

Original Research Article

Acute Appendicitis with Normal Total Leukocyte Count

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Abstract

The objective of this study was to ascertain whether acute appendicitis can occur in patients with a normal leukocyte count. This study was prospective and descriptive. In this study, patients of all ages coming to this hospital with pain in the right iliac fossa with duration less than seven days were included. All patients were clinically assessed for signs and symptoms of acute appendicitis and haemoglobin (Hb) %, total leukocyte count (TLC) count, Urine D/R and ultrasound of abdomen was observed. Patients having increase total leukocyte count, diabetic patients, patients with lump in the right lower quadrant and patients with hepatitis B and C reactive were excluded from this study. A diagnosis of acute appendicitis was made and patients were prepared for appendicectomy in emergency and appendicetomies done, per-operative findings were recorded and specimen sent for histopathology. This study included fifty patients of acute appendicitis with normal leukocyte count in which 56% of patients were male and 44% of patients were female. The minimum age of the patient was five years and maximum was 67 years with a mean age 20.32 years. Majority of patients had pain less than three days of duration while only 8% had pain duration more than four days. Ultrasound showed 26% of patients having normal appendix while 74% had inflamed appendix. A total of 6% of patients had no signs of inflammation on naked eye appearance per operatively, 12% had minimal signs of inflammation while 82% of patients had moderate to severe signs of inflammation. Histopathology showed 2% of patient had non-inflammatory appendix, 10% had minimal inflammation, and 72% had moderate inflammation while 16% had severe inflammation. Patients having signs and symptoms of acute appendicitis may have a normal total leukocyte count. The diagnosis of acute appendicitis is mainly clinical not laboratory based. So minimum investigations should be done in cases of acute appendicitis where clear signs and symptoms of acute appendicitis are present, in order to avoid delay in surgery and save costs involved.

Keywords: Acute appendicitis, total leukocyte count, perforation, appendicular lump, appendicectomy

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Introduction

Acute appendicitis (AA) is the most common surgical disease seen in surgical department, which can be treated in time if diagnosed early otherwise it may lead to complications like perforation, peritonitis and lump formation (1). The appendiceal perforation is usually because of delay in diagnosis and treatment. Therefore, the longer the delay between diagnosis and surgery, the more likely is the perforation leading to peritonitis. Initially total leukocyte count (TLC) and neutrophil count were considered to be reliable tools

for the diagnosis of acute appendicitis but now they are not reliable parameters especially in children, necessitating a search for more sensitive criteria to diagnose acute appendicitis (2). Several studies have been performed in order to diagnose an acute appendicitis using history taking, clinical findings and laboratory investigations. Investigations like CT scan are used to diagnose acute appendicitis in difficult and atypical cases (3). In the present case in our set up, many patients who came to our public sector hospitals were poor and could not afford such high cost of treatment expenses. Diagnosis of acute appendicitis is

easy in typical cases, but difficult in atypical cases (4). The diagnostic value of total leukocyte count and CRP in establishing the diagnosis of appendicitis has contradictory results as simple appendicitis was observed in normal total leukocyte count and CRP (5). Therefore, the diagnostic role of white blood cell (WBC) count in cases of acute appendicitis in emergency medicine is not clear (6). Therefore, a normal total leukocyte count and CRP value do not exclude acute appendicitis especially in children (7). In the present study, the history, clinical findings and investigations including ultrasonographic (USG) findings of patients were examined to diagnose acute appendicitis with a normal leukocyte count. The results of the present study may be helpful in future for early diagnosis and treatment of acute appendicitis in typical and atypical patients with normal leukocyte count and to avoid its complications.

Materials and Methods

This prospective and descriptive study was performed in Surgical Unit-1, Abbasi Shaheed Hospital and Karachi Medical & Dental College, Karachi which is a tertiary care hospital in the district central Karachi from July 2011 to June 2012. All patients, male and female from different age group attending surgical outpatient department and emergency with pain in right iliac fossa of less than seven days duration were included in this study while patients with diabetes mellitus, raised TLC, lump in right iliac fossa and hepatitis B and C reactive patients were excluded from this study. All patients were clinically assessed for signs and symptoms of acute appendicitis first and then labs were sent including Hb %, TLC count, Urine D/R and ultrasound of abdomen. Diagnosis was made on clinical findings and on ultrasound findings then patients were counseled for surgery and written consent was taken. Patients were prepared for appendicectomy, prophylactic antibiotics were given and surgery done. Findings were recorded and the appendix was sent for histopathological examination. Histopathology report collected and all information of the patients was recorded in a proforma and data was analyzed on SPSS version 10.

