International Journal of Research in Medical Sciences
Mujawar P et al. Int J Res Med Sci. 2026 Mar;14(3):1008-1013
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20260618

Original Research Article

Clinical profile and management outcomes of gastrointestinal perforations: a comprehensive analysis from a tertiary care center

Parvez Mujawar*, Asif Bagwan, Sadikali Sabir Kothawala

Department of General Surgery, Shri Bhausaheb Hire Government Medical College, Dhule, Maharashtra, India

Received: 27 October 2025
Revised: 09 December 2025
Accepted: 18 February 2026

***Correspondence:**
Dr. Parvez Mujawar,
E-mail: mardsbhgmc@gmail.com

ABSTRACT

Background: Gastrointestinal perforation represents a critical surgical emergency with significant morbidity and mortality. Understanding the epidemiological patterns, clinical presentations, and treatment outcomes is essential for optimizing patient management. This study aimed to analyze the clinical profile, etiological factors, and surgical outcomes of gastrointestinal perforations in a tertiary care setting.
Methods: A cross-sectional observational study was conducted over 24 months at a tertiary care center. Ninety-seven patients with gastrointestinal perforation diagnosed intraoperatively were included. Data on demographics, clinical presentation, investigations, surgical management, and outcomes were analyzed using SPSS trial version.
Results: The mean age was 42.94±18.32 years with male predominance (80.41%). The ileum was the most commonly affected site (31.96%), followed by caecum/colon (23.71%) and stomach (16.49%). Trauma was the leading etiology (30.93%), followed by idiopathic causes (24.74%) and peptic ulcer disease (14.43%). Generalized abdominal pain was universal (100%), with nausea/vomiting in 85.57% patients. Simple closure was the most common surgical procedure (41.82%). Surgical site infection was the predominant complication (60.82%). The overall mortality rate was 15%.
Conclusions: Gastrointestinal perforation predominantly affects middle-aged males, with trauma being the leading cause. Early recognition, prompt surgical intervention, and effective perioperative management are crucial for improving outcomes. The high complication rate emphasizes the need for enhanced infection control measures and postoperative care protocols.

Keywords: Gastrointestinal perforation, Peritonitis, Surgical emergency, Trauma, Clinical outcomes

INTRODUCTION

Gastrointestinal (GI) perforation is a life-threatening surgical emergency characterized by disruption of the alimentary tract wall with spillage of enteric contents into the peritoneal cavity, precipitating peritonitis, sepsis, and, if unaddressed, multi-organ dysfunction and death.[1,2] Despite advances in imaging, resuscitation, anesthesia, and perioperative care, mortality remains substantial, particularly in settings with delayed presentation and limited critical care capacity.[3,4] The etiological and demographic patterns of GI perforation differ significantly between developed and developing countries. In high-income settings, diverticulitis, malignancy, and complications from colorectal procedures are leading causes, whereas in LMICs like India, peptic ulcer disease, appendicitis, typhoid and tuberculosis predominate, along with a rising contribution from trauma due to increased road traffic accidents.[5-9] Infective causes alone may account for up to one-quarter of all cases in India, and the typical patient is often younger than in Western studies.[6,7,10] Various predisposing factors such as NSAID use, alcohol and tobacco abuse, systemic diseases, and iatrogenic injuries during endoscopic or surgical procedures further complicate the clinical profile.[11,12] Clinical presentation commonly includes acute abdominal pain (typically sudden and severe), peritoneal signs (guarding, rigidity, rebound), ileus, and systemic toxicity

features that correlate with the duration of contamination and bacterial load.[1,2] Upright chest or abdominal radiography may reveal free subdiaphragmatic air, while ultrasonography can detect free fluid and guide differential diagnosis in unstable patients; computed tomography (CT) improves sensitivity for small volumes of pneumoperitoneum, localizes the perforation site, and informs operative planning.[3,10] Rapid sepsis recognition and initial resuscitation airway protection, hemodynamic stabilization, broad-spectrum antimicrobials, and source control are central to improved outcomes.[2,5,10]

Operative strategy is tailored to etiology, location, time from perforation, contamination burden, and physiological reserve.[2,5] Options include simple primary repair (e.g., Graham patch for small duodenal perforations), limited resection with anastomosis, exteriorization or proximal diversion, and staged or damage-control approaches in physiologically deranged patients.[2,4,5] Infection prevention bundles timely antibiotics, optimized skin preparation, normothermia, glycemic control, and judicious drains are critical in reducing postoperative infectious morbidity.[5,11]

Against this background, institutional epidemiology and outcomes data are essential to refine context-appropriate protocols. This study from a tertiary care center analyses the clinical profile, etiologies, operative strategies, complications, and mortality in GI perforations over a 24-month period, with emphasis on factors contributing to high surgical site infection (SSI) rates and mortality in delayed presenters.

