PATTERN OF SURGICAL ACUTE ABDOMEN IN UPTH, PORT HARCOURT.

A DISSERTATION SUBMITTED

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DECLARATION

It is hereby declared that this dissertation is a product of my original ideas, unless otherwise acknowledged. The work has not been presented to any other college for a fellowship, nor has it been submitted elsewhere for publication either in part or in full.

DR. PAINGHA JOE ALAGOA
DEDICATION

To Jehovah almighty; Creator of heaven and earth for His faithfulness.

To my beautiful wife Nkem for all her love and support.

To my loving children Atonbara, Paingha, Karina and Birimote, for being the angels that they are.

To my mother. She is one of a kind.

To my father, for his guidance.
CERTIFICATION

I hereby certify that **DR. PAINGHA JOE ALAGOA** personally carried out this research project at the Department of Surgery, University of Port Harcourt Teaching Hospital, Port Harcourt, NIGERIA.

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SUMMARY

Introduction: Surgical acute abdomen is an important cause of morbidity and mortality. Its pattern is known to vary from one place to another and also to change over time. The aim of this study therefore was to ascertain the present pattern of surgical acute abdomen in Port Harcourt.

Patients and Methods: All patients with surgical acute abdomen admitted into the University of Port Harcourt Teaching Hospital, Port Harcourt between January and November, 2004 were evaluated. History, physical examination and relevant investigations were conducted. Patients requiring surgery were properly prepared and surgery performed. Those not requiring surgery were appropriately investigated and treated. Relevant specimens were collected intra-operatively and findings at surgery recorded. Data obtained were demographic, clinical and pathological including results of the investigations. Standard medical principles and a proforma (APPENDIX I) were used. Data obtained were subjected to statistical analysis using the SPSS Package.

Results: One hundred and eighty (180) patients were evaluated in this study. Their ages ranged between 5 days and 72 years. The mean age was 25±15.9 years. There was a slight male preponderance. The
The commonest cause of surgical acute abdomen was acute appendicitis 85 (47.2%). This was followed by abdominal trauma 46 (25.6%) and intestinal obstruction 35 (19.4%). Other causes were 14 (7.8%).

Most patients presented in hospital after the first day of onset of symptoms. Only 73 (40.6%) patients presented in hospital within 24 hours of illness.

A total of 34 (18.9%) developed post-operative complications. The most common complications were wound infection 11 (32.4%) and septicaemia 11 (32.4%). Complications were significantly higher in patients whose duration of symptoms was more than 24 hours than those who presented within 24 hours of symptoms. Complications were also significantly higher in the extremes of life.

The mortality rate was 10%. Deaths were significantly more in the extremes of life. Mortality was not affected by the duration of symptoms.

**Conclusion:** The commonest causes of acute abdomen were acute appendicitis, abdominal trauma and intestinal obstruction in decreasing order. Previously, intestinal obstruction was the second leading cause. It is difficult to conclude after an 11-month study that the pattern of surgical acute abdomen has indeed changed. It however raises the possibility of a changing pattern. Further work would be required in this regard.
CHAPTER ONE

INTRODUCTION

Acute abdomen is a common problem encountered in surgical practice worldwide. The causes are varied, most being benign and non life-threatening and may be managed conservatively\(^1\). Others may require surgical intervention in their management.

Acute abdomen is important not only because of its high prevalence but also because of the obvious diagnostic difficulties it often presents. Furthermore, the high mortality and morbidity associated with such patients who require surgical intervention is a cause for concern, especially when there is a delay in diagnosis and treatment\(^2-4\). Enormous resources are required for prompt and effective management of such patients. Sometimes the decision on whether to operate or not has to be made within minutes. The knowledge of the pattern of surgical acute abdomen is therefore important as it may reinforce clinical assessment and other investigations when seeking a diagnosis.

The pattern of surgical acute abdomen is known to vary from one place to another and also changes over time within the same
environment. For example at Ibadan, Udeh\(^5\) in 1962 noted that the commonest cause of surgical acute abdomen was ectopic pregnancy, followed by strangulated hernia. Adesola\(^6\) in 1968, however, observed that the commonest cause was intestinal obstruction. Currently, several studies show appendicitis to be the leading cause of surgical acute abdomen in the West African sub-region\(^7\)\(^-\)\(^10\).

This study undertook an investigation of the present pattern of surgical acute abdomen in Port Harcourt as seen at the University of Port Harcourt Teaching Hospital, Nigeria.

The University of Port Harcourt Teaching Hospital is the only teaching hospital in Rivers State. The hospital also serves as a referral centre for patients from the neighboring Bayelsa, Abia, Imo, and Akwa Ibom states. Port Harcourt is a city with an expanding population with a continuing influx of people. This is attributable to the presence of a seaport, an international airport and the activities of oil companies. The patients at the University of Port Harcourt Teaching Hospital are therefore diverse in race and ethnicity as well as challenging in numerical terms.
CHAPTER TWO

REVIEW OF LITERATURE

DEFINITION AND BRIEF HISTORICAL BACKGROUND

Surgical acute abdomen is a serious condition within the abdomen characterized by sudden onset pain, tenderness, and muscle rigidity, and usually requiring emergency surgery\textsuperscript{11}.

Abdominal pain is one of the top three symptoms of patients presenting to emergency departments, accounting for 5-10\% of presenting complaints\textsuperscript{12}. There is however a wide range of conditions which may cause acute abdominal pain. These range from minor self-limiting conditions to life-threatening disorders in which immediate treatment may be of utmost priority. Often, the management requires surgical intervention\textsuperscript{13-15}. Failure to identify and treat those with serious illness requiring surgery may result in devastating sequelae. This was recognized since the time of Hippocrates. From Hippocrates (460-377 BC) to Galen (129-199 AD) and then Paracelsus (1493-1541), surgical acute abdomen was invariably fatal except for externally obvious conditions like strangulated herniae which were treated surgically\textsuperscript{16}.
Advances in anaesthesia and the introduction of antisepsis led to a rapid expansion in the horizon of surgery in the last quarter of the nineteenth century. This occurred despite the prediction in 1874 of Sir John Eric Erichsen, Professor of Surgery, that “the abdomen, the chest and the brain would be forever shut from the intrusion of the wise and humane surgeon.” The development of physiology and pathology and the unification of medicine and surgery also led to an improvement in the standard of surgery. Surgeons were then required to qualify as doctors first before practicing. All these changed the unhappy picture, making abdominal surgery safer and more tolerable by the 1870s.

Sir Reginald Fitz, a Havard pathologist was the first to use the term ‘acute appendicitis’ in 1886 to describe inflammation of the appendix in a paper titled “Perforating inflammation of the vermiform appendix, with special reference to its early diagnosis and treatment.” This was followed several years later, in 1948 with the publication of the first classic manuscript on acute abdomen by Sir Zachary Cope.

From the crude instruments of flints of ancient times, through the lithotrites of the 19th century, the practice of surgery has evolved into the use of sophisticated instruments in the 21st century. The abdomen which was hitherto ‘shut from the wise and human surgeon’ has now become one of the most frequently explored parts of the body.
CLINICAL DIAGNOSIS OF SURGICAL ACUTE ABDOMEN

Pain is the main issue in the assessment of the patient suspected of having an acute abdomen$^{19,20,21}$. The duration, location, mode of onset and the character of pain will provide useful clues to the underlying condition. As observed by Zachary Cope$^{18}$ over 50 years ago, abdominal pain of over 6 hours duration which persists in intensity increases the likelihood of a surgical intervention. This is less so for pain that ebbs after a few hours of onset. Pain of visceral origin caused by distension, inflammation, or ischaemia is usually dull and vaguely localized in the mid abdomen. In contrast, parietal pain presents as a sharper and better localized type of pain. Pain originating in particular portions of the abdomen may indicate the organs of origin. Hence epigastric pain is often noted in duodenal ulcer, acute cholecystitis and acute pancreatitis. Left upper quadrant pain is frequently reported in gastric ulcer, acute pancreatitis and splenic infarct or rupture. Right lower quadrant pain is typically seen in acute appendicitis and left lower quadrant pain may suggest diverticulitis. Gynaecologic and urologic causes of acute abdominal pain such as salpingitis, ectopic pregnancy and cystitis also present with lower abdominal pain.

Referred pain is also important in the clinical evaluation of the location of pain. For example, subdiaphragmatic disorders can produce
pain referred to the shoulder. Hence, left shoulder pain can be produced as a result of blood or pus beneath the left diaphragm. However, some diseases occurring above the diaphragm such as basal pneumonia may produce pain which is referred to the neck or shoulder in the distribution of the fourth cervical nerve.

Migration of pain may also give an indication as to its aetiology. A classic example is the pain of acute appendicitis. Here, the initial pain which is visceral begins as a poorly defined dull pain in the periumbilical region. It progresses with the spread of inflammation and produces a parietal peritonitis; the pain is now felt as a sharp, severe pain in the right lower quadrant.

The mode of onset of pain is also important in the evaluation of the patient as it may give an insight into its aetiology. Pain that is sudden or awakens the patient from sleep suggests a perforated viscus\textsuperscript{22}. In other situations, the pain begins and progressively becomes worse over a few hours. This group includes some common causes of surgical acute abdomen such as acute cholecystitis, acute pancreatitis or small bowel obstruction. Other illnesses may begin with vague general discomfort which may progress to abdominal pain over a few hours. Here the pain increases in intensity and then localizes. This group
includes such conditions as acute appendicitis, incarcerated hernia, colon obstruction and walled-off visceral perforation.

