



## A Study of Surgical Management of Ileal Perforations and its Outcomes

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### Abstract

**Background:** Ileal perforations are a common presentation in Surgical clinics with most cases having an etiology of typhoid. The current study aimed to assess the presentation and management of ileal perforation with special reference to typhoid, non-specific and traumatic perforations. The study also aims to assess the outcomes in these patients and the factors affecting prognosis. **Methods:** All the cases suspected of perforated ileum were included in the study. History with special reference to the presence of fever, pain, vomiting, abdominal distension, constipation, and treatment before admission was taken. Vital signs, hydration, abdominal distension, tenderness, guarding, and presence of free fluid were noted. Systemic examination of cardiovascular, respiratory, and central nervous systems was done. All routine blood investigations along with Chest X-Ray, Electrocardiogram, Peritoneal fluid culture, and Pus culture in case of wound infection. In patients wherein, a resection was done the specimen was histopathologically examined. **Results:** Out of n=40 cases included in the study n=23(57.5%) were typhoid perforations and nonspecific perforations were found in n=12(30%) cases, traumatic perforations were found in n=5(12.5%) cases. Most of the patients presented with symptoms and signs of peritonitis. The commonest symptoms were abdominal pain, fever, and vomiting. The commonest signs were abdominal tenderness, guarding, intra-abdominal free fluid, and dehydration. Most patients with typhoid gave a history of fever 12.5 % of patients were in shock. **Conclusion:** Typhoid is the commonest cause of Ileal perforations. The male population is affected most of the time as compared to females. It tends to occur commonly in the second or third decade of life. Traumatic perforations have better outcomes because of healthy bowel conditions. Typhoid perforations have greater morbidity or mortality. The other factors affecting the outcomes are the lag period, increased age, and presence of shock at admission. The type of surgical procedures did not affect the outcome.

**Keywords:** Typhoid; Intestinal Perforation; prognosis; small intestine

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### Introduction

Ileal perforation is a common problem seen in tropical countries. The commonest cause is typhoid fever. In western countries, the causes are malignancy, trauma, and mechanical etiology, in the order of frequency. <sup>[1,2,3]</sup> Over the years a definite changing trend has been observed in ileal perforations both in terms of

causes, treatment, and prognosis. Better antibiotics, aggressive surgery, the elimination of conservative treatment, better preoperative and postoperative care have all significantly contributed to the improvement in patient outcomes. <sup>[4]</sup> Outcomes have indeed improved but still cases of ileal perforation cause significant morbidity and mortality that persists despite the significant changes in health care

over the years. Preoperative resuscitation, antibiotic therapy, and total parental nutrition have reduced mortality from 28.5% to 10%.<sup>[2]</sup> The various surgical options are drainage of peritoneal cavity done in moribund patients during resuscitation and preparation for surgery, simple closure is done by the freshening of the edges and closure.<sup>[3]</sup> Talwar et al.,<sup>[5]</sup> have recommended primary closure and limited surgery, wedge resection, and closure in which a wedge of ileal tissue is resected around the perforation and the defect is closed transversely in two layers. Some authors have also recommended resection and anastomosis by excision of the affected segment. Ileotransverse colostomy or resection anastomosis combined with side-to-side ileotransverse colostomy has been advocated by some authors.<sup>[6-8]</sup> This study was done to determine etiology, presentation, management outcome and the factors influencing prognosis and outcome in ileal perforations. The present study includes patients of ileal perforation with emphasis on typhoid, nonspecific and traumatic perforations, and the factors influencing the outcome.

## **Materials and Methods**

This cross-sectional study was conducted in the Department of General Surgery, Prathima Institute of Medical Sciences, Naganoor, Karimnagar. Institutional Ethical permission was obtained for the study. Written consent was obtained from all the participants of the study. The study of clinical features, investigations, operative procedures performed, postoperative morbidity and mortality, and the outcome was done. Jejunal, caecal, appendicular, gastric, or duodenal perforations were excluded from the study. History with special reference to the presence of fever, pain, vomiting, abdominal distension, constipation, and treatment before admission was taken. Vital signs, hydration, abdominal distension, tenderness, guarding, and presence of free fluid were noted. Systemic examination of the cardiovascular, respiratory, and central nervous systems was done. The following investigations were done as a routine CBP, Hemoglobin, Bleeding and Clotting times, Blood sugar and urea and Serum creatinine, Chest X-Ray, Electrocardiogram, Peritoneal fluid culture, and Pus culture in case of wound infection. In patients wherein, a resection was

