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Original Research Paper

General Surgery

DIAGNOSTIC ACCURACY OF RIPASA SCORE IN ACUTE APPENDICITIS

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ABSTRACT

Background: The department of surgery of Raja Isteri Pengiran Anak Saleha (RIPAS) hospital in 2008 developed a new scoring system called "Raja Isteri Pengiran Anak Saleha Appendicitis" (RIPASA) by Chong et al., for the diagnosis of acute appendicitis in Asian population. RIPASA scoring system has shown to have higher sensitivity and specificity and diagnostic accuracy. It includes various parameters like Demographic factors like age , gender etc , clinical features ,duration of symptoms prior to reporting to surgeon.[9,13]

Methods: 100 Patients presenting with right iliac fossa pain with other signs and symptoms suggestive of acute appendicitis and admitted in Bharati Hospital and research center , Pune from August 2017 to July 2019 were included in the study after gaining informed consent. The study was carried out after ethical clearance. Base line investigations such as (Hemogram, urine routine, USG and /or CT abdomen etc) were done .Provisional diagnosis was framed and RIPASA score was given and management was done based on the scores.

Results: Patients with RIPASA score between 12 and above , 100.0% patients (30/30) underwent appendicectomy and histopathology report suggesting of Acute Appendicitis were seen in 100.0%of patients(30/30).

Conclusions: The RIPASA scoring system is a simple, low cost and highly accurate in the diagnosis of acute appendicitis

KEYWORDS : Acute appendicitis, RIPASA score, Diagnosis.

INTRODUCTION

Appendicectomy remains the most frequently performed emergency abdominal surgical procedure . The life time risk of acute appendicitis being 7%.[1] Acute appendicitis incidence is 1.5-1.9 per 1,000 people and it is approximately 1.4 times greater in men than in women.[2] However lifetime risk of having an appendicectomy is 12% for men and 25% for women .[3,4]The incidence among young individual remains high and complicated appendicitis can occur among fifferent age groups.[5]

A delayed appendicectomy can increase complications like perforation and sepsis which further increases morbidity and mortality.[6] Whereas the negative appendicectomy rate is raised due to reduced diagnostic accuracy , and negative appendicectomy rate reported to be 20-40%.[7]

Hence , delayed or incorrect diagnosis has both clinical and economic consequences and has resulted in considerable research to identify clinical, laboratory and radiological findings that are diagnostic of appendicitis and development of clinical scoring system to guide the clinician in making correct diagnosis.[8]

Several scoring systems have been devised to aid decision making in doubtful cases, including the Ohmann, Alvarado, Eskelinen, Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) and several others.[9,10,11,12]The most commonly used are Alavarado , Modified alvarado scoring systems, their sensitivity and specificity range from 53-88% and 75-80% respectively.[7,11]

The department of surgery of Raja Isteri Pengiran Anak Saleha (RIPAS) hospital in 2008 developed a new scoring system called "Raja Isteri Pengiran Anak Saleha Appendicitis" (RIPASA) by Chong et al., for the diagnosis of acute appendicitis in Asian population. RIPASA scoring system has shown to have higher sensitivity and specificity and diagnostic accuracy. It includes various parameters like Demographic factors like age , gender etc , clinical features ,duration of symptoms prior to reporting to surgeon.[9,13]

However, being the new scoring system, the present study was undertaken to evaluate accuracy of RIPASA scoring system in the diagnosis of acute appendicitis so as to reduce the delay in diagnosis.

METHODS

100 patients of age above 18 years and fulfilling the inclusion criteria were enrolled in the study after gaining consent from them. Patients were interviewed and demographic data such as age and sex were noted . Patient's complete history was taken and further was subjected to thorough examination such as general physical examination and detailed clinical examination of per abdomen along with other systems ,findings were noted. Base line investigations such as (Hemogram, urine routine, USG and /or CT abdomen etc) were done .Provisional diagnosis was framed and RIPASA score was given and management was done based on the scores as mentioned below.

