



## Perforation Peritonitis: A Prospective Evaluation of Clinical Presentation, Operative Management, and Mortality

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### ABSTRACT

**Background:** Perforation peritonitis is a critical abdominal emergency requiring urgent surgical intervention and is associated with significant morbidity and mortality. The clinical spectrum varies according to etiology, site of perforation, and timing of presentation. This study aimed to evaluate the demographic characteristics, clinical profile, operative management, postoperative complications, and outcomes in patients with hollow viscus perforation.

**Material and Methods:** This prospective observational study included 50 patients with clinically and/or radiologically confirmed perforation peritonitis at a tertiary care teaching hospital. Patients older than 12 years were included, while traumatic, primary, and postoperative peritonitis cases were excluded. All patients underwent emergency exploratory laparotomy. Data regarding demographic profile, clinical presentation, radiological findings, intraoperative site of perforation, operative procedure performed, postoperative complications, and outcomes were systematically recorded and analyzed.

**Results:** The majority of patients were aged  $\geq 50$  years (34%), with a male predominance (74%). Delayed presentation beyond 3 days was observed in 42% of cases. Generalized tenderness was present in 58%, and pneumoperitoneum was detected radiographically in 78% of patients. Peptic



perforations (34%) were most common, followed by ileal (28%) and appendicular (18%) perforations. Modified Graham's omentopexy was performed in 34% of cases, while primary repair (24%), appendicectomy (18%), resection and anastomosis (16%), and resection with diversion stoma (8%) were undertaken based on intraoperative findings. Surgical site infection (26%) was the most frequent complication. The mortality rate was 16%, and 76% of patients were discharged after recovery.

**Conclusion:** Perforation peritonitis predominantly affects elderly males and is frequently associated with delayed presentation. Early diagnosis and prompt surgical intervention are essential to reduce complications and mortality.

**Key words:** Perforation peritonitis; Hollow viscus perforation; Emergency laparotomy; Surgical site infection; Mortality.

## INTRODUCTION

Perforation peritonitis, characterized by contamination of the peritoneal cavity following full-thickness disruption of the gastrointestinal wall, constitutes a major surgical emergency worldwide and continues to pose a therapeutic challenge despite advances in critical care, antimicrobial therapy, and operative techniques [1,2]. The underlying pathophysiological process involves spillage of enteric contents, leading to chemical peritonitis that rapidly progresses to bacterial infection, systemic inflammatory response, and, in severe cases, septic shock and multiorgan dysfunction. Consequently, early recognition and timely intervention are crucial to prevent adverse outcomes [1,2].

Clinically, patients most often present with sudden and severe abdominal pain, frequently generalized, accompanied by guarding, rigidity, and features of peritoneal irritation. Associated symptoms such as vomiting, fever, abdominal distension, and obstipation are common. Systemic manifestations, including tachycardia, hypotension, and signs of dehydration or hypovolemia, may reflect evolving sepsis. Radiological investigations, particularly erect abdominal or chest radiographs demonstrating free intraperitoneal air, along with ultrasonography or computed tomography, play an important role in confirming the diagnosis and facilitating surgical planning [1,2].

The etiological spectrum of perforation peritonitis exhibits notable regional variation. In low- and middle-income countries, perforations secondary to peptic ulcer disease and small-bowel pathology, including enteric infections and inflammatory conditions, are frequently encountered [3]. In contrast, studies from Western populations report a higher incidence of perforations related to colonic diverticular disease, colorectal malignancies, and other large-bowel pathologies [4]. Such geographical differences likely reflect variations in disease prevalence, healthcare access, nutritional factors, and comorbidity profiles.

Timely presentation to a healthcare facility is a critical determinant of prognosis. Delayed hospital admission and postponement of definitive surgical management are strongly associated with increased peritoneal contamination, higher rates of postoperative complications, prolonged hospital stay, and elevated mortality [5,6]. Therefore, rapid resuscitation with fluid therapy, correction of electrolyte imbalances, initiation of broad-spectrum antibiotics, and urgent operative intervention are fundamental components of management.

Emergency exploratory laparotomy with adequate source control remains the cornerstone of treatment. The choice of operative procedure depends on the anatomical site, size and number of perforations, degree of contamination, and the patient's physiological status. Commonly performed procedures include omental patch repair for peptic perforations, primary closure, appendectomy in appendicular perforation, and segmental resection with or without anastomosis in cases of extensive bowel involvement [1,2].

Despite appropriate surgical intervention, postoperative morbidity remains substantial. Surgical site infection, septicemia, respiratory complications, and anastomotic leakage are frequently reported and significantly influence overall outcome and resource utilization [1,2]. In view of these considerations, the present prospective study was undertaken to comprehensively evaluate the demographic characteristics, clinical presentation, operative strategies, postoperative complications, and outcomes among patients with perforation peritonitis managed at a tertiary care teaching hospital.

## **MATERIAL AND METHODS**



**Study Design and Setting:** A prospective observational study was conducted at a tertiary care teaching hospital in India. The study included 50 consecutive patients diagnosed with perforation peritonitis secondary to hollow viscus perforation who met the predefined eligibility criteria.

