

Evaluation of right iliac fossa pain with reference to modified alvarado score and correlation with histopathology

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Abstract

Background: Modified Alvarado score is used to determine likelihood of acute appendicitis based on clinical symptoms and signs, laboratory findings. The goal of this study is to determine whether modified alvarado score can be effectively used to diagnose acute appendicitis when correlated with histopathology. **Materials and Methods:** 100 patients with right iliac fossa pain were evaluated using modified alvarado score as prospective observational study from January 2015 to November 2016 and results correlated with histopathology. **Results:** In our study females were predominant in number, in the ratio of 1.08:1 to males. Out of 91 who were operated 75 had appendicitis and 16 had normal appendix with other disease. The overall sensitivity of the score was 87.32%. males had a sensitivity of 85.71% and females of 75.19%. After application of the scoring system the overall negative appendicectomy rate was 16% **Conclusion:** Modified Alvarado Score is cheap and easy to apply in acute appendicitis. This scoring system allows one to observe and reevaluate the patient as the clinical picture evolves. Its application improves diagnostic accuracy and consequently reduces negative appendicectomy rate.


Keywords: Modified Alvarado score, acute appendicitis, right iliac fossa pain, histopathology.

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INTRODUCTION

Although appendicitis has been a common problem for centuries, it was not until the early 19th century that appendix was recognized as an organ capable of causing inflammation. The pain in the right lower quadrant was falsely attributed to the inflammation of caecum. Inflammation of the appendix is called appendicitis. Acute appendicitis is the most common cause of intraabdominal infection in developed countries and appendicectomy is the most common emergency surgical operation. The diagnosis of acute appendicitis is purely based on history, clinical examination and laboratory investigation. Imaging techniques have been shown to add very little. A certain diagnosis can only be obtained at

surgery and after pathological examination of surgical specimen. A negative appendicectomy rate of 20-40% has been reported. Removing normal appendix is an economic burden both on patients and health resources. Misdiagnosis and delay in surgery can lead to complications like perforation and finally peritonitis. Difficulty in diagnosis arise in very young, elderly patients and females of reproductive age because they usually have atypical presentation and many other conditions also present like appendicitis and literature shows that 2-7% of all adults on exploration have diseases other than appendicitis. Scoring systems are valuable and valid instruments for discriminating between acute appendicitis and non specific abdominal pain. 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. Though there are classical and modified, we considered in our study the Modified Alvarado Scoring system.

MATERIALS AND METHODS

Design of study: It is a prospective observational type of study, conducted from January 2015 to November 2016.

Source of data: The data collected from all willing

patients with right illiac fossa pain getting admitted to tertiary care centre. **Inclusion criteria:** Willing patients with right iliac fossa pain - of age group 15- 50 years - of any sex. **Exclusion criteria:** Non consenting patients. - Patients with previous history of abdominal or inguinal surgery. **Sampling method:** Purposive sampling. **Consent:** - Nature of procedure, its advantages and side effects explained to the patients and written informed consent taken. - Permission taken from Head of the institute and Head of the department of general surgery.

Financial Burden: There is no financial burden on patient or relatives, as all required equipments and drugs are available at the institute. **Details of the Study:** From the period of 2015 January to 2016 September 100 cases of suspected appendicitis were studied. Modified Alvarado score was applied to all the patients and management strategy planned accordingly. Operative and conservative intervention was undertaken in patients with scores between 5-9 and <5 respectively. When surgery was done, the appendix specimen was sent for HPE. An attempt was made to correlate the clinical presentation with pathological findings.

Modified Alvarado Scoring System

Symptoms	Score
Migratory right iliac fossa pain	1
Nausea / Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Elevated temperature (>37.5°C)	1
Laboratory findings	
Leucocytosis (>10 x 10 ⁹ /L)	2

Based on the score the patients were divided into three groups.

Aggregate score 7-9(emergency surgery group):

In this group the probability of acute appendicitis is high and hence the patients are prepared and will undergo emergency appendicectomy.

Aggregate score 5-6 (observation group):

In this group the patients are admitted and kept under observation for 24 hours with frequent re-evaluation of the clinical data and reapplication of the score. If the condition of the patients improves as shown by a decrease in score the patient is discharged with the instructions to come back if symptoms persist or increase in intensity. On the other hand if on observation the condition of the patient deteriorates, the patient is taken up for surgery.

Aggregate score 1-4 (discharge home group):

These patients, after giving initial symptomatic treatment, will be discharged and sent home with the instructions, to come back if symptoms persist or condition become worse.

RESULTS

100 patients from January 2015 to September 2016 with the symptoms and signs of suspicious appendicitis were evaluated. Modified Alvarado score was applied to all these patients.

