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MODIFIED ALVARADO SCORE FOR ACUTE APPENDICITIS

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Abstract:

Background: Modified Alvarado scoring system helps to reduce the negative appendicectomy rate without increasing morbidity and mortality.

Objectives: To analyse the validity of modified Alvarado score in the pre operative diagnosis of acute appendicitis.

Study design: Cross sectional study.

Setting: Konaseema Institute of Medical Sciences & Research Foundation, Andhra Pradesh, India.

Subjects: 100 patients provisionally diagnosed as acute appendicitis.

Study variables: Age, gender, symptoms, Alvarado score, ultrasound findings, management.

Statistical analysis: It was done using Epi-info version 7.0.

Results: Majority (37%) were in the age group of 21-30 years, 58% were males.. According to modified Alvarado score 9% have score 1 – 4, 23% have score 5 – 6 and 68% have score > 7. 80% of the patients have graded tenderness over McBurney's point. The sensitivity of modified Alvarado score of > 7 was 92.6%. the overall negative appendicectomy rate was 7.4%. The sensitivity was highest among males 97.6%, while in females it was 84.6%. Negative appendicectomy rate was highest among females (15.4%).

Conclusion: Alvarado score application improves diagnosis accuracy and reduces negative appendectomy so that it decreases the morbidity and mortality.

Key words: Alvarado score, Andhra Pradesh

Introduction:

Appendicitis is a great leveler in surgery, an antidote to diagnostic complacency. Albeit abdominal surgeons have been confronting acute appendicitis for more than 120 years its diagnosis remains elusive because of its notorious ability to stimulate other conditions and in the frequency it can be mimicked by other pathologies.

Delay in early diagnosis of acute appendicitis will lead to complications with their attendant increased morbidity. On the other hand, overzealous diagnosis may lead to a negative appendicectomy. So, even to this day a surgeon confronting a patient suspected of having acute appendicitis is wedged between the perforation and the

negative appendicectomy. A negative appendicectomy rate of 20-44% is not unusual in surgical literature and many surgeons would accept a negative appendicectomy rate of up to 30% as inevitable.

Further due to increase in use of appendix for urinary tract reconstruction[1,2,3] and biliary tract replacement it is probably important to save a normal appendix, as it is to remove a pathological appendix.

Although aids exist to enhance diagnosis, these are either complex or not easily available when most needed Alvarado scoring system described by Alvarado was designed to reduce the negative appendicectomy rate without increasing morbidity and mortality.

This present study aims to evaluate usefulness of this scoring system in patients who come to emergency OPD and provisionally diagnosed as acute Appendicitis.

Material and Methods:

The present cross sectional study was carried out in the Konaseema Institute of Medical Sciences & RF, Amalapuram, East Godavari district, Andhrapradesh, India. A total of 100 consecutive cases of suspected acute appendicitis that were admitted, investigated and treated were taken for the study. After detailed examination and investigations a modified Alvarado score was applied to cases. Approval from the Institutional Ethics Committee was taken prior to the study initiation and written consent was taken from the participants those who are willing to participate, after explaining the objectives and procedure of the study. In this study we used modified Alvarado score by excluding one lab finding –shift to the neutrophils maturation. (Score 1), instead patients were subjected to ultrasonography of abdomen. All patients who were considered for appendicectomy underwent ultrasonography of abdomen primarily to rule out other conditions mimicking acute appendicitis.

Inclusion criteria

- All patients presenting with right iliac fossa pain were included in the study.

Exclusion criteria

- Patients with appendicular mass or abscess.
- Appendicitis in pregnancy
- Patients of age less than or equal to 10 years

Modified Alvarado Score[4, 5, 6]

Symptoms:	
Migratory RIF pain	1
Anorexia	1
Nausea / vomiting	1
Signs:	
RIF tenderness	2
Rebound tenderness	1
Increase in temperature	1
Lab findings:	
Leukocytosis	2
Total count	9

Patients with score > 7 were considered for appendicectomy.

All the specimens of appendix were sent for histopathological confirmation of acute appendicitis. Final correlation between the scoring system and final diagnosis was made.

Results and Discussion:

Patients were divided in to two groups according to sex, 58 were male and 42 were female. Men are at greater risk than women for developing appendicitis.[7]

Majority of them (37%) were in the age group of 21-30 years. (Table – 1) Appendicitis is most frequently seen in patients in their third decade of life.[8]

Table - 1: Age and Sex Distribution

Age in years	Male	Female	Total
11-20	15	9	24
21-30	21	16	37
31-40	9	7	16
41-50	6	8	14
51-60	5	1	6
61-70	2	1	3
	58	42	100