**Study Population:** Patients were selected randomly from those admitted to the Department of General Surgery during the study period.

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### **Inclusion Criteria**

1. Clinically and/or radiologically confirmed cases of perforation peritonitis.
2. Patients aged more than 12 years.

### **Exclusion Criteria**

1. Perforation peritonitis resulting from penetrating abdominal trauma.
2. Primary peritonitis without evidence of hollow viscus perforation.
3. Postoperative peritonitis.
4. Patients younger than 12 years of age.

**Clinical Evaluation and Diagnostic Workup:** All enrolled patients underwent comprehensive clinical assessment, including detailed history taking and thorough physical examination. Particular emphasis was placed on duration of symptoms, abdominal pain characteristics, associated gastrointestinal complaints, and systemic features. The diagnosis of perforation peritonitis was established based on clinical findings and supported by radiological investigations. Imaging modalities included erect abdominal or chest radiography to detect free intraperitoneal air, ultrasonography of the abdomen, and contrast-enhanced computed tomography of the abdomen when indicated.

**Surgical Management:** All 50 patients underwent emergency exploratory laparotomy after initial resuscitation and stabilization. Intraoperative findings were documented in detail, including the anatomical site of perforation, number of perforations, degree of peritoneal contamination, and underlying pathological condition. The choice of surgical procedure was determined based on the



location and etiology of perforation, extent of contamination, and the general condition of the patient. The operative interventions performed included:

- Modified Graham's omentopexy
- Primary repair of perforation
- Appendicectomy
- Resection and anastomosis (R&A)
- Resection and anastomosis with diversion stoma

**Postoperative Follow-up and Outcome Assessment:** Patients were monitored in the postoperative period for the development of complications such as surgical site infection, septicemia, respiratory complications, wound dehiscence, anastomotic leak, and intra-abdominal collections. Data regarding intraoperative findings, type of surgical procedure performed, postoperative complications, morbidity, and mortality were systematically recorded using a structured proforma. The collected data were compiled and analyzed to derive the study results.

## RESULTS

A total of 50 patients with perforation peritonitis were analyzed in the present study. As shown in Table 1, the highest proportion of patients belonged to the  $\geq 50$  years age group (34%), followed by 40–49 years (24%). Patients aged 20–29 years constituted 20% of the study population, while 14% were in the 30–39 years category. Individuals younger than 19 years accounted for 8% of cases. A marked male predominance was observed, with 37 males (74%) and 13 females (26%), resulting in a male-to-female ratio of approximately 2.8:1 (Table 1).

The duration of abdominal pain prior to admission is summarized in Table 2. The majority of patients (42%) presented after more than 3 days of symptom onset. Thirty percent reported pain duration of 2–3 days, 20% presented within 24 hours, and 8% sought care between 1–2 days after symptom onset. With respect to the site of tenderness, generalized abdominal tenderness was the most frequent clinical finding (58%), followed by epigastric tenderness (26%) and right iliac fossa tenderness (14%). Left iliac fossa tenderness was noted in 2% of patients (Table 2). All patients (100%) presented with abdominal pain. Vomiting was reported in 72% and fever in 66% of cases. Guarding and rigidity were observed in 78% of patients. Clinical features suggestive of



hypovolemia were documented in 46%, while absent bowel sounds were present in 18% (Table 2).

As illustrated in Table 3, pneumoperitoneum on plain radiography was identified in 39 patients (78%), whereas 11 patients (22%) did not demonstrate free intraperitoneal air.

The distribution of cases according to the anatomical site of perforation is presented in Table 4. Peptic perforations involving the stomach and duodenum were the most common (34%). Ileal perforations accounted for 28%, followed by appendicular perforations (18%). Jejunal perforations were seen in 6% of cases. Colonic perforations were less frequent, comprising caecal (8%), ascending colon (4%), and sigmoid colon (2%) perforations.

The operative interventions undertaken are detailed in Table 5. Modified Graham's omentopexy was the most commonly performed procedure (34%), corresponding to peptic perforations. Primary repair of perforation was carried out in 24% of patients. Appendectomy was performed in 18% of cases. Resection and anastomosis without diversion was undertaken in 16%, while 8% required resection and anastomosis with diversion stoma.

Postoperative complications are summarized in Table 6. Surgical site infection was the most frequent complication (26%). Septicemia occurred in 18% of patients, and respiratory complications were noted in 16%. Wound dehiscence was observed in 8%. Anastomotic leak and intra-abdominal abscess/collection were each reported in 2% of cases.

The overall outcome is shown in Table 7. The majority of patients (76%) were discharged following recovery. Postoperative morbidity without mortality was documented in 8% of cases. The mortality rate in the present study was 16%.