Various features like age, sex of the patient, clinical presentation, operative findings, histopathological examination were observed and analyzed. Stastical analyses of these observations were made and the results are as follows.

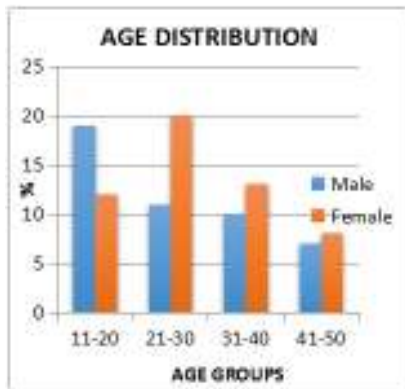


Chart 1

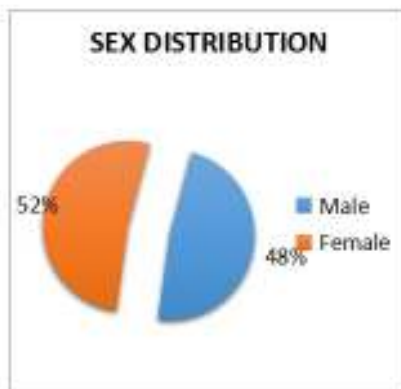


Chart 2

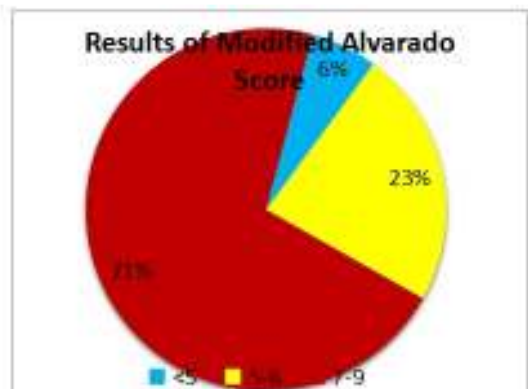


Chart 3

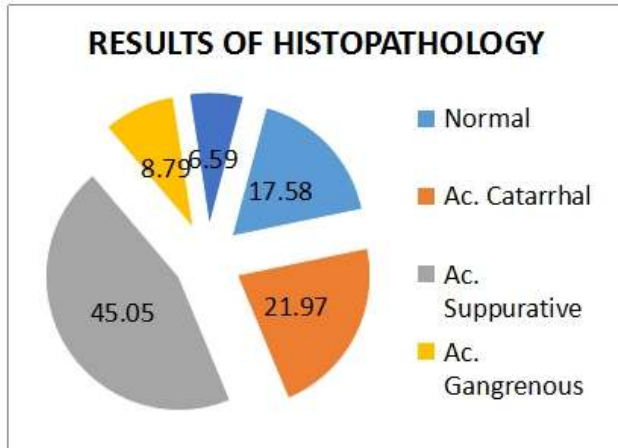


Chart 4

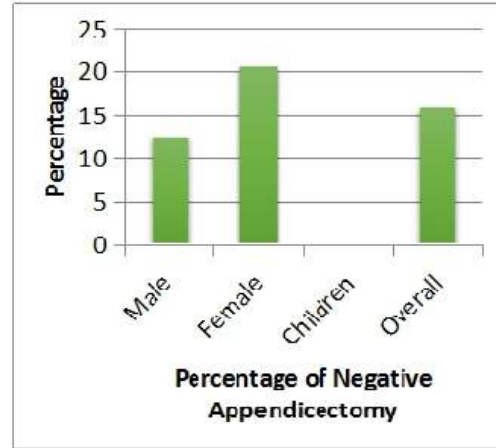


Chart 5

Legend

Chart 1: Age Distribution **Chart 2:** Sex Distribution **Chart 3:** Results of modified Alvarado Score as percentage of patients. **Chart 4:** Results of Histopathology. **Chart 5:** Negative appendicectomy percentage

Table 1: Presentation of Clinical features

Clinical Features	Number %
Symptoms	
Migratory RIF pain	100%
Anorexia	74%
Nausea/ Vomiting	86%
Signs	
RIF Tenderness	92%
Rebound tenderness	68%
Fever	74%
Lab findings	
Leucocytosis	90%

Table 2(A): Diagnostic value of Modified Alvarado Score

	Total no of Patients	Score>7	Appendicitis	Sensitivity
Men	48	35	30	85.71%
Women	52	36	32	88.88%
		Score 5-6*		
Men	48	10	5	50.00
Women	52	13	8	61.53
Inference	Alvarado score 7-9 has more diagnostic value for diagnosing appendicitis compared to Alvarado score 5-6. Overall Alvarado score >5 has got more sensitivity and of diagnosing patients for appendicitis.			