Other factors such as the quality, severity and periodicity of the pain may provide clues to the diagnosis. The pain that accompanies perforated duodenal ulcer or perforated appendix is steady and sharp, while the early pain of small bowel obstruction is vague and deep seated. It then assumes a crescendo-decrescendo character described as colicky pain. However, if obstruction results in gangrene, then the pain would become dull and constant. In ureteric obstruction, the pain is said to be colicky and very severe and intense.

Vomiting is another symptom which is useful in the evaluation of the patient. Knowing the timing of associated nausea and vomiting is important in narrowing the diagnostic possibilities. In surgical conditions, pain usually precedes vomiting, whereas the reverse is true for medical conditions like gastroenteritis where vomiting precedes abdominal pain. Obstruction of proximal bowel produces more vomiting than distal bowel obstruction. Obstruction distal to the ampulla of Vater causes bilous vomiting whereas the vomiting is clear in obstruction occurring proximally. Most patients with acute abdominal pain have no desire to eat. In acute appendicitis this anorexia usually precedes the onset of pain.
Other useful information includes a history of constipation, diarrhea or recent change in bowel habit. Failure to pass gas or move bowel suggests mechanical intestinal obstruction. A good menstrual history is useful to exclude such conditions as ectopic pregnancy. A history of amenorrhea or irregular menstrual periods can be related to complications of an undiagnosed pregnancy. A history of corticosteroid use may help in diagnosing gastroduodenal ulceration and the possibility of perforation. History of previous surgery is useful especially in cases of suspected intestinal obstruction from post operative adhesions.

**Physical Examination**

The physical examination of the patient with an acute abdomen is important as it gives the necessary information in the diagnosis and management\(^{20,21}\). Examination should start with a general observation. The patient’s overall appearance, ability to communicate, habitus and signs of pain are noted. The presence of pallor, fever, jaundice and dehydration are looked for.

Examination of the abdomen starts with inspection, noting the shape of the abdomen and the presence of scars, hernias, masses or abdominal wall defects or evidence of trauma. An abdominal distension may mean intestinal obstruction, ileus or fluid collection including ascites, blood or bile.
Palpation should be careful, noting the patient’s facial expression. The finding and the description of tenderness are the most important steps in palpation of the patient with acute abdomen. Localized tenderness over the McBurney point may suggest appendicitis, while that over the right upper quadrant may point towards an inflamed gallbladder. Generalized abdominal tenderness may reflect diffuse peritonitis.

Rebound tenderness is a sign of peritonitis and may be associated with guarding. It could be elicited directly over the site of abdominal pain. Some clinicians consider rebound tenderness an unkind sign to elicit. Lightly percussing the tender area or asking the patient to cough can elicit this sign\textsuperscript{24,25}. Generalized intense guarding produces the board like abdomen characteristic of perforated duodenal ulcer.

Percussion can define the nature of the intra-abdominal contents; whether solid, fluid or gaseous. Shifting dullness is invaluable in the assessment of the patient with intraperitoneal fluid.

Auscultation of the abdomen gives information as to the activity of bowel motility. Hyperactive bowel sounds are found in Gastroenteritis. High-pitched hyperactive bowel sounds with intervening quiet periods suggests mechanical bowel obstruction, while a quiet abdomen indicates ileus.
Other tests or maneuvers used in the assessment of the surgical acute abdomen include: Murphy’s sign, psoas sign, Rovsing’s sign etc. Murphy’s sign can be elicited by making the patient take a deep breath while the subcostal area is palpated. Abrupt cessation of inspiration due to pain is considered a positive sign and suggestive of cholecystitis. Rovsing’s sign is elicited by deeply palpating the left iliac fossa and observing for referred pain in the right iliac fossa\textsuperscript{26}. The psoas sign is pain elicited by extending the right hip while the patient is in the left lateral decubitus position\textsuperscript{26}. Both the psoas and Rovsing’s signs when positive are indicative of acute appendicitis.

A rectal examination is essential in the management of the patient with surgical acute abdomen. Diffuse tenderness is non-specific, but right sided rectal tenderness accompanied by lower abdominal rebound tenderness is indicative of peritoneal irritation due to pelvic appendicitis or abscess. Although the test can be unpleasant, it is quick and can be made more acceptable with adequate explanation and the presence of chaperons. The genitals and groin are examined as well.
LABORATORY INVESTIGATIONS

URINE TESTS

Urinalysis should be done. The presence of urinary tract infection, haemoconcentration or haematuria is looked for. Pyuria (white blood cells in urine) is common in appendicitis as the inflammatory process may lie adjacent to the right ureter\textsuperscript{17}. Pyuria is also present in urinary tract infection and ureteric colic. Dipstick test of urine (for albumin, bilirubin, glucose and ketones) may also reveal a medical cause of an acute abdomen. Glucose and ketones in the urine may occur in pre-diabetic coma. The presence of red blood cells, white blood cells and oxalate or phosphate crystals is also suggestive of ureteric stones.

In suspected porphyria, the urine is tested for porphobilinogen. If the urine is allowed to stand for a long time it turns wine-colour or dark.

BLOOD STUDIES

Haemoglobin, haematocrit, and white blood cell and differential counts taken on admission are highly informative. Often the white blood cell count is elevated due to intra-abdominal inflammation. A marked leucocytosis of $12-18 \times 10^9$/L with a shift to the left on the blood smear is significant although some have failed to find any correlation between the white blood cell count and the degree of intraabdominal inflammation\textsuperscript{27,28,29}. 
Serum electrolytes, urea nitrogen, and creatinine are important, especially in cases where hypovolaemia is expected (i.e. shock, severe vomiting or diarrhea, abdominal distension or prolonged delay after onset of symptoms). The assessment of the electrolyte and urea helps in proper resuscitation before surgery\textsuperscript{27,28}.

Measurement of serum amylase level may be helpful in the evaluation of the patient by corroborating a clinical suspicion of acute pancreatitis. Moderately raised levels of serum amylase require caution in interpretation, because other abdominal conditions such as strangulated or ischaemic intestines, perforated peptic ulcer, and twisted ovarian cyst may also cause some increase in serum amylase. Levels above 500 Somogyi units are suggestive of early pancreatitis.

Arterial blood gas determination is useful in patients with generalized peritonitis, pancreatitis, septicaemia or possible bowel ischaemia.

Other blood investigations will include liver function tests and hepatitis antigen to exclude medical causes of acute abdomen like hepatitis, clotting studies (platelet counts, prothrombin time and partial thromboplastin time) if the history suggests a possible haematological disorder.
DIAGNOSTIC IMAGING

Although history and physical examination remain the most important steps in the assessment of the patient with acute abdominal pain, diagnostic accuracy is improved by the imaging of the abdomen. Various imaging techniques are now available including ultrasonography and computerized tomography (CT).

1. **Plain X-ray of chest and Abdomen:*** This form of imaging still has great usefulness in several circumstances.

   An erect chest X-ray can detect as little as 1ml of air injected into the peritoneal cavity\(^3\). A lateral decubitus radiograph is as useful in patients who cannot stand up. The observation of free air in the peritoneal cavity indicates a perforation of the gastrointestinal tract. Plain films of the abdomen may also show areas of abnormal calcifications. About 10% of gallstones and 90% of renal stones are radiopaque.

   Abdominal x-ray will also show air-fluid levels and distended bowel in intestinal obstruction.

2. **Abdominal Ultrasonography**

   It provides a rapid and safe evaluation of the abdominal organs. The liver, gallbladder, bile ducts, spleen, appendix, ovaries, pancreas,
adnexae and uterus can all be examined. Hence, it can diagnose liver abscesses, pancreatic lesions, cholecystitis and cholelithiasis. It can also detect and characterize the distribution of intra-abdominal fluid.

Ultrasound is useful in the diagnosis of appendicitis by detection of appendicoliths and demonstration of an abnormal distention and thickening of the appendix wall \(^31\). Prospective studies have shown predictive values of close to 100% with sensitivity of about 86% \(^32-35\). However, the limitation of ultrasonography in this environment is its observer dependency which is worsened by the lack of trained personnel for its interpretation.

3. **Computed Tomography**

CT scanning has significantly improved the preoperative diagnostic accuracy in the evaluation of patients with acute abdomen and it reveals both anatomic and pathologic details not possible with plain radiographs \(^36\). In a study, the role of CT scan in the diagnosis of appendicitis was evaluated prospectively. The CT interpretation had 98% sensitivity, 98% specificity, 98% positive predictive value, 98% negative predictive value, and 98% overall accuracy for diagnosing or excluding appendicitis \(^37\). Although its use in appendicitis has been questioned \(^38\).
In Nigeria, the use of CT scan as an investigative tool in cases of surgical acute abdomen is largely limited by its high cost and unavailability.

4. **Radio-isotope scanning**

   Incubation and injection of patient’s leucocytes with Indium-111 or technetium 99m has shown uptake in an inflamed appendix with a sensitivity of up to 98% and specificity of 95%. This is also useful in the diagnosis of intra-abdominal abscesses. However, its usefulness is greatly decreased by its unavailability and cost.