METHODS

Study design and setting

This cross-sectional observational study was conducted at the Department of Surgery, Shri Bhausaheb Hire Government Medical College and Hospital, Dhule, over a 24-month period from January 2023 to December 2024. The study was approved by the institutional ethics committee.

Study population

All patients admitted with gastrointestinal perforation diagnosed intraoperatively during the study period were included. A total of 97 patients fulfilled the inclusion criteria.

Inclusion criteria

Patients with gastric, duodenal, ileal, jejunal, or colonic perforation diagnosed intraoperatively.

Exclusion criteria

Patients who did not provide consent to participate in the study were excluded. Non-willing patients were not included.

Data collection

Data were collected through patient interviews and review of operative records. Information gathered included demographic data (age, sex), clinical examination findings (vital signs, systemic examination), investigations (hematological and radiological), type of surgical intervention, postoperative complications, and outcomes.

Statistical analysis

Data were entered into Microsoft Excel version 17 and analyzed using Statistical Package for Social Sciences (SPSS).

Descriptive statistics including mean, standard deviation, ratios, and proportions were calculated. Results were presented in tabular and diagrammatic formats. A p value <0.05 was considered statistically significant.

RESULTS

Anatomical distribution

The ileum was the most commonly involved site (31.96%), followed by caecum/colon (23.71%), stomach (16.49%), jejunum and appendix (10.31% each), and duodenum (7.22%).

Risk factors

A history of substance use was present in 58% of patients: alcohol consumption (25%), tobacco use (23%), and combined alcohol and tobacco use (10%). The remaining 42% had no history of addiction.

Duration of presentation

Most patients (42.27%) presented within 1-3 days of symptom onset, 37.11% presented after more than 3 days, and only 20.62% sought medical attention within 24 hours.

Investigations

Mean vital parameters showed tachycardia (pulse: 108.75±17.39 bpm), with systolic blood pressure of 111.09±14.72 mmHg and diastolic blood pressure of 72.16±10.05 mmHg.

Laboratory investigations revealed mean hemoglobin of 11.84±2.02 g/dl, white blood cell count of $9.52\pm4.35\times10^9$/l, and serum creatinine of 1.20±0.60 mg/dl.

Surgical management

A total of 110 surgical procedures were performed. Simple closure (including primary repair and Graham's patch) was most common (41.82%), followed by resection and anastomosis (18.18%), open appendectomy (9.09%),

ileostomy and colostomy (8.18% each), hemicolectomy (5.45%), and other combined procedures (9.09%).

Complications

Surgical site infection was the most frequent complication (60.82%), followed by burst abdomen (10.31%), wound dehiscence (9.28%), incisional hernia (8.25%), and faecal fistula (4.12%).

Histopathological examination revealed chronic non-specific inflammation in 80.4% of cases, appendicitis in 10.3%, adenocarcinoma in 8.2%, and pseudomembranous colitis in 1.0%.

Table 1: Distribution according to age.

Age (in years)	No. of cases	%
5-15	6	6.19
16-25	16	16.49
26-35	14	14.43
36-45	18	18.56
46-55	20	20.62
56-65	12	12.37
66-75	9	9.28
>75	2	2.06
Total	97	100
Mean±SD	42.94±18.32	

Table 2: Distribution according to gender.

Gender	No. of cases	%
Female	19	19.59
Male	78	80.41
Total	97	100.00

Table 3: Distribution of patients according to Symptoms.

Symptoms	Negative (-)		Positive (+)	
	No of cases	%	No of cases	%
Fever	45	46.39	52	53.61
Nausea/vomiting	14	14.43	83	85.57
Abdominal distension	30	30.93	67	69.07
Abdomen pain	0	0.00	97	100.00
Constipation	28	28.87	69	71.13

Table 4: Distribution of patients according to sign.

Sign	Negative (-)		Positive (+)	
	No of cases	%	No of cases	%
Tenderness	0	0%	97	100
Gauding rigidity	12	12.37%	85	87.63
Distension	30	30.93%	67	69.07
Absent bowel sounds	14	14.43%	82	84.54

Table 5: Distribution according to USG.

USG	No. of cases	%
Appendicular perforation	10	10.31
Bowel wall thickness	8	8.25
Free fluid	83	85.57
Holo viscus perforation	11	11.34
Reduced bowel movement	9	9.28
Air fluid levels	2	2.06
Haemoperitonium	19	19.59

Table 6: Distribution according to etiology.

