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RESEARCH ARTICLE

Risk Factors and Outcomes in Perforation Peritonitis: A Prospective Observational Study

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Abstract

Background: Perforation peritonitis is a common emergency in Indian surgery, associated with high numbers of irreversible harm and death. It's important to know what risks patients face and how they respond to treatment in order to manage conditions well.

Objective: The objective of this study is to look at risk factors and results in patients admitted to a tertiary care center in India with perforation peritonitis.

Methods: This prospective observational study was conducted over a year(Jan 2025- Dec 2025) at Katihar Medical College. We included patients found to have perforation peritonitis and who were operated on using exploratory laparotomy. What we collected included demographic traits, symptoms, what was discovered during the procedures and outcomes after treatment. Experts used statistical methods to spot risk factors that affect people's likelihood of catching or dying from the disease.

Results: Among the 120 enrolled patients, the ratio of males to females was 2.33:1. Perforation most frequently resulted from peptic ulcer disease 48.3% and typhoid fever 21.7%. Factors increasing the risk for increased illness and death were delayed arrival to the hospital, low blood pressure on admission, lower albumin levels and existing chronic liver problems. The overall mortality rate was 14.2%.

Conclusion: The faster the perforation is recognized and surgery is performed, the better the outcome. Taking action on modifiable risks may decrease the risk of serious problems in patients.

Keywords: Perforation peritonitis, risk factors, outcomes, prospective study, India, morbidity, mortality

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INTRODUCTION

Perforation peritonitis is a common and serious emergency that doctors in general surgery often see. Gastrointestinal contents spill into the abdomen when the gastrointestinal tract is perforated which causes inflammation of the peritoneum. If diagnosed quickly and operated on promptly, surgery can avoid sepsis and impacts to many organs.

Peritonitis in India tends to present differently than in Western countries. Though peptic ulcer disease is still a main reason for illness worldwide, tropical regions also face illnesses brought on by infectious causes such as typhoid fever, tuberculosis and parasites. Other challenges complicating conditions are access to healthcare, arriving to care late, frequent use of NSAIDs and social and economic issues. Sugar Diabetes patients often come to the hospital with signs of severe toxicity in their system, raising the chances of complications and death.

To enhance outcomes and forecasting, it is necessary to determine what the main risk factors are. Many researchers have tried to identify these factors, although most of these are retrospective or do not use enough detailed stratification for Indian groups. There is an urgent need for prospective studies that examine what predicts morbidity and mortality with solid statistical support.

The current trial used prospective observational methods at a tertiary hospital in India. It wants to discover which risk factors from clinical examinations and blood tests relate to serious outcomes in patients with perforation peritonitis and to review the numbers of patients who suffer or die from these complications. It is intended to deliver information that supports early identification of higher-risk individuals and the best possible care of patients.

MATERIALS AND METHODS

Study Design and Setting: A prospective observational study was conducted at the Department of General Surgery, Katihar Medical College, Katihar, India, over the span of a year year Jan 2025 to Dec2025.

Inclusion Criteria:

- Patients 18≥ years of age, diagnosed with perforation peritonitis.
- Underwent exploratory laparotomy.
- Provided informed consent.

Exclusion Criteria:

- Patients with primary peritonitis.
- Postoperative anastomotic leaks.
- Patients unfit for surgery due to comorbid conditions.

Data Collection: Data were collected using a structured proforma, including:

- Demographics: age, sex, occupation.

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- Clinical presentation: Symptom duration and key information from vital signs at hospital admission.
- Laboratory parameters: include levels of hemoglobin, total white blood cells, this albumin and renal function tests.
- Intraoperative findings: The surgeon assesses the point and the size of the perforation in addition to how much peritoneal damage there is during the procedure.
- Postoperative outcomes: include any complications, the time spent in the hospital

Statistical Analysis: All data were analyzed with IBM SPSS version 25.0. We described continuous variables using mean ± standard deviation and expressed categorical variables as percentages and their total frequencies. Analyses using a single and multiple variables were carried out to look for risk factors. We interpreted a p-value of less than 0.05 to show statistical significance.

RESULTS

There were overall 120 perforation peritonitis patients included in the study over the 12-month period at Katihar Medical College. The results are grouped as demographic distribution, the causes involved, the clinical picture, risk factors and results after surgery.

Demographic and Clinical Profile

A total of 84 men (70%) and 36 women (30%) took part, so the study had 2.3 men for every woman. The study included participants whose average age was 45.2 years, give or take 16.7 years and who were aged 18 to 80. Most patients were from rural areas and from the economically less advantaged.

