

Comparing Accuracy of Alvarado Score and Ultrasonography with Operative Findings in Acute Appendicitis

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Abstract

Context: Acute appendicitis is one the very common acute abdomen presenting to the emergency department. Many scoring systems and radiological modalities have been developed over the years for the diagnosis of acute appendicitis. *Aims:* Our objective is to study acute appendicitis, the various clinical patterns that help to make a clinical diagnosis and effectiveness of radiological investigation in diagnosing acute appendicitis and its influence on clinical decision making. *Method:* The study group included all the patients presenting to KIMS Hubli with suspected acute appendicitis and operated for the same during December 2016 to May 2018. *Results:* The current study included 172 cases. Out of which 61.8% were male and 38.2% were female. Majority of the study population belonged to the age group of 10-30 years. The most common symptom was pain abdomen followed by nausea and vomiting, fever and anorexia. Most common sign elicited was right iliac fossa tenderness and followed by rebound tenderness. On blood investigations 66.5% of the patients had leukocytosis of >10,000. 64.1% of the patients had Alvarado score of 7 and more. As per USG, 94.1% of them had signs of acute appendicitis. The most common position in our study is retrocecal. Appendicitis was reported in all the cases on histopathological examination. *Conclusion:* Clinically diagnosing a case of appendicitis based on symptoms and signs combined with affordable radiological investigations can reduce unnecessary delay in the

operative management of acute appendicitis. It is evident in our study that clinical and radiological investigations have no specificity in clinical diagnosis of acute appendicitis.

Keywords: RIF- right iliac fossa, USG-ultrasonography

Introduction

The surgical treatment of appendicitis is one of the great public health advances of the last 150 years. Appendicitis is a disease of the young, with 40% of cases occurring in patients between the ages of 10 and 29 years. In 1886, Fitz reported the associated mortality rate of appendicitis to be at least 67% without surgical therapy [1]. Currently, the mortality rate for acute appendicitis with treatment is reported to be <1%. Today, ultrasonography (USG) of abdomen is one of the commonly asked investigations by the surgeon in case of acute abdomen. Advantage of USG over other radiological investigation is that it is easily available, cost effective, portable, no known side effects, non-invasive and requires minimal patient preparation [2]. ALVARADO score is the most commonly employed system for suspecting acute appendicitis clinically. There have been many studies for evaluating the efficacy of this scoring system.

Our objective is to study acute appendicitis, the various clinical patterns that help to make a clinical diagnosis and effectiveness of radiological investigation in diagnosing acute appendicitis and its influence on clinical decision making. The emphasis laid here is whether a proper

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history and clinical examination, coupled with cost effective investigation like ultrasound can help prove the diagnosis as later confirmed by operative and histopathology examination findings.

Materials and Methods

The study group included all the patients presenting to KIMS Hubli with suspected acute appendicitis and operated for the same during December 2016 to May 2018. The patients more than 18 years of age, patients who were admitted history of recurrent appendicitis and female patients with suspected gynecological problems were excluded from the study population. ALVARADO score was calculated for all the patients. This is a prospective observational study.

Results

The current study included 172 cases. Out of which 61.8% were male and 38.2% were female. 78.7% of the study population was in the age group of 10-30 years. The symptoms in our study were pain abdomen (100%), nausea and vomiting (64.2%), fever (45.1%) and anorexia (4.6%). Clinical presentation of acute appendicitis in adults at the Chris Hani Baragwanath academic hospital by Richard Nshuti et al. show that predominant presenting symptoms were right iliac fossa pain (95%), nausea (80%), and vomiting (73%) and fever was present in 15%. (Fig. 1).

Most common signs elicited were tenderness in the right iliac fossa (100%) and rebound tenderness

(84%). On blood investigations 66.5% of the patients had leukocytosis of >10,000.

64.1% of the patients had Alvarado score of 7 and more. When the Alvarado score of 5 and more was considered, there are 151 patients considered to be a case of acute appendicitis in which all were turned out to be having appendicitis on histopathological examination.

When the Alvarado score of 7 and more was considered to be the case of acute appendicitis, there are 110 cases suspected of acute appendicitis. All of them were turned out to be appendicitis on histopathological examination. The mean score is around 6 and the standard deviation is 1.65. Majority of the patients had score of 7 and above (64.1%). 23% of the patients had score of 5 and 6. Only 12.8% of our study population had score 4 and less. (Table 1).

Evaluation of the modified Alvarado score in the diagnosis of acute appendicitis: a prospective study by M Kalan et al. show that sensitivity of Alvarado score with cut off 7 was 93% in men, 67% in women and 100% in children which comparable to our study with sensitivity of 63.9 [3].

