



## A COMPARATIVE STUDY OF RIPASA SCORING SYSTEM AND ALVARADO SCORING SYSTEM IN THE CLINICAL DIAGNOSIS OF ACUTE APPENDICITIS

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**ABSTRACT** **BACKGROUND:** The Raja Isteri Pengiran Anak Saleha Appendicitis (RIPASA) and ALVARADO score are diagnostic scoring systems developed for the diagnosis of Acute Appendicitis .

**AIM & OBJECTIVES OF STUDY:**

To compare the accuracy of ripasa scoring system & Alvarado scoring system in diagnosing acute appendicitis.

**MATERIALS AND METHODS:** A prospective , hospital based observational study conducted in department of general surgery, unit eight, osmania general hospital, Hyderabad.. A total of 100 patients presenting with RIF pain from January 2018 to june 2019 were enrolled & information regarding history & clinical features treatment offered will be collected in a pretested , semi-structured proforma cum observational check list. The final diagnosis was done based on the histopathological report.

**RESULTS:** Diagnostic accuracy of ripasa score was 90% & of alvarado score was 85%.

**CONCLUSION AND SUMMARY:** The RIPASA scoring system is a simple, low cost and highly accurate in the Diagnosis of acute appendicitis.

**KEYWORDS :** Acute Appendicitis, RIPASA , ALVARADO

### INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies . The RIPASA Score is a new diagnostic scoring system developed for the diagnosis of Acute Appendicitis and has been shown to have significantly higher sensitivity, specificity and diagnostic accuracy compared to Alvarado Score, particularly when applied to Asian population. Not many studies have been conducted to compare RIPASA and ALVARADO scoring system in the diagnosis of acute appendicitis. Osmania General Hospital being a tertiary care hospital caters to the needs of the patients from all over the state of Telangana and also from the adjacent states of Andhra Pradesh, Karnataka & Orissa. Such patient population provides ideal material for studying the effectiveness of RIPASA SCORING system and ALVARADO scoring system in the diagnosis of acute appendicitis.

### AIMS AND OBJECTIVES

#### AIM

To evaluate & compare the effectiveness of RIPASA scoring system & ALVARADO scoring system in the diagnosis of acute appendicitis.

#### OBJECTIVES

1. To record & study the various clinical presentations of acute appendicitis.
2. To compare the accuracy of ripasa scoring system & Alvarado scoring system in diagnosing acute appendicitis.
3. To study the post operative complications of appendicectomy and study association with ripasa score.
4. To compare the results obtained with other studies.

### REVIEW OF LITERATURE

Acute appendicitis is the most common cause of an 'acute abdomen' in young adults and, as such, the associated symptoms and signs have become a paradigm for clinical teaching. Appendicitis is sufficiently common that appendicectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training. Advances in modern radiographic imaging have improved diagnostic accuracy , however, the diagnosis of appendicitis remains essentially clinical, requiring a mixture of observation, clinical acumen and surgical science and as such it remains an enigmatic challenge and a reminder of the art of surgical diagnosis.

### PATHOPHYSIOLOGY OF ACUTE APPENDICITIS

It is estimated that as much as 6% to 7% of the general population will develop appendicitis during their lifetime, with the incidence peaking in the second decade of life.

Appendicitis is caused by luminal obstruction. The causes of the luminal obstruction are many and varied. These most commonly include fecal stasis and fecoliths but may also include lymphoid hyperplasia, neoplasms, fruit and vegetable material, ingested barium,

and parasites such as ascarids.

The appendix is vulnerable to this phenomenon because of its small luminal diameter in relation to its length. Obstruction of the proximal lumen of the appendix leads to elevated pressure in the distal portion because of ongoing mucus secretion and production of gas by bacteria within the lumen.

With progressive distention of the appendix, the venous drainage becomes impaired, resulting in mucosal ischemia. With continued obstruction, full-thickness ischemia ensues, which ultimately leads to perforation. Bacterial overgrowth within the appendix results from bacterial stasis distal to the obstruction.

Because the appendix is an outpouching of the cecum, the flora within the appendix is similar to that found within the colon.

Infections associated with appendicitis should be considered polymicrobial, and antibiotic coverage should include agents that address the presence of both gram-negative bacteria and anaerobes.

Common isolates include *Escherichia coli*, *Bacteroides fragilis*, enterococci, *Pseudomonas aeruginosa*, and others.

