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ORIGINAL RESEARCH

Non-Traumatic Small Intestinal Perforation: A Prospective Study from a Tertiary Care Center in Northeast India

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Abstract:
Background: Non-traumatic small bowel perforation, though uncommon, is a serious and life-threatening condition requiring prompt diagnosis and management. This study aimed to examine the etiological factors, clinical presentations, surgical outcomes, and patterns of morbidity and mortality associated with non-traumatic small bowel perforation in a tertiary care center in Northeast India.
Methods: This prospective study, conducted at RIMS Hospital, Imphal, included 30 cases of non-traumatic small intestinal perforation. Cases involving trauma, anastomotic dehiscence, or lack of consent were excluded. Detailed histories, clinical examinations, radiological evaluations, and laboratory tests were performed. Emergency exploratory laparotomies confirmed perforations, and biopsy samples were collected for histopathological examination. Postoperative care involved antibiotics, analgesics, and fluid therapy, with complications managed appropriately. Data were analyzed using SPSS, with qualitative variables as frequencies/percentages and quantitative data as means/standard deviations or medians/ranges. Postoperative morbidity and mortality were carefully documented.
Results: The mean age of the study population was 46.5 ± 5.2 years, with a male predominance (83.3%). Abdominal pain (100%) and distension (96.7%) were the most common presenting complaints. Duodenal ulcer perforations were the leading cause (60%), followed by typhoid (30%) and tuberculous perforations (10%). Surgical techniques included Graham's omental patch (60%) and primary closure (40%). Postoperative complications included paralytic ileus (23.3%), wound sepsis (16.7%), and septicemia (10%). The median hospital stay was 10 days.
Conclusion: Duodenal ulcers were the predominant cause of non-traumatic small bowel perforations in this study. Despite complications, early surgical intervention and postoperative care effectively managed morbidity and mortality.
Key-words:small bowel perforation, non-traumatic, exploratory laparotomy, complications

Introduction:

Non-traumatic small bowel perforation, though uncommon, is a serious clinical condition that can be life-threatening if not promptly and vigorously managed. In developing countries, typhoid fever and tuberculosis remain the predominant causes of small bowel perforation, while in Western countries, non-infectious etiologies are more prevalent. Peritonitis following bowel perforation can rapidly progress to sepsis, multi-organ failure, and death unless treated in a timely and aggressive manner. In India, small bowel perforation leading to peritonitis is a frequently encountered surgical emergency.[1,2] This condition necessitates urgent intervention, as delays can significantly increase the risk of morbidity and mortality due to complications such as multi-organ dysfunction syndrome and systemic sepsis. In resource-limited settings, the burden of small bowel perforation is amplified by socioeconomic factors, poor sanitation, and inadequate access to healthcare. Diagnosing small bowel perforation can be challenging due to its nonspecific clinical manifestations, which may include recurrent abdominal pain and subtle laboratory abnormalities. While imaging modalities can aid in diagnosis, many cases are ultimately identified intraoperatively during

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exploratory laparotomy.The choice of surgical management is determined by the underlying etiology and the extent of peritoneal contamination. Treatment options include primary repair, resection with anastomosis, or resection with ileostomy. Despite advances in surgical techniques, critical care, and antimicrobial therapy, the mortality rate for non-traumatic small bowel perforation remains alarmingly high, with reported rates reaching up to 37%.[3–7]
Although substantial data on non-traumatic small bowel perforation exist from various parts of the world, there is a paucity of literature from Northeast India. This study aimed to address the existing knowledge gap by examining the etiological factors, clinical presentations, and patterns of morbidity and mortality associated with non-traumatic small bowel perforation from a tertiary care centre in Northeast India.

Material and Methods:

Study design, population & setting

The study was conducted from October 2011 to September 2013in the Department of Surgery, Regional Institute of Medical Science (RIMS) Hospital, Imphal. Study population comprised of all the cases of small intestinal perforation presented in the Deptt. Of Surgery, RIMS Hospital during Study period.

Selection criteria

The study included all cases of non-traumatic small intestinal perforation presenting at RIMS. Cases involving traumatic perforation, perforations due to anastomotic dehiscence, and patients who declined to participate were excluded.

