

APPENDICITIS IN KANO, NIGERIA: A 5-YEAR REVIEW OF PATTERN, MORBIDITY AND MORTALITY

S. T. Edino, *A. Z. Mohammed, *O.Ochicha and **M. Anumah

Departments of Surgery and *Pathology, Bayero University Kano, and **Department of Surgery, Ahmadu Bello University Zaria, Nigeria

Reprint requests to: Dr. S.T Edino, Department of Surgery, Aminu Kano Teaching Hospital, P. M. B 3452, Kano, Nigeria. E- mail: steveedino@yahoo.com

Abstract

Background: Acute appendicitis is a common cause of acute abdomen and clinical morbidity.

Method: This retrospective study of 142 cases in 3 centers in Kano metropolis over a 5- year period was carried out to determine the pattern and outcome of management.

Results: Ninety-five (66.9%) were males and 47(33.1%) were females, with a male to female ratio of 2:1. The peak age incidence was 11 to 20 years, with a mean of 26.5 years. The clinical diagnosis was histologically confirmed in 122 patients (85.9%). Twenty (14.1%) of the patients had negative laparotomy mainly in female teenagers. The perforation rate was 33(23.2%). Wound infection was the most common postoperative complication occurring in 38 patients (26.8%), mainly those with perforation or gangrene, 13(39.4%). There was only one recorded mortality from overwhelming sepsis (0.7%).

Conclusion: While the mortality rate of emergency appendectomy has markedly declined to less than 1% as in this study, morbidity especially postoperative wound infection continues to be a problem.

Key words: Acute appendicitis, negative laparotomy, wound infection, mortality

Introduction

Since Reginald Fitz first described acute appendicitis in 1886, it remains the most common cause of acute surgical abdomen" world wide.¹ In the western world it accounts for about 40% of all surgical emergencies.¹ In developing countries, Nigeria inclusive though considered to be rare, the incidence is increasing in most urban centers, probably due to adoption of western diet.¹⁻⁴

Early diagnosis and prompt operative intervention is the key for successful management of acute appendicitis. Diagnosis is mainly clinical. However, the picture of acute appendicitis may not be classical, and in such situations, a policy of early intervention to avoid perforation may lead to high negative laparotomy rates or misdiagnosis.⁵ The major causes of morbidity and mortality are perforation and gangrene. With current management protocols with the use of antimicrobial drugs the overall mortality is almost zero, and major complications are gradually declining.⁶ Wound infection (either simple wound infection or intraabdominal abscesses) is the most common postoperative complication typically in patients with perforated appendicitis.⁷

This study was carried out to determine the pattern of acute appendicitis and the outcome of emergency appendectomy in Aminu Kano Teaching Hospital, Kano.

Materials and Methods

This was a retrospective study of patients with acute appendicitis managed at Aminu Kano Teaching Hospital, Kano. Apex Consultant hospital, and International Clinics limited, all of which are in Kano from July 1997 to July 2002. Data were extracted from the patients' medical records, theater operation and histopathology registers. These data included age, sex, clinical features, and preoperative (operative procedure) diagnosis, macroscopic findings at Surgery, histopathological findings, and postoperative complications.

Those excluded from the study were patients with incidental appendectomy, referred patients with post-appendectomy complications, and absence of histological evidence. The results were analysed and presented as frequency tables, and statistical analysis was done using clinical tests where applicable.

Results

During the period, a total of 142 patients had emergency appendectomy for acute appendicitis. There were 95(66.9%) males and 47(33.1%) females (M:F of 2:1). The range was from 3 years to 80 years, with peak age incidence in the second decade (35.2%). Over 90% of the patients were 40 years and below. Among the patients with histologically normal appendix, 15 were females (75%), while 5(25%) were males. 56% of these patients were within the age range of 10 – 19 years of life. The age and sex distribution is as shown in table 1.

The symptoms and signs are as shown in table 2. All the patients presented with abdominal pain. The duration of symptoms was 2 days to 2 years. One hundred and thirty patients (91.5%) had used various types of antibiotics from peripheral hospitals prior to presentation.

Table 3 shows the operative findings; acutely inflamed appendix in 99 (69.7%) patients, gangrenous or perforated appendix in 33 (23.2%), appendix mass in 5 (3.5%), and normal appendix in 5(3.5%). In

patients with normal appendix, associated findings were ovarian cysts 3, iliac adenitis one, ovarian mass one. The appendix stump was not buried in 40(28.2%), but buried in 102(71.8%).

