International Journal of Research in Medical Sciences
Kumar M et al. Int J Res Med Sci. 2026 Dec;14(12):5724-5729
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20264474

Original Research Article

A clinical profile, etiological spectrum and prognostic determinants of perforation peritonitis: a 26-month retrospective analysis from GMC Udhampur (December 2023-January 2026)

Mohinder Kumar*, Anil Kumar, Adeel Ahmed Malik, Farah Ahad

Department of General Surgery, GMC Udhampur, Udhampur, Jammu and Kashmir, India

Received: 14 June 2026
Revised: 15 July 2026
Accepted: 02 November 2026

***Correspondence:**
Dr. Mohinder Kumar,
E-mail: drmohinder17@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Perforation peritonitis is a quintessential surgical emergency, where morbidity and mortality are strictly dictated by the timeline of intervention. A granular understanding of regional etiology and patient demographics is essential for improving outcomes.
Objective: This study aims to delineate clinical presentations, etiological spectrum, surgical management strategies, and postoperative complications in patients presenting with perforation peritonitis at a tertiary care center in Udhampur.
Methods: A retrospective, cross-sectional analysis was conducted on 213 patients admitted to the Department of General Surgery, GMC Udhampur, from December 2023 to January 2026. Data extracted included demographics, clinical findings, comorbidities, surgical procedures, and follow-up outcomes.
Results: Of the 213 patients, a strong male predominance (n=168, 78.9%) was observed, with a median age of 45 years. Duodenal ulcer perforation was the definitive leading cause (n=149, 69.9%). Pain was the ubiquitous symptom (94.4%). Preoperative pneumoperitoneum was visualized in 66.2% of cases. Complications, primarily dyselectrolytemia (24.4%) and wound infection (18.3%), were strongly correlated with delayed presentation. The mortality rate was 0.94% (n=2). Hospital stay significantly increased for patients presenting after 10 days (Mean: 9.3 vs. 6.1 days).
Conclusions: In this hospital-based cohort, duodenal perforation was the predominant cause of perforation peritonitis, with a marked male predominance and a high prevalence of smoking and peptic ulcer disease. Delayed presentation was associated with increased postoperative morbidity, prolonged hospital stay, and all observed mortalities. Early recognition, timely referral, prompt surgical intervention, and appropriate management of modifiable risk factors may help improve outcomes in patients with perforation peritonitis.

Keywords: Perforation peritonitis, Duodenal perforation, Peptic ulcer disease, Emergency laparotomy, Surgical outcomes, Sepsis, Pneumoperitoneum

INTRODUCTION

Perforation peritonitis remains one of the most serious challenges facing the acute care surgeon, accounting for a significant volume of emergency laparotomies worldwide. It is characterized by the catastrophic leakage of intraluminal contents into the peritoneal cavity, triggering a swift and often systemic inflammatory cascade, progressing rapidly to sepsis and multi-organ failure if left untreated.[1-3] The spectrum of etiology for perforation peritonitis is geographically diverse. While in Western populations, colonic diverticular disease and malignancy are common causes, literature from developing nations frequently highlights the continued dominance of upper

gastrointestinal perforations, particularly duodenal ulcers and increasingly, typhoid-related perforations.[1,4-6] This variance necessitates robust regional studies to guide local surgical strategy and public health focus.

The outcome for these patients is notoriously volatile, driven largely by the "time-to-intervention" interval, rather than the intrinsic disease process itself. Delays, often stemming from socio-economic factors, delayed recognition of symptoms, or referral bottlenecks, allow the physiological damage to become irreversible.[2,7] This comprehensive retrospective study at the Government Medical College (GMC) Udhampur, covering 213 patients over a 26-month period, seeks to document the surgical reality of perforation peritonitis in this tertiary care setting. It will analyze demographics, clinical risk factors (such as the high prevalence of smoking and NSAID use), surgical techniques, and postoperative outcomes, specifically examining how the delay in presentation impacts hospital stay, morbidity, and mortality. The data generated will provide critical benchmarks for quality improvement and resource allocation in the management of this lethal surgical emergency.

