ROLE OF MODIFIED ALVARADO SCORING IN ACUTE APPENDICITIS AND ITS HISTOPATHOLOGICAL CORRELATION IN GOVERNMENT VELLORE MEDICAL COLLEGE HOSPITAL

K. Shantha Kumar¹

¹Associate Professor, Department of General Surgery, Government Vellore Medical College Hospital.

ABSTRACT

BACKGROUND

Acute Appendicitis is a more common surgical emergency encountered in a day-to-day surgical practice. There are many methods for diagnosis of acute appendicitis, both by clinically and radiologically.^[1] The delay in diagnosis usually leads on to various complications that causes increase in both morbidity and mortality of the patient.

The aims of this study is to study the effectiveness of modified Alvarado score in acute appendicitis and to correlate the same with post-operative histopathological report in acute appendicitis.

MATERIALS AND METHODS

In this study, 100 patients with features suggestive of acute appendicitis were included. Modified Alvarado score is used for scoring the patients and their post-operative histopathological features were evaluated and 'p' value is calculated accordingly about p = 0.0001 which is found to be significant by chi square test.

RESULTS

Among the 100 patients, the prevalence of acute appendicitis is more commonly seen in patients who scored > 7 (41/46), i.e. about 89%. The patients with score between 5 and 7 were found to be within the reactive lymphoid hyperplasia group (30/42), i.e. about 71%. The patients with score 1 - 4 was found to be in the group of reactive lymphoid hyperplasia (7/12) i.e. 58.3% and others with unremarkable pathology (5/12) i.e. 41.7%.

CONCLUSION

Modified Alvarado score is used in diagnosing acute appendicitis (13) and with score > 7 is most commonly seen with acute appendicitis by post-operative histopathological report and patients with score 5 - 7 are observed and followed up (12). Those with score 1 - 4 are being observed have shown less chances of appendicitis.

KEYWORDS

Acute appendicitis; modified Alvarado; histopathology report.

HOW TO CITE THIS ARTICLE: Kumar KS. Role of modified Alvarado scoring in acute appendicitis and its histopathological correlation in Government Vellore Medical College Hospital. J. Evolution Med. Dent. Sci. 2016;5(95):7005-7008, DOI: 10.14260/Jemds/2016/1584

BACKGROUND

Acute appendicitis is seen in a day-to-day practice in emergency department. It is one of the commonest surgical emergency met out. It can sometimes confuse the practitioners by its presentation. The delay in early diagnosis or failure in early diagnosis may happen many times. This may lead on to the disease prognosis. This will further lead on to increase in morbidity as well as occasional mortality in the patient, though there are many recent trends in investigatory modalities. Diagnosis of acute appendicitis is still a mystery.^{[2][3]}

This may lead to increase in operative indication for the patient due to the fear of complication followed by it. There is increase in the negative appendectomy rate of about 20% seen in literature.^[4]

Therefore, a scoring system was developed by Alvarado in 1986. This is used for the diagnosis of acute appendicitis, thereby reducing the rate of negative appendectomy without causing increase in morbidity and mortality.^[5]

AIMS OF THE STUDY

1. To study the effectiveness of modified Alvarado score in acute appendicitis.
2. To correlate the modified Alvarado score with post-operative histopathological examination in acute appendicitis.

MATERIALS AND METHODS

This study includes the population of 100 patients. The 100 patients are those who attended the emergency department from August 2014 to July 2015. The scoring system used is modified Alvarado scoring system. One of the criteria in this scoring system is not evaluated or dropped out. This is because of the facility of non-availability of the criteria, i.e. shift of neutrophils to the left as an emergency measure. All other criteria were taken into consideration. All those patients admitted in the emergency department were included in the study. Routine examination was carried out after obtaining the history from them. This also includes obtaining the history for criteria of modified Alvarado scoring system. Patient's gynaecological and urological were excluded from the study

Financial or Other, Competing Interest: None.

Submission 06-10-2016, Peer Review 19-10-2016,

Acceptance 21-10-2016, Published 28-11-2016.

Corresponding Author:

Dr. K. Shantha Kumar,

Associate Professor,

Department of General Surgery,

Government Vellore Medical College & Hospital.

E-mail: drkskumarmmc@gmail.com

DOI: 10.14260/Jemds/2016/1584

population. All the 100 patients were evaluated by using modified Alvarado scoring system. Then they were subjected to surgery and followed by histopathological report; out of 100 patients all the 100 patients were undertaken for surgery. The modified Alvarado score was calculated according to the presenting feature of the patient in the emergency department. The calculation of modified Alvarado score is divided into three grading,

- Grade 1: values 1 to 4.
- Grade 2: values 5 to 7.
- Grade 3: values more than 7.

The grading is calculated and they are correlated with histopathological reports. They are further analysed and tabulated in the following variables. The variables are as follows,

- Age.
- Modified Alvarado scores.
- Pre-operative evaluation/score.
- Post-operative histopathological reports.

All the patients were followed routinely for the period of 6 months and then they were reviewed monthly.

OBSERVATION AND RESULTS

The study population of this study is about 100 patients. The 100 patients had undergone classical appendicectomy.

Age Distribution

The incidence of acute appendicitis in the study population fall into 5 major groups. In this the incidence is maximum in 21 - 30 age group (of about 42% in the 2nd decade of life). The least incidence of occurrence is seen in 51 - 60 age group (of about 2% in the 5th decade of life). This shows the incidence of acute appendicitis, classically seen in the age group of 21 - 30 due to the increase in the presence of clinical cases in this age group.