done the specimen was histopathologically examined. In all non-traumatic perforations, the following additional investigations were done Widal test and Blood Culture. All patients were resuscitated pre-operatively with intravenous fluids and antibiotics. Patients unfit for surgery were initially treated with flank drains under local anesthesia as a temporary measure before definitive laparotomy. Most cases received cefotaxime or ciprofloxacin with metronidazole. In case of gross peritoneal contamination, aminoglycosides were added. All patients underwent laparotomy under general anesthesia. A Midline or Paramedian incisions were employed. The amount and type of peritoneal contamination, number, size, and size of perforations, and procedure employed were noted. The choice of procedure was based on the surgeon's preference or unit policy. The following procedures were employed; Simple two-layer closure, Closure with the free or pedicled omental patch, Resection and anastomosis for both closure and anastomosis, the inner all-coats layer was performed with polyglactin 910, and the outer layer with silk. Antibiotics were routinely given for 5-7 days unless the diagnosis was typhoid in which case antibiotics were continued for up to 10 days. A diagnosis of typhoid was made only if the Widal test was positive, or Salmonellae were isolated from blood or urine, and if histopathological evidence of typhoid perforation was found. When the etiology of a non-traumatic perforation was not found, it was termed nonspecific. Post-operative complications were noted. The factors influencing mortality and morbidity and outcome were assessed. The various parameters were recorded in a proforma and tabulated. Analysis was done using SPSS software version 19. The various tests used for statistical analysis were Chi-square.

## **Results**

Out of n=40 cases included in the study, n=23 were typhoid perforations and nonspecific perforations were found in n=12 cases, traumatic perforations were found in n=5 cases. The age of patients ranged from 17 to 65. Perforation commonly occurred in the second and third decade of life with 65% of patients between the ages of 20 and 40. The male to female ratio was 3:1.

**Table 1:** Age and Sex incidence in Ileal Perforation

Age in years	Male	Female	Total	Percent
15 - 20	2	0	02	5.0
20 - 30	10	5	15	37.5
30 - 40	8	3	11	27.5
40 - 50	5	2	07	17.5
50 - 60	4	0	04	10.0
60 - 70	1	0	01	2.5
Total	30	10	40	100

Most of the patients presented with symptoms and signs of peritonitis. The commonest symptoms were abdominal pain, fever, and vomiting. The commonest signs were abdominal tenderness, guarding, intra-abdominal free fluid, and dehydration. Most

patients with typhoid gave a history of fever 12.5 % of patients were in shock. X-Ray: Pneumoperitoneum in the chest and erect abdominal x-ray was seen in 80% of patients. Features of intestinal obstruction, including dilated bowel loops with air-fluid levels in erect abdominal x-ray were seen in 25% of patients. Hematology and Biochemistry: Hemoglobin was less than 8 g/dL in 15 (37.5%) of patients and Albumin of < 3.5 g/dL was seen in 11 (27.5%) of cases. Azotemia is defined as a Blood Urea of > 52 mg/dL and/or Serum Creatinine > 2 mg/dL was seen in 40% of patients. Microbiology: Blood cultures were done the typhoid growths were sensitive to ciprofloxacin, cefotaxime, ceftriaxone, and amikacin. The peritoneal fluid culture was done in all patients and cultures obtained in 20.0 patients grew *E. coli* and *Klebsiella* spp. each and one patient had *Proteus Vulgaris*. Histopathology: Pathological examination of either resected specimen or scrapings from the edge of the ulcer was done in ten patients. A report suggestive of typhoid was seen in 2 cases. The size of perforation in n=18 patients ranges from 0.6 cm to 1 cm, in n=12 patients' size of perforation ranges up to 0.5 cm and in n=10 patients' size of perforation is more than 1 cm.

**Surgical Procedures:** Simple 2-layer closure was the commonest procedure done n=26(65%). Closure with the omental patch was done in n=8(20%) and resection and anastomosis in n=6(15%) of patients. The postoperative complications were commonly wound infection in n=4 cases, followed by burst abdomen in n=2 cases, fecal fistula in n=1 cases, and respiratory complication in one case depicted in table 2.

