

NEGATIVE APPENDICECTOMY RATE IN ADULT PATIENTS WITH ACUTE APPENDICITIS AT UNIVERSITY OF BENIN TEACHING HOSPITAL, BENIN CITY

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ABSTRACT

Acute appendicitis is the most common surgical abdominal emergency worldwide. The initial diagnosis is mainly clinical and the treatment of choice is appendicectomy. A Negative appendicectomy is the absence of inflammation or pathology in the appendix. To determine the negative appendicectomy rate in adult patients with acute appendicitis. This was a prospective descriptive study carried out over a year period from September 2009 to August 2010 at the University of Benin Teaching Hospital, Benin City. All consenting and consecutive adult patients of 18 years and above with diagnosis of acute appendicitis were recruited. Clinical features, treatment and outcome were entered into a pro forma and analyzed using SPSS 16 version. Acute appendicitis was pre-operatively diagnosed in 86 patients but confirmed in 71 patients on histology. The Male to Female ratio was 1:2 with a mean age of 28.36 ± 10.40 years. The most common age group was in 3rd decade (57.0%). All the patients had appendicectomy. Fifteen patients had a negative histology with overall negative appendicectomy rate of 17%. Third decade is the most common age for acute appendicitis at the University of Benin Teaching Hospital, Benin City with male to female ratio of 1:2. Females accounted for a higher number of acute appendicitis, though negative appendicectomy rate was higher in them. The negative appendicectomy rate in this study is within acceptable range.

Introduction

Appendicitis is defined as the presence of inflammatory cells (transmural polymorphonuclear leucocytes, lymphocytes or plasma cells) in the wall of the appendix. The standard or more liberal definition of negative appendicectomy is the absence of inflammation/pathology in the appendix^{1, 2}. A more stringent definition of negative appendicectomy is the absence of

polymorphonuclear leucocytes (neutrophils) in the wall of the appendix^{3, 4}.

Acute appendicitis is the leading cause of surgical acute abdomen in many studies⁵⁻⁷ across the world with a decline in its incidence at extremes of life. It accounts for 15-40% of all emergency surgery carried out in most hospitals in Nigeria⁸. The peak incidence occurs in 2nd-3rd decade of life with a male preponderance⁹. Its diagnosis remains challenging because clinical evaluation yields sensitivity of 39-74% and specificity of 57-84%¹⁰. In spite of technologic advances, the initial diagnosis of appendicitis is still based primarily on the patient's history and physical examination.

The actual aetiology is unknown, but some predisposing factors are known. These include higher social class, low-fibre diet, infection, hereditary and familial tendency and luminal obstruction

KEYWORDS: Acute appendicitis, negative appendicectomy rate, outcome.

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from faecolith, lymph node hyperplasia or surgical parasites^{11, 12}. Being a common disease, it must remain in the differential diagnosis of any undiagnosed patient with persistent abdominal pain, particularly in the right lower abdominal quadrant¹³.

The aim of the study was to determine the negative appendicectomy rate in adult patients with acute appendicitis at University of Benin Teaching Hospital, Benin City.

Patients and Method

This was a prospective descriptive study carried out over one-year period from September 2009 to August 2010 at the University of Benin Teaching Hospital, Benin City located in the South-South zone of Nigeria with over 600 hospital bed capacity. The study population included

all consenting and consecutive adult patients from 18 years and above admitted into the surgical ward with a diagnosis of acute appendicitis. The study was approved by the Research and Ethics committee of the University of Benin Teaching Hospital, Benin City.

All patients who met the inclusion criteria had their demographic data, clinical features, abdominal findings, abdomino-pelvic ultrasound findings, diagnosis on admission, findings at surgery and histological diagnosis entered into a pro forma. Data analysis was carried out using the Statistical Package for Social Sciences (SPSS 16) and results were summarized in texts, tables and charts.

