

The Alvarado Scores for the Diagnosis of Acute Appendicitis at Muhammad Medical College Hospital Mirpurkhas.

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Abstract:

Objective: To assess the diagnostic accuracy of the Alvarado scoring system in acute appendicitis for the patients with right iliac fossa pain.

Methods: This one year descriptive type of study was carried out from 1st December 2008 to 30th November 2009, in the Department of Surgery Unit-I at Muhammad Medical College Hospital (MMCH) Mirpurkhas, Sindh, Pakistan. Hundred consecutive patients of all age group and both genders, who were diagnosed as the case acute appendicitis purely on clinical ground were admitted in surgical unit-I and their Alvarado score was calculated. Irrespective of Alvarado score all the patients underwent surgical intervention and diagnosis was confirmed by operative and histopathological findings were documented on the preformed Performa after written consent of patients.

Results: We studied 100 consecutive patients who were operated with impression of acute appendicitis purely on clinical basis. A preoperative Alvarado score done in all patients and compare with intraoperative and histopathological findings. Alvarado score cut-off value was ≤ 7 and > 7 . Appendicitis was confirmed in 45/47 male and 13/15 females having Alvarado score > 7 . With negative appendectomy rate 6.4%. In contrast to the patient having Alvarado score ≤ 7 having appendectomy rate 29%. The rate of negative appendectomy was higher in females as compared to males and those have score ≤ 7 .

Conclusion: concluded that Alvarado score is useful in the diagnostic accuracy of acute appendicitis if score is > 7 .

Introduction:

Acute appendicitis is a common cause of pain in right iliac fossa (RIF) and can be difficult to differentiate especially during the early stages^{1,2}. Acute appendicitis is one of the common surgical emergencies with life time prevalence is as high as one in seven^{3,4}. Although various aids exist to facilitate more accurate diagnosis and reduces the rate of negative appendectomies; many are complex. Where as Alvarado score is simple and mostly comprises of clinical parameters in association with leukocyte count⁵. Alvarado score was described by Alvarado in 1985, against a background of a high negative appendectomy rate (44%)⁶. Prior to surgery the diagnostic accuracy of acute appendicitis remains unsatisfactory ranging from 25% to 90%⁷ and being create a diagnostic problem, especially in females like; pelvic inflammatory diseases, ruptured griffin follicles of ovary, ectopic pregnancy and ovarian torsion⁶ e-t-c. As a result of concern about missed diagnosis, surgeons cre-

ated for themselves a surgical security zone which allowed them to accept 15-30 percent negative appendectomy rate with impurity. Observation is not an ideal solution if acute appendicitis is the cause of pain in RIF. Delay in the diagnosis leads to increases morbidity and mortality reference needed here. Surgery for acute appendicitis is the most frequently performed operation (10% of all abdominal operations)⁷. Our aim of this study was to assess the utility and reliability of the Alvarado score in cases the of acute appendicitis to avoid unnecessary exploration.

Parents and Methods:

This one year descriptive type of study was conducted in the Department of surgery unit-I at Muhammad Medical College Mirpurkhas, Sindh, Pakistan on 100 consecutive patients with pain in the RIF from 1st December 2008 to 30th November 2009. Patients of all age group and the both gender, who were diagnosed clinically as a case of acute appendicitis were included in this study. The patients having appendicular lump, clinical features of generalized peritonitis and age bellow 14 years were excluded. After admission detailed history, examination and relevant laboratory investigations (Total leucocyte/neutrophil count) were carried out by Resident Medical officer in the emergency room and preformed Performa of Alvarado score was filled. A Performa containing general information about the patient and variables of Alvarado score such as;

Symptoms	Score
• Migratory right iliac fossa pain	01
• Anorexia	01
Nausea / Vomiting	01

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Signs

Tenderness in RIF	02
Rebound tenderness RIF	01
Elevated temperature	01

Laboratory Finding

Leukocytes count	02
Shift to the left of neutrophils	01

Total score 10

All admitted cases were reviewed by operating surgeon. Irrespective of Alvarado score patients who were clinically diagnosed as a case of acute appendicitis prepared for conventional laparotomy/appendectomy under general anesthesia. Alvarado score was correlated with operative findings and histopathological findings.

