

Comparison of clinical scores in diagnosis of acute appendicitisDr. Hitendra K. Desai¹, Dr. Rajnish R. Patel², Dr. Bansil V. Javia³¹Assistant Professor, ²Associate Professor, ³2nd year Resident, Department of General Surgery, B.J.M.C and Civil Hospital, Ahmadabad.**Abstract:**

Background and objectives: The present prospective study is attempted to compare the efficiency of Alvarado, Teicher score, Fenyo score, Ohmann's score, in preoperative diagnosis of acute appendicitis in Indian population, in a tertiary health care centre. **Material and Methods:** 75 patients who presented with acute right Iliac fossa pain were analyzed using four different scoring systems. An abdominal ultrasound was also performed when necessary. The results of these scores, USG findings were compared to the intra operative findings and final histopathological report. **Result:** The Alvarado score had the best positive predictive value with high sensitivity. The Fenyo score was most sensitive for males, whereas the Teicher score was most sensitive for females. The Teicher score was the most specific. The Ohmann score had the highest negative predictive value. **Conclusion:** There was a 24% negative appendectomy rate in our study. The Alvarado score is ideal for borderline cases where a quick decision needs to be taken. Ohmann's score can be used to rule out appendicitis in the casualty setting as it has the best negative predictive value. Fenyo and Teicher's score with their high sensitivity can be used to reduce the number of negative appendectomies

Keywords: Appendicitis, Ultrasound, Scoring system**Introduction**

Acute appendicitis is one of the most common surgical emergencies which require prompt diagnosis. Appendicitis is a disease of the young with 40% of cases occurring in patients between the ages of 10 and 29 years. Its diagnosis is usually made depending on presenting history, surgeon's clinical evaluation, with the aid of laboratory tests and imaging modalities. A decision to operate based on subjective clinical suspicion alone can lead to removal of a normal appendix in 15-30% cases. Negative appendectomies are one of the burdens facing not only the general surgeon but also the patient himself and the society as a whole, since appendectomy, as any other operation, results in socio-economic impacts in form of lost working days and declined productivity, in addition to complications arising out of operative trauma caused to peritoneal lining & bowel. Ultrasonography is an accurate procedure that leads to the prompt diagnosis and early treatment of many cases of appendicitis, although it does not prevent adverse outcomes or reduce length of hospital stay.¹

to compare various clinical scoring systems in the diagnosis of acute appendicitis and incorporate them into the institutional protocol, which will improve the diagnostic accuracy, decrease dependency on imaging, reduce the number of negative appendectomies and hence the Socio-economic burden of the commonest surgical emergency, that is acute appendicitis, in the Indian health care scenario.

Material and Method

This study was conducted in 75 patients admitted to general surgical emergency ward, Civil Hospital, Ahmedabad from May 2018 to Oct 2019. Inclusion criteria-Patients with provisional diagnosis of Acute Appendicitis, undergoing emergency surgical management. Exclusion Criteria- Patients with conservative management, patients with generalized peritonitis due to appendicular perforation, patients with appendicular mass or abscess, patients <12 yr old. This study was conducted on patients presenting with pain in the right lower quadrant of Abdomen, lasting fewer than 7 days who after clinical examination are provisionally diagnosed to have acute appendicitis.

Result

Age distribution: The maximum no of patients (34) were in the age group of 21-30.

Sex distribution: 41 of the 75 patients were

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females (54.6%)

Negative appendectomy rate: 18 of the 75 patients operated were found to have a normal appendix. The negative appendectomy rate was 24%.

Complicated appendix: Of the 57 patients with acute appendicitis on histo-pathology, only 4 were above the age of 40 yrs. Of the 57 patients, 7 had perforated appendix (12.2%) and 2 had gangrenous appendix (3.5%). Of the 4 patients >40 years of age, 3 patients had complicated appendicitis (75%) as compared to 11.3% in the <40 years age group. This difference is statistically significant with p value of <0.001

Alvarado score²: 55 patients had a score more than 6, of which 48 had histologically proved acute appendicitis. Of the 20 patients with score less than 6, 9 patients had a histopathological report of acute appendicitis.

