To Evaluate Use of Combined Modified Ripasa Scoring and Ultrasonography to Improve Diagnostic Accuracy in Acute Appendicitis

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Introduction

Acute appendicitis is a common cause of abdominal pain for which a prompt diagnosis and treatment is rewarded by a marked decrease in morbidity and mortality. Routine history and examination both remain the most effective and practical diagnostic modalities.\(^1\) Acute appendicitis is associated with raised TLC. It is raised in other inflammatory conditions also, making its role only supportive in the diagnosis of acute appendicitis.\(^2\)

There is limited role of Xrays in the diagnosis of acute appendicitis. It may rule out other causes of acute abdomen such as bowel perforation. Ultrasound is operator dependent and often misses or over diagnose the condition.\(^3\) CECT scan is the investigation of choice with high sensitivity and specificity for diagnosis but is expensive and not available at all centers particularly in developing countries, like India.\(^4,5\) Recent reports suggest that the indiscriminate use of CT scans may lead to detection of low grade appendicitis that would otherwise have resolved spontaneously.\(^6,7,8\)

There has been a need of some scoring system that can overcome these problems, with good sensitivity and specificity and acceptable negative appendicectomies on exploration. One of the common scoring system is Alvarado system which is based on clinical and laboratory evidence of acute appendicitis, includes pain migration to RIF, anorexia, nausea and vomiting, tenderness, rebound tenderness, fever, leucocytosis and shift of WBC to the left.\(^9\) The reported sensitivity and specificity for the Alvarado and the modified Alvarado scores range from 53%–88% and 75%–80%, respectively. However, these scoring systems were developed in western countries, and several studies have reported very low sensitivity and specificity when these scores are applied to a population with a completely different ethnic origin and diet.\(^10,11\)

In 2010 a new scoring system was developed at Department of Surgery, Raja Isteri Pengiran Anak Saleha Hospital, Brunei Darussalam and named after hospital name, with calculated sensitivity and specificity of 88.46% (95% confidence interval 83.94%–92.08%) and 66.67% (95% Confidence interval 52.08%–79.24%), respectively.\(^12\)

Hence this study is designed to evaluate the use of modified Ripasa score along with ultrasonography to diagnose acute appendicitis in preopera and accuracy of it will be evaluated by operative findings and postoperative histopathological examination.
Aim and Objectives
1. To evaluate combined use of Modified ripasa score and ultrasonography in increasing diagnostic accuracy in cases of Acute appendicitis
2. To Compare the Combined score with operative findings and histopathology reports.

Materials and Methods
Tools and techniques
Site of study
Study will be conducted at Jaipur golden Hospital, 265 bedded muti- speciality tertiary care hospital.

Type and Duration of Study -
The study will be a prospective analysis of symptomatic patients with right iliac fossa pain, who have failed to improve even after sufficient conservative treatment and then presented in Jaipur golden hospital with complaints of right iliac foss pain. All cases treated upto December 2012 in this manner and qualifying the criteria will be included in this study

Sample size and study population
A minimum of sixty cases will be included in this study, with a minimum follow up of 3 months.

Data collection tools and techniques
Data will be gathered on clinical, radiological, histopathological and follow up examination according to the proforma attached. This will be tabulated; results and conclusion will be then obtained.

Inclusion Criteria
1. Age of patient 10-60 years. Either sex.
2. All Patients of suspected acute appendicitis

Exclusion Criteria
1. Age of patient not between 10-60 years.
2. Patients of blunt trauma abdomen with right iliac fossa pain
3. Patients with history of appendectomy

Methodology
For the purpose of this study we will follow patients who present with complaints of right iliac fossa pain at Jaipur Golden Hospital New Delhi. Clinical history with clinical examination, and radiological record of patient will be taken according to the proforma attached. Diagnosis will be confirmed by operative findings and post operative histopathological examination reports and usefulness of modified ripasa score with ultrasonography in diagnosis of acute appendicitis will be evaluated.