Literature review

Perforation peritonitis remains one of the most common and life-threatening surgical emergencies worldwide, associated with significant morbidity and mortality despite advances in emergency surgical care and intensive care support.[1,6] It results from perforation of a hollow viscus leading to contamination of the peritoneal cavity and rapid progression to sepsis if untreated.[1-3] Early diagnosis and prompt surgical intervention are therefore considered essential determinants of survival and postoperative recovery.[2,7] The etiological pattern of perforation peritonitis demonstrates marked geographic variation. In Western countries, lower gastrointestinal perforations secondary to diverticulitis, malignancy, and ischemic bowel disease are more commonly encountered. In contrast, studies from developing countries, particularly from the Indian subcontinent, consistently report upper gastrointestinal perforations as the predominant cause.[1,6] Jhobta et al reviewed 504 cases of perforation peritonitis in India and found gastroduodenal perforation to be the leading etiology, followed by appendicular and ileal perforations.[6] Similar findings were reported by Agrawal et al and Sharma et al who demonstrated a high prevalence of duodenal ulcer perforation in patients presenting with generalized peritonitis.[4,5]

Peptic ulcer disease remains strongly associated with perforation peritonitis in developing regions. Risk factors such as smoking, chronic NSAID consumption, alcohol intake, and untreated Helicobacter pylori infection contribute significantly to mucosal injury and ulcer formation. Several studies have identified smoking and NSAID use as major predisposing factors for perforated peptic ulcer disease.[4,5] The persistence of these preventable risk factors indicates the importance of early diagnosis and appropriate medical management of peptic ulcer disease at the primary healthcare level.

Clinically, abdominal pain is reported as the most consistent presenting symptom in perforation peritonitis, often accompanied by abdominal distension, vomiting, fever, constipation, and features of systemic toxicity. Radiological evidence of pneumoperitoneum on erect chest or abdominal X-ray remains an important diagnostic tool; however, the absence of free gas does not exclude perforation.[1] Hence, diagnosis often depends on a combination of clinical suspicion, physical examination, laboratory investigations, and imaging findings. Multiple studies have demonstrated that delayed presentation is one of the strongest predictors of adverse outcomes in perforation peritonitis. Boey et al. identified delayed surgical intervention, shock on admission, and associated comorbid illnesses as major determinants of mortality in perforated peptic ulcer disease.[2] Similarly, Buck et al reported that increased delay between symptom onset and hospital admission significantly increases mortality and postoperative complications.[7] Delayed presentation often results in severe peritoneal contamination, septic shock, electrolyte imbalance, and multi-organ dysfunction, thereby increasing the complexity of perioperative management.[3]

Postoperative complications remain common in perforation peritonitis even after successful surgical intervention. Frequently reported complications include wound infection, dyselectrolytemia, burst abdomen, intra-abdominal abscess, respiratory complications and anastomotic leak.[8] Seenu et al demonstrated that patients presenting late with sepsis and associated comorbidities had significantly higher morbidity and mortality rates.[8] Surgical site infection is particularly common because of gross contamination and poor nutritional status in many patients. The choice of surgical procedure depends on the site of perforation, degree of contamination, and physiological status of the patient. Omental patch closure remains the standard and most commonly performed procedure for duodenal perforation because of its simplicity and effectiveness.[9-12] Other procedures, including appendectomy, primary repair, bowel resection with anastomosis and stoma formation, are performed according to the underlying pathology and intraoperative findings.

Despite improvements in surgical techniques, antibiotics, and critical care support, perforation peritonitis continues to pose a major healthcare burden in developing countries. Regional studies remain important because the etiological spectrum and patient outcomes vary considerably across different populations and healthcare systems. However, data from the Jammu region and adjoining hilly areas remain limited. Therefore, the present study was undertaken to evaluate the clinical profile, etiological spectrum, surgical management, and prognostic determinants of perforation peritonitis at GMC Udhampur, with particular emphasis on the impact of delayed presentation on patient outcomes.

METHODS

Study design and setting

This study was a retrospective, single-center, observational study conducted in the Department of General Surgery, Government Medical College (GMC) Udhampur.

Study population

The study included all 213 patients who presented to the surgical emergency department and were subsequently diagnosed with and operated upon for non-traumatic or traumatic perforation peritonitis during the study period, which spanned from December 2023 to January 2026. No age limits were applied, with the youngest patient being 10 years and the oldest 80 years.

Exclusion criteria

Patients with perforation peritonitis managed conservatively without surgical intervention; patients with abdominal trauma without evidence of hollow viscus perforation; patients with localized intra- abdominal abscess without evidence of perforation peritonitis; patients with postoperative or iatrogenic bowel perforation unrelated to the index presentation; and patients with incomplete medical record or insufficient clinical data for analysis were excluded.