All the patients had undergone ultrasonography in our study. As per USG, 94.1% of them had signs of acute appendicitis. A Prospective Study of Ultrasonography in the Diagnosis of Appendicitis by Julien B.C.M. et al. shows that sensitivity of ultrasonography 80.55% whereas sensitivity in our study is 94.1% [4]. (Fig. 2).

On intra operative examination during open appendicectomy done in all the patients in our study population majority of the study population

Table 1: Show the distribution of Alvarado score in our study population

7-10	5-6	4 or less	mean	SD	minimum	maximum
111(64.1)	40(23.1)	22(12.8)	6.66	1.65	3	10

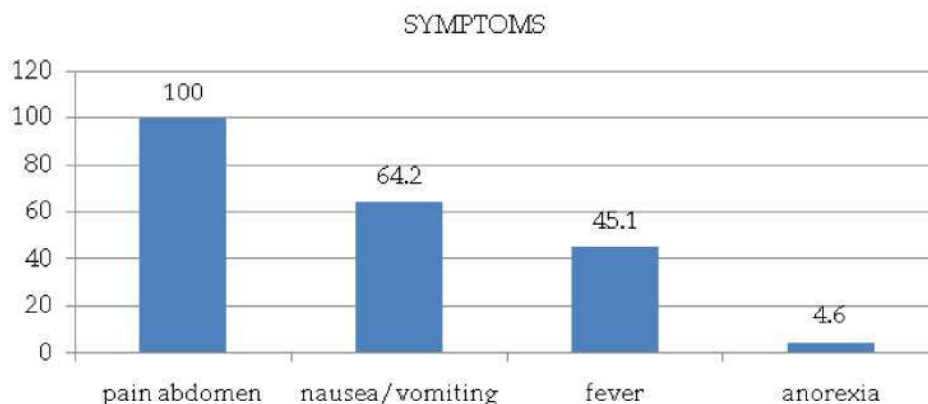


Fig. 1: Show the most common presenting symptoms in acute appendicitis

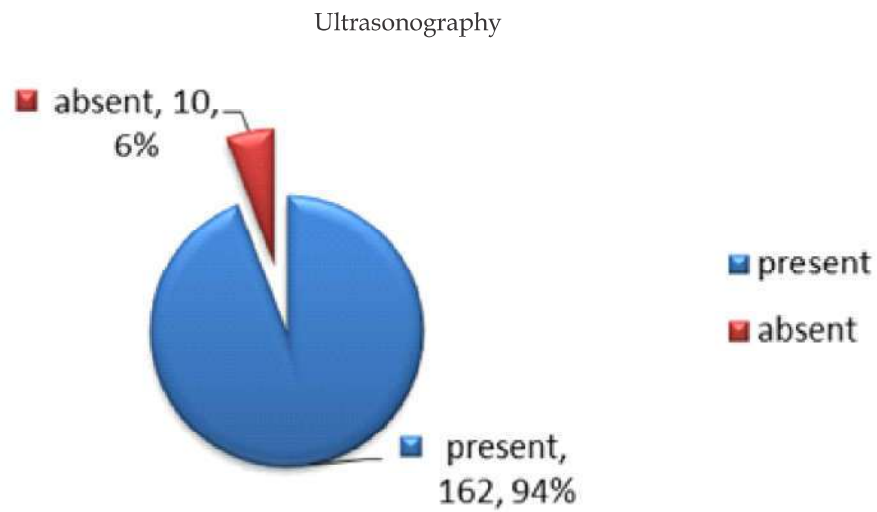


Fig. 2: Show the ultrasonography examination findings in suspected cases of acute appendicitis

