



EVALUATION OF RIPASA SCORING SYSTEM FOR DIAGNOSIS OF ACUTE APPENDICITIS.

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ABSTRACT... Objectives: To evaluate the role of RIPASA scoring system for diagnosis of acute appendicitis taking histopathology as gold standard. **Study Design:** Prospective Study. **Setting:** Department of General Surgery, Nishter Hospital Multan. **Period:** February 2016 to February 2017. **Material & Methods:** One hundred and sixty 160 patients were included in this study. Study was started after ethical approval from ethical board of institution and informed consent from patients was taken. Non probability consecutive sampling was used. Main outcome variables were sensitivity, specificity and diagnostic accuracy of RIPASA score. SPSS version was used to analyze data. P value ≤ 0.05 was considered as significant. **Results:** Estimated sensitivity was 97.9%, which means that of the patients with acute appendicitis, 97.9% were diagnosed correctly. The estimated specificity was 76.9%, which means that of the patients not having acute appendicitis, 76.9% were diagnosed correctly. Positive predictive value was 86.1% and negative predictive value was 96.2%. The overall accuracy was 89.4% for diagnosing acute appendicitis. **Conclusion:** RIPASA scoring system is efficient, reliable and more diagnostic in cases of acute appendicitis. Abdominal ultrasonography is not suitable diagnostic tool to rule out negative appendectomy.

Key words: Acute Appendicitis, Diagnostic Accuracy, Histopathology, Predictive Value, RIPASA Score.

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INTRODUCTION

In clinical practice acute appendicitis is a common surgical emergency with prevalence rate of 1 in 7 patient's approximately.¹ Incidence of acute appendicitis is more in male 1.4 to 1.9 than in female 1.4 in 1000 people. Clinical history and examination is sufficient for its diagnosis but sometime total leukocyte count is also helpful.² In some cases diagnosis is difficult despite it's a common problem in health sector especially in adult, young and reproductive female because host of another gynecological and genitourinary tract may present with similar symptoms.^{3,4}

In many previous studies authors concluded that negative appendectomy is a better option than the fear of perforation which is a more serious complication.⁵ Diagnostic accuracy may be improved with use of computed tomography and ultrasonography but here is another risk of early appendectomy which can be resolved

conservatively.⁶ Many diagnostic criteria and scoring system have been introduced for fast and accurate diagnosis of acute appendicitis in cheapest and economical way.⁷ Among them Alvarado's and modified Alvarado's scoring system are most common and reliable systems with sensitivity and specificity of 53-88% and 75-80% respectively.

Another scoring system Raja Isteri Penigran Anak Saleha Appendicitis RIPASA score is available now. Ripasa consist of 14 fix clinical parameters.⁸ Among these 14 parameters 2 demographic, 5 clinical signs two clinical investigation 5 clinical symptoms and 1 for foreign nationality bearing personals.⁹ In a recent study conducted by Chong SG et al¹⁰ used RIPASA scoring system for diagnosis of acute appendicitis and reported sensitivity and specificity 88% and 63% respectively and diagnostic accuracy was 81%.

This type of scoring system was developed in western settings¹¹, specificity and sensitivity of RIPASA scoring may be changed when applied in different environment like Asian and specifically in subcontinent region.

Aim of this study is to evaluate sensitivity and specificity of RIPASA scoring system to facilitate the health care providers in emergency department by taking histopathology as gold standard. This scoring system helps to minimize the risk of wrong appendectomy.

MATERIAL & METHODS

Study was conducted in the department of general surgery Nishtar hospital, Multan from February 2016 to February 2017. Study was started after ethical approval from ethical board of institution and informed consent from patients was taken. Non probability consecutive sampling was used. Patients of all age groups presented with pain in right iliac fossa in emergency department were included in the study. Patients with non RIF pain or admitted in other wards with other disease and suddenly present with RIF were excluded in the study.

