ORIGINAL RESEARCH PAPER

General Surgery

ROLE OF ALVARADO SCORING IN ACUTE APPENDICITIS: A SINGLE INSTITUTIONAL REVIEW OF 50 CASES

KEY WORDS: Alvarado Scoring,acute Appendicitis, appendectomy.

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ABSTRACT

Appendicitis today is the most common reason for emergency abdominal surgery and has a lifetime risk of 7-8%. It is a disease more commonly seen in the younger age. Our study aims to know the and severity of disease using Alvarado scoring. 50 patients were studied. Alvarado scoring helps in assessing severity of appendicitis where ultrasound and ct scan is not available in emergencies especially in rural setups. Implementation of this scoring system helps in diagnostic accuracy and reduces negative appendicectomy and thus reduces complication rates. The sensitivity of the test was found to be 81.25% and 73.68% respectively in male and female.

INTRODUCTION

The appendix was first described in 1521 and inflammation of the appendix has been known to be a clinical problem since 1759.[1,2] The term 'appendicitis', however, was not used until Reginald Fitz described this condition in 1886.[3]

Appendicitis today is the most common reason for emergency abdominal surgery and has a lifetime risk of 7-8%.[4] It is a disease more commonly seen in the younger population with a slight male preponderance. Its incidence rises slowly from birth and peaks in the late teen years, while gradually declining in the elderly age group.[5]

Simple appendicitis can progress to perforation, which is associated with a much higher morbidity and mortality, and surgeons have therefore been inclined to operate when the diagnosis is probable rather than wait until it is certain.[6]

As a result of their concern about this, surgeons create for themselves 'a surgical security zone which allows them to accept a 15-30% negative laparotomy rate with impunity'.[7]

These rates of negative appendicectomy have been considered "acceptable" because the morbidity associated with complicated appendicitis is significantly higher than that of non- therapeutic appendicectomy.

Scoring systems are valuable and valid instruments for discriminating between acute appendicitis and non specific abdominal pain.[8]

At present many scoring systems for the diagnosis of acute appendicitis are available.

Alvarado scoring system is one of them and is purely based on history, clinical examination and few laboratory tests and is very easy to apply.[9]

The use of an objective scoring system such as the Alvarado system can reduce the negative appendicectomy rate to 0-5%.[10,11]

However, this system is not a substitute for clinical judgment and just an aid in diagnosing acute appendicitis and assist in arriving at a conclusion whether a particular case should be operated or not, so that the number of negative laparotomies will be reduced. Our study is to evaluate the role of Alvarado Scoring System (MANTRELS Scoring) in diagnosis of acute appendicitis.

MATERIALS AND METHOD

A prospective study of 50 patients who were suspected enough to warrant surgery for acute appendicitis admitted in our hospital under various surgical units was conducted during a period from July 2016- July 2017.

INCLUSION CRITERIA

Patient coming to hospital with pain abdomen and diagnosed provisionally as acute appendicitis and are willing for surgery are included in the study.

EXCLUSION CRITERIA

pregnant females
any mass per abdomen
patient with recent history of any abdominal surgeries
patient not willing for surgery

DIAGNOSTIC CRITERIA FOR ACUTE APPENDICITIS

History of right lower quadrant pain or periumbilical pain migrating to the right lower quadrant with nausea and /or vomiting.

Fever of more than 38°C.

Right lower quadrant guarding and tenderness on physical examination.

Patients of any age group and both genders presenting to the out patient department or emergency department with pain in right lower quadrant of abdomen presenting with symptoms & signs of acute appendicitis are included in the study.

All included patients admitted, initially were subjected for detailed history taking which includes symptoms & duration of the disease; general physical examination & systemic examination.

Base-line investigations (CBC, urine routine examination, USG abdomen, peripheral smear for shift to left) are done.

This study was undertaken to evaluate the usefulness of Alvarado scoring system in reducing the number of negative appendicectomy and to evaluate its sensitivity & positive predictive value in the diagnosis of acute appendicitis.

