

Acute Appendiceal Diseases In Enugu Role Of Histological Diagnosis

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ABSTRACT

Acute appendicitis is a common surgical problem in Enugu. Its diagnosis usually conjures fear in people. To date, the mainstay of pre-operative diagnosis is clinical and the accuracy is variable. Histological diagnosis will help to increase accuracy of clinical diagnosis. To correlate clinico-pathologic diagnosis of appendiceal diseases in our centre to determine accuracy of clinical diagnosis, negative appendectomy rate, and usefulness of some pre-operative investigations. A retrospective study utilizing the histopathology laboratory request forms and histological reports on (108 consecutive) appendectomy specimens analyzed in the histopathology laboratory of ESUT Teaching Hospital in 2011 and 2012 which were reviewed, incidental appendectomy specimens were excluded. A total of 108 appendectomy specimens removed following a clinical diagnosis of acute appendicitis were reviewed. Most patients were between the ages of 21-30 years. There was no difference in mean ages when reviewed by sex. Negative appendectomy, that is normal histology, was 37.2% of this 23.2% was in young females. Complicated cases (gangrene, mass, abscess) accounted for 11.1% of the specimens analyzed. A 100% clinic-pathologic diagnostic concordance is noted in complicated appendicitis. (P=1) For non-complicated case, there was statistical difference between clinical and histological diagnosis. The diagnosis of acute appendicitis which is mainly clinical should be confirmed histological. This will increase clinical accuracy, and reduce unnecessary appendectomies.

Key words: Retrospective, Appendicitis, Appendectomy, histology, diagnosis

INTRODUCTION

Acute appendicitis is the commonest appendiceal disease and a common surgical problem accounting for nearly 34.22% of surgical emergencies in Enugu, Nigeria. (Anyanwu, 1989) and is the commonest abdominal emergency in Nepal. (Subedi et al, 2012) Appendectomy is not only curative but remains the mainstay of treatment. (Inchein, 2006) The role of conservative antibiotic treatment and of delayed operative treatment in uncomplicated acute appendicitis remains controversial. (Varadhan, et al; 2010).

Probably more appendectomies are performed in the various non-teaching hospitals than in the two teaching hospitals in Enugu. For the majority of these, histology reports are never obtained, therefore the true clinical accuracy rate and negative appendectomy rate are not known. No doubt histology serves to confirm the diagnosis of appendicitis and exclude appendix tumors (Connor et al, 1998), because macroscopically normal appendix may

harbor an appendix malignancy (Jones et al). The presumptive diagnosis of acute appendicitis remains essentially clinical and appendicitis has many differentials. The accuracy rate of clinical diagnosis is in one series about 80% with twice as many false-positive diagnoses occurring in females as in males. (Gilmore et al; 1975) The common differentials in Nigeria include both medical and surgical conditions. Medical ones include malaria, gastro-enteritis, right basal pneumonia, sickle cell crises, diabetic keto-acidosis and right pyelonephritis. Among common surgical problems are non-specific mesenteric adenitis in children, Meckel's diverticulitis, typhoid perforation, acute intestinal obstruction, right salpingitis, ruptured right ectopic pregnancy, rupture or torsion of right ovarian cyst; right ureteric colic and tumors of the appendix or caecum among others. To reduce the morbidity associated with this disease it is impracticable to always insist on definitive pre-operational diagnosis. The

absolute diagnosis can be made at surgery and by histological examination. Some malignant appendix tumors may require further surgery like right hemi-colectomy. It is therefore necessary that all appendectomy specimens be submitted for histological examination. The confirmation or otherwise of clinical suspicion will improve clinical diagnosis, and reduce morbidity and mortality from both appendicitis and negative appendectomies

The hallmark of histological diagnosis of acute appendicitis remains the presence of neutrophils in the muscular wall and may be the serosa of the appendix. (Abioye and Ejeckam, 1977)

MATERIALS AND METHODS

The histology reports on 108 consecutive appendectomy cases at the Enugu State University Teaching Hospital and PODA Specialist Hospital, Enugu, in 2011, and 2012 were analyzed retrospectively.

