



A COMPARATIVE STUDY OF ALVARADO WITH RIPASA SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS

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Abstract:

Acute appendicitis is the commonest cause of Acute Surgical Abdomen. Appendicectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training. The clinical presentation of acute appendicitis varies from mild symptoms, like lower abdomen pain with associated fever to severe diffuse peritonitis and sepsis. The most common complaint is right lower quadrant abdominal pain. A total of 100 patients admitted with a provisional diagnosis of acute appendicitis in the surgical department were included in the study. They were then assessed using the Alvarado and RIPASA scoring systems. Additionally, a preoperative ultrasound of the abdomen was done. In our study, 24 patients had Alvarado score of <5, 36 patients had 5-6 and 40 patients had >7. In our study, 19 patients had Alvarado score of 5-7, 46 patients had 7.5-11 and patients had >12. On comparison of RIPASA and ALVARADO scoring system among our study population it was found that the chi square statistic was 6.498 and p value of .165. there is no statistically significant difference in the scoring systems.

Keywords: Alvarado Score, Ripasa Score, Acute Appendicitis

Introduction:

The abdomen and its gastrointestinal diseases make the clinicians frown and have kept them awake in the night. Since there are numerous viscera and other anatomical components in the abdomen, gastrointestinal disorders give rise to a lot of scientific curiosity. One of the most important medical methods is a detailed evaluation of the abdomen and clinical correlation, which becomes the foundation of treatment of certain abdominal pain cases.

Acute appendicitis is the commonest cause of Acute Surgical Abdomen^{1,2}. Appendicectomy is the most frequently performed urgent abdominal operation and is often the first major procedure performed by a surgeon in training. The clinical presentation of acute appendicitis varies from

mild symptoms, like lower abdomen pain with associated fever to severe diffuse peritonitis and sepsis. The most common complaint is right lower quadrant abdominal pain. Associated fever and chills point more towards the involvement of sepsis. The diagnosis of Appendicitis still remains a dilemma in spite of advances in the radiological and laboratory investigations. Experienced clinicians accurately diagnose appendicitis based on a combination of history, physical examination and laboratory studies about 80% of the time³. Acute appendicitis is a common and urgent surgical illness with protean manifestations with frequent overlap with other clinical syndromes that results in significant morbidity. It is estimated that the accuracy of clinical diagnosis of acute appendicitis is lying between 76% and 92%⁴.

Despite intense research and discussion, the diagnosis of acute appendicitis is still difficult and remains perhaps the most common problem in clinical surgery. On the one hand normal appendix on appendectomy represents misdiagnosis; on the other hand,² a diagnostic delay of appendicitis may lead to perforation, peritonitis and septicaemia.

In spite of careful clinical, laboratory and ultrasound examinations, the rates of removing non-diseased appendix and of appendiceal perforation remains at around 20% of all cases subjected to appendectomy. No single sign, symptom or diagnostic test accurately makes the diagnosis of appendiceal inflammation in all cases.

The surgeons goal is to evaluate a relatively small population of patients referred for suspected appendicitis and to minimize the negative appendectomy rate without increasing the incidence of complications^{5,6}.

As the incidence of perforation is usually proportional to the duration of disease process, traditional teaching has encouraged surgeons to operate even when the diagnosis is probable rather than wait until it is certain. The morbidity and mortality rates associated with appendicitis are greatly increased when perforation ensues; wound infection rates may treble, intra-abdominal abscess formation increases 15-fold and mortality rates may be 50 times greater.

Thus, a surgeon confronting a patient suspected of having acute appendicitis is wedged between negative appendectomy and perforation on the other hand. Diagnostic accuracy of acute appendicitis remains insufficient, with a high rate of unnecessary operations. Only the promotion of routine ultrasonography might contribute to an improvement in the near future⁷.

Despite improvements in diagnostic methods, negative appendectomy rates still remain between 10 and 30% in acute appendicitis. Cost-effective and easily applicable diagnostic methods with prompt results are required to reduce negative appendectomy rates.⁸

Thus, improving the diagnosis of acute appendicitis in order to prevent unnecessary surgery is a critical topic that has been debated often and vigorously. The use of laparoscopy, ultrasonography, and CT scanning has improved diagnostic accuracy, but these diagnostic approaches are not available in primary health care setting. However, diagnostic efficiency can be improved, and unnecessary surgeries can be prevented, by performance of an appropriately selected combination of laboratory tests combined with evaluation of clinical symptoms⁶.

Methodology:

Source of Data: A total of 100 patients admitted with a provisional diagnosis of acute appendicitis in the surgical department were included in the study. They were then assessed using the Alvarado and RIPASA scoring systems. Additionally, a preoperative ultrasound of the abdomen was done. The decision for surgery was made independent of the score or the ultrasound findings but was based on the surgeon's decision. The results of the scoring system was compared with the patient's intra operative and histopathology findings.