Distribution According to Modified Alvarado's Scoring

In this study, the patient's clinical features/symptoms are included. Aged patients in this study were presented with right iliac fossa tenderness with 96% had right iliac fossa pain, pyrexia (36%), leucocytosis were presented only in a little proportion, anorexia, nausea/vomiting were seen in highest number of cases of about 78% and 72% respectively.

Modified Alvarado's Components	No. of Cases	%
Right iliac fossa pain	96/100	96%
Anorexia	78/100	78%
Nausea/Vomiting	72/100	72%
RIF tenderness	100/100	100%
Rebound tenderness	64/100	64%
Pyrexia	36/100	36%
Leucocytosis	68/100	68%

Table 1. Modified Alvarado Components and its Percentage

This shows that in the study population all are not presented in a single patient and symptoms varies in different proportion. This shows the Alvarado components constitute of about varying degree of occurrence according to the severity of illness.

Distribution of Modified Alvarado Scores

This scoring increases the type of involvements of patients according to the severity of infection. In this study population, about 46% of patients (46/100) were seen to be in the scoring of about > 7.

Modified Alvarado Score	Total	
	No. of Case	%
1 - 4	12	12%
5 - 7	42	42%
> 7	46	42%
Total	100	100%

Table 2. Distribution of Modified Alvarado Score

About 42% of study population were in the scoring of about 5 - 7 (42/100). The least incidence is seen in about 12% (12/100), is seen in the scoring value of about 1 - 4. This denotes the presence of severity of symptoms seen in the worthy, the study group of about 46% (46/100) and to the level of 42% (42/100).

Modified Alvarado Score	Male		Female	
	No. of Case	%	No. of Case	%
1 - 4	5	7.7%	7	20.0%
5 - 7	27	41.5%	15	42.9%
> 7	33	50.8%	13	37.1%
	65	100%	35	100%

Table 3. Different Grades of Modified Alvarado Scoring in Acute Appendicitis with Sex Distribution

According to modified Alvarado scoring, about 50.8% (33/65) of the patients were in the score of > 7 in the male and 37.1% (13/35) in females.

Out of the patient in scoring 1 - 4, i.e. 12 patients (12/100) there is 5/12 (7.7% of males) and 7/12 (20% of females). There are about 42% (42/100) in the scoring of about 5 - 7, of this (41.5%) 27/42 were males and (42.9%) 15/42 were females.

Histopathological Correlation with modified Alvarado Scoring

The following are the observation made with the histopathological reports of the patients who have undergone appendectomy after Alvarado scoring.

The correlation of score 5 - 7 of both the sex, that is about 71.4%. Patients came there with reactive lymphoid hyperplasia, which contribute of (30/42) patients followed by 23.8% patients with acute appendicitis of (10/42) patients. The unremarkable pathology in this is (2/42) patients of 4.8%.

In patients with > 7 score, acute appendicitis correlate to about 89.1% (41/46) patients; reactive lymphoid hyperplasia is seen in 6.5% (3/46) and unremarkable features is seen in 4.4% (2/46) of patients in this category.

These stages and correlations of 'p' values is about ($p = 0.0002$), which is very significant calculated by using chi square test of association.

It shows that reactive lymphoid hyperplasia is seen in about 73.3% (11/15) patients with scoring of about 5 - 7 and

20% (3/15) patients with acute appendicitis in the scoring of about 5 - 7 and 6.7% (1/15) patients with unremarkable pathology in this group.

It shows that significant correlation of about 100% (13/13) patients is seen in score of > 7 in the histopathological correlation following acute appendicitis in female. This shows a 'p' value of about ($p = 0.0001$) in this group of population, which is tested by using chi square test of association. The 'p' value is very significant from correlating in this group of people.

CONCLUSION

Modified Alvarado scoring is a good diagnostic scoring system used in a day-to-day practice by all clinicians.^[6] It is a scoring system used for evaluation of acute appendicitis with score of less than 4. Those whose scoring system is between 5 to 7, they are kept under observation and they are surveyed and re-examined for every 2 hours for the score to be increasing or decreasing.^{[7][8]} It is to be taken as an added feature for an additional investigation to be carried out in this category of people like CT abdomen and the survey can be decided after additional investigations are obtained.^{[9][10]} The plan for surgery (i.e.) emergency appendectomy is recommended for the patients for score of more than 7. They are further managed and investigated post-operatively with histopathological correlation.^{[11][12]}

Correlation of scoring with histopathology report was done. Simultaneously, the scoring of more than 7 shows the histopathological positivity of about 89% and 6.5% have been shown to be presented with reactive lymphoid hyperplasia. The unremarkable histopathology correlates to about 4.4%. It was found to be the patients with Alvarado scoring of about 4 - 7 with about 71.4%. About 23.8% and 4.8% are those who presented with reactive lymphoid hyperplasia^{[13][14]} and unremarkable histopathological feature.

The patient with scoring 1 - 4 presented with reactive lymphoid hyperplasia and unremarkable feature corresponds to about 58.3% and 41.7% in this scoring system respectively. Hence, we finally recommended to say that usage of modified Alvarado scoring system is used in the clinical diagnosis of acute appendicitis in the emergency department. This causes reduction in false negative operation.^{[14][15]}

There are many other modalities/investigations for the diagnosis of acute appendicitis, but clinical correlation was found to be superior to all clinically than all this investigations.^[16] The other investigations are used only in additive/supportive informatory measures. They are most commonly used for confirmation in case of doubtful diagnosis.^{[17][18]}

In patient admitted with diagnosis of acute appendicitis, modified Alvarado scoring system has been used. When the score is more than 7, appendectomy is planned. When the score is 5 - 7, the patient is re-evaluated after sometime or with some other investigations. When the score is 1 - 4, then they can be usually observed and can be discharged with acceptable false negative results in this group.

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