



ACUTE APPENDICITIS - EFFICACY OF SCORING SYSTEMS IN DIAGNOSIS AND SURGICAL MANAGEMENT

General Surgery

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ABSTRACT

Acute appendicitis is one among the common acute abdominal conditions that presents in surgical emergency. Prompt and precise diagnosis helps in decreasing complications like, abscess, perforation, and mass formation. Scoring systems which uses clinical features, and basic investigations were taken and efficacy of those systems were studied.

KEYWORDS

Acute appendicitis, Scoring systems, Modified Alvarado Score, Ohmann score, Eskelinen scoring.

INTRODUCTION:

Acute appendicitis is one of the most common conditions that presents in surgical emergency department needing swift management. Pain, nausea, vomiting, fever, guarding, increased leucocyte count are common presenting features of acute appendicitis.^[13] In spite its common presentation, diagnosis of acute appendicitis remains challenging with a negative appendectomy rate ranging from 20-30%. Post-operative complications following a negative appendectomy such as adhesions and hospital acquired infections can be avoided if we have a validated scoring system that shall accurately diagnose acute appendicitis.^[11] Anatomical variations in location of appendix may lead to confusion which delays diagnosis and intervention.^[14] Delay in surgical management may lead to abscess formation, perforation, sepsis. Since availability of radiological investigations round the clock is practically not feasible in all hospitals, for this study purpose scoring systems with clinical evaluation and basic investigations such as Eskelinen scoring, Ohmann's scoring and Modified Alvarado scoring are taken for validation. In spite of having various scoring, high level of suspicion and efficacy of treating surgeon further increase the precision and promptness in diagnosis thereby decreasing complications.^[12] Surgeon's efficiency will get refined if a better scoring system is followed, hence this study.

AIMS OF STUDY:

Study by various scoring systems for diagnosing acute appendicitis. Comparing sensitivity and specificity of Eskelinen score, Ohmann score, Modified Alvarado scoring (MAS).

Validation of scoring system towards accuracy and diagnosis of acute appendicitis, which is confirmed with Histopathological findings.

Selecting an accurate scoring system that helps in precise diagnosis of Acute appendicitis.

Inclusion Criteria:

Patients presenting with surgical emergency department with right lower abdomen pain.

Age: 10 years to 60 years.

Sex: Male, female, male child, female child and transgenders.

Hemodynamically stable patients.

Exclusion Criteria:

Age <10 years and >60 years.

Hemodynamically unstable patients.

Patients who undergone previous appendectomy.

Patients already diagnosed with other diseases causing right lower abdomen pain.

METHODS AND MATERIALS:

Study: Prospective Observational study.

Materials: 174 cases of right lower abdomen pain with acute presentation at Govt. Tiruvannamalai Medical College from August 2017 to February 2020.

After applying inclusion and exclusion criteria a total of 174 patients were studied.

Once a patient with acute presentation of right lower abdomen pain admits in surgical emergency department, Clinical examination, temperature, routine investigations like CBC, RFT, LFT, ECG, and X-Ray abdomen erect were taken. Patients kept nil per oral and IV fluids and antibiotics started. Clinical diagnosis made based on the following three scoring systems. Confirmation of diagnosis was done by post appendectomy histopathological study. Validation of scoring systems then analysed.

Scoring Systems Used:

Eskelinen scoring (Table 1)

Ohmann scoring (Table 2)

Modified Alvarado scoring (Table 3)

Table 1 Eskelinen Scoring

SIGNS AND SYMPTOMS	YES	NO
TENDERNESS	22.82	11.41
RIGIDITY	13.32	6.62
LEUCOCYTE COUNT >10,000	11.76	5.88
REBOUND TENDERNESS	8.50	4.25
PAIN AT RIF	7.02	3.51
DURATION OF PAIN <48 hr	4.26	2.31

Diagnostic ≥ 55

Non-Diagnostic <55

Table 2 Ohmann Scoring

SIGNS AND SYMPTOMS	SCORE
MIGRATION OF PAIN TO RLQ	1
TENDERNESS IN RLQ	4.5
REBOUND TENDERNESS IN RLQ	2.5
LEUCOCYTOSIS	1.5
AGE <50	1.5
ABSENCE OF URINARY SYMPTOMS	2
CONTINUOUS PAIN	2
GUARDING	1
TOTAL	16

Diagnostic ≥ 12

Non-Diagnostic <12

Table 3 Modified Alvarado scoring

PARAMETERS	SCORE
MIGRATION OF PAIN TO RIF	1
ANOREXIA	1
NAUSEA & VOMITING	1
TENDERNESS IN RIF	2
REBOUND TENDERNESS	1
PYRERXIA	1
LEUCOCYTOSIS	2
TOTAL	9

Diagnostic ≥ 7

Non-Diagnostic <7

OBSERVATION AND RESULTS:

Removed Appendix in all cases were sent to Histopathological investigations for confirmation of Appendicitis. Out of 174 samples, 40 (23%) turned negative for inflammatory features.

