

Study to Evaluate Results and Outcomes of Non-Trauma Emergency Laparotomy

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Abstract:

Aim: This study aimed to prospectively assess the etiology of patients who undergone emergency laparotomy for non-traumatic indications.

Materials and Methods: This study, on non-traumatic cause of exploratory laparotomy was conducted on 100 patients admitted in ESIC Medical College and Hospital Kalaburagi from November 2023 to November 2024. After stabilizing the patient initially, the other necessary investigations like basic radiological investigations and special radiological investigations were completed as per necessity, and patients were taken up for laparotomy under general anesthesia, depending on the suspected site of pathology and the general condition of the patient.

Result: Abdominal pain was the most common (100%) presenting complaint and incidence of other clinical symptoms and signs were variable. Features of peritonitis like tenderness (100%) and guarding (98%) were present in every patient undergone emergency laparotomy. Intestinal obstruction was found to be affected all age group. The biggest incidence was found in age group of 41 to 50 years, mean age is of 46 years. The most common gastrointestinal tract cause of perforation were ileal perforations (46%) and most common cause for obstruction is obstructed umbilical hernia (21.6%). Wound infection (61%) was the most common postoperative complication followed by electrolyte imbalance (39%). The case fatality rate was highest for small bowel pathology (13%) followed by colon pathology (7.4%).

Conclusion: This study concluded that emergency laparotomy for non-traumatic indications can be performed with lower morbidity and mortality.

Keywords: Emergency laparotomy, outcomes, non-traumatic indications, mortality.

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Introduction

An emergency laparotomy [lapara- the soft part of the body between the ribs and hip, flank; tomē-incision] is a non-elective surgical procedure involving an incision through the abdominal wall when the patient's well-being or life is in jeopardy [1,2]. Emergency laparotomy is a common procedure when compared with other acute surgical emergencies, patients undergoing it have disproportionately high mortality both in younger and older sick patients [2]. Emergency laparotomy is a surgical procedure with high morbidity and mortality rates even in the best healthcare systems and remains an area of focus for quality improvement even in developed nations [3]. Perioperative management of patients undergoing emergency laparotomy in middle and low- income

countries is extremely challenging. In this study, we characterized the heterogeneity of patients presenting with acute abdomen, their underlying etiopathology, evaluation and, surgical management and postoperative morbidity and mortality in tertiary teaching and referral governmental hospital.

Aims and Objectives: This study is aimed to analyze the following aspects.

- To prospectively assess the etiology of patients who were undergoing emergency laparotomy for non-traumatic indications in ESIC Medical College and Hospital Kalaburagi from November 2023 to November 2024.

- To study various means of intraoperative management in the above study group.
- To determine morbidity, mortality in our study group.

Materials and Methods

The materials for the clinical study of non-traumatic causes of patients undergoing emergency exploratory laparotomy were collected from cases admitted to in ESIC Medical College and Hospital Kalaburagi from November 2023 to November 2024. 100 cases of patients undergoing exploratory laparotomy in whom intestinal perforation or obstruction was studied. Patients belonged to age groups ranging from 18 years to 70 years.

The patients included in the study was subjected to a thorough history elicitation and physical examination. They were subjected to undergo only relevant investigations which were indicated in emergency conditions. After clinical assessment and basic investigations, patients were first actively resuscitated after nasogastric aspiration with intravenous fluids, antibiotics, and analgesics. Antibiotics are most widely used as the preferred combination of third-generation cephalosporins and metronidazole intravenously covering the broad spectrum of Gram-positive cocci, gram-negative aerobic bacilli, and anaerobic gram-negative rods. Later antibiotics were changed in due course of illness depending on the culture and sensitivity report of the inflammatory peritoneal fluid or blood culture.

After stabilizing the patient initially, the other necessary investigations like basic radiological investigations and special radiological investigations were completed as per necessity, and patients were taken up for laparotomy under general anesthesia, depending on the suspected site of pathology and the general condition of the patient. Midline abdominal incisions were used and the abdominal viscera was inspected carefully for pathology [4,5]. The site of lesion was located and appropriate surgery was performed depending on the pathology made out intraoperatively. Thorough peritoneal toileting was done with normal saline

and the peritoneal cavity was drained. The abdomen was closed in layers. Post-operatively patients were managed with nasogastric aspiration, i.v. fluids, and antibiotics [6]. Daily patients were monitored and assessed for recovery and complications which were identified and treated appropriately. Patients were discharged after a full recovery to normalcy and were followed up for a minimum period of postoperative day 30 after the patient discharge from the institute.

A separate proforma for each patient, containing all the relevant particulars were maintained and reviewed for analysis.

