

## Original Research Article

# A comparative study of postoperative complications in emergency versus elective laparotomy at a tertiary care centre

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## ABSTRACT

**Background:** The incidences of post-operative complications are higher after laparotomy particularly in emergency. This study was aimed to evaluate and compare postoperative complications after emergency versus elective laparotomy performed at Bundelkhand Medical College, Sagar.

**Methods:** This comparative study was carried out at Department of General Surgery in Bundelkhand Medical College, Sagar, Madhya Pradesh during period of January 2015 to February 2016. All the patients who underwent laparotomy (elective or emergency) were included in the study. Demographic data about patients was collected and noted in pro forma. Patients were followed in postoperative period and any complication developed recorded. Complications compared according to nature of laparotomy whether elective or emergency.

**Results:** A total of 350 patients underwent emergency laparotomy and 50 patients underwent elective laparotomy. 128 (36.57%) patients developed complications following emergency laparotomy while 11 (22%) patients developed complication after elective laparotomy. Postoperative complications following emergency laparotomy included pyrexia (18.2%) followed by nausea and vomiting (12%), wound infection (11.4%), respiratory tract infection (6.85%), urinary tract infection (2.28%), gastrointestinal complications (3.71%), toxemia and septicaemia (8%). After elective laparotomy 20% patients showed postoperative fever, 10% patients suffered from postoperative nausea and vomiting and wound infection was noted in 4% patients.

**Conclusions:** In comparison to elective laparotomy postoperative complications are more common in emergency laparotomy.

**Keywords:** Complications, Emergency, Elective, Laparotomy, Postoperative

## INTRODUCTION

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

Postoperative complication may be defined as any negative outcome as perceived by the surgeon or by the

patient.<sup>2</sup> It may occur intraoperatively in the immediate postoperative 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 like proper resuscitation, meticulous surgical technique, age, any co-morbid condition (coronary artery disease, diabetes mellitus, hypertension, any chronic illness), anaesthesia technique and postoperative care contribute to final result.

Adverse events that are closely related to processes of care, such as postoperative complications, may be a better measure of quality than death rates or other intermediate outcomes.<sup>3</sup> Therefore, early detection and proper intervention can reduce the morbidity and mortality related with complication.

## **METHODS**

This study was conducted at Department of General Surgery in Bundelkhand Medical College, Sagar, MP, India, a tertiary care teaching institute and hospital. The target population was patients undergoing emergency/elective laparotomy admitted to the general surgical wards. This was a hospital based, single centre longitudinal prospective observational study from January 2015 to February 2016 including 350 patients who underwent emergency laparotomy and 50 patients who underwent elective laparotomy. Patients who were admitted but died during resuscitation, absconded or referred to higher centre were excluded from study.

The data of patients who underwent elective or emergency laparotomy was noted on a pro forma. A detailed history and clinical examination was conducted. Basic investigations like random blood sugar, complete blood count, urinalysis, serum urea/creatinine, serum electrolytes, chest radiograph, electrocardiograph, hepatitis B and HIV profile and blood grouping and cross matching were done. Abdominal radiographs and ultrasonography was also done where required. Patients who presented with acute abdomen and needed immediate surgery, after resuscitation with IV fluids and supportive treatment, Foley's catheterization and nasogastric intubation, underwent emergency laparotomy.

In elective group patients, beside pre-operative evaluation as done in case of emergency laparotomy, correction of any co-morbid condition like anaemia, diabetes, hypertension, respiratory infection was done before laparotomy.

Pre-anaesthetic assessment was made and written/informed consent was taken after counseling regarding the condition of the patient and the possible outcomes. Under general/spinal anaesthesia the operative field was prepared with povidone iodine and all the patients were opened through a midline abdominal incision. After

surgery patients were observed for any postoperative complication and mortality with predisposing factors. Persistent postoperative fever (>48 hours), post-operative nausea and vomiting and respiratory tract infections were monitored regularly.