5. **Endoscopy**

   Various endoscopic procedures could be undertaken in investigation of the patient with a surgical acute abdomen. Gastroduodenoscopy and endoscopic retrograde pancreatic-coduodenoscopy are useful to evaluate less urgent inflammatory conditions (e.g. gastritis, peptic ulcer disease) when the abdominal signs are not severe.

6. **Fine Catheter Peritoneal Cytology and others**

   Other investigations like Diagnostic peritoneal lavage, in cases of suspected intraabdominal haemorrhage and diagnostic laparoscopy are
useful tools in the evaluation of patients. In the acute abdomen, laparoscopy has been used to reduce the rate of negative explorations, thereby reducing mortality, morbidity and duration of hospital stay\textsuperscript{40}.

**PATTERN OF SURGICAL ACUTE ABDOMEN**

The pattern of surgical acute abdomen varies from one place to another and may change overtime in a particular place. In the Industrialized countries of Europe and North America, acute appendicitis is the commonest cause of surgical acute abdomen\textsuperscript{41-44}. Other causes include cholecystitis, acute pancreatitis, intestinal obstruction, perforated peptic ulcer. Also in these countries the commonest cause of intestinal obstruction is adhesion following surgery\textsuperscript{14,45}.

This pattern was at variance with what obtained in Nigeria where the commonest cause of surgical acute abdomen was intestinal obstruction which was mainly from obstructed inguinal hernia\textsuperscript{6}. This pattern has since changed. Currently, the leading cause of surgical acute abdomen in most societies, including Nigeria is appendicitis\textsuperscript{7,43,45}. Approximately 7\% of the population develops the condition during their life time in some countries\textsuperscript{46}. It has a peak incidence between ages 10 and 30 years\textsuperscript{25}. When all causes of acute abdominal pain are considered including non-surgical causes, the commonest causes are Non-specific
abdominal pain (NSAP)\textsuperscript{14,15} (also called undifferentiated abdominal pain (UDAP)) and appendicitis\textsuperscript{7,45}, each leading the other depending on which studies are cited. Non-specific abdominal pain is a diagnosis of exclusion made after an attempt has been made to exclude more serious causes. Most of these patients have a benign course on follow-up.

In Nigeria, the pattern has undergone a change. Studies done in the 1960s suggested that the leading cause of surgical acute abdomen then was not appendicitis. Udeh reported the commonest cause of surgical acute abdomen to be ruptured ectopic pregnancy. This was followed by strangulated hernia and then appendicitis in that order\textsuperscript{5}. In 1968, Adesola found that intestinal obstruction (29.7\%) was the commonest cause of surgical acute abdomen in Ibadan\textsuperscript{6}. Acute appendicitis (29.2\%) followed closely. From these studies, Intestinal obstruction (mainly from obstructed herniae) was the leading cause of surgical acute abdomen in Nigeria in the 1960s.

However, in 1981 Ajao\textsuperscript{48} observed a changing pattern at Ibadan. In his study, appendicitis (40.3\%) was now the leading cause of surgical acute abdomen; Intestinal obstruction (34.2\%) was the second leading cause, followed by abdominal trauma (10\%). Other studies in Nigeria and other countries show a similar changing pattern. Datubo-Brown &
Adotey\textsuperscript{49} in 1990 also reported that appendicitis (51.2\%) was the leading cause of surgical acute abdomen in Port Harcourt followed by Intestinal obstruction (28.7\%), abdominal trauma (10.8\%) and other causes (6.8\%). From the foregoing, appendicitis can be said to be the current published leading cause of surgical acute abdomen in Nigeria. Both studies observed in addition a rather high rate of abdominal trauma which was not previously seen. This was attributed to the increasing industrialization with the attendant increased risk of accident. Other studies also attribute this to the rise in armed conflicts and banditry\textsuperscript{50,51}.

In a more recent study, Naaeder\textsuperscript{7}, in Ghana reported that appendicitis (23.5\%) was the commonest cause of acute abdomen. In this study, both medical and surgical causes of acute abdomen were considered. Those with non-specific abdominal pain made up 21.4\%, Intestinal Obstruction (10.8\%), gynaecological causes (9.5\%) and peptic ulcer disease (9.2\%) following in that order.

The incidence of appendicitis is progressively increasing in Sub-Saharan Africa while decreasing in the developed countries\textsuperscript{28,51,52}. Several reasons have been suggested for the increase in Africa, one being the changing diet of many people in Sub-Saharan Africa towards a westernized low fibre content diet. This invariably results in the slowing
of the transit time of faeces, making the stool smaller, firmer and more
tenacious, requiring high intraluminal pressure to evacuate it\textsuperscript{28}.
However, a study by Naaeder and Archampong\textsuperscript{53} strongly dispute this as
they found no relationship between dietary fibre intake and acute
appendicitis. They believe that other luminal as well as morphological
factors may be the predisposing factors.

Another important change noted over the past 20 years is the
pattern of acute intestinal obstruction which is an important cause of
surgical acute abdomen. Recently, post operative adhesions have
continued to gain importance as a cause of acute intestinal obstruction.
There has also been a progressive decline in obstruction from hernias
which used to be the leading cause of not only intestinal obstruction but
also surgical acute abdomen in the subregion\textsuperscript{54-56}. Various reasons have
been put forward for this changing pattern. The first reason is that there
has been a general decline in the overall cases of intestinal obstruction
in the past 20 years\textsuperscript{56}. Naaeder\textsuperscript{54,55} has also suggested that the
declining rate of obstructed hernias is related to the increased number
of elective operations now performed for inguinal hernia. This is
attributable to improved awareness in the population and the increasing
availability of expertise.
Despite the studies already cited, it is important to review other studies done in Africa which do not particularly agree with this changing pattern. A report from rural Sierra Leone shows a pattern similar to what obtained at Ibadan in the 1960s. In this study, strangulated hernia was the leading cause of surgical acute abdomen, followed by ectopic pregnancy and then appendicitis\textsuperscript{57}. This result may be due to the fact that the study was conducted in a rural environment where conditions were basically similar to what probably obtained in the urban areas in the 1960s.

Asefa\textsuperscript{58}, working in Ethiopia also noted a different pattern. He reported that the leading cause of surgical acute abdomen in Ethiopia was small bowel obstruction (mainly from small intestinal volvulus). This was followed by appendicitis, large bowel obstruction (mainly sigmoid volvulus), typhoid perforation and primary peritonitis, in that order. This pattern contrasts with what obtains in most studies and may be a regional variation.

The pattern of surgical acute abdomen outside Africa, especially in Europe and the United States of America gives a somewhat different picture. From Italy, Caterino et al\textsuperscript{45} reported on all patients with acute abdominal pain admitted into the general surgery unit of the 1\textsuperscript{st} Institute of surgery of the University of Rome during a 7 – year period 1991-
1997. They noted that the commonest cause of acute abdomen were appendicitis (16.4%), non-specific abdominal pain (15.5%), cholelithiasis (12.5%) and abdominal malignancy (10.3%). The largest admissions occurred in the age groups 60 – 70 years (16.6%) and 20 – 30 years (14.2%).

Also from Finland, Miettinen and colleagues\(^\text{15}\) reported that the commonest cause of acute abdomen was non-specific abdominal pain (33.0%), followed by appendicitis (23.3%) and biliary disease (8.8%). The male: female ratio was 47:53. They also noted that acute appendicitis was most frequently found in young men and biliary disease was most common in elderly women. In Sweden, Fenyo et al\(^\text{14}\) reported that non – specific abdominal pain (24%) was the leading cause of acute abdomen among 3,727 in-patients, cholecystitis (9%), appendicitis (8%), bowel obstruction (7%), intraabdominal malignancy, disease of the urinary tract and peptic ulcer (6%) each.

From the above, the commonest cause of surgical acute abdomen in Europe is also appendicitis, although the other causes differ significantly from what obtains in Nigeria and other countries in Africa. The other causes of surgical acute abdomen in the industrialized countries include, Biliary disease, Intraabdominal malignancy and
Intestinal obstruction. The leading causes of Intestinal obstruction in these European countries are adhesions\textsuperscript{59}.

\section*{SPECIAL CONSIDERATIONS}

\section*{SURGICAL ACUTE ABDOMEN IN CHILDREN}

Acute abdomen in children deserves a special consideration. It is one of the most frequent causes of admission to an emergency department of a children’s hospital\textsuperscript{60}.

Age is the key feature in the assessment of abdominal pain in children because the aetiology differs with the age of the child\textsuperscript{61-63}. These can be divided into those that relate to congenital abnormalities and acquired disease. Hence, the diagnostic algorithm has been compartmentalized into groups; the neonate, the infant and toddler (Preschoolers), and the child aged 3 years to the teenager (school-age children)\textsuperscript{64, 65}. Children are poor historians and pain localization is poor, therefore the site of pain may not be too helpful in making a provisional diagnosis. One of the main challenges in management therefore is to identify the majority of children with self-limiting conditions and those with life-threatening cause of pain. Infantile colic is a common cause of non-surgical pain in infants. It affects 10-20\% of infants during the first 3 to 4 weeks of life\textsuperscript{66}. However, within the first year of life the surgical
causes of acute abdomen include intussusception, volvulus, obstructed inguinal hernia and Hirschprung’s disease. After the age of 3 years, the pattern gradually tends towards that of adults\textsuperscript{67}. In a study in Nigeria, Archibong and his colleagues\textsuperscript{68} reported that appendicitis was the commonest cause of surgical acute abdomen between the ages of 3 and 15 years and it was rare before the age of 3 years.