### SYMPTOMS & SIGNS

Right iliac fossa pain, migration of pain , nausea and vomiting, anorexia & fever are common symptoms observed in acute appendicitis.

Right iliac fossa tenderness, guarding, rebound tenderness, rovsing sign, paralytic ileus are common signs elicited in acute appendicitis

### MATERIALS AND METHODS

- Study Design: A prospective , hospital based observational study.
- A total of 100 patients presenting with right Illiac fossa pain from January 2018 to june 2019 were enrolled.
- Patients presenting to the hospital with with acute right iliac fossa pain with high suspicion of acute appendicitis will undergo clinical examination and necessary investigations following which information regarding the mode of presentation, relevant history, signs and symptoms, treatment offered will be collected in a pretested , semi-structured proforma cum observational check list.
- The patients were evaluated for all the variables required to obtain RIPASA scores & ALVARADO SCORE.

### INCLUSION CRITERIA:

All patients presenting with RIGHT ILIAC FOSSA PAIN with high suspicion of acute appendicitis.

### EXCLUSION CRITERIA:

1. Patients with generalised peritonitis

2. Patient with appendicular lump

Alvarado Score		
	MANTRELS	Scoring Value
SYMPTOMS (3)	Migratory right iliac fossa pain	1
	Anorexia	1
	Nausea/Vomiting	1
SIGNS (3)	Tenderness Right Lower Quadrant	2
	Rebound tenderness	1
	Elevation of temperature	1
LABORATORY (4)	Leucocytosis	2
	Shift to the Left of Neutrophils	1
Total Score		10

- AALVORADO score of 5 or 6 is compatible with the diagnosis of acute appendicitis. A score of 7 or 8 indicates a probable appendicitis, and a score of 9 or 10 indicates a very probable acute appendicitis.

ITEMS	RIPASA SCORING SYSTEM
Demographic data	
Male	1.0
Female	0.5
Age <39.9 years	1.0
Age ≥40 years	0.5
Symptoms	
RIF pain	0.5
Migration of RQP	0.5
Anorexia	1.0
Nausea/vomiting	1.0
Duration of symptoms <48 h	1.0
Duration of symptoms >48 h	0.5
Signs	
RIF tenderness	1.0
RIF guarding	2.0
Rebound tenderness	1.0
Rovsing's sign	2.0
Fever >37- <39	1.0
Investigations	
Raised WBCs	1.0
Negative urinalysis	1.0
Additional scores	
Foreign ID	1.0

RQP, right quadrant pain; RIF, right iliac fossa; WBCs, white blood cells.

- RIPASA SCORE interpretation suggests 4 management groups:
- a) < 5 points (unlikely, patient observation)
- b) 5-7 points (low probability, emergency room observation, abdominal ultrasound),
- c) 7.5-11.5 points (high probability, surgical evaluation and preparation for appendectomy), and
- d) > 12 points (appendicitis diagnosis, appendectomy).

Based on these parameters, maximum RIPASA score can be 15, a cut off point of greater than or equal to 7.5 to discriminate acute appendicitis according to RIPASA SCORE.

Based on above parameters, maximum MANTRELS score can be 10, a cut off of greater than or equal to 7 to discriminate acute according to Alvarado score.

A senior surgical resident initially examined the patients, and the decision to operate was subsequently confirmed by a senior surgical staff member.

Imaging like ultrasound & ct are used selectively at the discretion of the senior surgeon.

The diagnosis was confirmed by histological examination of resected

specimens.

Cases with right abdominal pain & managed conservatively were closely observed during follow up visits & posted for diagnostic laparoscopy under guidance of senior surgical staff members. In case if the patient was discharged and has not undergone operative procedure, then the patient was followed up subsequently either on OPD basis or by contacting on Phone.

**RESULTS**

In my study, out of 100 patients, 40 patients were lost in follow up.

Seventy percent (70%) of the patients each were males and with male to female ratio of 7:3. Most of the patients (90%) were aged between 18 to 39.9 years and mean age was 29.5 ± 8.81 years.

Other than RIF pain, common symptoms were nausea and vomiting (96.67%), pain migration of RIF (80%), anorexia (70%), fever (78.33%) and commonest clinical sign was RIF tenderness (100%).

The duration of pain was <48 hours in 90% of the patients.

Urine analysis was negative in 80% while WBC count of ≥ 11000 was noted in 70% of the patients.

The HPR report revealed 88.33% of the patients with acute appendicitis.