**Table 1: Demographic Profile of Study Participants (n = 50)**

Variable	Category	Number of Patients (n)	Percentage (%)
<b>Age (years)</b>	<19	4	8%
	20–29	10	20%
	30–39	7	14%
	40–49	12	24%
	≥50	17	34%
<b>Gender</b>	Male	37	74%
	Female	13	26%
	<b>Total</b>	<b>50</b>	<b>100%</b>



**Table 2: Clinical Profile of Patients with Perforation (n = 50)**

Variable	Category	Number of Patients (n)	Percentage (%)
<b>Duration of Pain at Admission</b>	< 1 day	10	20%
	1–2 days	4	8%
	2–3 days	15	30%
	> 3 days	21	42%
<b>Site of Tenderness</b>	Epigastric	13	26%
	Right Iliac Fossa (RIF)	7	14%
	Left Iliac Fossa (LIF)	1	2%
	Generalized	29	58%
<b>Symptoms</b>	Abdominal pain	50	100%
	Vomiting	36	72%
	Fever	33	66%
<b>Signs</b>	Guarding and rigidity	39	78%
	Signs of hypovolemia	23	46%
	Absent bowel sounds	9	18%

**Table 3: Distribution by presence of pneumoperitoneum in x ray**

Pneumoperitoneum in X-ray	No of patients	Percentage
Present	39	78%
Absent	11	22%

**Table 4: Distribution of case by anatomical site of perforation**

Site of perforation	No of patients	Percentage
Peptic (stomach + duodenal)	17	34%
Jejunum	03	6%
Ileum	14	28%
Appendix	09	18%
Caecum	04	8%
Ascending colon	02	4%
Sigmoid colon	01	2%

**Table 5: Distribution of case by operative procedure done**

Operative procedure	No of patients	Percentage
Modified graham's omentopexy	17	34%
Primary repair of perforation	12	24%
Appendicectomy	9	18%
Resection and anastomosis (R&A) only	8	16%
R&A with diversion stoma	4	8%



**Table 6: Distribution of case by complications**

Complications	No of patients	%
Surgical site infection	13	26%
Septicemia	9	18%
Respiratory complications	8	16%
Wound dehiscence	4	8%
Anastomotic leaks	1	2%
Abscess/ collections	1	2%

**Table 7: Distribution of case by outcome**

Outcome	No of patients	Percentage
Discharge	38	76%
Morbidity	04	8%
Expired	08	16%

## DISCUSSION

In this prospective study of patients undergoing emergency laparotomy for perforation peritonitis, delayed presentation and advanced age were commonly observed, consistent with existing reports showing that prolonged symptom duration before surgical care is associated with increased morbidity and mortality in secondary peritonitis [7]. Timeliness of admission and intervention has been repeatedly identified as a critical prognostic determinant, with delays correlating with greater intra-abdominal contamination and a higher likelihood of postoperative complications [7,8].

The anatomical distribution of perforations in this cohort, with peptic ulcer perforations and ileal perforations predominating, corresponds with patterns described in other tertiary care studies from similar settings, where peptic and small-bowel perforations are major contributors to the burden of secondary peritonitis [9]. These patterns likely reflect regional disease epidemiology, differences in infectious disease prevalence, and variable access to healthcare.

In terms of operative management, procedures such as omental patch repair, primary closure, and resection with or without diversion stoma were chosen based on clinical and intraoperative findings. This approach parallels recommendations in surgical literature, which emphasize tailoring the operative strategy to the site of perforation, degree of contamination, and overall physiological status of the patient [10].



Postoperative complications remain a significant challenge. Surgical site infections, septicemia, and respiratory complications were among the most frequent adverse outcomes in the present study. Similar complication profiles have been documented in large observational studies, affirming that secondary peritonitis frequently leads to systemic morbidity, prolonged hospital stay, and increased resource utilization despite contemporary perioperative care [8].

Mortality in this study (16%) falls within the range reported in recent multicentric and institutional series, where mortality following emergency laparotomy for gastrointestinal perforations ranges approximately from 10% to 25%, particularly in cases with extensive contamination or physiological derangements at presentation [7,11]. This underscores the need for prompt resuscitation, early identification of high-risk patients, and implementation of structured perioperative optimization protocols.

Emerging evidence from prospective cohorts also suggests that integrating prognostic scoring systems (e.g., APACHE II, Mannheim Peritonitis Index) can aid in identifying patients at elevated risk for adverse outcomes and inform clinical decision making; however, further validation in diverse clinical contexts is warranted [11,12]. Overall, these findings reinforce that early diagnosis, rapid surgical intervention, and vigilant postoperative care are essential to improve outcomes in perforation peritonitis.

## CONCLUSION

Perforation peritonitis remains a life-threatening surgical emergency associated with considerable morbidity and mortality. In the present study, the condition predominantly affected elderly males, with delayed presentation being common. Peptic perforation emerged as the most frequent etiology, followed by ileal and appendicular perforations. Prompt resuscitation, early diagnosis supported by radiological evaluation, and timely emergency laparotomy with procedure tailored to the site and pathology of perforation were critical determinants of outcome. Despite appropriate surgical management, postoperative complications—particularly surgical site infection and septicemia—contributed significantly to adverse outcomes. Early presentation, rapid intervention, and meticulous perioperative care are essential to improve survival and reduce complication rates in patients with perforation peritonitis.



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