MANAGEMENT ACCORDING TO TOTAL SCORE

Patients with score of < 5 were observed in the ward and evaluation of score was repeated after two hours as score of < 5 is regarded as having acute appendicitis unlikely. If the scores showed reducing trend then the patients were treated conservatively and discharged. If scores showed increasing trend during repeat assessment patients were treated according to the reviewed score .

Patients with scores from 5.0 to 7.0 were regarded as having low probability of acute appendicitis and were observed in the ward and evaluation of score was repeated after two hours and were treated according to the reviewed score.

Patients having scores from 7.5 to 11.0 were regarded as having high probability of acute appendicitis and patients were subjected for appendicectomy procedure.

Patients with scores of >12 were regarded to have definite acute appendicitis and underwent appendicectomy.

Diagnosis of appendicitis was confirmed by intraoperative findings and histopathological assessment of appendix specimen. RIPASA score was correlated to USG and/or CT findings , intraoperative findings and histopathological report .

RESULTS

In this study, 61% cases (61 out of 100) were male patients and 39% cases (39 out of 100) were female patients.

In this study, 83% patients(83/100) were in the age group of 18-39.9years and were majority of patients, followed by 17% patients(17/100) above 40years.

Table 1: Distribution of samples by age:

Years	No. of cases	Male	Female
18-39.9	83(83%)	52	31
>40	17(17%)	9	8
Total	100	61	39

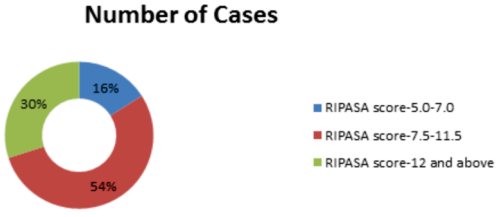
Fifty seven (57%) of patients(57/100) presented to us less than or equal to 48hours and 43% patients (43/100) presented after 48hours.

All the patients(100%) presented with pain in the RIF. Pain migration to RIF was seen only in 17% of the patients (17/100), Anorexia was noted in 74% patients (74/100), Nausea and vomiting was seen in 62% patients(62/100).

Fever was noted in 55% patients (55/100) and tachycardia see in 74% of patients (74/100). RIF tenderness could be elicited in all the patients (100%). RIF guarding noted in 65% of patients (65/100), Rebound tenderness seen in 89% patients (89/100), Rovsing's sign could be elicited only in 9% of patients (9/100).

In this series, White Cell Count(WCC) was raised in 65% of cases(65/100) and 35% cases(35/100) in normal range(4000-11000). Neutrophil count raised in 59% of cases (59/100). Urine routine was within normal limits in 99% cases (99/100).

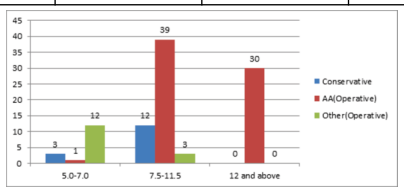
All the parameters of RIPASA score was added and total score of each patient noted. 16% patients(16/100) had total score within 5-7, 54% of patients(54/100) had total score between 7.5-11.5 and 30 patient's total score was 12 and above.



Graph 2: Evaluation of RIPASA score

Table 2: Evaluation of management of cases with different RIPASA score

RIPASA score	5-7	7.5-11.5	12 and above
Conservative	3	12	0
Operative	13	42	30



Graph 2:Evaluation of management and histopathology of cases with different RIPASA score

Out of total number of cases, patients with RIPASA score between 5.0-7.0 , 81.25% patients (13/16) underwent appendicectomy and 18.75% of patients(3/16) were conservatively managed. Out of 13 patients with RIPASA score of 5.0-7.0 who underwent appendicectomy , histopathology report suggesting of Acute Appendicitis were 7.70%of patients(1/13) and 92.3% patients(12/13) histopathology report suggested other than acute appendicitis like subacute appendicitis.

