

## Study of Surgical Complications of Explorative Laparotomy and Their Management – A Study of 100 Cases

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### Abstract

**Background:** Post-operative complication may occur after explorative laparotomy whether elective or emergency. This study was aimed to evaluate the cause in which laparotomy has been done, the frequency of different types of surgical complications after laparotomy and the effect of different management regime and their efficacy at Guru Nanak Dev Hospital, Govt. Medical College Amritsar.

**Methods:** This study was carried out in the department of general surgery in Guru Nanak Dev Hospital, Govt. Medical College Amritsar. 100 Patients undergoing explorative laparotomies for different indication over a period of last 3 years included in this study.

**Results:** The explorative laparotomy was performed for a variety of conditions, the majority of cases were of acute abdomen/peritonitis. Perforation peritonitis constituted (31%) cases followed by appendicular perforation/ abscess (12%) and Hepatic abscess (10%). Pain most common postoperative complication which was present in all cases followed by fever, paralytic ileus and superficial wound infection. Wound discharge 30% was the one of most common complication, was purulent (80%) in majority of cases. Partial wound dehiscence occurred in 16% cases, all were infected wounds. 4 cases of Burst Abdomen occurred and incisional hernia was detected in 2% cases during the follow-up period. 52.94% cases of wound dehiscence required resuturing of the wound, rest of the cases were treated by local wound management. All cases of burst abdomen were managed by resuturing. Out of 4 cases of anastomotic leak 3 cases (75%) had to go for resection and anastomosis. Re-exploration done in 2 out of 3 cases of obstruction and all cases of incisional hernia were managed by mesh repair of the defect.

**Conclusions:** This study demonstrates that explorative laparotomy has to be done most commonly as an emergency procedure in case of hollow viscous perforation. Post-op complications may be prevented by thorough preoperative evaluation, sound surgical technique and careful follow-up care. The emergency laparotomies are also more common than elective laparotomies. In present study, the complication rate after emergency laparotomies is higher as compared to the elective laparotomies. The commonest problems being pain, postoperative fever, wound infection and postoperative nausea and vomiting.

**Keywords:** Burst abdomen, Partial wound dehiscence, incisional hernia

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### I. Introduction

An explorative laparotomy is a surgical procedure performed with the objective of obtaining information that is not available via clinical and diagnostic methods. In surgical language, the word laparotomy explains exploration of the abdomen and proceed further according to the cause identified.<sup>1</sup> It is usually performed in patients with acute or unexplained abdominal pain, in patients who have sustained abdominal trauma and occasionally for for staging in patients with malignancy.

Once the underlying pathology has been determined, an explorative laparotomy may continue as a therapeutic procedure; sometimes, it may serve as a means of confirming a diagnosis (as in the case of laparotomy and biopsy for intra-abdominal masses that are considered inoperable). These applications are distinct from laparotomy performed for specific treatment, in which the surgeon plans and executes a therapeutic procedure.

Post-operative complication may occur after laparotomy whether elective or emergency. Post-operative pain, nausea, vomiting are common but some patients develop short and long term complications like fever, wound infection, wound dehiscence, anastomosis disruption, adhesive bowel obstruction, incisional hernia, etc. Such complications are more frequently seen after emergency surgeries, but they do occur in elective procedures also, which is a matter of concern.<sup>2</sup> Wound infection, wound dehiscence and incisional hernia remain challenging problems.

Preoperative antibiotic prophylaxis, effective and persistent skin antisepsis, avoidance of contamination and better surgical skills are most effective methods to reduce complications. Wound infection is the most important single factor in the development of burst abdomen and incisional hernia.<sup>3</sup> Ancient surgeons recognized that foreign bodies and dead tissue must be removed from wounds.<sup>4</sup> Lister, Semmelweis, Ehrlich, Fleming and Foley realized that bacteria prevented healing and lead to sepsis and death, and their control by asepsis, antisepsis and anti-microbials heralded a new era in wound management.<sup>5</sup>

### **Aims And Objective**

1. To know the disease/ cause in which explorative laparotomy has been done.
2. To know the frequency of different types of surgical complications after laparotomy.
3. To study the effect of different management regime and their efficacy related to stay in hospital among the different complication.
4. To study the frequency of re-exploration rate among listed complication.
5. To study the frequency of mortality in patient having abdominal complication after laparotomy

### **II. Material And Methods**

The present study was based upon the patients attending the surgical Outdoor/Emergency of our institute Govt. Medical College, Amritsar. All patients underwent exploratory laparotomy were examined thoroughly for the disease history and examination. The patients who developed complications were examined clinically and managed as required. This study was conducted after approval from thesis and ethical committee. An informed consent was taken from each patient. Data was collected and appropriate statistical analysis was done. Present study included 100 cases of laparotomy.

