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EXPLORATORY LAPAROTOMY IN A SINGLE CENTRE GENERAL SURGERY UNIT: INDICATIONS AND OUTCOME

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ABSTRACT

Background: Exploratory laparotomy is a surgical procedure performed in a patient who requires surgery when the actual cause and nature of the disease is not certain. Exploratory laparotomy is usually carried out as an emergency procedure in patients who are acutely ill and require urgent operation for control and stabilization of their disease condition.

Objective: The aim of this study is to evaluate the common indications for exploratory laparotomy among general surgery patients and to assess their post-operative outcome and complications.

Methodology: This is a three-year retrospective study extending from January 2014 to December 2016. All the consecutive general surgery patients who had exploratory laparotomy within the study period were recruited into the survey. Patient's demographics including: age, sex, diagnosis, intra-operative findings, operative procedures, complications and outcomes were extracted and analysed. Analysis was done using the SPSS version 21.0.

Results: A total of 120 exploratory laparotomies were performed out of 1,908 surgical operations conducted within the study period (6.29% of total surgery). The age range was 4 - 85 years with a mean of 40.25±17.23 years and peaks in the 21-30 years and 31-40 years age groups. Seventy-six patients were males and 44 females giving a male to female ratio of 1.73:1. Intestinal obstruction from colonic tumours was the commonest indication constituting 28 (23.3%) followed by complicated appendicitis at 26 (21.6%). Bowel obstruction from post-operative bands, perforated peptic ulcer disease (PPUD) and abdominal trauma accounted for 25 (20.8%), 17 (14.2%) and 16 (13.3%) respectively. A total of 12 patients had complications following surgery representing a complication figure of 10.0%. Mortality rate was 4.2%.

Conclusion: Exploratory laparotomy is still very relevant in general surgery practice. Intestinal obstruction from colonic tumour was the commonest indication in the study. Post-operative complications and mortality rate were relatively low at 10.0% and 4.2% respectively.

Keywords: Laparotomy, Indications, Complications, Mortality.

INTRODUCTION

The term laparotomy is derived from two Greek words: 'lapara' (meaning the soft anterior part of the trunk between the ribs and the pelvic bone) and 'otomy' (meaning making a surgical incision). Surgically, laparotomy is a procedure involving making a large incision through the abdominal wall to gain access into the abdominal cavity for diagnostic or therapeutic reasons.¹

Exploratory laparotomy in itself is a surgical operation performed on a patient who requires surgery but the actual cause and nature of the disease is not known.¹⁻³ On the other hand, therapeutic laparotomy is done for

a known disease which requires operation for its treatment.^{2,3} Exploratory laparotomy is usually conducted as an emergency procedure in patients who are acutely ill and require urgent operation for control and stabilization of their disease condition.^{1,4}

The indications for exploratory laparotomy are wide and varied. It is usually performed for cases of acute abdomen which have not responded to conservative measures or have shown rapid deterioration in patient's clinical condition.¹⁻⁵ Indications may include: blunt and penetrating abdominal traumas with associated haemodynamic instability, bowel perforations, complicated inflammation of

some intra-abdominal viscera, small and large bowel obstructions, mesenteric ischaemia etc.¹⁻⁵ Earlier before the advent and wide spread use of current advanced imaging techniques, most patients presenting with acute abdominal conditions underwent emergency surgical exploration.⁵⁻⁷

However, with the improvement in the use of modern imaging techniques and also with the current use of laparoscopy, the need for exploratory laparotomy is dwindling.^{2,5,8}

Nonetheless, the importance and place of exploratory laparotomy as a rapid and cost effective diagnostic and therapeutic tool in the management of some cases of acute abdomen is still very apt.^{2,4,5,9}

The objective of this study is to appraise the common indications for exploratory laparotomy in a General Surgery unit as well as to assess the post-operative outcome and complications.

METHODOLOGY

This is a three-year retrospective study extending from January 2014 to December 2016. The study was carried out at Iyenu mission hospital, Ogidi. The hospital is a multi-specialist mission health facility located in Anambra State, South-East Nigeria. All the consecutive patients in general surgery unit who had exploratory laparotomy within the study period were recruited into the study.