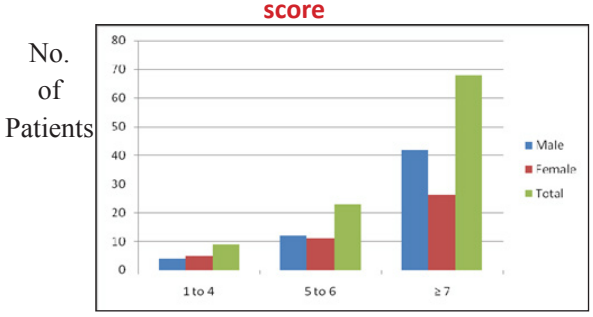
Most patients presented with classical symptoms of appendicitis including abdominal pain (migratory pain), nausea and vomiting, anorexia, typical signs such as right lower abdominal tenderness. (Table – 2)

Table – 2: Symptomatology of the patients

Symptoms	No. of patients	Percentage
Migratory pain	86	86%
Anorexia	93	93%
Nausea	50	50%
Raised temperature	47	47%
Rebound tenderness	45	45%
Increased TLC	42	42%

Majority (68%) of the patients have Alvarado score of > 7, among them males are 42% and females are 26%. (Figure – 1)

Figure – 1: Distribution according to Modified Alvarado score



Modified Alvarado score:

In our study negative appendectomy was highest among females 37.5% with score <7 and 15.4% with score >7. In males, negative appendectomy rate was 20% with score <7 and 2.4% with score >7.

In a study conducted by Kalan M et al.[4] negative appendix rate in women using alvarado score(it was modified by deleting last parameter – shift of neutrophils to left) was 33% v/s 22%.

In a study conducted by Bhattacharjee PK[9] who also incorporated ultrasonography for modified Alvarado score by deleting last parameter shift of neutrophils to left incidence of negative appendectomy was highest among females (28.1%).

Table - 3: Comparison of sensitivity of Modified Alvarado score <7

Category	Kalan et al	Bhattacharjee PK	Present study
Male	67%	83.3%	80.0%
Female	50%	66.7%	62.5%
Total	62.5%	73.7%	72.2%

Table - 4: Comparison of sensitivity of Modified Alvarado score >7

Category	Kalan et al	Bhattacharjee PK	Present study
Male	93%	94.1%	97.6%
Female	67%	71.9%	84.6%
Total	83.7%	82.7%	92.6%

Management:

Out of 100 patients in the study, 9 patients in score 1-4 group and 5 patients in score 5-6 group, a total of 14 patients were managed conservatively. Eighteen patients in score 5-6 group and 68 patients in score > 7 a total of 86 underwent appendicectomy. Among them 28 cases underwent laparoscopic appendicectomy and 58 cases underwent and open appendicectomy.

Conclusions:

The Alvarado score in its modified form together with abdominal ultrasonography is a cheap and quick tool that can be applied in emergency department to diagnose acute appendicitis.

Its application improves diagnostic accuracy and reduces negative appendectomy without increase in morbidity and mortality.

It may be concluded that high scores(>7) in modified Alvarado score is dependable aid in early diagnosis of acute appendicitis in men, but the same is not true as far as women are concerned, because of other conditions mimicking acute appendicitis like pelvic inflammatory disease, ruptured ectopic pregnancy.

References:

1. Morrow SE, Newman KD. Current management of appendicitis. Sem ped Surg 2007; 16:34-40.

2. Sarin YK, Puri AS, Sengar M, Sinha A, Gupta K. Use of Vascularised appendiceal graft for Biliary tract replacement in a case of choledochal cyst. J Ind assoc ped Surg 2007; 12(2): 80-2.

3. Mitrofanoff P. Appendicovesicostomy with gastric augmentation. In. Frank Hinman Jr. Editor. Atlas of Urologic surgery. 2nd ed. Vol.1, USA; Saunders W.B:1998. p.762.

4. Kalan M, Talbot D, Cunliffe WJ, Rich AJ. Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study: Ann Rcoll surg Eng. 1994; 76: 418-19.

5. Owen TD, Williams H, stiff G, Jenkinson LR, Rees BI. Evaluation of Alvarado score in acute appendicitis. Journal of the Royal society of medicine 1992; vol. 85: 87-8.

6. Sudhir Kumar Mohanty, Kaushik Sil. Evaluation of modified Alvarado score in decreasing negative appendicectomy rate – our experience. IJS 2000; 62(5): 342-3.

7. Charles V Mann. Vermiform appendix. In. Russel RCG, Williams NS, Bulstrode CJK Editors. Bailey & Love's, Short practice of Surgery. 25th ed. Vol 1, London; Arnold: 2004. p. 1204-18.

8. Fuijkschot J, Wijnen RMH, Gerrits GPJM, Dubois SV, Rieu PNMA. A neonate with an intact congenital umbilical appendix. an alternative theory on the etiology of the appendico-umbilical fistula. Pediatr Surg Int 2006; 22: 689-93.

9. Bhattacharjee PK, Chowdhury T, Roy D. Prospective evaluation of modified Alvarado scores for diagnosis of acute appendicitis. J Indian Med Assoc 2000; 100(5): 310-11.