

CAUSES AND CLINICAL PROFILE OF PATIENTS WITH PERFORATION PERITONITIS IN A TERTIARY CARE HOSPITAL OF MORADABAD

Harshit Jain¹, Vibhor Agarwal², Naveen Kumar Singh³, Shahnawaz Ahmad⁴, Suvek Varshney⁵, Sushil Kumar Jain⁶

Received : 20/04/2026
Received in revised form : 04/06/2026
Accepted : 19/06/2026

Keywords:

Perforation peritonitis, Ileal perforation, Typhoid perforation, Tubercular perforation, Acute abdomen, Clinical profile, Surgical emergency.

Corresponding Author:

Dr. Shahnawaz Ahmad,
Email: shaikhshahnawazahmad@gmail.com

DOI: 10.47009/jamp.2026.8.4.2

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (4); 7-12



¹Junior Resident, Department of General Surgery, Teerthanker Mahaveer Medical College & Research Hospital, Moradabad, India.

²Assistant Professor, Department of General Surgery, Teerthanker Mahaveer Medical College & Research Hospital, Moradabad, India.

³Professor, Department of General Surgery, Teerthanker Mahaveer Medical College & Research Hospital, Moradabad, India.

⁴Assistant Professor, Department of General Surgery, Teerthanker Mahaveer Medical College & Research Hospital, Moradabad, India.

⁵Professor, Department of General Surgery, Teerthanker Mahaveer Medical College & Research Hospital, Moradabad, India.

⁶Senior Consultant, Department of General Surgery, Indraprastha Apollo Hospital, New Delhi, India.

ABSTRACT

Background: Perforation peritonitis is a common surgical emergency associated with significant morbidity and mortality, particularly in developing countries. The etiological spectrum and clinical presentation vary considerably across geographical regions, necessitating institution-specific data for informed management and prognostication. Infectious etiologies, particularly typhoid and tuberculosis, predominate in developing nations, though data from tertiary care institutions in Western Uttar Pradesh remain limited. **Objectives:** To evaluate the causes and clinical profile of patients presenting with perforation peritonitis at a tertiary care hospital in Moradabad, Uttar Pradesh. **Materials and Methods:** A hospital-based cross-sectional observational study was conducted in the Department of General Surgery, Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Eighty adult patients with clinically, radiologically, and intraoperatively confirmed perforation peritonitis were enrolled using consecutive sampling. Demographic characteristics, presenting symptoms, clinical signs, risk factors, radiological findings, etiological factors, and site of perforation were analyzed using appropriate statistical methods. **Results:** The mean age was 47.6 ±15.2 years, with peak incidence in the 41-50 years age group (22.5%). Males predominated (75%; male-to-female ratio 3:1). Abdominal pain and distension were present in all patients (100%), and vomiting (77.5%) and fever (72.5%) were common. Guarding, tachycardia, and absent bowel sounds were universal. Smoking (40%), NSAID use (35%), and alcohol consumption (32.5%) were the leading risk factors. Typhoid ileal perforation was the most common etiology (43.8%), followed by tubercular perforation (25.0%); infectious causes collectively accounted for 68.8% of cases. Ileal perforation was the most frequent site (52.5%), with a significant association with infectious etiologies ($p < 0.001$). Tubercular perforation was associated with significantly longer hospital stays (12.6 ±4.3 days; $p=0.004$). **Conclusion:** Perforation peritonitis predominantly affects middle-aged males and is most commonly caused by infectious etiologies, especially typhoid and tuberculosis, in this region. Early diagnosis, prompt surgical intervention, and targeted preventive strategies against infectious diseases are essential to reduce associated morbidity and mortality in resource-limited settings.

