Acute Appendicitis: Incidence and Management in Nigeria

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ABSTRACT

Appendicitis is the leading cause of surgical emergency admission in most hospital in Nigeria. It accounts for about 15-40% of all emergency surgery done in most centers in the country. All age groups can develop the disease including the fetus in utero, but the incidence is higher in the second and third decade of life. Majority of patients in Nigeria present late with complicated disease. Surgery is the treatment of choice for appendicitis. However patients must be adequately resuscitated before the procedure. Prognosis is excellent. High morbidities and occasional mortalities seen are usually due to late presentation and delay in treatments. Fear of surgery and cost of treatment are the main reason for late presentation. Mass education should be done to enlighten the populace on the evil of late presentation. The government should be implored to make widely available social support facilities that patients can make use of, at least in emergency situations.

INTRODUCTION

The appendix is a close – ended, narrow lumen tube-like vestigial organ attached to the first part of the large intestine, the caecum, about 3cm below the ileo-caecal junction. The lumen lining produces a small amount of mucus that flows into the caecum while the wall contains lymphatic tissues, a part of the immune system. The lymphatic tissue is sparse in infants and the aged, but more profuse in the second and third decades of live. Though the position of the appendix base is constant, the location of the tip varies considerably. The most common location of the tip is retrocaecal (67.4%). Other locations include pelvic (21.6%), paraileal (8.7%), and paracaecal (2.4%)[1]. Rarely, the appendix can be found in the subhepatic region in malrotation, or left iliac fossa in non-rotation or situs inversus.

Appendicitis is inflammation of the appendix. This is usually acute in onset and so is considered a surgical emergency, which when given prompt treatment, most patients recover without difficulty. If treatment is delayed due to late presentation, the appendix can burst thus causing peritonitis and death. Unfortunately, most of our patients present in the hospital when there is complication.[2]

EPIDEMIOLOGY

Appendicitis is the leading cause of surgical emergency admission in most hospital in Nigeria. It accounts for about 15-40% of all emergency surgery done in most centres in Nigeria[3-4]. The incidence appeared to be on the increase in most developing countries like Nigeria[5]. Rising incidence of acute appendicitis in the country may be related to change in diet from high fiber diet to more refined diet[6]. All age groups can develop the disease including in utero fetus[7-8], but the incidence is higher in the second and third decade of life[1-2,9]. When it affects the extreme age groups, the risk for it to be complicated is very high[10-11]. In most series in Nigeria, male are slightly more affected than females[1-4]. Acute appendicitis is also the most common cause of non-obstetrics abdominal pain in pregnancy[12].

PATHOLOGICAL TYPES

There are two types of acute appendicitis namely

- Obstructive Appendicitis
- Inflammatory (Catarrhal) Appendicitis

Obstructive Appendicitis

Obstructive Appendicitis is the more common type. It may be responsible for about 90% of all appendicitis. It comes about by the obstruction of the appendiceal lumen. Feacolith is the major cause of the obstruction. A faecolith is composed of processed faecal material, calcium phosphates, bacteria and epithelial debris. It is found more in individuals who take much of low residue diet. Hence, acute appendicitis occurred more commonly in urban area, highly skill workers and high socioeconomic class individuals. Other causes of obstruction of the appendiceal lumen include fibrous adhesion, stricture in the lumen, foreign materials, parasites like strongyloides and enterobius species, ova of ascaris or schistosoma, tuberculosis, toxoplasma, carcinoid tumor and adenocarcinoma of the appendiceal base or that of the caecum[13]. Lymphoid hyperplasia tends to occur more in children and it usually follows viral infection which is common about the time of weather change. Lymphoid hyperplasia could also be associated with a variety of inflammatory and infectious disorders such as, gastroenteritis, amoebiasis, respiratory infections, measles, Crohn's disease and mononucleosis.

Obstruction of the lumen leads to increase in mucous secretion distal to the obstruction. Stasis encourages proliferation of organism which tends to migrate through the wall to the peritoneal cavity. This leads to formation of exudate around the disease organ. As the luminal secretion increases, the wall tension rises above the venous pressure. Venous flow is obstructed subsequently, and this can result into arterial thrombosis. Gangrene or perforation is usually the end result of the cascade. Occasionally, gangrene or perforation of the appendix may result from direct pressure of the faecolith on the subjacent wall.

Inflammatory (Catarrhal) Appendicitis

Inflammatory (Catarrhal) Appendicitis follows reduction in immunity of the individual which result in proliferation of organism within the wall of the appendix. In majority of cases, this resolves spontaneously with residual fibrous adhesion within or outside the lumen. This sets the stage for obstructive appendicitis on a later day.