Subject Selection

Inclusion criteria:

- Patients undergoing emergency laparotomy for preoperative diagnosis of bowel obstruction or perforation.
- Patients between the ages of 18-70 years.

Exclusion criteria:

- Patients undergoing emergency laparotomy for trauma (blunt/penetrating).
- Patients with intraoperative diagnosis of perforations to genitourinary tract like urinary bladder rupture, ruptured ectopic pregnancy, ruptured gall bladder, acute appendicitis, any acute abdominal conditions related to malignancies, ruptured liver abscess, ruptured hemorrhagic cyst of ovary, etc.
- Patients aged less than 18 years and more than 70 years.
- Those were lost to follow up.

Observations and Discussion

The present study was undertaken at the ESIC Medical College and Hospital Kalaburagi in department of general surgery. During the study period between November 2023 to November 2024. A total of 100 patients who underwent emergency laparotomy for non-traumatic causes like perforations and obstruction of gut. A systemic analysis of presentation, management and outcome were performed and the results tabulated.

Table 1: Age Distribution

Age In Years	No. of Patients	Percentage	Kolandaswamy et al
18-20	3	3%	11.1%
21-30	17	17%	23.8%
31-40	14	14%	25.4%
41-50	26	26%	15.8%
51-60	24	24%	17.5%
61-70	16	16%	6.4%

Above table depicts the data about age distribution of patients who underwent emergency laparotomy irrespective of either perforation or obstructive cause, the predominant age group is between 41-60

years consisting 50% of the total. A steady decline in number of cases was noted in age groups below 41 and above 60. According to the study by Kolandasamy et al [7] incidence of patients

undergoing laparotomy is predominated in the age groups of 21-40 years.

Table 2: Age Distribution in Case of Obstruction and Perforation

Age	No. Of Patients With Obstruction	No. Of Patients With Perforation	Percentage
18-20	2	1	4.5%
21-30	9	8	20.4%
31-40	4	10	9%
41-50	11	15	25%
51-60	10	14	22.7%
61-70	8	8	18.1%
TOTAL	44	56	100%

Above table shows the total number of patients who had obstruction and perforation according to the age distribution. Both obstruction and perforations in our study most affected age group was between 41 and 50 years.

Table 3: Sex Distribution

Gender	No. Of Patients	Percentage	Kedar et al
Male	77	77%	71.6%
Female	23	23%	28.4%

Above table shows the sex distribution of study population. Males constitutes 77% of the study group with a sex ratio of 3.34: 1. A study conducted by Kedar Essa Oumer et al [8], shows

that sex distribution among patients undergone emergency laparotomy for various causes where males constitute 71.6% and females 28.4%, which can be compared with our study.

Table 3: Presenting Complaints

Presenting Complaint	No Of Patients
Abdominal Pain	100
Constipation	79
Abdominal Distention	97
Vomiting	94
Fever	86

Above table shows that abdominal pain was the clinical presentation in all patients irrespective of site of perforation or obstruction and age of presentation. Abdominal pain and vomiting were the other predominant symptoms present in 97% and 94% of the study sample respectively. Constipation was more common in patients with obstruction though not as common in perforation peritonitis. Fever was nonspecific, present commonly in patients with enteric fever,

appendicular perforation and infective colitis or in those presenting with late as symptoms of septicemia secondary to peritonitis. The symptoms poorly correlate with the localization of bowel pathology and are more correlated with the degree of peritonitis. The only symptom that gives clue to localize the involved organ is initial site of pain which later becomes generalized with onset of peritonitis.

Table 4: Examination Findings

Findings	No. Of Patients
Tenderness	100
Guarding And Rigidity	98

Above table shows the presence of generalized peritonitis often seen in perforations of stomach, jejunum, ileum, colon and it is also consistent in the patients presented with obstructive causes

caused by stricture, intussusception, and volvulus. Evidence of localized ileus secondary to localized peritonitis was most common in patients with perforations of the appendix.

Table- 5: Indication for Laparotomy Based On Radiology

Indication	No Of Patients	Percentage
Pneumoperitoneum	56	56%
Obstruction	44	44%

Above table depicts number of patients who had either pneumoperitoneum or obstruction from the radiological investigations. However, pneumoperitoneum is not seen in cases of appendicular perforation (100%), sigmoid perforation (33.3%) and in some cases of mesenteric vascular thrombosis (25%).

