

# A Retrospective Study of Factors Affecting Post Operative Morbidity in the Patients Undergoing Emergency Abdominal Surgery

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**Abstract:** ***Background:** The emergency surgery is described as non - elective surgery, which is carried out to prevent a disease that is surgically treatable from having a fatal or morbid health effect. Emergency surgery is one case where a surgeon faces a therapeutic challenge. Since the surgical management of the patient is inevitable, we aim here to understand certain factors that could be contributing to major post operative mortality and morbidities. In a developing nation as the Indian subcontinent where a study like this is conducted on largely poverty struck population, better understanding of these factors can improve multiple aspects of healthcare as better patient counselling, explaining the prognosis, and shortening hospital stay. **Methods:** A retrospective study was done on 40 patients who underwent emergency exploratory laparotomy in a tertiary care centre, R. D Gardi Medical college and C. R Gardi Hospital, Ujjain from May 2022 to December 2022. **Results:** There were 75% males and 25% females in the study. The mortality in our study was 7.5%. Morbidity was seen in 65% patients who suffered postoperative complications in which surgical site infections remain the most common complication (58.3%), pulmonary complications were suffered by 23% patients and 11.5% patients suffered sepsis and multi - organ dysfunction syndrome each. **Conclusion:** Patients with postoperative complications who had undergone emergency abdominal surgery probably are aged people, patients with elevated levels of creatinine & blood glucose and males with reduced levels of serum albumin, smokers and males who had longer procedure duration. Fluid resuscitation and experienced surgeons are important to enhance results.*

**Keywords:** Abdominal Surgery, Emergency, Post - Operative Complications, Morbidity Factor

## 1. Background

The emergency surgery is described as non - elective surgery, which is carried out to prevent a disease that is surgically treatable from having a fatal or morbid health effect. Emergency surgery procedures account for a small fraction of all surgical procedures, but a disproportionately large amount of postoperative morbidity and mortality. Every year millions of individuals worldwide need immediate time - critical abdominal emergency operations to overcome the potentially fatal diseases as obstruction of small bowels, haemorrhage, perforation of the gastrointestinal tract, invasive cancer tumours, injuries of the abdominal viscera by a blunt force / penetrative trauma and peritonitis. Emergency surgery is one case where a surgeon faces a therapeutic challenge. Since the surgical management of the patient is inevitable, we aim here to understand certain factors that could be contributing to major post operative mortality and morbidities.

Bowel obstruction, appendicular perforation, bowel perforation, and malignancy are the major factors behind emergency abdominal surgeries. The study of pre operative health status of an individual in terms of anaemia, COPD, long standing diabetes, smoking and malnutrition etc. can give us a broad idea of post operative complications faced by these patients. As practising surgeons, we aim to understand the factors and try to possibly modify them by careful pre and post operative management for better surgical outcomes. In a developing nation as the Indian subcontinent where a study like this is conducted largely on

a poverty struck population, better understanding of these factors can improve multiple aspects of healthcare as better patient counselling, explaining the prognosis, and shortening hospital stay.

### Objectives

- To identify the factors contributing to morbidity in patients of emergency abdominal surgery.
- To identify the risk factors that are potentially modifiable pre operatively and post operatively to reduce the complications in patients undergoing emergency abdominal surgery.

## 2. Methods

A retrospective study was done on 40 patients who underwent emergency exploratory laparotomy in a tertiary care centre, R. D Gardi Medical college and C. R Gardi Hospital from May 2022 to December 2022. The detailed history and complete examination were noted.

The following were included as post - operative complications that developed till post operative day 10: surgical site infection (deep, superficial, organ spacing), sepsis, respiratory (pneumonia, pleural effusion and pulmonary embolism), and multiorgan failure. Classification is into two categories - the patient with complications and patients with no complications with the following pre operative factors:

Total blood count – haemoglobin and Total Leucocyte Count

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Serum levels of – urea and albumin  
 Pre - existing comorbidities –Hyperglycaemia and COPD  
 History of smoking and alcohol intake  
 Duration of illness at the time of admission

**Inclusion Criteria**

The patients who had undergone emergency abdominal surgery within 12 hours of admission, over a period of eight months from May 2022 to December 2022 at C. R Gardi Hospital.

**Exclusion Criteria**

Those patients who for some reason quit the study. Patients who had prior surgery within 30 days. Patients who were immunocompromised.