Inclusion Criteria-

1. Patients of age group (>5 years).
2. All patient with diagnosis of surgical problems whether elective or emergency.

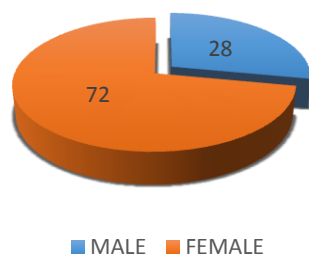
Exclusion criteria-

1. Patients of age group < 5 years.
2. Cases which underwent laparotomy for indications other than abdominal pathology.
3. Cases with comorbid condition which include immunosuppression (HIV, chemotherapeutic drug) or diabetes.

### **III. Observations And Result**

In this study a total of 100 cases who underwent explorative laparotomy for various reasons were studied which showed majority of the cases 69% were between 21-50 years of age (69 cases). With a median age of 37.94 yrs.

**Graph I:** Graph Showing Gender Distribution of Cases Of Explorative Laparotomy

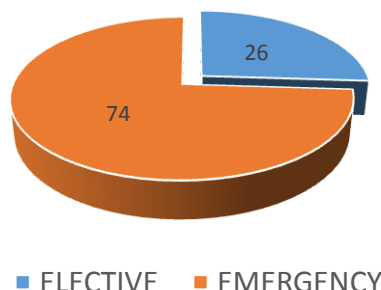


**Table I: Indication Of Explorative Laparotomy**

Sr. No.	Causes	No. of cases	Percentage
1	Perforation peritonitis	31	31%
2	Appendicular abscess/perforation	12	12%
3	Liver abscess	10	10%
4	Intestinal obstruction	8	8%

5	Abdominal Trauma	8	8%
6	Incisional hernia	7	7%
7	Pyloric stricture	6	6%
8	Volvulus	6	6%
9	Mass per Abdomen	6	6%
10	Malignant condition	3	3%
11	Intussusception	2	2%
12	Necrotising fasciitis	1	1%

**GRAPH II**  
**EMERGENCY VS ELECTIVE LAPAROTOMY (N=100)**



**TABLE II**  
**POSTOPERATIVE COMPLICATIONS (DURING HOSPITAL STAY)**

Sr. No.	Complications	No. of cases	Percentage
1	Pain	100	100%
2	Fever	71	71%
3	Paralytic ileus (>2 days)	46	46%
4	Wound infection	30	30%
5	Anemia / hypoproteinemia	22	22%
6	Chest infection	19	19%
7	Wound dehiscence	16	16%
8	Abscess (superficial/deep)	5	5%
9	Anastomotic leak	4	4%
10	Burst abdomen	4	4%

**TABLE III**  
**MANAGEMENT OF COMPLICATIONS IN FOLLOW UP PERIOD OF 3 MONTHS**

Complications	Resurgery done				
	Resuturing	Ileostomy closure	Resection and anastomosis	Exploratory laparotomy with Adhesiolysis	Mesh repair
Wound dehiscence	9	-	-	-	-
Burst abdomen	4	-	-	-	-
Ileostomy	-	20	-	-	-
Anastomotic leak	-	-	3	-	-
Obstruction	-	-	-	2	-
Incisional hernia	-	-	-	-	2
Total	13	20	3	2	2

#### IV. Discussion

Post-operative wound complications alter the outcome of surgery, hence they are of great importance to a surgeon. They complicate the post-operative course and create an unnecessary financial burden. Despite great progress made during recent times in the perioperative care, abdominal surgeries are sometimes marked by wound complications ranging from 2.8 - 40% depending on various factors.<sup>6,7</sup>

