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Original Research Article

Clinical spectrum, surgical management, and outcomes of non-traumatic perforation peritonitis: A prospective study from South India

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Abstract:

Background: Non-traumatic perforation peritonitis remains a common surgical emergency in India, contributing substantially to morbidity and mortality. Despite advances in critical care and antimicrobial therapy, delayed presentation continues to worsen clinical outcomes.

Aim: To evaluate the clinical profile, etiology, management, and postoperative outcomes of patients with non-traumatic perforation peritonitis.

Methods: A prospective observational study was conducted in the Department of General Surgery, GSL Medical College, Rajahmundry, from January 2018 to June 2018, involving 61 patients diagnosed with non-traumatic perforation peritonitis. Clinical, biochemical, radiological, and operative data were recorded. All patients underwent exploratory laparotomy with appropriate surgical procedures based on site and cause of perforation. Data were analyzed using SPSS version 21.0, with $p<0.05$ considered statistically significant.

Results: Males predominated (75.4%) with a mean age of 42.6 years. The duodenum (42.6%) and ileum (29.5%) were the most common perforation sites. Omental patch repair (42.6%) was the most frequent procedure. Postoperative wound infection (29.5%) was the leading complication, and overall mortality was 9.8%, significantly associated with delayed presentation and sepsis.

Conclusion: Early diagnosis, aggressive resuscitation, timely surgery, and infection control are essential to reduce complications and mortality in perforation peritonitis.

Keywords: Perforation peritonitis, Duodenal ulcer, Ileal perforation, Omental patch repair, Sepsis

Introduction:

Non-traumatic perforation peritonitis—secondary peritonitis due to perforation of a diseased viscus remains a time-critical surgical emergency in our region, with substantial morbidity and meaningful mortality despite advances in peri-operative care [1]. Large Indian and regional cohorts consistently identify perforated duodenal ulcer, appendicular perforation, and ileal typhoid perforation as the dominant etiologies, with tuberculosis contributing a smaller but important share [2]. Recent prospective data from South Asia reaffirm the preponderance of peptic-ulcer perforation and highlight delayed presentation as a key driver of adverse outcomes [3]. These patterns underscore the need for standardized, guideline-based resuscitation and expedited source control to mitigate sepsis-related deterioration before definitive surgery [4].

The aim of the study is to describe the clinical profile, etiologic spectrum, peri-operative management, and short-term outcomes of adults with non-traumatic perforation peritonitis managed at our center, and to benchmark processes of care against contemporary sepsis and intra-abdominal infection guidance [5]. Specifically, we will capture demographics, time-

to-presentation, physiologic severity, site and cause of perforation, resuscitation and antimicrobial timelines, operative strategies, complications, length of stay, and mortality, emphasizing adherence to early antimicrobials, hemodynamic stabilization, and timely operative or percutaneous source control per the Surviving Sepsis Campaign 2016, 2017 and WSES/GAIS global clinical pathways [4, 5].

Methods

This prospective observational study was conducted in the department of General Surgery, GSL Medical College and General Hospital, Rajahmundry, Andhra Pradesh, from January 2018 to June 2018. All patients admitted with clinical features of peritonitis and intraoperatively confirmed non-traumatic gastrointestinal perforations were included. Detailed demographic, clinical, laboratory, radiological, and intraoperative data were collected using a structured proforma. The diagnosis of perforation peritonitis was established based on acute abdominal pain, tenderness, guarding, and radiological evidence of pneumoperitoneum. Patients with traumatic bowel perforation, postoperative peritonitis, or primary peritonitis were excluded. Preoperative stabilization included correction of fluid and electrolyte imbalance, nasogastric decompression, broad-spectrum antibiotics, and urinary catheterization. Informed written consent was obtained from all participants prior to inclusion in the study. Ethical clearance for the study protocol was obtained from the Institutional Ethics Committee.