Results

This study included fifty patients (N=50) of acute appendicitis with normal leukocyte count of which 56% of patients were males (28) and 44% of patients were females (22) (Fig. 1). The minimum age of the patient was five years and maximum age was 67 years with a mean age 20.32 years. Six percent of the patients were below 10 years of age, 54% of patients were between 11 to 20 years, 34% of patients were

between 21 to 30 years while 6% of patients were above 31 years of age. Most of the patients in our study were teenagers (Fig. 2). Twenty six percent of the patients (13) presented with one day history, 22% patients with two days history, 24% of patients (12) presented with three days history, 20% of the patients (10) with four days history while 8% of patients presented with more than four days history (Fig. 3). Majority of our patients had pain less than three days of duration while only 8% of patients had pain duration more than four days. Ultrasound revealed 26% of patients (13) having normal appearance of appendix while 74% of the patients (37) had inflamed appendix on ultrasound (Fig. 4). Six percent of patients (3) had no signs of inflammation on naked eye appearance, 12% of patients (6) had minimal signs of inflammation while 82% of patients (41) had moderate to severe signs of inflammation (Fig. 5). Histopathology of the appendix showed 2% of patient (1) had non-inflammatory appendix while 98% had inflammatory appendix in which 10% of patients (5) had minimal inflammation, and 72% of patients (36) had moderate inflammation while 16% of

