A STUDY OF DIAGNOSTIC VALUES OF RIPASA SCORING SYSTEM AND ULTRASONOGRAPHY IN ACUTE APPENDICITIS

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Abstract

Background: Acute appendicitis (AA) poses a significant health risk, necessitating timely and accurate diagnosis to prevent complications. Despite advancements in imaging and diagnostic techniques, the clinical diagnosis remains pivotal. Various scoring systems, including RIPASA, have emerged to support diagnosis, alongside imaging modalities like ultrasonography (USG). This study systematically evaluates and compares the diagnostic accuracy of the RIPASA scoring system with USG in the clinical diagnosis of acute appendicitis.

Methods: A prospective study involving 100 patients with acute abdominal pain and a provisional diagnosis of acute appendicitis was conducted over one year. The RIPASA scoring system was utilized, and diagnoses were confirmed through histopathological examination (HPE), serving as the gold standard. Data were analyzed using IBM SPSS Statistics (2015), computing sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). Inclusion criteria encompassed right iliac fossa pain, provisional AA diagnosis, willingness for surgery, and study consent. Exclusion criteria included appendicular mass or abscess and generalized peritonitis. Sampling utilized a purposive approach with convenience sampling, and ethical considerations were observed.

Results: Ultrasonography findings revealed various appendiceal abnormalities in 59 out of 100 patients. The tripartite comparison (RIPASA, USG, and HPE) demonstrated that RIPASA outperformed USG, exhibiting higher sensitivity (0.82 vs. 0.75), specificity (0.57 vs. 0.42), accuracy (0.79 vs. 0.71), PPV (0.92 vs. 0.86), and NPV (0.35 vs. 0.24). The bipartite comparison further underscored RIPASA's superiority across all metrics.

CONCLUSION:

RIPASA scoring is a good indicator of the severity of acute appendicitis and helps is guiding better prognosis.

KEY WORDS: RIPASA score, Ultrasonography, acute appendicitis, histopathology

Introduction

Acute appendicitis (AA) poses a significant health risk with a lifetime incidence of 6-7%, making it the most prevalent cause of acute abdominal pain localized to the right iliac fossa. Recognized as a medical urgency, AA represents a diagnostic challenge, and its timely identification is crucial to prevent complications, such as perforation, which can escalate morbidity and mortality rates. Surgeons often adopt a proactive approach, opting for appendectomy based on a probable diagnosis rather than risking delayed intervention [1].

Despite advances in radiographic imaging and diagnostic laboratory techniques, the diagnosis of appendicitis remains primarily clinical, as highlighted by the dictum established by Harvard pathologist Reginald Fitz in 1886. The propensity for negative appendectomy (NA), even with rates as high as 30%, persists globally as a strategy to avert the dire consequences of untreated AA complications [2].

While routine history and physical examination remain effective diagnostic tools, efforts to reduce NA rates have led to the development of various scoring systems supporting AA diagnosis. Among these, the RIPASA (The Raja Isteri Pengiran Anak Saleha Appendicitis score) and Alvarado scoring systems, often complemented by imaging modalities such as CT scan, ultrasonography, and laparoscopy, aim to enhance diagnostic accuracy [3].

The Alvarado scale, originally proposed in 1986 with modifications over the years, has been widely used but faces challenges, particularly in females, where its predictive efficacy is questioned. In contrast, the RIPASA score has demonstrated superior sensitivity (88%) and specificity (67%) in certain populations, outperforming the Alvarado score in retrospective studies. This raises the question of the comparative accuracy of the RIPASA scoring system against ultrasonography (USG) for the clinical diagnosis of AA [4].

In light of this, our study seeks to contribute to the existing body of knowledge by systematically evaluating and comparing the diagnostic accuracy of the RIPASA scoring system with ultrasonography in the clinical diagnosis of acute appendicitis. By exploring these diagnostic modalities and their respective performances, our research aims to provide valuable insights that may inform clinical decision-making and contribute to the ongoing efforts to optimize diagnostic approaches for AA.

Materials and Methods

Study Design: This prospective study spanned a period of 1 year and aimed to evaluate 100 patients presenting with acute abdominal pain and a provisional diagnosis of acute appendicitis. The assessment involved utilizing the RIPASA scoring system and subsequently confirming the diagnosis through histopathological examination (HPE).

Data Collection and Analysis: Patient data were collected and analyzed using IBM SPSS Statistics (2015). Key parameters, including sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV), were computed to compare the diagnostic accuracy of the RIPASA scoring system against the gold standard of HPE.

Gold Standard for Diagnosis: Histopathological examination (HPE) was established as the gold standard for confirming the diagnosis of acute appendicitis. This rigorous and established method provided a reliable benchmark against which the diagnostic efficacy of the RIPASA scoring system could be assessed.

Inclusion Criteria: Patients meeting the following criteria were included in the study:
- Presentation with right iliac fossa pain.
- Provisional diagnosis of acute appendicitis.
- Willingness to undergo surgery.
- Consent for participation in the study.

Exclusion Criteria: Patients presenting with the following conditions were excluded from the study:

- Appendicular mass or abscess.
- Generalized peritonitis.

Sampling Method: A purposive (non-probabilistic) sampling approach was employed due to the undefined population pool. Additionally, convenience sampling was integrated, focusing on individuals who visited the designated hospital within the specified time frame. In total, 100 individuals were selected for inclusion in the study.

Ethical Considerations: The study adhered to ethical principles, ensuring patient confidentiality, informed consent, and compliance with institutional guidelines. Ethical approval was obtained from the relevant institutional review board before the commencement of the study.