Serengbe et al\textsuperscript{69} studied the pattern of acute abdominal pain in children between the ages of 3 and 10 years in the central African Republic. The leading cause of acute abdomen was appendicitis (32.4%), typhoid perforation (9.9%), digestive forms of malaria (5.8%), strangulated hernia (4.8%), acute gastroenteritis (4.8%) and acute pneumoniae (3.8%) etc.

Holland and Gollow\textsuperscript{70} working in Australia conducted an audit of 1,313 children with acute abdominal pain over a 3-year period. Their study which was not restricted to only surgical abdomen, revealed the following: Non-specific abdominal pain accounted for 70% of all the cases. 54% of all their patients were discharged without surgery. Of those who had surgery, 74% had appendicitis, making it the leading cause of surgical acute abdomen. Others had uterine pathology, meckel’s diverticulum and omental torsion. Anatol and colleagues\textsuperscript{71} working in Trinidad noted a similar pattern. Of 1,158 children admitted
with acute abdominal pain, appendicitis was also the leading cause of surgical acute abdomen (20.9%). Other causes include urinary tract infection (11.7%), constipation (7.5%), gastroenteritis (5.8%) and intussusception (5.3%). It is important to note that complications of typhoid enteritis is an important cause of morbidity and mortality in Nigeria. In a study of acute generalized peritonitis, Adesunkanmi\textsuperscript{72} found 50.7% of children had typhoid intestinal perforation.

**SURGICAL ACUTE ABDOMEN IN THE ELDERLY**

Geriatric patients are more likely than younger patients to have serious causes of abdominal pain\textsuperscript{73- 74}. With increasing life expectancy, it is expected to become a common problem because of the expected increase in the population of the elderly.

The definition of elderly is a subject of debate; however, age 65 years could be accepted as the dividing line\textsuperscript{75}. Elderly patients have a high mortality, longer duration of stay in hospital and the rate of misdiagnosis is said to increase exponentially after the age of 50 years\textsuperscript{74,76}. This is so because they are more likely than younger patients to have vague symptoms. On examination, findings may also appear non-specific, making diagnosis more difficult. This was illustrated by Telfer et al\textsuperscript{77} who demonstrated in their study that 14% of patients over 50 years of age with appendicitis had generalized pain and tenderness compared with 2% of younger patients. Also rebound tenderness as a sign is unreliable in elderly patients with appendicitis.
Various studies have shown that in addition to the above, the disease spectrum in the elderly differed significantly from those of other ages. Whereas appendicitis is the commonest cause of surgical acute abdomen in the other ages (except below 3 years of age), it is uncommon in the elderly. Bugliosi and colleagues\textsuperscript{74} reported that cholelithiasis and small bowel obstruction were the commonest causes of acute abdomen in patients aged 65 years and above. Telfer et al\textsuperscript{77} also reported a study of 2,406 patients aged over 50 years. Their finding was that cholecystitis was more common as a cause of surgical acute abdomen than appendicitis. Intestinal obstruction was also three times as common in the elderly when compared with those below 50 years. Cancer rates were more than 24\% in patients over the age of 70 years\textsuperscript{73}. This supports Deehan’s\textsuperscript{81} conclusion that elderly patients with abdominal pain more likely have catastrophic illnesses rarely seen in younger ones.

Mortality rates are also much higher in the elderly with surgical acute abdomen.
CHAPTER THREE

AIMS AND OBJECTIVES

The general aim is to determine the pattern of surgical acute abdomen in Port Harcourt.

SPECIFIC OBJECTIVES

1. To determine the causes of surgical acute abdomen.
2. To obtain the age and sex pattern of surgical acute abdomen.
3. To determine the duration of symptoms before presentation in hospital.
4. To document the complications in the patients studied and to determine its relationship with patient’s age and duration of symptom.
5. To determine the mortality associated with surgical abdomen and to relate it with age and duration of symptoms.
CHAPTER FOUR

PATIENTS AND METHODS

Preamble

This study was conducted at the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria which is a 500 – bed tertiary health - care institution. It serves as a referral centre for all other hospitals both private and public in the state. Its central location and easy accessibility allows a high numerical and diverse attendance to the hospital.

PATIENTS’ ATTRIBUTES

(a) Inclusion Criteria

All cases of acute abdomen admitted into the University of Port Harcourt Teaching Hospital and referred to the surgical unit of the hospital.

(b) Exclusion Criteria

Patients who fell under the following criteria were excluded from the study:

(i) Patients who refused to give consent to be included in the study.
(ii) Patients who left hospital against medical advice or absconded without completing the study.

(iii) All patients with acute abdomen of immediate post operative aetiology.

(iv) All patients who were proven to have medical causes of acute abdomen.

ETHICAL CONSIDERATIONS

1. The study was approved by the Research and Ethical Committee of the hospital.

2. Informed consent was obtained from all patients who participated in the study.

3. The author explained the procedures in detail to individual patients, and reassured them that they would not be refused treatment even if they declined to participate in the study.

4. Confidentiality of information obtained from patients was maintained.

METHODS

All consultants and resident doctors in the surgical department as well as the Accident and emergency and children’s emergency wards
were informed in writing by the author. Permission was also obtained from the consultants to enrol their patients for the study.

The casualty officers and residents notified the author (if not present) when there was a suspected case of surgical acute abdomen. The author was involved in the management of all the patients until discharge or death.

**Pre-operative Protocol**

All patients seen at the accident and emergency and children’s emergency departments who met the inclusion criteria were selected. A detailed history and physical examination was carried out by the author or by the residents on call if the author was not immediately available. Information obtained was entered into the proforma designed for the study (Appendix 1). Patients were also investigated as part of the pre-operative management. Investigations done included a full blood count (FBC), serum electrolytes, urea and creatinine (E/U/Cr), urinalysis (and culture of urine when indicated). A plain radiograph of the abdomen (erect and supine), chest radiograph, abdominal ultrasonography, serum amylase and other specific investigations were carried out when necessary to establish a diagnosis. Results of investigations were also entered into the proforma.
Pre-operatively, patients were resuscitated adequately, with correction of fluid and electrolyte imbalance. When necessary, blood was grouped and crossed matched after screening for transmissible diseases. Patients who required blood transfusion were transfused pre-operatively while others were transfused either intra or post – operatively. Patients were placed on broad spectrum antibiotics and analgesics. They also received other treatment depending on their diagnosis and clinical condition i.e. urethral catherization and insertion of nasogastric tube when indicated. Patients were optimized and taken to theatre for indicated surgery.

**Intra-operative Protocol**

Most operations were carried out by Consultants and senior registrars (the author inclusive). Anaesthesia was mostly general anaesthesia with endotracheal intubation.

Operative procedures were carried out under aseptic conditions. The abdominal incision and extent of surgery depended on the cause of the surgical acute abdomen.

The findings at surgery and the type of surgical procedure done were also noted. Specimens obtained at surgery were sent for tissue histopathological, biochemical or microbiological analysis as required.
**Post operative Protocol**

Post – operatively, patients’ vital signs, nasogastric tube drainage and urine output were charted. Patients were managed by their various managing units with the author keeping a daily assessment of each patient. Problems and other complications were noted by the author as they arose and recorded in the proforma.

Results of investigations done before or after surgery were retrieved and noted. Each patient was followed-up until discharge or death. Discharged patients were given out-patient clinic appointments for follow-up. Attempts were made to do post – mortem examination on patients who died during the study.

**Non – operative protocol**

All patients for whom surgery was not indicated were managed conservatively. The initial management was similar to those who had operative management (see pre-operative protocol).

In addition, efforts were aimed at reaching a diagnosis. Patients were investigated and results of investigations recorded.

They were followed up daily by the managing team (and the author). Their progress was noted and on discharge patients were followed up through the out-patient clinic for one month.
DATA ANALYSIS

Data was recorded and analyzed using the STATISTICAL PACKAGE FOR SOCIAL SCIENCES (SPSS) Version 11.0®. The measures of central tendency and dispersion were computed for all quantitative variables. The frequency distribution, cross tabulation and test of significance using the p values were done using SPSS. p≤0.05 was considered statistically significant. Results were expressed in simple statements, tables and bar charts.

LIMITATIONS OF THE STUDY

1. The study which was initially planned for a 12-month period (January, 2004 to December, 2004) had to be done over 11 months because of a disruption in hospital services resulting from a strike by Doctors in December, 2004.

2. This study was hospital based and might not entirely be representative of surgical acute abdomen in Port Harcourt since many hospitals undertake less complex surgical procedures like appendicectomy. Because of the law enforcement aspects of gunshot wounds, it is believed a good number of cases would rather receive treatment at locations that would ensure they were not arrested by the Police.