Table 4

CLINICAL FEATURES	NUMBER
RIF PAIN	174
ANOREXIA	138
NAUSEA/EMESIS	140
RIF TENDERNESS	168
FEVER	124
REBOUND TENDERNESS	124
LEUCOCYTOSIS	130
DURATION <48 HRS	154
RIGIDITY	7
CONTINUOUS PAIN	151
AGE<50	168
GUARDING	33
ABSENT URINARY SYMPTOMS	154

Sensitivity and specificity by MAS were found to be 79.8% and 72.5% respectively. Positive predictive value was 90.6% and Negative predictive value was 51.8%. (Table 6)

Table 5 MAS Results

MAS	PATIENTS	APPENDIX HPE +VE	APPENDIX HPE - VE
1	0	0	0
2	0	0	0
3	0	0	0
4	8	0	8
5	3	0	3
6	45	27	18
7	17	9	8
8	54	52	2
9	47	46	1
TOTAL	174	134	40

Table 6

MAS	HPE + VE	HPE - VE	TOTAL
DIAGNOSTIC 7 AND ABOVE	107	11	118
NON-DIAGNOSTIC LESS THAN 7	27	29	56
TOTAL	134	40	174

Ohmann scoring results. Its Sensitivity was 59.7%, and Specificity was 87.5%. The Positive predictive value being 94.1% and Negative predictive value of 39.3%. (Table 7)

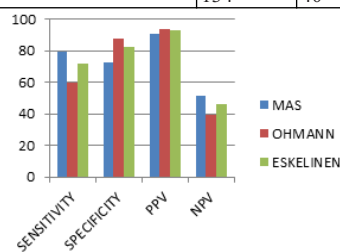
Table 7

OHMANN SCORE	HPE +VE	HPE -VE	TOTAL
DIAGNOSTIC 12 AND ABOVE	80	5	85
NON-DIAGNOSTIC LESS THAN 12	54	35	89
TOTAL	134	40	174

Eskelinen scoring results. The Sensitivity was 71.6%, and Specificity was 82.5%. The Positive predictive value was 93.2% and Negative predictive value 46.5%. (Table 8)

Table 8

ESKELINEN SCORE	HPE +VE	HPE - VE	TOTAL
DIAGNOSTIC 55 AND ABOVE	96	7	103
NON-DIAGNOSTIC BELOW 55	38	33	71
TOTAL	134	40	174

**Chart 1 Interpretation****DISCUSSION**

There are plenty of scoring systems for diagnosing acute appendicitis. Validation of scoring systems helps to choose a better system for precise diagnosis and also helps in finding additional criteria and investigations that may lead to an accurate diagnosis of appendicitis.

M.korkut, BediC in his study of validation among MAS, Tzankis, RIPASA, Eskilinen, Ohmann scores confirmed that Tzankis scoring has more sensitivity and specificity.^[2] Pajana Rastovic, Tminic Z in his study observed that, accuracy parameters are better for Ohmann score than Eskilinen than Modified Alvarado.^[1] Yilmuz EM in his study states that Alvarado scoring is better in predicting acute appendicitis and Ohmann scoring is better in eliminating diagnosis of appendicitis.^[4] Daniel j shogilev in his study states that CT abdomen and Ultra sonogram along with Alvarado scoring has better precision in diagnosis.^[5] Peyyastesh M, Askarpour in his study noted that, Modified Alvarado score has high sensitivity but low specificity for diagnosing Acute appendicitis in children.^[6] Sencon A, Aksoy N in their study states that most important factor for deciding for surgery is the operating surgeons experience than sensitivity and specificity of scoring systems.^[3] Garg PK Jain. BK suggests that combined use of Modified Alvarado with high frequency Ultrasound reduces negative appendectomy rate hence preventing unnecessary morbidity and post-operative complications.^[7]

Recent RCT by Gandy RC, Wang F suggest Non operative management in uncomplicated and non-perforated acute appendicitis has better outcome with only 23% requiring appendectomy at 1 year.^[8] Tan WJ Pek W in their study states that suspected Acute appendicitis with Alvarado score ranging 4-8 benefits from further CT evaluation.^[9] Shrivasta UH, Gupta A in their study state that cut off value of more than or equal to 6 MAS is more sensitive in Indian patients.^[10]

CONCLUSION:

Though the Positive predictive value is higher in all three scoring systems, the sensitivity and specificity are not so satisfactory. Negative predictive value is very low in all scoring systems. Hence an additional radiological investigation like Ultra sonogram or CT scan abdomen may give a better diagnostic precision and may decrease the negative surgical morbidity.

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