Evaluation of RIPASA and ALVARADO Score for Diagnosis of Acute Appendicitis

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Abstract

Background: To evaluate RIPASA and ALVARADO scores for the diagnosis of acute appendicitis.

Methods : In this cross sectional study, patients presenting with features suggestive of acute appendicitis and who had undergone appendectomy, were included. All those patients whose follow up was not possible with histopathology reports were excluded .Sampling technique was non probability random sampling technique.Frequencies , percentages were calculated for categorical variables i.e. different parameters of RIPASA and ALVARDO scoring system. Sensitivity and specificity of both scoring system was checked keeping histopathology reports as gold standard .

Results : Mean age was 20.2 years. Minimum RIPASA score was 5.5 , maximum 14 ,mean 10.64 and range turned out to be 8.50 with standard deviation of 1.639. P value for RIPASA score was 0.015 . 155 cases had RIPASA score of 7.5 and above . Maximum ALVARADO score was 9 and minimum 2 , mean of 8.13 and standard deviation of 1.48. Majority (92.5%) had ALVARADO score more than 5 . P value for ALVARADO score was 0.001 .The gold standard for diagnosing acute appendicitis was histopathology report which was positive in 90.6%.Sensitivity of RIPASA score 95 % ALVARADO 88 % .Specificity of RIPASA was 21 % while of ALARADO 42 %.

Conclusion: RIPASA score >7 and ALVARADO > 6 are significant for diagnosing appendicitis .RIPASA is more sensitive but less specific than ALVARADO score for diagnosing acute appendicitis.

Key Words: RIPASA,ALVARADO , Appendicitis.

Introduction

In acute appendicitis clinical diagnosis may be straightforward in patients who present with classic signs and symptoms, yet atypical presentations may result in diagnostic confusion and delay in treatment.[1,2] Although the patient's history, physical examination, and laboratory tests are used in diagnosis, it can be difficult to make a definitive diagnosis in every case.[3,4] Various gynecological and genitourinary inflammatory conditions clinical picture resemble with acute appendicitis which often makes diagnosis of appendicitis uncertain in many circumstances.[5] It has been observed that sometimes delay in performing an appendectomy in order to improve its diagnostic accuracy increases the risk of complications. [6]

There has been a paucity of effort to evaluate the importance of using RIPASA(Raja Isteri Pengiran Anak Saleha Appendicitis) and ALVARADO scoring systems in significantly diagnosing acute appendicitis in prospective studies. There are many studies done on national ,international and local level to evaluate the diagnostic accuracy of both scoring systems .Previously ALVARADO and modified ALVARADO systems were used but the accuracy of these systems in Asian population was disappointingly low .The RIPASA scoring system was established in 2008 especially for the Indian population .It includes more parameters than Alvarado system and the latter did not contain certain parameters such as age, gender, duration of symptoms prior to presentation. These parameters are shown to affect the sensitivity and specificity of Alvarado scoring system in the diagnosis of acute appendicitis . A significant reduction in the negative appendectomy rate was also predicted with the use of RIPASA scoring system.[7,8] In a recent study done which compared Alvarado and RIPASA scoring systems revealed that The RIPASA score at a cut-off threshold total score of 7.5 is a better diagnostic scoring system than the Alvarado score for the diagnosis of acute appendicitis.[9]

Although acute appendicitis is a common disease but it may result in many complications if early identification is delayed such as appendicular perforation ,abscess formation and peritonitis. So a proper clinical and laboratory workup is essential to allow optimal care of the patient. This would also save the expense of investigations such as CT scans, which are being used recently in diagnosis of acute

appendicitis, especially in remote areas where the respective facility is not available.

Patients and Methods

This cross sectional study was conducted in Allied hospitals Rawalpindi Medical University Rawalpindi, from July 2017 to October 2017 on patients presenting in Accident and emergency department of Allied hospital RMU Rawalpindi with features suggestive of acute appendicitis and who had undergone appendectomy. According to our reference study and WHO sample size calculator keeping level of significance 5 % our study sample size came out to be 160 . [9] Inclusion criteria was all patients who were operated with provisional diagnosis of acute appendicitis .