Data collection and outcomes

Patient data were extracted from physical and digital medical records. Variables collected included: demographics: age and gender; clinical profile: major symptoms, comorbid conditions and specific history (PUD, NSAID intake and smoking); diagnostics: basic laboratory parameters and findings on imaging (chest X-ray and abdominal X-ray); surgical management: etiology confirmed intraoperatively and the precise surgical procedure performed; outcomes: postoperative complications (wound infection, burst abdomen and dyselectrolytemia) duration of hospital stay (stratified by presentation delay) and mortality.

Statistical analysis

Categorical variables are presented as absolute numbers (n) and percentages (%). Correlation between categorical variables (time-to-presentation and specific complications) was assessed using the Chi-square test (or Fisher's exact test where cell counts were low). Continuous variables, such as hospital stay, are described using means and standard deviations, with differences between groups analyzed via the students t-test or ANOVA. A p value of less than 0.05 was considered statistically significant. Data visualization was performed using advanced medical visualization software to generate charts and high-resolution clinical illustrations.

RESULTS

Etiological spectrum

The intraoperative findings provided the definitive diagnosis for all patients. Duodenal perforation was confirmed in 149 (69.9%) of the 213 cases, establishing it as the singular leading cause in this region. This was followed by perforated appendicitis in 29 (13.6%) patients. All etiologies and their relative prevalence are presented in Figure 1.

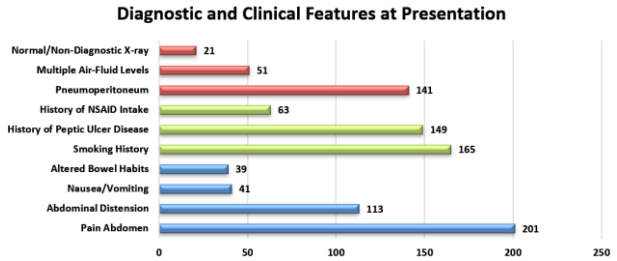


Figure 1: Diagnostic and clinical features at presentation.

Figure 1 summarizes the diagnostic parameters at presentation. While the clinical trial of acute abdominal pain (94.4%) was nearly ubiquitous, the hallmark radiological sign of pneumoperitoneum was absent in 33.8% (n=72) of cases, highlighting that a negative X-ray does not rule out perforation in the high-suspicion patient.

Surgical interventions and outcomes

The surgical strategies employed were tailored to the specific etiology and physiological status of the patient (Figure 3). A majority of upper GI perforations were managed via omental patch closure (n=149, 69.9%), reinforcing it as the standard of care in our tertiary setting.

Table 1: Demographic and baseline clinical characteristics of patients with perforation peritonitis (n=213).

Variables	Category	N (%)
Total sample size	Patients	213
Gender	Male	168 (78.9)
	Female	45 (21.1)
Age	Range (years)	10–80
Risk factors	Smoking history	165 (77.5)
	History of peptic ulcer disease (PUD)	149 (70.0)
	NSAID intake	63 (29.6)
Comorbidities	Diabetes mellitus	43 (20.2)
	Hypertension	41 (19.2)
	Respiratory disease	33 (15.5)
	Renal disease	13 (6.1)

Complications and postoperative analysis

Postoperative morbidity was high, with specific complications occurring in 31.9% of the cohort. The overall mortality rate was extremely low at 0.94% (n=2). Both fatalities were patients who presented in severe sepsis with a presentation delay of greater than 10 days as explained in Figure 4.