PRO FORMA

Negative Appendicectomy Rate in Adult Patients with Acute Appendicitis at University of Benin Teaching Hospital, Benin City

SECTION 1

BIODATA/DEMOGRAPHIC CHARACTERISTICS

1. SERIAL No
2. DATE
3. HOSPITAL No
4. AGE
5. SEX : - (M) (F)
6. ETHNIC GROUP: (a) Hausa/Fulani (b) Ibo (c) Yoruba (d) Bini
(e)Others
7. STATE OF RESIDENCE/LOCALITY
8. RELIGION: (a) Christian (b) Moslem (c) Pagan (d) others
9. MARITAL STATUS: (a) married (b) single (c) separated
10. LEVEL OF EDUCATION : (a)primary (b)secondary (c)Tertiary (d)None
11. OCCUPATION: (a) public enterprise (b) private establishment (c) student (d) none

SECTION 2

HISTORY AND PHYSICAL EXAMINATION

- 1. PRESENTING COMPLAINT
- 2. DURATION OF SYMPTOMS BEFORE PRESENTATION
- 3. SYMPTOMS:
 - (a) Abdominal pain..... (b)Vomiting.....(c) Constipation..... (d)Abdominal Distension..... (e) Fever.....
 - (f) Anorexia..... (g) Nausea..... (h)Diarrhea.....
- 4. ABDOMINAL SIGNS:
 - (a) Localized tenderness..... (b) Generalized tenderness..... (c) Guarding.....
 - (d)Rigidity..... (e) Rebound tenderness..... (f) Bowel sound.....
- 5. PRE-OPERATIVE DIAGNOSIS
- 6. SURGERY PERFORMED
- 7. INTRA-OPERATIVE FINDINGS
- 8. COMPLICATIONS:
 - (a) Localized peritonitis..... (b) Generalized peritonitis.....(c) Hemorrhage-
Reactionary/Secondary..... (d) Wound infection..... (e) Wound dehiscence.....
 - (f)Others.....
- 9. DURATION OF HOSPITAL STAY
- 10. OUTCOME: Well and discharged.....; Morbidity.....; Mortality.....

SECTION 3

INVESTIGATIONS

- 1. FBC: PCV.....
 - WBC: Total.....
 - Differentials.....
 - PLATELETS
- 2. E & U Cr
- 3. Random blood sugar
- 4. Abdominal ultrasound
- 5. Histology findings
- 6. Others.....

Results

Acute appendicitis was pre-operatively diagnosed in 86 patients. Twenty-nine were males while 57 were females. The age range of the patients was 18-65 years with a mean age of 28.36 ± 10.40 years. The most common age range affected in appendicitis was in 3rd decade.

The clinical findings of the patients are shown in Figures 1 and 2. Most of the patients have been having recurrent right lower abdominal pain before presentation. Abdominal ultrasound was carried out in 53 patients. Forty-five were females while eight were males. Twenty-six females and seven males had positive findings suggestive of appendicitis ranging from probe tenderness in the right iliac fossa, fluid collection in the right iliac fossa and pelvis and appendix with diameter greater than 6mm.

Pre-operative diagnosis of acute appendicitis was either made by a Senior Surgical registrar or by a Consultant surgeon

in all the patients. Sixty-three patients had appendicectomy under Spinal anesthesia while 23 were operated under General anesthesia. Ten patients had perforated appendix; seven were males and three were females. The 10 patients with perforated appendix had laparotomy and appendicectomy while the remaining 76 had appendicectomy via Lanz incision. Appendicitis was confirmed in 71 patients on histology out of 86 patients pre-operatively diagnosed; 27 were males while 44 were females giving a male to female ratio of 1:1.6. Fifteen patients had a negative histology; two were males while 13 were females with overall negative appendicectomy rate of 17%. No other pathology was found in the patients with negative appendicectomy. Two patients had wound infection while one patient had wound dehiscence. The average duration of hospital stay after appendicectomy was 3.6 ± 1.94 days with a range of 2-11 days. All the patients were well and discharged and followed up in Outpatient clinic. Other results are shown in the Tables and Charts.

Table 1: Age Range and Gender Distribution in Acute Appendicitis (Adult patients)

Age range(years)	Male	Female	Frequency (%)
11-20	3	10	13(15.1)
21-30	16	33	49(57.0)
31-40	5	8	13(15.1)
41-50	2	4	6(7.0)
51-60	2	1	3(3.5)
61-70	1	1	2(2.3)
Total	29	57	86(100)