Sample size

A total of 58 cases of small intestinal perforation were admitted and managed in the Department of Surgery at the Regional Institute of Medical Sciences (RIMS) Hospital, Imphal, during the study period. Of these, 24 cases were of traumatic origin, and informed consent was unavailable in four cases. Consequently, the final sample size comprised 30 cases.

Study procedure

Upon admission, a detailed medical history was obtained, and physical examination findings were documented. Radiological evidence of pneumoperitoneum was assessed using plain abdominal X-rays in erect and supine positions. Emergency laboratory investigations, including biochemical and pathological tests, were conducted. Following preoperative management, an emergency exploratory laparotomy was performed, during which a biopsy of the perforation margin was obtained for histopathological examination. The diagnosis of perforation was confirmed during exploratory laparotomy. Postoperative care included the administration of antibiotics for approximately seven days or longer, depending on the patient's clinical improvement, analgesics for pain relief, and intravenous fluid therapy. Any complications were managed appropriately. Postoperative morbidity and mortality were meticulously recorded.

Data collection and analysis

Patient demographic and clinical details were documented using a semi-structured proforma. The data were entered and analyzed using SPSS. Qualitative variables were presented as frequency and percentages, while quantitative variables were summarized as means with standard deviations for normally distributed data and medians with ranges for skewed data.

Results:

The study population had a mean age of 46.5 ± 5.2 years, ranging from 18 to 80 years, and demonstrated a male predominance, with most patients being 60 years or older***(Table 1)***.The most common presenting complaint among the patients was abdominal pain, observed in 100% of cases, followed by abdominal distension, reported in 96.7% (29) of the patients***(Figure 1)***.

Table 1: Basic characteristics of patients

Variables	Sub-group	Frequency	Percentage
Age group (in years)	**15-29**	8	26.7%
	30-44	6	20.0%
	45-59	7	23.3%
	60 and above	9	30.0%
Gender	**Female**	5	16.7%
	Male	25	83.3%
Total		30	100%

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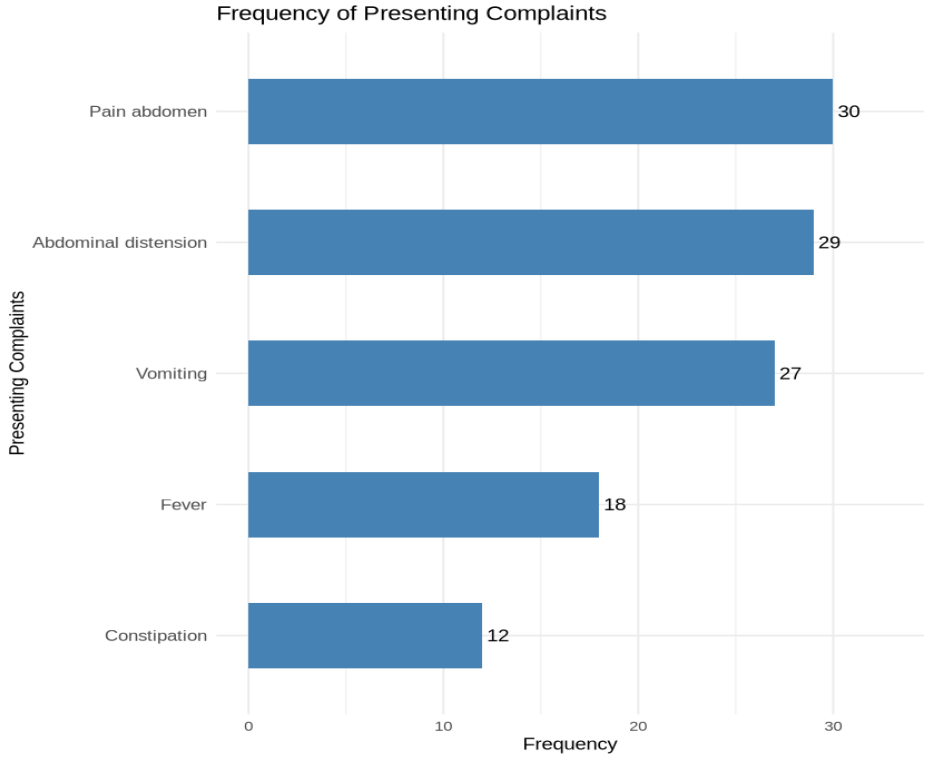
Figure 1: Distribution of presenting complaints