Etiology	No. of cases	%
Peptic	14	14.43
Ideopathic	24	24.74
Typhoid	3	3.09
Tubercular	7	7.22
Appendicular	10	10.31
Trauma	30	30.93
Obstructed/strangulated hernia	1	1.03
Neoplastic	8	8.25
Total	97	100.00

Table 7: Distribution according to histopathology.

Histopathology	No. of cases	%
Adenocarcinoma	8	8.2
Appendicitis	10	10.3
Chronic nonspecific inflammation	78	80.4
Pseudomembranous colitis	1	1.0
Grand total	97	100.0

Table 8: Distribution according to outcome.

Outcome	No of cases	%
Dead	15	15
Discharged	82	85
Total	97	100

DISCUSSION

The present study confirms that gastrointestinal perforation is a heterogenous condition with marked regional variability in etiology, clinical profile, and outcomes. This study of 97 patients demonstrates a clear predominance of middle-aged males and highlights the ileum as the most frequently involved site, with trauma as the leading etiology features consistent with regional reports from India and other LMIC settings where infectious and traumatic mechanisms remain prominent.[4,6,9]

The high male preponderance observed in this and other cohorts can be partially explained by greater occupational hazard exposure, increased use of NSAIDs, alcohol, and tobacco, and more pronounced risk-taking behaviors, all of which are established risk factors for GI perforation and its poor outcomes.[3,4,6,7,11] Notably, the findings mirror those from Bali et al and others reporting a 70–80% male share and similar age distribution.[4,7] The observed peak in the 4th–5th decades underscores the socioeconomic impact of GI perforations in the working-age population.

Etiology and site distribution

The predominance of ileal perforations aligns with Low middle-income countries settings where typhoid and tuberculosis remain endemic, and where small-bowel trauma (particularly blunt trauma with mesenteric or bowel wall injuries) contributes significantly.[4,6-9] While many Western series report higher frequencies of duodenal (PUD) or colonic (diverticular) perforations, local etiologic drivers (enteric infections, trauma incidence, NSAID use patterns) and variable access to early diagnostics likely shape this profile.[2,4,6,7,9] The significant proportion of idiopathic perforations likely reflects underdiagnosed inflammatory or ischemic pathology and limitations in preoperative imaging and intraoperative tissue diagnosis in contaminated fields.[2,4]

Clinical presentation and delays

Time to presentation plays a crucial role in prognosis, as demonstrated in our own study and by others.[7,12] Delayed hospital arrival (>48 hours) results in more advanced peritoneal contamination, increased rates of burst abdomen, wound dehiscence, and a subsequent surge in SSI and mortality.[12,13] Despite improvements in community awareness and access to transportation, considerable diagnostic and referral delays persist across much of the developing world.[13] Nearly universal abdominal pain with high rates of peritoneal signs reflects the advanced contamination at presentation. The large fraction presenting after 24–72 hours or beyond likely contributed to the elevated SSI rate and overall morbidity,

consistent with literature linking time-to-source-control and peritoneal contamination to adverse outcomes.[2,5,10] Public health strategies injury prevention, improved referral pathways, community education on danger signs, and streamlined emergency triage could shorten preoperative delays.

Imaging and diagnostics

Although erect chest radiography identified pneumoperitoneum in many patients, its limited sensitivity for small or contained perforations is well-documented; ultrasonography's identification of free fluid aided rapid decision-making in unstable patients.[1,3,10] Where feasible, CT can improve perforation localization and guide operative strategy, but resource constraints may necessitate expedited exploratory laparotomy in clinically evident peritonitis.[1,3,10]

Operative strategy and outcomes

The predominance of simple closure (including Graham's patch) reflects common practice for small, localized perforations in hemodynamically acceptable candidates, while resection/anastomosis and stoma formation were reserved for devitalized bowel, gross contamination, or compromised physiology.[7,14]

High SSI rates in this series likely stem from delayed presentation, fecal contamination, and patient comorbidities; they mirror experience from similar centers and underscore the need for robust infection-prevention bundles, appropriate empiric antibiotics, timely de-escalation based on cultures, and meticulous intraoperative contamination control.[7,15] Enhanced recovery measures adapted to emergency GI surgery early mobilization, nutrition optimization, and multimodal analgesia may also reduce complications and length of stay.