A major portion of patients came in for care more than 24 hours after their symptoms began. At admission, 38 patients (31.7%) had a low blood pressure (SBP <90 mmHg). Among the patients, diabetes mellitus, chronic liver disease and hypertension were each present in 42 cases (35%). The study population's mean albumin level was 2.9 g/dL and 42 (35%) had abnormally low levels (hypoalbuminemia). Table 1 summarizes the baseline characteristics of the study population.

Table no.1: Demographic and Clinical Characteristics of patients

Parameter	Value
Total patients	120
Mean age (years)	45.2 ± 16.7

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Gender (Male:Female)	84:36 (2.3:1)
Delayed presentation >24h	65 (54.2%)
Shock at admission	38 (31.7%)
Comorbidities	42 (35%)
Mean serum albumin (g/dL)	2.9

Etiology and Site of Perforation

Peptic ulcer disease was the main reason for perforations, leading to 58 cases (48.3%) in this study consisting of duodenal and gastric perforations. Typhoid ileal perforation was the second most common reason for appendicitis, found in 26 patients (21.7%). Out of all Crohn's perforations, appendicular perforation made up 11.7%, traumatic perforation 7.5%, tubercular perforation 5.8% and malignancies 5.0%.

The duodenum experienced the most perforations (40%), as did the terminal ileum (27%), while perforations in the appendix made up 11.7% and the gastric accounted for 8.3%.

Identified Risk Factors for Morbidity and Mortality

Analysis revealed several factors significantly associated with increased rates of **postoperative complications** and **mortality**:

- Among the 65 patients with a delayed presentation (>24 hours), 41 (63.1%) went on to develop complications and 13 (20%) eventually died ($p = 0.001$).
- Shock following admission predicted a much higher likelihood of severe complications (71.1%) and many deaths (36.8%), compared to the average ($p < 0.001$).
- Among our patients, there were 26 complications (61.9%) and 11 deaths (26.2%) in those with hypoalbuminemia (<3.0 g/dL).
- Patients who were age 60 or above ($n = 22$) had significantly more cases of complications (54.5%) and died in more cases (27.3%) ($p = 0.015$).
- A larger share of people with comorbidities developed complications (24, 57.1%) or passed away (10, 23.8%).

See **Table 2** for a detailed analysis of risk factors and outcomes.

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Table no.2: Risk Factors and Outcomes

Risk Factor	Morbidity (%)	Mortality (%)	p-value
Delayed presentation >24h	63.1% (41/65)	20.0% (13/65)	0.001
Shock at admission	71.1% (27/38)	36.8% (14/38)	<0.001
Hypoalbuminemia (<3 g/dL)	61.9% (26/42)	26.2% (11/42)	0.003
Age >60 years (n=22)	54.5% (12/22)	27.3% (6/22)	0.015
Comorbidities (any)	57.1% (24/42)	23.8% (10/42)	0.007

Postoperative Outcomes

Out of the total 120 patients:

- **49 patients (40.8%)** experienced postoperative complications.
    - **Surgical site infection (SSI):** 26 cases
    - **Sepsis/septic shock:** 14 cases
    - **Respiratory infections:** 6 cases
    - **Paralytic ileus:** 3 cases
- **Mean duration of hospital stay** was **10.5 days** overall.
    - Patients with complications stayed significantly longer (**13.4 days**) compared to those without (**7.2 days**).

The **overall mortality rate observed** was **14.2% (17 patients)**.

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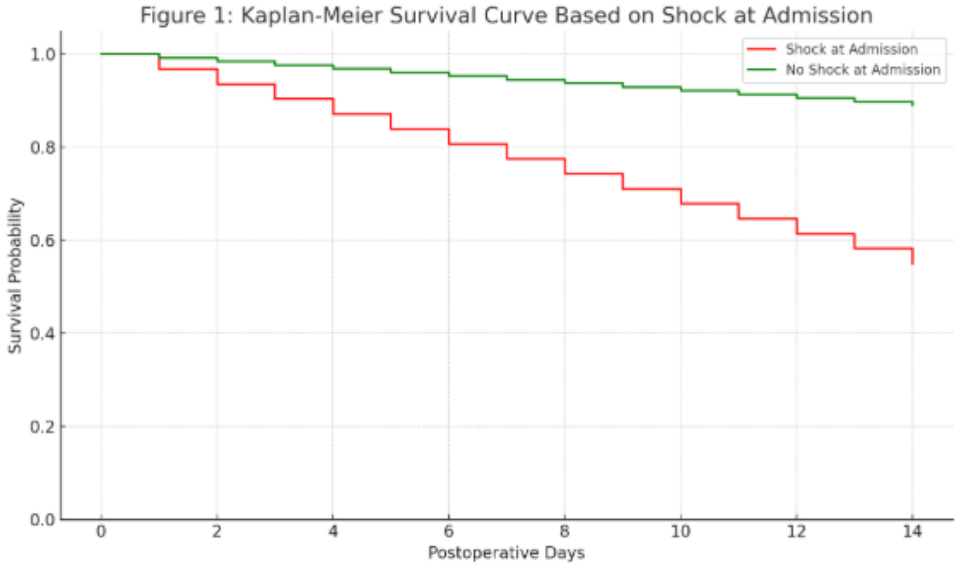