Results and Observation
In our study 36.7% of patients were in the age group of 21-30 years followed by 25 % of patients who were in the age group of 10-20 years.
In our study 73.3% of patients were male suggesting incidence of acute appendicitis is more in male than female.
Migration of pain to right iliac fossa is seen in 36.7% of the patients in this study.
Nausea and vomiting is present in 66.7% of the patients in this study.
In our study loss of apetite is seen in only 26.7% of patients.
56.7% of all patients in this study presented with duration of more than 48 hours while rest 43.3% patients presented within 48 hours of symptoms.
Right iliac fossa tenderness was present in 91.7% of patients in our study.
Abdominal guarding is present in 25% of all patients in this study.
Rebound tenderness is present in 66.7% patients of this study and there was no rebound tenderness in 33.3% of patients.
In our study rovsing sign was found to be positive in 51.7% and was negative in 48.3% of all patients.
55% of patients included in this study was complaining of fever at the time of presentation and 45% of patients was afebrile.
Total leucocyte count was raised in 42 out of 60 (70% ) of the patients in our study.
Urine analysis of patient was negative in 45% of all patients involved in this study.
Ripasa score calculated on the basis of above clinical features and ROC curve is plotted, cut off threshold score was found to be 7.25. 84.2% patients who were positive on histopathology had RIPASA SCORE >= 7.25 and 15.8% who were positive for acute appendicitis on histopathology had RIPASA score <7.25. No patient was negative on histopathology with score >=7.25 score. All Patients with histopathology negative had score <7.25.

According to our study Modified RIPASA score has sensitivity, specificity, PPV, NPV and accuracy of 84.2%,100%,100%,25% and 85% respectively.

Ultrasound abdomen is done in all patients included in this study and 72% of patients were positive on ultrasound.

Histopathology is the gold standard for diagnosis in our study and 57 out of 60 (95%) patients were found to be positive on histopathological examination.

In our study, ultrasound has sensitivity, specificity, PPV, NPV and accuracy of 70.2%, 67%,98%,10.5% and 70% respectively.

On combining Modified RIPASA score and ultrasound, 98.2% were found positive and 1.8% patient was negative in all 57 patients who were positive on HPE. In 3 patients who were negative on HPE, 66.7% were negative on RIPASA+USG and 33.3% patients were positive on RIPASA +USG.

In our study Modified RIPASA and USG has sensitivity, specificity, PPV, NPV and accuracy of 98.2%, 66.7%, 98.2%, 66.7% and 96.7% respectively.

### Conclusions

1) Modified RIPASA score is an important tool for diagnosis of acute appendicitis with sensitivity of 84.2% as compared to RIPASA score study by Chong C F et al with sensitivity of 88.46%.

2) Modified RIPASA score is found to be more specific than RIPASA score by Chong C F et al.

3) Diagnostic accuracy of Modified RIPASA score is more (85%) than RIPASA score (80.5%).

4) ROC analysis depicts cutoff point of 7.25 for Modified RIPASA score for diagnosis with maximum sensitivity and specificity which is consistent with original cutoff of 7.5.

5) 48 patients (84.2%) with score ≥7.25 were positive on HPE, while among 12 patients with score < 7.25 9 were positive and 3 were negative on HPE.

6) Ultrasound is a good adjunct for diagnosis of acute appendicitis with sensitivity, specificity and diagnostic accuracy of 70.2%,67%, and 70.0% respectively in our study.

7) By adding USG with Modified RIPASA score sensitivity and diagnostic accuracy is increased from 84.2% and 85% to 98.2% and 96.7% respectively.
8) By adding USG with Modified RIPASA score specificity is decreased from 100% to 66.7%.
9) By adding USG with Modified RIPASA score PPV becomes 98.2% in compare with 100% of Modified RIPASA score, while NPV increased from 25% to 66.7%.
10) Negative appendicectomy reduced to 5% by adding USG with Modified RIPASA score in compared with 16.3% in RIPASA score study by Chong C F et al.
11) Modified RIPASA score with USG can successfully diagnose acute appendicitis with less negative appendicectomy rate and can be used in asian population for diagnosing acute appendicitis.
12) Among 3 HPE negative patient one was female of reproductive age group and two were male one of 58 years and second of 25 years of age.
13) Most of the patients(83.4%= 50) were in age group of 10-40 years with maximum incidence in 21-30 years of age.
14) Male were more affected with acute appendicitis with 73.3% of all patients ,well correlated with several studies.
15) There is paucity of studies that compares histopathological findings with score and USG findings,needs to be evaluated further by prospective studies.

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