

### Evaluation of Modified Alvarado Score in Diagnosis of Acute Appendicitis

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#### Abstract

**Background:** Acute abdominal pain is a common complaint among emergency department patients.

**Methods:** A 50 consecutive patients suspected of acute appendicitis who were admitted in department of surgery, RVRS medical college Bhilwara . They were prospectively evaluated using the modified Alvarado scoring (MAS) to determine whether or not they had acute appendicitis.

**Result:** In present study, out of total 50 patients 39% were have MAS score 7-9, 10% were have 5-6 and 1% have MAS score 1-4.

**Conclusion:** The study shows that use of MAS score in patients suspected to have acute appendicitis provides a high degree of diagnostic accuracy.

**Keywords:** Modified Alvarado Score (MAS), Acute appendicitis, Patients.

#### Introduction

Acute abdominal pain is a common complaint among emergency department patients. Diagnostics of one of the most common pathologies behind acute abdominal pain, acute appendicitis, has radically changed over the last decades. Traditionally, the diagnosis of appendicitis was made solely based on clinical symptoms and signs, and

later diagnosis included results of inflammatory laboratory variables such as leukocytes, neutrophils, and CRP. This practice in diagnostics led to a false positive diagnosis (negative appendectomy) rates in the range of 15-30%<sup>1-3</sup>.

The diagnosis of acute appendicitis is essentially clinical; however a decision to operate based on clinical suspicion alone can lead to removal of a normal appendix in 15-30% cases. The premise that it is better to remove a normal appendix than to delay diagnosis doesn't stand up to close scrutiny, particularly in the elderly. A number of clinical and laboratory based scoring systems have been devised to assist diagnosis. The most commonly used is the Alvarado score and equally its modifications<sup>4</sup>.

#### Material and Methods

**Study design:** Hospital based prospective study.

Study duration: 3 months .

**Study place:** Dept. of Surgery, RVRS medical college Bhilwara.

**Study population:** patients presenting with pain in the right lower quadrant of Abdomen, lasting fewer than 7 days who after clinical examination will be provisionally diagnosed to have acute appendicitis .

**Sample size:** 50 patients reporting to the Surgery dept. within study duration and eligible as per inclusion criteria will be included in the study.

**Sampling Method:** Convenience sampling

**Inclusion Criteria:** Patients with provisional clinical diagnosis of acute appendicitis

**Exclusion Criteria**

1. Patients of age less than or equal to 12 years
2. Patients with generalised peritonitis due to appendicular perforation
3. Patients with appendicular mass or abscess

**Data Collection**

Suspect acute appendicitis who were admitted, investigated and treated were taken for the study. After detailed examination and investigations a modified Alvarado score was applied to each case.

**Modified Alvarado Score**

This consists of three symptoms, three sign and a laboratory finding as described by Alvarado and later modified by Kalan et al<sup>5</sup>.

All patients were subject to USG. Ultrasonographic criteria will be:

- Non compressible appendix with diameter > 6 mm or wall thickness > 3mm
- Complex mass ( echo poor, asymmetric)
- Loss of contour
- Free fluid
- Local adynamic ileus
- Graded tenderness over Mc Burney’s point

Other biochemical tests like Hb, BT, CT, TLC, DLC, Urine C/E, FBS, Blood urea, Serum creatinine, ECG etc. will be done, if required. Surgical exploration if needed was done. Surgical findings were recorded and compared with Alvarado score findings and USG findings. All

appendices remove will be sent for histopathology. If pathologist reports no evidence of acute inflammation in the organ, the case will be designate as false positive Appendisectomy. Sensitivity and specificity of modified Alvarado score and USG was calculate separately and after combining both modalities together and will be compare with available literature.

**Data Analysis**

To collect required information from eligible patients a pre-structured pre-tested Proforma will be used. For data analysis Microsoft excel and statistical software SPSS will be used and data will be analyzed with the help of frequencies, figures, proportions, measures of central tendency, appropriate statistical test.

