



ORIGINAL ARTICLE

The RIPASA score in comparison to the ALVARADO score for diagnosis of acute appendicitis.

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ABSTRACT... Objective: To compare the efficacy of RIPASA score with Alvarado Score in terms of diagnosing acute appendicitis. **Study Design:** Comparative study. **Setting:** Surgical Unit V, Faisalabad Medical University, Faisalabad. **Period:** January 2018 to January 2019. **Material & Methods:** We recruited 100 consecutive patients who presented in surgical emergency ward with complain of pain right iliac fossa having suspicion of acute appendicitis. All patients underwent routine blood investigation, USG abdomen was performed. Then they were scored on the basis of Alvarado and RIPASA scoring system. Per operative findings were noted and confirmed by histopathological examination. Results of RIPASA and Alvarado score were tabulated using appropriate statistical analysis. **Results:** in our study, 94 cases had RIPASA score of 7 and above while 31 cases had ALVARADO score more than 7. Histopathology report was positive in 93 case while 07 cases turned out to be normal. Sensitivity of RIPASA score 95.69% and ALVARADO 32.25%. Specificity of RIPASA was 33.33 % while of ALVARADO 85.71%. **Conclusion:** Our study concludes that RIPASA score stands better as compared to Alvarado score for diagnosis of acute appendicitis.

Key words: Appendicitis, Alvarado, RIPASA, Specificity, Sensitivity.

INTRODUCTION

Appendicitis is defined as inflammation of appendix. It was first coined by “Regionald Fitz from Boston”. First Appendectomy was performed by Robert Lawson in England.¹ Appendix arises from the posteromedial wall of caecum roughly 2 cm below ileocecal junction. Length of appendix varies from 10 to 20 cm with average of 09 cm, more length in children than adults. It also varies in position with retrocecal 60%, pelvic 30%, paracolic, preileal 5% and post ileal 1%. Lifetime prevalence of appendicitis is 1 in 7 having incidence of 1.5 to 1.9 / 1000. Acute appendicitis is most common emergency and appendectomy is most of the times first clinical surgery performed by young resident. However, diagnosis of acute appendicitis is not always straightforward, especially in young persons, elderly and women of reproductive age.² Different modalities like USG and CT scan improves clinical

outcome as demonstrated by Stepheoeus² but they have their own limitations like more in expenses in Asian countries like our where they have limited resources. Also, CT scan is not available in all health care units. While USG has operative dependency as well.³ There were high false positive rates (negative appendectomy) in range of 15-30% in past.⁴ The raja isteri Pengiran anak saleha appendicitis (RIPASA) score was developed for Asian population in 2008 having higher sensitivity specificity and diagnostic accuracy.⁴ Similar results were found in Oriental population. It had few parameters such as age, gender and duration of symptoms prior to the presentation. These parameters were shown to have a significant effect on sensitivity and specificity of Alvarado score.⁵ While using this score a significant reduction in negative appendectomy was found.⁶

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Parameter	Score
Sex: Male	1.0
Female	0.5
Age: <39.9 years	1.0
>40.0 years	0.5
RIF pain	0.5
Migration of RLQ pain	0.5
Anorexia	1.0
Nausea and vomiting	1.0
Duration of symptoms: <48 hours	1.0
>48 hours	0.5
RIF tenderness	1.0
RIF guarding	2.0
Rebound tenderness	1.0
Rovsing's sign	2.0
Fever	1.0
Raised WBC	1.0
Negative urinalysis	1.0
Foreign NRIC	1.0
RIPASA score for acute appendicitis.	

Criteria	Score
Symptoms	
Migratory RIF pain	1
Anorexia	1
Nausea and vomiting	1
Signs	
Tenderness in RIF	2
Rebound tenderness	1
Elevated temperature >37.5°C	1
Laboratory	
Leucocyte count >10x10 ⁹ /l	2
Shift to left (neutrophilia)	1
Total	10
Alvarado score for acute appendicitis (mantrels).	

Alvarado score contain eight parameters while RIPASA contain 18 parameters. In one of recent studies performed, result showed that score of 7 was having high probability of acute appendicitis in Alvarado scoring system and score of 7.5 was for RIPASA scoring system.⁷ For the diagnosis of appendicitis there have been paucity of effort to evaluate RIPASA vs Alvarado scoring system. Alvarado and modified Alvarado score significantly reduce negative appendectomy score in Asian population, but we have no significant data, so aim and objective of our study was to compare efficacy of RIPASA scoring system in terms of diagnosing acute appendicitis.

MATERIAL & METHODS

This Comparative Study was conducted at Surgical Unit- V, DHQ Hospital, Faisalabad. January 2018- January 2019 after approval from ethical committee.

We recruited 100 consecutive patients who presented in surgical emergency ward with complain of pain right iliac fossa having suspicion of acute appendicitis.

Inclusion Criteria

Patient of all age group with pain in right iliac fossa.

Exclusion Criteria

- Patient with generalized peritonitis
- Patient with non-Right iliac fossa pain
- Right iliac fossa mass
- Diagnosed case of appendicular lump

Methods

All patients underwent routine blood investigation, USG abdomen was performed. Then they were scored on the basis of Alvarado and RIPASA scoring system (done by 17 grade medical officer/post graduate resident).

Proper consent was taken and after having detailed clinical examination laboratory investigations and radiological peculiarities all patients underwent open appendectomy. Per operative findings were noted and confirmed by histopathological examination. Results of RIPASA and Alvarado score were tabulated using appropriate statistical analysis.

Data Analysis

Score were tested and compared by applying chi-square test. All measures were done using SPSS version 23 and values less than 0.05 was considered as statistically significant.