Table 2: Features of Patients with Negative Appendicectomy

Patients	Gender/Age(years)	Intra-operative findings	Histology
1	Male/24	Inflamed retrocaecal appendix, 10cm long adherent to caecum	Normal
2	Male/52	Retrocaecal appendix, 20cm long bound down to the posterior surface of caecum	Normal
3	Female/33	Serous peritoneal fluid, omentum around inflamed retrocaecal appendix, 15cm long	Normal
4	Female/22	Inflamed retrocaecal appendix with surrounding omentum	Normal
5	Female/24	Inflamed retrocaecal appendix 10cm long	Normal
6	Female/20	Retrocaecal appendix, 10cm long	Normal
7	Female/26	Inflamed retrocaecal appendix, 8cm long with some adhesions	Normal
8	Female/24	Inflamed retrocaecal appendix with some adhesions	Normal
9	Female/24	Inflamed retrocaecal appendix, 6cm long with faecolith at its base	Normal
10	Female/24	Inflamed retrocaecal appendix, 8cm long	Normal
11	Female/22	Inflamed retrocaecal appendix 10cm long	Normal
12	Female/22	Edematous retrocaecal appendix, 10cm long	Normal
13	Female/20	Inflamed retrocaecal appendix, 8cm long	Normal
14	Female/21	Inflamed retrocaecal appendix with omental wrap	Normal
15	Female/24	Inflamed pelvic appendix with omental wrap	Normal

Table 3: Intra-operative Findings in the Adult Patients with Acute Appendicitis

Intra-operative findings	Frequency (%)
Location of appendix:	
Retrocaecal	81 (94.19)
Pre-ileal	2 (2.33)
Post-ileal	1 (1.16)
Pelvic	1 (1.16)
Not indicated	1 (1.16)
Length of appendix (cm):	
5-10	60 (69.77)
11-20	11 (12.79)
Not indicated	15 (17.44)
Perforation of appendix:	
Yes /No	10 (11.63)/ 76 (88.37)
*Others:	
Purulent peritoneal fluid	13
Serous peritoneal fluid	12
Adhesions	10
Omentum around appendix	10
Not indicated	47

***Values may not add up as parameters may occur more than once**

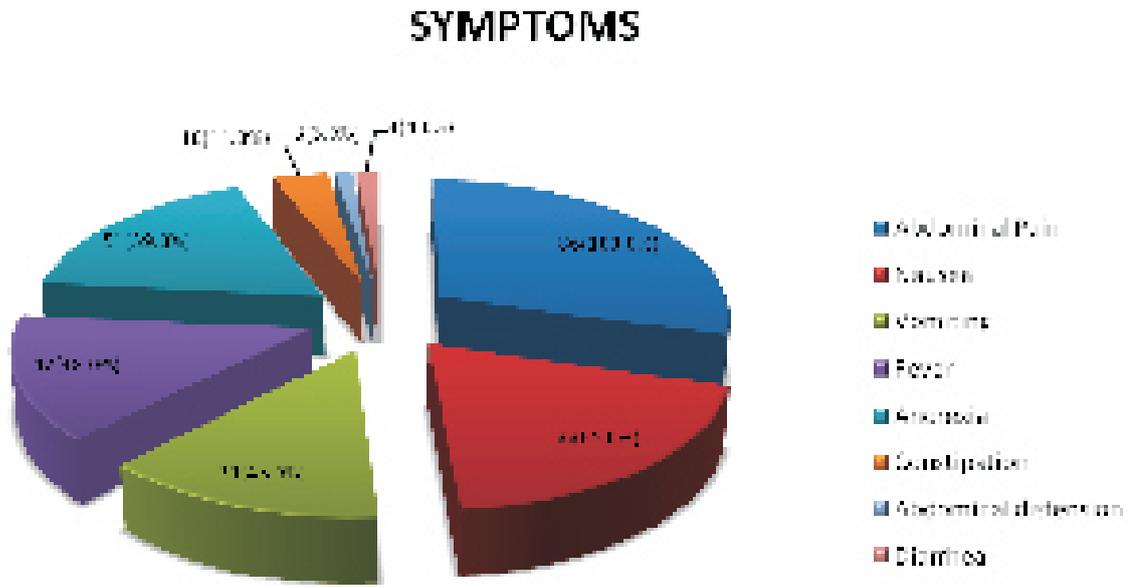
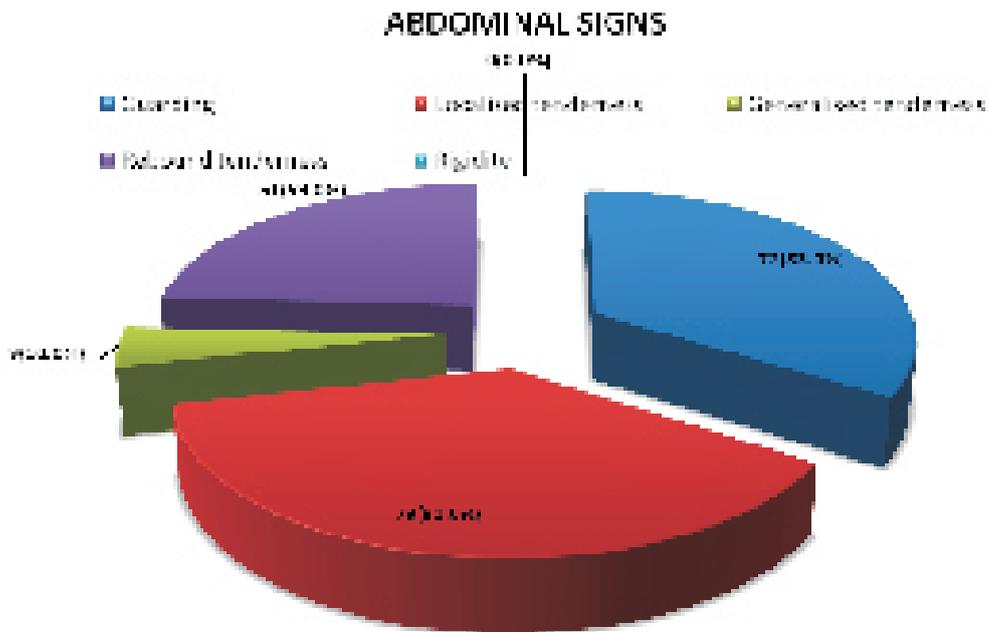