In this study, 50 patients who presented with acute symptoms and pre-operatively diagnosed to have acute appendicitis were studied.

Then a specially designed proforma is filled in for each patient.

These proforma have general information about the patients plus eight variables based on the alvarado scoring system.

Then the sum of all the scores are calculated for each patient and based on the results patients are divided into three groups.

Score	Managment
7 to 10	Operative
5 to 6	Conservative or Operative
<5	Conservative

Diagnosis of acute appendicitis is confirmed by operative findings and histopathological assessment of the appendicectomy specimen. Finally the reliability of Alvarado scoring system is assessed by calculating negative appendicectomy rate (the proportion of operated patients having normal appendix removed) and positive predictive value (the proportion of patients with a positive test result who actually have the disease).

RESULT AND DISCUTION

Alvarado Scoring System is one of the many scoring systems available today. It is based on history, physical examination and few laboratory tests. It is a simple, easy to apply and cheap complimentary aid for supporting the diagnosis of acute appendicitis.

This study was undertaken to evaluate the usefulness of Alvarado scoring system in reducing the number of negative appendicectomy and to evaluate its sensitivity & positive predictive value in the diagnosis of acute appendicitis.

In this study, 50 patients who presented with acute symptoms and pre-operatively diagnosed to have acute appendicitis were studied.

Table-02: Out of 47 operated cases 39(82.97%) patient were found to have inflamed appendix.

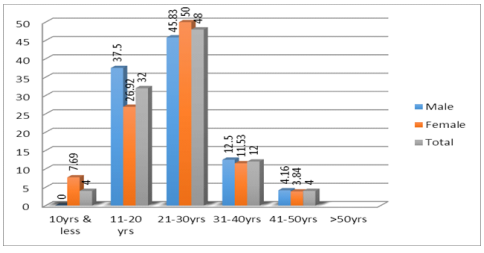
Total no. of cases of suspected appendicitis	No. of cases operated	No. of operated cases found to have inflamed appendix	Percentage of cases with inflamed appendix
50	47	39	82.97

Table-03: Age & sex distribution of patients.

Age in years	Male	Female	Total
≤ 10	-	02(7.69%)	02(4%)
11-20	09(37.5%)	07(26.92%)	16(32%)
21-30	11(45.83%)	13(50.00%)	24(48%)
31-40	03(12.5%)	03(11.53%)	06(12%)
41-50	01(4.16%)	01(3.84%)	02(4%)
Total	24	26	50

Acute appendicitis found commonly between 11 to 30 years. In this study male and female ratio was almost equal.

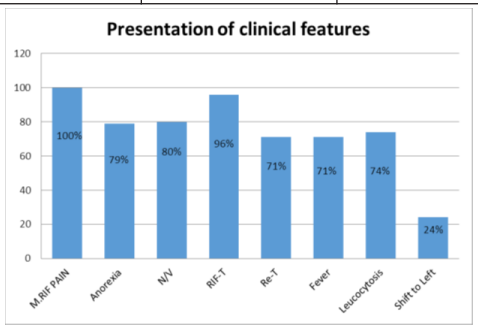
It is clear that incidence is less in younger and older age groups with peak incidence in 2nd and 3rd decade.



AGE INYEARS INFERENCE:

About 80% of the cases of acute appendicitis occurred between the age group of 11-30 years.

Clinical features	Number	%
Symptoms		
Migratoty RIF pain	50	100
Anorexia	39	79
Nausea/vomiting	40	80
Signs		
RIF- tenderness	48	96
Rebound-tenderness	36	71
Fever	36	71
Lab findings		
Leucocytosis	37	74
Shift to left	12	24



Pain was commonest presenting symptom and has been observed in all the cases (100%).

Next common symptoms observed were nausea/vomiting in 80% of cases and anorexia in 79% of case.

Low grade fever was present in 71% of cases.

On clinical examination, tenderness at McBurney's point was the commonest sign (96%).

Guarding was present in 8% of patients. It was present when the inflammation was severe.

In this study the TLC was increased in 74%, and Shift to left was noted in 24% of the cases.