The patient's identification numbers were obtained from the theatre records and the case notes retrieved from the records department. Their demographics including age, sex, diagnosis, intra-operative findings, operative procedures, complications and outcomes were extracted and analysed. Analysis was done with SPSS version 21.0 (IBM Corporation and other(s) 1989, 2012) and results presented in tables and charts.

RESULTS

A total of 120 exploratory laparotomies were performed out of 1,908 surgical operations during the study period (6.29% of total surgery). Within the same interval, a total of 717 abdominal surgeries were conducted (exploratory laparotomy

constituting 16.74%). The age range was 4 - 85 years with a mean of 40.25±17.23 years. The peak ages were in the 21-30 years and 31-40 years age groups (Figure 1).

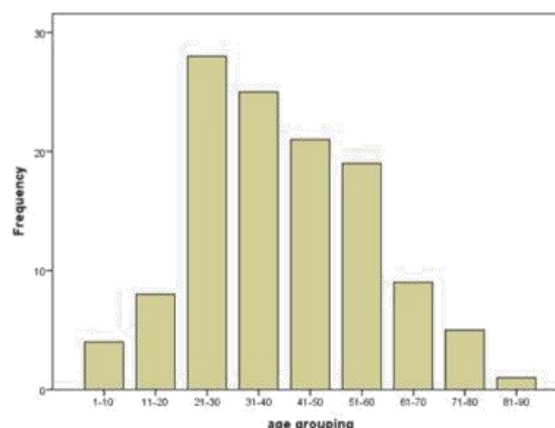


Figure 1. Bar chart showing age group distribution of patients.

Out of 120 patients who had exploratory laparotomy, 76 were males and 44 females giving a male to female ratio of 1.73:1.

The commonest indication for exploratory laparotomy was intestinal obstruction from colonic tumours constituting 28 of the 120 patients (23.3%). Bowel obstruction from post-operative bands involved 25 subjects accounting for 20.8% (table 1).

Table 1: Frequency table showing the intra-operative diagnoses.

Diagnosis	Frequency	Percent
Trauma	16	13.3
Acute pancreatitis	1	.8
Ruptured appendix	25	20.8
Appendix abscess	1	.8
Intestinal obstruction from bands	25	20.8
Intestinal obstruction from colonic tumors	28	23.3
Perforated peptic ulcer disease	17	14.2
Typhoid perforation	3	2.5
Gastric Outlet Obstruction	4	3.3
Total	120	100.0

combined cases of intestinal obstruction from bands and colonic tumours were 53 (44.1%). Complicated appendicitis (ruptured appendix

and appendix abscess) occurred in 26 individuals (21.6%). Perforated peptic ulcer disease (PPUD) and abdominal trauma cases were 17 (14.2%) and 16 (13.3%) respectively (table 1).

Of the 26 patients with complicated appendicitis, 16 were males while 10 were females giving a male to female ratio of 1.6:1. Among the 16 cases from abdominal trauma, 15 were males and one female representing a male to female ratio of 15:1. Patients with PPUD had 15 males and 2 females with a male to female ratio of 7.5:1. The cases from intestinal obstruction were almost equal for both genders (table 2).

Table 2: Diagnosis/Sex of patient Cross-tabulation

Diagnosis	Sex of patient		Total
	Female	Male	
Trauma	1	15	16
Acute pancreatitis	0	1	1
Ruptured appendix	9	16	25
Appendix abscess	1	0	1
Intestinal obstruction from bands	12	13	25
Intestinal obstruction from colonic tumor	15	13	28
Perforated peptic ulcer disease	2	15	17
Typhoid perforation	3	0	3
Gastric Outlet Obstruction	1	3	4
Total	44	76	120

The peak age group for appendicitis-related presentations was 21-30 years. The peaks for intestinal obstruction from colonic tumours, post-operative bands and PPUD were: 51-60 years, 41-60 years and 41-50 years respectively (table 3).

Table 3: Diagnosis/Age grouping Cross-tabulation.