Figure 1: Symptoms in patients with Acute Appendicitis



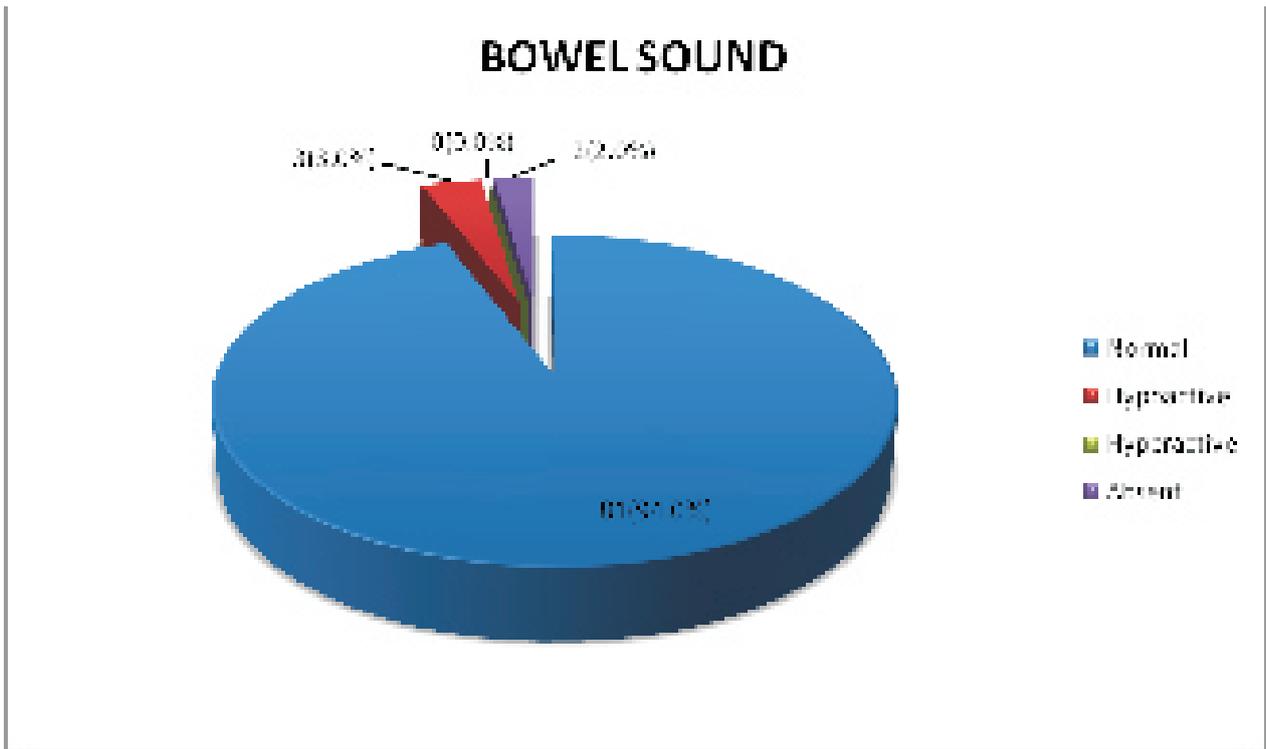


Figure 2: Abdominal Signs in Patients with Acute appendicitis

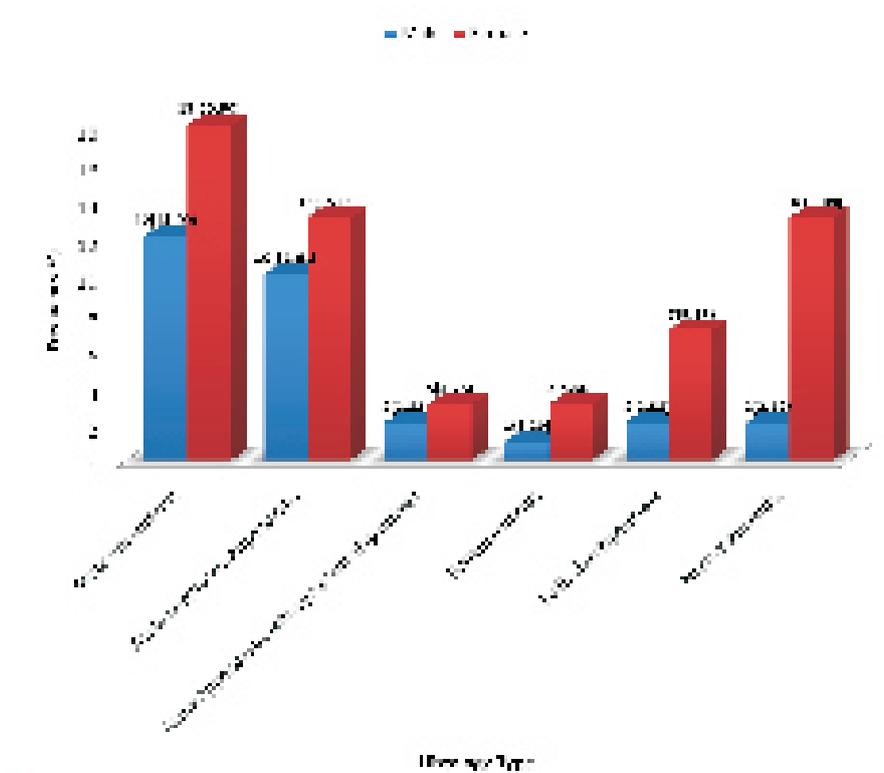


Figure 3: Histology Findings with respect to Gender in Patients with Acute Appendicitis

Discussion

Our study showed that acute appendicitis was more common in females than in males. Okobia and colleagues¹⁴ reported a similar finding of higher incidence of acute appendicitis in females than in males which is similar to what Mangete and colleague¹⁵ reported in Port-Harcourt, Nigeria. However, this differs from other studies^{16, 17} that reported higher incidence of appendicitis in males. There was no reason for the observed gender difference. The mean age of the patients was 28.36 ± 10.40 years and 3rd decade (57.0%) years being the most common age range. The 3rd decade of life is the most common period for acute appendicitis¹⁸. Flum and co-workers¹⁹ reported a higher mean age of 31 ± 18 years over a 20-year study of appendicitis when diagnostic imaging was used. However, Oguntola and co-workers²⁰ in South-Western Nigeria reported a lower mean age of 25.79 years.

Right lower abdominal quadrant pain was present in all the patients. Other symptoms were nausea, vomiting, anorexia and fever while localized tenderness in right iliac fossa, guarding and rebound tenderness were remarkable abdominal signs (Figures 1 and 2). Abdominal pain located in the right lower quadrant is the most common symptom of acute appendicitis²¹. The classic history of pain beginning in the peri-umbilical region and migrating to the right lower abdominal quadrant occurs only in fifty percent of patients²². None of the patients in this study had such classical peri-umbilical pain as they have been having recurrent right lower abdominal pain before presentation. A meta-analysis of the symptoms and signs associated with acute appendicitis was unable to identify any one diagnostic finding, but showed that a migration of pain from the peri-umbilical region to the right iliac fossa was associated with a diagnosis of acute appendicitis²³. Right iliac fossa tenderness, guarding and rebound tenderness are the

most reliable clinical findings suggestive of acute appendicitis²³. These signs were present in a remarkable number of patients diagnosed with appendicitis in this study (Figure 2).

