Research Article

SJIF Impact Factor 6.044

CLINICAL VS LABORATORY PARAMETER IN DIAGNOSIS OF ACUTE APPENDICITIS

Sunit Agrawal[1]*, Bhawani Khanal[1], Dipendra Thakur[1], Vikas Adil[1], Raj Kumar Sangroula[2] and Ashok Koirala[1]

[1]Department of General Surgery.
[2]Department of Public Health.

*Corresponding Author: Sunit Agrawal

Department of General Surgery.

ABSTARCT

Introduction: Acute appendicitis is one of the most frequent causes of acute abdominal pain often requiring surgical intervention. The condition is often difficult to diagnose especially during the early stages when the classical signs and symptoms are usually subtle .Therefore, an ideal diagnostic method or a combination of laboratory and clinical methods provides adequate information for proper treatment planning. **Methods**: A total of 100 patients were enrolled in this study following the Ethical approval. All the parameters like age, sex, demographic data including clinical parameters (migratory pain, anorexia, nausea/vomiting, fever, tenderness and rebound tenderness) and Laboratory parameters [Total Leucocyte Counts (TLC) and Ultrasonography (USG) of Abdomen and Pelvis] were entered to predesigned proforma and data was analyzed using SPSS software version 23. Confirmatory diagnosis of acute appendicitis was made by histopathological examination (HPE) report. **Result**: The mean age in our study population was 33.3 years. The male to female ratio was 3:2. Migration pain and tenderness was found in 100% of the participants. Leukocytosis was found in 30% of the participants. USG had sensitivity and specificity of 85.6% and 40% respectively in diagnosis of acute appendicitis in our study. Of the variables only TLC was significantly associated with HPE with p-value of 0.022. **Conclusion:** The main findings of our study confirmed improved diagnostic accuracy of combined clinical and laboratory parameters in the diagnosis of AA in the adult emergency population, compared to clinical or laboratory parameters alone.

KEYWORDS: Acute appendicitis, pain, total leucocyte counts (TLC), ultrasonography (USG),

INTRODUCTION

Acute appendicitis is one of the most frequent causes of acute abdominal pain often requiring surgical intervention.[1] It has a lifetime risk of 1 in 7 which means that 6% of the individuals suffer an attack during their lifetime with incidence of 8.6% for males and 6.7% for females.[2,3,4] The overall incidence of this condition is approximately 11 cases per 10,000 population per year. Acute appendicitis may occur at any age, although it is relatively rare at the extremes of age.[5]

Although acute appendicitis diagnosis is clinical, in some situations (diagnosis doubt) complementary tests might be useful.[6,7,8] The condition is difficult to diagnose especially during the early stages when the classical signs and symptoms are usually subtle.[9,10] Traditionally, the diagnosis is based on a clinical history of abdominal pain, migration of pain to the right iliac fossa and signs of local peritonitis. Lab parameter aiding in diagnosis of acute appendicitis includes ultrasound, CT scan, hemogram analyses such as such as white blood cell, differential counts (percentage of neutrophil granulocytes

and band neutrophil granulocytes), and c-reactive protein.[11]

While the clinical diagnosis may be straightforward in patients who present with classic signs and symptoms, atypical presentations may result in diagnostic confusion and delay in treatment.[12]

Therefore, an ideal diagnostic method or a combination of laboratory and clinical methods is still required. The main aim of this study is to evaluate clinical and laboratory parameter in diagnosis of acute appendicitis.

METHODS

This is prospective study conducted in Department of General Surgery, Nobel Medical College, Biratnagar, Nepal after taking ethical clearance from institutional review committee. Those patients fulfilling our inclusion criteria and who gave consent were included in our study. Initially 110 patients were included in our study. Among them 5 patients were lost to follow up. 5 patients didn't give consent. The study was conducted from February, 2018 to January 2019. A total of 100 patients

were enrolled in this study. Written informed consent was taken from the patients participating in the study.

Inclusion criteria for our study was: age above 18 years presenting with clinical symptoms and sign of acute appendicitis (suspected acute appendicitis that were decided by senior resident or consultant on duty to operate), presenting within 72 hours of onset and the patients willing to give consent.

The exclusion criteria include
1. patients not willing to give consent.
2. patients with history of pain abdomen more than 3 days.
3. patients with clinically palpable appendicular lump or appendicular abscess.

Our aim was to find out the effectiveness of clinical or laboratory parameters in the diagnosis of acute appendicitis. All the parameters like age, sex, demographic data including clinical parameters (migratory pain, anorexia, nausea/vomiting, fever, tenderness and rebound tenderness) and Laboratory parameters [Total Leucocyte Counts (TLC) and Ultrasonography (USG) of Abdomen and Pelvis] were entered to predesigned proforma and data was analyzed using SPSS software version 23. A descriptive analysis was done using mean, frequency, percentage and standard deviation. Bivariate analysis was done using chi-square test. Confirmatory diagnosis of acute appendicitis was made by Histopathological examination (HPE)report.

RESULTS
In this prospective study conducted at Nobel Medical College, Biratnagar, Nepal we found that the incidence of acute appendicitis was more in male (60%) than in female (40%). Age range of patient in this study varied from18-65 years and the Maximum patients (38) were from age group 21-30 years with a mean age of about 33.3 years [as depicted in table 1].