RIPASA score evaluation was done by completing pre designed score sheet. Score sheet does not consist of actual numbers but surgeon will and evaluation was included to avoid bias. Patients were seen by SMO in emergency ward and then surgeon evaluation were done in surgical ward after admission and shifting of patients. RIPASA scoring was assessed by and SMO with 5 year clinical experience. Score evaluation was done on daily basis before routine round up of professor till decision of appendectomy or conservative treatment. Completed performa was submitted to person who is unaware of study rules.

Patients demographic data date of admission, date of appendectomy if done, surgeon satisfaction and signature, detail of radiological investigation post operative complications, date of discharge and histology funding was recorded. Histopathological finding again reviewed and confirmed by senior pathologist. Patients who treated conservatively and reevaluated and

in surgical unit and discharged. Patients with true negative RIPASA were contacted later and readmission was not done they were operated in emergency department. Their appendix sent to pathology department for confirmation of appendectomy.

Data was entered in SPSS version 23 software and analyzed for all possible variables. Frequency percentages were calculated for qualitative data like gender, confirm appendix, normal appendix, and post operative complications. Mean and standard deviation were calculated for quantitative variable like age. Student t-test and chi square test was applied to see association between variables. P value less than or equal to 0.05 was considered as significant.

RESULTS

One hundred and sixty patients were included in this study. The mean age and hospital stay of the patients was 28.05 ± 3.16 years and 5.62 ± 1.99 days respectively. Gender distribution showed that there were more males than females i.e. n=92 (57.5%) and n=68 (42.5%), respectively. Clinical suspicion of acute appendicitis was observed inn=114 (71.3%) patients. Laparoscopic appendicectomy and open appendicectomy was noted inn=34 (21.3%) and n=126 (78.8%) patients, respectively. Confirmed appendicitis was found in n=93 (58.1%) patients and normal appendix was found in n=67 (41.9%) patients. Post-operative complications i.e. superficial wound infection, bowel obstruction and haematuria secondary to urinary catheter was observed in n=9 (5.6%), n=11 (6.9%) and n=2 (1.3%), respectively. (Table-I).

It was observed that 93 patients with acute appendicitis on gold standard as well as on histology, labeled as true positive. 2 patients with acute appendicitis on gold standard but absent on histology, labeled as false positive. 50 patients with no acute appendicitis on gold standard as well as on histology, labeled as true negative. 15 Patients with no acute appendicitis on gold standard but present on histology, labeled as false negative. (Table-II)

Therefore, the estimated sensitivity was 97.9%, which means that of the patients with acute appendicitis, 97.9% were diagnosed correctly. The estimated specificity was 76.9%, which means that of the patients not having acute appendicitis, 76.9% were diagnosed correctly. Positive predictive value was 86.1% and negative predictive value was 96.2%. The overall accuracy was 89.4% for diagnosing acute appendicitis. (Table-III)

Patient Characteristics	Score
Gender	
Female	0.5
Male	1.0
Age	
<40 yrs	1.0
>40 yrs	0.5
Symptoms	
RIF Pain	0.5
Pain migration to RIF	0.5
Anorexia	1.0
Nausea and vomiting	1.0
Duration of Symptoms	
<48 hours	1.0
>48 hours	0.5
Signs	
RIF tenderness	1.0
Guarding	2.0
Rebound tenderness	1.0
Rovsing's Sign	2.0
Fever >37C, <39C	1.0
Investigations	
Raised WCC	1.0
Negative urinalysis	1.0
Total	16.5
RIPASA Scoring System.	

Variable	Presence
Mean age (years)	28.05±3.16
Mean Hospital stay (days)	5.62±1.99
Gender	
Male	n=92 (57.5%)
Female	n=68 (42.5%)
Admission diagnosis	
Clinical suspicion of acute appendicitis	n=114 (71.3%)
None appendicitis	
Operative Details	
Laparoscopic appendectomy	n=34 (21.3%)
Open appendectomy	n=126 (78.8%)
Histology Findings	
Confirmed appendicitis	n=93 (58.1%)
Normal appendix	n=67 (41.9%)
Post-operative Complications	
Superficial wound infection	n=9 (5.6%)
Bowel obstruction	n=11 (6.9%)
Haematuria secondary to urinary catheter	n=2 (1.3%)
Table-I.	