Data Analysis: Statistical analyses were performed using IBM SPSS Statistics (2015). Sensitivity, specificity, positive predictive value, and negative predictive value were computed, allowing for a comprehensive and comparative assessment of the diagnostic accuracy of the RIPASA scoring system against HPE.

This methodologically sound approach aimed to contribute robust evidence regarding the performance of the RIPASA scoring system in the diagnosis of acute appendicitis, providing valuable insights for clinical decision-making and enhancing patient care.

Results

Ultrasonography (USG) Findings:

The majority of patients (59 out of 100) exhibited positive findings on USG, indicating the presence of appendiceal abnormalities. Other findings included cases of secondarily inflamed appendix (11), sub-acute appendicitis (4), probe tenderness (3), and normal appendix (2).

Tripartite Comparison (RIPASA, USG, and HPE):

Out of 100 patients, 86 were confirmed cases of acute appendicitis (P) based on the gold standard histopathological examination (HPE), while 14 were negative (N). RIPASA identified 71 true positive (TP) cases and 8 false positives (FP), resulting in 77 positive RIPASA cases (PR). In comparison, USG identified 65 true positive cases and 8 false positives, resulting in 75 positive USG cases (PU).

Bipartite Comparison (RIPASA vs. USG):

In terms of statistical attributes, RIPASA demonstrated better performance than USG across all metrics. The sensitivity of RIPASA (0.82) surpassed that of USG (0.75), indicating a higher ability to correctly identify true positive cases. Similarly, RIPASA exhibited higher specificity (0.57) compared to USG (0.42), highlighting its proficiency in correctly identifying true negative cases. The overall accuracy of RIPASA (0.79) exceeded that of USG (0.71). Additionally, the positive predictive value (precision) of RIPASA (0.92) outperformed USG (0.86), signifying a higher precision in identifying true positive cases. Conversely, RIPASA demonstrated a higher negative predictive value (0.35) compared to USG (0.24), indicating its efficacy in correctly identifying true negative cases.These results collectively suggest that the RIPASA scoring system exhibits superior diagnostic accuracy compared to Ultrasonography in the clinicaldiagnosis of acute appendicitis within the studied patient population.

TABLE.1: USG FINDING OF APPENDIX

Positive	59
Secondarily inflamed	11
Sub-acute appendicitis	4

Probe tenderness	3
Normal	2

TABLE.2: TRIPARTITE COMPARISON (RIPASA, USG AND HPE)

	RIPASA	USG Finding	HPE
Positive	71 TP, 15 FN	65 TP, 21 FN	86 P
Negative	08 TN, 06 FP	06 TN, 08 FP	14 N
Total	$P_R = 77$, $N_R = 23$	$P_U = 75$, $N_U = 25$	n=100

TABLE.3: BIPARTITE COMPARISON (RIPASA VERSUS USG)

Statistical Attribute	RIPASA	USG
Sensitivity	71/86 = 0.82	65/86 = 0.75
Specificity	8/14 = 0.57	6/14 = 0.42
Accuracy	79/100 = 0.79	71/100 = 0.71
Positive Predictive value = Precision	71/77 = 0.92	65/75 = 0.86
Negative predictive value	8/23 = 0.35	6/25 = 0.24

Discussion:

In our study, acute appendicitis (AA) was diligently considered in the differential diagnosis of every case presenting with acute abdominal pain. Early diagnosis was predominantly achieved through meticulous history-taking and clinical examination. The classic clinical presentation of periumbilical pain, transitioning to right iliac fossa pain accompanied by nausea, vomiting, anorexia, fever, and leukocytosis, aligns with the established clinical hallmark of acute appendicitis [5].

Ultrasonography (USG) Findings: Ultrasonographic findings consistent with appendicitis included an appendix with an anteroposterior diameter of 7 mm or more, presenting as a thick-walled, non-compressible luminal structure. Additional supportive findings encompassed aperistaltic, non-compressible, dilated appendix (>6 mm outer diameter), appendicolith, distinct appendiceal wall layers, echogenic prominent pericaecal and periappendiceal fat, periappendiceal hyperechoic structure, periappendiceal fluid collection, target appearance in axial section, and periappendiceal reactive nodal prominence/enlargement [6].

Comparison of Diagnostic Modalities: Table 3 delineates the tripartite comparison among the gold standard histopathological examination (HPE), the RIPASA scoring system, and Ultrasonography (USG). Out of 60 patients, 50 were confirmed cases of acute appendicitis based on HPE, while the remaining 10 were negative. The RIPASA scoring system identified 45 true positive cases, with 5 false negatives, and demonstrated better performance than USG, which identified 42 true positive cases with 8 false negatives [7].

Statistically, RIPASA outperformed USG across key attributes. Notably, RIPASA exhibited higher sensitivity (0.90 vs. 0.84), specificity (0.30 vs. 0.20), accuracy (0.80 vs. 0.73), negative predictive value (0.38 vs. 0.25), and positive predictive value (precision) (0.87 vs. 0.84). These results suggest that the RIPASA scoring system is more adept at correctly identifying both positive and negative cases compared to Ultrasonography in our studied patient population.

Limitations and Considerations: The small sample size, attributed to limited reach and duration, imposes constraints on the generalizability of the study results. Given these limitations, further statistical tests such as t-tests were not applied, and caution is warranted when extrapolating the findings to larger and more diverse populations.

Conclusion:

In conclusion, our study emphasizes the diagnostic superiority of the RIPASA scoring system over Ultrasonography in the context of acute appendicitis within the studied cohort. The results advocate for the continued exploration and refinement of diagnostic approaches, acknowledging the inherent complexities of appendiceal pathology. Future studies with larger and more diverse populations are warranted to corroborate and extend the implications of our findings.

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