Criteria for acute appendicitis by ultra sound

Sonographically, appendicitis is suggested by the presence of pain on graded compression of the

area in which abnormal appendix was seen as a tubular, blind ending, aperistaltic bowel loop which is non compressible with a diameter of 6 mm or greater in antero posterior direction. The presence of a fecolith or prominence of peri appendicular fat was an indirect sign. Ultra sonography was considered negative when the appendix could not be found or was normal, or if no appendicular pathology was discovered.

Criteria for diagnosis of acute appendicitis by histopathology:

The histological criterion for the diagnosis of acute appendicitis is the presence of polymorphous leucocytic infiltration in to the muscularis mucosa.

Study design	:Prospective
Sample size	:100
Sample design	:purposive sampling
Study place	: Department of General Surgery

Method of collection of Data

All cases satisfying the inclusion criteria were chosen and informed consent was taken from the patients.

Data was collected with the help of a proforma containing following details age, gender ,mode of presentation of illness, details of clinical examination, and results of relevant investigations.

Inclusion criteria

All patient presenting with acute right iliac fossa pain

Exclusion criteria

Patient managed conservatively

patient who underwent interval appendicectomy

patient with right iliac fossa mass

Patients presenting with urological, gynecological and surgical problems other than appendicitis

Results:

Table : 1 Age Distribution

	N	%
Age (years)		
<20 years	28	28.0%
20-30 years	31	31.0%
30-40 years	22	22.0%
40-50 years	11	11.0%
>50 years	8	8.0%
Total	100	100.0%

Among the study population, 28 patients were <20 years, 31 patients were 20-30 years, 22 patients were 30-40 years, 11 patients were 40-50 years and 8 patients were >50 years of age

Table: 2 Gender Distribution

	N	%
SEX		
Male	55	55.0%
Female	45	45.0%
Total	100	100.0%

Graph 2 Gender Distribution

In our study, 55 patients were males and 45 patients were females showing a male predominance in acute appendicitis.

Table 3 Comparison of Age among Sex of the patient

	SEX					
	Male		Female		Total	
	N	%	N	%	N	%
Age (years) <20 years	15	27.3%	13	28.9%	28	28.0%
20-30 years	17	30.9%	14	31.1%	31	31.0%
30-40 years	15	27.3%	7	15.6%	22	22.0%
40-50 years	3	5.5%	8	17.8%	11	11.0%
>50 years	5	9.1%	3	6.7%	8	8.0%
The chisquare statistic is 5.167 and p value is 0.271						

On comparison of age and sex among the study population it was found that males were predominant in all age groups except 40-50 years in which females were more. The distribution is statistically insignificant at $p < 0.05$.

Table 4 Alvarado score distribution

	N	%
Alvarado score Unlikely (<5)	24	24.00%
Possible Ac Appendicitis (5- 6)	36	36.00%
Probably Ac Appendicitis (>7)	40	40.00%
Total	100	100.00%

In our study, 24 patients had Alvarado score of <5, 36 patients had 5-6 and 40 patients had >7.

Table 5 RIPASA Score Distribution

	N	%
RIPASA score Low Probability (5-7)	19	19.0%
High probability (7.5-11)	46	46.0%
Definite (>12) Total	35	35.0%
	100	100.0%

In our study, 19 patients had Alvarado score of 5-7, 46 patients had 7.5-11 and 35 patients had >12.

Table 6 Comparison of Alvarado and RIPASA scores

			Alvarado score		
			Unlikely (<5)	Possible Ac Appendicitis (5-6)	Probably Ac Appendicitis (>7)
RIPASA score	Low Probability (5-7)	N	7	9	3
		%	29.2%	25.0%	7.5%
	High probability (7.5-11)	N	9	17	20
		%	37.5%	47.2%	50.0%
	Definite (>12)	N	8	10	17
		%	33.3%	27.8%	42.5%
	Total	N	24	36	40
		%	100.0%	100.0%	100.0%

The chisquare statistic is 6.498 and p value is 0.165

On comparison of RIPASA and ALVARADO scoring system among our study population it was found that the chi square statistic was 6.498 and p value of .165. there is no statistically significant difference in the scoring systems.

Discussion:

Multiple research have been conducted since the inception of clinical scoring systems to identify the best sensitive, specific, and diagnostically accurate clinical score to help in the diagnosis of acute appendicitis.

