

# Post-operative complications rates in patients undergoing emergency laparotomy in tertiary care hospital



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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 emergency laparotomy has been done, the frequency of different types of surgical complications after laparotomy in KR hospital, Mysore Medical college and Research Institute, Mysore, Karnataka.

**Aims and Objective:** This study aims to evaluate the post-operative complications in patients undergoing emergency laparotomies at K R Hospital, Mysore Medical College and Research Institute, Mysore. **Materials and Methods:** This prospective observational study was carried out at the Department of General Surgery in Mysore Medical College, Mysore, Karnataka, during the period of October 2020–June 2021. All the patients who underwent emergency laparotomy were included in the study. They were followed up in the post-operative period and all the complications/sequelae developed were recorded. **Results:** The primary indications for an exploratory laparotomy are perforation peritonitis constituted (58.8%) cases followed by intestinal obstruction (13%), gallbladder perforation (10%), blunt and penetrating trauma abdomen (9.2%), and appendicular abscess/perforation (4.8%). In this study, most of the patients (77.2%) were between 21 and 50 years of age. Out of these, maximum cases (age) were found in the 4<sup>th</sup> decade, that is, 107 cases (42.8%). In this study local complication, surgical site infection (47.2%) was the most common complication followed by respiratory infection (30%), fever (38%), nausea and vomiting (14%), paralytic ileus (12.8%), UTI (10%), and thrombophlebitis (10.8%). Mortality was 6%. **Conclusion:** Post-operative complications are more common after emergency laparotomy as compared to elective laparotomies. Post-operative surgical site infection, nausea and vomiting, and fever are the most common complications which need adequate management and post-operative care.

**Key words:** Emergency laparotomy; Abdominal surgery; Post-operative complications

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## INTRODUCTION

Laparotomy is a most common surgical procedure done by general surgeon. In surgical language, the word laparotomy explains exploration of the abdomen and proceeds further according to the cause identified.<sup>1,2</sup>

Post-operative complication may be defined as any negative outcome as perceived by the surgeon or by the patient. It may occur intraoperatively in the immediate post-operative period or later on. Complications following abdominal

surgery role a formidable challenge to surgeon in a general surgery unit, where abdominal surgery constitutes bulk of major operations. They are the chief weakness of surgeon's craftsmanship on operation table. Commencing as a seemingly minor disturbance and if allowed to persist, they can jeopardize the patient recovery and even result in a fatal outcome. Post-operative complication may occur after laparotomy whether elective or emergency.

Various factors such as time of presentation, pre-operative resuscitation, underlying pathology (mesenteric ischemia

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and fecal peritonitis), meticulous surgical technique, age, any comorbid condition (coronary artery disease, diabetes mellitus, hypertension, and any chronic illness), anesthesia technique, and post-operative care contribute to final result. Post-operative sequel can range from fever, pneumonitis, wound complications, and in extremes cases death. Compared to elective laparotomy, emergency laparotomies have a disproportionately high morbidity and mortality and prolonged hospital stay. Despite the bundles of care, there is limited standardization of effective post-operative care after emergency laparotomy to avoid post-operative complications.<sup>3</sup> The study was conducted to identify post-operative complications in the form of outcome in emergency laparotomy so that effective measures could be suggested to reduce them.

## MATERIALS AND METHODS

This study was conducted at the Department of General Surgery in Mysore Medical College, Mysore, Karnataka, India, a tertiary care teaching institute and hospital. The patients undergoing emergency laparotomy admitted to the general surgical wards were taken for study. This was a hospital-based, single-center longitudinal prospective observational study from October 2020 to June 2021 which included 250 patients who underwent emergency laparotomy<sup>4</sup>.

Patients of different age groups and sex were tabulated and the possible causes of laparotomy were noted. A detailed history on smoking, alcohol intake, intravenous drug users, and any comorbidities such as diabetes, tuberculosis, chronic obstructive pulmonary disease, and acquired immune deficiency syndrome are noted. A clinical examination was conducted and all biochemical investigations required for pre-anesthetic checkup along with other investigations required for making diagnosis were done. All the patients were resuscitated as per need and an exploratory laparotomy was carried out through a midline incision.

After surgery, patients were observed for any post-operative complication and mortality with predisposing factors. Persistent post-operative fever (>48 h), post-operative nausea and vomiting, and respiratory tract infections were monitored regularly. Patients were evaluated for both local and systemic complications. Examination of the wound-related complication was started from the 2<sup>nd</sup> post-operative day and patients having post-operative pyrexia and serosanguinous/serous/pus discharge coming from main wound site were included in this complication. They were further followed up for sequelae such as wound gapping and burst abdomen. Patients were also evaluated for post-operative systemic complications such as pulmonary, gastrointestinal, and urinary complications.

