ORIGINAL PROF- 758

APPENDICECTOMY;
MODIFIED ALVARADO SCORING SYSTEM; DOES IT HELP TO AVOID UNWANTED OPERATION?

DR. SHAHZAD AVAIS, FRCS
Department of surgical Unit III,
Jinnah Hospital Lahore.

PROF. MASOOD RASHID, FCPS
Department of surgical Unit III,
Jinnah Hospital Lahore.

DR, SAFDAR HUSSAIN SHAH, FCPS
Department of surgical Unit III,
Jinnah Hospital Lahore.

Correspondence:
Dr. Shahzad Avais
Department of Surgical Unit-III,
Jinnah Hospital Lahore.

ABSTRACT ... shahavais@hotmail.com **Introduction:** Several diagnostic aids have been developed to improve diagnosis in suspected appendicitis and to avoid negative appendicectomy. **Objectives:** To evaluate modified, Alvarado scoring system in reducing rate of negative appendicectomy. **Study Design:** A prospective study was conducted. **Setting:** Jinnah hospital Lahore. **Period:** January 2003 to July 2003. **Patients & Methods:** 96 patients admitted with suspected diagnosis of appendicitis but with equivocal signs were management according to modified Alvarado system. **Results:** Diagnosis of acute appendicitis was made in 61 patients on the basis of scoring system. These patients were operated for appendicitis. Vermiform appendix was found to be acutely inflamed in all but 5 patients, giving a negative appendicectomy rate of 8.2%. A clinical decision to operate leads to removal of a normal appendix in 15% to 30% of cases. **Conclusions**: Modified Alvarado's scoring system did well in reducing negative appendicectomy rate. It is not meant to replace clinical judgment, and is not considered a primary mean of making a diagnosis of acute appendicitis.

Key Words: Appendicectomy, Modified Alvarado Scoring System

INTRODUCTION

Acute appendicitis is the most common disease leading to abdominal surgery[3]. Diagnosis of acute appendicitis can be easy, based on clinical findings of pain and tenderness in RIF along with associated symptoms. At times it becomes very difficult and puts the clinician in a diagnostic dilemma. For difficult cases, which usually include women of child bearing age, a number of diagnostic aids have been developed[4]. Incidence of negative appendicectomy is high in females of child bearing age[8]. Various diagnostic modalities has been used to increase diagnostic accuracy so that both rate of negative appendicectomy and rate of perforation remain low. In hospital stay and observation, abdominal sonography or CT scan has been all add to the cost. Alvarado scoring system[5] or its modification[6] has no added cost of its own and is quick to apply on the bedside of a patient with diagnostic dilemma.

METHODOLOGY

Patients presenting with pain RIF and definite clinical sign of acute appendicitis in whom a confident clinical diagnosis of acute appendicitis could be made were managed according to the clinical diagnosis and were not included in the study. Patients with equivocal signs in whom confident diagnosis of acute appendicitis could not be made were included in the study and managed according to the recommendations of modified Alvarado scoring system[6,7].

Patient evaluation included a detailed history, clinical examination and total and differential white cell count along with routine urinalysis. A proforma for the scoring system was completed and a diagnostic score given to the patient. A patient with a score of 7-9 was considered probable acute appendicitis[6,7]. Patient with a score of 1-4 was considered unlikely to have acute appendicitis, that with a score of 5-6 has a possible diagnosis of acute appendicitis, not convincing enough to warrant surgery[6,7]. Patients with a score of 6 or less were observed for 24 hours at least. However, they were operated if their clinical condition deteriorated in spite of low score. Patients with a score of 7-9 were operated upon and the per-operative diagnosis was completed with the pre-operative diagnosis.

RESULTS

Ninty six patients presenting with equivocal picture of appendicitis underwent scoring system. There were 45 females and 51 males. 39 females were of child bearing age. Diagnosis of acute appendicitis was made in 61 patients on the basis of scoring system i.e score 7-9. They were operated and appendix was found to be inflamed in 56 and normal in 5 patients, giving a negative appendicectomy rate of 8.2%.

In 1994 Kalan and associates modified the scoring system by omitting the shift of neutrophils to left, thus reducing the total score to 9.