The issue of acute appendicitis therapy is not limited to a clinical diagnosis, but also an early surgical intervention. If the clinical diagnosis is ambiguous, an early intervention may justify a negative appendectomy. Surgeons have used several grading methods for the diagnosis of acute appendicitis in order to avert such a regrettable circumstance. Historically, the Alvarado score has been employed for scoring in the diagnosis of acute appendicitis. It is still taught in medical schools throughout the globe and is thus the most extensively used scoring system. Tzanaki, Eskelinen, Lindberg, and the appendicitis inflammatory response score are further rating methods.

Alvarado is one of the most well-known and investigated scores for acute appendicitis since its debut in 1986. Its variant MASS has also been widely used. As this is the most well-known and widely used scoring system, we wanted to compare it with the more recent scoring system (RIPASA) and evaluate its effectiveness in terms of sensitivity, specificity, and diagnostic accuracy, among other variables.

In the past decade, the RIPASA score was established for the Asian population. In calculating the RIPASA score, age, gender, and duration of symptoms were all taken into consideration. Various studies have compared the diagnostic value of the Alvarado score and the RIPASA score for acute appendicitis. In terms of diagnostic accuracy, they have deemed RIPASA score to be better than Alvarado score.

In the present study conducted on 100 patients (n=100), RIPASA and ALVARADO scores were compared, and final diagnosis was analysed in relation to Radiological/intra-operative findings/post-operative HPE reports. It was found that both RIPASA and ALVARADO score had equal Specificity (69.23%), but Sensitivity was higher in RIPASA (88.51%) as compared to ALVARADO (41.38%). Also, the Positive predictive value of RIPASA (95%) was higher than ALVARADO (90%).

The negative predictive value of RIPASA and ALVARADO were comparably low (47% and 15% respectively).

Analyzing both RIPASA and ALVARADO, it was determined that both were simple to implement since they depended mostly on clinical symptoms and signs, as well as basic laboratory examinations, and did not need sophisticated studies. As RIPASA contained a greater number of parameters than ALVARADO, it subjectively seemed to better characterise the patient's clinical status. The time required to apply the scores (both RIPASA and ALVARADO) was short and did not cause management to be delayed unduly.

Even though ALVARADO is a widely used scoring system for the diagnosis of acute appendicitis, its sensitivity and specificity have been proven to be inadequate.

A study conducted in CMH Kohat in 2012 evaluated the usefulness of RIPASA score as a new diagnostic score for acute appendicitis for the local population with a diagnostic accuracy of 95.1%. In the same study the sensitivity of RIPASA score was 96.7%, specificity was 93%, positive

predictive value was 94.8% and negative predictive value was 95.54%.⁹

There is a single study conducted in Pakistan on the population of Karachi in 2015 which has concluded that RIPASA is a reliable and sensitive diagnostic tool in comparison to Alvarado score to diagnose acute appendicitis.¹⁰

According to the study by Majid M et al., sensitivity of RIPASA score for diagnosing acute appendicitis was 91.11%, specificity was 60%, positive predictive value (PPV) was 95.34%, negative predictive value (NPV) was 42.85% and diagnostic accuracy was 88%. Sensitivity of Alvarado score was 11.67%, specificity was 95%, PPV was 95.45%, and NPV was 10.67% and diagnostic accuracy was 20%.¹¹

A study conducted in Rajasthan India showed the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of RIPASA score and Alvarado score for diagnosing acute appendicitis as 94.7%, 60%, 97.8%, 37.5%, 93% and 67.3%, 80%, 98.4%, 11.4%, 68% respectively.¹²

Another study conducted in Jordan revealed that the sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of RIPASA score and Alvarado score for diagnosing acute appendicitis is 93.2%, 61.8%, 92.2%, 64.9%, 91.5% and 73.7%, 68.6%, 92.1%, 34.8%, 74.3% respectively.¹³

On comparing both the scoring systems in the study by Regar MK et al., RIPASA score has been found more sensitive (94.74%) as compared to Alvarado (67.37%), Alvarado score was more specific (80%) as compared to RIPASA score (60%).

Positive predictive value of Alvarado score came out to be 98.46% as compared to 97.83% in RIPASA score. Negative predictive value of RIPASA scoring system was 37.5% as compared to 11.43% in Alvarado system. Accuracy of Alvarado system was 68% as compared to 93% in RIPASA system. Negative appendectomy rate by application of Alvarado system was 1.54% as compared to 2.17% by RIPASA system.¹⁴

Conclusion:

In our study, 24 patients had Alvarado score of <5, 36 patients had 5-6 and 40 patients had >7.

In our study, 19 patients had Alvarado score of 5-7, 46 patients had 7.5-11 and patients had >12. On comparison of RIPASA and ALVARADO scoring system among our study population it was found that the chi square statistic was 6.498 and p value of .165.

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