



## A Clinical Profile of Small Bowel Perforation – Prospective Cross-Sectional Study

<sup>1</sup>Subburaaj. A. P, <sup>2</sup>Sridhar. J, <sup>3</sup>Nabeel Yusuf. A, <sup>4</sup>Preethiya. S

<sup>1,2,4</sup>M.S., <sup>1</sup>Professor, <sup>2</sup>Professor and Head of Department, <sup>3</sup>M.B.B.S, Post Graduate (Junior Resident), Department of General Surgery, Vinayaka Mission Kirupananda, Variyar Medical College and Hospital

**\*Corresponding Author:**

**Dr. Nabeel Yusuf. A**

City Hospital, 87, RKV Road, Erode – 638003

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### Abstract

**Background:** Intestinal perforation is a surgical emergency with a wide variety of clinical features and causes. To recognize the different causes of small bowel perforation, clinical features, diagnostic modalities and to investigate various surgical procedures, it's outcomes and medical management.

**Materials and Methods:** The present study was a prospective study conducted at Surgery Department, Vinayaka Mission's Kirupananda Variyar Medical College and Hospital from June 2018 to November 2020. A total of 30 Patients experiencing abdominal pain and showing signs of peritonitis, presenting to the department of surgery and casualty section were considered as study subjects. Data was analyzed by using coGuide v.1.0.3

**Results:** In the present study, 26 (86.67%) were male and 4 (13.33%) were female. Among study participants 25 (83.33%) had history of peptic ulcer disease and 30(100%) had pain, the mean duration of pain was  $8.83 \pm 4.09$  hours, ranged from (2 to 18) hours, 29(96.67%) had distension. DUP was 25 (83.33%) participants.

**Conclusion:** The results of the present study show that commonest cause of small intestine perforation was peptic ulcer. There was predominance of male population. Abdominal pain and abdominal distension were common clinical features while air under the diaphragm was present in all the patients. DUP was found to be most common post-operative diagnosis

**Keywords:** Small bowel Perforation, Peptic Ulcer, DUP, Surgical Emergency, Abdominal Pain.

### Introduction

The loss of continuity of the intestine wall, known as intestinal perforation, is a potentially fatal complication that can occur due to a range of diseases [1]. From the esophagus to the rectum, perforation can occur anywhere in the gastrointestinal system [2]. Small intestine perforation is an acute pathological disease caused by a rupture in the small bowel wall due to various causes, resulting in the leakage of intestinal gas and substances into the peritoneal cavity [3].

Perforation of the small intestine, commonly known as the small bowel, can occur in adults due to gangrene, hernia strangulation, or other causes [4–6]. Appendicitis and diverticulitis are the most prevalent

infectious causes of perforation. Diverticulitis is more frequent after middle age, but Appendicitis can occur at any age. Both diseases are thought to be caused by entrapped feces in a blind-ending structure, which causes increased intraluminal pressure, stasis, and infection, resulting in a localized abscess or outright perforation. Inflammatory bowel illnesses, including Crohn's disease and ulcerative colitis, especially Crohn's, which causes full-thickness inflammation of the intestinal wall, can lead to perforation [7,8]. Other common perforation causes include bowel obstruction, necrosis, cancer, and ulcerative illness [9–12]. Gastrointestinal perforations are among the most common surgical emergencies that surgeons face [13,14].

Primary peritonitis is an infection of the peritoneal fluid that is generally monomicrobial and does not result in visceral perforation. The most frequent peritonitis is secondary peritonitis, which occurs when the integrity of a hollow viscus is lost. Tertiary peritonitis arises after secondary peritonitis has been treated, either as a result of a failure of the host's inflammatory response or as a result of superinfection [15]. The majority of patients arrive late and have purulent peritonitis and septicemia. The surgical treatment of perforated peritonitis is complicated; nevertheless, better surgical skills, antimicrobial therapy, and critical care support have improved the result of such cases [16,17].

In India, perforation peritonitis differs significantly from that of its western counterparts [18–20]. According to Kallely MF et al., the small bowel is the second most frequent location of perforation (30%) [21]. According to Kiran Somani et al., typhoid fever is the most prevalent cause of non-traumatic small intestine perforation, followed by ischemic bowel disease and TB [22]. Very few studies from the previous literature shed light on the complete clinical profile of small bowel perforation. Hence, we conducted this study to recognize the different causes of small bowel perforation, clinical features, diagnostic modalities and investigate various surgical procedures, outcomes, and medical management.