**Table 2:** The postoperative complication in the study

Complication	Frequency	Percentage
Wound infection	4	10.0
Burst abdomen	2	5.0
Fecal fistula	1	2.5
Respiratory complication	1	2.5
Stoma complications	0	0.00

The time between the onset of pain and the surgical intervention was between 8 and 72 hours with an average of 35.50 ± 10.5 hours. The average operating time was 125.0 ± 10.5 minutes. Resection and anastomosis took a long time than the other procedures, but the difference was not statistically significant. The median hospital stay was twenty days. There was no significant difference in the hospital stay of patients undergoing different surgical procedures. The mortality rate was 7.5%. Septicemia, fecal fistula, and respiratory complications were the commonest causes of death.

## Discussion

The commonest cause of ileal perforation in the series was typhoid fever accounting for 57.5% of cases. Typhoid fever was the commonest cause of ileal perforation in tropical countries. Typhoid fever accounted for 56.6% of cases of ileal perforation in the series by Karmakar et al.,<sup>[1]</sup> our results are in concordance with his findings. Mechanical perforations were caused in 12.5% of cases of our study. Mechanical causes and malignancy are the commonest causes of small bowel perforation in the western world. Dixon et al.,<sup>[2]</sup> found Mechanical causes and lymphomas accounted for 40.7% of perforations in their series. When the etiology of the perforation was not identified it was termed non-specific perforation. Non-specific perforation was the second commonest cause in this study. Seven patients of non-specific perforation had a fever before the onset of abdominal symptoms. Widal test, blood culture, and Histopathology were not suggestive of typhoid. These cases may be undiagnosed cases of typhoid. Non-specific perforations were the commonest cause of small bowel perforation in the series by Dixon et al.,<sup>[2]</sup> There was a male preponderance with the male: female ratio in this study being 3:1. This preponderance was

seen in typhoid, non-specific and traumatic perforations other studies in this field also have reported similar findings. [10-12] Most patients presented with features suggestive of peritonitis. Patients of both typhoid and non-specific perforations had a similar presentation with respect to abdominal symptoms and signs. Patients with typhoid perforation had a fever, abdominal pain, and vomiting. Examination revealed tenderness, guarding, distension, and intraperitoneal free fluid. Eggleston et al., [13] reported that most patients had a fever, malaise, and sudden increase in abdominal pain in typhoid perforation. Gibney et al., [14] and Gulati et al., [15] have reported pneumonia, cholecystitis, gastrointestinal bleed, osteomyelitis, and intestinal perforation in patients with typhoid perforation. Perforation was commonly seen to occur in the second week following the onset of illness. [8, 16] In this series the perforation was earlier with a majority occurring within a week of onset of fever. Chest X-ray is a useful investigation to detect hollow viscus perforation. Free gas was seen under the diaphragm in 78% of perforations and 75% of typhoid perforations. Salmonella typhi was grown in 3 (13% of tested) patients with ileal perforation in whom blood cultures were done. All cultures were sensitive to ciprofloxacin, cefotaxime, and ceftriaxone. Keenan JP et al., [17] reported positive cultures in 22.2% and Santillana et al., [18] in 48% of patients. Prior antibiotic therapy was probably responsible for the low isolation of the study. In this study, patients underwent simple closure, omental patch repair, or resection anastomosis. Resection was employed in typhoid or traumatic perforations wherein multiple perforations were found on laparotomy. Orloff et al., [19] recommended debridement and closure in patients of traumatic perforation where the injury was small and resection anastomosis in patients with large wounds or multiple perforations. The overall complication rate for all patients in this series was 20%. Typhoid perforations are associated with a high morbidity rate with literature reports between 28.5% and 81%. [13] There was no mortality in patients of traumatic perforations. Typhoid perforations in this study thus showed a poorer prognosis than the other etiologies. The surgical procedure did not influence either the morbidity

or the mortality in patients irrespective of etiology.

## Conclusion

Within the limitations of the present study, it can be concluded that typhoid is the commonest cause of Ileal perforations. The male population is affected most of the time as compared to females. It tends to occur commonly in the second or third decade of life. Traumatic perforations have better outcomes because of healthy bowel conditions. Typhoid perforations have greater morbidity or mortality. The other factors affecting the outcomes are the lag period, increased age, and presence of shock at admission. The type of surgical procedures did not affect the outcome.

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