Patients were evaluated for both local and systemic complication. Examination of the wound related complication was started from the second postoperative day and patients having postoperative pyrexia and serosanguinous/serous/pus discharge coming from main wound site were included in this complication. They were further followed up for sequelae like wound gapping and burst abdomen.

Patients were also evaluated for post-operative systemic complications like 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 postoperative period included postoperative ileus, intestinal obstruction, diarrhea, and gastrointestinal fistula (faecal, 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.

## **RESULTS**

Total 400 patients underwent laparotomy, among which 350 patients underwent emergency laparotomy and 50 patients underwent elective laparotomy. 270 (77.14%) patients were male and 80 (14.28%) were female. The age ranged between 8-70 years. The majority of cases were of acute abdomen/peritonitis. Peptic perforation peritonitis constituted 110 (31.42%) cases followed by typhoid perforation peritonitis 85 (24.28%), intestinal obstruction 76 (21.7%), blunt and penetrating trauma abdomen 28 (7.98%), appendicular perforation 17 (4.85%) and other surgeries were performed as mentioned in table below (Table 1). 128 (36.57%) patients developed complications after emergency laparotomy in postoperative period.

Most common complication evident was postoperative pyrexia in 70 (20%) patients followed by wound related complication in 43 (12.28%) patients and postoperative nausea and vomiting in 42 (12%) patients, respiratory complications seen in 24 (6.85%) patients, fecal fistula observed in 7 (2%) patients, post-operative obstruction seen in 6 (1.71%) patients, toxemia and septicemia developed in 28 (8%) cases. Deep vein thrombosis was seen in 1 patient. 30 patients died in postoperative period because of complications (majority because of septicemia) (Table 2).

**Table 1: Distribution of cases underwent emergency laparotomy according to diagnosis.**

Diagnosis		Total no. of cases	Percentage (%)
Peptic perforation peritonitis		110	31.42
Typhoid perforation peritonitis		85	24.28
Intestinal obstruction	Small bowel	45	12.85
	Large bowel	31	8.85
Trauma	Haemoperitoneum	12	3.42
	Jejunal perforation peritonitis	10	2.85
	Colonic perforation	6	1.71
Pyoperitonium		21	6
Abdominal tuberculosis		13	3.71
Appendicular perforation		17	4.85

**Table 2: Distribution of complications after emergency laparotomy.**

Complications		No. of cases	Percentage (%)
Post-operative fever		70	20
Postoperative nausea and vomiting		42	12
Wound related complication	Wound infection	34	9.71
	Minor gapping	7	2
	Burst abdomen	2	0.57
Respiratory complications	Atelactasis	15	4.28
	Tracheobronchitis	10	2.85
	Pneumonia	6	1.71
	Pleural effusion or empyema	2	0.57
	ARDS	1	0.28
Toxemia and septicemia		28	8
Faecal fistula		7	2
Post-operative obstruction		6	1.71

**Table 3: Distribution of cases underwent elective laparotomy according to diagnosis.**

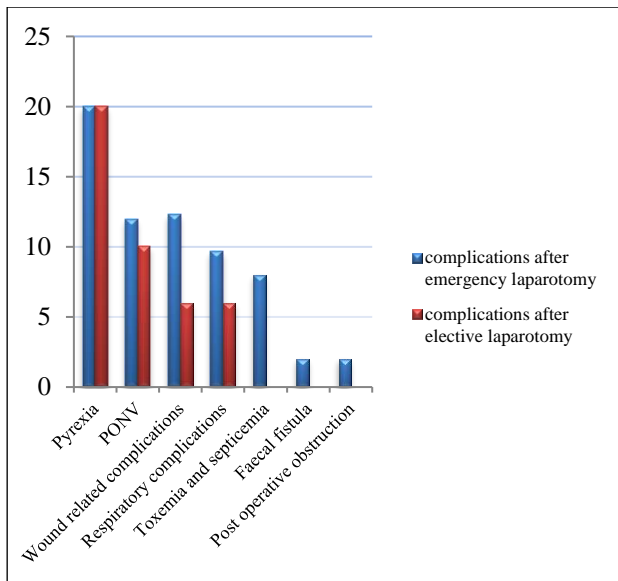
Diagnosis	No. of cases	Percentage
Ovarian masses	Benign ovarian cyst	1632
	Tobo-ovarian mass	
	Mucinous cystadenoma ovary	
Retroperitoneal mass	5	10
Mesentric cyst	15	30
Abdominal tuberculosis	10	20
Colonic carcinoma	4	8