All patients underwent baseline investigations including hemogram, renal and liver function tests, serum electrolytes, and chest and abdominal radiographs. Ultrasound of the abdomen was performed in selected cases to localize fluid collection or free air. After resuscitation, exploratory laparotomy under general anesthesia was performed in all cases through a midline incision. Intraoperative findings such as site and size of perforation, cause, degree of contamination, and presence of pus or fecal matter were recorded. Appropriate surgical procedures were performed depending on the etiology and location of the perforation—Graham's omental patch repair for duodenal perforations, segmental resection and anastomosis for ileal perforations, appendectomy for appendicular perforation, and simple closure for gastric or jejunal perforations. Peritoneal lavage with warm saline and placement of intra-abdominal drains were routinely done.

Postoperatively, all patients were monitored in the surgical ward or intensive care unit based on clinical severity. Intravenous fluids, nasogastric aspiration, broad-spectrum antibiotics (typically a third-generation cephalosporin, metronidazole, and aminoglycoside), and proton pump inhibitors were administered. Patients were gradually shifted to oral feeding once bowel sounds returned. Postoperative complications such as wound infection, burst abdomen, intra-abdominal abscess, and septicemia were recorded. Mortality and duration of hospital stay were also documented. Data were entered into Microsoft Excel and analyzed using SPSS version 21.0 (IBM Corp., USA). Continuous variables were expressed as mean ± standard deviation, while categorical data were expressed as frequencies and percentages. The Chi-square test and Student's t-test were used to determine statistical significance between groups. A p-value <0.05 was considered statistically significant.

Results:

The study included 61 patients, with a male predominance (75.4%) and mean age of 42.6 years. Most patients presented after 24 hours of symptom onset, reflecting delayed healthcare access. The duodenum was the most frequent site of perforation (42.6%), followed by ileal (29.5%) and appendicular (16.4%) sites, consistent with regional trends. Peptic ulcer disease and enteric fever were the leading etiologies. Surgical management primarily involved Graham's omental patch repair for duodenal perforations and resection with anastomosis for ileal perforations. The postoperative period was notable for wound infection (29.5%) as the most common complication, followed by septicemia (8.2%) and burst abdomen (6.6%). Overall mortality was 9.8%**,** predominantly among patients with delayed presentation and severe sepsis. The mean hospital stay was 11.4 ± 3.2 days. Statistical analysis demonstrated a significant correlation between delayed presentation (>24 hours) and both complication rates ($p<0.05$) and mortality

($p<0.01$), emphasizing the importance of early diagnosis and prompt surgical intervention.

Discussion:

The demographic and clinical profile in the present study revealed a male predominance (75.4%) with a mean age of 42.6 years, indicating that perforation peritonitis predominantly affects adult males in their productive years. This gender disparity may be attributed to higher rates of smoking, alcohol intake, and nonsteroidal anti-inflammatory drug (NSAID) use among males, which are recognized risk factors for duodenal ulcer perforation [6]. A similar male preponderance was documented by Jhobta et al., who reported that 83% of patients with perforation peritonitis were male, with a mean age of 40.7 years [1]. The majority of patients in our series presented after 24 hours of symptom onset (63.9%), highlighting the problem of delayed diagnosis and referral, especially in rural areas where early medical access is limited. Delayed presentation often results in worsened peritoneal contamination, leading to increased morbidity and mortality. In a South Asian prospective study, it was observed a comparable delay in presentation, with most cases arriving beyond 24 hours of symptom onset, correlating with postoperative sepsis and prolonged hospitalization [3]. The common presenting complaints—abdominal pain, vomiting, and distension—reflect the typical clinical evolution of generalized peritonitis.

The etiological and site distribution in the present study demonstrated that the duodenum (42.6%) was the most common site of perforation, followed by the ileum (29.5%), appendix (16.4%), stomach (6.6%), and jejunum (4.9%). The predominance of duodenal ulcer perforation reflects the persistent burden of peptic ulcer disease in India, where Helicobacter pylori infection, smoking, alcohol consumption, and NSAID abuse remain prevalent risk factors [7]. The high incidence of ileal perforations may be linked to enteric fever caused by Salmonella typhi and paratyphi, which continues to be endemic in developing regions with poor sanitation and water contamination [9]. Appendicular and gastric perforations, though less frequent, also contributed significantly to the disease burden, often presenting with severe sepsis due to delayed referral.