3. Nine (9) patients signed against medical advice and were not included in the study.
CHAPTER FIVE

RESULTS

5.1 AGE AND SEX

A total of one hundred and eighty nine (189) patients with surgical acute abdomen were initially recruited for this study. However, nine (9) patients signed and left hospital against medical advice and were excluded from the study.

One hundred and eighty (180) patients who satisfied the inclusion criteria were therefore studied. Their ages ranged between 5 days and 72 years, with a mean age of 25.7± 15.9 years. The peak incidence of 51 (28.3%) patients was in those aged between 21-30 years. The least incidence of 1 (0.6%) was observed in those aged between 71-80 years. (Table 1). There were 100 (55.6%) males and 80 (44.4%) females. This gave a male: female ratio of 1.25:1. (Table II and Figure 1 show the age sex distribution). There were more males in all age groups below 50 years of age except in those between 1-10 years where they were equal and also in those between 11-20 years where females were more (Table II). There were 22 (45.8%) males and 26 (54.2%) females. This gave a male: female ratio of 1:1.2.
<table>
<thead>
<tr>
<th>AGE</th>
<th>NUMBER</th>
<th>PERCENTAGE</th>
<th>CUMMULATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>13</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>1-10</td>
<td>14</td>
<td>7.8</td>
<td>15.0</td>
</tr>
<tr>
<td>11-20</td>
<td>48</td>
<td>26.7</td>
<td>41.7</td>
</tr>
<tr>
<td>21-30</td>
<td>51</td>
<td>28.3</td>
<td>70.0</td>
</tr>
<tr>
<td>31-40</td>
<td>26</td>
<td>14.4</td>
<td>84.4</td>
</tr>
<tr>
<td>41-50</td>
<td>14</td>
<td>7.8</td>
<td>92.2</td>
</tr>
<tr>
<td>51-60</td>
<td>6</td>
<td>3.3</td>
<td>95.5</td>
</tr>
<tr>
<td>61-70</td>
<td>7</td>
<td>3.9</td>
<td>99.4</td>
</tr>
<tr>
<td>71-80</td>
<td>1</td>
<td>0.6</td>
<td>100.0</td>
</tr>
<tr>
<td>AGE (YEARS)</td>
<td>MALE</td>
<td>FEMALE</td>
<td>TOTAL</td>
</tr>
<tr>
<td>------------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>&lt;1</td>
<td>10 (5.6)</td>
<td>3 (1.7)</td>
<td>13 (7.3)</td>
</tr>
<tr>
<td>1-10</td>
<td>7 (3.9)</td>
<td>7 (3.9)</td>
<td>14 (7.8)</td>
</tr>
<tr>
<td>11-20</td>
<td>22 (12.2)</td>
<td>26 (14.4)</td>
<td>48 (26.6)</td>
</tr>
<tr>
<td>21-30</td>
<td>29 (16.1)</td>
<td>22 (12.2)</td>
<td>51 (28.3)</td>
</tr>
<tr>
<td>31-40</td>
<td>18 (10.0)</td>
<td>8 (4.4)</td>
<td>26 (14.4)</td>
</tr>
<tr>
<td>41-50</td>
<td>9 (5.0)</td>
<td>5 (2.8)</td>
<td>14 (7.8)</td>
</tr>
<tr>
<td>51-60</td>
<td>2 (1.1)</td>
<td>4 (2.2)</td>
<td>6 (3.3)</td>
</tr>
<tr>
<td>61-70</td>
<td>3 (1.7)</td>
<td>4 (2.2)</td>
<td>7 (3.9)</td>
</tr>
<tr>
<td>71-80</td>
<td>0 (0)</td>
<td>1 (0.6)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100 (55.6)</td>
<td>80 (44.4)</td>
<td>180 (100)</td>
</tr>
</tbody>
</table>
FIGURE 1: AGE SEX DISTRIBUTION OF PATIENTS.
5.2 CAUSES OF SURGICAL ACUTE ABDOMEN

The causes of surgical acute abdomen are shown on Table III. 85 (47.2%) were caused by appendicitis. 46 (25.6%) were attributable to trauma while 35 (19.4) were due to intestinal obstruction. Other causes accounted for (7.8%) of cases.

Appendicitis

The diagnosis of appendicitis was clinical as histological diagnosis was not possible in some cases. A total of 85 patients were diagnosed with appendicitis. Of these 6 had appendix mass and were managed conservatively. The remaining 79 patients had an appendicectomy. Nineteen patients had either a perforated or gangrenous appendix. When added to those with appendix mass, the rate of complicated appendicitis was 29.4%.

Of the 85 patients with appendicitis there were 45 (52.9%) females and 40 (47.1%) males. This gave a male: female ratio of 1:1.1. There was a preponderance of females in patients below the age of 30 years. This was particularly pronounced in those aged between 11-20 years. In this group, a total of 28 patients had appendicitis. There were 10 (35.7%) males and 18 (64.3%) females. This gave a male: female ratio of 1:1.8. This was responsible for the higher number of females as
compared to males in that age group when all causes of surgical acute were considered.

**Abdominal trauma**

Forty-six patients (25.6%) had abdominal trauma. There were 35 (76.1%) males and 11 (23.9%) females. This gave male: female ratio of 3.2:1. Of these patients 28 (60.9%) were as a result of penetrating abdominal trauma. Among these 24 (85.7%) resulted from gunshot injuries, the remaining 4 (14.3%) were caused by stab wounds. Blunt abdominal trauma was noted in 18 (39.1%) of all cases of abdominal trauma. Of these 15 (83.3%) had splenic injuries, 2 (11.1%) had trauma to the liver and 1 (5.5%) had a mesenteric tear.

**Intestinal Obstruction**

The third leading cause of surgical acute abdomen was intestinal obstruction 35 (19.4%). Obstructed hernias (both inguinal and para-umbilical) accounted for 12 (34.3%) of all cases of intestinal obstruction. Other causes of intestinal obstruction are shown in Table III.
<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>NUMBER OF CASES</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. APPENDICITIS</td>
<td>85</td>
<td>47.2</td>
</tr>
<tr>
<td>2. TRAUMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Penetrating abdominal trauma.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Gunshot</td>
<td>24</td>
<td>13.3</td>
</tr>
<tr>
<td>- Stab wound</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>* Blunt Abdominal trauma</td>
<td>18</td>
<td>10.0</td>
</tr>
<tr>
<td>3. INTESTINAL OBSTRUCTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Adhesions</td>
<td>9</td>
<td>5.0</td>
</tr>
<tr>
<td>* Inguinal hernia</td>
<td>9</td>
<td>5.0</td>
</tr>
<tr>
<td>* Intussusception</td>
<td>6</td>
<td>3.3</td>
</tr>
<tr>
<td>* Paraumbilical hernia</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>* Volvulus</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Tumour (Large bowel)</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>* Imperforate anus</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>* Annular pancreas</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>4. OTHERS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Typhoid perforation</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>* Sigmoid perforation</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Acute cholecystitis</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Necrotizing Enterocolitis</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Amoebic liver abscess</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Intraabdominal abscess</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Retroperitoneal tumour (Rhabdomyosarcoma)</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>* Perforated Peptic ulcer</td>
<td>4</td>
<td>2.2</td>
</tr>
<tr>
<td>*Unknown Diagnosis</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>180</td>
<td>100.0</td>
</tr>
</tbody>
</table>
**TABLE IV: AGE SEX DISTRIBUTION OF PATIENTS WITH APPENDICITIS**

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-10</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>11-20</td>
<td>10</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td>21-30</td>
<td>11</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>31-40</td>
<td>11</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>51-60</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>40(47.1%)</td>
<td>45(52.9%)</td>
<td>85(100%)</td>
</tr>
</tbody>
</table>
5.3 SYMPTOMS

Symptoms at presentation are as shown on table V. The duration of symptoms before presentation ranged between 1 and 21 days with a mean of 2.0±2.9 days. Only 73 (40.6%) patients presented within 24 hours of onset of symptoms.

The commonest complaint of patients with appendicitis was abdominal pain 85 (100%), this was followed by anorexia 65 (76.5%), nausea 57 (67.1%), vomiting 43 (50.1%) and fever 48 (47.1%). Other symptoms occurring only in a few patients were constipation, diarrhoea and abdominal distension.

The commonest symptoms following abdominal trauma were abdominal pain 45 (97.8%), abdominal distension 28 (60.9%), fever 5 (10.9%) and constipation 4 (8.7%).

Patients with intestinal obstruction presented with abdominal pain 32 (91.4%), vomiting 29 (82.9%), abdominal distension 29 (82.8%) and constipation 27 (77.1%).