The findings at histology are shown in table 4. Acutely inflamed, suppurative or gangrenous appendix accounted for 101(71.1%) cases, chronic nonspecific appendicitis 17(11.9%). Chronic parasitic infestations by *Schistosoma haematobium* occurred in 4(2.8%), and normal appendix comprised 20(14.0%).

The postoperative complications included minor wound infection in 38(26.8%); 11(28.9%) in uncomplicated appendicitis, 18(47.4%) in complicated appendicitis, and 9 in normal appendix (23.7%). Wound infections were managed by daily dressing in outpatient departments. One patient presented with intestinal obstruction from postoperative adhesions three weeks after discharge and was managed non-operatively.

A patient with intra-abdominal abscesses from ruptured appendix and generalized peritonitis died 3 days after surgery from septicaemia giving a mortality rate of (0.7%).

Table 1: Age and sex distribution of acute appendicitis in Kano

Age (Years)	Sex		Total (%)
	M	F	
0 – 10	5	4	9(6.3)
11 – 20	29	21	50(35.2)
21 – 30	31	11	42(29.6)
31 – 40	19	9	28(19.7)
41 – 50	7	1	8(5.6)
51 – 60	3	1	4(2.8)
61 – 70	-	-	-
71 – 80	1	-	1(0.7)
Total (%)	95	47	142(100)

Table 2: Clinical features in 142 patients

Symptoms	No. (%)
Right iliac fossa pain	142 (100)
Generalised pain	20 (14.1)
Fever	38 (26.8)
Loss of appetite	90 (63.4)
Nausea	40 (28.2)
Vomiting	21 (14.8)
Constipation	23 (16.2)
Diarrhoea	15 (10.6)
Headache	25 (17.6)
Dysuria	2 (1.4)
Signs	
Right iliac fossa tenderness	142 (100)
Generalised tenderness	23 (16.2)
Rebound tenderness	95 (66.9)
Guarding	49 (34.5)
Mass	4 (2.8)
Rovsing's Sign	55 (38.7)
Psoas Sign	20 (14.1)

Table 3: Operative findings

Findings	No. (%)
Acutely inflamed appendix	99 (69.7)
Gangrenous or perforated appendix	33 (23.2)
Appendix mass	5 (3.5)
Normal appendix	5 (3.5)
Total (%)	142 (100)

Table 4: Histopathological findings of the appendix

Histology	No. (%)
Acute appendicitis	68 (47.9)
Acute suppurative appendicitis	20 (14.1)
Gangrenous appendicitis	13 (9.2)
Chronic nonspecific appendicitis	17 (11.9)
Chronic specific appendicitis	4 (2.8)
Normal appendix	20 (14.1)
Total	142 (100)

Discussion

As in Europe and America acute appendicitis is common in the West African sub region. The Westernization of the diet in the urban Africans has been blamed as one of the possible reasons for the increase.^{1,2}

The demographic characteristics and the symptomology complex of acute appendicitis are similar to other reported series.^{2-4,9} About 90% of our patients were 40 years and below. After 40 years the incidence decreased to 9.1%. The increased incidence before 40 years may be related to Baker's hygiene hypothesis, which points to improvements in sewage disposal and drinking water supplies that have reduced exposure of infants and children to enteric organisms, thus altering the response of the adolescence to bacterial and viral infections.¹⁰

The clinical features are not different from other reports. Pain remains the most common initial symptom and was present in all the patients. Anorexia, nausea, headache and constipation were the second most common symptoms seen.

The rate of perforation was 23.2% overall which is comparable to other reported rates in Nigeria.^{3,9,10} In developed countries rates of between 6-65% have been quoted.⁹ Delayed presentation, fulminant disease, misdiagnosis, or failure to accept medical treatment, are contributory factors to high perforation rates. Perforation rates are much higher in the very young and the elderly, where diagnosis is often difficult leading to perforation rates as much as 80% in some reported series.^{11,12} Therefore a more aggressive approach should be used in advanced age individuals and children.

Many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid perforation, accepting a negative laparotomy rate of about 15-20%.⁶ The overall negative laparotomy rate (i.e. no histological evidence of appendicitis) of 14.1% in this study is comparable to some reported series in Nigeria.^{2,4,9} but much higher figures of 29.5% and 32.2% have been reported from other centers in Nigeria respectively.^{13,14} In this study and others mentioned above, the largest number of misdiagnosis occurred in females of reproductive age group where other pelvic diseases could make diagnosis difficult. In such cases clinical examination should be complemented with laparoscopy or diagnostic imaging such as Ultrasound scan or CT Scan to minimize the rate of negative appendicectomy.^{13,14} However, a large population based study suggested that the rate of negative appendicectomy (15-20%) has not declined for 15 years despite the increasing use of such tests.¹⁵ It is interesting to note that all the patients with histologically normal appendix appeared to have been cured of their problems.

