

A Prospective Assessment of Clinico-Etiologic Profile and Risk Factors of Non-Traumatic Small Intestinal Perforation

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Abstract

Aim: The aim of the present study was to assess the etiology and risk factors of non-traumatic small intestinal perforation.

Material & Methods: This prospective study was conducted in the Department of General Surgery and 100 patients were included. The patients with intestinal perforations due to trauma, mesenteric ischemia and obstruction or strangulation because of hernia, volvulus or intra-abdominal adhesions, and peptic ulcer perforations of the duodenum were excluded from the study.

Results: Patients were of 20-30 years of age followed by 22% who belonged to 10-20 years age group. Mean age of the patients who presented with perforation peritonitis was 37.3 years that shows age was not a confounding factor. Among patients who presented with perforation peritonitis, majority (80%) of the patients were males. Out of the 100 cases, 40% were caused by peptic ulcer, 20% by tuberculosis, 18% by typhoid, 12% by ischemic bowel disease, 2% by malignancy, 4% by intussusception, and 4% by worm infestation. Abdominal tenderness was present in all patients, signs of peritoneal irritation were present in 75 (75%) patients. The other patients had moderate localized or generalized tenderness but relatively soft abdomen. Out of the total of 100 cases, 70% underwent primary repair, 12% underwent resection with primary anastomosis, 10% underwent resection with exteriorization of the bowel, another 6% underwent resection with anastomosis and proximal stoma, and 2% received palliative drainage.

Conclusion: Non-traumatic small bowel perforation is a serious condition associated with significant morbidity and mortality. The etiology, clinical presentation, and outcomes can vary depending on geographical location and patient population. Prompt recognition, appropriate investigations, and early surgical intervention remain crucial in managing this condition effectively.

Keywords: Non-Traumatic, Small Bowel Perforation, Aetiological factor, Management.

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Introduction

Perforation of the small bowel from a wide variety of causes is a significant entity in surgical emergencies. [1] It is relatively uncommon in western societies but its incidence is more in the regions where typhoid, tuberculosis and parasitic infestation are endemic. [2] The prominent complication of typhoid is perforation seen in the 3rd week where the ileum is the main site. [3] Sudden onset of abdominal pain with rebound tenderness and guarding is seen in the majority of patients. It requires a high index of suspicion as diagnostic delay results in significant morbidity and mortality. Surgery is the cornerstone in the management of perforations peritonitis. Majority of cases present late in the hospital with well

established generalized peritonitis and varying degree of septicaemia. [4] Non traumatic gastrointestinal perforations as an entity have not received that much of importance as compared to perforations due to trauma or even malignancy. Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from the Latin perforatus, meaning "to bore through". [5]

As a result, serious complications such as post-operative peritonitis caused by a leak from repaired intestine, superficial wound infection, and complete wound dehiscence are not uncommon. The causes for SBP's other than trauma and known common aetiological factors (mesenteric vascular disease, internal and external hernias, intraabdominal

adhesions, inflammatory bowel diseases, and iatrogenic) are also called spontaneous or nontraumatic SBPs. [6,7]

Presence of recurrent abdominal pain episodes due to underlying disease and having non-specific clinical and laboratory findings may lead to a delay in the preoperative diagnosis. Although radiological imaging procedures are helpful in diagnosis, the early diagnosis rate is low, and the majority of cases are diagnosed during laparotomy. Despite advances in surgical techniques and improvement in intensive care conditions, mortality of non-traumatic small bowel perforation is still high and can be up to 42%. [1,8]

The management of complications is particularly difficult in developing countries due to limited resources, particularly facilities for parenteral nutrition. Presentation at the hospital is generally late, and patients are in an impaired physical condition due to diffuse peritonitis. [9] This is why outcomes in the postoperative period are still poor despite developments in surgical-radiologic techniques and intensive care conditions. [9,10]

Hence the aim was to study the etiology and risk factors of non-traumatic small intestinal perforation.