Diagnosis	Age grouping									Total
	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	
Trauma	0	2	8	5	0	0	1	0	0	16
Acute pancreatitis	0	0	0	1	0	0	0	0	0	1
Ruptured appendix	2	5	12	5	0	1	0	0	0	25
Appendix abscess	0	0	0	1	0	0	0	0	0	1
Intestinal obstruction from bands	2	0	2	5	7	7	1	1	0	25
Intestinal obstruction from colonic tumor	0	1	2	2	6	7	6	3	1	28
Perforated peptic ulcer disease	0	0	2	4	7	3	0	1	0	17
Typhoid perforation	0	0	1	2	0	0	0	0	0	3
Gastric Outlet Obstruction	0	0	1	0	1	1	1	0	0	4
Total	4	8	28	25	21	19	9	5	1	120

Among the 120 patients, 12 had complications following surgery, giving a complication rate of 10.0%. Seven of these cases had surgical site infection (SSI), three had wound dehiscence and two others had acute renal failure. The patients who had SSI did well on a course of antibiotics and wound dressing. Those with wound dehiscence had secondary wound closure after days of wound dressing and antibiotics. The three patients with acute renal failure recovered after four sessions of haemodialysis.

Five patients died giving a mortality rate of 4.2%. Of the five deaths, two had perforated peptic ulcer disease, one had typhoid perforation, one presented with ruptured appendix and the remaining one had intestinal obstruction from post-operative bands. All the mortalities were probably due to late presentation as they arrived more than five days from onset of their abdominal symptoms. Each of them developed sepsis and multiple organ dysfunction before death.

DISCUSSION

Exploratory laparotomy is a very common procedure in general surgical practice. It is commonly performed as an emergency procedure in conditions when there is rapid deterioration of patient's condition or the patient cannot be stabilized for a possible definitive diagnosis to be made.^{1,4}

Exploratory laparotomy is also carried out in cases where the need for an operation is certain but a definitive diagnosis cannot be achieved until the abdomen is opened up.¹ This is more so in limited resource environment where the capacity for modern imaging procedures are lacking or sub-optimal.

Exploratory laparotomy has been found to be a lifesaving procedure especially in cases of trauma associated with severe haemodynamic instability which cannot be corrected by resuscitation alone.^{1,2,4} However, active resuscitation with intravenous fluids to correct fluid and electrolyte imbalance, blood transfusion to replenish significant blood losses and naso-gastric decompression should be pursued aggressively before surgery.^{1,2,10,11}

Peri-operative antibiotic will be

required in most of the patients especially those with peritonitis from bowel perforation or obstruction.¹¹ These will help to improve the patient's physiological status and reduce peri-operative and post-operative morbidity and mortality.^{1,2,10,11}

Whenever possible, active efforts should be made to arrive at a definitive or a provisional diagnosis as this will help the surgeon to plan for the surgery ahead of time and also to isolate cases that can be managed conservatively.¹

In this study, exploratory laparotomy was quite common constituting 6.29% of the total number of surgeries and 16.74% of the entire abdominal operations performed in the hospital during the period under review. The peak age was between 21-40 years and this compares favourably with the peak age of 31-40 years reported by Suresh Patil et al² and 21-50 years by Kapoor et al³ in similar studies elsewhere. There is male preponderance in our series with a male to female ratio of 1.73:1. This finding is lower than 2.57:1 documented by Kapoor et al³ and contrasts to 1:1 ratio obtained by Suresh Patil et al².

The indications for exploratory laparotomy in general surgery are numerous and varied in their frequencies. In the current review, intestinal obstruction by colonic tumours was the commonest reason for exploratory laparotomy, constituting 23.3% of the total number of cases (Table 1). This finding is in contrast to hollow viscus perforation reported as the commonest indication for exploratory laparotomy in studies by Suresh Patil et al² and Kapoor et al³.

The finding of colonic tumours as the commonest cause for exploratory laparotomy in our setting may be due to late presentation. Patients with colonic tumour in complete bowel obstruction were compromised clinically. This did not give room for more detailed investigations. Intestinal obstruction from post-operative bands was the third commonest indication for exploratory laparotomy constituting 20.8% of the cases. This together with colonic tumours made up 44.1% of the reasons for laparotomy in this review.

