

Determine the Accuracy & Use of Ultrasound Guidance and Alvarado Score for Diagnosing Acute Appendicitis

NADIA KHATTAK¹, SYED IMRAN HAIDER², NADEEM AKRAM BUTT³, YASRAB⁴, SANA SHARIF⁵, ASMA AFZAL KIANI⁶

¹Assistant Professor Diagnostic Radiology, Peshawar Institute of Cardiology, Peshawar

²Assistant Professor Radiology, Sahara Medical College, Narowal

³Consultant Radiologist, Health Point Hospital, Abu Dhabi UAE

⁴Consultant Radiologist, Dr. Ziauddin Hospital Clifton Campus, Karachi

⁵Assistant Professor, Diagnostic Radiology, PNS SHIFA, Karachi

⁶Assistant Professor, Diagnostic Radiology, PNS SHIFA, Karachi

Corresponding author: Syed Imran Haider, Email: drimranfcp@yahoo.com, Cell: +92 331 4351976

ABSTRACT

Background: Appendicitis is one of the most common and frequently encountered operations in surgical emergencies. It is the most frequent cause of acute abdominal pain. Early and accurate diagnosis can reduce the rate of negative appendectomy (surgical removal of appendix) and helps to provide better treatment with no extra cost and complications.

Aim: The objective of this study was to examine the accuracy and use of ultrasonography and Alvarado score system for diagnosing Acute Appendicitis.

Place and Duration of Study: Radiology Department Hayatabad Medical Complex, Peshawar for duration of six months from January 2021 to June 2021.

Methods: In this cross-sectional observational study, 130 patients of abdominal pain having ages of 10 years to 70 years were included. All patients had diagnosis with Alvarado scoring system and ultrasound for identifying Acute Appendicitis. Patients' detailed history including age, sex and histopathology and ultrasonographic results were recorded. All statistically data was analyzed by SPSS version 17. P-value <0.05 was considered as significant.

Results: Out of 130 patients, 95 (73.08%) patients were men and 35 (26.92%) patients were women. 15 (11.54%) patients were ages less than 20 years, 75 (57.70%) patients having ages between 20 to 39 years, 32 (24.62%) patients were aged between 40 to 59 years and 8 (6.15%) patients were ages of >59 years. Symptoms observed in all patients such as anorexia, nausea and vomiting, tenderness in right iliac fossa, rebound tenderness, elevated temperature as 71.54%, 53.85%, 100%, 95.39% and 84.62% respectively. In all 130 patients 122 (93.85%) had found acute appendicitis by using ultrasound. As per histopathology results 95 % had acute appendicitis and 5 % had chronic or normal appendicitis.

Conclusion: It is concluded that Alvarado Score system along with noninvasive ultrasound guidance resulted accurately and helps to reduce the rate of negative appendectomy, complications and infections with no extra cost. The combine role of Alvarado score and ultrasonography can helps to provide better treatment in acute appendicitis.

Keywords: Alvarado score system, Histopathology findings, ultrasound results, Appendicitis.

INTRODUCTION

Appendicitis is one of the most common disease found in all over the world. Appendicitis is defined as an inflammation in the inner lining of the vermiform appendix that proliferate to its other parts. The most common and useful treatment for appendicitis is the surgical removal of the inflamed appendix lumen. [1] Globally, appendicitis is commonly found in surgical emergencies and one of the most frequent cause of acute abdominal pain. According to the some international research, approximately 10% of all surgical operation followed by appendectomy.[2] Appendicitis is commonly found disease in people of all ages and have 7 to 8% prevalence with life time.[3-4] The rate of cases associated to appendectomy is 1.5 to 1.9 out of 1000 population of both gender. [5] As per high rate of appendicitis cases, more work is needed for early and accurate examination to provide better treatment and to reduce the morbidity and mortality rate. The examination of acute appendectomy is depends on patients medical related history, clinical observations and some Lab findings like white blood cells count.[6] CT scan, Ultrasonography, and laparoscopy are useful technique for diagnosing acute appendicitis accurately.[7-8] The surgical operation is mainly based on clinical examination and Lab findings. Therefore diagnostic inaccuracy may be caused and resulted 20 % of prevalence of perforation and 2 to 30% rate of negative appendectomy.[9] Computerized tomography and ultrasonography with clinical examination can helps to reduce the rate of inessential abdominal surgeries.[10-12] Use of ultrasound by expertise can helps to increase the accuracy rate of diagnose acute appendicitis. Different researches regarding appendectomy reported that 30% rate of negative appendectomy.[10] Inaccurate diagnosis can cause the complications like peritonitis and perforation in patients suffering from appendicitis.[13]

There are some other scoring systems are using in evaluation of appendectomy but Alvarado scoring system is more reliable, due to easy use as compared to other techniques.[14]

Recent study was conducted to evaluate the combine role of Alvarado Score and Ultrasound guidance for diagnosing acute appendicitis so that it could be helpful for surgeons for providing better diagnosis and management.

MATERIAL AND METHODS

This study was conducted at Radiology Department Hayatabad Medical Complex, Peshawar for duration of six months from January 2021 to June 2021. In this cross-sectional observational study, 130 patients of abdominal pain having ages of 10 years to 70 years were included. All patients had diagnosis with Alvarado scoring system and ultrasound for identifying Acute Appendicitis. Patients detailed history, age, sex and histopathology and ultrasonographic results were recorded. Patients undergone laparotomy, and patients have other abdominal inflammation/infections were excluded from this study. All statistically data was analyzed by SPSS version 17. P-value <0.05 was considered as significant.