In the study population, 30% of patients reported a history of NSAID consumption, 16.7% had a history of duodenal or gastric ulcer, and 13.3% had a history of alcohol consumption. Notably, 40% of patients had no history of NSAID use, alcohol consumption, or duodenal/gastric ulcer.Only three patients had signs of shock ***(Figure 2)***. Among the cases, majority had perforation at the first part of duodenum ***(Figure 3)***.

Figure 2: Distribution of clinical signs

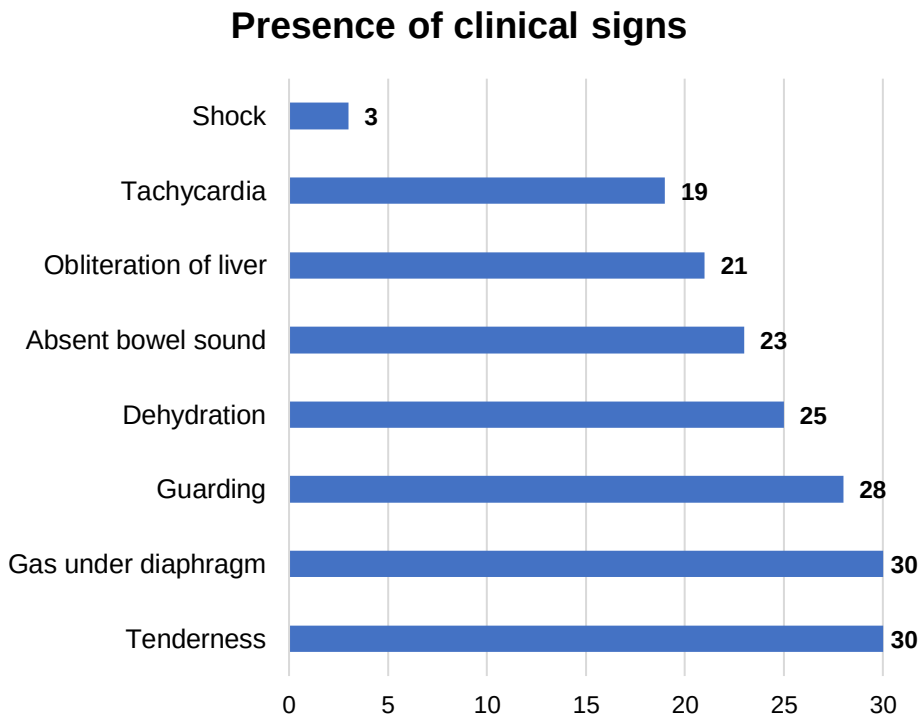


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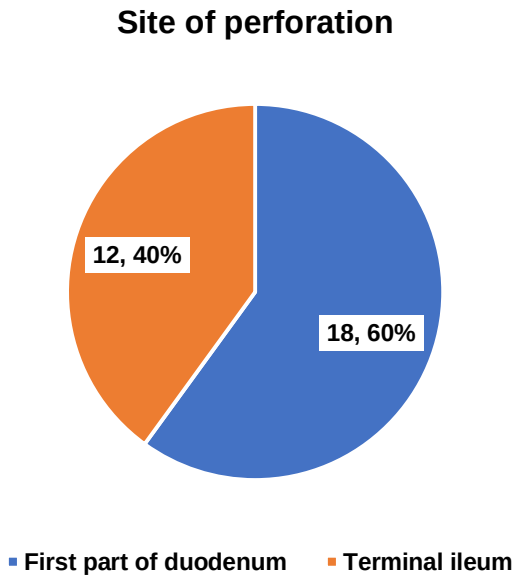
Figure 3: Distribution according to site of perforation