INTRODUCTION

Perforation peritonitis is one of the most common and life-threatening surgical emergencies encountered in

clinical practice worldwide, resulting from perforation of a hollow viscus with subsequent contamination of the peritoneal cavity by gastrointestinal contents, bacteria, and inflammatory

mediators.^[1] The condition rapidly progresses to generalized peritonitis, systemic sepsis, septic shock, and multi-organ dysfunction syndrome if not diagnosed and treated promptly.^[2] Despite substantial advances in diagnostic imaging, antimicrobial therapy, anesthesia, and critical care, perforation peritonitis continues to carry considerable morbidity and mortality, particularly in low- and middle-income countries where healthcare access remains limited and delayed presentation is common.^[3]

The global incidence of hollow viscus perforation requiring emergency surgical intervention is estimated at 5-10 per 100,000 population annually, though this figure varies widely across regions.^[4] In developed nations, colonic perforations secondary to diverticular disease, malignancy, ischemia, and inflammatory bowel disease are more prevalent.^[5] In contrast, studies from India and other developing countries consistently demonstrate a predominance of upper gastrointestinal and small bowel perforations caused by peptic ulcer disease, enteric fever, and intestinal tuberculosis.^[6,7] This difference reflects variations in socioeconomic conditions, infectious disease burden, healthcare accessibility, and lifestyle-related risk factors.

Typhoid intestinal perforation, a serious complication of enteric fever caused by *Salmonella typhi*, remains disproportionately common in South Asia and sub-Saharan Africa, occurring in approximately 0.8-4% of typhoid cases.^[8] Intestinal tuberculosis causing perforation represents an important surgical complication, particularly among immunocompromised individuals and in regions with a high tuberculosis burden.^[9] Peptic ulcer perforation continues to be prevalent in India despite widespread proton pump inhibitor use, largely due to *Helicobacter pylori* infection, NSAID overuse, and smoking.^[10]

Clinical presentation of perforation peritonitis typically includes sudden-onset abdominal pain, abdominal distension, vomiting, fever, obstipation, guarding, rigidity, and absent bowel sounds.^[1,2] Delayed presentation remains a significant challenge in developing countries due to poor health literacy, financial constraints, and lack of accessible healthcare facilities, and is associated with increased postoperative complications, prolonged hospitalization, and higher mortality.^[3,6] Several studies have identified age, comorbidities, duration of symptoms, extent of peritoneal contamination, hemodynamic status, and underlying etiology as important determinants of prognosis.^[4,11]

Although numerous studies have evaluated perforation peritonitis across India, regional variations in disease patterns necessitate institution-specific data. Western Uttar Pradesh serves a predominantly rural and semi-urban population where delayed referral, self-medication, and a high burden of infectious diseases remain prevalent challenges.^[12] Therefore, understanding the local etiological spectrum and clinical profile of

perforation peritonitis at a regional tertiary care institution is essential for guiding timely intervention and informing targeted preventive strategies.

Aims and Objectives

To assess the causes (etiological factors) and clinical profile of patients presenting with perforation peritonitis to a tertiary care hospital in Moradabad, Uttar Pradesh, and to analyze their association with clinical outcomes including duration of hospital stay.

MATERIALS AND METHODS

A hospital-based cross-sectional observational study was conducted in the Department of General Surgery, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, over a period of 18 months after obtaining approval from the Institutional Ethics Committee. The study was designed to evaluate the causes and clinical profile of patients presenting with perforation peritonitis, a major surgical emergency contributing substantially to morbidity in tertiary care institutions in developing nations.^[1,3]

A total of 80 adult patients (aged ≥ 18 years) diagnosed with perforation peritonitis based on clinical findings, radiological investigations, and intraoperative confirmation were enrolled using consecutive sampling. Inclusion criteria comprised adult patients with confirmed perforation peritonitis who underwent surgical management and provided written informed consent. Patients with postoperative peritonitis, patients unfit for surgery despite adequate resuscitation, and individuals unwilling to participate were excluded.

