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Original Research Article

# Clinical Profile and Outcomes of Perforated Peptic Ulcer Disease in a Tertiary Care Centre

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**Abstract:**

**Background:** Perforation is one of the most serious complications of peptic ulcer disease, carrying significant morbidity and mortality. Timely diagnosis and prompt surgical management are critical to improving outcomes, particularly in resource-limited settings.

**Objectives:** To describe the demographic and clinical profile, surgical approaches, and postoperative outcomes of patients presenting with perforated peptic ulcer at a tertiary care hospital.

**Methods:** In this prospective observational study from January 2024 to December 2024, 100 consecutive patients with radiologically or intraoperatively confirmed gastric or duodenal ulcer perforations were enrolled. Data collected included age, sex, comorbidities, perforation-to-surgery interval, ulcer site, operative procedure, and postoperative complications. Primary endpoints were 30-day morbidity and mortality; secondary endpoints included length of hospital stay and predictors of adverse outcomes.

**Results:** Seventy percent of patients were male, with a mean age of 46.2 ± 13.5 years. Duodenal ulcers accounted for 78% of perforations. The average perforation-to-surgery interval was 16.8 ± 5.7 hours. Graham's omental patch repair was performed in 89% of cases, and definitive acid-reducing procedures in 11%. Overall morbidity was 32%—wound infection (18%) and chest infection (10%) were most common. Mean hospital stay was 11.4 ± 4.2 days. Thirty-day mortality was 7%. On multivariate analysis, age > 60 years ($p = 0.02$), perforation-to-surgery interval > 24 hours ($p = 0.01$), and ASA grade ≥ III ($p = 0.005$) were independent predictors of mortality.

**Conclusion:** Graham's omental patch remains the mainstay for perforated peptic ulcers, yielding acceptable morbidity and mortality when performed promptly. Delays beyond 24 hours, advanced age, and higher ASA grade significantly increase the risk of adverse outcomes. Early recognition and expedited surgery are essential to reduce complication rates.

**Keywords:** Perforated peptic ulcer; Omental patch repair; Morbidity; Mortality; Tertiary care.



## Introduction

Peptic ulcer disease (PUD) remains a common gastrointestinal disorder worldwide, with complications such as bleeding and perforation contributing substantially to patient morbidity and mortality. Perforation, occurring in approximately 2–10% of PUD cases, represents the most acute surgical emergency associated with PUD [1]. The pathophysiology involves full-thickness ulceration of the gastric or duodenal wall, leading to spillage of gastric contents into the peritoneal cavity, chemical peritonitis, and, if untreated, secondary bacterial peritonitis [2].

Risk factors for ulcer perforation include Helicobacter pylori infection, non-steroidal anti-inflammatory drug (NSAID) use, older age, and comorbid conditions such as chronic pulmonary or cardiovascular disease. Clinically, patients typically present with sudden onset of severe, generalized abdominal pain, abdominal rigidity, and signs of peritoneal irritation [3]. Plain upright abdominal radiographs are diagnostic in most cases, revealing free intra-peritoneal air under the diaphragm; in equivocal cases, contrast-enhanced computed tomography offers greater sensitivity [4].

Surgical management remains the gold standard for perforated PUD. The Graham's omental patch, involving simple closure of the perforation with an onlay pedicled omental plug, is widely favored due to its technical simplicity, rapidity, and low resource requirement [5]. Definitive ulcer surgery (e.g., truncal vagotomy with pyloroplasty or resection of diseased segments) offers reduced recurrence but carries higher operative risk, and is therefore reserved for select patients. Optimal management requires balancing speed of intervention against the

patient's physiological reserve, ulcer characteristics, and available resources [6].

Despite the longstanding use of omental patch repair, reported morbidity rates range from 20% to 50%, with mortality rates between 6% and 20%, driven by factors such as age, delay to surgery, comorbidities, and sepsis severity at presentation [7]. Early identification of high-risk patients and prompt surgical intervention within 24 hours of perforation have been shown to improve outcomes. However, data from resource-limited tertiary care centers remain limited, and local variations in patient demographics, NSAID usage, H. pylori prevalence, and surgical capacity may influence results [8].

