

## Research Article

# Predictors of Morbidity in Patients Undergoing Surgery for Perforation Peritonitis

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**Abstract:** *Introduction:* Perforation peritonitis remains one of the most common surgical emergencies in developing countries and is associated with significant postoperative morbidity and mortality. Early identification of predictors of morbidity helps in risk stratification and improves clinical outcomes. *Materials and Methods:* A prospective observational study was conducted on 120 patients undergoing emergency laparotomy for perforation peritonitis in a tertiary care center over 18 months. Clinical, laboratory, and intraoperative variables were recorded. Postoperative complications were graded using the Clavien-Dindo classification. Statistical analysis was performed to identify independent predictors of morbidity. *Results* Postoperative morbidity was observed in 54 (45%) patients. Advanced age (>60 years), delay in presentation (>24 hours), hypoalbuminemia (<3.0 g/dL), septic shock at admission, and high Mannheim Peritonitis Index (MPI >26) were significantly associated with increased morbidity ( $p < 0.05$ ). Multivariate logistic regression showed hypoalbuminemia, septic shock, and MPI score as independent predictors. *Conclusion* Preoperative nutritional status, systemic sepsis, and severity scoring systems are strong predictors of postoperative morbidity in perforation peritonitis. Early recognition and aggressive management may reduce complications.

**Keywords:** Perforation peritonitis; Morbidity; Mannheim Peritonitis Index; Hypoalbuminemia; Predictors; Emergency laparotomy.

## INTRODUCTION

Perforation peritonitis represents a critical surgical emergency characterized by contamination of the peritoneal cavity due to gastrointestinal tract perforation<sup>1</sup>. It accounts for a major proportion of emergency laparotomies in developing nations<sup>2</sup>. Despite advances in surgical techniques, antibiotics, and critical care, postoperative morbidity remains substantially high<sup>3</sup>.

The spectrum of perforation peritonitis varies geographically. In Western countries, colonic perforations predominate, whereas in Asian populations, gastroduodenal and small bowel perforations are more common<sup>4</sup>. Delayed presentation, malnutrition, and limited access to healthcare further worsen outcomes in low- and middle-income countries<sup>5</sup>.

Morbidity following surgery for perforation peritonitis includes wound infection, intra-abdominal abscess, septicemia, respiratory complications, anastomotic leak, and multiorgan dysfunction syndrome<sup>6</sup>. The incidence of postoperative complications ranges from 30–60% in various studies<sup>7</sup>. Identifying high-risk patients is essential for targeted perioperative management.

Several clinical and biochemical parameters have been studied as predictors of outcome. Age, comorbidities, delay in intervention, hemodynamic instability, leukocytosis, renal dysfunction, and serum albumin levels have shown correlation with adverse outcomes<sup>8–10</sup>. Hypoalbuminemia reflects poor nutritional status and

systemic inflammation and has been strongly associated with postoperative complications<sup>11</sup>.

Scoring systems such as the Mannheim Peritonitis Index (MPI), APACHE II, and SOFA score are widely used to assess severity and predict outcomes<sup>12</sup>. MPI is particularly useful in resource-limited settings due to its simplicity and reproducibility<sup>13</sup>.

Early risk stratification allows surgeons to plan intensive monitoring, optimize fluid resuscitation, correct metabolic derangements, and anticipate postoperative complications<sup>14</sup>. However, data specific to Indian populations remain limited.

This study aims to evaluate clinical, biochemical, and intraoperative predictors of postoperative morbidity in patients undergoing surgery for perforation peritonitis in a tertiary care center.

## MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery at a tertiary care hospital over 18 months.

### Study Population

A total of 120 consecutive patients diagnosed with perforation peritonitis and undergoing emergency exploratory laparotomy were included.