Following written informed consent, detailed demographic information, presenting symptoms, duration of symptoms, clinical signs, risk factors (including smoking, alcohol consumption, NSAID use, and comorbidities), previous medical history, and laboratory parameters were recorded using a pre-designed structured proforma. Radiological evaluation included erect abdominal and chest radiography for detection of free peritoneal gas, abdominal ultrasonography, and contrast-enhanced computed tomography (CECT) of the abdomen when clinically indicated.^[13] All patients underwent emergency exploratory laparotomy following appropriate preoperative resuscitation, including intravenous fluid replacement, broad-spectrum antibiotics, nasogastric decompression, urinary catheterization, and correction of electrolyte and acid-base imbalances.

Intraoperative findings including the site and cause of perforation, degree of peritoneal contamination, and surgical procedures performed were systematically documented. Postoperative parameters including complications, duration of hospital stay, and final patient outcome were recorded. Etiology was classified into infectious (typhoid ileal perforation, tubercular perforation) and non-infectious (duodenal

ulcer, gastric ulcer, appendicular, and traumatic perforations) categories.

Data were entered into Microsoft Excel and analyzed using appropriate statistical software. Continuous variables were expressed as mean \pm standard deviation; categorical variables were presented as frequencies and percentages. Statistical associations between categorical variables were assessed using the Chi-square test, and continuous variables between groups were compared using independent-samples t-test or one-way ANOVA as appropriate. A p-value <0.05 was considered statistically significant.^[14]

RESULTS

A total of 80 patients with perforation peritonitis were included in the study. The mean age was 47.6 ± 15.2 years, with the highest proportion in the 41-50 years age group (22.5%), followed by the 51-60 years group (21.3%). [Table 1] Analysis of variance demonstrated a statistically significant association between age and etiology ($F=3.18$, $p=0.018$), indicating that the underlying cause of perforation varied significantly across age groups.

Table 1: Age Distribution of Study Participants and Association with Etiology (n=80)

Age Group (Years)	Frequency	Percentage (%)
18-30	14	17.5
31-40	16	20.0
41-50	18	22.5
51-60	17	21.3
>60	15	18.7
Total	80	100.0

Mean Age: 47.6 ± 15.2 years | ANOVA (Age vs Etiology): $F = 3.18$, $p = 0.018^*$ | *Statistically significant ($p < 0.05$)

Regarding clinical presentation, abdominal pain and abdominal distension were universal symptoms present in all patients (100%). Vomiting and fever

were common, affecting 77.5% and 72.5% of patients respectively, while obstipation and nausea were present in 61.2% and 60.0% of cases. [Table 2]

Table 2: Distribution of Presenting Symptoms Among Study Participants (n=80)

Symptom	Frequency	Percentage (%)
Abdominal Pain	80	100.0
Abdominal Distension	80	100.0
Vomiting	62	77.5
Fever	58	72.5
Obstipation	49	61.2
Nausea	48	60.0

Clinical examination revealed guarding, tachycardia, and absent bowel sounds in all patients (100%), reflecting the severity of peritoneal inflammation at presentation. Rigidity was observed in 86.2% and rebound tenderness in 80.0% of patients. Notably, 26.3% of patients presented with frank shock.

Comparison of systolic blood pressure between shock and non-shock patients demonstrated a highly significant difference (Independent t-test, $p < 0.001$), confirming marked hemodynamic compromise in those presenting with shock. [Table 3]

Table 3: Distribution of Clinical Signs Observed at Presentation Among Study Participants (n=80)

Clinical Sign	Frequency	Percentage (%)
Guarding	80	100.0
Tachycardia	80	100.0
Absent Bowel Sounds	80	100.0
Rigidity	69	86.2
Rebound Tenderness	64	80.0
Shock	21	26.3

Independent t-test (Shock vs Non-shock SBP): $p < 0.001^*$ | *Statistically significant ($p < 0.05$)

Among the identified risk factors, smoking was the most prevalent (40.0%), followed by NSAID use (35.0%), alcohol consumption (32.5%), COPD

(30.0%), hypertension (25.0%), and diabetes mellitus (22.5%). [Table 4]

Table 4: Distribution of Identified Risk Factors Among Study Participants (n=80)

