

ALVARADO SCORE;

Evaluation in precise diagnosis of acute appendicitis

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ABSTRACT.....Objective: To evaluate the usefulness and accuracy of Alvarado scoring system in the precise diagnosis of acute appendicitis to decrease the rate of negative appendectomies. **Design:** Descriptive study. **Place and duration of study:** The study was conducted in Military Hospital Rawapindi from Aug 2010 to Dec 2011. **Patients and methods:** In this study, initially 351 cases by convenience sampling, were included but later 31 patients were excluded specially females because they turned out to be cases of PID, renal / ureteric colic or UTI. Patients with score of 4 or above underwent appendectomy. 320 patients were operated. All except gangrenous and perforated appendices were subjected to histopathology. Six operated cases were found to be having normal appendices. Twenty patients were treated conservatively because their scores were less than 4 according to Alvarado scoring system. Those patients were observed till their symptoms settled. **Results:** Male to female ratio was 1.46:1. 71.2 % (n=196) patients were between 13-24years. On the basis of Alvarado score 62.50 % (n=200) patients secured 7 and above while 31.25 % (n=100) were having 4 and above score. Remaining 6.25 % (n=20) had less than 4 score. Out of total (n=300) 98 % (n=294) were histopathologically proven to be acute appendicitis while 2 % (n=6) were of normal histopathology. **Conclusions:** We concluded that Alvarado Score is a useful parameter / yardstick in diagnosis of acute appendicitis

Key words: Alvarado score, acute appendicitis, appendicectomy

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INTRODUCTION

Acute appendicitis is the most common cause of acute abdomen in young adults. Appendicectomy is the most frequently performed abdominal operation and often the first major procedure performed by a surgeon in training. Left untreated, acute appendicitis has the potential of severe complications, including perforation, sepsis and fatal outcome¹⁻³.

Early diagnosis can avoid complications like perforation and peritonitis⁵. In usual clinical practice a surgeon makes diagnosis on the basis of clinical skills and treatment of choice is surgery⁴.

On the other hand studies showed that complications like appendiceal abscess formation, septicemia, and perforation leading to localized or generalized peritonitis can result in a fatal outcome in 20% of children less than 2 years of age¹² while this could be 0.16-8% in adults⁵.

In daily clinical practice use of a scoring system is

associated with a reduced rate of negative laparotomies⁶. In attempts to increase the diagnostic accuracy and to reduce the high negative appendicectomy rate, various scoring systems, imaging modalities and novel techniques have been devised. However most of these are complex, expensive and difficult to implement in emergency situation^{1,7-10}.

Alvarado scoring system is simple and based on clinical and laboratory variables giving a maximum score of 10¹¹.

The purpose of this research was to determine the Alvarado score in our setup in making a base line score on which we can have less chance of negative appendectomies and we will be more confident while dealing with such patients.

In Alvarado scoring system score is given to few important points of history, exam and lab investigations. (Table-I)

MATERIALS AND METHODS

Study Design: Analytical study

Place of Study: MH, Rawalpindi

Duration of Study: 18 Months

Sampling Technique: Convenience sampling

INCLUSION CRITERIA

Patients (n=351) of all age groups and both sexes were included in the study who presented with symptoms of pain RLQ.

EXCLUSION CRITERIA

Patients who were later diagnosed of having any other pathology/diagnosis were excluded from the study.

DATA COLLECTION PROCEDURE

Most of the patients were of age group 15-20 years. 31 patients were excluded from the study, because they were found to have some other pathology.

320 patients were assessed and keeping in view the history, examination and TLC, DLC reports those patients were provisionally diagnosed as cases of acute appendicitis. Alvarado score of all those patients was calculated and documented in their records and in respective proforma. Twenty patients secured less than 4 Alvarado score. Except those 20 patients other 300 patients who secured more than 4 score were subjected to appendectomy. Out of 300 patients 279 appendices were sent for histopathological examination and their reports were collected and entered in their proforma. Results were analyzed in the end. Remaining 20 patients who secured less than 4 score were managed conservatively with continuous monitoring and they got well without any significant event and were discharged from the hospital.

RESULTS

Total 351 patients were included in the study. 31

patients were excluded from the study because of the other pathology. Out of 320 patients 59.38 % (n=190) were male and 40.62% (n=130) were females. Most of the patients were of age 16 to 20 years. Mean age was 28 years. Male to female ratio was 1.46:1. 71.2 % (n=196) patients were between 13-24 years and 28.7 % (n=79) patients were between 25-58 years. 62.50% (n=200) patients secured 7 and above Alvarado score while 31.25% (n=100) were having 4 and above score. Remaining 6.25% (n=20) had less than 4 score. Out of 300 operated cases 93 % (n=279) appendices were subjected to histopathology excluding 7% (n=21) perforated and gangrenous appendices. Out of total (n=300) 98% (n=294, including perforated and gangrenous appendices) were histopathologically proven to be acute appendicitis while 2% (n=6) were of normal histopathology.

