

## ORIGINAL RESEARCH ARTICLE

## OPEN ACCESS

### CLINICAL PRESENTATION OF PATIENTS WITH ACUTE APPENDICITIS AND FACTORS ASSOCIATED WITH DELAYED PRESENTATION AT YEKATIT 12 MEDICAL COLLEGE HOSPITAL

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#### ABSTRACT

**Background:** Acute appendicitis is one of the commonest surgical abdominal emergencies. Delayed presentation leads to complications. Different factors are responsible for delayed presentation.

**Objective:** The study was conducted to assess the clinical presentation and factors responsible for delayed presentation in patients with acute appendicitis at Yekatit 12 Medical College Hospital.

**Methods:** A retrospective analysis of patients with clinical diagnosis of acute appendicitis from September 1, 2013 to August 31, 2016.

**Results:** The male to female ratio was 2.3:1. The mean age was 20.2 years. The typical migratory abdominal pain was observed in 85.5% of the cases. The average durations of symptoms at presentation among patients with uncomplicated and complicated appendicitis were 2.5 and 5.8 days, respectively. The mean durations of symptoms among patients with complicated appendicitis with and without history of prehospital treatment were 5.3 and 2.7 days, respectively. The mean durations of symptoms among patients with complicated appendicitis who had and had not abdominal sonography were 4.8 and 2.6 days, respectively.

**Conclusions:** Most of our patients with acute appendicitis presented with a typical clinical presentation. Delayed presentation was associated with complicated appendicitis. Misdiagnosis, prehospital treatment and ultrasound study before surgical consultation were reasons for delayed presentation and complicated appendicitis.

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## INTRODUCTION

Acute appendicitis refers to the inflammation of the vestigial veriform appendix. It is a frequent reason for emergency hospital admission. Appendectomy, removal of the appendix, is one of the most common emergency procedures performed in contemporary medicine. The lifetime risk of developing appendicitis in the USA is 8.6% for males and 6.7% for females, with the highest incidence in the second and third decades. Acute appendicitis is very common in the Western countries. The incidence in the United Kingdom is about 52 per 100,000 population (Mike, 2015; John, 2008 and Addis, 1990). It is relatively a rare disease in Africa.

The incidence is estimated to be less than 9 per 100,000 population in South Africa (Richard, 2014). The incidence of the disease is now thought to have increased in African populations which is probably due to the adoption of more western patterns of life (Burkitt, 1973 and Gelfand, 1976). The diagnosis of acute appendicitis is mainly clinical. Sudden onset of acute abdominal pain is the primary presenting complaint of patients with acute appendicitis. Patients with acute appendicitis may come with typical or atypical presentation. Typical presentation begins with initial diffuse perumbilical pain for several hours, which later migrates to the right lower quadrant (RLQ) of the abdomen. Atypical presentations lack this typical progression and may include initial pain in the right lower quadrant and remains there (Joe, 2006; Anderson, 2004 and Doherty, 2010). In 1889, Chester McBurney described characteristic migratory pain as well as

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localization of the pain along an oblique line from the anterior superior iliac spine to the umbilicus (Mike, 2015 and John, 2008). Murphy observed the occurrence of typical sequence of colicky central abdominal pain followed by vomiting with migration of the pain to the right iliac fossa in 50% of the patients (Murphy, 1904). Acute appendicitis, if left untreated, may complicate leading to gangrene, inflammatory mass, appendicular abscess, perforation with generalised peritonitis with subsequent sepsis and death. Early diagnosis remains most important and can be made primarily on the bases of history and physical examination in most cases (Fulton, 1999; Okobia Mn, 1999; Levy, 1997; John, 1993; Chamisa, 2009; Willmore, 2001; Madiba, 1998 and Mason, 1977). The diagnosis of complicated acute appendicitis could clinically be supplemented by ultrasound or computed tomographic scan (De Castro, 2012 and Sengupta, 2009). Different studies showed that patient delay in seeking medical attention and misdiagnosis by physicians, non-doctors, and surgeons were reasons for occurrence of complicated appendicitis (Pittman-Waller, 2000; Asad, 2015). The objectives of this study were to assess the prevalence, clinical presentation, and factors associated with delayed presentation and complications in patients with acute appendicitis admitted at Yekatit 12 Medical College Hospital (Y12MCH), Addis Ababa, Ethiopia.