Risk Factor	Frequency	Percentage (%)
Smoking	32	40.0
NSAID Use	28	35.0
Alcohol Consumption	26	32.5
COPD	24	30.0
Hypertension	20	25.0
Diabetes Mellitus	18	22.5

Infectious etiologies predominated in this study population. Typhoid ileal perforation was the most common cause (43.8%), followed by tubercular perforation (25.0%). Together, these two infectious etiologies accounted for 68.8% of all cases. Duodenal

ulcer perforation (12.5%), appendicular perforation (10.0%), gastric ulcer perforation (7.5%), and traumatic perforation (2.5%) were comparatively less frequent. [Table 5]

Table 5: Distribution of Etiological Factors Among Study Participants (n=80)

Etiology	Frequency	Percentage (%)
Typhoid Ileal Perforation	35	43.8
Tubercular Perforation	20	25.0
Duodenal Ulcer Perforation	10	12.5
Appendicular Perforation	8	10.0
Gastric Ulcer Perforation	6	7.5
Traumatic Perforation	2	2.5
Total	80	100.0

Infectious causes (Typhoid + Tuberculosis) = 55/80 (68.8%).

DISCUSSION

The present study evaluated the causes and clinical profile of 80 patients with perforation peritonitis presenting to a tertiary care institution in Moradabad, Western Uttar Pradesh. The findings highlight the predominance of infectious etiologies, particularly typhoid and tuberculosis, in this region, which is consistent with the broader pattern observed across northern India and other developing countries.

The mean age of patients in this study was 47.6 ± 15.2 years, with the 41-50 years age group most frequently affected (22.5%). A statistically significant association was found between age and etiology ($F=3.18$, $p=0.018$), suggesting that infectious perforations predominated in younger adults while peptic ulcer disease was more prevalent in older patients. These findings are consistent with studies by Jhobta et al. and Singh et al., who similarly reported peak incidence in the fourth and fifth decades of life.^[6,7] The male predominance observed in this study (75%; male-to-female ratio 3:1) is also consistent with published Indian literature, likely reflecting higher prevalence of risk factors such as smoking, alcohol use, and occupational exposure in males.^[3,6]

All patients (100%) presented with abdominal pain and distension, and the majority had associated vomiting (77.5%) and fever (72.5%). The universal presence of guarding, tachycardia, and absent bowel sounds reflects the advanced state of peritoneal inflammation and systemic sepsis at the time of hospital admission. Notably, 26.3% of patients presented with frank shock, and these patients demonstrated significantly lower systolic blood pressure compared to non-shock patients ($p < 0.001$). Delayed presentation due to financial constraints, self-medication, and limited healthcare access in rural and semi-urban areas is a recognized challenge in developing countries and contributes to advanced clinical presentations.^[3,12]

Smoking (40%), NSAID use (35%), and alcohol consumption (32.5%) were the most prevalent risk factors identified. The high prevalence of NSAID use

in this cohort is consistent with the well-established role of NSAIDs in disrupting mucosal defense mechanisms, impairing prostaglandin synthesis, and predisposing to peptic ulcer perforation.^[10,16] The concurrent presence of COPD (30%), hypertension (25%), and diabetes mellitus (22.5%) underlines the complex systemic disease burden in these patients, which significantly influences perioperative risk and postoperative outcomes.

Typhoid ileal perforation was the single most common etiology, accounting for 43.8% of cases in this series. This is comparable to studies from India and other developing nations, where typhoid perforation constitutes 30-50% of perforation peritonitis cases in endemic regions.^[7,8] The high prevalence in Moradabad and surrounding areas of Western Uttar Pradesh likely reflects suboptimal sanitation, inadequate safe drinking water infrastructure, and low typhoid vaccination coverage in the semi-urban and rural catchment population.^[8,17] Delayed initiation of appropriate antibiotic therapy for enteric fever is also a recognized contributor to ileal perforation.