Features	Points
Shifting of pain	1
Anorexia	1
Nausea/vomiting	1
Tenderness	2
Rebound tenderness	1
Temperature > 37°C	1
Leucocytosis	2
Neutrophils Shift to left	1
Total	10

Table-I. Alvarado score system

(Alvarado score includes 8 features each having 1 point except tenderness and leucocytosis which have 2 points each)

(Out of 300 appendectomies about 60% appendices were severely inflamed and only 2 found to be normal, supporting the use of Alvarado scoring system)

Per op findings	No of patients
Severely inflamed appendix	195
Mild to moderate appendix	65
Gangrenous appendix	11
Localized peritonitis	17
Perforated appendix	10
Normal appendix	2

Table-II. Operative findings

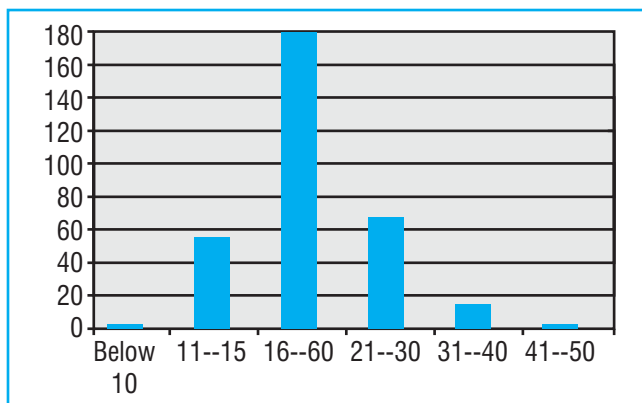


Fig-1. Age wise distribution of patients

DISCUSSION

Claudius Aymand, surgeon of Saint George Hospital, performed first appendicectomy in 1736¹². Since then it became the commonest intra abdominal operation within a Century¹⁴. Some textbooks showed that incidence of acute appendicitis are 1.5 and 1.9/1000 in males and females respectively¹⁴.

Diagnostic accuracy should be high as negative appendectomy carries a significant morbidity. In developed countries with diagnostic laparoscopy, radionuclide imaging, barium enema and CT scan diagnostic accuracy remains below 90%¹⁵. USG in good hands can yield sensitivity of 85-93% and specificity of 80%¹⁶. C reactive protein is another adjunct to diagnosis¹⁷.

In our setup advanced investigations like CT scan,

USG, laparoscopy and other investigations are not available in most of emergency departments. On the other hand these investigations are expensive also. We should increase our clinical acumen for good diagnosis and it has been observed that incorporating signs and symptoms into a tabulated form in different scoring systems, accuracy of diagnosis increases.

In comparison to some other studies, Alvarado score has been found to be a good aid in making the diagnosis of acute appendicitis¹⁸. Because it's just a mathematical tabulation of the common clinical signs and symptoms found in patients of acute appendicitis. 300 patients secured 4 and above score and in them negative appendectomy rate was 2 % (n=6), while positive appendectomy rate was 98 % (n=294). These are almost similar to research of sheikh ms et al¹⁹ although he used modified Alvarado score system but points of scoring are almost similar and this also shows that this cut off point is significant.

We can also say that if we increase the cut off point, negative appendectomy rate decreases. Pain RLQ with or without shifting and tenderness RIF with or without rebound tenderness were the most common symptoms and signs in our study and almost every patient had these. This is similar to study of Gulzar S and Ahmed et al^{15,21}. Keeping in view the above, points may be increased in Alvarado score for persistent pain RIF along with tenderness with or without rebound tenderness.

Negative appendectomy rate is also compared with other studies in the world literature (Table-III).

In this study Alvarado scoring system was highly sensitive for the diagnosis of acute appendicitis in adult males. This is in conformity with other published studies²²⁻²⁴.

CONCLUSIONS

Scoring systems are being developed for

Studies with different scoring system	Negative appendectomy rate%
Gallego et al ²⁰ (With ultrasonographic Score)	9.37
Ramirez and deus ¹⁹	19.3
Alvarado et al ⁷	11.6
Hussain et al ²¹	18
This study (4 & above score)	2

Table-III. Comparison of negative appendectomy rate in our study with literature

mathematical representations of diagnosis of a disease. Alvarado score is a similar yard stick to simplify and standardize the diagnosis of acute appendicitis. Diagnosis in children and females especially during child bearing age needs more concern and in general for all patients to avoid the unnecessary morbidity and mortality of the procedure.

It is recommended that scoring systems like Alvarado scoring system should be introduced and practiced.

We conclude that it is very simple and even junior surgeons could also easily calculate and collaborate. Negative appendectomy rate could be very low as score rises. This helps in economizing the already meager health resources of our country and reducing the number of unnecessary appendectomies.

We suggest that Alvarado Score could be reassessed for awarding more points/marks to tenderness which is invariably present in almost all patients.

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