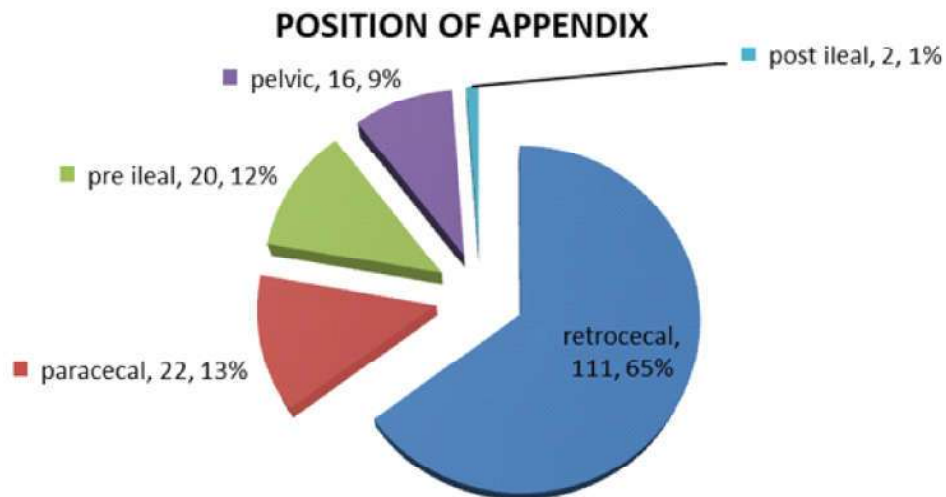


Fig. 3: Show the position of appendix on intra operative examination

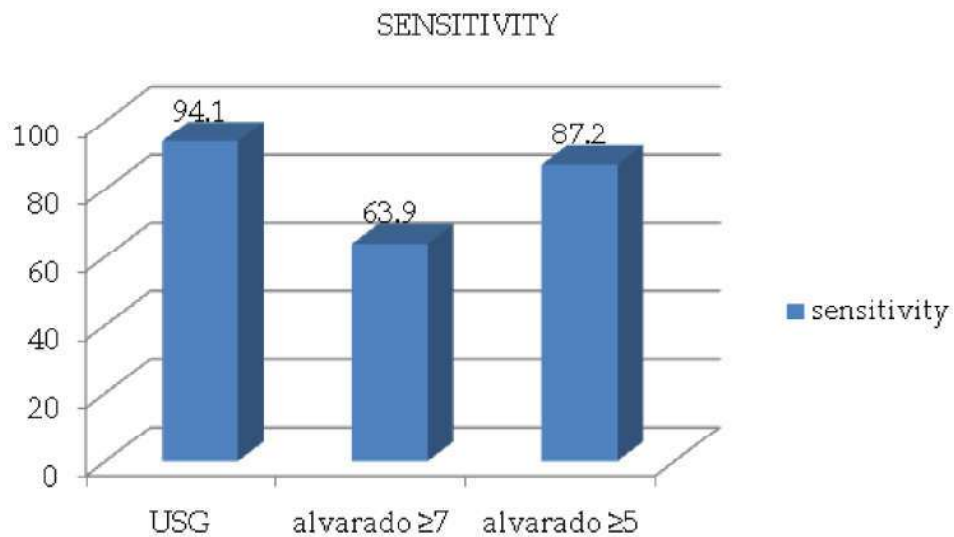


Fig. 4: Shows the sensitivity of different modalities of examination in the diagnosis of acute appendicitis

99.4% had evidence of inflamed appendix and only 1 normal appendix was witnessed. The most common position in our study is retrocecal (64.9%) and least is post ileal (1.2%). [Fig. 3]

All the specimens were sent for histopathology examination. Appendicitis was reported in all the cases on histopathological examination.

The sensitivity to diagnose appendicitis was highest in intra operative examination (99.41%), followed by ultrasonography (94.1%). Alvarado scoring has higher sensitivity when the cut off was kept at 5 (87.2%) and more rather than 7 (63.9%) and more.

Discussion

The study was conducted at Karnataka Institute of Medical Sciences from December 2016 to June 2018. The present study included total of 172 cases who were admitted with suspicion of acute appendicitis.

The lower incidence fever and nausea and vomiting could be due easy availability medication prescribed by the local doctors. The lower incidence of anorexia could be attributed the early presentation to the emergency centre where patients could not have appreciated the same. The lower incidence of rebound tenderness may be due to early presentation of the patients where parietal peritoneum was not inflamed. Histopathologically all the sent specimens were positive for signs of acute appendicitis and that could be due to inflammation that might happen during intra operative manipulation.

The lack of specificity in both Alvarado scoring and ultrasonography indicate that neither of these measurements was accurate in the diagnosis of acute appendicitis. ALVARADO score with cut off 5 significantly increased sensitivity of clinically diagnosing acute appendicitis. On considering the USG as the primary radiological investigation of choice, it has sensitivity of 94.1% but no specificity which might be due to objective differences in the

operator and difficulty in visualising the appendix due to overlying bowel gas shadow. So this objective scoring system with additional radiological investigation such as ultrasonography could possibly increase the sensitivity of diagnosing acute appendicitis. Sensitivity being lower with Alvarado score alone it is advisable to have ultrasonographic examination to increase the efficacy of the clinician in diagnosing acute appendicitis. (Fig. 4).

Finally clinically diagnosing a case of appendicitis based on symptoms and signs combined with affordable radiological investigations can reduce unnecessary delay in the operative management of acute appendicitis as it is evident in our study that clinical and radiological investigations have no specificity

Conclusion

Clinically diagnosing a case of appendicitis based on symptoms and signs combined with affordable radiological investigations can reduce unnecessary delay in the operative management of acute appendicitis. It is evident in our study that clinical and radiological investigations have no specificity in clinical diagnosis of acute appendicitis.

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