Symptoms of other causes of surgical acute abdomen are as shown on table VI.
5.4 NUMBER OF DAYS OF HOSPITALIZATION

Figure 3 shows the number of days patients spent in hospital. The mean number of days was 9.9±6.6. The minimum number of days was 1 and the maximum was 53 involving a patient with enterocutaneous fistula.
<table>
<thead>
<tr>
<th>SYMPTOMS</th>
<th>NUMBER OF PATIENTS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Abdominal pain</td>
<td>174</td>
<td>96.7</td>
</tr>
<tr>
<td>* Vomiting</td>
<td>84</td>
<td>46.7</td>
</tr>
<tr>
<td>* Nausea</td>
<td>73</td>
<td>40.6</td>
</tr>
<tr>
<td>* Fever</td>
<td>65</td>
<td>36.1</td>
</tr>
<tr>
<td>* Constipation</td>
<td>39</td>
<td>21.7</td>
</tr>
<tr>
<td>* Diarrhea</td>
<td>11</td>
<td>6.1</td>
</tr>
<tr>
<td>* Abdominal Distension</td>
<td>72</td>
<td>40.0</td>
</tr>
<tr>
<td>* Anorexia</td>
<td>84</td>
<td>46.7</td>
</tr>
<tr>
<td>* Protrusion of abdominal contents</td>
<td>6</td>
<td>3.3</td>
</tr>
<tr>
<td>* Bloody stools</td>
<td>6</td>
<td>3.3</td>
</tr>
<tr>
<td>* Groin swelling</td>
<td>10</td>
<td>5.6</td>
</tr>
</tbody>
</table>
# TABLE VII: DURATION OF SYMPTOMS AT PRESENTATION IN HOSPITAL

<table>
<thead>
<tr>
<th>DAYS</th>
<th>NUMBER OF PATIENTS</th>
<th>PERCENTAGE</th>
<th>CUMULATIVE PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>73</td>
<td>40.6</td>
<td>40.6</td>
</tr>
<tr>
<td>2</td>
<td>32</td>
<td>17.8</td>
<td>58.3</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>13.9</td>
<td>72.2</td>
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<tr>
<td>4</td>
<td>19</td>
<td>10.6</td>
<td>82.8</td>
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<td>5</td>
<td>10</td>
<td>5.5</td>
<td>88.3</td>
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<td>90.6</td>
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<td>7</td>
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<td>5.5</td>
<td>96.1</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>3.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>
FIGURE 2: DURATION OF SYMPTOMS AT PRESENTATION.
FIGURE 3: NUMBER OF DAYS OF HOSPITALIZATION.
5.5 COMPLICATIONS

Thirty-four (18.9%) patients developed complications. Table VIII shows the correlation between duration of symptoms and occurrence of complications. There was a significantly higher occurrence of complications in those with longer duration of symptoms of more than 24 hours than those of less than 24 hours (p<0.05).

Complications were also significantly higher in those below 1 year of age and those aged over 61 years as compared with the rest of the patients (p<0.05).

5.6 MORTALITY

Eighteen patients died during the study. This gave a mortality rate of 10%. Table XI shows a correlation between age and mortality. It reveals a significant mortality in the extremes of life. Patients below the age of 1 year and those over 61 years had a significantly higher mortality as compared with the others.

Those who presented in hospital within 24 hours of duration of symptoms were compared with those who presented later. There was no significant difference between the two groups (p>0.05) (Table XII).
TABLE VIII: COMPLICATIONS AMONG PATIENTS

<table>
<thead>
<tr>
<th>COMPLICATIONS</th>
<th>NUMBER</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wound Infection</td>
<td>11</td>
<td>32.4</td>
</tr>
<tr>
<td>Septicaemia</td>
<td>11</td>
<td>32.4</td>
</tr>
<tr>
<td>Enterocutaneous fistula</td>
<td>5</td>
<td>14.7</td>
</tr>
<tr>
<td>Anastomotic breakdown</td>
<td>2</td>
<td>5.9</td>
</tr>
<tr>
<td>Renal failure</td>
<td>2</td>
<td>5.9</td>
</tr>
<tr>
<td>Bronchopneumonia</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Adult Respiratory distress syndrome</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Secondary Haemorrhage</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>34</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
TABLE IX: CORRELATION BETWEEN DURATION OF SYMPTOMS AND OCCURRENCE OF COMPLICATIONS. (PERCENTAGES ARE IN BRACKETS)

<table>
<thead>
<tr>
<th>DURATION OF SYMPTOMS (DAYS)</th>
<th>PATIENTS WITH COMPLICATIONS</th>
<th>PATIENTS WITHOUT COMPLICATIONS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1</td>
<td>9 (12.3)</td>
<td>64 (87.7)</td>
<td>73 (100.0)</td>
</tr>
<tr>
<td>&gt; 1</td>
<td>26 (24.3)</td>
<td>81 (75.7)</td>
<td>107 (100.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>34</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

p=0.046
### TABLE X: CORRELATION BETWEEN AGE AND THE OCCURRENCE OF COMPLICATIONS.

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>PATIENTS WITH COMPLICATIONS</th>
<th>PATIENTS WITHOUT COMPLICATIONS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1</td>
<td>6 (46.2)</td>
<td>7 (53.8)</td>
<td>13 (100.0)</td>
</tr>
<tr>
<td>1-10</td>
<td>0 (0)</td>
<td>14 (0)</td>
<td>14 (100.0)</td>
</tr>
<tr>
<td>11-20</td>
<td>7 (14.6)</td>
<td>41 (85.4)</td>
<td>48 (100.0)</td>
</tr>
<tr>
<td>21-30</td>
<td>11 (21.6)</td>
<td>40 (78.4)</td>
<td>51 (100.0)</td>
</tr>
<tr>
<td>31-40</td>
<td>3 (11.5)</td>
<td>23 (88.5)</td>
<td>26 (100.0)</td>
</tr>
<tr>
<td>41 – 50</td>
<td>2 (14.3)</td>
<td>12 (85.7)</td>
<td>14 (100.0)</td>
</tr>
<tr>
<td>51-60</td>
<td>2 (33.3)</td>
<td>4 (66.7)</td>
<td>6 (100.0)</td>
</tr>
<tr>
<td>61-70</td>
<td>3 (42.9)</td>
<td>4 (57.1)</td>
<td>7 (100.0)</td>
</tr>
<tr>
<td>71-80</td>
<td>1 (100.0)</td>
<td>0 (0)</td>
<td>1 (100.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>35 (19.4)</td>
<td>145 (80.6)</td>
<td>180 (100.0)</td>
</tr>
</tbody>
</table>

For <1 year vs 1-60 years Fisher exact test p=0.01

For age 61-80 years vs 1-60 years Fisher exact test p=0.03
### TABLE XI: CORRELATION BETWEEN AGE AND MORTALITY.

<table>
<thead>
<tr>
<th>AGE (YEARS)</th>
<th>DEAD</th>
<th>ALIVE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1</td>
<td>4 (30.8%)</td>
<td>9 (69.2%)</td>
<td>13 (100.0%)</td>
</tr>
<tr>
<td>1-10</td>
<td>0 (0%)</td>
<td>14 (100%)</td>
<td>14 (100.0%)</td>
</tr>
<tr>
<td>11-20</td>
<td>1 (2.1%)</td>
<td>47 (97.9)</td>
<td>48 (100.0%)</td>
</tr>
<tr>
<td>21-30</td>
<td>4 (7.8%)</td>
<td>47 (92.2%)</td>
<td>51 (100.0%)</td>
</tr>
<tr>
<td>31-40</td>
<td>3 (11.5%)</td>
<td>23 (88.5%)</td>
<td>26 (100.0%)</td>
</tr>
<tr>
<td>41 – 50</td>
<td>1 (7.1%)</td>
<td>13 (92.9%)</td>
<td>14 (100.0%)</td>
</tr>
<tr>
<td>51-60</td>
<td>2 (33.3%)</td>
<td>4 (66.7%)</td>
<td>6 (100.0%)</td>
</tr>
<tr>
<td>61-70</td>
<td>3 (42.9%)</td>
<td>4 (57.1%)</td>
<td>7 (100.0%)</td>
</tr>
<tr>
<td>71-80</td>
<td>0 (0%)</td>
<td>1 (100.0%)</td>
<td>1 (100.0%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18 (10.0%)</td>
<td>162 (90.0%)</td>
<td>180 (100.0%)</td>
</tr>
</tbody>
</table>

For age <1 year vs 1-60 years  Fisher exact test p=0.02

For age 61-80 years vs 1-60 years  Fisher exact test p=0.02
TABLE XII: CORRELATION BETWEEN DURATION OF SYMPTOMS AND MORTALITY (PERCENTAGES ARE IN BRACKETS)

<table>
<thead>
<tr>
<th>DURATION OF SYMPTOMS (DAYS)</th>
<th>OUTCOME</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DEAD</td>
<td>WELL</td>
</tr>
<tr>
<td>&lt; 1</td>
<td>4 (5.5)</td>
<td>69 (94.5)</td>
</tr>
<tr>
<td>&gt; 1</td>
<td>14 (13.1)</td>
<td>93 (86.9)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18 (10.0%)</td>
<td>162 (90.0)</td>
</tr>
</tbody>
</table>

p=0.095
<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>NUMBER OF CASES</th>
<th>NUMBER OF DEATHS</th>
<th>CASE FATALITY RATE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. APPENDICITIS</td>
<td>78</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>2. TRAUMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Penetrating Abdominal trauma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Gunshot</td>
<td>24</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>- Stab wound</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Blunt Abdominal trauma</td>
<td>18</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>3. INTESTINAL OBSTRUCTION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Adhesions</td>
<td>9</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>* Inguinal hernia</td>
<td>9</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>* Intussusception</td>
<td>6</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>* Paraumbilical hernia</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Volvulus</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Tumour(Large bowel)</td>
<td>4</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>* Imperforate anus</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Annular pancreas</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>4. OTHERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Typhoid perforation</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Sigmoid perforation</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Acute Cholecystitis</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Necrotising Enterocolitis</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>* Amoebic Liver abscess</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Intraabdominal abscess</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Retroperitoneal tumour(Rhabdomyosarcoma)</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Perforated peptic ulcer</td>
<td>4</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>* Lymphoid hyperplasia</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>* Unknown Diagnosis</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>180</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER SIX
DISCUSSION

In discussing the results of this study one must first observe that the study was conducted in a tertiary hospital in an urban environment which is saturated with other hospitals. Indeed there is a General Hospital situated about 3 kilometres from this centre. There are also a large number of privately owned clinics in the metropolis which also care for the sick in the society. It is therefore believed that those who eventually got to the Teaching Hospital were mainly referred from some of these centres. They may therefore not be representative of the pattern of surgical acute abdomen in Port Harcourt.