RESULT

Out of 100 cases 54 were male and 46 were female. Mean Age of the patients was 25.14 years (8-75 years) with SD 13.714. (Table-I).

P value for RIPASA score was 0.015 (Table-

II). In our study minimum RIPASA score was 5, maximum 15, mean 12.25 with standard deviation of 2.0505 while maximum ALVARADO score of 9 and minimum 5, mean of 7.020 and standard deviation of 0.9742 (Table-III). 94 cases had RIPASA score of 7 and above (Table-IV) while 31 cases had ALVARADO score more than 7 (Table-V). Histopathology report was positive in 93 case while 07 cases turned out to be normal (Table-VI). Sensitivity of RIPASA score 95.69% and ALVARADO 32.25%. Specificity of RIPASA was 33.33% while of ALVARADO 85.71% (Table-VII, VIII, IX).

N	100
Minimum	08
Maximum	75
Mean	25.14
SD	13.714
Male	54 (54%)
Female	46 (46%)

Table-I. Age & Gender distribution of patients.

Score	P-Value
Alvorado	0.838
RIPASA	0.000

Table-II. Comparison of P values for ALVORADO and RIPASA score.

	RIPASA Score	ALVORADO Score
Minimum	5	5
Maximum	15	09
Mean	12.25	7.020
Median	13	07
SD	2.0505	0.9742

Table-III. RIPASA & ALVORADO Score Distribution.

RIPASA Score	Frequency	Percentage
Less than 7	6	6%
7-12.5	41	41%
12.5-15	53	53%
Total	100	100%

Table-IV. Percentage of patients according to RIPASA score.

ALVORADO Score	Frequency	Percentage
Less than 7	0	0%
5-7	69	69%
>7	31	31%
Total	100	100%

Table-V. Percentage of patients according to ALVORADO score.

		Frequency	Percentage
VALID	Acute Appendicitis	93	93%
	Normal	07	07%

Table-VI. Validity of Histopathology reports for diagnosing appendicitis.

RIPASA Score	Histopathology Report	
	Appendix Inflamed	Appendix Normal
>7	89 (true positive 'a')	04 (false positive 'b')
<7	04 (false negative 'c')	02 (true negative 'd')

Table-VII. Comparison of RIPASA score with histopathology reports.

Sensitivity of Ripasa score

$$\frac{a}{a+c} \times 100 = \frac{89}{89+4} \times 100 = 95.69\%$$

Specificity of Ripasa score

$$\frac{d}{d+b} \times 100 = \frac{02}{04+02} \times 100 = 33.33\%$$

ALVORADO Score	Histopathology Report	
	Appendix Inflamed	Appendix Normal
>7	30 (true positive 'a')	01 (false positive 'b')
<7	63 (false negative 'c')	06 (true negative 'd')

Table-VIII. Comparison of ALVORADO score with histopathology reports.

Sensitivity of Alvorado score

$$\frac{a}{a+c} \times 100 = \frac{30}{30+63} \times 100 = 32.25\%$$

Specificity of Alvorado score

$$\frac{d}{d+b} \times 100 = \frac{06}{06+01} \times 100 = 85.71\%$$

	RIPASA	ALVORADO
Sensitivity	95.69%	32.25%
Specificity	33.33%	85.71%

Table-IX. ALVORADO score and RIPASA score statistical evaluation.

DISCUSSION

Most of times, diagnosis of acute appendicitis is clear in patient with pain RIF. However, problem arises sometimes where similar sign and symptoms mimic other conditions as well.⁸ With increasing use of modern modalities (radiological

and laboratory investigation like USG, CT, CRP) diagnosis became easy in recent years but many times depending upon resources availability, area location, population it may not be so easy. All these factors may end up with raised rate of unwanted appendectomy or negative appendectomy.⁹ Being one of the commonest surgical emergencies, incidence of acute appendicitis has been about 50%.¹⁰ Acute appendicitis is as old as man and Egyptian mummies of Byzantine era retails.¹¹ Single investigation tool for diagnosing acute appendicitis is not there but various scoring systems like RIPASA score, Alvarado score, AIR score are used widely. Combination of these scores with USG and CT scanning can improve diagnostic accuracy.

Similar study like ours was conducted in department of surgery Benazir Bhutto Hospital and Rawalpindi Medical College. Age of presentation was young and teenagers as clear in both studies. There was male predominance in that study that was same as in our one. Similar study was conducted in INDIA that revealed corresponding results.¹² In our study, sensitivity of RIPASA score was 95.69% while in other study, performed in Singapore, sensitivity of RIPASA score was 96.7%.⁵ Likewise, specificity of RIPASA score was 33.33% here in our case. Sensitivity of Alvarado score was 32.25% and specificity was 85.71%. These values were coherent with one of other study.^{13,14,15} Another study published in Word J of Emerg Med results of both scoring system that is RIPASA and Alvarado Score were a bit different.^{16,17} In another study the RIPASA score is a simple scoring system with better sensitivity and specificity than the modified Alvarado scoring system in Asian populations.^{16,18} A study compares the histopathological reports states that The RIPASA score correctly classified 88% of patients with histologically confirmed acute appendicitis compared with 48.0% with modified Alvarado score, indicating that RIPASA score is more superior to Modified Alvarado score.¹⁹ A study concludes that RIPASA score at a cut-off total score of 7.5 was a useful tool to diagnose appendicitis.²⁰

CONCLUSION

To conclude, on the basis of negative Ultrasonographic finding diagnosis of acute appendicitis cannot be ruled out. RIPASA score stands better as compared to Alvarado score for diagnosis of acute appendicitis.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

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1	Faiqa Aslam	Main author, Data collector, Proof reading.	
2	Sabeen Adil	Literature review.	
3	Shuja Tahir	Collection of references, Statistical work.	