**3. Results**

**a) Age**

The patients in this study were between the age of 17 and 70 years.19 (47.5%) patients were below the age of 55 years and 21 (52.5%) patients were above the age of 55 years. More post operative morbidity and mortality were seen in the patients older than 55 years who underwent emergency abdominal surgery.

**b) Sex**

A total of 30 (75%) male and 10 (25%) female patients were seen during the study, thus the number of male patients were comparatively higher but the complications in the post operative period were not statistically significant. Hence,

gender does not appear to predispose to severity of post operative complications.

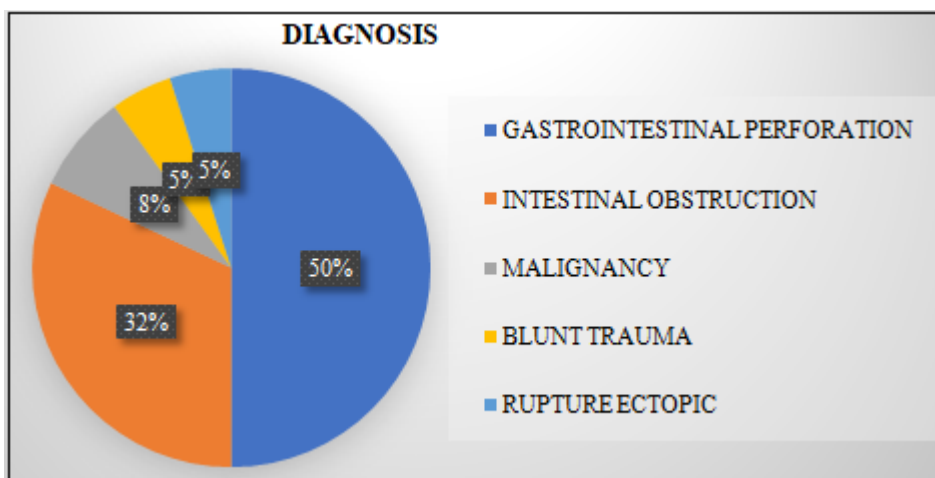
**c) Occupation**

Among males all were farmers, daily wage workers and labourers whereas females were all housewives, belonging mostly to lower socio - economic status of the society.

**d) Diagnosis**

The most common intraoperative cause of emergency abdominal surgery was seen to be the gastrointestinal perforation (50%), ileal perforation being the most common of all, followed by gastric perforation. Second most common aetiology was noted to be intestinal obstruction (32%) followed by GI malignancy (8%), blunt trauma (5%) and rupture of ectopic pregnancy (5%).

S. No	Diagnosis	Number of cases	Percentage
1	Gastrointestinal perforation	20	50%
	1) Ileal	14	
	2) Gastric	4	
	3) Duodenal	1	
	4) Appendicular	1	
2	Intestinal obstruction	13	32%
	1) Adhesions	9	
	2) Volvulus	2	
	3) Obstructed hernia	1	
4) Meckel's diverticulum	1		
3	Malignancy	3	8%
4	Blunt trauma	2	5%
5	Rupture of ectopic pregnancy	2	5%



**Measure of Post Operative Complications**

**Pre - Operative biochemical and haematological parameters**

S. NO.	Parameters	Mean
1.	Haemoglobin	11.5g/dl
2.	Total leucocyte count	12, 600/mm3
3.	Serum urea	45mg/dl
4.	Serum albumin	2.5g/dl
5.	Random blood sugar	150mg/dl

**1) Anaemia and post operative complications**

A total of 17 patients were anaemic in the preoperative period and 12 suffered postoperative complications. The p value for the parameter was <0.05 hence, there is a strong

correlation between anaemia and postoperative complications.

Parameter (Hb%)	Yes (N=25)	No (N=15)	Analysis
<10gm/dl	12	5	X <sup>2</sup> value = 0.825 P value = 0.02
>10gm/dl	13	10	

**2) Leucocytosis and post operative complications**

A total of 24 patients had leucocytosis on admission.17 had postoperative complications. The p value is >0.05, therefore it does not show any statistically significant association with post operative complications.

Parameter	Yes (N=26)	No (N=14)	Analysis
Total Leucocyte Count < 12, 000/mm <sup>3</sup>	17	6	X <sup>2</sup> value = 1.889 P value = 0.22
>12, 000/mm <sup>3</sup>	9	8	

**3) Serum urea and post operative complications**

A total of 19 patients had raised preoperative levels of serum urea 15 of them had postoperative complications. The p value is <0.05, hence it is a strong risk factor.