The various indications for laparotomy in this study varied from hollow viscous perforation, appendicular abscess, intestinal obstruction and others. Primary indications for an exploratory laparotomy are Perforation peritonitis constituted (31%) cases followed by appendicular perforation/abscess(12%), Hepatic abscess (10%), intestinal obstruction (8%), blunt and penetrating trauma abdomen (8%), and mass per abdomen (6%). This is similar to the study of Suresh S Patil et al<sup>8</sup> (62 cases out of 205 cases were of perforation

peritonitis), Jignesh A. Gandhi et al study<sup>9</sup>; gastroduodenal perforation (30.95%) and Chauhan et al study 2017<sup>10</sup>; peptic perforation peritonitis constituted (31.42%) cases.

In this study most of the patients (69%) were between 21 to 50 years of age. Out of these; maximum cases (age) were found in 4th decade i.e. 25 cases (25%). This study matches with the study of Jignesh A Gandhi et al<sup>9</sup> (peak incidence was around 31-45 years) but differs with study of Sharma A C et al<sup>11</sup> with maximum number of patients were in age group 41–50 years (31.8%).

In our study male to female ratio in the study was 2.57:1. This study matches with the studies of Dickson et al<sup>12</sup> (2.4:1), and Noguiera et al<sup>13</sup> (2.5:1).

Among 100 patients who underwent laparotomy in our study; 74 patients underwent emergency laparotomy and 26 patients underwent elective laparotomy.

In this study the most common site of perforation was stomach presented in 16 cases (33.33%), next most common site was appendix 12 cases (25%), other sites were ileum 11 cases (22.91%), jejunum 5 cases (10.41%), duodenum (3 cases) and caecum (1 case). This study matches with the studies of Chauhan et al<sup>10</sup>, Gupta et al<sup>14</sup>, Sharma et al<sup>11</sup> in their studies peptic perforations were the most common etiology.

In this study abdominal pain (93%) was the most common symptom; other symptoms were vomiting (92%), fever (78%), abdominal distension (74%), constipation (73%) and lump/bulge (14%). This study is well comparable with the study of Gupta et al<sup>14</sup>; symptoms of pain, vomiting, distension, fever and constipation presented in 100%, 80%, 76%, 20% and 14% cases respectively.

Most of the patients (73%) in this study were presented to the hospital with signs of abdominal tenderness, (71%) with rigidity and guarding. This study is well comparable with the study of Dickson et al<sup>12</sup> reported signs of abdominal tenderness and distension is most common presentation.

Minimum required operative procedure was performed. In all the cases of peptic perforation, the edges were excised and margins freshened and perforation was closed. Omental patch along with pedicle was also applied in all the cases. In enteric perforation, simple closure of perforation was done with atraumatic needle in two layers/single layer. An alternative procedure like resection and ileo-ileal anastomosis was also done in 3 cases where there were multiple perforations or distal gut was not healthy. In 5 cases of enteric perforation where the gut was not healthy enough or with multiple perforations or there was excessive soiling, exteriorization of gut was done (ileostomy). Drainage of the peritoneal cavity is essential to drain out the residual pus and was done in all the cases.

Gupta et al<sup>14</sup> and other authors have also recommended the omental patching in gastro duodenal perforations. Dickson et al<sup>12</sup> have also recommended simple closure, if it is possible, Kim et al<sup>15</sup> recommended resection of small bowel in multiple typhoid perforations of the terminal ileum; he also recommended exteriorization of the small bowel in very sick patients.

In our study, 4 patients presented with subacute intestinal obstruction, which on laparotomy was found to be most commonly due to bands and adhesions. Release of bands and adhesiolysis was done. Patients presenting with gangrenous small bowel obstruction were subjected to resection and anastomosis. 2 patients presented with intestinal stricture, in which stricturoplasty was done.

In our study, among blunt abdominal injury patients, spleen was commonly involved which was matching with the literature. Two out of 3 cases of traumatic perforations were treated by primary closure of the perforation. In one case resection and anastomosis was required due to multiple perforations. Gupta et al<sup>14</sup> and Townsend et al<sup>16</sup> had also recommended the primary closure of the traumatic perforations.