The clinical diagnosis, age and sex of patients as recorded in the histology request forms were retrieved. The initial clinical diagnosis and subsequent operations in the teaching hospital were done mainly by senior registrars and senior medical officers while those at PODA were done by a consultant general surgeon.

RESULTS

The clinical diagnoses made were inflamed appendix, acute appendicitis, subacute appendicitis, ruptured appendicitis and chronic appendicitis (Table 1) The various histological diagnosis are normal appendix, appendix with lymphoid hyperplasia, peri-appendicitis, mucosal appendicitis , acute suppurative appendicitis, acute appendicitis with rupture and chronic appendicitis (Table 2).

Correlation between clinical and histological diagnosis was made. There was 100% concordance for complicated appendicitis (Table 3) Age and sex distribution showed more occurrences in female teenagers. The youngest patient in this series was 11years and the oldest was 86 years (Table 4)

Table 1: Clinical Diagnosis

Diagnosis	No of Cases	Percentage
No clinical diagnosis	8	7.4%
Inflamed appendix	24	22.2%
Acute appendicitis	44	40.7%
Ruptured appendicitis	12	11.1%
Chronic appendicitis	4	3.7%
Appendix abscess	2	1.9%
Sub-acute appendicitis	14	13.0%
	108	100%

Table 2: Histological Diagnosis

Diagnosis	No of Cases	Percentage
Normal appendix	6	5.56%
Lymphoid hyperplasia	22	20.37%
Peri-appendicitis	4	3.70%
Mucosal appendicitis	6	5.56%
Acute suppurative appendicitis	58	53.70%
Acute appendicitis with rupture	2	1.85%
Chronic appendicitis	10	9.26%
	108	100%

p<0.05 is considered significant

Table 3: Comparison between Clinical and Pathological Diagnosis

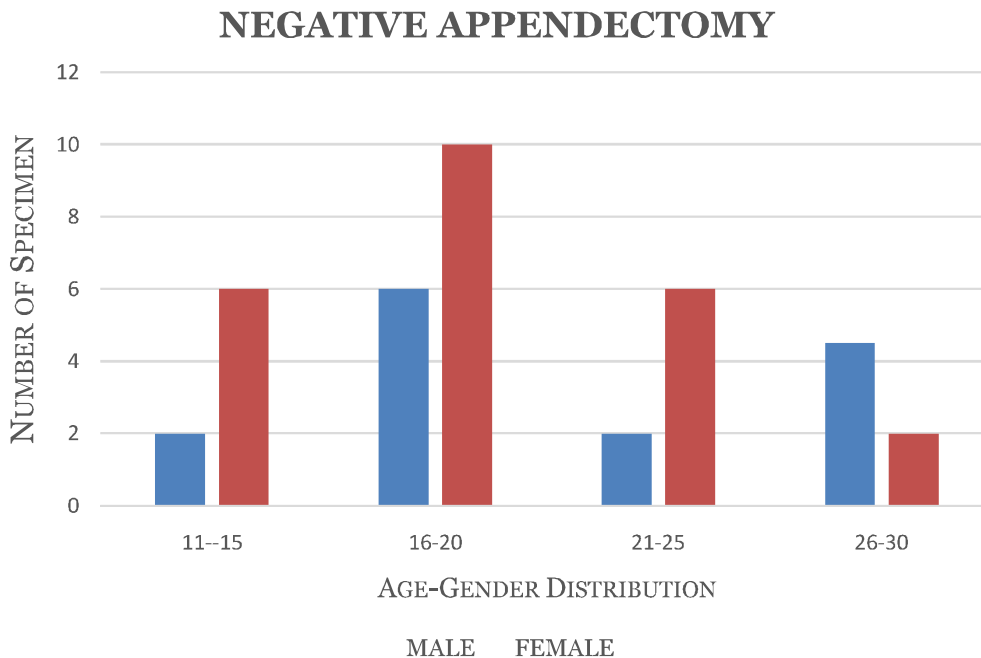
	Clinical Diagnosis	Pathological Diagnosis	Fischer Test
Inflamed appendix	24	14	P=0.006
Acute appendicitis	44	26	P=0.02
Ruptured appendix	12	12	P=1
Sub-acute appendicitis	14	4	P=0.02
Chronic appendicitis	4	2	P=0.5
Appendiceal abscess	2	2	P=1