Recent evidence from tertiary centers in India and Nepal supports similar findings, emphasizing duodenal and ileal sites as the predominant sources of non-traumatic perforation peritonitis [3]. Sharma et al. observed that 45% of perforations in their series involved the duodenum, while 30% were ileal, mirroring our results [9]. Despite advances in proton pump inhibitor therapy, duodenal perforations persist in younger adults, suggesting continued H. pylori prevalence and NSAID use [10]. Moreover, typhoid-related ileal perforations remain a major cause of diffuse peritonitis and postoperative complications, especially in the second and third decades of life. Thus, preventive public health measures and timely surgical intervention remain crucial to improving outcomes in this clinical spectrum.

The breakdown of surgical procedures for non-traumatic perforation peritonitis reveals important practice patterns and implications for outcomes. The predominance of Graham's omental patch repair as the main intervention reflects the continuing high incidence of duodenal ulcer perforations in our patient cohort. This aligns with multiple studies from South Asia that report peptic ulcer perforation as the dominant cause, and patch repair remains the standard, quick source-control measure [11]. Meanwhile, resection and anastomosis for ileal perforations—in this study approximately one-quarter of cases—underscores the impact of small-bowel disease (for example typhoid-associated or tubercular perforation) in this region, which many series also document [3]. The usage of appendectomy in perforation peritonitis (≈16%) again corresponds to global trends where perforated appendicitis, though less common than ulcer or ileal etiologies in developing countries, still contributes a significant surgical workload [12].

Importantly, operative choice is strongly influenced by presentation delay, contamination severity and hemodynamic status. In cases of widespread fecal peritonitis or hemodynamic instability, surgeons often prefer damage-control or diversion procedures, while in more contained presentations, definitive repair is possible [13]. Large cohorts demonstrate that simpler procedures (patch repair/primary closure) are associated with lower morbidity compared to more extensive

resections, but require early presentation and less contamination [14]. In our series, the distribution of procedures likely reflects the regional etiologic spectrum and local health-seeking delays, suggesting that early presentation could increase proportion of primary closures and reduce need for more major resections.

The key postoperative complications and outcomes for non-traumatic perforation peritonitis are laid out: wound infection (29.5 %), burst abdomen (6.6 %), septicemia (8.2 %), intra-abdominal abscess (4.9 %) and mortality (9.8 %). These findings mirror broader literature: for example, wound or surgical site infection remains the most frequent complication across multiple series of perforation peritonitis. A large prospective Indian study found surgical site infection in ~28% of cases [15]. The observed mortality of 9.8 % is also consistent with reports from similar tertiary-care settings in low- and middle-income countries, where rates often range from ~5 % to ~20 % [16].

The association of outcomes with specific risk-factors has been documented: delayed presentation (>24 h), fecal contamination, older age and comorbidities being major drivers of worse outcomes. In one study, fecal peritoneal exudate was associated with mortality >50 % [16]. Burst abdomen and intra-abdominal abscess—though less frequent in our cohort—reflect severe contamination or suboptimal control of intra-abdominal sepsis. Septicemia at 8.2 % underscores the systemic impact of intra-abdominal infection and the need for aggressive resuscitation and antimicrobial therapy. Importantly, hospital stay and need for ICU admission are often lengthened by such complications; one large series reported mean stay ~10.2 ± 3.9 days with a mortality of 10 % [17].

In our series, the complication profile aligns with global and regional benchmarks, reinforcing the importance of early intervention, meticulous intra-operative technique (thorough lavage + drainage), and vigilant post-operative monitoring. Reducing the incidence of wound infection—through strict asepsis, appropriate antibiotic prophylaxis and timely wound care—may have the strongest immediate impact on morbidity. Meanwhile, minimising delay in presentation and improving preoperative stabilization may further reduce mortality and severe complications like burst abdomen and sepsis.

Conclusion: Non-traumatic perforation peritonitis continues to be a significant surgical emergency in developing countries, primarily affecting middle-aged males and associated with high morbidity and mortality due to delayed presentation and sepsis. Duodenal and ileal perforations remain the predominant etiologies, managed mainly by omental patch repair and resection–anastomosis, respectively. Early recognition, prompt resuscitation, appropriate antimicrobial therapy, and timely surgical intervention are critical to improving survival. Strengthening public health awareness, early referral systems, and postoperative infection control measures can further reduce complications and optimize outcomes in patients with perforation peritonitis.

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