On the basis of clinical examination and investigations (blood examination and X-ray chest), respiratory tract infection was identified. Gastrointestinal complications observed during post-operative period included post-operative ileus, intestinal obstruction, diarrhea, and gastrointestinal fistula (fecal, bilious fluid discharge from main wound, or drain site). Septicemia was also noted in post-operative period and mortality associated with it was also recorded.

Post-operative complications were classified based on severity classification and Clavien-Dindo classification.

## RESULTS

A total of 250 patients who underwent emergency laparotomy were noted. In this study, most of the patients (77.2%) were between 21 and 50 years of age. Out of these, maximum cases (age) were found in the 4<sup>th</sup> decade, that is, 107 cases (42.8%) (Table 1).

The primary indications for an exploratory laparotomy are perforation peritonitis constituted (58.8%) cases followed

**Table 1: Age and gender distribution of the study participants**

Variable	Categories	Frequency	Percentage
Age (years)	<20	6	2.4
	20–39	86	34.4
	40–59	107	42.8
	≥60	51	20.4
Gender	Female	195	78.0
	Male	55	22.0

**Table 2: Different types of surgeries performed**

Diagnosis	Frequency	Percentage
Appendicitis	2	0.8
Appendicular abscess	9	3.6
Appendicular mass	1	0.4
Gall bladder perforation	25	10.0
Gastric perforation	62	24.8
Duodenal perforation	37	14.8
Other small bowel perforation	22	8.8
Large bowel perforation	5	2.0
Intestinal obstruction	33	13.2
Gangrenous bowel	3	1.2
Mesenteric ischemia	6	2.4
Intussusception	3	1.2
Volvulus	4	1.6
Malignancy	8	3.2
Intra-abdominal abscess	3	1.2
Blunt trauma	8	3.2
Deep penetrating trauma	15	6.0
Intestinal obstruction due to TB mass	1	0.4
Others	3	1.2

by intestinal obstruction (13%), gallbladder perforation (10%), blunt and penetrating trauma abdomen (9.2%), and appendicular abscess/perforation (4.8%) (Table 2).

Among these, surgical site infection (47.2%) was the most common complication followed by respiratory infection (30.4%) and fever (38%). Other systemic complications were nausea and vomiting (14%), urinary tract infection (10%), thrombophlebitis (10.8%), hypotension (0.8%), and acute kidney injury (0.4%). Local complications included post-operative ileus (12.8%), stoma complications (skin excoriation, retraction, prolapse, obstruction, and ischemia) (7.2%), wound dehiscence (3.2%), burst abdomen (1.6%), and anastomotic leak and enterocutaneous fistula (0.8%) (Table 3). Mortality was 6%.

## DISCUSSION

The emergency laparotomy for acute abdomen is a major test of the surgical skills of a surgeon. Post-operative care is as essential as the pre-operative preparation for a successful outcome. Deficient care in either may produce unsatisfactory results irrespective of the standard of surgery. The aim of meticulous post-operative care is early detection and immediate treatment of post-operative complications.

In this study, a total of 250 emergency laparotomies were performed and post-operative complications were found in 181 (72.4%) patients. In this study local complication, surgical site infection (47.2%) was the most common complication followed by respiratory infection (30%), fever (38%), nausea and vomiting (14%), paralytic ileus (12.8%), UTI (10%), and thrombophlebitis (10.8%). Mortality of 6% was seen.

In this study, male-to-female ratio in the study was 3.5:1 which is comparable with the studies of Dickson and Cole,<sup>5</sup>

Nogueira et al.,<sup>6</sup> and Kapoor et al.,<sup>7</sup> who also found a higher male to female ratio of 3.25:1 and 3:1, respectively. The present study is in conformity to the world literature, where males were outnumbered females because of higher rate of smoking, alcohol, drug abuse, and a higher proportion of outdoor activities exposing to trauma than in females.

Among the cases of perforation peritonitis, peptic perforation constitutes 39.6% of cases followed by small bowel perforation (8.8%). The present study is similar to the study Gupta et al.<sup>8</sup> (30.9%), Wani et al.,<sup>9</sup> Ghandhi et al.,<sup>10</sup> Jhoota et al.<sup>11</sup> (57%), Chauhan et al.<sup>12</sup> (31.42%), and Graham et al.<sup>13</sup> (29%), stating that peptic perforation is most common among all cases of perforation peritonitis.