Age (Years)	%	F	M	Mean Age (F)	Mean Age (M)	t-Test
1-20	11.9%	6	4	17.5±1.43	16.63±0.82	P=0.30
21-30	54.8%	34	12	25.5±2.45	24.6±2.4	P=0.28
31-40	11.9%	6	2	34.75±2.3	36.5±2.12	P=0.36
41-50	9.5%	6	2	43.33±1.2	45.5±3.54	P=0.19
51-60	4.8%	2	2	56.6±2.12	57.7±0.71	P=0.56
61-70	4.8%	4	0			
71-80	0%	0	0			
81-90	2.4%	2	0			

F – Female, M-Male, t-Test for difference in Mean

p value <0.05 is considered significant

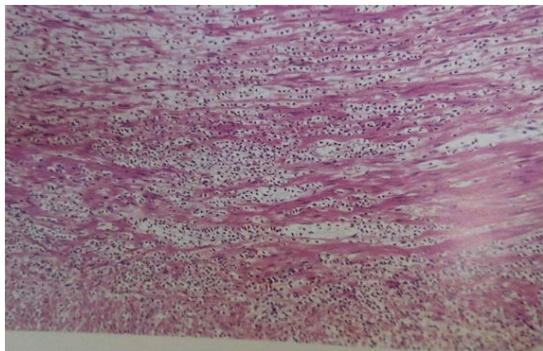
FIG. 1: Histogram of Negative Appendectomies by Age and Gender.



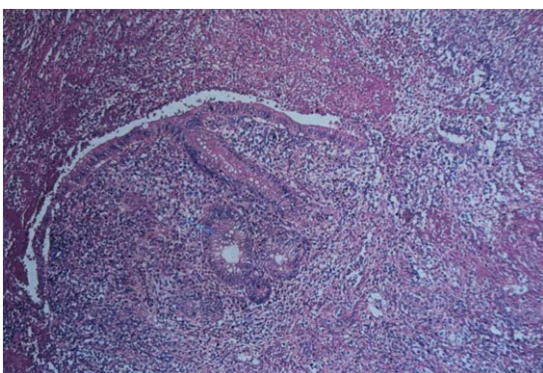
DISCUSSION

The sample size of 108 cases in two years may be lower than the actual incidence of appendix diseases in Enugu, as Enugu has two teaching hospitals and many private hospitals that perform appendectomies. Also, this

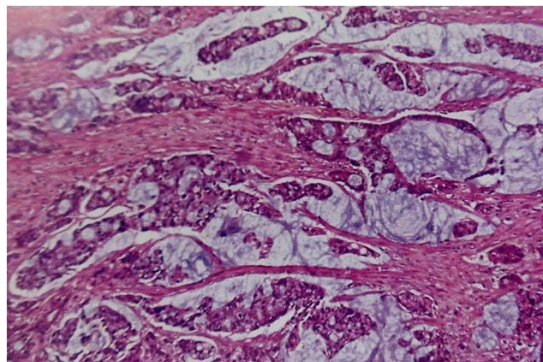
sample size in a teaching hospital and specialist hospital over a 2 year period may be considered small. This could be attributed to the industrial action of doctors in 2011 that lasted for 8months and probably to the fact that more appendectomies are done in the



Picture 1: **Acute Appendicitis.** The smooth muscle fibres of the muscularis propria are separated by oedema and infiltration by numerous polymorphonuclear leukocytes.