Mortality

An overall mortality of 15% falls within reported ranges for perforation peritonitis, which vary widely with etiology, delay, and sepsis severity.[2,4,7] Predictors of mortality reported in the literature include advanced age, delayed operative intervention, high contamination burden, shock at presentation, organ dysfunction, and malignancy-related perforations.[7,14]

Risk stratification using physiologic scores and prompt, protocolized resuscitation may improve triage to ICU and timing of damage-control versus definitive procedures.[14]

Implications

Prevention

Road safety and violence-reduction initiatives, antimicrobial stewardship to curb typhoid, and TB control can reduce traumatic and infectious perforations.[4,6]

Systems

Early sepsis recognition, antibiotic initiation within an hour of diagnosis, and rapid operating-room access are key performance targets.[2,7,13,15]

Operative strategy

Individualize repair versus resection/diversion based on contamination, tissue viability, and physiology; employ staged approaches when indicated.[2,14,15]

Infection control

Implement perioperative bundles, monitor SSI with feedback loops, and strengthen postoperative wound care protocols.[7,14]

Limitations

Single-center observational design, potential referral bias, and limited advanced imaging availability may constrain generalizability. Nonetheless, this study reflects real-world challenges and priorities in comparable tertiary centers.

CONCLUSION

This study demonstrates that gastrointestinal perforation predominantly affects middle-aged males, with trauma being the leading cause in the setting. The ileum was the most commonly involved site, and delayed presentation was frequent. Simple closure was the preferred surgical technique, though complications, particularly surgical site infections, were common.

The overall mortality rate of 15% emphasizes the serious nature of this condition. Key factors for improving outcomes include early recognition and prompt surgical intervention, enhanced infection control measures, comprehensive perioperative management, and improved healthcare access to reduce delayed presentation.

These findings highlight the need for continued surveillance, quality improvement initiatives, and evidence-based protocols to optimize the management of gastrointestinal perforations. Future research should focus on identifying risk factors for complications, evaluating preventive strategies, and developing improved treatment protocols.

Context-tailored protocols that emphasize early resuscitation, timely source control, judicious operative strategy, and rigorous infection- prevention can meaningfully improve outcomes.

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

REFERENCES

1. Odom SR, Raghavendran K. Overview of gastrointestinal tract perforation. UpToDate. Connor RF (ed): Wolters Kluwer, Alphen Aan Den Rijn, Netherlands. 2023.
2. Langell JT, Mulvihill SJ. Gastrointestinal perforation and the acute abdomen. Med Clin North Am. 2008;92(3):599-625.
3. Nadkarni KM, Shetty SD, Kagzi RS. Small-bowel perforations. Arch Surg. 1981;116:53-8.
4. Jhobta RS, Attri AK, Kaushik R. Spectrum of perforation peritonitis in India: review of 504 consecutive cases. World J Emerg Surg. 2006;1:26.
5. Sharma L, Gupta S, Soin AS, Sikora S, Kapoor V. Generalized peritonitis in India the tropical spectrum. Jpn J Surg. 1991;21:272-7.
6. Hameed T. Emerging spectrum of perforation peritonitis in developing countries. PMC. 2020:33029133.
7. Bali RS, Verma S, Agarwal PN. Perforation peritonitis and the developing world. ISRN Surg. 2014;2014:105492.
8. Dorairajan LN, Gupta S, Deo SVS. Peritonitis in India—a decade's experience. Trop Gastroenterol. 1995;16:33-8.
9. Afridi SP, Malik F, Ur Rahman S. Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience. World J Emerg Surg. 2008;3:31.
10. Sandu SS, Kaur P. Epidemiological incidence and features of gastrointestinal perforation in tertiary care centre. Int Surg J. 2025;12(6):952-60.
11. Minami S, Gotoda T, Ono H. Complete endoscopic closure of gastric perforation induced by endoscopic resection of early gastric cancer using endoclips. Gastrointest Endosc. 2006;63:596-601.
12. Mewara BC, Chourashiya BK, Porwal S. A Clinical Study of the Spectrum of Gastrointestinal Perforation Peritonitis in Rural Southern East Rajasthan. J Univer Surg. 2017;5:2.
13. Devi PS, Manikantan G, Chisthi MM. Gastrointestinal perforations: a tertiary care center experience. Int Surg J. 2017;4:709-13.
14. Sartelli M, Catena F, Ansaloni L. WSES guidelines for the management of intra-abdominal infections. World J Emerg Surg. 2013;8:3.
15. Ban KA, Minei JP, Laronga C. American College of Surgeons/SIS Surgical Site Infection Guidelines, 2016 update. J Am Coll Surg. 2017;224(1):59-74.

Cite this article as: Mujawar P, Bagwan A, Kothawala SS. Clinical profile and management outcomes of gastrointestinal perforations: a comprehensive analysis from a tertiary care center. Int J Res Med Sci 2026;14:1008-13.