Histology findings	Gold Standard		Total
	Yes	No	
Confirmed appendicitis	True Positive=93	False Positive=2	95
Normal appendix	False Negative=15	True Negative=50	65
Total	108	52	160
Table-II.			

Diagnostic Accuracy	Findings
Sensitivity	97.9%
Specificity	76.9%
Positive predictive value (PPV)	86.1%
Negative predictive value (NPV)	96.2%
Accuracy	89.4%
Table-III.	

DISCUSSION

Many comparative studies were conducted between RIPASA and other scoring systems such as Alvarado scoring system for diagnosis of acute appendicitis.¹² Diagnostic accuracy of RIPASA was also evaluated by taking histopathology and CT as gold standard. In our study we used histopathology as gold standard and observed sensitivity 97.9%, specificity 76.9% and accuracy was 89.4%.

In a study conducted by Chong CF et al¹⁰ and reported sensitivity 97.5%, specificity 81.8% and accuracy of 91.8% which shows that RIPASA score is a more accurate reliable and useful scoring system in diagnosis of acute appendicitis. RIPASA can be used to diagnosis acute appendicitis with minimum fear of negative appendectomy. In another study Malik MU et al¹³ compared RIPASA with Alvarado's scoring system and reported that RIPASA is accurate, reliable and convenient as compared to Alvarado's scoring system.

Here is another study conducted by Díaz-Barrientos CZ et al¹⁴ and reported some different results which were controversial to our study. He reported that RIPASA has no benefits over Alvarado scoring system when applied on suspected cases of acute appendicitis. He reported sensitivity and specificity of RIPASA as 93.3% and 8.3% on other hand Alvarado sensitivity and specificity was 75%

and 41.6%.

Butt MQ et al¹⁵ in a study reported that RIPASA scoring system is a useful tool when used at cut of value 7.5 for acute appendicitis diagnosis. Results of his study show sensitivity 967%, specificity 93.0% and diagnostic accuracy of 95.1%. Raikwar RS et al¹⁶ reported that there was no difference between RIPASA and Alvarado scoring system when compared in terms of sensitivity and specificity. Sensitivity of RIPASA was 98.42% and specificity was 90%, sensitivity of Alvarado scoring is 73.7% and specificity was 80%. He concluded that both scoring systems a almost equally effective for diagnosis of acute appendicitis.

Nancharaiah P et al¹⁷ conducted a study comparison of RIPASA and Alvarado scoring system and reported that RIPASA reduces rate of negative appendectomies to a significant range when compared with Alvarado. In routine practice RIPASA scoring system can be used successfully for decision making of appendectomy. It is simple in use accurate and reliable in every environment. Alnjadat I et al¹⁸ conducted a comparative study between RIPASA scorign and Alvarado scoring and reported that both systems are equally effective in reduction of negative appendectomies, butt RIPASA diagnosed more cases that can be missed with Alvarado scoring system. Results of these studies can be compared with our results.

In another study conducted by *Pasumarthi V et al*¹⁹ reported that RIPASA scoring system is more useful tool for acute appendicitis as compared to Alvarado scoring system. He reported sensitivity and specificity of Alvarado as 52.08% and 80% respectively and diagnostic accuracy was 56.9%. Similarly sensitivity and specificity of RIPASA was 75% and 56% respectively. Diagnostic accuracy was 73.28%.

Subramani B et al²⁰ and Karan M et al²¹ also reported similar findings that RIPASA scoring system is accurate, reliable and effective diagnostic criteria for diagnosis of acute appendicitis. RIPASA scoring system is more effective than any other

scoring system used for reduction of negative appendectomy rate. These two studies are also comparable with our study.

CONCLUSION

Results of our study reveal that RIPASA scoring system is efficient, reliable and more diagnostic in cases of acute appendicitis. Abdominal ultrasonography is not suitable diagnostic tool to rule out negative appendectomy.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Shabbir Ahmed	Data collection, Literature review.	
3	M. Fazal ur Rehman	Manuscript writing, Data analysis.	