### Inclusion Criteria

- Age  $\geq 18$  years
- Radiological evidence of perforation (free air under

diaphragm or CT confirmation)  
 • Intraoperative confirmation of gastrointestinal perforation  
 • Consent to participate

**Exclusion Criteria**

- Traumatic perforation
- Primary peritonitis
- Patients managed conservatively
- Immunocompromised patients (HIV, chemotherapy)
- Pregnant women
- Patients who expired within 24 hours of surgery

**Data Collection**

Preoperative variables recorded:  
 • Age and gender  
 • Duration of symptoms  
 • Comorbidities (diabetes, hypertension, COPD)  
 • Vital signs and shock at admission

• Laboratory parameters (hemoglobin, leukocyte count, serum creatinine, serum albumin)

• MPI score

Intraoperative findings:

- Site of perforation
- Degree of peritoneal contamination
- Nature of exudate

Postoperative monitoring included daily clinical evaluation and laboratory investigations. Complications within 30 days were recorded and graded using the Clavien-Dindo classification.

**Statistical Analysis**

Data were analyzed using SPSS version 25. Categorical variables were expressed as percentages. Continuous variables were expressed as mean ± SD. Chi-square test and Student’s t-test were applied. Variables with p<0.05 were entered into multivariate logistic regression to determine independent predictors.

**RESULTS**

**Table 1: Demographic Profile**

Variable	Total (n=120)
Mean age	48.6 ± 15.2
Age >60 yrs	34 (28.3%)
Male	82 (68.3%)
Female	38 (31.7%)

Interpretation: Majority were males. Nearly one-third were elderly, which correlated with higher complication rates.

**Table 2: Clinical Presentation**

Variable	Morbidity Present (n=54)	No Morbidity (n=66)	p-value
Delay >24 hrs	40 (74%)	24 (36%)	<0.001
Shock at admission	22 (41%)	8 (12%)	0.002

Interpretation: Delayed presentation and shock significantly increased postoperative morbidity.

**Table 3: Laboratory Parameters**

Parameter	Morbidity (%)	p-value
Albumin <3 g/dL	38 (70%)	<0.001
Creatinine >1.5 mg/dL	18 (33%)	0.01

Interpretation: Hypoalbuminemia was strongly associated with complications.

**Table 4: MPI Score Distribution**

MPI Score	Morbidity (%)
≤21	10%
22–26	35%
>26	75%

Interpretation: Higher MPI score correlated with increased morbidity.

**Table 5: Site of Perforation**

Site	Percentage
Duodenal	40%
Ileal	30%
Gastric	15%
Colonic	15%

Interpretation: Duodenal perforation was most common.

**Table 6: Postoperative Complications**

Complication	Frequency
Surgical site infection	32 (26%)
Respiratory complications	18 (15%)
Intra-abdominal abscess	10 (8%)
Septic shock	8 (6%)

Interpretation: Surgical site infection was the most frequent complication.

## DISCUSSION

Perforation peritonitis continues to pose a major surgical challenge with high postoperative morbidity. The present study demonstrated a morbidity rate of 45%, consistent with previous Indian and international studies reporting 30–60% complication rates<sup>15–17</sup>.

Advanced age was significantly associated with adverse outcomes, similar to findings by Sharma et al. and Singh et al., who reported increased morbidity in elderly patients due to reduced physiological reserve<sup>18,19</sup>.

Delay in presentation beyond 24 hours was a major determinant of complications. Sepsis progression and bacterial contamination increase exponentially with time<sup>20</sup>. Similar observations were noted by Chalya et al. and Gupta et al.<sup>21,22</sup>.

Hypoalbuminemia emerged as one of the strongest independent predictors. Albumin is a marker of nutritional and inflammatory status. Multiple studies have confirmed its association with poor wound healing and infection<sup>23,24</sup>.

The Mannheim Peritonitis Index proved effective in predicting morbidity. Patients with MPI >26 showed significantly higher complication rates. Comparable findings were reported by Demmel et al. and Notash et al.<sup>25,26</sup>.

Surgical site infection was the most common postoperative complication, reflecting contamination severity and nutritional compromise. Implementation of ERAS protocols and early antibiotic therapy may reduce these complications.

The study highlights the importance of early risk stratification and optimization of modifiable factors such as nutrition and sepsis control. However, limitations include single-center design and modest sample size.

## CONCLUSION

Postoperative morbidity in perforation peritonitis is significantly influenced by advanced age, delayed presentation, hypoalbuminemia, septic shock, and high MPI score. Preoperative optimization, early intervention, and aggressive sepsis management can improve outcomes. MPI scoring is a useful and practical tool for risk assessment.

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