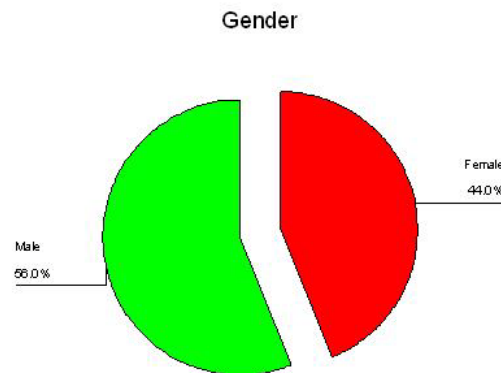


Figure 1: Gender distribution of patients

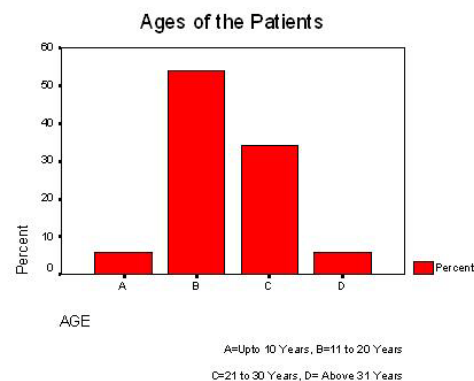


Figure 2: Age distribution of patients

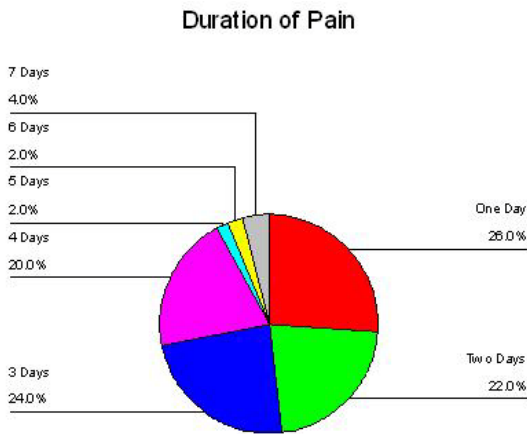


Figure 3: Duration of pain of patients on presentation

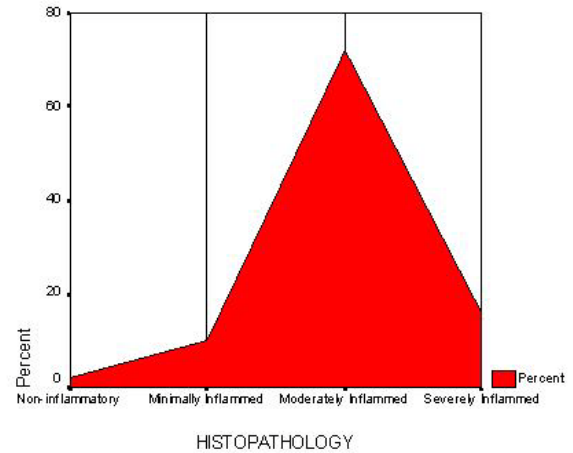


Figure 6: Histopathological findings of appendix

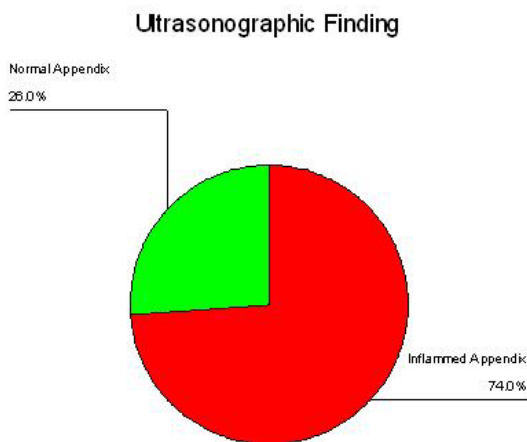


Figure 4: Findings on emergency ultrasound abdomen

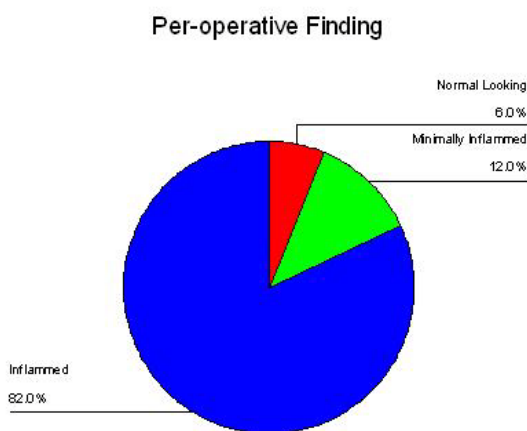


Figure 5: Per-operative findings of appendix

Table 1: Summary of the results

Final Result (N=50)				
Normal Appendix	Inflamed Appendix			Total
	Mild	Moderate	Severe	
1	5	36	8	50
(2%)	(10%)	(72%)	(16%)	(100%)

patients (8) had severe inflammation on histopathology (Fig. 6) (Table 1).

Discussion

In this study, the main clinical features including pain in the right iliac fossa, duration of pain, tenderness, rebound tenderness, cough sign, pointing sign and diagnostic modality (ultrasound abdomen) were studied. The results showed that most of the patients were teenagers while only few patients were above 30 years which is similar to the most of the studies conducted in western countries (3, 8). Majority of our patients were males (56%) which is similar to the study conducted in Columbia University College of Physicians and Surgeons, New York, USA by Kharbanda et al. in Jan 2012 (9). The main presenting feature was pain in the right iliac fossa in our study while majority of the studies showed pain in periumbilical or epigastric region which shifted to the right iliac fossa (10). The duration of pain in our study mainly ranged between one to four days and only 8% of patients presented between five to seven days while some studies showed the time of presentation was 24 to 48 hours (11). Other studies showed less than four days (9). In our study the TLC was within normal range in all patients while majority of other studies showed a raised TLC (12) but some of the researchers also showed that total leukocyte is not reliable and

may be normal in acute appendicitis (2,13). The diagnosis of acute appendicitis was mainly made on the basis of history and clinical examinations and it was supported by an ultrasound of abdomen in our study while in other studies CT/MRI scan was required to diagnose the case (14) which are too costly to afford for our patients. Results of the present study showed that only 6% of the patients had normal appendix, 12% of the patients had minimally inflamed appendix and 82% of the patients had moderate to severe inflammation of the appendix while other studies showed that normal looking appendectomy rate is 8.2% (3) while in some centres it is 15 to 20% (15) which is quite high as compared to our study. The histopathology confirmed that 98% of the patients had inflamed appendix in this study while majority of the studies showed less than this result and a study done by Mekhail et al. in Sep. 2011 in Department of Surgery, Aintree University Hospital, Liverpool, United Kingdom showed only 75.4% positive histopathology results (16). In our study only 2% of the patients had non-inflamed appendix while majority of the studies showed quite different results from 5% to 25% (17, 18) which indicates that the clinical experience is more important than the costly investigations. Different researchers tried different investigations to diagnose the acute appendicitis (3, 19) and to minimize the chances to operate on a normal appendix (20) but it is clear from this study that history and clinical examination is the main diagnostic tools for acute appendicitis which may be supported by a simple ultrasound of the abdomen by some experienced sonologists. It is also evident from this study that it is not necessary that acute appendicitis without a raised total leukocyte count is not possible, but most of the study showed a raised leukocyte count (21) instead acute appendicitis may be found with a normal leukocyte count as supported by other studies (2, 22). The success rate in diagnosing acute appendicitis by history, clinical examination and using diagnostic modality like ultrasound was 98% in our study which is quite high compared to other studies (3, 19, 23).

Conclusion

Patients having signs and symptoms of acute appendicitis may have a normal total leukocyte count and the diagnosis of acute appendicitis is mainly clinical, not laboratory based. Hence, minimum and simple investigations should be done in cases of acute appendicitis where clear signs and symptoms of acute appendicitis are present to avoid delay in surgery and to save the cost of the expenses, as well.

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