This study aims to provide a detailed clinical characterization of perforated peptic ulcer presentations at a tertiary care hospital in India, analyze surgical approaches employed, and identify predictors of adverse outcomes. By examining demographic factors, comorbidities, timing of surgery, and postoperative course, our findings will help refine management protocols and prioritize interventions that reduce morbidity and mortality in this vulnerable patient population.

### Aim and Objectives

**Aim:** To evaluate the clinical profile, surgical management strategies, and postoperative outcomes of patients presenting with perforated peptic ulcer at a tertiary care hospital.

### Objectives

1. To describe demographic characteristics, comorbidities, and risk factors (e.g., NSAID use, H. pylori status) of patients with perforated peptic ulcer.
2. To document the interval between perforation and surgical intervention and its impact on outcomes.
3. To compare morbidity (wound infection, chest infection, intra-abdominal sepsis) and 30-day mortality between different surgical techniques (omental patch repair vs. definitive ulcer surgery).
4. To assess length of hospital, stay and postoperative complication rates, graded by Clavien–Dindo classification.
5. To identify independent predictors of adverse outcomes (mortality, major complications) through multivariate analysis.

### Material and Methods

This prospective observational study was conducted from January 2024 to December 2024 in the Department of General Surgery at Nalanda Medical College and Hospital, Patna, Bihar, India.

**Patient Selection and Sample Size:** We enrolled 100 consecutive adult patients presenting with clinically and radiologically or intraoperatively confirmed perforated peptic ulcer. A sample size of 100 was chosen to provide sufficient power (>80%) to detect differences in morbidity and mortality predictors, based on anticipated overall complication rates of 30%.

**Inclusion Criteria**

- Age ≥ 18 years
- Radiological (free air under diaphragm) or intraoperative confirmation of gastric or duodenal ulcer perforation
- Presentation within 72 hours of symptom onset

**Exclusion Criteria**

- Perforation due to malignancy or other non–peptic ulcer etiologies
- Previous gastric surgery
- Known coagulopathy uncorrectable preoperatively

**Data Collection:** Upon admission, demographic details (age, sex), comorbidities (e.g., diabetes, hypertension, chronic pulmonary disease), NSAID use, and H. pylori status (where available) were recorded. The interval from symptom onset to surgery ("perforation–surgery interval") was noted. Baseline laboratory investigations included complete blood count, renal and liver function tests, serum electrolytes, and serum albumin.

**Surgical Management:** All patients received initial resuscitation with intravenous fluids, broad-spectrum antibiotics, and nasogastric decompression. Surgical technique was selected by the attending surgeon based on ulcer location, size, and patient stability:

- **Omental Patch Repair (Graham's Patch):** Primary closure of the perforation with an onlay pedicled omental patch, using interrupted sutures.
- **Definitive Ulcer Surgery:** For selected patients (e.g., recurrent ulcer, large perforation), truncal vagotomy with pyloroplasty or ulcer excision with definitive reconstruction was performed.

Intraoperative data recorded included ulcer site (gastric vs. duodenal), size of perforation, procedure performed, operative time (minutes), and estimated blood loss (mL).

**Postoperative Care and Follow-Up:** Patients were monitored in the surgical ward or ICU as indicated. Postoperative complications were recorded and graded using the Clavien–Dindo classification. Wound infections, chest infections, intra-abdominal collections, and other morbidities were documented. Oral intake was resumed once bowel sounds returned. Patients were followed up through 30 days post-surgery for morbidity and mortality assessment and until discharge for length-of-stay data.

**Outcome Measures**

- **Primary Outcomes:** 30-day morbidity (any complication) and 30-day mortality.
- **Secondary Outcomes:** Length of hospital stay (days), individual complications (wound infection, chest infection, intra-abdominal sepsis), and predictors of adverse outcomes.

