

Modified Alvarado Scoring System in the Diagnosis of Acute Appendicitis

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ABSTRACT

Introduction: Appendectomy is a common emergency procedure. Negative appendectomy rate is up to 33 %. As it is associated with the risks of anesthesia like any operation, it should be avoided where possible. Modified Alvarado score is one of the probable ways to reduce this rate. Our objective of the study was to evaluate its value in reducing the percentage of the negative appendectomy.

Methods: A non randomized controlled trial was conducted at Emergency Department of DHQ Hospital Faisalabad over the period of 6 months. 60 patients were divided into two groups. In group A, 1st consecutive 30 patients were included who had indication for appendectomy based on the choice of the surgeon while in group, B 30 patients having indication for appendectomy based on modified Alvarado score 7 or more were included. Surgically removed appendix was evaluated by histopathology for the presence or absence of inflammation. Both groups were compared for the percentage of the negative appendectomy.

Results: In group A, overall negative appendectomy rate was 20 % while gender based negative appendectomy rate was 28.5% in Females and 12 % in males. In group B overall negative appendectomy rate was 14 % while gender based negative appendectomy rate was 17.6% in females and 7.6% in males. Over all reduction through modified Alvarado score was insignificant (chi-square 0.480, df 1, p value 0.488). Similarly, statistically significant reduction could not be found both in female (chi-square 0.524, df 1, p value 0.469) and male (chi-square 0.179, df 1, p value 0.672) groups.

Conclusion: Modified Alvarado score is not helpful in significant reduction of the over all percentage of the negative appendectomy. Similarly, statistically significant reduction could not be found both in female and male groups. Further methods of evaluation should be used especially in females.

Key Words: Modified Alvarado score, Negative Appendectomy.

INTRODUCTION

Pain in the right iliac fossa is a common presentation in the emergency. Acute appendicitis is one of the differential diagnoses. Emergency appendectomy is usually done in these patients if there is decision to operate on the choice of the surgeon or surgical resident on the overall clinical suspicion. It has been observed that many patients undergoing appendectomy prove to be negative [1] on the histopathology of the surgically removed appendix, which is gold standard for the diagnosis of the appendicitis. As negative appendectomy is a big issue associated with the risks related with any of the surgical procedures under general anesthesia, so it should be avoided where possible. Many suggestions have been given to reduce the percentage of the

negative appendectomy such as use of modified Alvarado score [2] and evaluation by CT scan [3]. According to the modified Alvarado scoring system (Table-1), symptoms, signs and increased total leukocyte count (TLC) are given numerical values and patients are scored out of 9. Surgery is indicated in patients with score 7 or more.

The use of this scoring system was intended to improve the decision making and to reduce the percentage of the negative appendectomy in this common condition. The performance of this system however had not been uniform [4, 5]. Our intention was to evaluate the role of this system in reducing the percentage of the negative appendectomy.

MATERIALS AND METHODS

A non randomized controlled trial was conducted at emergency department of DHQ hospital attached with Punjab medical college Faisalabad over the period of 6 months. 60 patients were included in the study. They were divided in to two groups. In group A, 1st consecutive 30 patients presenting with pain in right iliac fossa, in Emergency Department of DHQ Hospital and having indication for appendectomy based on the choice of the surgeon after evaluation through history, examination, and lab investigation, but not having mass in the right iliac fossa clinically as well as on ultrasonography were included. While in group B, next consecutive 30 patients presenting with pain in right iliac fossa, in Emergency Department of DHQ and having indication for appendectomy based on Alvarado score 7 or more were included after exclusion of mass in right iliac fossa on physical examination and ultrasound. On the basis of history, examination and increased TLC, Alvarado scoring was calculated according to the Table-1.

