Original Article

Diagnosing Acute Appendicitis

Determine the Accuracy and Use of Ultrasound Guidance and Alvarado Score for Diagnosing Acute Appendicitis at Central Park Teaching Hospital Lahore

Zahid Ahmad and Muhammad Wasif Iqbal

ABSTRACT

Objective: To examine the accuracy and use of ultrasonography and Alvarado score system for diagnosing Acute Appendicitis.

Study Design: Observational / Cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Surgery and Department of Radiology Central Park Teaching Hospital Lahore during from March 2016 to Dec 2016.

Materials and Methods: One hundred and thirty 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.

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: 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.

Key Words: Alvarado score system, Histopathology findings, Ultrasound results, Appendicitis

Citation of articles: Ahmad Z, Iqbal MW. Determine the Accuracy and Use of Ultrasound Guidance and Alvarado Score for Diagnosing Acute Appendicitis at Central Park Teaching Hospital Lahore. Med Forum 2018;29(5):15-18.

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]

Department of Radiology, Central Park Medical College & Teaching Hospital Lahore.

Correspondence: Dr. Muhammad Wasif Iqbal, Assistant Professor of Radiology, Central Park Medical College & Teaching Hospital Lahore.
Contact No: 0333-6113756
Email: wasifiqbalradiologist@yahoo.com

Received: October, 2017; Accepted: January, 2018

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 laboratory findings like white blood cells count.[6]

Computed tomography scan, ultrasonography, and laproscopy 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.

MATERIALS AND METHODS

This cross-sectional observational study was conducted at Department of surgery and Department of Radiology Central Park Teaching Hospital Lahore during from March 2016 to Dec 2016. One hundred and thirty 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 laparatomy, and patients have other abdominal inflammation/infections were excluded from this study. **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) and leucocytosis left shift (+1) were noted. Score total; 5-6 compatible with acute appendicitis, 7-8 probable acute appendicitis and 9-10 very probable acute appendicitis were noted. Ultrasound diagnosis of acute appendicitis; aperistaltic, noncompressible, dilated appendix (>6 mm outer diameter) and inflamed periappendiceal fat and periappendiceal fluid were noted. 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 (Table 1).

Symptoms observed by Alvorado 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 illiac 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 No/1: Demographic information of the patients

Variable	No.	%
Gender		
Male	95	73.08
Female	35	26.92
Age (years_		
< 20	15	11.54
20 -39	75	57.70
40 - 59	32	24.61
> 59	8	6.15

Table No.2: Symptoms prevalence by Alvarado Score

Symptoms/Sign	Alvarado score		
	0	1	2
Anorexia	37 (28.46%)	93 (71.54%)	-
Nausea and vomiting	60 (46.15%)	70 (53.85%)	-
Tenderness in rirght iliac	-	-	130 (100%)
Rebound tenderness	20 (15.38%)	110 (84.62%)	-
Leukocytosis>10 000/L	11 (8.46%)	6 (4.62%)	114 (87.70%)
White cells count shifting to left	70 (53.85%)	60 (46.15%)	-

Table No.3: Distribution of total scores obtained by patients

Characteristics/score	No.	%
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 No.4: Ultrasound Findings of Patients

Acute appendicitis	No.	%
Yes	122	93.85
No	8	6.15

Table No.5: Histopathology Findings of Patients

Histopathology	No.	%
Acute appendicitis	124	95.38
Normal/Chronic	6	4.62

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[17] and Almulbim et al[18] in their 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 Alvorado 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 positive ultrasound was 5.5%.[20] 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 and 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.

Author's Contribution:

Concept & Design of Study:	Zahid Ahmad
Drafting:	Muhammad Wasif Iqbal
Data Analysis:	Muhammad Wasif Iqbal
Revisiting Critically:	Zahid Ahmad, Muhammad Wasif Iqbal
Final Approval of version:	Zahid Ahmad

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Santacroce L, Ochoa JB. Appendicitis. E Med General Surg 195778:2010.
2. Khan MN, Davie E, Irshad K. The role of white cell count and C-reactive protein in the diagnosis of acute appendicitis. J Ayub Med Col Abbotabad 2004;16:51-55.
3. Ahmad AM, Vohra LM, Khaliq T, Lehri AA. Diagnostic Accuracy of Alvarado Score in the diagnosis of acute appendicitis. Pak J Med Sci 2009;25:118-21.
4. Kemal M, Bora K, Metin M, Ender O. The Value of preoperative diagnostic tests in acute appendicitis. World J Emerg Surg 2010;5:1749-92.
5. Kamran H, Naveed D, Nazir A, Hameed M, Ahmad M, Khan U. Role of total ;eukocyte count in diagnoses of acute appendicitis. J Ayub Med Coll Abbotabad 2008;20:70-1.
6. Khan I, Rehman A, Application of Alvarado Score in the diagnosis of acute appendicitis. J Ayub Med Col Abbotabad 2005;17:41-4.
7. Augustin T, Bhende S, Shardha K, Cagir B. CT scan and acute appendicitis a five year analysis for a rural teaching hospital. J Gastrointest Surg 2009; 13:1306-12.
8. Potman P, Oostrogel HJ, Bosma E, Lohli PN, Cuesta MA, et al. Improving diagnosing of acute appendicitis result of a diagnostic pathway with standard use of US followed by selective use CT. J AM Coll Surg 2009;208:434-41.
9. Anderson R. Meta analysis of the clinical and lab diagnosis of appendicitis Dr J Surg 2004;91(1): 28-37.
10. Horzic M, Salamon A, Skupjak M, Cupurdija K, Vanjac D. Analysis of scores in diagnosis of acute appendicitis in women college antropole 2005; 29:132-8.
11. Liu JL, Wyatt JC, Calap S, Keen J, Verde P. Systematic reviews of clinical decisions tools for acute abdominal pain health Technol Assess 2006;10(47):1-167.
12. Shreef KS, Waly Ah, Abd Elrehman S, Abdul Hafiz MA. Alvarado score as an admission

criterion in children with pain in right iliac fossa. Afr J Paediatri Surg 2010;7(3):163-5.
13. West WM, Bradey West DC, Mcdonald AH, Henchard B, Feoron-Booth D. Us and white blood cells counts in suspected acute appendicitis . West india Med J 2006;55.
14. Shrivastava UK, Gupta A, Sharma D. Evaluation of the Alvarado Score in the diagnosis of acute appendicitis. Trop Gastroentestrol 2004;25:184-6.
15. Soomro AG, Sidiqui FG, Abbro AH, Abro S, Sheikh NA, Memon AS. Diagnostic accuracy of Alvarado scoring System in acute appendicitis JLUMHS 2008;93-96.
16. Talukder DB, Siddique AKMZ. Modified Alvarado scoring system in the diagnosis of acute appendicitis. JAFMC Bangladesh 2009;5:18-20.
17. Almulbim ARS, Al-Sultan AI. Modified Alvarado score for acute appendicitis in over weight patients. Saudi Med J 2008;29:1184-87.
18. Shah Na, Islam N, Sabir IA, Mehreen T, Khan M. Combination of abdominal US Alvarado score in patients with acute appendicitis. J Postgrad Med Inst 2008;22:41-6.
19. Khan I, Rehman A. Application of Alvarado Score in the diagnosis of acute appendicitis. J Ayub Med Col Abbotabad 2005;17:41-4.
20. Van Randen A, Bipat S, Zwinderman AH, Ubbink DT, Stoker J. Acute appendicitis meta analysis of diagnostic performance CT and graded Compression US related to prevalence of disease Radiol 2008;249:97-106.