All patients presented with migratory pain in right iliac fossa. Temperature was elevated in 60 % of patients during presentation. Anorexia and Nausea/vomiting was present in 70% and 80% patients respectively. On examination all patients have tenderness over RIF whereas rebound tenderness was present in 70% patients. The symptoms at presentation are summarized in table 2. On viewing TLC reports 68% have counts ranging from 4001-11000/cumm and 32% have counts above 11000/cumm. USG diagnosed acute appendicitis in 83% patients with sensitivity and specificity of 85.6% and 40% respectively and positive predictive and negative predictive values of 92.8% and 23.5% respectively. HPE reports showed acute appendicitis in 90% cases. Of the variables only TLC was significantly associated with HPE with p-value 0.022.

Table 1: Age distribution.

Age Range	Frequency (%)
18-20	20
21-30	38
31-40	15
41-50	12
51-60	10
61-65	5

Table 2: Symptoms at presentation.

Symptoms at presentation	Frequency (%)
Migratory Pain	100
Anorexia	70
Nausea/Vomiting	80
Fever	40
Tenderness	100
Rebound Tenderness	70

DISCUSSION
Acute appendicitis remains the most common abdominal condition requiring surgical intervention worldwide.[2] However, the diagnosis of acute appendicitis still remains a challenge and can humble even the most experienced medical practitioner.[11] This may be due to variable presentations of the disease and lack of a reliable diagnostic test.[13]

Epidemiological studies have shown that appendicitis is more common in the age 10- 20 years group[14] which was in contrast to our study where it was common in 21-30 years age group with mean age of 33.3 years. Males were more frequently affected than females in our study, a finding in concordance with Memon ZA et al.[2]

By far, the most likely physical finding was abdominal tenderness, which occurred in 100% of patients. Patients with AA often find the right lateral decubitus position with slight hip flexion as the position of maximal comfort.[5] Rebound Tenderness was present in 70% of the patients.

In females of child bearing age, the presence or absence of bilateral tenderness, pain migration and vomiting may help to differentiate acute appendicitis from acute pelvic inflammatory disease where patients tend to have raised white cells count and demonstrate signs of peritonism which can make the differentiation between the two diagnoses on clinical grounds difficult.[15]

Our finding that the strongest clinical features for appendicitis were tenderness in the RLQ, rigidity, migration of pain to the RLQ, and elevated inflammatory laboratory parameters is in line with the findings of the meta-analysis.[6]

USG is rapid, non-invasive, inexpensive, and requires no patient preparation or contrast material administration. Although operator skill is an important factor in all USG examinations. USG has reported sensitivities of 75%-

90%, specificities of 86%-95%, accuracies of 87%-96%, positive predictive values of 91%-94%, and negative predictive values of 89%-97% for the diagnosis of acute appendicitis,[5] in our study the sensitivity and specificity of 85.6% and 40% respectively and positive predictive and negative predictive values of 92.8% and 23.5% respectively.

CONCLUSION

The main findings of our study confirmed improved diagnostic accuracy of combined clinical and laboratory parameters in the diagnosis of AA in the adult emergency population, compared to clinical or laboratory parameters alone.

CONFLICT OF INTEREST: None.

REFERENCES

1. Tan WJ, Acharyya S, Goh YC, Chan WH, Wong WK, Ooi LL, Ong HS. Prospective comparison of the Alvarado score and CT scan in the evaluation of suspected appendicitis: a proposed algorithm to guide CT use. J Am Coll Surg, 2015; 1(220): 218-24.
2. Memon ZA, Irfan S, Fatima K, Iqbal MS, Sami W. Acute appendicitis: diagnostic accuracy of Alvarado scoring system. Asian J Surg, 2013; 1(36): 144-9.
3. Birnbaum BA, Wilson SR. Appendicitis at the millennium. Radiology, 2000; 215: 337-48.
4. Rothrock SG, Pagane J. Acute appendicitis in children: Emergency Department Diagnosis and Management. Ann Emerg Med, 2000; 36: 39-51.
5. Petroianu A. Diagnosis of acute appendicitis. Int J Surg, 2012; 1(10): 115-9.
6. Anderson REB. Meta-analysis of the clinical and laboratory diagnosis of appendicitis. Br J Surg, 2004; 91: 28-37.
7. Humes DJ, Simpson J. Acute appendicitis – clinical Review. BMJ, 2006; 333: 530-34.
8. Panebianco NL, Jahnes K, Mills AM. Imaging and laboratory testing in acute abdominal pain. Emerg Med Clin North Am, 2011; 29: 175-93.
9. Owen TD, Williams H, Stiff G, Jenkinson LR, Rees BI. Evaluation of Alvarado scoring in acute appendicitis. J R Soc Med, 1992; 85: 87-8.
10. Singh K, Gupta S, Parga P. Application of Alvarado scoring system in the diagnosis of acute appendicitis. JK Sci, 2008; 10: 84-6.
11. Ulukent SC, Sarici IS, Ulutas KT. All CBC parameters in diagnosis of acute appendicitis. Int J Clin Exp Med, 2016; 1(9): 11871-6.
12. Birnbaum BA, Wilson SR. Appendicitis at the millennium. Radiology, 2000; 215: 337-48.
13. Phophrom J, Trivej T. The modified Alvarado Score versus the Alvarado Score for the diagnosis of acute appendicitis. Thai J Surg, 2005; 26: 69-72.
14. Limpawattanasiri C. Alvarado score for the acute appendicitis in a provincial hospital. J Med Assoc Thai, 2011; 94: 441-9.
15. Lee CC, Golub R, Singer AJ, Cantu Jr R, Levinson H. Routine versus selective abdominal computed tomography scan in the evaluation of right lower quadrant pain: a randomized controlled trial. Acad Emerg Med, 2007; 14: 117-22.