Picture 2: Chronic Appendicitis. Infiltration of chronic inflammatory cells



Adenocarcinoma of the appendix: Mucinous adenocarcinoma



Pic 4: Intraoperative Picture of Grossly Inflamed Appendix

hospitals collectively. The cost of appendectomy in the teaching hospital is higher than in most peripheral hospitals in Enugu. People are also known to prefer private hospitals for real or perceived promptness of attention. Appendectomy is one of the 'bread and butter' of a residents training in surgery. Cost should not jeopardize effective training.

We noted eight specimens had no clinical diagnosis on the histopathology request forms. We advise that for good histology report, surgeons should always endeavour to complete the request forms properly otherwise mistakes can occur in interpretation of histopathology findings. And it is the duty of surgical residents to complete these forms correctly and promptly. There is clinical diagnostic accuracy rate of 100% for the complicated appendicitis (ruptured appendicitis, appendix abscess). There is only 60% clinical accuracy rate in this series which is lower than the quoted average in literature. The accuracy rate for sub-acute and

chronic appendicitis is even much lower (Table 2). Anderson argued that it may be better to delay and be sure of the diagnosis than to hurry and operate on normal appendix, (Anderson, 2007). The majority of surgeons still prefer early diagnosis because post-operative morbidity for emergency appendectomy is 10-19% in those without perforation but reaches 12-30% in those with perforation. (Inchem, 2006) Our perforation rate of 11.1% was much higher than the international quoted average of 3.2-5.30% (Adnan et al; 2012). This could be due to late presentation which is common in our environment and delay in surgical interventions which is also common.

There is some disagreement among pathologists as to whether to include mucosal appendicitis and peri-appendicitis among the cases of acute appendicitis. Majority still believe that the hallmark of true inflammation of the appendix is neutrophil infiltration of the

neutrophils' within the muscular wall. These pathologists therefore regard some inflammatory activities limited to the mucosa (mucosal appendicitis) or the serosa (peri-appendicitis) as not acute appendicitis. In this our series we also did not regard these as true acute appendicitis.

The history of initial umbilical or right lower abdominal pain, then nausea or vomiting and then low grade fever, (so called Murphy's syndrome) should alert one to the real possibility of acute appendicitis. The finding of tenderness, rebound tenderness, with or without guarding in the right lower abdomen clinches the clinical diagnosis in most cases. Atypical presentations occur but are fewer. Many clinicians who operate early rely heavily on clinical scoring systems to decide when to operate. The earliest of the scoring system was that of Murphy referred to above.

Alvarado in 1986 added right lower abdominal tenderness to Murphy's syndrome (Alvarado, 1986). Another scoring system by Christian and Christian in 1992 suggested appendectomy on admission if equal to or more than four of the following are present: abdominal pain, vomiting, right lower abdominal tenderness, low grade fever ($\leq 38.8\%$) and leucocytosis ($>10,000$ polymorphs or $>75\%$ differential polymorphs in white cell count)(Christian and Christian,1992).

To reduce negative appendectomy they suggested that if less than four of these are present, the patient should be admitted to hospital for observation, monitoring and may be further investigations to improve definitive pre-operative diagnosis.

The practice of insisting on some laboratory or radiological investigations before appendectomy in doubtful cases may be cost effective in the diagnosis of acute appendicitis. Doppler ultra-sonography and contrast CT where available have been shown to reduce negative appendectomy rate. (Giatini et al; 2008). These are not available in our centre as in most centres in sub-Sahara Africa, and even where available may not be affordable by the average patient.

There is relatively high negative appendectomy rate of 37% in this series. Majority of these are in young female teenagers.