Table 6: Intraoperative Finding for Site and Cause of Perforation

Organ	Cause	No. Of Patients	%	Kolandaswamy et al
Stomach	Peptic Perforation	17	26.98%	6.3%
Duodenum	Peptic Perforation	0	0%	
Jejunum	Diverticular Perforation	3	4.76%	41.3%
Ileum	Typhoid	16	25.39%	4.7%
	Tuberculosis	4	6.34%	3.2%
Appendix	Appendicular Perforation	7	11.11%	41.3%
Colon		7	11.11%	1.6%
MVT		9	14.28%	-
Total		63	100%	

Above table shows various causes for laparotomy and site of perforation for non-traumatic cause peptic ulcers (26.98%) were the only cause identified for non-traumatic hollow viscus perforation in stomach, in study by Kolandaswamy et al [7] peptic perforation involving stomach is seen in 6.3% perforations of jejunum caused by jejunal diverticular perforation (4.76%) with mean age group of 57.

Perforations in ileum were found to be overall in 37.73% of cases having perforations due to enteric perforations and tuberculosis are 25.39% and 6.34% respectively. In study by Kolandaswamy et al [7] typhoid perforations and tuberculosis were

seen in 4.7% and 3.2% respectively. In case of appendix the only pathology was found to be appendicular perforation causing about 11.11% of total patients with perforation peritonitis. In contrast to our study, study by Kolandaswamy et al [7] appendicular perforation is seen in 41.3%.

The causes involving colon (11.11%) are attributed to infective colitis (7.93%) and sigmoid perforation (3.17%), in study by Kolandaswamy et al [7] colonic cause of perforation is seen in 1.6%. In total patients with MVT (19%) perforation of the involved bowel segment can be seen in 14.2% of patients.

Table 7: Cause of Obstruction

Cause	No of Patients	Percentage
Stricture And Band	6	16.21%
Volvulus	4	10.81%
Intussusception	6	16.21%
Hernia	8	21.62%
MVT	3	8.10%
Sigmoid Diverticular Perforation	4	10.81%
Infective Colitis	6	16.21%
Total	37	100%

Above table shows the patients having obstructive cause in which a total of 37(100%) patients had undergone emergency laparotomy among which patients with stricture and band causing acute obstruction in 6(16.21%) of patients.

Obstruction due to volvulus is seen in 4(10.81%) of patients, intussusception involving the ileo-colic region is seen in 6(16.21%), obstructed umbilical

hernia is seen in 8(21.62%) of patients, MVT is seen in both perforation and obstruction 3(8.10%) cause but predominantly presented with perforation, patients having sigmoid diverticular perforation but having features of obstruction were seen in 4(10.81%) of cases and infective colitis is seen as presenting as obstruction in 6(16.21%) of patients.

Table 8: Different Treatment Modalities Followed

Stomach & Duodenum	No. Of Patients	%	Kolandasamy Et Al
Simple Closure	0	0%	0%
Grahams Live Omentopexy	17	100%	100%
Jejunum			
Resection And Anastomosis	3	100%	100%
Resection And Anastomosis With Fj	0	0%	0%
Ileum			

Resection And Anastomosis	0	0%	100%
Resection And Anastomosis With Diverting Stoma	46	100%	0%
Appendix			
Appendicectomy	7	100%	100%
Quatercolectomy	0	0%	-
Colon			
Resection With Primary Anastomosis	6	22%	100%
Resection With Diversion	21	77%	-

Above table shows different surgical procedures followed in patients with both perforation and obstruction. All patients of peptic ulcer perforations of stomach were treated by simple closure with graham's live omentopexy (100%), none of the patients of gastric ulcer perforation were subjected to a definitive anti-ulcer surgery. As compared to Kolandasamy et al [7] all the patients who underwent surgery for peptic ulcer disease were done graham's live omentopexy (100%). Resection and anastomosis are done in the patients with jejunal diverticular perforation (100%) with the patients having mean age of 57.6. Resection and

anastomosis with stoma are done in all ileal (100%) and colonic (77%) perforations due to presence of inflammation and late presentation of the patients and condition of the bowel was kept in mind and diversion is given in order to recover the bowel from inflammatory process in due time. Resection with primary anastomosis (22%) is done in patients with intussusception involved both ileum and colon. Appendicectomy (100%) is done in all patients presented with appendicular perforation and quarter colectomy (0%) avoided due to uninvolved base of appendix.