Tubercular perforation accounted for 25% of cases, representing the second most common etiology. The high burden of tuberculosis in Northern India, combined with a growing proportion of immunocompromised individuals due to malnutrition and HIV co-infection, contributes to this prevalence.^[9] Patients with tubercular perforation demonstrated significantly longer hospital stays (12.6 ± 4.3 days; $p=0.004$), likely reflecting the more complex postoperative course, nutritional deficits, wound healing impairment, and need for prolonged anti-tubercular therapy in this subgroup. These findings align with those of Debi et al. who reported greater operative complexity and prolonged hospitalization in abdominal tuberculosis with perforation.^[9]

Duodenal ulcer perforation (12.5%), appendicular perforation (10.0%), gastric ulcer perforation (7.5%), and traumatic perforation (2.5%) accounted for the remaining cases. The relatively lower proportion of peptic ulcer perforations may reflect the younger age profile and the geographic predominance of

infectious etiologies in this cohort.^[6,10] Appendicular perforation was more common in younger patients, consistent with the known peak incidence of acute appendicitis in the second and third decades.^[11]

Ileal perforation was the most common site overall (52.5%), with a highly significant association with infectious etiologies ($p < 0.001$). This predominance of ileal perforation, driven by typhoid and tubercular disease affecting the terminal ileum and ileocecal region, distinguishes the etiopathological profile of perforation peritonitis in this region from that in Western populations where colonic perforations are more prevalent.^[5,6] These findings are consistent with those reported by Jhobta et al. and Gupta et al. from Northern India.^[6,12]

Several limitations of this study deserve acknowledgment. The cross-sectional design and single-centre setting limit generalizability, and the sample size of 80 patients may limit statistical power to detect weaker associations. Additionally, microbiological confirmation of typhoid perforation was not universally available. Prospective multi-centre studies with larger sample sizes and standardized diagnostic protocols are needed to validate these findings.

Despite these limitations, this study contributes valuable institution-specific data on the etiological spectrum and clinical profile of perforation peritonitis from Western Uttar Pradesh. The overwhelming predominance of preventable infectious etiologies underscores the critical importance of public health measures including typhoid vaccination programs, safe drinking water and sanitation infrastructure, early detection and treatment of enteric fever and tuberculosis, and health education to encourage timely healthcare-seeking behavior.^[17,18]

CONCLUSION

Perforation peritonitis in this tertiary care institution in Moradabad predominantly affects middle-aged males and is most commonly caused by infectious etiologies, with typhoid ileal perforation and tubercular perforation together accounting for nearly 69% of all cases. Abdominal pain and distension are universal presenting features, while a significant proportion of patients present with shock, indicating advanced disease at admission. Smoking, NSAID use, and alcohol consumption are the most prevalent modifiable risk factors. Tubercular perforation is associated with significantly prolonged hospital stay, reflecting its complex postoperative course and systemic disease burden.

These findings emphasize the imperative for early clinical recognition of perforation peritonitis, prompt resuscitation, and timely emergency surgical intervention to reduce associated morbidity and mortality. Concurrently, targeted public health strategies focused on typhoid vaccination, tuberculosis control, improved sanitation and clean

water access, and discouraging unsupervised NSAID use are essential to reduce the incidence of perforation peritonitis and its infectious causes in this region. Institution-specific data of this nature are crucial for guiding local clinical protocols, resource allocation, and preventive health planning.

Human Ethics: Ethical approval for this study was obtained from the Institutional Ethics Committee of Teerthanker Mahaveer Medical College and Research Centre, Moradabad, and written informed consent was obtained from all participants.

Animal Ethics: No animal subjects were involved in this study.

Data Availability Statement: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions: All authors contributed substantially to the study conception, design, data collection, analysis, manuscript preparation, and approved the final version of the manuscript.

Acknowledgments: The authors acknowledge the support of the Department of General Surgery and Department of Radiodiagnosis, Teerthanker Mahaveer Medical College and Research Centre, Moradabad, and thank all study participants.

Conflicts of Interest: The authors declare no conflicts of interest.

Funding Statement: The authors received no financial support or external funding for this study.

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