Table 1: Parameters for RIPSA score

Age	Less than 40=1;Greater than 40= 0.5
Gender	Male=1;Female=0.5
RIF Pain	0.5
Migration of pain to RIF	0.5
Nausea & vomiting	1
Anorexia	1
Duration of symptoms	Less than 48 hrs=1 More than 48 hrs=0.5
RIF tenderness	1
Guarding	2
Rebound tenderness	1
Rovsing's sign	2
Fever	1
Raised white cell count	1
Negative urinalysis	1
Foreign National ID Card holder	1

Table 2: Parameters of ALVARADO score

Feature	Score
Migration of pain	1
Anorexia	1
Nausea	1
Tenderness in right iliac fossa	2
Rebound tenderness	1
Elevated temperature	1
Leucocytosis	2
Shift of white blood cells to left	1
Total	10

All those patients whose follow up was not possible with histopathology reports were excluded .Sampling technique was non probability random sampling technique. .Frequencies , percentages were calculated for categorical variables i.e. different parameters of RIPASA and ALVARDO scoring system ,sensitivity and specificity of both RIPASA and ALVARADO scoring system was checked keeping histopathology reports as gold standard (Table 1 &2) .The validity of both scoring system was checked for diagnosis of acute appendicitis

Results

Out of 160 126 were males and 34 females. All the cases were having pain in RIF (100%) (Table 3). P value for RIPASA score was 0.015 (Table 4). In our study minimum RIPASA score was 5.5 , maximum 14 ,mean 10.64 and range turned out to be 8.50 with standard deviation of 1.639 .

Table 3 : Acute Appendicitis – presenting complaints

Presenting complaint	No (%)
Pain right iliac fossa	160 (100)
Pain migrating to right iliac fossa	109(68.1)
Anorexia	140(87.5)
Nausea	134(83.8)
Duration of symptoms more than 48 hours	112(70)
Right iliac fossa tenderness	159(99.4)
Rebound tenderness	160(100)
Guarding	152(95)
Rovsing sign	27(16.7)
Fever	159(99.4)
Rasied TLC	149(91.9)
Negative urinalysis	130(81.3)

One hundred and fifty five cases had RIPASA score of 7.5 and above .Histopathology report which was positive in 145 cases (90.6%) .Our study had maximum ALVARADO score of 9 and minimum 2 , mean of 8.13 and standard deviation of 1.48. 148 cases (92.5%) had ALVARDO score more than 5 (Table 5-10).Sensitivity of RIPASA score 95 % ALVARADO 88 % .Specificity of RIPASA was 21 % while of ALARADO 42 % (Table 11).

Table 4 : Comparison of p values for ALVARADO and RIPSA score

Score	p value
ALVARADO	0.001
RIPASA	0.015

Table 5 : Percentage of patients according to RIPASA score

RIPASA score	Frequency	Percentage
Less than 5.5	0	0%
5.5-7.5	10	6.25%
7.5-14	150	93.75%
Total	160	100%

Table 6 : Percentage of patients according to ALVARADO score

ALVARADO Score	Frequency	Percentage
Less than 5	7	4.37
5-7	20	12.5
Greater 7	133	83.125
Total	160	100%

Table 7: RIPSA score –Distribution

RIPASA score	
Mean	10.6478
Median	11.0000
Std. Deviation	1.63965
Range	8.50
Minimum	5.50
Maximum	14.00

Table 8: Validity of histopathology reports for diagnosing appendicitis

		Frequency	Percentage
Valid	Acute appendicitis	145	90.6
	Normal	15	9.37

Table 9 a : Comparison of RIPASA SCORE with histopathology reports

RIPSA score	Histopathology report	
	Inflamed	Normal
>7	True positive (a)	False positive (b)
<7	False positive (c)	True negative (d)