The second commonest cause for exploratory in this report was complications from appendicitis (ruptured appendix and appendix abscess) which accounted for 21.6% of the total number of patients. This value is quite high and indicated that patients within the study locality presented late with complicated appendicitis. This is much higher than the values of 12.0% and 12.7% recorded by Kapoor et al³ and Suresh Patil et al² respectively in their series. Hollow viscera perforation (perforated peptic ulcer disease and typhoid perforation) in the current survey constituted 16.7% of the total cases. This was the fourth commonest indication for exploratory laparotomy and did not correlate with the findings in other surveys where perforation was the commonest indication.^{2,3}

Trauma constituted the fifth cause for exploratory laparotomy in our report. Most of the cases of trauma had significant splenic injury resulting in splenectomy, 10 of 16 cases of trauma (62.5%) (tables 1 and 4).

Table 4: Frequency distribution of the operative procedure.

Treatment	Frequency	Percentage
Exploratory laparotomy and bowel repair	25	20.8
Exploratory laparotomy and appendectomy	24	20.0
Exploratory laparotomy and bowel resection	37	30.8
Exploratory laparotomy and abscess drainage	3	2.5
Exploratory laparotomy, adhesiolysis and abscess drainage	1	0.8
Exploratory laparotomy and splenectomy	10	8.3
Exploratory laparotomy and adhesiolysis	16	13.3
Exploratory laparotomy and by-pass surgery	4	3.3
Total	120	100.0

This is consistent with findings in the literature where splenic injuries were reported as one of the commonest indications for exploratory laparotomy especially following blunt abdominal trauma.^{12,13} Other intra-abdominal organs commonly involved in abdominal injuries are the liver and the intestine because of their large sizes and wider distribution in the abdomen.¹³ Some other less common reasons for laparotomy following

trauma include injury to the diaphragm, mesentery, traumatic abdominal wall hernia etc.¹⁴⁻¹⁸

The male to female ratio for complicated appendicitis in this study was 1.6:1. This gender difference corresponds to the general predominance of male patients with appendicitis in most reports.¹⁹⁻²¹

However, this finding is in contrast to equal gender distribution of appendix abscess observed by Suresh Patil et al². The peak age group for appendicitis-related cases in this study was 21-30 years. This corresponds to second and third decades documented by Kotiso in 2006.²⁰ Abdominal injury in the current survey showed an overwhelming male predominance with a male to female ratio of 15:1. This could be explained by the fact that males are more adventurous than females and are therefore more likely to be involved in cases of trauma. Also, cases of PPUD showed very significant male preponderance with a male to female ratio of 7.5:1. This correlates with similar male predominance in a ratio of 4:1 in a report by Agboola.¹⁹

A total of 12 patients had various complications following surgery, giving a complication rate of 10.0%. Generally, abdominal surgeries are sometimes marked by wound complications ranging from 2.8 - 40% depending on various factors as indication, duration before presentation, extent of disease etc.^{3,22,23} The current survey recorded a mortality rate of 4.2%. The causes of death in this review were perforated peptic ulcer disease in 40%, typhoid perforation in 20%, ruptured appendix in 20% and intestinal obstruction in remaining 20%. The mortality figure in this study was lower than 6.4%, 10.0% and 14.0% recorded by Hagos, Alagoa and Kotiso respectively after surgery for acute abdomen.^{20,24,25} All the cases of mortality in our report presented more than five days after onset of symptoms. Each developed sepsis and multiple organ dysfunction before death. This suggests that late presentation greatly enhanced the risk for mortality.

CONCLUSION

Exploratory laparotomy is still very relevant in general surgery practice particularly for those patients with acute abdominal conditions who would require urgent intervention in order to save the patient's life or prevent further deterioration in their clinical condition. Complete bowel obstruction from colonic tumour was the commonest indication. Late presentation was associated with significant mortality.

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Conflict of Interest: None declared.

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