Material & Methods

This prospective study was conducted in the Department of General Surgery, Lord Buddha Koshi Medical College & Hospital, Saharsa, Bihar, India for one year and 100 patients were included. The patients with intestinal perforations due to trauma, mesenteric ischemia and obstruction or strangulation because of hernia, volvulus or intra-abdominal adhesions, and peptic ulcer perforations of the duodenum were excluded from the study.

Inclusion Criteria

- Patient of all ages, both males and females.
- Patient diagnosed with small bowel perforation.
- Admitted in ICU or any other department with diagnosis of Small bowel perforation.

Exclusion Criteria

- Cases of esophageal, gastric and colonic perforation.
- Cases of traumatic small bowel perforation.

- Cases of delayed Presentation with shock and septicaemia whose general condition did not warrant any operative management even after resuscitating measures.
- All cases of primary peritonitis, corrosive peritonitis and post-operative peritonitis due to anastomosisleakage are excluded from the study.

History of the patients, physical examination findings, laboratory data, imaging, and operative reports were examined. Age, gender, complaints, duration of symptoms, comorbid disease(s), perforation location, length of stay in hospital, etiology, surgical treatment, morbidity, and mortality data were recorded. All patients were divided into two groups, survivors and non-survivors, and their features were compared.

Preoperative routine complete blood count and biochemical tests were performed in all patients. Initial imaging modalities were pulmonary and abdominal x-ray and abdominal ultrasound (USG). Abdominal computed tomography (CT) was performed in patients in whom direct abdominal X-ray and USG examination were normal. Patients who were thought to have acute abdomen according to physical examination, laboratory, and radiological findings underwent surgery after initial resuscitation. A prophylactic broad-spectrum antibiotic therapy was started for all cases preoperatively. Perforation was managed by either primary suturing or resection and anastomosis with or without ileostomy. All patients received postoperative antibiotic therapy as prophylactic or therapeutic according to the results of cultures. Tissue biopsy was performed in all patients and a segment of diseased tissue or lymph node was sent for culture for mycobacterium in suspected cases.

Statistical Analysis

Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group were used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). Difference between two groups was determined using chi square test and the level of significance was set at $p < 0.05$.

Results

Table 1: Demographic data

Age (years)	Frequency (%)
10-20	22 (22)
20-30	32 (32)
30-40	15 (15)
40-50	15 (15)
50-60	4 (4)
>60	12 (12)

Mean ± SD	37.3±18.2
Gender	
Female	20 (20)
Male	80 (80)

Patients were of 20-30 years of age followed by 22% who belonged to 10-20 years age group. Mean age of the patients who presented with perforation peritonitis was 37.3 years that shows age was not a confounding factor. Among patients who presented with perforation peritonitis, majority (80%) of the patients were males.

Table 2: Etiology among the study subjects

Etiology	N=100	%
Peptic Ulcer	40	40
Tuberculosis	20	20
Typhoid	18	18
Ischaemic bowel disease	12	12
Malignancy	2	2
Intussusception	4	4
Worm infestation	4	4

Out of the 100 cases, 40% were caused by peptic ulcer, 20% by tuberculosis, 18% by typhoid, 12% by ischemic bowel disease, 2% by malignancy, 4% by intussusception, and 4% by worm infestation. The p-value cannot be determined from this table alone as it only provides the frequency distribution of the etiology of the disease.

Table 3: Signs and symptoms

Sign/Symptom	n (%)
Abdominal pain	100 (100)
Nausea/vomiting	78 (78)
Signs of peritoneal irritation	75 (75)
Abdominal distention	64 (64)
Constipation	12 (12)

Abdominal tenderness was present in all patients, signs of peritoneal irritation were present in 75 (75%) patients. The other patients had moderate localized or generalized tenderness but relatively soft abdomen.

Table 4: Types of surgical procedure performed

Procedure	N	%
Primary repair	70	70
Resection and primary anastomosis	12	12
Resection and exteriorisation of bowel	10	10
Resection and anastomosis with proximal stoma	6	6
Palliative drainage	2	2
Total	100	100

Out of the total of 100 cases, 70% underwent primary repair, 12% underwent resection with primary anastomosis, 10% underwent resection with exteriorization of the bowel, another 6% underwent resection with anastomosis and proximal stoma, and 2% received palliative drainage.