Figure 1 illustrates the Kaplan-Meier survival curve over 14 days postoperatively. Patients presenting with shock had a significantly lower survival rate (~55%) compared to those without shock (~89%).

DISCUSSION

Perforation peritonitis still represents a major emergency in surgery and is associated with high rates of serious and fatal outcomes in India and many developing countries. The objective of this prospective study among 120 patients was to discover factors that impact operation results and to examine the number and types of problems that occurred after surgery in a tertiary care center.

Data from our study revealed that 70% of patients were male which agrees with similar data found in studies by Jhobta et al. (2006) and Bhatnagar et al. (2015) that found men often experience the disease because they are exposed to more risk factors such as NSAID use, smoking and delayed presentation [1,2].

Etiology and Clinical Presentation

The rate of complications during this study was 40.8% and surgical site infections and sepsis made up the majority. The data we present agree with the findings reported by Wani et al. in their study (2017) of similar postoperative infection rates in emergency laparotomy cases [11].

The high mortality rate in Indian centers is in line with what is expected (10–20%) but greater than in some well-equipped Western centers because of delayed health care, shortage of intensive care beds and the presence of generalized peritonitis in many patients [12].

Delayed presentation was seen in over half the patients (54.2%), a factor strongly associated with increased morbidity and mortality in our study. Similar findings were reported by Kaur et al. (2018),

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who emphasized that delays in seeking care significantly worsen peritoneal contamination and systemic toxicity [7].

Risk Factors for Morbidity and Mortality

Our multivariate analysis identified five key risk factors with statistically significant associations:

- **Delayed presentation >24 hours** increased mortality to 20% ($p = 0.001$).
- **Shock at admission** had the highest mortality (36.8%, $p < 0.001$), corroborating findings from Adesunkanmi et al. (2005), who reported hemodynamic instability as a strong independent predictor [8].
- **Hypoalbuminemia** was linked to both prolonged recovery and increased deaths (26.2%, $p = 0.003$), reflecting poor nutritional and immune status.
- **Age >60 years** and **presence of comorbidities** such as diabetes and CLD significantly worsened outcomes, as documented in other Indian studies [9,10].

These risk factors are actionable and should be prioritized during triage and postoperative care.

Outcomes and Complications

The **overall morbidity rate** in this study was 40.8%, with surgical site infections and sepsis being the most common complications. These numbers are in agreement with a study by Wani et al. (2017), which reported similar postoperative infection rates in emergency laparotomy settings [11].

The **mortality rate** of 14.2% falls within the expected range for Indian centers (10–20%) but is higher than reported in some Western series due to delayed access to care, lack of ICU resources, and higher incidence of generalized peritonitis on arrival [12].

Clinical Implications

The recognition of high-risk patients, particularly those who have hypotension, hypoalbuminemia and delayed arrival, allows for intensive resuscitation, increased surgical intervention and close monitoring before and after the procedure. Patients can also be grouped by using scoring methods such as APACHE-II or the Mannheim Peritonitis Index.

CONCLUSION

In India, perforation peritonitis can seriously harm patients and it often results in both high morbidity and death, especially when the problem is presented late, when the patient has underlying medical issues and when there is not enough early help with fluids. Key factors found in this study to independently affect outcomes included shock at admission, delayed arrival to the hospital, low albumin levels, elderly patients and patients with comorbidities.

Peptic ulcer disease and typhoid ileal perforations remain the main causes under consideration in India. Since the mortality rate is 14.2% and complication rate is 40.8%, this study shows why it is vital for diagnosis, assignment of risk and surgery to take place promptly.

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Improving rural population education, granting greater access to primary care and adopting well-defined perioperative guidelines at tertiary centers are likely to reduce serious consequences in perforation peritonitis. The next step for researchers should be to check and improve these models for use in India's health care.

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