## MATERIALS AND METHODS

Yekatit 12 Medical College Hospital (Y12MCH) is a teaching and referral hospital. It is located in Addis Ababa, the capital city of Ethiopia. Department of Surgery has 60 surgical beds. The hospital delivers surgical services to elective and emergency patients coming from the metropolis and neighbouring villages.

**Table 1. Pattern of Acute Appendicitis by Sex, Age and Place of Residence, Y12MCH, Addis Ababa, Ethiopia, September 2013-August 2016**

Characteristics	No. of Patients	Percentage
Sex		
Male	696	69.7
Female	302	30.3
Age Groups		
0-10	156	15.6
11-20	401	40.2
21-30	328	32.9
31-40	66	6.6
41-50	12	1.2
51-60	17	1.7
61-70	8	0.8
>70	10	1.0
Age (mean ± SD)	20.2± 7.1 years	
Age range	3-84 Years	
Place of Residence	No. of Patients	Percentage
Addis Ababa (A.A.)	893	89.5
Outside A.A.	78	7.8
Unknown	27	2.7

All medical records of patients who were admitted to Y12MCH with a diagnosis of acute appendicitis in the period between September 1, 2013 and August 31, 2016 were reviewed. All patients with a clinical diagnosis of acute appendicitis were considered eligible for this study. Data was collected from the patients' medical records by using structured questionnaires. Variables extracted were patient demographics, clinical symptoms and signs, durations of

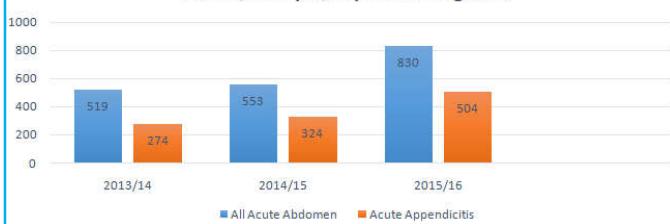
symptom presentation, prehospital treatment history, ultrasound study reports, operative findings, postoperative complications, duration of hospital stay, and treatment outcomes. Data analysis was done using SPSS software and the results were presented using frequency distribution tables and figures. Tests of significance were done where appropriate and P value of <0.05 was taken as statistically significant.

## RESULTS

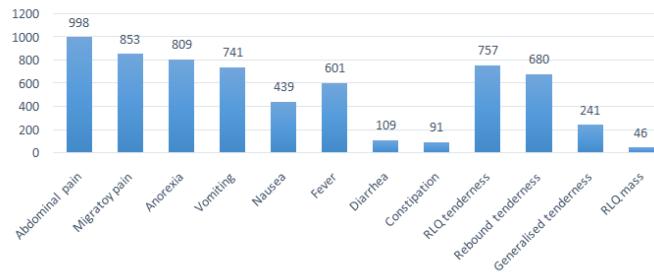
A total of 1922 patients were admitted with the diagnosis of non-traumatic acute abdomen during the study period. Out of these, 1102(57.3%) patients were admitted with a clinical diagnosis of acute appendicitis. Acute appendicitis constituted most of the admissions for acute abdomen for the years 2013/14, 2014/15 and 2015/16 with respective percentages of 52.8, 58.6 and 60.7(Figure 1). Out of the 1102 patients admitted with a diagnosis of acute appendicitis, medical records of 998 patients were possible to retrieve for analysis and the remaining records could not be traced or contained incomplete information. Eight hundred ninety three (89.5%) of the cases were from Addis Ababa. Out of the 998 patients, 696 were males and 302 were females, giving male to female ratio of 2.3:1. The ages of patients ranged from 3-84 years with the mean age of  $20.2 \pm 7.1$  years. Eight hundred eighty five patients (88.7%) with acute appendicitis were in the first 3 decades of their age, the peak age range being 11-20 years. Pattern of acute appendicitis by sex, age and address was shown on Table 1. Clinical presentation of patients to the hospital was shown on Figure 2. All patients presented with abdominal pain and the typical presentation of acute appendicitis was observed in 85.5%. The overall duration of illness at presentation ranged from 6 hours to 10 days with the

overall mean duration of  $3.5 \pm 1.5$  days. The average duration of symptoms at presentation among patients with uncomplicated appendicitis was  $2.5 \pm 1.1$  days(range= 6 hours-4 days) whereas the average duration of illness at presentation among patients with complicated appendicitis was 5.8 days with standard deviation of 2.1 days(range= 24 hours-12 days)(P<0.001). History of prehospital treatment with unspecified medications was documented in 570 patients.