Out of total number of cases, patients with RIPASA score between 7.5-11.5 , 77.78% patients (42/54) underwent appendicectomy and 22.22% of patients(12/54) were conservatively managed. Out of 42 patients with RIPASA score of 7.5-11.5 who underwent appendicectomy , histopathology report suggesting of Acute Appendicitis were 93%of patients(39/42) and 7% patients(3/42) histopathology report suggested other than acute appendicitis.

Patients with RIPASA score between 12 and above , 100.0% patients (30/30) underwent appendicectomy and histopathology report suggesting of Acute Appendicitis were seen in 100.0%of patients(30/30).

DISCUSSION

Acute appendicitis is the most commonly seen and challenging surgical emergency. It can lead to complications like appendiceal perforation, abscess and peritonitis, which is concomitant with high morbidity and mortality. Wide range of differential diagnosis to be considered in a given case before taking decision of operative intervention. Surgical management based only on the patient's signs and symptoms has the risk of increasing negative appendectomy rate. Hence, a rational approach is to decrease removal of normal appendices as well as decrease incidence of complications.[14]

The diagnosis of acute appendicitis mainly relies on the clinical evaluation which includes history like anorexia, RIF pain, nausea, vomiting which is commonly seen. Clinical examination like fever, tachycardia , RIF tenderness and various signs where each of them determine the various positions of appendix and these findings can be confirmed with investigations. Neutrophil counts is routinely done in all laboratories. Ultrasound examination or Computed Tomography helps in confirming diagnosis.

Many scoring systems are being used to help in the diagnosis of acute appendicitis and lower the negative appendicectomy rates. These include but not limited to, Alvarado, Ohmann, Acute inflammatory response syndrome, Eskelinen, RIPASA and so on but most of these were developed in the west hence when applied in different population their sensitivity and specificity decrease. The most known of these is Alvarado score, which was developed in 1986.[11] It contains eight predictive factors and said to be practical and easy to use which was later modified in 1994.

RIPASA score is a more extensive yet simple scoring system which consists of 14 parameters which is common for all population and an additional parameter (NRIC) that is confined only to Asian population setting. A better clinical history, examination and investigations help in obtaining 15 parameters of this scoring system. Being the new scoring system not many studies have been done to evaluate the accuracy of RIPASA scoring system. Hence, the present study was undertaken to evaluate the accuracy of RIPASA scoring system in the diagnosis of acute appendicitis.[9,13] RIPASA score was developed in , Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital, Brunei Darussalem. This was a retrospective study which consisted of 400 patients who had undergone an appendicectomy between October 2006 and May 2008.

The RIPASA score is a simple scoring system to use with all

parameters easily assessed n available. This score also include a urine analysis which can be easily performed. Hence a score can be quickly calculated and a rapid diagnosis made when a score of >7.5 is obtained.

Overall, the RIPASA score is a simplest scoring system with high sensitivity and specificity for the diagnosis of acute appendicitis. Thus, the operating surgeon can make a quick decision regarding the management of patients upon seeing patients with right iliac fossa pain, by RIPASA scoring system with a score > 7.5 to be operated, while patients with a RIPASA score < 7.0 can be non operatively managed.

Comparison of accuracy with other studies

Study	Sensitivity	Specificity	PPV	NPV
Chong CF. et al.[9]	88.46%	66.67%	93%	53%
Chong CF. et al.[14]	97.47%	81.82%	83.52%	96.43%
Nanjundaiah N. et al.	96.2%	90.5%	98.9%	73.1%
Butt MQ et al.[65]	96.7%	93.0%	94.8%	95.54%
Karan M. et al.[66]	97.8%	77.0%	98.89%	66.67%
Present study	98.60%	80.0%	95.8%	92.3%

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DECLARATIONS

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