	Males	Females	Total
Sensitivity	85.2%	89.3%	87.3%
Specificity	57.1%	53.8%	55%
Positive predictive value	88.5%	80.6%	84.2%
Negative predictive value	50%	70%	61.1%

Teicher score³

On applying Teicher score, 33 patients had a score more than -3, of which 31 patients had a histologically proved acute appendicitis. 12 patients had a score of <-7. Two of these patients had acute appendicitis on histopathology. The remaining 30 patients had unequivocal score, of which 24 had histologically proved acute appendicitis.

	Males	Females	Total
Sensitivity	91.3%	100%	93.9%
Specificity	80%	85.7%	83.3%
Positive predictive value	80.8%	32.3%	54.4%
Negative predictive value	50%	60%	55.6%

Fenyo score⁴: 37 patients had a score ≥ -2 of which 36 patients were confirmed to have appendicitis on histopathology. 23 patients having a Fenyo score of ≤ -17 . Of these 10 patients had acute appendicitis on histopathology. 11 of the 13 patients with equivocal scores had acute

appendicitis.

	Males	Females	Total
Sensitivity	100%	93.3%	97.3%
Specificity	71.4%	50%	56.5%
Positive predictive value	84.6%	45.2%	63.2%
Negative predictive value	62.5%	80%	72%

Ohmann's score⁵: None of the patients had a score of <6. 41 patients had a score >11.5. 36 of these patients had histologically proved appendicitis. 34 patients with scores between 6 and 11.5 who needed to be observed according to the score, 21 of these patients had acute appendicitis.

	Males	Females	Total
Sensitivity	94.4%	82.6%	87.8%
Specificity	43.8%	33.3%	38.2%
Positive predictive value	65.4%	61.3%	63.2%
Negative predictive value	87.5%	60%	72.2%

Discussion

Despite improvement in imaging techniques and laboratory investigations, routine diagnosis of acute appendicitis still poses a challenging problem. The major area of concern worldwide is negative appendectomies (25-30%), perforated appendix (15-20%), delayed operations and longer hospital stay. Over the years, several diagnostic scoring systems have been evolved so as to aid the clinician in making a quick decision. In this study, we have evaluated the usefulness of these scores in an Indian set up and compared the scores.

The maximum number of patients was from the 20-30 age group. There was no significant difference in the incidence among males or females. Study had a negative appendectomy rate of 24% (18 of 75). This is comparable to other studies 30% in Ohmann's study⁶ and 15-30% as reported by Douglas et al. It was interesting to note that though only 4 patients with acute appendicitis were above the age of 40 years, 3 of them had complicated appendicitis (75%). This indicates the need for early diagnosis in the elderly.

The accuracy of the scores in our study were as follows:

The Alvarado score³ has the best positive

predictive value and a high sensitivity. Macklein and Radcliffe showed a sensitivity of 76% while Malik and Wani had a sensitivity of 82%; these were comparable with our study where the Alvarado score had a sensitivity of 87%.^{9,10}

It is a simple score and does not have an observation range. It is useful when a decision is needed to be taken on whether to operate on a clinically borderline case since it has a high positive predictive value.

Fenyo score was found to be the most sensitive amongst males and Teicher score was most sensitive in female patients. The Teicher score was the most specific amongst all scores.

Both these scores have a significant number of patients who fall in the observation range. Thus, in spite of their high sensitivity and specificity, they have limited value in decision making in borderline cases.

None of our patients had a score <6 in the Ohmann score. Thus, appendicitis could not be ruled out in any of our patients. Hence it is safe to say that patients with Ohmann score <6 are unlikely to have acute appendicitis. This score has a high negative predictive value. It can be used as a screening score by interns or paramedical staff. Ohmann's study using his score showed a sensitivity of 91% and specificity of 86%. Our study showed a similar sensitivity (87%) but a poor specificity (38%).

Conclusion

A 24% negative appendectomy rate was seen in our study. The Fenyo score is the most sensitive clinical score among males, whereas the Teicher score is the most sensitive among females. Usage of these scores could reduce the number of negative appendectomies.

The Alvarado score has the best positive predictive value. It could be used in borderline cases where a quick decision to explore or conserve needs to be taken. Combined use of modified Alvarado's Score and high frequency USG not only reduces negative appendectomy rate but also reduces morbidity and post operative complications.⁶

Ohmann's score⁵ can be used to rule out appendicitis in a casualty setting, as it has the best negative predictive value. Ultrasound examination

in our study was less reliable as compared to clinical scores in the diagnosis of acute appendicitis.

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