Parameter S. urea	Yes (N=24)	No (N=16)	Analysis
<45gm/dl	6	15	X <sup>2</sup> value = 10.15 P value = 0.001
>45gm/dl	15	4	

**4) Serum albumin and post operative complications**

A total of 21 patients had a lower level of serum albumin.18 of them had postoperative complications. The p value is <0.05, so there is a strong correlation between lower albumin levels and postoperative complications.

Parameter S. Albumin	Yes (N=28)	No (N=12)	Analysis
< 2.5gm/dl	18	3	X <sup>2</sup> value =5.198 P value = 0.02
>2.5 gm/dl	10	9	

**5) Hyperglycaemia and post operative complications**

Fasting blood glucose level at the time of surgery was measured including the patients who had a history of type 2 diabetes mellitus. A total of 16 patients had raised levels.11 of them had postoperative complications. The p value is >0.05, so it is not statistically significant in contributing to postoperative complications.

Parameter Random blood sugar	Yes (N=27)	No (N=13)	Analysis
< 180mg/dl	16	8	X <sup>2</sup> value = 0.019 P value = 0.892
>180mg/dl	11	5	

**6) Presence of COPD and post operative complication**

COPD was assessed by presence of bilateral crept and chest X - Ray changes. Total 23 patients had COPD and 16 had postoperative complications. There is a very strong correlation to postoperative complications as the p value is <0.05.

Presence of COPD	Yes (N=21)	No (N=19)	Analysis
Present	16	7	X <sup>2</sup> value = 6.319 P value =0.028
Absent	5	12	

**7) Presence of history of smoking and alcohol consumption and post operative complications**

History of smoking of >5 years / 10 bidi per day  
History of alcohol consumption of >5 years / >120ml per day. A total of 25 patients were seen with positive history among which 19 had postoperative complications. Thus, there is strong correlation as the p value stands to be <0.05.

Presence of history of smoking and alcoholism	Yes (N=25)	No (N=15)	Analysis
Present	19	6	X <sup>2</sup> value= 5.184 P value =0.02
Absent	6	9	

**8) Duration of illness at the time of admission and post operative complications**

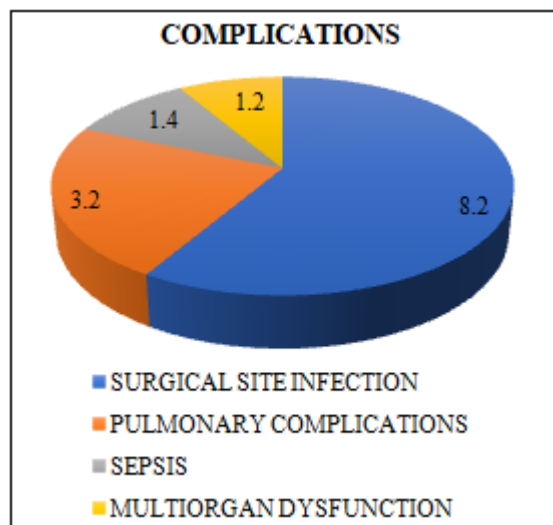
The time of duration of onset of the symptoms to the admission was considered. There were 27 patients who had presented at >48 hours, 15 of them had post operative complications. Since the p value is >0.05, it is not a statistically significant factor in postoperative prognosis.

Duration of illness at the time of admission	Yes (N=20)	No (N=20)	Analysis
< 48 hours	5	8	X <sup>2</sup> value = 1.025 P value =0.31
>48 hours	15	12	

**Types of Complications**

Total patients who suffered postoperative complications were 26 (65%). Most common complication were the surgical site infections seen in 14 patients followed by pulmonary complications seen in 6 patients then sepsis and multiorgan dysfunction syndrome seen in 3, 3 patients respectively. Although most patients showed a combination of these complications, for the sake of analysis we have categorised them into one of the more severe complications.

S. No	Complications	Percentage
1.	Surgical site infection	14 (53.8%)
2.	Pulmonary complications (pleural effusion and pulmonary oedema)	6 (23%)
3.	Sepsis	3 (11.5%)
4.	MODS (Multiple Organ Dysfunction Syndrome)	3 (11.5%)



**4. Discussion**

The study we conducted for the evaluation of factors affecting postoperative morbidity in patients undergoing emergency abdominal surgery included a total of 40 patients.

