ROLE OF MODIFIED ALVARADO SCORE IN ACUTE APPENDICITIS

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ABSTRACT
Objective: *To evaluate the efficacy of Modified Alvarado Score in Acute Appendicitis, and to correlation it with the operative and histopathological findings.*
Design & Duration: *Observational, cross sectional study carried out in two phases, 2000-2001 at Nawabshah and 2002-2003 at Karachi.*
Setting: *Nawabshah Medical College Hospital and Sindh Govt. Lyari General Hospital, Karachi.*
Patients: *All patients admitted with the diagnosis of Acute Appendicitis during the study period.*
Methodology: *After collecting the basic and clinical data, the patients were divided into three groups according to the Alvarado Score. Group-I (Score 1-4) patients were put on conservative treatment and sent home, while Group III (Score 8-10) patients were operated after necessary preparations. Group-II (Score 5-7) cases were admitted, put on conservative treatment and, re-assessed and re-scored after few hours. Those settling down were discharged, while those deteriorting with increase in their Alvarado Score were operated. Modified Alvarado Score was then correlated with the operative and histopathological findings.*
Results: *A total of 254 patients, 140 males and 114 females were included in the study. Majority (62.19%) of them were teenagers or in their twenties. Amongst them 174 patients, 110 of Group-III and 64 from Group-II, underwent appendicectomy. Out of these 20 (11.49%) cases had a normal appendix.*
Conclusion: *Modified Alvarado Score is effective, cheap and easy to apply. Hence it helps in improving the diagnosis in cases of Acute Appendicitis.*

KEY WORDS: *Acute Appendicitis, Appendicectomy, Scoring Systems, Alvarado Score*

INTRODUCTION

One of the commonest clinical presentation that requires emergency surgery is acute appendicitis[1,2]. It is rare in infancy and amongst the elderly, but is common in children, teenagers and young adults[3]. Much efforts has been directed towards early diagnosis and intervention as approximately 6% of the population will suffer from this disease during their life time[4]. Delay in diagnosis leads to increase morbidity and costs.

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Despite attempts to increase the diagnostic accuracy in cases of acute appendicitis, the rate of misdiagnosis in developed countries has remained constant at 15.3%[5], although a higher rate has been reported from the other countries like Pakistan (27%)[6] and Iran (34.2%)[7]. Various scoring system have been devised to help in the diagnosis of the condition[8-10]. The Alvarado Score described in 1986[11] has been in use in surgical practice for some time. This study was carried out to evaluate the Modified Alvarado Scoring System in patients admitted with the diagnosis of acute appendicitis.

PATIENTS & METHODS

All patients admitted with the diagnosis of acute appendicitis at Nawabshah Medical College Hospital (2000-2001) and Sindh Govt. Lyari General Hospital (2002-2003) were included in the study.

After collecting the basic and clinical data, they were

Variables	Clinical Feature	Score
Symptoms	Migratory Pain to RIF	1
	Anorexia	1
	Nausea/Vomiting	1
	Tenderness RIF	2
Signs	Rebound tenderness RIF	1
	Temperature elevation	1
	Extra signs	1
	Rovsing's sign, Cough test, Rectal tenderness	
Labs.	Leucocytosis	2
Total		10

Table I. Modified Alvarado Score

divided into three groups according to Modified Alvarado Score (Table I) as follows, and the results compared with the operative and histopathological findings:

Group-I (Score 1-4) Conservative treatment.

Group-II (Score 5-7) Admitted, re-examined and re-assessed after few hours. Those settling were discharged, while those deteriorting with increasing scores were operated.

Group-III (Score 8-10) Operative treatment.

Table III. Clinical Features

Feature	No.	%
Pain:		
Right Iliac Fossa	180	70.86
Para-Umbilical	36	14.17
Generalized	50	19.68
Nausea / Vomiting	110	43.30
Anorexia	100	39.37
Rectal Tenderness	50	19.68
Rebound Tenderness	194	76.38
Increased Temperature	70	27.55
Leucocytosis	100	39.37

Age Group	Number	%
11-20 years	48	18.89
21-30 years	110	43.30
31-40 years	51	20.08
41-50 years	42	16.54
51-60 years	3	01.19

Table II. Age Incidence

RESULTS

Out of the 254 patients, 140 were males and 114 females. Their age incidence is shown in Table II, majority of patients being in the twenties. Pain in right iliac fossa was the commonest symptom and rebound tenderness the commonest sign; nausea and vomiting were the other important symptoms (Table III).

The distribution of patients according to the various groups of the Modified Alvarado Score and their management is depicted in Table IV. A total of 174 patients, 110 belonging to Group III and 64 to Group II, underwent appendicectomy. The histopathology reports confirmed features of acute inflammation in 154 (88.51%) cases, but in 20 (11.49%) cases the appendix was found normal (Table V).

Table IV. Management of patients

Group	No.	%	Outcome
I	60	23.62	Sent home
II	84	33.08	20-Sent home 64-Proceed to Group III
III	110	43.30	Operated

Table V. Histopathological reports (n=174)

Histopathology	No.	%
Acute Inflammation	110	63.22
Ac. Suppurative Inflam.	23	13.22
Gangrenous Appendix	10	5.75
Perforated Appendix	11	6.32
Normal	20	11.49

DISCUSSION

Clinical decision making in cases of acute appendicitis is still a matter of debate. The approach to the problem is further highlighted by the desire to reduce the rate of misdiagnosis to avoid unnecessary surgery on one hand and to reduce the morbidity by operating at an early stage on the other hand[12].

In the management of a number of surgical conditions, clinical scoring systems have proved useful. Various Scoring systems have been developed to help improve the diagnosis of acute appendicitis[13]. Many of them are difficult and complex to apply in the clinical scenario[13], but the Alvarado Score is simple, effective and can be easily applied[11]. In one study at Cardiff the Alvarado Score reduced the unusually high false positive appendectomy rate from 44% to 14%[14]. Now many use the Modified Alvarado Score, which has proved its efficacy in several studies[15].

In the present study patients were divided into three groups based on Modified Alvarado Score. There were 60 (23.62%) patients in Group-I (Score 1-4), who responded to medical treatment and were sent home. There were 84 (33.08%) cases in Group-II (Score 5-7). They were admitted and regularly evaluated; 20 patients improved and were sent home while the remaining deteriorated with scores increasing and had to be operated. Group III (Score 8-10) had 110 (43.30%) patients who were all operated.

A total of 174 cases underwent appendicectomy, out of which a normal appendix was removed in 20 (11.49%) patients. Thus our negative appendicectomy rate is comparable to other studies which show removal of 21%[13], 17.5%[16], 14%[17] and 11%[18] normal appendices.

Use of Scoring systems, a valid instrument for discrimination between the acute appendicitis and non-specific abdominal pain, have lead to a reduction in the frequency of negative surgeries[19]. The Modified Alvarado Score is useful[20] as few clinical variables can provide the information which can be easily applied for the diagnosis of acute appendicitis[21,22].

CONCLUSION

Modified Alvarado score is effective, cheap and quick to apply. This score allows observation and evaluation of the clinical features to improve the diagnosis.

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