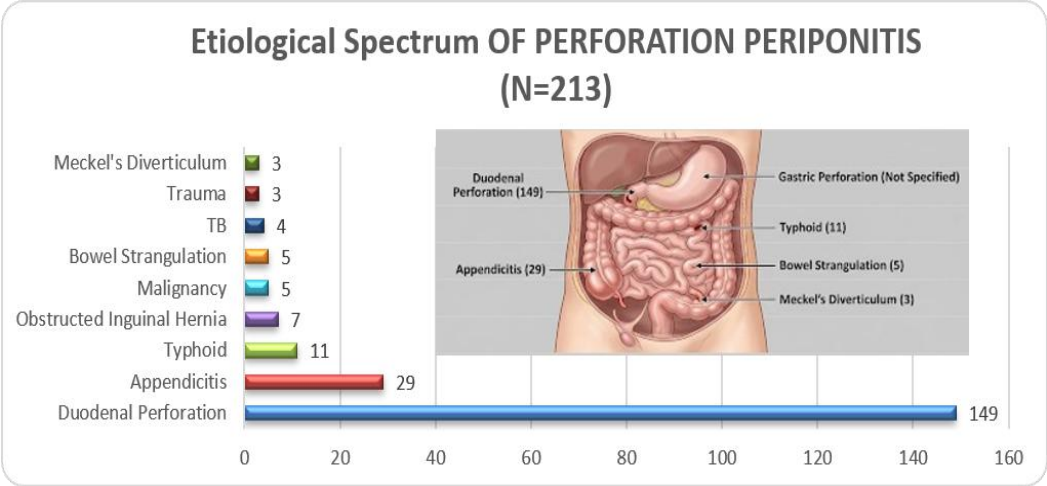


Figure 2: Etiological spectrum of perforation peritonitis (n=213). A complete etiological breakdown for the study population of 213 patients is presented with high clarity and surgical contextualization.

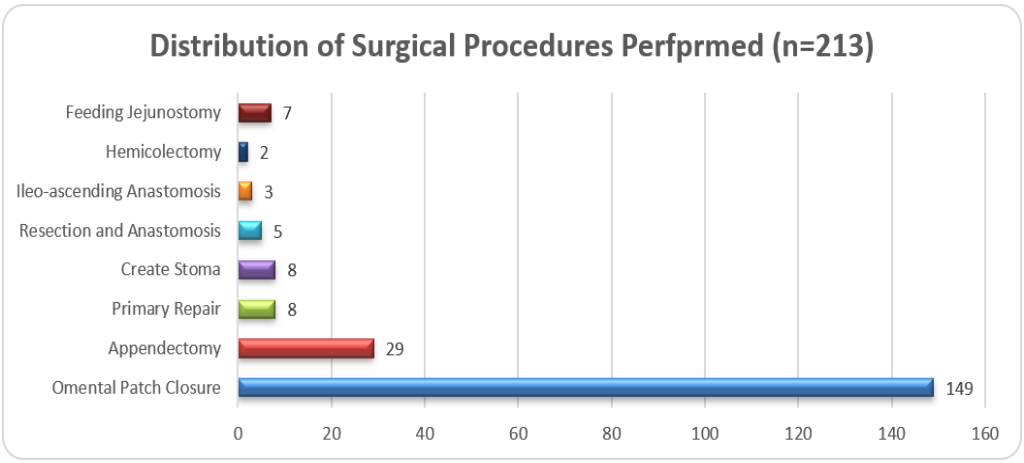


Figure 3: Distribution of surgical procedures performed.

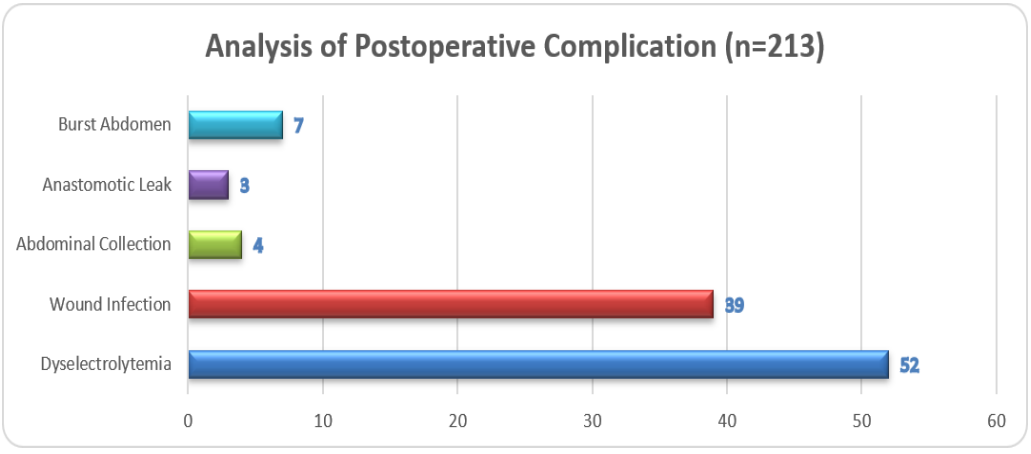


Figure 4: Analysis of postoperative complication.

A definitive, statistically significant correlation was identified between time-to-presentation and patient outcomes. Patients were stratified into two groups: Early Presentation (≤10 days) and Late Presentation (>10 days). Our analysis confirmed that: late presentation (>10 days) drastically increased the likelihood of major complications (such as burst abdomen, leak, and collections).

Hospital stay duration was directly impacted by the delay: early presentation mean stay: 6.1 days (range 5–7 days); and late presentation mean stay: 9.3 days (range 7–11 days) ($p<0.001$). All mortalities occurred exclusively in the late presentation (>10 days) cohort.