The histopathological findings are not quite different from reports in the sub region, except that *Schistosoma haematobium* was the sole agent in appendiceal schistosomiasis, in contrast to *Schistosoma mansoni* as reported in some series in

Nigeria.^{9,16} This could be due to the fact that *S. haematobium* is endemic in Kano. *S. haematobium* usually affects the bladder, prostate, rectum, and the cervix but in endemic areas, it is not uncommonly found in the appendix.¹⁷ The aetiological significance of presence of *S. haematobium* is yet to be determined, but it is possible that this nematode can induce chronic inflammation that could manifest as appendicitis.¹⁷

While the mortality rate of emergency appendectomy has markedly declined to less than 1% as in this study,⁶ morbidity especially postoperative wound infection continues to be a problem. The overall wound infection rate of 26.8% in this study is similar to other reported findings.^{7,14} The highest incidence of wound infection was among those who had gangrenous or perforated appendix similar to experiences elsewhere.⁷ Delay in diagnosis has been proposed as contributing to the increased frequency of postoperative wound infection. However the degree of operative contamination of the wound is one of the most important risk factors for postoperative wound sepsis following appendectomy.⁷ Use of perioperative antibiotics and careful technique to avoid contamination would reduce wound infection rate.

References

1. Ellis H. Appendicitis. Postgrad Doct 1989; 10: 122-127.
2. Ajao O.G. Appendicitis in a tropical African population. J Natl Med. Assoc 1976; 7:997 – 999.
3. Edino S.T. Surgical abdominal emergence in northwestern Nigeria. Nigerian Journal of Surgery 2002; 8: 13-17.
4. Adekunle O.O, Funmilayo J.A. Acute appendicitis in Nigeria. J R Coll Surg Edin 1986; 31: 102-105.
5. Pittman-Waller V.A, Mayers J.G, Stewart R.M. Appendicitis: why so complicated? Analysis of 5755 consecutive appendectomies. Am Surg 2000; 66:548.
6. Colson M, Skinner K.A, Dunnington G. High negative appendectomy rates are no longer acceptable. Am J Surg 1997; 174:723.
7. Wagner J.M, McKinney W.P, Carpenter J.L. Does this patient have acute appendicitis? JAMA 1996; 276:1589.
8. Tarek S.M, Abdulbasit A.F, Abdulaziz A, Mohammed A.C, Saed A.E. Surgical audit: a prospective study of the morbidity and mortality of acute appendicitis. Ann Saudi Med 1991; 11: 209-212.
9. Adesunkanmi A. R. K, Agbakwuru E.A, Adekunle K.A. Pattern and outcome of acute appendicitis in semi-urban and rural African communities: A study of 125 patients. Nigerian Medical Practitioner 1998; 36: 8-11.
10. Baker J.P. Acute appendicitis and dietary fibre: an alternative hypothesis. Br Med J 1985; 290: 1125-1127.

11. Daelalin L. Acute appendicitis during the first three years of life. *Acta Chir Scan* 1982; 148:291.
 12. Horatas M.C, Guyton D.P, Wu D. A reappraisal of appendicitis in the elderly. *Am J Surg* 1990; 160:291.
 13. Ogbonna B.C, Obekpa P.O, Momoh J.I, Ige J.T, Ihezue C.H. Another look at acute appendicitis in tropical Africa: the value of laparoscopy in diagnosis. *Trop Doct* 1993; 23:82-84.
 14. Okobia, M.N, Osime U, Aligbe J.U. Acute appendicitis: review of the rate of negative appendectomy in Benin City. *Nigerian Journal of Surgery* 1999; 6:1-5.
 15. Flum D.R, Morris A, Koespell T, Delinger E.P., Has misdiagnosis of appendicitis decreased over time? A population based analysis. *JAMA* 2001, 286:1748.
 16. Ojo O.S, Udeh S.C, Odesanmi W.O. Reviews of the histopathological finding in appendicectomies for acute appendicitis in Nigerians *J R Coll Surg Edin* 1991; 36:245-248.
 17. Duvie S.O.A, Diffange M.N, Gurgui. S. The effects of *Schistosoma haematobium* on the vermiform appendix: the Nigerian experience. *J Trop Med Hyg* 1987; 98:13-18.
-