Discussion

Hollow viscus perforation leading to peritonitis is a common emergency faced by a general surgeon. [11] Late presentation, missed diagnosis and late interventions are frequent causes of morbidity and mortality. [12] Now a day's inadvertent use of NSAIDs and analgesics available over the counter forms one of the most common risk factors. [13] Perforation of stomach, duodenum and small bowel forms considerable proportion of emergency than colonic perforations. [14,15] Perforation of large bowel represents major surgical challenge to the

clinician, because it is rapidly fatal condition, death being caused by sepsis from peritoneal contamination by various aerobic and anaerobic pathogens. [16,17] Surgery is mainstay in management of hollow viscus perforations. High index of suspicion is essential to diagnose hollow viscus perforations, because diagnostic delay may result in significant morbidity and mortality.

Patients were of 20-30 years of age followed by 22% who belonged to 10-20 years age group. Mean age of the patients who presented with perforation peritonitis was 37.3 years that shows age was not a confounding factor. Among patients who presented with perforation peritonitis, majority (80%) of the patients were males. Similar studies have reported a peak incidence of small bowel perforation in the 31-40 age group and a higher prevalence among males, which aligns with the findings of this study. [18] Abdominal pain was reported in all subjects, while abdominal distension and obstipation were

present in 86% and 72% of the cases, respectively. Vomiting and fever were observed in 58% and 46% of the subjects, respectively. Other studies have also noted abdominal pain as the predominant symptom, followed by constipation and fever. [19]

Out of the 100 cases, 40% were caused by peptic ulcer, 20% by tuberculosis, 18% by typhoid, 12% by ischemic bowel disease, 2% by malignancy, 4% by intussusception, and 4% by worm infestation. Similar findings have been reported in Kumar VB et al [20] and Rao et al study. [21] Abdominal tenderness was present in all patients, signs of peritoneal irritation were present in 38 (76%) patients. The other patients had moderate localized or generalized tenderness but relatively soft abdomen. These findings are consistent with previous studies where abdominal pain was the most common symptom, often accompanied by distention, constipation, and fever. [22]

Out of the total of 100 cases, 70% underwent primary repair, 12% underwent resection with primary anastomosis, 10% underwent resection with exteriorization of the bowel, another 6% underwent resection with anastomosis and proximal stoma, and 2% received palliative drainage. Abdominal tenderness was present in all patients, signs of peritoneal irritation were present in 75 (75%) patients. The other patients had moderate localized or generalized tenderness but relatively soft abdomen. Etiology and the degree of peritoneal contamination should be considered in the decision of which surgical procedure to repair the perforated segments. Primary suture is recommended in patients with single perforation and no generalized peritonitis, though resection and anastomosis is preferred in patients with multiple perforations. [1,23] Because the prognosis is associated with the degree of peritonitis, ileostomy is preferred in patients with generalized peritonitis. [23] Because the degree of peritonitis is usually advanced due to the delay in diagnosis, ileostomy is required in most patients. It should be noted that anastomosis leakage rates might be high in patients with tuberculosis or lymphoma on whom primary closure or resection-anastomosis without ileostomy were performed.

The primary treatment modality for small bowel perforation in this study was surgical intervention. Exploratory laparotomy was performed in all patients, and the site of perforation was identified and repaired. The choice of surgical technique depended on the location and size of the perforation, with primary closure being the most common approach. In cases of extensive bowel involvement or contamination, bowel resection with anastomosis or stoma creation was performed. In some instances, additional procedures such as peritoneal lavage or omental patching were required. [24]

Conclusion

Non-traumatic small bowel perforation is a serious condition associated with significant morbidity and mortality. The etiology, clinical presentation, and outcomes can vary depending on geographical location and patient population. Prompt recognition, appropriate investigations, and early surgical intervention remain crucial in managing this condition effectively. Further studies are needed to explore preventive strategies and optimize treatment approaches for better patient outcomes.

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