TABLE 2(B): Diagnostic value of modified Alvarado score

Variables	Sensitivity
Total:	
Alvarado score= >7	87.32%
Alvarado score = 5-6	56.52%
Males	
Alvarado score => 7	85.71%
Alvarado score = 5-6	50.00%
Females	
Alvarado score =>7	88.88%
Alvarado score = 5-6	61.53%

DISCUSSION

Acute Appendicitis is one of the most common causes of emergency surgical operation. The diagnosis of acute appendicitis is purely based on history, clinical examination and laboratory investigation. Imaging techniques have been shown to add very little. A certain diagnosis can only be obtained at surgery and after pathological examination of surgical specimen. A negative appendectomy rate of 20-40% has been reported. Removing normal appendix is an economic burden both on patients and health resources. Misdiagnosis and delay in surgery can lead to complications like perforation and finally peritonitis. Difficulty in diagnosis arises in very young, elderly patients and females of reproductive age because they usually have atypical presentation. Our study is a prospective study which included 100 patients a period of 2015 January to 2016 september. All cases of suspected appendicitis followed. Modified Alvarado score was applied to all the patients and strategy planned accordingly. In the present series the females slightly outnumbered males in the ratio of 1.08 :1. Most common age group presenting with right iliac fossa pain in our study is 11- 30 years. Out of 48 males score of >7-9 were 35; score of 5-6 were 10 and 3 had score < 5. Total 9 patients did not undergo appendectomy. One patient with mass in right iliac fossa was advised for interval appendectomy. Out of 52 female patients, 36 had score >7-9, 13 had score 5-6 and 3 had score <5, none had mass in RIF. Total of 91 patients were operated, of which 42 were males, 49 were females. 35 males having score 7-9, 30 had acute appendicitis, 4 patients had normal appendix, one had appendicular lump. Male patients having score of 5-6 were 10, out of which 5 had acute appendicitis. In 36 female patients having a score of 7-9, 32 had acute appendicitis, 4 had normal appendix with other diseases, like PID and ureteric colic. In 13 females with scores of 5-6, 6 had acute appendicitis, and 8 had normal appendix. In our series a score of 7-9 using modified Alvarado scoring system had a total sensitivity of 87.32%. Increased proportion (38.05%) of negative appendectomy is noticed (5.87 times more) for the ALVARADO score 5-6 and significantly decreased proportion (11.42%) negative appendectomy is noticed (0.17 times less) for the ALVARADO score 7-9. In our series negative appendectomy rate in females with score 5-6 was 38.46% and with score 7-9 was 16.67%. Men with score 5-6 had negative appendectomy rate of 37.50% and with score 7-9 had negative appendectomy rate of 11.76%. The overall ALVARADO score >5 has got more sensitivity (82.41%) and diagnostic accuracy (80%) of diagnosing patients for appendicitis. This indicates that by particularly adopting this system,

negative laparotomies can be reduced by a figure of 16%. Those patients who scored <5 did not require subsequent laparotomy, indicating the usefulness of the system ruling out acute appendicitis. In our series, when the score was more than 7, suggesting an inflammation localized to the RIF surgery was done within 6hrs of the patient getting admitted to hospital and it was observed that these patients had badly inflamed appendices, again indicating the sensitivity of the system. Laparoscopy can be advised as a diagnostic tool to minimize negative appendectomy rates. In patients whom score was 5-6, were observed and reassessed after a period of 12-24hrs, where there was persistence of abdominal tenderness with increased WBC count, appendectomy was done. These patients were also found to have congested and inflamed appendix. In our present study, the usefulness of the system was demonstrated beyond doubt by reducing the number of negative laparotomies, especially in men. In women negative laparotomies are still high and this can be reduced by laparoscopy.

SUMMARY AND CONCLUSION

The following conclusions were made after studying 100 cases of suspected appendicitis.

1. Nearly 62% of cases occur in second decades.
2. Females are a bit more frequently affected than males with female: male ratio of 1.08:1.
3. Migratory pain is the most common symptom. Nausea with vomiting is the second commonest symptom.
4. Leucocytosis especially neutrophilia, a feature of acute inflammation is present in 90% of the cases.
5. Commonest position of appendix in our study is retrocaecal position second common position is pelvic position.
6. Sensitivity and positive predictive value on using modified Alvarado scoring is 87.32% and 80% respectively.
7. The negative appendectomy rate of our study is 16% which is less from the described rate (20 to 40%).
8. Modified Alvarado score is easy to apply, in expensive and helps in decreasing the negative appendectomy rate.

Modified Alvarado Score is cheap and easy to apply in acute appendicitis. This scoring system allows one to observe and reevaluate the patient as the clinical picture evolves. Its application improves diagnostic accuracy and consequently reduces negative appendectomy rate.

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