### Materials And Methods:

The present study was a prospective study conducted at Surgery Department, Vinayaka Mission's Kirupananda Variyar Medical College and Hospital from June 2018 to November 2020. A total of 30 Patients experiencing abdominal pain and showing signs of peritonitis, presenting to the department of surgery and casualty section, were considered study subjects. Patients presenting with duodenal and small bowel perforation and perforation with features of peritonitis during radiological investigations were included in the study. Patients with a history of peritonitis other than the cause of perforation. Immuno-compromised patients were excluded from the study. The study was approved by the institutional ethical committee, and written informed consent was obtained from the participants before enrolment in the study.

During the study procedure, chief complaints of the study participants, including pain, vomiting, fever,

and abdominal distension, were obtained. Participants were examined for history past illnesses like diabetes mellitus, hypertension, bronchial asthma, epilepsy, tuberculosis, hematemesis, Malena, Nonsteroidal anti-inflammatory drugs (NSAID) intake, and Proton pump inhibitors (PPIs). Systemic examination was performed for the respiratory system, cardiovascular system, central nervous system, and pre abdominal system. Investigations including Complete blood count, erect X-ray abdomen, chest x-ray (CXR), Ultrasound abdomen were performed.

### Statistical Methods:

Descriptive statistics were used to analyze data following the study's objectives. Data were expressed as the mean, 95% confidence interval (CI; lower and upper bounds), median, minimum and maximum, and percentage, where appropriate. Data were analyzed by using coGuide software, V.1.0.3 [23].

### Results:

A total of 30 subjects were included in the final analysis

As per the study, the mean age was  $43.1 \pm 11.11$ , ranged 25 to 65 years, 26(86.67%) were male and 4(13.33%) were female. out of 30 participants, 15(50%) were alcohol consumption, 7(23.33%) were smoking, 19 (63.33%) were NSAID use, 25 (83.33%) had history of peptic ulcer disease and 30(100%) had pain, the mean duration of pain was  $8.83 \pm 4.09$  hours, ranged from (2 to 18) hours, 29 (96.67%) had distension, 12 (40.00%) had vomiting, 3 (10.00%) had constipation/diarrhoea and 11(36.67%) had fever in symptoms. The mean pulse rate was  $100.43 \pm 14.47$  b/min, ranged from 72 to 128, the mean systolic blood pressure was  $98.67 \pm 10.08$ mmhg, ranged from 80 to 120 and the mean diastolic blood pressure was  $60.33 \pm 9.64$  mmhg, ranged from 40 to 90 mmhg. (Table 1)

Among the study population, 30(100%) had dehydration and tenderness for each, 21(70%) had single guarding/rigidity and 9(30%) had double guarding/rigidity, 30(100%) had OB. 1 of liver dullness, 4(13.33%) had b. sounds, 6(20%) had free fluid. The mean total count was  $11667.6 \pm 3830.48$   $\mu$ L, ranged from 6800 to 18230 and mean haemoglobin was  $10.17 \pm 1.58$  g/dl, ranged from 7 to 14, 30(100%) had X-erect abdomen -GUD. The post op diagnosis of 20 CM FRO ICIJ ,10 CM FROM ICIJ,

12 CM FROM ICJ, 15 cm from ICJ and 25 CM FROM ICJ was 1(3.33%) participant for each. and DUP was 25(83.33%) participants. The mean size of perforation was  $1.17 \pm 0.61$ cm, ranged between 0.50 to 2.50, 30(100%) were Procedure (COP+OP) and the mean date of discharge was  $12.53 \pm 1.85$  days, ranged between 10 to 17 days. (Table 2)

### Discussion:

The current study findings show that the male population was majorly showing the signs of abdominal pain and peritonitis. Our results agreed with studies by Garwood RA et al. in their case review study presented a case of small bowel perforation secondary to metastatic lung cancer. They found a male predominance of 89 percent versus 11 percent female [24]. Also, Vaidya R et al. concluded that a higher percentage of perforations occurred in males compared with females in their study [25]. These findings suggest that males are at higher risk of small intestinal perforation.