The majority of patients in the study did not have co-morbid conditions, although a small proportion (1/30, 3.3%) were diagnosed with abdominal tuberculosis. Among the diagnostic tests conducted, three patients tested positive for Mycodot, five for Typhidot, and four for the Widal test. Upon final diagnosis, duodenal ulcer perforation accounted for the majority of non-traumatic perforations (18/30, 60%), followed by typhoid perforation (9/30, 30%), and tuberculous perforation (3/30, 10%). Surgical management primarily involved Graham's omental patch technique, which was performed in 18 cases (60%), encompassing all duodenal perforations. Primary closure was employed in 12 cases (40%), which included typhoid and tuberculous perforations. Postoperative complications were observed in a significant number of patients, with wound sepsis reported in 16.7% and paralytic ileus in 23.3%. Other complications included fever (20%), septicemia (10%), multi-organ system failure (3.3%), renal complications (6.7%), and respiratory complications (10%). One patient, a male diagnosed with duodenal ulcer perforation, succumbed to septicemia. The median hospital stay was 10 days, with a range of 8 to 18 days.

Discussion:

The mean age of the patients in this study was 46.5 years, with an age range spanning from 18 to 80 years. This is consistent with findings from previous studies, where the mean age has been reported to vary between 36.8 and 60 years.[8–10] A notable male predominance was observed, with males comprising 83.3% of the study population and females accounting for 16.7%. This gender distribution aligns closely with the findings of Jhobta RS et al., highlighting similar demographic trends in non-traumatic small intestinal perforations.[10]

In the present study, duodenal ulcer perforation emerged as the most common type, accounting for 60% of cases. Additionally, 16.7% of patients reported a history of peptic ulcer disease. These findings are consistent with observations reported in previous studies, further emphasizing the significant association between peptic ulcer disease and perforations.[10,11]

Several studies have reported a significant association between peptic perforation and the use of nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroids, and alcohol consumption.[10,12,13] In the present study, 30% of patients had a history of NSAID use, 16.7% reported a prior history of duodenal or gastric ulcers, and 13.3% had a history of alcohol consumption, highlighting the role of these factors as potential contributors to the development of peptic perforations.

Previous studies have reported tuberculosis as a less frequent cause of intestinal perforation, with an incidence ranging from 4% to 21%.[4,5,9,10,14]Tuberculosis is a systemic disease that can affect any organ at any age, with the ileocecal region and terminal ileum being the most common sites of involvement in extrapulmonary tuberculosis.In this study, tuberculous perforation was identified as a rare cause of small intestinal perforation. Consistent with these findings, three cases (10%) of terminal ileal perforation due to tuberculosis were observed in this study, underscoring the need to consider tuberculosis in the differential diagnosis of small bowel perforations, particularly in endemic regions.

Postoperative complications were observed in a substantial proportion of patients in this study. Wound sepsis was reported in 16.7% of cases, while paralytic ileus occurred in 23.3%. Other notable complications included fever (20%), septicemia (10%), respiratory complications (10%), renal complications (6.7%), and

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multi-organ system failure (3.3%). These findings are consistent with observations from previous studies conducted by Afridi et al., Gupta et al., and Patil et al., highlighting the significant morbidity associated with non-traumatic small bowel perforations and the need for comprehensive perioperative management.[9,11,15]

Conclusion:

Non-traumatic small intestinal perforation remains a significant clinical challenge, particularly in resource-constrained settings. This study highlights the predominance of duodenal ulcer perforation as the leading cause, followed by typhoid and tuberculous perforations. The findings underscore the association between such perforations and risk factors such as NSAID use, peptic ulcer disease, and alcohol consumption. Despite advances in surgical and perioperative care, postoperative complications, including wound sepsis, paralytic ileus, and systemic infections, contribute to considerable morbidity and mortality. The observed male predominance and higher prevalence among older patients align with trends reported in previous studies. Importantly, this research fills a critical gap in the literature by providing data from Northeast India, a region with unique epidemiological characteristics. These findings emphasize the need for timely diagnosis, prompt surgical intervention, and targeted public health strategies to address modifiable risk factors and reduce the burden of this life-threatening condition.

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