In this study pain was the most common postoperative complication which was presented in 100% of the patients, 2<sup>nd</sup> most common postoperative complication was fever, which was presented in 71% of the patients. Other postoperative complications were paralytic ileus (>2 days) 46%, superficial wound infections 30%, anaemia/hypoproteinemia (22%), chest infections (19%), burst abdomen (12%), anastomotic leaks (4%) and abscess (5%). Which was comparable to Chauhan et al study<sup>10</sup>; where most common complication evident was postoperative pyrexia in (20%) patients followed by wound related complication in (12.28%) patients and Sohail Hameed Chaudhary study<sup>17</sup>; where post-operative fever was (22.8%), wound infection (22.2%) and vomiting (14%), wound dehiscence (5.3%), incisional hernia (2.8%), pneumonia /anastomotic disruption in 10 cases (3.1%). Whereas in the study of Gupta et al<sup>14</sup> most common complications observed were wound infection (16%), followed by fever (8%).

Despite ensuring good patient characteristics and best possible peri-operative care, wound complications were observed in 30 (30%) cases. Wound discharge was most common complication found in 30 case and 24 cases were found to be positive for infective pathogens. Rate of surgical site infection in this study was 24%. However, they are much higher than the bench mark set by Cruse and Ford<sup>18</sup> who reported 1-2% infection rate in elective surgeries in Canada. Various studies have reported infection rates ranging from 5% to 25%. Chauhan et al (2017)<sup>10</sup> reported overall infection rate of 12.28%; Sohail hameed et al (2016)<sup>17</sup> reported overall infection rate of 22.2%, while Deepak R chavan et al (2014)<sup>19</sup> reported a 25% infection rate in laparotomy surgeries. Our observation is 24% infection rate.

Pain is the most common complication in follow up period followed by anaemia/hypoproteinemia, wound dehiscence and fever. Intestinal obstruction is the late postoperative complications encountered after 1<sup>st</sup> month of follow up (with 2 cases, each during 2<sup>nd</sup> and 3<sup>rd</sup> month of follow up). Incisional hernia is the late postoperative complication encountered during 3<sup>rd</sup> month of follow up (2 cases).

In present study 16% patients developed partial wound dehiscence along with infection and 2%, such cases developed incisional hernia later on. These observations are in consonance with observations of Murtaza et al (2010)<sup>2</sup> who concluded that the wound infection is the most important single factor in the development of incisional hernia.

In 20 cases of ileostomy, ileostomy closure was done in all the cases after primary pathology was cured and gut was healthy. Three out of 4 cases of anastomosis leak required resection and anastomosis, rest were treated conservatively by bowel rest, IV antibiotics, IV fluids. Out of 3 cases of obstruction encountered during followed up, 2 cases (66.67%) required exploratory laparotomy with adhesiolysis, one case was managed conservatively by RT aspiration, bowel rest, IV antibiotics, iv fluids. Two cases of incisional hernia developed at the scar site, required mesh repair of the defect.

The overall mortality in the present study is 9%. The causes of mortality in the present series are very poor general condition of the patient at the time of admission, anemia, toxemia, dehydration and patients reported later after the perforation. Most of the cases (4 of 31) were of perforations peritonitis.

Mortality rate comparison with other studies:

Authors	Year	Mortality rate (%)
Gupta et al <sup>14</sup>	2005	8.64
Agrawal et al <sup>20</sup>	2008	10.0
Sohail hameed et al <sup>17</sup>	2016	7.5
Chauhan et al <sup>10</sup>	2017	7.5

## V. Summary And Conclusion

This study shows that explorative laparotomy has to be done most commonly as an emergency procedure in case of hollow viscous perforation. Peptic ulcer perforation is the most common cause of perforation peritonitis. Mass per abdomen and incisional hernia was the one of the most common cause of explorative laparotomy, which was done electively.

Postoperative complications increase patient morbidity and mortality and are a target for quality improvement programs. Many complications may be prevented by thorough preoperative evaluation, sound surgical technique and careful follow-up care. The emergency laparotomies are also more common than elective laparotomies. In present study, the complication rate after emergency laparotomies is higher as compared to the elective laparotomies. The commonest problems being pain, postoperative fever, wound infection and postoperative nausea and vomiting. Suture technique is a major determinant of burst abdomen and incisional hernia after laparotomies. Simple adjustment in technique can considerably improve late operative results.

**FIG- Showing postoperative complication**



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