Rebound tenderness was present in 71%.

Rovsing's sign was positive in 14%. This sign is seen whenever there is inflammation in the RIF. Psoas test was positive in 8% cases, whereas Obturator test was positive in 16% due to retrocaecal appendix. Rectal tenderness was present in 8% of the cases, which suggests pelvic position of appendix. Burning micturation was seen in 12% and bowel disturbance was seen in the form of constipation (10%) and diarrhoea (6%). Low grade fever was present in 71% of cases.

PATHOLOGICAL DIAGNOSIS AS PER HISTOPATH OLOGICAL REPORT

Histopathology (n=94)	Number of Cases	Percentage (%)
Normal	08	17.02
Catarrhal	15	31.91
Suppurative	19	40.42
gangrenous	03	6.38
Perforative	02	4.25

Table-07: Results of Alvarado Score on operated patients (n=47)

Sex	Number of Patients	Score 7-10	Appendicitis	Normal Appendix	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)

Male	22	17	16	01	81.25	50	94.11
Female	24	17	14	03	73.68	50	82.35
Children	01	01	01	00	100	100	100

Total of 47 patients were operated, out of which 22 were males, 24 females and 1 child.

17 males having score of 7-10, out of 16 had acute appendicitis, 1 patient had normal appendix (with mesenteric lymphadenitis). Male patients having score of 5-6 were 5, out of which 3 patients had acute appendicitis, 2 patients had normal appendix and both with mesenteric lymphadenitis. In 17 female patients having a score 7-10, 14 had acute appendicitis, 3 patients had normal appendix with other diseases, out of which 2 patients had PID and 1 patient had mesenteric lymphadenitis. In 7 females with score 5-6, 5 had acute appendicitis, 2 had normal appendix with other diseases (2 with PID).

The child subjected to appendicectomy had acute appendicitis.

Male patients with Alverado score 7 to 10 have sensitivity 81.25%, specificity 50% and positive predictive value 94.11%. Female patients with Alverado score 7 to 10 have sensitivity 73.68%, specificity 50% and positive predictive value 82.35%. Children with Alverado score 7 to 10 have 100% sensitivity, specificity and positive predictive value.

Table-08: Diagnostic value of Alvarado Scoring System

Alvarado Score	Histopathological Examination Result	
	Appendicitis	N.Appendix
7-10(n=35)	31(88.58)	04(11.42)
5-6 (n=12)	08(66.64)	04(33.33

Table-09: Negative Appendicectomy

N=50	No. Of negative Appendicectomy	Percentage
Male	03	12.50
Female	05	19.23
Children	-	-
Total	08	16.00

Table – 10: Comparison of Alverado score with other studies

Series	Sensitivity
Kalan et al[12]	81.63
Denizbasi A[13]	95.40
Al – Hashemy et al[14]	53.90
Shrivastava UK et al[15]	92.40
Present study	77.46

Sensitivity of present study can be compared with other studies as mentioned above in table no 10.

CONCLUSION

- The sensitivity of the Alvarado scoring system in males with score ≥7 to 10 was 81.25% with specificity of 50.00%. The positive predictive value in males was 94.11%.
- The sensitivity of the scoring system in females with score ≥7 to 10 was 73.68% with specificity of 50.00%. The positive predictive value in females was 82.35%.
- In children the test was very sensitive.
- Thus Alvarado score is very effective in the diagnosis of acute appendicitis in children and men but some other diagnostic modality is necessary to ascertain the diagnosis in females along with the clinical scoring system to rule out other pelvic pathology.
- In the diagnosis of acute appendicitis, the Alvarado score is a fast, simple, reliable, non-invasive, repeatable and safe diagnostic modality without extra expense and complications.
- It is very handy in peripheral hospitals where back up facilities like USG or CT scan is not available.
- It can be very helpful for junior doctors provided it is applied purposefully and objectively in patients of abdominal emergencies.
- The application of this scoring system improves diagnostic accuracy and consequently reduces negative appendicectomy and thus reduces complication rates.

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