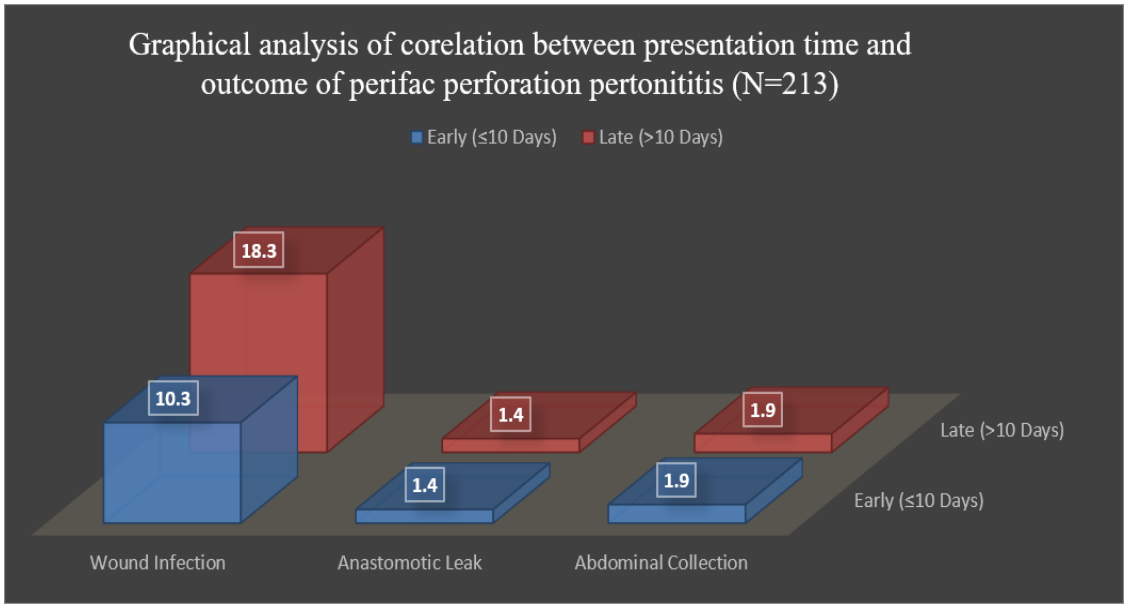


Figure 5: Correlation between presentation time and patient outcomes in perforation peritonitis. This advanced graphical analysis analyzes the correlation between presentation time and outcomes for perforation peritonitis patients, based on the study data of 213 patients.

DISCUSSION

This retrospective audit of 213 patients with perforation peritonitis provides valuable regional data regarding the clinical profile, etiological spectrum, and outcomes of this surgical emergency. Our finding of a marked male predominance (78.9%) and duodenal ulcer perforation as the leading etiology (69.9%) is consistent with reports from other developing countries, where upper gastrointestinal perforations continue to predominate over lower gastrointestinal causes.[4-6]

The predominance of upper gastrointestinal perforation in our cohort is likely explained by the high prevalence of established risk factors. More than three-fourths of our patients were smokers (77.5%), while 70.0% had a documented history of peptic ulcer disease (PUD).[4,5] Additionally, 29.6% reported chronic NSAID use, often without adequate gastroprotective therapy, further increasing the risk of ulcer perforation.[4,5] The high prevalence of pre-existing PUD suggests that perforation peritonitis frequently represents a failure of early diagnosis, *Helicobacter pylori* eradication, or appropriate long-term medical management at the primary healthcare level.Our findings reaffirm that time to definitive surgical intervention is the single most important prognostic determinant in perforation peritonitis. Patients presenting more than 10 days after symptom onset experienced significantly higher morbidity, prolonged hospital stay, and accounted for all observed mortalities. Similar observations have been reported by Boey et al and Buck et al who demonstrated that delayed presentation and delayed operative intervention are major predictors of adverse outcomes.[2,7] Furthermore, the World Society of Emergency Surgery (WSES) recommends early source control and prompt surgical intervention as key principles for reducing morbidity and mortality in perforated peptic ulcer disease.[9]