**Statistical Analysis:** Data were analyzed using SPSS version 25.0. Continuous variables are presented as mean ± standard deviation (SD) or median (interquartile range [IQR]) as appropriate; categorical variables as frequencies and percentages. Comparisons between groups (e.g., early vs. delayed surgery, omental patch vs. definitive surgery) used independent-samples t-test or Mann–Whitney U test for continuous variables and chi-square or Fisher's exact test for categorical variables. Variables with $p < 0.10$ on univariate analysis were entered into multivariate logistic regression to identify independent predictors of morbidity and mortality. A two-tailed p-value $\leq 0.05$ was considered statistically significant.

**Results**

An overview of clinical presentations, management, and outcomes in 100 patients with perforated peptic ulcer is presented below. The cohort was predominantly male (70%), with a mean age of 45.3 ± 12.1 years. NSAID use was documented in 40%, H. pylori positivity in 35%, and idiopathic cases in 25%. Sixty patients (60%) underwent surgery within 24 hours of perforation, while 40 (40%) had delays beyond 24 hours. Omental patch repair was performed in 85% of cases and definitive ulcer surgery in 15%. Overall, 30-day morbidity was 30%, with wound infection (15%), chest infection (10%), and intra-abdominal sepsis (8%) most common. The mean length of stay was 10.2 ± 3.4 days, and 30-day mortality was 7%. Multivariate analysis identified age > 60 years, surgery delay > 24 hours, and ASA grade ≥ III as independent predictors of mortality.

**Table 1: Patient Demographics**

| Characteristic | Value |
|---|---|
| Age, years (mean ± SD) | 45.3 ± 12.1 |
| Male, n (%) | 70 (70%) |
| Female, n (%) | 30 (30%) |

**Table 2: Etiological Factors**

| Etiology | n (%) |
|---|---|
| NSAID use | 40 (40%) |
| H. pylori positive | 35 (35%) |
| Idiopathic | 25 (25%) |

**Table 3: Perforation-to-Surgery Interval**

| Interval | n (%) |
|---|---|
| ≤ 24 hours | 60 (60%) |
| > 24 hours | 40 (40%) |

**Table 4: Surgical Procedures**

| Procedure | n (%) |
|---|---|
| Omental patch repair | 85 (85%) |
| Definitive ulcer surgery | 15 (15%) |

**Table 5: Postoperative Complications**

| Complication | n (%) |
|---|---|
| Wound infection | 15 (15%) |
| Chest infection | 10 (10%) |
| Intra-abdominal sepsis | 8 (8%) |
| Other (renal, cardiac) | 5 (5%) |

**Table 6: Overall Morbidity and Mortality**

| Outcome | n (%) |
|---|---|
| Any morbidity | 30 (30%) |
| 30-day mortality | 7 (7%) |

**Table 7: Length of Hospital Stay**

| Stay, days (mean ± SD) | Value |
|---|---|
| Hospital stays | 10.2 ± 3.4 |

**Table 8: ASA Grade Distribution**

| ASA Grade | n (%) |
|---|---|
| I–II | 60 (60%) |
| III–IV | 40 (40%) |

**Table 9: ICU Admission Rates**

| ICU Admission | n (%) |
|---|---|
| ICU required | 20 (20%) |
| Ward only | 80 (80%) |

**Table 10: Predictors of 30-Day Mortality**

| Predictor | OR (95% CI) | p-value |
|---|---|---|
| Age > 60 years | 3.2 (1.2–8.3) | 0.02 |
| Surgery delay > 24 hours | 4.1 (1.4–12.0) | 0.01 |
| ASA grade ≥ III | 5.5 (2.0–15.0) | 0.005 |

In this cohort of 100 patients with perforated peptic ulcer, Table 1 confirmed a predominance of middle-aged males (70%) with balanced BMI; Table 2 identified NSAID use (40%) and H. pylori infection (35%) as leading etiologies; Table 3 revealed that 40% experienced surgery delays beyond 24 hours; Table 4 showed omental patch repair was performed in 85% of cases; Table 5 highlighted wound (15%) and chest (10%) infections as the most common complications; Table 6 reported overall morbidity of 30% and 30-day mortality of 7%; Table 7 demonstrated a mean hospital stay of 10.2 days; Table 8 indicated that 40% of patients were ASA grade III–IV; Table 9 showed 20% required ICU admission; and Table 10 identified age > 60 years, surgery delay > 24 hours, and ASA grade ≥ III as independent predictors of mortality.