Most complication occurred in typhoid perforation peritonitis 37 (28.90%), intestinal obstruction 35 (27.34%) and peptic perforation peritonitis 34 (26.56%) cases. Many patients were affected from more than one complication.

Out of 50 patients who underwent elective laparotomy 11 (22%) patients were male and 39 (78%) patients were female and age ranged from 10-56 years. The cases included ovarian masses 16 (32%), retroperitoneal mass 5 (10%), mesenteric cyst 15 (30%), abdominal tuberculosis 10 (20%) and colonic carcinoma 4 (8%) as depicted in Table 3.

Among 50 patients undergoing elective laparotomy complications was seen in 11 (22%) patients. Most common complication was post-operative pyrexia seen in 10 (20%) patients, followed by nausea and vomiting in 5 (10%) cases, wound infection recorded in 3 (6%) patients and pulmonary complication in 3 (6%) cases.

No mortality recorded in 30 days follow up period. Frequency of postoperative complication following emergency versus elective laparotomy is shown graphically in Figure 1.



**Figure 1: Frequency of postoperative complication after emergency versus elective laparotomy.**

## DISCUSSION

The emergency laparotomy for acute abdomen is a major test of the surgical skills of a surgeon. Postoperative care is as essential as the preoperative preparation for a successful outcome. Deficient care in either may produce unsatisfactory results irrespective of the standard of surgery.<sup>4</sup> The aim of meticulous postoperative care is early detection and immediate treatment of postoperative complications.

In this study complications were recorded in 128 patients after emergency laparotomy as compared to 11 patients after elective laparotomy. In emergency laparotomy, most common complication found was post-operative fever seen in 20% followed by nausea and vomiting in 12% and wound infection in 12% as compared to elective laparotomy where 20% patients showed postoperative fever followed by nausea and vomiting in 10% and wound infection in 6% patients. A study done by Jawaid et al, also recorded postoperative fever in 18.2% as the commonest complication, postoperative nausea and vomiting in 11.6% cases and wound infection in 11.4% cases after emergency laparotomy.<sup>5</sup>

Different studies show that fever is common among postoperative patients.<sup>6,7</sup> In this study also fever is the most common complication after emergency as well as elective laparotomy. After emergency laparotomy as well as elective laparotomy fever was seen in 20% of cases. Most early postoperative fever (temperature above 38°C/100.4°F) for 48 hours or more is caused by the inflammatory stimulus of surgery and resolves spontaneously.<sup>8,9</sup> However, postoperative fevers can also be a manifestation of a serious complication. Pyrexia within 48 hours of surgery is often due to pulmonary atelectasis. Between 48 hours and five days, pyrexia may

be the result of thrombophlebitis or infection of the urinary tract or the chest, and, more than five days after surgery, a wound infection or anastomotic breakdown should be suspected.<sup>10</sup> Between 7 to 10 days deep venous thrombosis and pulmonary embolus were the common causes. A study in critically ill surgical patients showed that 26% of patients developed postoperative fever.<sup>11</sup> A low percentage of fever in elective laparotomy may be because of less chances of wound infection, chest infection and less critically ill patients in this group.

Postoperative nausea and vomiting (PONV) are among the most common adverse events after surgery and anaesthesia.<sup>12</sup> The overall incidence of PONV is about 30 percent but can be as high as 70 percent in high risk patients.<sup>13</sup> Most episodes of postoperative nausea and vomiting resolve within 24 hours. In present study PONV documented in 12% cases after emergency laparotomy and 10% after elective laparotomy.

