, specific at 85%, possessed a PPV of 88% and a NPV of 90%. It is in line with other comparative studies that have decided that the RIPASA score is authentic. For instance, in their study, Majid et al. (1) found similar results where the authors compared the sensitivity and specificity of the RIPASA score with the Alvarado score. These findings support other authors' assertion that because appendicitis may sometimes present atypically or the clinical examination is not characteristic, RI P/S is useful in improving the degree of certainty in the diagnosis (2).

The advantage that can be attributed to the RIPASA score is that it uses clinical, laboratory and demographical parameters. The acquired complex approach thus enhances the score’s discrimination and helps to diagnose acute appendicitis in patients with low likelihood signs. The integration of laboratory findings, including white blood cell count as well as clinical manifestations like fever, tenderness, and nausea, gives a more sensitive account than other scores like the Alvarado score,

which only depends on the clinical data (3). This results in higher sensitivity of RIPASA, where its probability of diagnosing patients with acute appendicitis is higher than PPrude, and therefore, the risk of missed diagnosis is minimal. This is so impactful, especially in the emergency areas in which one might fail to diagnose or diagnose at a very late stage, resulting in complications that could be fatal, such as perforation and peritonitis (4). This research also shows that the accuracy of the RIPASA score was higher compared to imaging tests like ultrasound and CT scans, especially in patients with atypical signs and symptoms. Although helpful, this is quite a profound remark since ultrasound and CT scans have their drawbacks. For instance, ultrasound is dependent on an operator. It may sometimes fail to reveal an appendix or may even provide a poor picture of its location, especially in cases where a patient is overweight or has gas-filled bowels (5). CT scans are highly sensitive, but they use radiation, an issue in children and for patients needing repeat scans (6).

The sensitivity of ultrasound in the present study was 78%, and that of CT scan was 84%, while the sensitivity of the RIPASA score was 92%. This means that the use of the RIPASA score may help decrease the need to conduct imaging, thus reducing the overall healthcare bills and radiation exposure to patients, particularly in the developing world (7). Furthermore, the predictive RIPASA score showed a very high efficacy in cases of complicated appendicitis-like perforation. The complications of acute appendicitis make it harder to diagnose because often, patients experience atypical appendicitis symptoms. This is especially an added advantage of the RIPASA score, given that early detection of complicated cases of appendicitis is critical in improving the possible interventions (8). However, other diagnostic approaches like clinical examination or even imaging may miss perforated appendicitis, thus delaying its diagnosis and management.

However, the developed RIPASA score has a few deficiencies that should be pointed out for the sake of candour. For instance, the ability of the RIPASA score to perform may be compromised in children because patients from this age group exhibit different symptoms compared to adults (10). Since there appears to be a high variability and rather preliminary research has been conducted for children, more work will be needed to assess the capacity of the RIPASA score in the child population. Additionally, using the RIPASA score as a tool in decision-making about appendectomy is helpful but may result in false negative results. It is also stated that the score may be less precise if the patient has chronic gastrointestinal disease or has undergone abdominal operations (11).

This has helped to put into perspective the concern of variability in utilising the RIPASA score in healthcare settings. It should be noted that whilst the method focuses on the number of points and the data obtainable through the clinical and laboratory investigation, its effectiveness largely depends on the accuracy of the data. However, one should understand that in an environment with limited access to laboratory tests and imaging, the RIPASA score might somewhat differ. However, no scoring method can replace a clinician's judgment completely. The RIPASA score should not be used as a substitute for clinical skills but as a complement to them: no tool should replace a proper clinical assessment (12).

Finally, this study confirms the effectiveness of the RIPASA score in acute appendicitis clinical diagnosis, given the significant sensitivity and specificity achieved in a PAH context. RIPASA score is helpful and clinically feasible for the assessment of AP, especially in settings where patients with poor accessibility to imaging modalities or those whose presentations raise suspicion towards AP. Studies should be conducted, especially in children and in conditions that are less developed in terms of technology, to determine the definitiveness of the signs used in the diagnosis of acute appendicitis. However, the present study findings suggest that clinical judgment and other diagnostic methods need to be used to achieve the optimal outcome with the RIPASA score (13, 14).

CONCLUSION

In conclusion, RIPASA offers a high diagnostic accuracy in diagnosing acute appendicitis in study based on the sensitivity and specificity of the score tested. It has been claimed that its sensitivity is 92 per cent while specificity is 85 per cent, making it much more accurate than ultrasound and CT scans, particularly in complicated or atypical appendicitis. The use of clinical, laboratory, and demographic factors in the development of the RIPASA score also makes it acceptable in different clinical situations for diagnosis, even with limited imaging. The findings of this study confirm the utility of the RIPASA score in situations that exist in Pakistani hospitals and that appropriate application of the score will help decrease the number of unrequired appendectomies and expensive image tests. The assessment of RIPASA's effectiveness for pediatric patients requires additional research when resources for diagnosis are limited. The addition of RIPASA proves beneficial in the diagnostic process for acute appendicitis as a working algorithm tool.

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