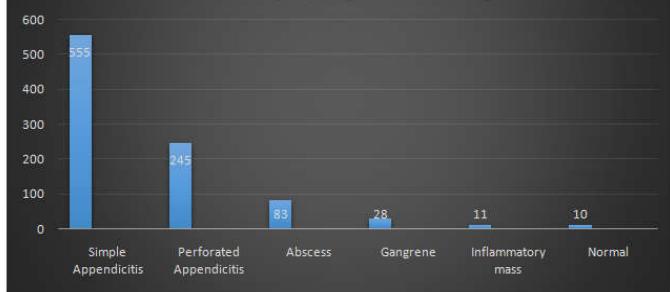
**Figure 1: Distribution of Emergency Admissions for All Acute Abdomen versus Acute Appendicitis by Year, Y12MCH, Addis Ababa, Ethiopia, Sept 2013-Aug 2016**



**Figure 2: Clinical Presentation of Patients with Acute Appendicitis, Y12MCH, Addis Ababa, Ethiopia, Sept 2013-Aug 2016**



**Figure 3: Distribution of Intraoperative Gross Pathologic Findings, Y12MCH, Addis Ababa, Ethiopia, Sept 2013-Aug 2016**



Among these, 394(69.1%) had complicated appendicitis. The mean durations of symptoms among patients with complicated appendicitis with and without history of prehospital treatment were  $5.3 \pm 2.1$  and  $2.7 \pm 1.1$  days, respectively ( $P<0.001$ ). Among the 570 patients with history of prehospital treatment, 526(92.3%) presented to the hospital with typical symptoms of acute appendicitis. Leucocytosis (WBC count  $>10,000/\text{mm}^3$ ) was seen in 80.1% of the patients and neutrophilia (differential neutrophil percentage  $> 70\%$ ) was observed in 78.5% of the cases. The average white blood cell count was  $11550/\text{mm}^3$  (range  $3100-32250/\text{mm}^3$ ). The diagnosis of acute appendicitis was clinically made in 90.8% of the patients. Five hundred and eighty five patients came to the hospital with ultrasound reports requested by prehospital health professionals before surgical consultation. Out of these, 383(65.5%) had complicated appendicitis. The mean durations of symptoms among patients with complicated appendicitis who had and had not abdominal sonography study were  $4.8 \pm 2.2$  and  $2.6 \pm 1.2$  days, respectively ( $P<0.001$ ). Out of 585 patients with ultrasound study, 525(89.7%) presented to the hospital with the classic symptoms of acute appendicitis. Abdominal ultrasound correctly stated acute appendicitis as an index in 38.3% of the patients. Out of the 998 patients with acute appendicitis, 71 were cases of simple inflammatory appendicular mass diagnosed preoperatively and treated

conservatively. All responded to the conservative management except 5 cases who later developed abscess and were operated up on. Surgery was performed for 932 patients. Figure 3 shows the frequency distribution of gross intraoperative pathologic findings in 932 patients. Simple and perforated appendicitis were found in 59.5% and 26.3% of the patients, respectively. Surgical site infection was found in 125(13.4%) patients and it was observed in 0.6% and 12.8% of the patients with uncomplicated and complicated appendicitis, respectively ( $P<0.001$ ). The mean length of hospital stay in patients with uncomplicated appendicitis was  $3.3 \pm 1.2$  days with a range of 2-7 days whereas the average length of hospital stay in patients with complicated appendicitis was  $8.5 \pm 2.4$  days with a range of 2-21 days ( $P<0.001$ ). No death was observed in this series.