Table-1
The Modified Alvarado Score

Symptoms	Score
Migratory right iliac fossa pain	1
Anorexia	1
Nausea/vomiting	1
Signs	
Tenderness right lower abdomen	2
Rebound tenderness right iliac fossa	1
Pyrexia greater than or equal to 37.5°	1
Investigations	
Leucocytosis	2
Total Score	9

Patients were provided with details of appendectomy along with risk benefit ratio (hazards of anesthesia, duration of procedure, chances of complication, hospital stay and pain) to get informed consent, after approval from ethical committee. Emergency appendectomy was done by the resident surgeon or by the senior registrar in both the groups. Per operative findings were noted. After removal, appendix was sent for histopathology. Negative appendectomy was labeled in the cases having no signs of inflammation on histopathology of surgically removed appendix. Proforma was used to collect data.

All the data was entered in SPSS version 10 and was subjected to analysis. Percentage of negative appendectomy among the patients undergoing emergency appendectomy based on the choice of surgeon and those based on the modified Alvarado scoring systems was calculated by using descriptive statistics. Chi-square was used to compare percentage of negative appendectomy between the two groups. A value less than .05 was considered as significant.

RESULTS

In group A [Table 2] negative appendectomy rate was 20 %. This group comprised of 30 patients, out of which 16 were males and 14 were females. Mean age was 30 ranging from 8 years to 80 years. 6 out of 30 patients had negative appendectomy, out of which 4 were females (negative appendectomy rate 28.5%) and two were males (negative appendectomy rate 12%). Females with negative appendectomy had PID (2 cases), ruptured ovarian cyst (1 case), no detectable pathology (1 case).

Table-2
Group A

	No. of Patients	No. of patients with negative appendectomy	Percentage
Males	16	2	12 (among males)
Females	14	4	28.5 (among females)
Total	30	6	20

In group B [Table 3], negative appendectomy rate was 14%.

Table-3
Group B

	No. of Patients	No. of patients with negative appendectomy	Percentage
Males	13	1	7.6 (among males)
Females	17	3	17.6 (among females)
Total	30	4	14

This group comprised of 30 patients, out of which 13 were males and 17 were females. Mean age was 28 ranging from 10 years to 65 years. 4 out of 30 patients having modified Alvarado score 7 or more had negative appendectomy, out of which 3 were females (negative appendectomy rate 17.6%) and 1 was male (negative appendectomy rate 7.6%). Females with negative appendectomy had PID (1 cases), ruptured ovarian cyst (2 cases). Over all reduction through modified Alvarado score was insignificant (chi-square 0.480, df 1, p value 0.488). Similarly, statistically significant reduction could not be found both in female (chi-square 0.524, df 1, p value 0.469) and male (chi-square 0.179, df 1, p value 0.672) groups.

DISCUSSION

In actual modified Alvarado score is divided in 3 groups. No treatment group (score 1-4), observation group (score 5-6) and early surgery group (score 7-9). In our study, we evaluated the value of early surgery group for its role in reduction of percentage in the negative appendectomy. Over all percentage was 14% which is more than Avais S, et al (8.2%)[6], but less than Saidi HS et al at 19.7% [7] and McKay R et al 22.22% (8/36)[8]. Percentage of Negative appendectomy in female group was 17.6% which was 33% in AA Malik et al[9], 30% according to Kalam M et al [10], 22% according to the Owen et al [11] and 17.9% according to Khan I et al [12]. On the other hand rate in male was 7.6 % very close to the AA Malik et al (8%) [9] and Khan I (12 %) [12]. Over all reduction through modified Alvarado score was insignificant (chi-square 0.480, df 1, p value 0.488). Similarly, statistically significant reduction could not be found both in female (chi-square 0.524, df 1, p value 0.469) and male (chi square 0.179, df 1, p value 0.672) groups.

CONCLUSION

Modified Alvarado score is not helpful in significant reduction of the over all percentage of the negative appendectomy. Similarly, statistically significant reduction could not be found both in female and male groups. Further methods of evaluation should be used especially in females.

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