Results:

This study comprises of total 100 patients, 68 males and 32 females of different age group ranging from 14 years to 78 years (mean age was 23 years). Most of the patients were in 16-30 years of age (56%) cases (Figure-I). Right iliac fossa pain was the chief complain and tenderness was chief sign (Table -I). Alvarado score cut-off value was 7. Thirty eight patients having Alvarado score ≤ 7 while in remaining 62 cases the score was >7 . The negative laprotomy / appendectomy rate in cases having Alvarado score ≤ 7 for males and females was 19% and 41% respectively; (over all 29%) Alvarado score ≤ 7 having different intra abdominal conditions was seen in 11 (28.9%) cases (Figure-II). While in cases where Alvarado score > 7 the negative laprotomy / appendectomy rate was 4% for males and 13% for females; with (overall 16.4%). Only 4 (6.4%) cases had an intra abdominal pathology with Alvarado score >7 (Figure- III).

Table - I Clinical Features (n=100)

CLINICAL FEATURES	NUMBER OF PATIENTS
1. Pain	
Right Iliac fossa	72
Para umbilical	10
Generalized	09
Lower Abdomen	06
Epigastric	03
2. Nausea/Vomiting	55
3. Anorexia	40
4. Epigastric Burning	12
5. Increase temperature	38
6. Increase Pulse rate	28
7. Rebound tenderness	78
8. Rectal tenderness	16

Table-II

Sex	Male Patients 68		Female Patient 32	
	Alvarado Score ≤ 7 ±38	Alvarado Score ≤ 7 ±62	Alvarado Score ≤ 7 ±38	Alvarado Score ≤ 7 ±62
Male	21 (55%)	4 (19%)	Male	4 (19%)
Female	17 (45%)	7 (41%)	Female	7 (41%)
Negative Appendectomy	11 (29%)	4 (6.5%)	Negative Appendectomy	4 (6.5%)
In Male	6 (19%)	2 (4%)	In Male	2 (4%)
In Female	7 (41%)	2 (3.3%)	In Female	2 (3.3%)

Figure - II Alvarado score <7 having appendectomy (n=38)

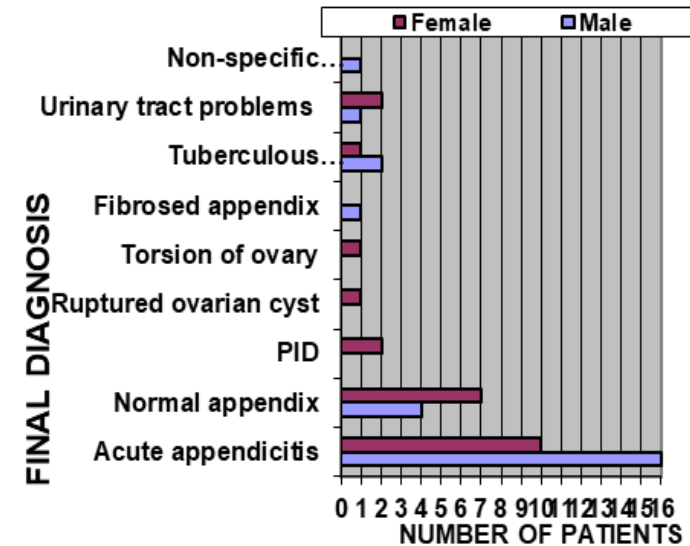
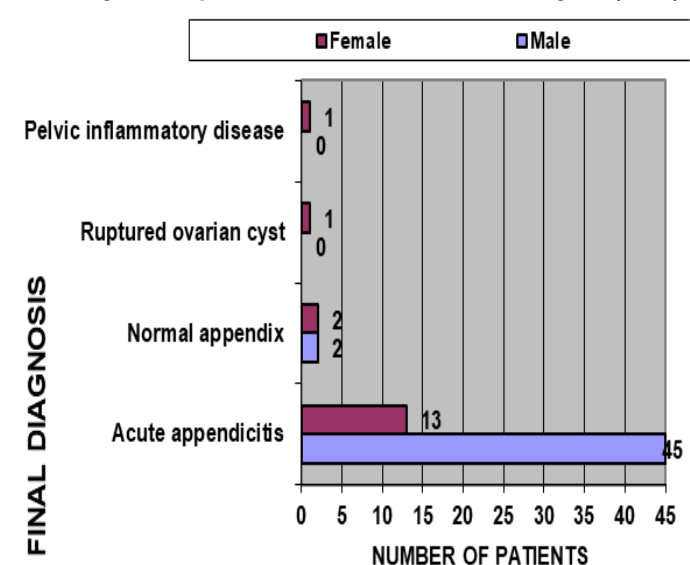


Figure - III Final diagnosis of patients with Alvarado score having > 7 (n=62)



Discussion:

Acute appendicitis still poses a diagnostic challenge in spite of radical advances in medical technology. Recently a good clinical acumen remains the main stay of correct diagnosis.⁷ Several studies validated the Alvarado score using different cut off points.^{8,11} In our study cut off point of Alvarado score was ≤ 7 or > 7 . In this study we analyze the utility and efficacy of Alvarado score in our peripheral tertiary setup so that we are able to better interpret the scores which will help us to improve the usage of diagnostic tool in emergency/out patient department (OPD) and to reduce the rate of unnecessary surgical intervention. In this study out of 100 patients 38 patients with Alvarado score ≤ 7 including 21(55%) males and 17(45%) female cases, while remaining 62 patients having score > 7 including 15(24%) females and 47(76%) males. In our study 11/38 (28.9%) cases having Alvarado score ≤ 7 showed normal appendix on exploration and histopathology report were 4(19%) in males and 7(41%) in females that was observed in national and international studies.^{7,12-14} In contrast 62 patients with Alvarado score > 7 includes 47(75.8%) males and 15(24.2%) females, only 4(6.4%) cases having normal appendix on exploration and histopathology which includes 2(4.2%) males and 2(13.3%) females that is relatively same to other studies.^{10,14-16} However in our study population those who had score ≤ 7 but proceeded to surgery purely on surgeons decision have evidence of acute appendicitis on exploration and histopathological findings in males was 76% and 59% in females (over all 68.4%).^{7,13,16} We have observed that patient having clinical picture of appendicitis in different abdominal conditions were common in females and those cases where Alvarado score was ≤ 7 .^{3,7-9} Literature supports this observation that in females additional investigations are needed to support the diagnosis.^{7,16-18}

Conclusion:

Therefore, we conclude from above study that the female patients and those cases having Alvarado score ≤ 7 needs additional investigation. Of all the parameters maximum stress should be laid on history and clinical findings.

References:

- Stephens PL, Mazzulco JJ. Comparison of Ultrasound and the Alvarado Score of the diagnosis of acute appendicitis. *Conn Med* 1999; 63(3): 137-40.
- Ramirez JM, Deus J. Practical Score to aid decision making in doubtful cases of appendicitis. *Br J Surg* 2001; 81:860-83.
- Pal KM, Khan A. Appendicitis: A Continuing Challenge JPMA 2001; 48(7):189-92.
- Christian F, Christian GP. A Simple Scoring System to retune the negative appendectomy rate. *Ann R Coll Surg Engl* 1992;74:281-5.
- Khan I, Rehman A. Application of Alvarado Scoring System in diagnosis of acute appendicitis. *J Ayub Med Coll Abbottabad* 2005; 17:41-4.
- Fenyo G, Lindberg G, Blind P, Enchsson L, Oberg. Diagnostic decision support in suspected acute appendicitis: Validation of a simplified scoring system. *Eur J Surg* 1997; 163(11):831-38.
- Durrani M, Wani M.M, Shafi M, et al Alvarado scoring system with respect to age, sex and time of presentation with regression analysis of individual parameters. *The Internet journal of surgery* .2007; 11(2):2-5.
- Shrivastava UK, Gupta A, Sharma D. Evaluation of Alvarado score in the diagnosis of acute appendicitis, *Trop gastroenterology* 2004; 25(4):184-6.
- Al Hashemy AM, Saleem MI. Appraisal of the modified Alvarado score for acute appendicitis in adults. *Saudi Med J* 2004; 25:1229-31.
- Alvarado A.A Practical score for the early diagnosis of acute appendicitis. *Ann Emerg Med* 1986; 15:557-64.
- Memon AA, Vohra LM Khaliq T. et al .Diagnostic Accuracy Score in the diagnosis of acute appendicitis. *Pak J Med sci* 2009; 25(1):118-121.
- Malik KA, Sheikh MR. Role of modified Alvarado score in acute appendicitis. *Pak J Surg*. 2007; 23(4):251-54
- Malik AA, Wani NA. Continuing diagnostic challenge of acute appendicitis. Evaluation through modified Alvarado score. *Aust N Z J Surg* 1998; 68:504-5.
- Bukhari SAH, Rana SH. Alvarado Score: A new approach to acute appendicitis. *Pak Armed Forces Med J* 2002; 52:47-50.
- Ohmann C, Frank C, Yang Q. Clinical benefit of diagnostic score for appendicitis *Aarch Surg* 1999; 134:993-996.
- Owen TD, Williams H, Stiff G et al. Evaluation of the Alvarado score in acute appendicitis. *JR Soc Med* 1992; 85:87-88.
- Kalliakmanis V, Pikoulis E, Karavokyros IG, et al. Acute appendicitis: The reliability of diagnosis by clinical assessment alone. *Scandinavian Journal of surgery* 2005; 94:201-206.
- Sanei B, Mahmoodieh M, Hosseinpour M. Evaluation of validity of Alvarado score system for diagnosis of acute appendicitis *Pak j Med sci*.2009;25(2):298-301.