Pathway of events

Acute appendicitis runs various courses in different individuals. It could be mild and may resolve spontaneously with high incidence of recurrence. In some cases, it can progress with formation of appendiceal mass or abscess. About 27% of cases can perforate leading to localized or generalized peritonitis. Very highly fulminant infection called portal pyemia could result from acute appendicitis.

MANAGEMENT

Evaluation and Resuscitation

Acute appendicitis is a surgical emergency, so managements start with quick evaluation and resuscitation of the patients. These must go on pari passsu. The aggressiveness of the resuscitation depends on the presence or abence of complicated disease.

Evaluation

Simple uncomplicated appendicitis presents classically with shifting, dull aching or colicky abdominal pain. Initial visceral pain is located around the umbilical region, but later shifts to the right iliac fossa, as the parietal peritoneum is involved. Pain becomes generalized and severe in ruptured appendix. Anorexia is almost invariable in acute appendicitis. This is usually associated with low grade fever, constipation, nausea and/or vomiting. Fever is often low grade but become high grade in complicated disease. Vomiting is not profuse in simple uncomplicated appendicitis. It rarely exceeds two episodes and it is usually non-bilious. It comes about as a result of pylorospasm. Profuse bilious vomiting with high grade fever suggests complicated appendicitis or other possible differentials like typhoid perforation, intestinal obstruction or perforated peptic ulcer disease.

Patients may also have other bizarre symptoms depending on the location of the apex of the appendix. Pelvic appendix can present with frequency, dysuria, haematuria or diarrhea due to irritation of the bladder or the rectum. It is not impossible to have left iliac fossa pain due to long appendix or situs inversus. Antibiotic abuse, which is very common among Nigerian patients, may mask the symptoms in some patients.

The most sensitive physical findings are rebound tenderness, guarding and tenderness after percussion on the iliac fossa. Some signs are usually described in acute appendicitis. This signs include:

- Rovsing sign - deep palpation of left iliac fossa causes pain
- in the right iliac fossa.
- Psoas sign - right iliac fossa pain with hyperextension of the right hip).
- Obturator sign - right iliac fossa pain with internal rotation of the flexed right hip.
- Cough sign- right iliac fossa pain on voluntary cough.
- Pointing sign- Patients point to Mc Burney's point when asked for the site of pain.
- The Markle sign - pain elicited in a certain area of the abdomen when the standing patient drops from standing on toes to the heels with a jarring landing[14].

It must be noted that absence of these signs does not rule out acute appendicitis. Patients with appendiceal mass or abscess will have tender mass palpated on the right iliac fossa. Tenderness is usually elicited on the right adnexa on vaginal or digital rectal examination. Cervical excitation tenderness is a sign of inflammation and can be positive in acute appendicitis.

Resuscitation

Patient is admitted and placed on nil per oral. Intravenous access in established and patient placed on crystalloid. Samples for blood investigation can be taken while establishing the intravenous line. Patient should be placed on intravenous broad spectrum antibiotics that cover for gram negative and anaerobes. In the absent of complications, gentamycin and metronidazole for 72hours may be sufficient. Analgesics should also be commenced as soon as possible. This has been found not to interfere with diagnosis as once believed[16].

In complicated disease, patients may require a nasogastric tube especially when there is persistent vomiting, so as to be able to decompress the stomach and to prevent aspiration pneumonitis. Vital signs and urethral catheterization should be done so that hourly urinary monitoring can be commenced. This will give a guide to the adequacy of the resuscitation. Adequate urinary output in children is 1 – 2 mls /kg/hour while is in adult is 0.5-1mls/kg/hour. Such patients will need a broad spectrum antibiotic agent. Most preferred options are the combination of ciprofloxacin and metronidazole. Third generation cephalosporins plus metronidazole are good alternatives in children. Electrolyte derangements should be looked out for and this must be corrected before any intervention is done.

INVESTIGATION

Acute appendicitis is essentially a clinical diagnosis; however, it can be masked by other conditions, especially in young women. Aims of the investigation: are to confirm the diagnosis and to rule out differentials, to assess the extent of the diseases, and to provide ancillary investigations needed for anaesthesia. The sole responsibility of the attending surgeon is to reduce the rate of negative appendectomy to as low as possible. The rate of negative appendectomy could be as high as 30% in some series[9,13,16].

Abdominal ultrasound scan is widely available even in the rural centre. Sensitivity of the test could be as high as 95% in good hands[17]. Features suggestive of appendicitis on ultrasound include probe tenderness, increase in the appendiceal wall size greater than 6mm, reduced compressibility of the appendix, presence of faecolith, periappendiceal exudate and reduced bowel movement around the appendix. In female patients, abdominal ultrasound scan rule out the occurrence of gynecological conditions that can mimic acute appendicitis such as ovarian torsion, ectopic pregnancy and pelvic inflammatory disease. It is important to note that negative abdominal ultrasound scan does not rule out appendicitis. This must be judged along with the clinical parameter of the patients. Plain abdominal X-ray can be done for the patient if abdominal ultrasound scan is not available. Faecolith can be seen at the right iliac fossa on plain abdominal X-ray. Most other diagnostic modalities are essentially for academic purposes. These include Computerized tomography scan, Magnetic resonance imaging, Radionuclide scanning, laparascopy and C reactive protein. In developed countries where these are available, it may be useful in cases of uncertainty.