A total of 180 patients were studied during the 11-month period. The age distribution agrees with observations from other studies\textsuperscript{17,49}. The mean age was 25±15.9 years. The peak incidence of 51 (28.3\%) patients was observed in the age 21-30 years. Also the least incidence of 1 (0.6\%) was observed in the 71-80 year age group. A similar pattern was reported by Datubo-Brown and Adotey\textsuperscript{49}. They observed a peak incidence in the second and third decades with a low incidence in the very young and the elderly. This finding may be as a result of the peak incidence of appendicitis which is the leading cause of surgical acute
abdomen. Its peak incidence is between 10 and 30 years of age\textsuperscript{25}. Also, most cases of trauma were observed in the same age group.

The male: female ratio in this study was 1.25:1. Although this does not show a significant difference in incidence (p>0.05), a similar male preponderance was also reported in other studies\textsuperscript{19,49}. The reason for this is not quite clear. However, of the 46 patients studied with abdominal trauma, 35 (77.8\%) were males. This rather high number of males with abdominal trauma may have in part contributed to the overall male preponderance. The crisis in the Niger Delta region may be the major reason for this male preponderance. Most of the armed youths involved in the conflict are males. The high number of patients with gunshot injury 24 (52.2\%) out of 46 with abdominal trauma is worrisome. Of all the patients with gunshot injury, 18 (75\%) were males. A similar study done in this centre 14 years ago suggested then that most cases of abdominal trauma were from blunt abdominal injury\textsuperscript{49}.

Results on Table III show the causes of acute abdomen. Appendicitis 85 (47.2\%) was the leading cause. There were more females with appendicitis. The male: female ratio of patients with appendicitis was 1:1.1. Although several studies suggest a male
other studies are also in agreement with my findings\textsuperscript{8,25,84}. The diagnosis of appendicitis in these studies which show a female preponderance were mainly clinical. The peak incidence of appendicitis in this study was in the age groups of 11-20 and 21-30 years. This was similarly reported in several other studies\textsuperscript{8, 9,10,25,47}. The higher incidence of appendicitis in females in this study may largely be due to the absence of histological diagnosis. Since the diagnosis of appendicitis in this study was clinical, more females without appendicitis may have been included as having appendicitis. It is known that the frequency of wrong diagnosis is higher in females\textsuperscript{52,85}. Such diseases as pelvic inflammatory disease, right sided salpingitis, ruptured or torsion of ovarian cyst and tubal pregnancy can mimic appendicitis. This is responsible for the higher rates of negative appendicectomy in females\textsuperscript{52,85}. This explains the higher incidence of appendicitis in females as compared to males in patients below 30 years of age. In fact, the male: female ratio in those between the ages of 11-20 years was 1:1.7. This age range also reflects an active period for most gynaecological problems as mentioned earlier.

Other causes of surgical acute abdomen were abdominal trauma 46 (25.6%), intestinal obstruction 35 (19.4%). Other causes accounted for 14 (7.8%). This pattern suggests the possibility of a continuing
change in the causes of surgical acute abdomen. As was mentioned, Ajao\textsuperscript{48} had in 1981 observed that appendicitis had replaced intestinal obstruction as the leading cause of surgical acute abdomen. The three leading causes then were appendicitis, intestinal obstruction and abdominal trauma in decreasing order\textsuperscript{10,48,49}. A study of all emergency procedures performed over a 5-year period at Nnewi also showed appendicectomy to be the most commonly performed surgical emergency\textsuperscript{84}. In another study conducted in this centre 14 years ago, Datubo-Brown\textsuperscript{49} found appendicitis (51.2%) to be the leading cause. This was followed by intestinal obstruction (28.7%) and abdominal trauma (10.8%) with other causes accounting for 6.8%. That study, like this one did not also consider the cases of negative appendicectomies. This appears to be a major draw-back. Around the world, the negative appendicectomy rate is between 5% and 35\%\textsuperscript{35,78,79}.

This pattern of abdominal trauma which is now the second leading cause of surgical acute abdomen also appears to be changing. Most of the cases of trauma 28 (60.9%) were penetrating abdominal trauma especially from gunshot.. In contrast, similar studies by Ajao\textsuperscript{48} and Datubo-Brown\textsuperscript{49} found over 60% of cases of abdominal trauma to be as a result of road traffic accidents.
The pattern of intestinal obstruction as revealed by this study was also affected by this apparent change. There was an increase in post operative adhesions from 15% as noted by Datubo-Brown\(^49\) to 25% in the present study. Also cases of post operative adhesions were equal to those of obstructed inguinal hernia (Table III). This changing pattern was also observed by Naaeder and Archampong\(^54\) in Ghana. They attributed this to the increasing awareness among the populace resulting in early elective hernia operations.

This study recorded a total of six (6) cases of intussusception during the period of study. Although this figure was more than that observed by Datubo-Brown\(^49\) over 14 years ago, six cases of intussusception in one year in a Teaching Hospital is small. This may be due the short period of existence of the Paediatric surgical unit in this centre. The unit was only formed at the commencement of this study hence enough awareness had not been created in the state.

Colonic tumours accounted for 4 (2.2%) of all cases. Of these, only one was malignant involving a 72-year old woman. This represents an increase in colonic tumours as a cause of surgical acute abdomen in Port Harcourt in 3 decades. Datubo-Brown\(^49\) recorded 3 cases of colonic tumours causing intestinal obstruction between 1983 and 1986. The reason for this increase is not known. It is possible that this may be an
indication of an increase in cases of colonic neoplasm in Port Harcourt. However, such a conclusion can not be reached without further evidence.

Typhoid perforation accounted for only 3 (1.6%) of all patients in this study. Although this appears small, we must remember that this is a referral centre with many private and government hospitals nearby. Typhoid enteritis is endemic in this country and typhoid perforation is its commonest complication. It is also the commonest cause of acute generalized peritonitis in this environment. Of the 3 patients in this study, 2 were females. This number is however statistically insignificant to make any conclusions. Other studies suggest that typhoid perforations are much commoner in males than females. Adesunkanmi and Ajao reported a male: female ratio as high as 4:1. Also of the 3 patients with typhoid perforation there were no deaths. It should however be noted that typhoid intestinal perforation carries a high mortality. Figures as high as 28% have been reported.

A total of 4 (2.2%) patients had perforated peptic ulcer. Of these 2 (50%) died. As can be observed, the mortality rate appears very high. The small number of cases makes it impossible to draw any reasonably conclusions. However, other studies also recorded high mortality rates.
although not as high\textsuperscript{89,90}. Otu\textsuperscript{90} reported a mortality rate of 10\% in Calabar.

Table V shows symptoms of the patients at admission in hospital. The most common symptom was abdominal pain 174 (96.7\%), others were vomiting 84 (46.7\%), anorexia 84 (46.7\%) and abdominal distension 72 (40.0\%). This spectrum of symptoms was similar to those observed in other studies\textsuperscript{45,47,49}. Some persons may question the relevance of knowing the pattern of symptoms in surgical abdomen. However, it is a useful as it reflects the symptoms of the common causes of surgical acute abdomen. The pattern of symptoms noted in this study of patients with appendicitis is similar to those observed in others\textsuperscript{10,78,82}. Abdominal pain was the leading complaint followed by anorexia, nausea and vomiting. Although the percentages of their occurrence differ with each study. Symptoms of intestinal obstruction as shown on table VI are similar to those previously reported\textsuperscript{91}.

Less than half of all patients 73 (40.6\%) presented in hospital within 24 hours of onset of symptoms. This is expected. Patients in our environment present late for treatment. As stated by Nwako\textsuperscript{92} “one can correctly assume that a history of an illness apparently commencing yesterday has lasted for at least 48 to 72 hours.” Thus it may be
assumed the proportion of patients with symptoms which had lasted beyond 24 hours may even be more than reported in the present study.