**Observations**

Table-1: Distribution of cases according to Age (N=50 cases)

Means age ( years)	30.20
SD	11.57

In present study, mean age of patients was 30.20±11.57 years.

Table-2: Distribution of cases according to Symptoms (N=50 cases)

Symptoms	No.	Percentage
Migration of pain to Right iliac fossa	47	94%
Anorexia	48	96%
Nausea and vomiting	44	88%

In present study, out of total 50 patients 48(96%) were presenting with anorexia, 47% presenting with Migration of pain to right iliac fossa and 44 % presenting with nausea and vomiting.

Table-3: Distribution of cases according to Sign (N=50 cases)

Sign	No.	Percentage
Tenderness in right iliac fossa	48	96%
Rebound tenderness	43	86%
Elevated temperature >37deg C	38	76%

In present study, out of total 50 patients 48(96%) were presenting with Tenderness in right iliac fossa, 43% presenting with Rebound tenderness and 76 % presenting with Elevated temperature >37deg C.

Table-4: Distribution of cases according to lab. Investigation (N=50 cases)

Lab . Investigation	No.	Percentage
Leukocytosis present	42	84%
Leukocytosis absent	8	16%

In present study, out of total 50 patients 42(84%) were present with leukocytosis.

Table-5: Distribution of cases according to Modified Alvarado Scoring (N=50 cases)

Modified Alvarado Scoring(MAS)	No.	Percentage
1-4	1	2%
5-6	10	20%
7-9	39	78%

In present study, out of total 50 patients 39(78%) were have MAS score 7-9, 10% were have 5-6 and 1% have MAS score 1-4.

**Discussion**

In present study, mean age of patients was 30.20±11.57 years.

Similar study has been done by Harsha et al.<sup>6</sup> In their study maximum incidence of acute appendicitis was found in the age group of 21 to 30 years , while Talukder et al<sup>7</sup> showed high incidence in third decade .

In present study, out of total 50 patients 48(96%) were presenting with anorexia, 37% presenting with Migration of pain to right iliac fossa and 44 % presenting with nausea and vomiting.

Vandakudri AB et al<sup>8</sup> was observed that the predominant symptom was anorexia (71.7%), the next common symptom being nausea/ vomiting (63.3%) and migration of pain to right iliac fossa (53.3%).

Appendicitis needs to be considered in the differential diagnosis of almost every patient with acute abdominal pain<sup>9</sup>. Early diagnosis remains the most important goal in these patients and is made in most cases based only on history and clinical examination. The typical presentation begins with periumbilical pain due to irritation of visceral nerves. Followed by anorexia and nausea. The pain then localizes to right lower quadrant as inflammatory process involves parietal peritoneum overlying appendix. Fever ensues, followed by development of leukocytosis.

In present study, out of total 50 patients 48(96%) were presenting with Tenderness in right iliac fossa, 43% presenting with Rebound tenderness and 43 % presenting with Elevated temperature >37deg C.

Vandakudri AB et al<sup>8</sup> was observed that The predominant sign was tenderness over RIF (75.8%). The next common sign was elevated temperature >37.3°C (68.3%) and rebound tenderness over RIF (46.7%).

In present study, out of total 50 patients 42(84%) were present with leukocytosis. Similar study was done by Thabit et al<sup>10</sup>. In his study 87% were present with leukocytosis.

In present study, out of total 50 patients 39(78%) were have MAS score 7-9, 10% were have 5-6 and 2% have MAS score 1-4. Similar result were observed by Vandakudri AB et al<sup>8</sup>.

Modified Alvarado described a scoring system in 1986 which was later modified by Kalan et al<sup>10</sup> to modified Alvarado score. The scoring system involves following components with a total score of 9. A score of 7 or more is considered high probability for appendicitis.

### Conclusion

The study shows that use of MASS in patients suspected to have acute appendicitis provides a high degree of diagnostic accuracy.

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