There were 75% males and 25% females in the study.47.5% patients were below the age of 55 years and 52.5% patients were above the age of 55 years. The mortality in our study was 7.5%, all of the patients were more than 55 years who had suffered multiple complications in the postoperative period.

Surgeries done were repair of intestinal perforation with/without diversion stoma, adhesiolysis, obstructed hernia repair, derotation of bowel and Meckel's diverticulectomy with/without resection and anastomosis, resection of mass with hemicolectomy with/without diversion stoma, splenectomy and oophorectomy.

65% patients suffered postoperative complications in which surgical site infections remain the most common complication (58.3%), pulmonary complications were suffered by 23% patients and 11.5% patients suffered sepsis and multiorgan dysfunction syndrome each.

<sup>123</sup>The factors that showed the strongest correlation with postoperative morbidity were preoperative anaemia, high serum urea levels, low serum albumin, positive history of smoking and alcoholism and presence of COPD.

72% anaemic patients (Hb <10gm%) had postoperative complications as anaemia leads to low tissue oxygenation, anaerobic respiration and poor wound healing. Immediate postoperative blood transfusions can significantly improve this<sup>4</sup>.

Serum albumin is one of the most important markers of liver function<sup>5</sup>. It binds to many factors involved in wound healing. Lower serum albumin levels are associated with significant post operative morbidity<sup>5</sup>. 85% patients suffered from complications who had preoperative lower serum albumin levels.

Preoperative glycaemic control has shown to significantly improve post operative outcomes<sup>8</sup>. The patients operated in emergency who have higher levels of blood sugar either due to a pre - existing diabetes or general metabolic response to infection, had post operative complications<sup>9</sup>. 68% of the patients suffered bad post operative outcomes. Although not statistically significant in this study, we know by literature the deleterious effects of hyperglycaemia on wound healing.

Chronic obstructive pulmonary disease in the patients cause poor oxygenation, respiratory compromise, increases the adverse effects of the anaesthetic drugs and increases risk for respiratory and metabolic acidosis. It is significant risk factor in poor post operative outcomes. 70% of the patients with COPD had severe post operative complication. The p value is <0.5 which indicates a strong correlation of COPD with post operative complications.

76% Patients who have a history of tobacco smoking and alcoholism suffered post operative complications. The p value is <0.5 which denotes a very strong statistical correlation with worst post operative outcomes. Smoking and alcoholism causes deranged metabolic profile, declined liver function and poor respiratory function all that predisposes the patient to bad operative outcomes<sup>8</sup>.

The duration of illness is the time period from the onset of symptoms to the time when patient got admitted to the hospital. It reflects the duration of infection in the body and the metabolic response to it. Longer duration from onset to admission means the body has been exposed to higher bacterial load and lower perfusion for a long time that may

aggravate the pre - existing sepsis<sup>10</sup>. Although not statistically significant in this study, 55% of the patients who got admitted after 48 hours of onset of symptoms, faced severe post operative complications.

## 5. Conclusion

Emergency abdominal surgeries are inevitable. All patients are at risk of post operative complications of varying degrees. The most important factors that put a patient to a higher risk of complications are anaemia, elevated blood urea levels, lower serum albumin levels, presence of chronic obstructive pulmonary disease and a history of smoking and alcoholism.

Immediate intra and post operative blood transfusions can be done to improve haemoglobin levels for better tissue perfusion and wound healing.

Patients of acute abdomen are dehydrated due to sepsis and third spacing of fluid. Good pre operative intravenous fluids can help bring serum urea levels in control.

In the post operative period, transfusion of fresh frozen plasma and amino acid solution which are cost effective and easily available, has shown to significantly improve serum albumin levels that results in better overall healing. Early enteral feeding with a diet rich in protein as eggs and dairy, with a supplemental protein improves the nutritional status of the patient.

Aggressive chest physiotherapy, incentive spirometry and nebulisation in the post operative period are the most important parts of preventing the respiratory complications in the high risk patients<sup>11</sup>.

Injection thiamine, multivitamin injections and vitamin K are well documented in improving the overall status is chronic alcoholics.

Understanding the importance of various risk factors and aggressively managing them in a simple and cost - effective way is the key to prevent post operative complications in the patients undergoing emergency abdominal surgery. Better surgical outcomes are a dedicated team work. Identification and effective management of high - risk patients improves patient prognosis, doctor patient relationship and reduces the overall economic burden on the society.

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