

EVALUATION OF MODIFIED ALVARADO SCORE IN THE DIAGNOSIS OF ACUTE APPENDICITIS

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ABSTRACT

Objective: To evaluate Modified Alvarado Score in patients with right iliac fossa pain.

Design & Duration: Prospective cross-sectional study from March 2006 to May 2007.

Setting: District Headquarter (DHQ) Hospital, Charsadda.

Patients: One hundred consecutive patients with right iliac fossa pain. Both male and female patients with ages >14 years were included.

Methodology: Basic data of all the patients was collected. They were divided into two groups on the basis of modified Alvarado score.

Group-I: Alvarado score ≥ 7 .

Group-II: Alvarado score ≤ 7 .

Results: In Group-I 61 patients underwent surgery; amongst them 52 had acute appendicitis while nine had other pathology. In Group-II there were 39 patients; amongst them six underwent surgery later on because of increase in their scores during observation, all of them had acute appendicitis. The negative appendectomy rate was 14.75% and positive predictive value 85.21%.

Conclusion: Alvarado Score is an easy and simple complementary aid in the diagnosis of acute appendicitis. It works well in patients with a score of ≥ 7 .

KEY WORDS: Acute Appendicitis, Appendectomy, Scoring Systems, Alvarado Score

INTRODUCTION

Acute appendicitis is the commonest surgical emergency and should always be included in the differential diagnosis, when a patient presents with pain in the right lower quadrant of the abdomen. Its incidence is 8.7% and 6.7% in male and female patients respectively¹. Fitz described the classical symptoms and signs of acute appendicitis in 1886². The diagnosis of acute appendicitis can be difficult, even for the experienced surgeons

at times. Hence various scoring systems have been devised to help in the diagnosis of the condition. Alvarado score was developed in 1986. It is a simple and easy to apply scoring system, that is based on the findings of history, examination and laboratory investigations³. This study was carried out to evaluate the efficacy of the Alvarado Score in our set-up.

PATIENTS & METHODS

This prospective cross-sectional study was carried out on 100 consecutive patients of suspected acute appendicitis, admitted to the Surgical Unit of District Headquarter Hospital, Charsadda, from March 2006 to May 2007. Patients of either sex, above 14 years of age were included in the study whereas those with urological, gynaecological and other surgical problems were excluded.

A specially designed proforma containing general information about the patient and eight variables of modified Alvarado score was filled for each patient. The classic Alvarado Score included shift to the left of the neutro-

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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

phils maturation was not available in our laboratory. Hence, a modified score substituting this parameter with extra signs like Rovsing's sign, cough test, etc. was developed (Table I). On this basis the patients were categorized into two groups:

Group-I: Modified Alvarado Score ≥ 7 .

Group-II: Modified Alvarado Score ≤ 7 .

In Group-I all the patients underwent surgery, while in Group-II all patients were kept under observation for 24 hours and re-assessed at six hourly intervals. Those who improved were sent home, with the instruction, to come back if symptoms persist or the condition deteriorates. Some cases belonging to the latter group were operated because of deteriorating score.

The results of the modified Alvarado Score were compared with the operative and histopathological findings. Finally the negative appendectomy rate, positive predictive value, sensitivity and specificity values were calculated to assess the reliability of Modified Alvarado Score.

Table IV. Diagnostic Accuracy of Modified Alvarado Score

Group	No.	Confirmed Appendicitis	Normal Appendix
I (<i>Alvarado score</i> ≥ 7)	61	52 (True positive)	9 (False positive)
II (<i>Alvarado score</i> ≤ 7)	39	6 (False negative)	33 (True negative)
Sensitivity=89.65%, Specificity=77.5%, Positive Predictive Value=85.21%			

Age Group	Number	%
14-20 years	55	55
21-40 years	32	32
41-60 years	10	10
61-80 years	3	3

Table II. Age Incidence

Final Diagnosis	No.	%
Acute Appendicitis	52	85.25
Normal Appendix (Other diagnosis)	9	14.75
Mesenteric adenitis	6	
Meckel's diverticulitis	2	
Caecal abscess	1	

Table III. Operative & Biopsy findings

RESULTS

Amongst the 100 consecutive cases of suspected acute appendicitis, there were 54 males and 46 females with a sex incidence of 1.17:1. Their ages ranged from 14-75 years, mean age being 18.26 years (Table II).

In Group-I there were 61 patients and all of them underwent surgery. Amongst them 52 had acute appendicitis on naked eye examination, which was later confirmed on histopathology. However, nine patients had a normal appendix with other diagnosis (Table III). In Group-II there were 39 cases. All except six were sent home after observation. The latter had to undergo surgery due to the increase in their scores; all of them had acute appendicitis histopathologically.

In our study the total number of operated patients was

67. Amongst these 58 had confirmed appendicitis and nine normal appendix, giving a negative appendectomy rate of 14.75%. Thus the overall sensitivity of the Modified Alvarado Score was 89.65% and the specificity 77.5%, while the positive predictive value was 85.21% (Table IV).

DISCUSSION

Acute appendicitis continues to be a diagnostic challenge because of its variable presentation. The negative appendectomy rate reported in the surgical literature varies from 8-33%⁵. However, there is some improvement in the diagnosis of acute appendicitis due to modern imaging techniques and the development of different scoring systems, based on the clinical symptoms and signs, and laboratory investigations⁷. Amongst them the Alvarado Score is simple, cheap and easily applicable³.

The negative appendectomy rate of this study was 14.75%, which is comparable with the results of Khan and Rehman (18.6%)⁸ and Arain et al (16.1%)⁹. The sensitivity was 89.65%, which is comparable with that of Lone et al (88%)¹⁰ in Kashmir, but higher than that reported by other workers (53.9%)⁵. The specificity of the Modified Alvarado Score in this study (77.5%), collaborates well with that of Saleem et al (80%)⁵. The +ve predictive value (85.24%) of this study is also similar to those studies in literature⁸.

CONCLUSION

The diagnosis of Acute Appendicitis depends on experience and clinical judgement. However, in equivocal cases scoring systems some modern imaging techniques are helpful. An example of this is the Modified Alvarado Score, which is a simple and easily applicable complementary aid in the diagnosis of acute appendicitis. A score of ≥ 7 virtually confirms the condition and the patients should undergo surgery. Patients with score of 5-6 must be kept under observation and re-scored, while those with a score of 1-4 can be sent home.

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