Wound infection is a well-recognized complication of surgical treatment and sometimes places a high burden on hospital resources.<sup>14</sup> It is the most common nosocomial infection, accounting for 38% of all such infections.<sup>15</sup> In present study wound infection occurred in 12.28% after emergency and 6% after elective laparotomy. A study from Saudi Arabia recorded an overall infection rate of 9% while another study from the same country showed infection rate of 1.38%.<sup>14,16</sup> Low rate of wound related complications in elective laparotomy may be because of less contamination of peritoneal cavity and wound site at the time of surgery and better nutritional status of patient undergoing elective laparotomy.

La De Sa found overall 38.28% wound infection rate in clean contaminated cases compared with 10.48% infection rate in clean cases.<sup>17</sup> Garia Baldi et al and PL Nandi also pointed out bacterial contamination of wound at the time of operation being most important factors.<sup>18</sup> Foothill hospital study demonstrated that clean cases were associated with 1.5% wound infection rate while clean contaminated; 7.7%, contaminated; 15.2%, highly contaminated cases were associated with 40.0% wound infection rate. 12.28% wound infection after emergency laparotomy and 6% after elective laparotomy is consistent with foothill hospital study.

Incidence of burst abdomen following abdominal surgery has been variably reported by authors like Wolff; 2.6%, Efron; 2.3%, Lehman et al; 2.5%, Parmar G; 5%.<sup>19</sup> Incidence of burst abdomen following emergency laparotomy was 0.57%, while no case of burst abdomen found after elective laparotomy in present study.

Postoperative pulmonary complications account for a substantial proportion of morbidity and mortality related to surgery and anesthesia and lead to longer hospital stays.<sup>20</sup> The incidence of post-operative pulmonary complication varies from 5 to 60% as reported by L.G.G. Serejo et al and Deodhar.<sup>21,22</sup> In present series 9.7%

patients developed pulmonary complications following emergency laparotomy while 6% patients suffered from pulmonary complication after elective laparotomy. The low incidence of pulmonary complications in present series is due to better screening of patients, effective pre-operative control of respiratory tract infection, and postoperative physiotherapy.

Among gastrointestinal complications, 7 (2%) cases of faecal fistula and 6 (1.71%) cases of postoperative obstruction observed after emergency laparotomy while no gastrointestinal complication seen following elective laparotomy. Edmunds reported 1.4% incidence of fistula in his study.<sup>23</sup>

Septicemia, a grave complication, was seen in 28 patients undergone emergency laparotomy while no case of septicemia recorded after elective laparotomy. 30 cases died in postoperative period after emergency laparotomy and no mortality recorded after elective laparotomy. Septicemia found to be most attributable factor for mortality in postoperative period following emergency laparotomy.

Venous thromboembolism (VTE) is considered to be a significant cause of morbidity and mortality in hospitalized patients, especially in those undergoing major surgical procedure. In present study only one case of DVT was documented after emergency laparotomy for typhoid perforation peritonitis. In the absence of prophylaxis, VTE rates as high as 25% have been reported following general surgery.<sup>24</sup> In the United States and Europe, DVT is present in over 5 million events each year, while PE is present in over 500,000 cases.<sup>25</sup> It has been perceived to be a rare disorder in Asians.<sup>26</sup>

## CONCLUSION

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. When we studied possible complications following elective surgery and those following urgent/emergency surgery, a debatable issue was the possibility of significant differences between them. The emergency laparotomies are also more common than elective laparotomies especially at peripheral centres.

In present study, the complication rate after emergency laparotomies is higher as compared to the elective laparotomies. The commonest problems being postoperative fever, wound infection and postoperative nausea and vomiting.

Despite the limitations of the current literature, this study can be useful for clinicians, individuals, and families making the difficult decision to undergo an emergency or elective abdominal surgery. Future studies should

consider the effect of complications on those outcomes that are most important to the individual patient.

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