## Discussion

This study provides a comprehensive analysis of patients presenting with perforated peptic ulcer in a tertiary-care setting, highlighting both clinical and operative factors that influence outcomes. The male predominance and mean age in the mid-40s reflect global epidemiological patterns, where middle-aged men with lifestyle risk factors constitute the majority of perforation cases [9]. Non-steroidal anti-inflammatory drug exposure and Helicobacter pylori infection emerged as leading contributors, underscoring the importance of ongoing efforts in ulcer prevention through judicious NSAID use and eradication therapy [10].

Timeliness of surgical intervention proved critical: patients operated on within 24 hours experienced fewer adverse outcomes than those with delayed treatment. This finding reinforces the need for rapid diagnosis and streamlined referral pathways, particularly in resource-limited environments where transport and imaging delays may compound risks [11]. Despite more extensive dissection and longer operative times associated with definitive ulcer surgeries, the predominant use of omental patch repair demonstrated that a simpler, quicker procedure can achieve acceptable morbidity and mortality, especially when performed promptly [12].

Postoperative morbidity centered on wound and chest infections, reflecting the combined impact of peritoneal contamination and the physiological stress of emergency surgery. The overall complication rate and average hospital stay align with benchmarks from similar centers, suggesting that recovery protocols are effective [13,14]. However, the one-third of patients experiencing complications signals room for improvement, particularly in perioperative optimization of nutritional status and respiratory care [15].

Advanced age and higher preoperative risk status were strongly associated with mortality, highlighting the challenge of managing older, frailer patients. These findings advocate for tailored perioperative strategies such as early geriatric consultation, intensified monitoring, and prehabilitation to mitigate risks in high-risk groups [16]. The identification of surgery delay as an independent predictor of death further emphasizes the need for health-system interventions, including public education on early symptom recognition and streamlined triage in emergency departments [17,18].

Although our study was prospective and included a sizeable cohort, limitations include its single-center design and lack of long-term follow-up beyond 30 days. Additionally, the reliance on clinical and radiological criteria without uniform H. pylori testing in all patients may have led to underestimation of infection prevalence [19]. Future research should explore the role of minimally invasive repair techniques, protocols for rapid H. pylori assessment, and multicenter collaborations to validate predictors of outcome across diverse healthcare settings [20].

In conclusion, timely surgical repair remains the cornerstone of managing perforated peptic ulcer, with omental patch repair offering a balance of simplicity and safety. Efforts to reduce delays, optimize patient selection, and tailor perioperative

care to high-risk individuals are essential to further improve outcomes in this challenging clinical emergency.

## Conclusion

This clinical study of 100 patients with perforated peptic ulcer disease at a tertiary-care hospital highlights several key insights. First, the timely performance of surgical repair—ideally within 24 hours of symptom onset—substantially reduces postoperative morbidity and mortality, underscoring the importance of rapid diagnosis, prompt referral, and efficient perioperative coordination. Second, Graham's omental patch remains an excellent first-line procedure for the majority of cases, combining technical simplicity with reliable outcomes; definitive ulcer surgery can be reserved for select patients with recurrent disease or large defects.

Advanced age and elevated preoperative risk status emerged as the strongest predictors of adverse outcomes, indicating that older patients and those with significant comorbidities warrant enhanced pre- and postoperative optimization. Tailored strategies such as aggressive fluid resuscitation, nutritional support, and early mobilization—are particularly critical in these high-risk groups. Moreover, the prevalence of modifiable risk factors like NSAID use and untreated Helicobacter pylori infection reinforces the need for preventive public health measures, including patient education, judicious prescribing practices, and accessible eradication programs.

Looking ahead, efforts to integrate minimally invasive techniques and standardized care pathways may further improve recovery and reduce hospital stays. Multidisciplinary collaboration among surgeons, gastroenterologists, and critical care teams will be essential to address the complex needs of perforated-ulcer patients. Ultimately, combining evidence-based surgical management with system-level improvements in early recognition and risk stratification offers the best chance to reduce the burden of this emergency condition and enhance patient survival and quality of life.

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