Alvarado Score

- right lower quadrant tenderness (+2)
- elevated temperature (+1)
- rebound tenderness (+1)
- migration of pain to right iliac fossa(+1)
- anorexia (+1)
- nausea or vomiting (+1)
- leucocytosis>10,000 (+2)
- leucocytosis left shift (+1)

Score total:

- 5-6 compatible with acute appendicitis
- 7-8 probable acute appendicitis
- 9-10 very probable acute appendicitis

Ultrasound diagnosis of acute appendicitis

- aperistaltic, noncompressible, dilated appendix (>6 mm outer diameter)

- inflamed periappendiceal fat and periappendiceal fluid

RESULTS

Out of 130 patients, 95 (73.08%) patients were men and 35 (26.92%) patients were women. 15 (11.54%) patients were ages less than 20 years, 75 (57.70%) patients having ages between 20 to 39 years, 32 (24.62%) patients were aged between 40 to 59 years and 8 (6.15%) patients were ages of >59 years.

Symptoms observed by Alvarado score in all patients, 93 (71.54%) patients had anorexia while 37 (28.46%) patients had not found anorexia, nausea and vomiting had found in 70 (53.85%) while 60 (46.15%) patients had not found nausea, tenderness in right iliac fossa found in all patients, 124 (95.39%) had rebound tenderness, elevated temperature in 110 (84.62%) patients, leukocytosis >10000/L found with white cells count had found in 60(46.15%) while 70 (53.85%) had not found. Appendicitis score was resulted such as 5,6,7,8,9,10 as 3.85%, 5.38%, 17.69%, 20.77%, 23.08%, 29.23% respectively. In all 130 patients 122 (93.85%) had found acute appendicitis by using ultrasound and as per histopathology results 95.38 % had acute appendicitis while 4.61% had chronic or normal appendicitis.

Table 1: Gender-wise distribution of patients

Gender	Frequency No.	%age
Men	95	73.08
Women	35	26.92

Table 2: Age-wise distribution of patients

Characteristics	Frequency No.	%age
<20 years	15	11.54
20 to 39 years	75	57.7
40 to 59 years	32	24.61
>59 years	8	6.15

Table 3: Symptoms prevalence by Alvarado Score

Symptoms/signs	0	1	2
Anorexia	37 (28.46%)	93 (71.54%)	-
Nausea & Vomiting	60 (46.15%)	70 (53.85%)	-
Tenderness in rirghilliac	-	-	130 (100%)
Rebound tenderness	20 (15.38%)	110 (84.62%)	-
Leukocytosis>10000/L	11 (8.46%)	6 (4.62%)	114 (87.70%)
White cells count shifting to left	70 (53.85%)	60 (46.15%)	-

Table 4: distribution of total scores obtained by patients

Characteristics/score	Frequency No.	Percentage
5	5	3.85
6	7	5.38
7	23	17.69
8	27	20.77
9	30	23.08
10	38	29.23

Table 5: Ultrasound Findings of Patients

Acute appendicitis	Frequency No.	Percentage
Yes	122	93.85
No	8	6.15

Table 6: Histopathology Findings of Patients

Characteristics	Frequency No.	%age
Acute appendicitis	124	95.38
Normal/Chronic	6	4.68

DISCUSSION

Better clinical examination may helps to diagnose acute appendicitis accurately and lead to better treatment.^[15] In present research, Out of 130 patients, 95 (73.08%) patients were men and 35 (26.92%) patients were women it shows the similarity to the some other studies conducted by soomro et al^[16] , Talukder et al

and Almulbim et al^[17, 18] in these studies, appendectomy rate in male patients population were higher than the females.

In this research, we found 15 (11.54%) patients were ages less than 20 years, this shows the similarity to the study conducted by Soomro et al^[16] and some other researchers.^[18, 19] 75 (57.70%) patients having ages between 20 to 39 years, 32 (24.62%) patients were aged between 40 to 59 years and 8 (6.15%) patients were ages of >59 years. Symptoms observed by Alvarado score in all patients, 93 (71.54%) patients had anorexia while 37 (28.46%) patients had not found anorexia, nausea and vomiting had found in 70 (53.85%) while 60 (46.15%) patients had not found nausea, tenderness in right iliac fossa found in all patients, while if we go through the other research the results shows 91.6% patients had pain in right iliac fossa.^[16] In our study we found 124 (95.39%) had rebound tenderness, elevated temperature in 110 (84.62%) patients, leukocytosis >10000/L found with white cells count had found in 60(46.15%) while 70 (53.85%) had not found, these findings show the similarity to the some other studies.^[20]

In a research conducted at USA, resulted that rate of negative appendectomy with +ve ultrasound was 5.5%.^[21] In recent study we found 122 (93.85%) had found acute appendicitis by using ultrasound and as per histopathology results 95.38% had acute appendicitis while 4.61% had chronic or normal appendicitis.

In current research, Alvarado scoring system resulted that the diagnostic accuracy was very reliable and acceptable in high scores patients but patients with lower scores should be under observation. Appendicitis score was resulted such as 5,6,7,8,9,10 as 3.85%, 5.38%, 17.69%, 20.77%, 23.08%, 29.23% respectively. Patients whom had 8 to 10 scores, marked as appendicitis and undergo surgical treatment immediately.

Moreover, we should have to evaluate the significance and factors related to this disease for better treatment and to reduce the morbidity and to improve the quality of life of patients.

CONCLUSION

It is concluded that Alvarado Score system with noninvasive ultrasound guidance resulted accurately diagnosis of acute appendicitis and helps to reduce the rate of negative appendectomy, complications and infections with no extra cost. The combine role of Alvarado score and ultrasonography can helps to provide better treatment in surgical emergency , acute appendicitis.

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