This is lower when compared with the finding of 45.5% by Attah and Mezue in Enugu in 1991 with majority also in young female teenagers. (Attah and Mezue; 1991 b) This high rate may be due to low threshold for surgical exploration in females for fear of tubal infertility following perforation of an acute appendicitis. It is now generally agreed that a perforated appendix does not seem to have long term effects on female fertility. (Muller et al; 1986). The negative appendectomy rate when the diagnosis is based only on clinical and laboratory data ranges from 16% to 47% with a mean of 26%. (Lally, Cox and Andrassy; 2004)

Diagnostic uncertainty can result in delays in treatment or negative explorations sometimes with associated complications. Ignorance of dangers of delayed treatment, unwillingness to accept diagnosis, poverty and hospital bureaucracy are also factors that lead to delayed treatments. In our environment some patients continue to go from one hospital to another looking for an 'appendix-expert' to give an opinion. Others continue to bargain from hospital to hospital before accepting surgery either because they found a good price or following complications. Delayed surgery causes a perforation rate of 35% but the death rate caused by acute appendicitis is now approximately 0.25% considering all age ranges. (Birnbaum and Wilson; 2000) (Anderson 2007)(Adnan et al; 2012) We did not record any mortality in our series.

When doubtful diagnoses are encountered, it may be better to delay surgery, start systemic antibiotics, intravenous fluids nil by mouth and investigate the patient further. Younger surgeons may need to consult more senior colleagues before deciding to operate.

We discourage indiscriminate or 'economic' or 'last resort' appendectomy by some hospitals and doctors in the belief that it usually will not do any harm and that some patients benefit from the surgery. Of course this is not science! Negative appendectomies have been shown to have significant long-term risks. The risk of small bowel adhesions and obstruction following negative exploration is 1.3% at 30 years. (Anderson, 2001a). It has also been observed that negative appendectomy has more complications than a positive

appendectomy. (Anderson, 2001b)

There are real cases of chronic appendicitis though may be few. Some surgeons deny its existence and label it various names 'diagnostic scapegoat', and 'last resort' diagnosis. However there is clinical and pathological existence of some cases of chronic appendicitis - may be in the groups of the so called non-obstructive appendicitis. We believe that wide spread use in our society of various antibiotics for even the slightest abdominal symptoms, (self-medication) can also lead to chronic appendicitis. A persistent discomfort, and several hospital visits would be an indication for laboratory and radiological investigations which may aid the diagnosis of chronic appendicitis or find another cause for the complaints. At surgery many cases of appendix specimens with fibrous band kinking them may be as a result of previous inflammation. And there were many cases in our series with histological diagnosis of chronic appendicitis.

We did not find any tumor of the appendix in this study. The incidence according to the literature is 4.6% for benign and 1.4% for malignant appendix tumors. (Connor SJ. et al 1998) These tumors include the carcinoid tumor, the argentaffin tumor and the adenocarcinoma. (Roggo, Wood & Ottinger; 1993)(Ojo, Udeh & Odesanmi, 1991)

And we did not find any appendicitis in association with any of the common tropical infections and infestations; e.g thread worms (*Oxyuris vermicularis*), *Ascaris lumbricoides*, schistosomiasis, amoebiasis, tuberculosis, and actinomycosis.

Incidental appendectomy is no longer accepted standard practice. The appendix may be important in body defense and can be useful in organ transplantation especially repair of damaged ureters. (Nwofor, 2013). However, this may be unavoidable in some procedures, especially right hemicolectomy. Incidental appendectomy specimens were excluded in this series.

CONCLUSION

Since the diagnosis of acute appendicitis remains essentially clinical, every clinician should strive to always make an early accurate clinical and later histological diagnosis. This

will reduce complications of acute appendicitis, increase diagnostic accuracy (clinical acumen) and reduce the risks of negative appendectomies. Appendectomy specimens should routinely be submitted for histological diagnosis.

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