Forty-five out of 53 patients had positive findings suggestive of acute appendicitis on ultrasonography. These findings include probe tenderness in the right iliac fossa, fluid collection in the right iliac fossa and pelvis and appendix with diameter greater than 6mm. A meta-analysis and a systematic review on the role of ultrasonography and computed tomography scanning in the diagnosis of acute appendicitis concluded that these investigations should be carried out only in patients in whom a clinical and laboratory diagnosis of appendicitis cannot be made²⁴. Ultrasonography studies are operator dependent and require careful examination²⁴. Computed tomography scan is preferable to ultrasonography as it has a greater diagnostic accuracy²⁵. However, cost, availability and exposure to radiation limit its use in our environment. Radiological investigations are rarely needed to confirm a diagnosis of acute appendicitis²¹.

Appendicectomy was carried out in all the patients. This is the treatment of choice in appendicitis²¹. In uncomplicated appendicitis, surgery is carried out via a Lanz incision in the right iliac fossa. However, following rupture with generalized peritonitis, a laparotomy is required to allow for thorough peritoneal lavage. The intra-operative findings are shown in Table 3. Though all the patients were noted to have inflamed appendix based on macroscopic features, 15 patients did not show microscopic features on histology which is confirmatory of appendicitis. However, 71 (82.5%) patients with macroscopic features showed microscopic features of appendicitis

which is a high clinical correlate between macroscopic and microscopic features in appendicitis. This differs from the work of Correa et al²⁶ who reported a weak correlation between the Surgeon's macroscopic diagnosis and the pathologic findings in *their study of correlation between intra-operative surgical diagnosis of complicated acute appendicitis and the pathology report [Kappa coefficient (κ)= 0.25]. They however concluded that the differences did not have meaningful clinical implication as post-operative management of appendectomy for acute appendicitis was based primarily on the operative findings and histologic findings are not always considered in the decision about the management.*

Appendicitis was confirmed on histology in 71 patients out of 86 pre-operatively diagnosed with a negative appendectomy rate of 17% (Figure 3). Negative appendectomy is the absence of inflammation or pathology in the appendix^{1, 2}. Negative appendectomy rates of 17-36% have been reported by some centres without the use of abdominal CT scan²⁷⁻²⁹. This was within the range observed in this study as none of our patients carried out abdominal CT scan. Osime and colleague³⁰ reported a slightly lower negative appendectomy rate of 16.1% in a study of incidence of negative appendectomy in a Company Hospital in Nigeria which they attributed to the clinical experience of the Consultant Surgeon as the hospital was usually manned by a Consultant Surgeon. The lower negative appendectomy rate noted in this study was in sharp contrast to similar study conducted in the same institution by Kpolugbo et al³¹ and Okobia et al¹⁴ that reported higher negative appendectomy rate of 47.2% and 32.2% respectively which they attributed to high

incidence of pelvic inflammatory disease and other gynecological disorders that can mimic appendicitis as many of their patients with negative appendectomy were females. The lower negative appendectomy rate in this study can be accounted for by the clinical experience of the Surgeons as the diagnosis of appendicitis was made by a Senior Surgical Registrar/ Consultant Surgeon in all the patients. Some studies reported declining negative appendectomy rate as low as 6-8% with use of computed tomography scan and laparoscopy³²⁻³⁴. The definition of negative appendectomy rate based on absence of inflammation or pathology in the appendix would logically produce a lower negative appendectomy rate compared to the definition based on absence of transmural (serosa-mucosa) acute inflammatory cells in the appendix. This may also explain the discrepancies in negative appendectomy rate between reported series.

In Conclusion

Acute appendicitis in adults occurred most commonly in the 3rd decade of life. Females accounted for a higher number of cases, though negative appendectomy rate was higher in them. The lower negative appendectomy rate in this study compared to similar studies in this same institution was achieved by the clinical experience of the Surgeons without abdominal CT scan. Though symptoms and signs of appendicitis abated in the patients with negative appendectomy, could antibiotics alone have resolved the problem? Further studies will be required to establish this.

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