## DISCUSSION

Acute appendicitis is the most common surgical emergency. About 8% of people in the Western countries will have appendicitis during their lifetime, with a peak incidence between 10 and 30 years of age (Mike, 2015 and John, 2008). In the developing countries, which are adopting western type diet, the incidence continues to rise (Laal, 2009). Acute appendicitis accounted for 57.3% of the admissions for acute abdomen in this study and comparable observations were reported in studies by Laal M, *et al* (Laal, 2009), B. Kotiso (Kotiso, 2007) and Mekonnen H. (Mekonnen, 2014). It, however, accounted for only 17.3% of acute abdomen in Gondar study (Birhanu, 1996). The majority of our patients came from the urban area, Addis Ababa, and this was in agreement to the studies by Birhanu, *et al*, Muthuphei, *et al* and Moore, *et al* (Birhanu, 1996; Muthuphei, 1998; Moore, 1979) who showed the high prevalence in urban population. A rising trend in prevalence of acute appendicitis was observed year after year in this study which might probably be explained by the adoption of more western patterns of life of the residents of the metropolis. The majority of our patients with acute appendicitis were predominantly males and this was in agreement with reports by Addis DG *et al* (Addis, 1990), Levy *et al*, (Levy, 1997), Madiba *et al* (Madiba, 1998), Mekonnen H. (Mekonnen, 2014), Birhanu K., *et al*. (Birhanu, 1996) and Fashina IB, *et al* (30) but a few studies from some African countries reported a female preponderance (Fulton, 1995; Emmanuel Kanumba, 2011; Borgstein, and Stephens, 1999).

The peak age of occurrence of acute appendicitis in this study was from 11-20 years and similar observations were reported by Addis *et al* (Addis, 1990), and Muthuphei, *et al* (Muthuphei, 1998). The peak age was 11-30 years, 15-30 years and 20-29 years in, Hagos's, Kotiso's and Ochola's series, respectively (Mekonnen, 2014; Birhanu, 1996; Ochola-Abila, 1979). A mean age of 20.2 years was observed in this study and comparable mean ages were reported in other studies (Okobia Mn, 1999; Levy, 1997; John, 1993; Chamisa; 2009; Willmore, 2001; Mekonnen, 2014; Birhanu, 1996 and Emmanuel Kanumba, 2011). The age range in this series was 3-84 years and age range 4-80 years, 4-73 years, and 4-60 years were observed in other studies (Mekonnen, 2014; Out, 1989; Ahmed, 1987). All of our patients with acute appendicitis presented with abdominal pain and similar results were reported in other studies (Abraham, 2003; Ochola-Abila, 1979; Ogbonna, 1993). Orvar J, *et al* and Abebe B, *et al* reported abdominal pain in 98% and 99.3% of their patients, respectively (Orvar, 1981; Abebe, 2006). The classic migratory abdominal pain was observed in 85.5% of our

patients and comparable results were reported by Birhanu K., *et al* (87.5%) and Abraham D., *et al* (80.5%) (Birhanu, 1996; Abraham, 2003). Murphy demonstrated the classic presentation in 50% of his patients (Murphy, 1904). A study from South Africa, however, showed the typical migratory type of pain in only 31% of the patients (4). The veriform appendix is part of the midgut. The classic progression of pain in appendicular inflammation results from the initial pain being referred from the visceral innervation of the midgut which is felt as a vague periumbilical pain followed by more defined localisation of the pain at the right lower quadrant when the parietal peritoneum is involved by the inflammatory process. However, for the reason that was unexplained there was a remarkable difference among patients with acute appendicitis of different regions with regard to the frequency of occurrence of the typical presentation (Richard, 2014; Murphy, 1904; Birhanu, 1996; Abraham, 2003). This study showed that the average durations of symptoms before presentation in patients with uncomplicated and complicated appendicitis were 2.5 days and 5.8 days respectively indicating a significant association between delayed presentation and occurrence of complicated appendicitis and this was in agreement with other studies (Eldar, 1976 and Narsule, 2011). The majority of our patients who had history of prehospital treatment had complicated appendicitis. The mean durations of symptoms among patients with complicated appendicitis with and without history of prehospital treatment were 5.3 and 2.7 days, respectively, indicating that prehospital treatment contributed to delayed patient presentation and complicated appendicitis.