Table 9 b :Comparison of RIPASA SCORE with histopathology reports

RIPSA score	Histopathology report	
	Appendix inflamed	Appendix normal
0	138(true positive)	11(false positive)
1	7(false negative)	3 (true negative)

Table 10 : Comparison of ALVARADO score with histopathology reports

ALVARADO	Appendix inflamed	Appendix normal
0	129	8
1	16	6

Sensitivity of RIPASA score = a/a+c*100 = 138/145*100 =95% ;Sensitivity of ALVARADO score =129/145*100 =88 %;Specificity of RIPASA = d/b+d *100 =d/d+b *100 = 3/3+11*100 =21 % ;Specificity Of ALVARADO = 6/14*100 =42%

Table 11 : ALVARDO score and RIPSA score- statistical evaluation

	ALVARADO	RIPASA
Sensitivity	88%	95%
Specificity	42%	21%

Discussion

Acute appendicitis is often straightforward to diagnose, however clinical evaluation is susceptible to conditions that mimic the signs and symptoms of appendicitis. Diagnosis of appendicitis has improved over the last 25 years through the use of such strategies as clinical scoring systems, laboratory studies, diagnostic laparoscopy, and advanced imaging studies (US, CT, and MRI).Which strategy, or combination of strategies, clinicians choose to employ depends on setting, resource availability, patient population, and clinical goals. Despite so much medical advances it is still one of that condition where no surgeon can say with conviction that it is appendicitis without operation and histopathology reports .

Acute appendicitis is one of the most common surgical emergencies with an incidence of about 50 %.[10-12] Its incidence is 1.5-1.9/1000 in male and female population.[13] Prevalence rate of one in 7[14].Acute inflammation of vermiform appendix is as old as man and an Egyptian mummy of the Byzantine era exhibits adhesions in right lower quadrant suggestive of old appendicitis [15] . Appendicitis is most common between the ages of 10 and 20 years, but no age is exempt.[16] A male preponderance exists, with a male to female ratio of 1.4:1. Overall lifetime risk is 8.6% for males and 6.7% for females in the United States.[17].There is no definitive investigative tool for diagnosing acute appendicitis but various scoring systems are used for its diagnosis .RIPASA score and ALVARDO score are widely used in clinical practice for diagnosing acute appendicitis .Diagnostic accuracy can be further improved through the use of ultrasonography and CT scanning . However, these investigations are costly. A recent study has suggested that such indiscriminate use of CT imaging may lead to early low-grade appendicitis and unnecessary appendectomies which would otherwise be resolved spontaneously by antibiotics therapy.[18]

Results of a study conducted in department of general surgery, Combined Military Hospital, Kohat, are consistent with our study results. Majority cases were males same as the case in our study which showed a male predominance . Typical age of presentation of appendicitis is in teenagers and young population which is being shown in both the studies . .Sensitivity of RIPASA score was 96.7 % while in our study it was 95 % .[9] Another study done in India again revealed male predominance and appendicitis as disease of young age group. Majority (80%) patients had ALVARADO score >7 and 99 % had RIPASA score

>7.5%. Majority (91%) patients had histopathological evidence of acute appendicitis.Sensitivity and specificity of RIPASA and ALVARADO score was 100 % , 11.1 % and 82.42 % and 44.44 % respectively [17].Almost all the studies done at various levels showed similar results, male predominance ,acute appendicitis disease of young age group ,histopathological report remains the gold standard for diagnosis of acute appendicitis. However sensitivity and specificity of both scoring systems differed in various studies .[20]

Conclusion

1.The diagnosis of acute appendicitis is always confusing for the operating surgeon and no one can say with conviction that its acute appendicitis. RIPASA and ALVARADO scoring system are widely practiced for this diagnosis .RIPASA score is more sensitive but less specific than ALVARADO score for diagnosing acute appendicitis .

2.Majority of patients operated for appendectomy had ALVARADO score > 5 and RIPASA 7.5 and above .

3.RIPASA is much better system as it is more elaborate and takes into account more parameters than ALVARADO and its sensitivity is more than ALVARADO

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