The history of peptic ulcers was prominently identified among the study population. A study conducted to determine the clinical profile of patients with intestinal perforation found that major causes included peptic ulcer 42.5% [26]. Merry Francis Kallely et al. found that V's Commonest etiology was peptic ulcer perforation [27]. Our study's results contradict the study done by as they found a common cause of perforation was typhoid in 66 patients [28]. Malhotra MK et al. reported that peptic ulcer perforation was 43 cases (46%) in line with our study [29]. Abdominal pain was reported in all the study participants, and its duration ranged from 2 to 18 hrs. Secondary to abdominal pain was abdominal distention. In a retrospective cohort study, it was observed that Cases with perforations due to vasculitic involvement had more small bowel involvement, longer duration of abdominal pain before perforation (41 days vs. 0 days,  $p=0.005$ ) [30]. Our results matched with a study by Malhotra MK et al. where they found 93(100%) study participants having abdominal pain. Similarly, abdominal distention was 31(33%) [29]. Similar findings were demonstrated in their case series of undiagnosed minor bowel stenosis presenting with acute perforation after capsule endoscopy. A 60-year-old male presented with distension of the stomach after capsule ingestion [31]. Another case study conducted

on a 77-years-old woman with small bowel perforation as a consequence of migrated esophageal stent showed the symptoms of abdominal pain with abdominal distension [32]. Similar results were presented by Shashank Nahar et al., where they found abdominal pain was 90 (100%) and abdominal distension was 85 (94.44%) [33]. Here we can state that abdominal pain and abdominal distension are the most prominent clinical signs for small intestinal perforation.

In the current study, tenderness, rigidity/guarding, and all the study participants presented obliteration of liver. Similar results were obtained from the study conducted by Shashank Nahar et al., where tenderness was 100%, rigidity was 100%, and obliteration of the liver was 61.11% [33]. In another study, tenderness was 100% guarding was 58.18% and obliteration of the liver was 40.90% [34]. In the present study, Duodenal ulcer perforation was the most common post-op- diagnosis. A study conducted by it found that 28 cases of perforations in 17 cases were of DU perforations [35]. The limitation of the current study was the smaller sample size. We recommend further research with a larger sample size.

### Conclusion:

The results of the present study show that commonest cause of small intestine perforation was peptic ulcer. There was predominance of male population. Abdominal pain and abdominal distension were common clinical features while air under the diaphragm was present in all patients. DUP was found to be most common post operative diagnosis.

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**Table1: Summary of baseline parameter (N=30)**

Parameter	Summary
Age (in years)	43.1 ± 11.11 (ranged 25 to 65)
<b>Gender</b>	
Male	26 (86.67%)
Female	4 (13.33%)
<b>History</b>	
Alcohol consumption	15 (50%)
Smoking	7 (23.33%)
NSAID use	19 (63.33%)
History of peptic ulcer disease	25 (83.33%)
Pain	30 (100%)
<b>Duration pain (in hours)</b>	8.83 ± 4.09 (ranged 2 to 18)
<b>Symptoms</b>	
Distension	29 (96.67%)
Vomiting	12 (40.00%)
Constipation/ Diarrhoea	3 (10.00%)
Fever	11 (36.67%)
<b>Sign</b>	
Pulse rate (Beats/min)	100.43 ± 14.47 (ranged 72 to 128)
Systolic blood pressure (mmhg)	98.67 ± 10.08 (ranged 80 to 120)
Diastolic blood pressure (mmhg)	60.33 ± 9.64 (ranged 40 to 90)

**Table 2: Summary of other parameters (N=30)**

Parameter	Summary
<b>Palpation</b>	
Dehydration	30(100%)
Tenderness	30(100%)
<b>Guarding/rigidity</b>	
+	21(70%)
++	9(30%)
<b>Obliteration of liver dullness</b>	30(100%)
<b>B. sounds</b>	
+	4(13.33%)
-	26(86.67%)
<b>Free fluid</b>	
+	6(20%)
-	24(80%)
<b>Investigation</b>	
Total Count (in / $\mu$ L)	11667.6 $\pm$ 3830.48(range 6800 to 18230)
Haemoglobin (g/dl)	10.17 $\pm$ 1.58(range 7 to 14)
X-erect abdomen - GUD	30(100%)
<b>Post – Op diagnosis</b>	
20 CM FRO ICJ	1(3.33%)
10 CM FROM ICJ	1(3.33%)
12 CM FROM ICJ	1(3.33%)
15 cm from ICJ	1(3.33%)
25 CM FROM ICJ	1(3.33%)
Duodenal Ulcer Perforation	25(83.33%)
<b>Surgery</b>	
Size of perforation (in cm)	1.17 $\pm$ 0.61(range 0.50 to 2.50)
Procedure (COP+OP)	30(100%)
Date of discharge (in days) (Post op day)	12.53 $\pm$ 1.85(range 10 to 17)