The standard treatment for acute appendicitis is appendectomy. Prior treatment with unspecified medications might indicate that a diagnosis other than acute appendicitis was considered at the prehospital health institutions indicating misdiagnosis. Asad *et al* showed that misdiagnosis by professionals and self-medication at home were reasons for delayed presentation and complicated appendicitis (Asad, 2015). Among the patients with history of prehospital treatment in this series, the majority presented to the hospital with typical symptoms of acute appendicitis. The misdiagnosis at the prehospital level might, therefore, be the result of improper clinical evaluation. Elevated white cell count was observed in 80.1% and neutrophil predominance was found in 78.5% of our patients and Abraham D., *et al* showed leucocytosis in only 50.6% of the patients (Abraham, 2003). The diagnosis of acute appendicitis was preoperatively made in 90.8% of our patients. Even if a normal white cell count could not rule out acute appendicitis, leucocytosis with neutrophil predominance and the typical clinical presentation in the majority of our patients played a remarkable role in settling preoperatively the diagnosis of the disease at the hospital level. Steven L., *et al* demonstrated that migratory abdominal pain, physical examination and leucocytosis remain reliable and accurate in diagnosing acute appendicitis (Steven, 2001). Graded compression sonography has been suggested as an accurate way to establish the diagnosis of appendicitis and has a reported sensitivity of 55-96% and a specificity of 85-98%. The technique, however, has limitations and results are user dependent (1).

John H., *et al* showed the usefulness of ultrasound in doubtful clinical pictures (John, 1991). Franke C., *et al* claimed that there was no proven clinical benefit of ultrasound scanning of the appendix in the routine clinical diagnosis (Franke, 1999).

From among patients scanned, abdominal ultrasonography correctly detected acute appendicitis in only 38.3% of our patients. Ultrasonography correctly identified acute appendicitis in 35.5% of patients with acute appendicitis in Steven L., *et al* study (Steven, 2001). In this series, the mean durations of symptoms among patients with complicated appendicitis who had and did not have abdominal sonography were 4.8 and 2.6 days, respectively, indicating that ultrasonography study might have contributed to delayed patient presentation to the hospital and complicated appendicitis and this was in agreement with Steven L., *et al* observation (Steven, 2001). Even if ultrasound is useful in the diagnosis of acute appendicitis, its request before surgical consultation and evaluation might lead to delayed diagnosis and complications. A perforation rate observed in this study was comparable to the rates observed by Nshuti, *et al* (28.7%) and Chamisa (30.5%) (4, 16). Higher rates of perforation were reported in studies from Natal University, South Africa (43%) and Uganda (37%). Delayed presentation, misdiagnosis or failure to accept surgical treatment had contributed to higher perforation rate in these studies.

Surgical site infection (SSI) was found in 13.4% of our patients and most of the SSI occurred in patients with complicated appendicitis. Mekonnen reported a 25% surgical site infection rate and most SSI were observed in patients with appendicular perforation (Asad, 2015). The study showed that the mean length of hospital stay in patients with uncomplicated appendicitis was 3.3 days whereas the mean length of hospital stay in patients with complicated appendicitis was 8.5 days indicating a significant association between complicated appendicitis and prolonged hospital stay which was in line with observations by Narsule *et al* and Nance ML, *et al* (Narsule, 2011 and Steven, 2001). This study has the following limitations: the study was a hospital based study and hence a general inference on the magnitude of acute appendicitis in the general population may not be made; medical records of a few patients were not obtained or contained incomplete information but this may not be as such significant to affect the results of the study.

In conclusion, this study showed that acute appendicitis was the most prevalent cause of acute abdomen in Yekatit 12 Medical College Hospital with increasing prevalence year after year. It was more common in the first three decades with a peak incidence in the second decade and predominantly affecting males. Most of our patients with acute appendicitis presented with a typical migratory abdominal pain. Delayed patient presentation to the hospital was significantly associated with complicated appendicitis. Misdiagnosis as evidenced by prior treatment with unspecified medications at the prehospital level and ultrasound study before surgical consultation were reasons for delayed presentation. Complicated appendicitis was associated with increased morbidity, higher rate of complications and prolonged hospital stay. Proper clinical evaluation should be given emphasis and a high index of suspicion should be born in mind of health professionals when evaluating patients presenting with acute abdominal pain in order to have early diagnosis, prompt treatment and avoid complications.

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