Although our overall mortality rate of 0.94% was considerably lower than that reported in most published series (6–18%), both deaths occurred exclusively in patients presenting late with advanced sepsis.[1,8] These patients demonstrated profound physiological derangements, including severe electrolyte imbalance and pre-renal azotemia, requiring prolonged resuscitation before definitive surgery. Early recognition and aggressive management of sepsis, as emphasized in the Surviving Sepsis Campaign Guidelines, are essential to improve outcomes in such patients.[3] Several prognostic scoring systems have been developed to predict outcomes in generalized peritonitis. Among these, the Mannheim Peritonitis Index (MPI) has consistently demonstrated good accuracy in predicting postoperative morbidity and

mortality by incorporating factors such as age, organ failure, duration of peritonitis, and the extent of peritoneal contamination.[13] Although the MPI was not evaluated in the present study, its application in future prospective studies may facilitate early risk stratification and optimization of perioperative management. The significant increase in hospital stay among patients presenting after 10 days (mean 9.3 vs. 6.1 days) further highlights the clinical and economic burden of delayed presentation. These patients frequently required prolonged hospitalization because of complications such as burst abdomen, intra-abdominal collections, wound infection, and prolonged nutritional and intensive care support, resulting in substantially greater healthcare resource utilization.

The findings of this study strongly emphasize that, in regions where duodenal ulcer perforation remains the predominant etiology, greater emphasis should be placed on public awareness regarding early symptom recognition, timely referral, appropriate management of peptic ulcer disease, smoking cessation, rational NSAID use, and prompt surgical intervention. These recommendations are consistent with contemporary international guidelines advocating rapid diagnosis, early resuscitation, and timely source control for improving outcomes in perforation peritonitis.[7,9]

CONCLUSION

This study confirms that duodenal perforation is the overwhelmingly predominant cause of perforation peritonitis at GMC Udhampur, strongly correlated with local habits of smoking and PUD. The time interval between symptom onset and surgical intervention is the ultimate determinant of patient outcome. Delays beyond 10 days are strictly linked to significant, preventable morbidity, greatly increased hospital utilization, and are the exclusive source of patient mortality in this cohort. Our data strongly advocates for public health focus on early symptom recognition and streamlined primary-to-tertiary care referral pathways.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Ugochukwu AI, Amu OC, Nzegwu MA, Dilibe UC. Acute perforated peptic ulcer: On clinical experience in an urban tertiary hospital in south east Nigeria. Int J Surg. 2013;11(3):223-7.
2. Boey J, Choi SKY, Poon A, Alagaratnam TT. Immediate factors affecting mortality in perforated peptic ulcers. Am J Surg. 1987;153(6):567-71.
3. Evans L, Rhodes A, Alhazzani W, et al. Surviving Sepsis Campaign: international guidelines for management of sepsis and septic shock 2021. Intensive Care Med. 2021;47(11):1181-247.
4. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India: Review of 504 consecutive cases. World J Emerg Surg. 2006;1:26.
5. Agrawal A, Joshi MK, Gupta S, et al. Etiological and clinical profile of perforation peritonitis: a study in a tertiary care teaching hospital. J Clin Diagn Res. 2015;9(12):PC11-3.
6. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India: review of 504 cases. Trop Gastroenterol. 2006;27(3):111-5.
7. Buck DL, Vester-Andersen M, Møller MH; Danish Clinical Register of Emergency Surgery. Association between duration of symptoms and mortality in patients with perforated peptic ulcer. Br J Surg. 2013;100(8):1045-9.
8. Memon AA, Siddiqui FG, Abro AH, Agha AH, Lubna S, Memon AS. An audit of secondary peritonitis at a tertiary care university hospital of Sindh, Pakistan. World J Emerg Surg. 2012;7:6.
9. Tarasconi A, Coccolini F, Biffl WL, et al. Perforated and bleeding peptic ulcer: WSES guidelines. World J Emerg Surg. 2020;15:3.
10. Lunevicius R, Morkevicius M. Comparison of laparoscopic versus open repair for perforated duodenal ulcers. Surg Endosc. 2005;19(12):1565–1571.
11. Lunevicius R, Morkevicius M. Comparison of laparoscopic versus open repair for perforated peptic ulcer: a systematic review and meta-analysis. Surg Endosc. 2005;19(12):1565-71.
12. Graham RR. The treatment of perforated duodenal ulcers. Surg Gynecol Obstet. 1937;64:235-8.
13. Billing A, Fröhlich D, Schildberg FW. Prediction of outcome using the Mannheim Peritonitis Index in 2003 patients. Br J Surg. 1994;81(2):209-13.

Cite this article as: Kumar M, Kumar A, Malik AA, Ahad F. A clinical profile, etiological spectrum and prognostic determinants of perforation peritonitis: a 26-month retrospective analysis from GMC Udhampur (December 2023-January 2026). Int J Res Med Sci 2026;14:5724-9.