Table-I. Alvarado Scoring System

1.	Migration of pain to RIF	2
2.	Anorexia	1
3.	Nausea/vomiting	1
4.	Tenderness in RIF	1
5.	Rebound tenderness	2
6.	Elevation of temperature	1
7.	Leucocytosis>10,000	1
8.	Differential Leukocyte count with neutrophils>75%	1
	Total Score	10

35 patients were labeled as not suffering from acute appendicitis as they scored 6 or less (Table-II). However, clinical condition of 6 patients deteriorated with increasing pain & tenderness and/or associated symptoms. They were operated upon and all 6 had inflamed appendices, giving a false negative rate of 7.30%.

Table-II.

Total no. of cases	96	
(Male)	51	
(Female)	45	
Score of patients 7 or above	61	all operated
	56	Ac. Appendicitis
	5	Normal (neg.)
Score of patients 6 or less	35	all observed
	29	miss diagnosis
	6	deteriorated, were operated and found to have Ac. Appendicitis

Remaining 29 patients did not develop clinical picture suggestive of acute appendicitis during observation in hospital for at least 24 hours. They included 21 female and 8 male patients. They were

further investigated by abdominal radiology and sonography. 13 females were found to have right ovarian cyst. 4 patients had right ureteric stone, while 3 had acute cholecystitis. Rest of the 9 patients were labeled as non specific abdominal pain. Thus in our study Modified Alvarado scoring system showed sensitivity of 90.3% and specificity rate of 85.3%. The overall accuracy rate being 88.5%. This showed a positive predictive value of 91.8% and negative predictive value of 82.9%. Reza F Saidi has reported sensitivity, specificity, positive & negative predictive value and accuracy rate of Alvarado score as 76%.95%,93%,84%,87% respectively[11]. In paediatric population overall sensitivity of 76.3% and specificity of 78.8% of modified Alvarado score has been reported[7].

Table-III.

Name of series		No. of cases	Neg.	Appendicectomy	Diagnostic accuracy
Lewis et al,	1975	1000	201	20.1%	79.9%
Silberman,	1981	1013	149	14.7%	85.3%
Jess et al,	1981	202	60	29.7%	70.3%
Jami-ur-Rehman et al,	1985	230	41	18%	82%
Young,	1989	196	12	6%	94%
Amir et al,	1992	210	15	7.2%	92.8%

DISCUSSION

Very often a surgeon is confronted with a patient in whom it is difficult to decide whether or not to operate for acute appendicitis. However, simple appendicitis can progress to perforation, which is associated with a much higher morbidity and mortality, and surgeons have therefore been inclined to operate when diagnosis is probable rather wait until certain[1]. A policy of early surgery to avoid perforation is likely to increase the number of non-inflamed appendices removed. However, low morbidity associated with negative exploration encouraged surgeons to accept a high rate of negative appendicectomy)[8]. Others believe that negative explorations is not innocuous and carries morbidity rate as high as of 16%[2]. Moreover, low rate of negative appendicectomy is expected to result in considerable saving to patient in direct cost and disability.

It has been claimed that diagnostic aids can dramatically reduce the number of appendicectomies in patients without appendicitis, number of perforations and time spent in hospital[1,2]. Methods advocated to assist in the diagnosis of appendicitis include laparoscopy[1,4], computer aided programs[9] ultrasonography, computed tomography, MRI[1]. All these investigations have been reported with favorable results but some are costly or invasive and while others may be not available in causality department of all institutions after office hours. Graded compression ultrasonography is least expensive and least invasive of these. Ultrasonography has shown to have 81% sensitivity and 96% specificity[10].

Utility of any diagnostic procedure depends upon its sensitivity, specificity and practical success. Scoring system like that of Alvarado's or its modification is simple in design and easy & quick to apply on the beside of patient with no added cost of its own. In our study the scoring system showed a sensitivity of 90.3% and specificity of 85.3%.

During the period of study rate of negative appendicectomy was 8.2%. Where as this rate had been 15.7% in the year preceding our study

according to the review of hospital record of patients who underwent operation with a diagnosis of acute appendicitis. This comparatively high negative appendicectomy rate is comparable to that given in literature[1,2]. Table-III compares negative appendicectomy rate and diagnostic accuracy of different series.

CONCLUSION

Modified Alvarado's scoring system did well in reducing negative appendicectomy rate. but it must be emphasized that in our study the scoring system was used as a diagnostic aid when there was uncertainty about the indication for surgery. It was not meant to replace clinical judgment , and was not considered a primary mean of making a diagnosis of acute appendicitis.

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