In this study, among the eight blunt abdominal injuries, the most common mode of injury was road traffic accidents and the most common organ injured was spleen (50%). This is similar to the studies of Mehta et al.,<sup>14</sup> and Yogish et al.,<sup>15</sup> in which 53% and 46.6% of cases were having splenic injury, respectively. The study conducted by Mukhopadhyay<sup>16</sup> who shows that mesenteric injury was common in blunt abdominal injuries.<sup>17</sup> Incidence of burst abdomen following abdominal surgery Parmar G; 5%.<sup>18</sup>

Post-operative wound infections have a major contribution to the post-operative morbidity of the patients. In our study, post-operative wound infection was seen in 118 (47.2%) patients, this value is high on comparing this with the study at Karachi which is reporting wound infection in 21.6% of patients, another study of Karachi by Memon et al. showed wound infection in 21.5% of cases.

The most common systemic post-operative complication is post-operative fever<sup>19</sup> which was found in 95 (38.0%) cases which are high in our study compared to Jawaid et al.,<sup>20</sup> documented post-operative fever as the commonest

**Table 3: Post-operative complications based on severity and Clavien-Dindo classification**

Severity	Clavien-Dindo classification	Post-operative complications	Frequency	Percentage
Mild	Grade 1 and 2	Fever	95	38
		Nausea and vomiting	35	14
		Pulmonary atelectasis	6	2.4
		Urinary tract infection	25	10
		Thrombophlebitis	27	10.8
		Stoma complications	18	7.2
		Post-operative ileus	32	12.8
		Surgical site infection	118	47.2
		Pneumonia	76	30.4
		Sepsis	8	3.2
Moderate	Grade 3	Anastomotic leak	2	0.8
		Wound dehiscence	8	3.2
		Burst abdomen	4	1.6
		Enterocutaneous fistula	2	0.8
Severe	Grade 4	Acute kidney injury	1	0.4
		Hypotension/cardiac failure	2	0.8
		Grade 5	Post-operative death	15

complication at 18.2%. Post-operative nausea and vomiting is also a common complication, in this study, post-operative nausea and vomiting was found in 35 (14%), Murtaza et al.,<sup>21</sup> is also in favor of this result in one of the recent studies on laparotomies.

Wound dehiscence/burst abdomen is a very serious post-operative complication associated with high morbidity and mortality. It has a significant impact on health-care cost both for the patient and the hospital. Nationally results from studies Waqar et al.,<sup>22</sup> Buhler et al.,<sup>23</sup> And Afzal et al.,<sup>24</sup> were showing percentage of wound dehiscence as 8.13% while in an international study documented, wound dehiscence is 0.43%.<sup>24</sup> In our study, the wound dehiscence was 12 (4.8%) in emergency laparotomy. A high percentage of burst abdomen in emergency laparotomy in our setup is due to many factors mainly patients poor hygiene and comorbidity, not up to the high level equipment and facility in emergency and no doubt the underline disease pathology found per operatively.

Essentially emergency laparotomy is performed for life saving purpose even than mortality cannot be excluded due to one or the other reason. In my study, mortality rate is 6%, however, it is seen variedly from 3.6% to 41.7% in literature. Almost all mortalities have had septicemia. As we already know, septicemia kills the patients. Septicemia because of intra-abdominal infection leads to 80% mortality. A study by Soomro et al., reported 2.8% mortality at Karachi a lower than our study mortality rate. It is probably due to our study consists of emergency laparotomies for life saving only as compare to elective surgeries.

Only one previous study, in Finland,<sup>25</sup> retrospectively analyzed a smaller group (n=444) of emergency surgical patients and validated the Clavien-Dindo classification for emergency surgical patients. They found a mortality rate of 18.2% in the patients undergoing laparotomy.

## CONCLUSION

The post-operative complications such as post-operative fever and wound infection are the most common after emergency laparotomies. The most common problems are the post-operative fever, wound infection, and post-operative nausea and vomiting. The local wound complications apart from wound infections are the wound dehiscence and burst abdomen, which directly affect the outcome of the disease. Post-operative complications increase patient morbidity and mortality and are a target for quality improvement programs. Many complications may be prevented by thorough pre-operative evaluation, sound surgical technique, and careful follow-up care.

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**Authors Contribution:**

**MP** – Concept and design of the study, prepared first draft of manuscript; **SHB** – Interpreted the results, reviewed the literature, and manuscript preparation; and **GK** – Concept, coordination, statistical analysis and interpretation, preparation of manuscript, and revision of the manuscript.

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