Table 9: Outcomes of Emergency Laparotomy

Outcome	No. Of Patients	%	Kedar et al
Death	9	9%	8.1%
Discharge	91	91%	91.9%
Post Op Complications			
Wound Infection (SSI)	61	61%	3.7%
Wound Dehiscence	4	4%	2.3%
Stoma Related	Retraction	1	
	Prolapse	0	
	Necrosis	0	
Post-Operative Ileus	10	10%	1%
Anastomotic Leak	3	3%	1.9%
Need For Re-Exploration	3	3%	8.3%
Respiratory	29	29%	6.8%
Cardiac	10	10%	0.4%
Electrolyte Imbalance	39	39%	-
Aki	12	12%	0.6%
Requirement Of Blood Transfusion	46	46%	-
Requirement Of ICU	13	13%	-
Average Length Of Hospital Stay	8.8 (SD 3.5)		

Above table shows the total number of patients (n=100) had outcome either death or discharged according to our study of total 100 patients 9 had death and 91 patients were discharged which can be compared with the study by Kedar et al [8] in which 8.1% of patients had death and 91.9% of patients were discharged. Above table shows the patients who had local and abdominal complications after laparotomy in which majority of patients had wound infection (SSI) of 61%, which can be compared with the study done by Kedar et al of only 3.1%.

In our study group patients with wound dehiscence were of 4% while with Kedar et al it was about 2.3%, patients with retracted stoma were only 1% in our study. Postoperative ileus is seen in about 10% in our study when compared to study of Kedar et al it was about 1%. Patients with anastomotic leak were of 3% in our study while in the study of Kedar et al it was of 1.9%. Patients who had requirement of re-exploration were of 3% in our study and of 8.3% in study by Kedar et al. Above table shows systemic complications after laparotomy in which respiratory complications were seen in

29% of cases, cardiac complications seen in 10%, electrolyte imbalance (39%) which is the most commonly seen in patients underwent emergency laparotomy.

AKI is seen in about 12% of cases which is seen in almost all of the patients who had outcome as death. Requirement of blood transfusion (46%) is almost seen in half of the patients who had

laparotomy and ICU admission is required for about 13% of patients. This study is supported by study done by Kedar et al [8] in which respiratory complications were seen in 6.8% of patients and AKI is seen in 0.6% of patients. Average hospital stay is of 8.8 days with S.D of 3.5 in our study which can be correlated with study by Kedar et al of 8 days with S.D of 5.9.

Table 10: Comorbidities

Comorbidities present	No of patients	Percentage
Diabetes	25	25%
Hypertension	15	15%
IHD	2	2%
COPD	1	1%

Above table shows patients with comorbidities like diabetes in 25% of patients, hypertension in 15%, IHD (2%) and COPD (1%) in patients underwent EL. Patients with comorbidities mentioned above had higher mortality and SSI when compared with patients who don't have any comorbidities. It is seen that those patients having comorbidities had prolonged hospital stay when compared to patients having no comorbidities.

Table 11: Mortality

Organ Involved	No. Of Patients	No. Of Deaths	Case Fatality Rate	Kolandaswamy et al
Stomach & Duodenum	17	1	5.88	7.7%
Small Bowel	46	6	13.04	16.7%
Appendix	7	0	0	0%
Colon	27	2	7.4	0%

Above table shows the mortality rate of patients who had undergone emergency laparotomy in which all the patients of appendicular pathology survived without any sequelae after surgery, rest of patients with stomach pathology had case fatality rate of 5.88%, small bowel and colon of 13.04% & 7.4% respectively.

This study is supported by Kolandasamy et al [7] of stomach and duodenum comprising of 7.7%, with small bowel of 16.7%. All the patients who underwent surgery for appendix in our study and of Kolandasamy et al had survived without any sequelae.

Older age is associated with a reduction in function of different organs and an increased prevalence of comorbidities associated with deterioration in post-operative morbidity and mortality, it has been reported that advanced age increases the mortality rate of emergency laparotomy higher than in non-elderly [9].

Conclusion

Patients underwent emergency laparotomy for non-traumatic causes were more common among males and age group between 41 and 60 years.

Abdominal pain (100%) was the most common presenting complaint and incidence of other clinical symptoms and signs were variable. Features of peritonitis like tenderness (100%) and guarding

(98%) were present in every patient undergone emergency laparotomy. Intestinal obstruction was found to be affected all age group.

The biggest incidence was found in age group of 41 to 50 years, mean age is of 46 years. The most common gastrointestinal tract cause of perforation were ileal perforations (46%) and most common cause for obstruction is obstructed umbilical hernia (21.6%).

Wound infection (61%) was the most common postoperative complication followed by electrolyte imbalance (39%). The case fatality rate was highest for small bowel pathology (13%) followed by colon pathology (7.4%). Average length of hospital stay was 8.8 days with S.D. of 3.5.

Patients with comorbidities like diabetes, hypertension, IHD and COPD had higher rates of complications like SSI, cardiac and respiratory complications and eventual higher mortality rate.

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