A total of 34 (18.9%) developed complications in this study. Table VIII shows the complications as observed. The most common complications were wound infection 11 (32.4%) and septicaemia 11(32.4%). Other complications include enterocutaneous fistula, anastomotic breakdown, renal failure, bronchopneumonia, adult respiratory distress syndrome and haemorrhage. The high percentage of complications of 18.9% may be attributable to late presentation in hospital. It is however difficult to relate the occurrence of complications with delay in presentation because of the unreliability of the history as noted by Nwako\textsuperscript{92}. Complication rates were also significantly higher in the extremes of life i.e. below the age of 1 year and after the age of 61 years when compared with those aged 1-60 years (p<0.05). Table X shows a correlation between the age of the patient and the occurrence of complications. This agrees with various studies which found similar higher complication rates in the elderly\textsuperscript{73,74}. Elderly patients are more likely to have co-morbidities like diabetes and hypertension. Also the causes of surgical acute abdomen in the elderly are significantly different from those of other ages. Cancer rates are significantly higher in the elderly\textsuperscript{73}. These are not true for the younger patient who in most cases
is well except for the acute abdominal condition for which he is being treated for. Very young patients also have special problems and so may have more complications. The problem of associated congenital anomalies remains a factor in increasing both morbidity and mortality in the neonates. The absence of neonatal monitoring equipment and trained personnel may also have been responsible for the higher complications in neonates.

A total of 18 (10%) patients died during this study. This was in agreement with other published works especially in developing countries with recorded rates of 8-22%\(^2,19,69\). There was a significantly higher mortality in the extremes of life (p<0.01). Patients below the age of 1 year had a case fatality rate of 30.9% with higher rates (42.9%) in those aged 61-70 years. The additional effects of immaturity of organs, high susceptibility to infection, electrolyte imbalance, prematurity and problems of temperature regulation in neonates may explain the high mortality. The shortage of incubators and the absence of a surgical neonatal intensive care unit may have contributed to this high mortality. The high mortality rate in the elderly is also not surprising. Similar findings have been published by other workers\(^2,93\). Gurleyik and Gurleyik\(^3\) observed a mortality rate of 5.5% in patients above 50 years of age who had appendicectomy. There were no reported deaths in
those below 50 years. The presentation of acute abdominal conditions in the elderly does not follow the usual pattern. For example, elderly patients with acute appendicitis may have only a vague abdominal discomfort. They therefore present in hospital after complications have already occurred. Gurleyik and Gurleyik\textsuperscript{3} also reported that 12.9\% of patients over 50 years with appendicitis had a perforated appendix. The corresponding figure among those below 50 years was 2.9\%. This was also observed in my work. The only patient over 50 years of age with appendicitis had an exploratory laparotomy because pre-operative diagnosis of appendicitis was not made. This was because her presentation was not typical. At surgery, she was found to have a perforated appendix. She was however discharged home without complications. This could cause delayed surgical intervention and a resultant increase in both morbidity and mortality rates.

Duration of symptoms before admission in hospital did not significantly affect mortality (p>0.05). It was observed that there was no significant difference in mortality between those who presented in hospital within 24 hours and those who presented later. This is difficult to explain. It however disagrees with Archampong’s\textsuperscript{93} claim that the most important determinant of outcome in acute abdomen is the duration of patient’s symptoms. The cause of the surgical acute
abdomen was also found to be important. For example, only 1.18% of patients with appendicitis died whereas the mortality rate was 15.2% in patients with abdominal trauma. Adesunkanmi, Akinkudie and Badru\textsuperscript{2} noted that trauma patients spent the shortest mean time in the accident and emergency room before death. It is also important to emphasize that surgical acute abdomen is not a single entity. The various conditions causing the acute abdomen each has a different pathology and prognosis. Hence a case of perforated peptic ulcer disease is unlikely to have same outcome with acute appendicitis.
CHAPTER SEVEN

CONCLUSIONS

From this study, the following conclusions have been made:-

1. The commonest causes of surgical acute abdomen in the University of Port Harcourt Teaching hospital were acute appendicitis, abdominal trauma and intestinal obstruction in decreasing order.

2. There was a slight male preponderance with a male: female ratio of 1.25:1. All age groups were affected. The mean age was 25±15.9 years. The peak incidence was 21-30 years and the least age incidence was between 71-80 years.

3. Most cases of surgical acute abdomen presented more than 24 hours after the onset of symptoms. Only 73 (40.6%) patients presented in hospital within 24 hours of symptoms.

4. The commonest complications were wound infection 11 (32.4%) and septicaemia 11 (32.4%). There was a significant increase in post operative complications in the extremes of life (p<0.05).

5. The overall mortality rate was 10%. Mortality was also significantly higher in the extremes of life (p<0.01).
RECOMMENDATIONS

1. There should be regular studies of the pattern of surgical acute abdomen in various centres. This will help in the management of patients, especially in diagnosis.

2. The increasing number of trauma especially from gunshot would require a reappraisal by the law enforcement agencies, the political class and the communities. Efforts should be made at resolving conflicts without violence.

3. Findings from this study and similar studies need to be brought to the awareness of Health care planners so that both human and material resources can be properly distributed. This would have the effect of reducing the mortality. There should be a public enlightenment campaign to sensitize the public on the need for prompt hospital attention in cases of acute abdominal pain.
REFERENCES


73. Marco CA, Schnoenfeld CN, Keyl PM, Menkes FD, Doehring MC. Abdominal pain in geriatric emergency patients: Variables


APPENDIX I

RESEARCH PROFORMA BY DR. P.J. ALAGOA ON THE PATTERN OF SURGICAL ACUTE ABDOMEN IN PORT HARcourt.

A. **BIO DATA:**

i. Recruitment Number and Date

ii. Hospital Number:

iii. Age:

iv. Sex:

v. Occupation:

vi. Marital Status:

vii. Religion:

viii. Educational Status:

ix. Address:

x. Ethnic Group:

xi. State:

B. **MEDICAL HISTORY**

i. Date of Admission:

ii. Duration of abdominal pain/Symptoms at presentation:
iii. Presenting Symptoms

- Abdominal pain
- Site of abdominal pain

(if migratory or generalized also state site of onset:)

- Vomiting
- Painful irreducible Groin swelling
- Fever
- Constipation
- Abdominal distension
- Nausea
- Anorexia
- Diarrhea
- Protrusion of abdominal contents
- Bloody stools
- Other symptoms

........................................................................................................................................
........................................................................................................................................
• History of trauma  
  (Specify type of trauma)
• Blunt or penetrating abdominal trauma ...........................................
• Cause of trauma (e.g. Road traffic accident, assault etc)
  ...........................................................................................................
• Type of injuring weapon/material ....................................................
• Associated injuries (involving other parts) .................................
  ...........................................................................................................
iv. Treatment before presentation .....................................................
v. Known medical conditions
  
  Hypertension  
  Diabetes mellitus  
  Sickle cell disease  

C. CLINICAL EXAMINATION
i. GENERAL EXAMINATION
  
  • Pallor  
  • Dehydration  
  • Jaundice  
  • Fever
ii. **ABDOMINAL EXAMINATION**

- Abdominal distension
- Abdominal Tenderness
  - Generalised Tenderness
  - Localized tenderness (state site)
- Rebound Tenderness
- Shifting Dullness

  OR

  Fluid Thrill (where indicated)

- Visible peristalsis

- Bowel sounds
  - Absent
  - Reduced
  - Increased
  - Normal

iii. **OTHER ABDOMINAL EXAMINATION**

**FINDINGS OF NOTE**

........................................................................................................................................
........................................................................................................................................

95
iv. **RECTAL EXAMINATION FINDINGS**

........................................................................................................................................
........................................................................................................................................

D. **PRE-OPERATIVE DIAGNOSIS**

E. **INVESTIGATIONS**

i. Hb

ii. **White Blood Cell Count**

**Total**

**Differential**

- Neutrophils
- Lymphocytes
- Eosinophil
- Monocytes

iii. **ELECTROLYTES & CREATININE**

- Na+
- K+
- HCO3
- Urea
- Creatinine
iv. **SERUM AMYLASE ESTIMATION**

v. **C X R**
   
   Abdominal X-ray

vi. **URINALYSIS**

vii. **ABDOMINAL ULTRASOUND SCAN**

viii. **CT SCAN**

ix. **DIAGNOSTIC PERITONEAL LAVAGE.**

F. **OPERATIVE FINDINGS & SURGICAL PROCEDURE**

G. **TIME BETWEEN ADMISSION & SURGERY**

H. **HISTOLOGICAL DIAGNOSIS**

I. **OUTCOME**
   
   - Well (Discharged) □
   - Cause of death .................................................................
   - Complications .................................................................
   - Date of discharge/death ...................................................
   - Number of days in Hospital □
Dear Sir/Madam,

PART II DESERTATION ON THE PATTERN OF SURGICAL ACUTE ABDOMEN IN PORT HARcourt.

I am a resident doctor in the Department of Surgery, UPTH, Port Harcourt and a part II fellowship candidate in the Faculty of surgery, National Postgraduate Medical College of Nigeria. As part of the requirements of the College, I am expected to undertake a research project aimed at achieving better surgical care in this hospital.

All patients presenting with a surgical acute abdomen shall be involved in this study. There are no extra complications or financial burdens on you associated with this project beyond the normal ones generally linked to surgery and anesthesia. If you wish to participate in this study, you will be required to sign the consent form below.
CONSENT FORM

This is to certify that I give permission to take part in this study as stated above. The aims and risks involved have been explained to me.

Signature:................................ Witness Name:........................................
Address: ................................. Signature:........................................
........................................
........................................
Date: ................................. Date:........................................

Thanks for accepting to be part of this study.

Sincerely,

DR. PAINGHA JOE ALAGOA.