Ancillary investigations needed for anaesthesia include packed cell volume. For adequate oxygen carrying capacity under anaesthesia, pack cell volume of 30% is usually adequate. White blood count and

differentials may be helpful for diagnosis in diagnostic dilemma. Studies have consistently showed that 80-85% of adults with appendicitis have a WBC count greater than 10,000 cells/mm^3. and neutrophilia greater than 75% occurs in 78% of patients[18-19]. Fewer than 4% of patients with appendicitis have a WBC count less than 10,000 cells/mm^3 and neutrophilia less than 75%[19]. Diagnostic scoring system by Alvarado[20] commonly referred to as MANTRELS score may be useful in children and young women to predict the likelihood of acute appendicitis (Table 1). Total score greater than 8 suggest acute appendicitis and patients should have surgery as soon as possible. Patients that have score of 5-8 should be admitted and observed. Patients with score less than 5 can be discharged because appendicitis is very unlikely. Urinalysis is done for all the patients to rule out the possibility of reducing substances in the urine. Electrolyte and urea should be done especially in complicated ceases to rule out derangements. This should be corrected before surgery. If the patients are older than 40 years, chest X-ray should be done because of general anaesthesia.

Characteristic	Score
M = Migration of pain to the right iliac fossa	1
A = Anorexia	1
N = Nausea and vomiting	1
T = Tenderness in right iliac fossa	2
R = Rebound tenderness	1
E = Elevated temperature	1
L = Leukocytosis	2
S = Shift of WBC to the left	1
Total	10

Table 1: MANTRELS score

TREATMENT

Surgery is the main stay of treatment for acute appendicitis. Studies have shown that outcome of patients is better if surgery is done within 12 hours of onset of symptoms [21-22]. This sometimes may not be feasible in the third world country where surgery can be delayed due to late presentation and other hospital logistics. Incision and drainage and interval appendectomy is the standard method of treating appendiceal abscess. If possible, the abscess can be drained percutaneously under ultrasound guidance. Patients with ruptured appendicitis and peritonitis should have explorative laparatomy and appendectomy done. Conservative management of patients with appendiceal mass used to be the treatments of choice for until recently. Argument in support of this treatment modality was that most masses resolved on conservative management except there was abscess that needed to be drain. Also the risks of surgical complications are high if the patients are operated before the mass resolve. The conservative approach include nil per oral, intravenous fluid, antibiotics, analgesics and twice daily monitoring of the size of the mass and vital signs. If the mass is not reducing in size and the vital signs are not stabilizing within 48-72 hours, the conservative managements should be aborted and patients should be explored. In successful cases, the mass tends to resolve completely within 7-14 days. The rationale behind these conservative managements has been challenged recently. Emergency appendicectomy for appendix mass is emerging as an alternative to conventional conservative treatment. It is feasible, safe, and cost-effective, allowing early diagnosis and treatment of unexpected pathology[25-26]. Hospital stay is also much reduced. However, the appropriate timing for emergency surgery is not clear. After successful conservative management, interval appendicectomy is not necessary and can safely be omitted, except in patients with recurrent symptoms. In patients over 40 years of age, other pathological causes of right iliac mass must be excluded by further investigations (colonoscopy and computerized tomography scan), and a close follow-up is needed [25-26].

COMPLICATIONS OF SURGERY

These include wound infection and wound dehiscence. The risk of wound complication is higher in complicated appendicitis. Patients could also have residual pelvic or abdominal abscess. Other complications include adhesion and subsequent intestinal obstruction, enterocutaneous fistula, pyelophlebitis, hypertrophic scar, and stump or caecal wall abscess. Liang et al reported the possibility of stump appendicitis in 36 patients who have had appendectomy previously[27].

PROGNOSIS

Prognosis is excellent. Most patients are discharged within 72hours of simple appendectomy. Mortality rarely occur even in complicated disease. High morbidities and occasional mortalities are usually due to lateness in presentation and delay in treatments. Most of the patients in Nigeria present late because of fear of surgery and cost of treatment.

FAST TRACK SURGERY

Appendectomy can be successfully done laparoscopically even in complicated cases[26]. This minimally invasive surgery allows early recovery and better cosmetics. These advantages are not without increase in cost of treatment. The cost issue becomes a major factor to its introduction in our environments where majority of the population live below the poverty margin.

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