Significantly higher number of patients with ≥7.5 RIPASA score were diagnosed to have acute appendicitis (85%; p<0.01) and showed sensitivity of 96.23%, specificity of 42.86%, positive predictive value of 92.72% and negative predictive value as 60%, & accuracy of 90%. Alvarado score diagnosed 76.67% of appendicitis patients and showed sensitivity of 86.79%, specificity of 71.43%, positive predictive value of 95.83% and negative predictive value as 41.67%, & accuracy of 85%.

VARIABLES	ALVORADO SCORE	RIPASA SCORE
SENSITIVITY	86.79%	96.23%
SPECIFICITY	71.43%	42.86%
POSITIVE PREDICTIVE VALUE	95.83%	92.72%
NEGATIVE PREDICTIVE VALUE	47.67%	60%
DIAGNOSTIC ACCURACY	85%	90%

**DISCUSSION**

Patients with suspected appendicitis remain a diagnostic challenge. Clinical diagnosis has been associated with a high rate of diagnostic errors.

The use of ultrasonography and CT is generally regarded as the standard of care.

According to Ying-Lie, et al., in a meta-analysis of 19 different appendicitis scores, found that the six most relevant features were: Elevated WBC, RLQ tenderness, combination of anorexia, nausea or vomiting, rebound tenderness, migration of pain to the RLQ, and elevation of temperature.

In another study, Sandell, et al. found that, among the signs, tenderness in the right iliac fossa had the greatest impact on the decision to perform appendectomy with an odds ratio (OR) of 80.3 followed by indirect tenderness with an OR of 29.1.

Among the symptoms, they found that pain migration was the most important symptom with an OR of 23.6, and image diagnostics gave an OR of 4.99. All of these signs and symptoms had a p-value of <0.001.

Wilasrusmee, et al. in a systematic review of scores performance, found that rebound pain was the most common sign (76.9%) followed by right lower quadrant tenderness (61.5%), and right lower quadrant guarding or elevated temperature (53.9% for both).

Ten symptoms were considered in which nausea (64.3%) followed by

migration and duration of pain (46.2%) were most commonly included.

In this study, RIPASA scores ranged from 3.5 to 15.0. The mean RIPASA scores were  $9.00 \pm 2.64$ . Most of the patients had RIPASA scores between 08 to 12.

Based on the cut-off value of 7.5, fifty five (55) patients were diagnosed to have acute appendicitis. Among them diagnosis of acute appendicitis was confirmed on HPR in 51 patients . The sensitivity, specificity, positive predictive value and negative predictive value of RIPASA score in the diagnosis of acute appendicitis was 96.23%, 42.857%, 92.72% and 60% respectively .

In this study, Alvorado scores ranged from 7.0 to 9.0. The mean Alvorado scores were  $8.00 \pm 1.24$ . Most of the patients had RIPASA scores between 07 to 09.

Based on the cut-off value of 7.0, forty eight (48) patients were diagnosed to have acute appendicitis. Among them diagnosis of acute appendicitis was confirmed on HPR in 46 patients . The sensitivity, specificity, positive predictive value and negative predictive value of Alvorado score in the diagnosis of acute appendicitis was 86.79%, 71.43%, 95.83% and 41.67% respectively .

According to Chong, et al., Ying-Lie,et al., ALVORADO score has better diagnostic accuracy than RIPASA score.

According to Frountzas,et al., EL Hosseiny,et al., Goel,et al., RIPASA score has better diagnostic accuracy thanALVORADO SCORE.

According to Singla, et al., karami, et al., Nas, et al., found strong agreement between both scoring systems.

According to Nema and jain, et al., Erdem, ET AL., Xingyie, et al., evaluated multiple scoring systems (Eskelinen, Ohmann, Ripasa, AIR, WSES) in patients with acute appendicitis and found that ALVORADO score has better diagnostic accuracy than other scores in the diagnosis of acute appendicitis.

## CONCLUSION AND SUMMARY

The RIPASA scoring system which is based on simple parameters that can be ascertained by complete history, clinical examination and few investigations is a valuable scoring system in the diagnosis of acute appendicitis.

The RIPASA scoring system is a simple, low cost and highly accurate in the Diagnosis of acute appendicitis as the sensitivity, and negative predictive value was high ,but low specificity & positive predictive value, when compared to alvorado score.

The RIPASA SCORING SYSTEM had better diagnostic accuracy thanALVORADO SCORING SYSTEM , in the present study.

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