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Original Article

Study on Etiopathogenesis and Management of Ileal Perforation in Tertiary Care Hospital in South India

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Abstract

Introduction: Ileal perforation is a common problem seen in tropical countries. The most common cause being typhoid fever.

Materials and Methods: This study consists of 40 patients of ileal perforation admitted in a tertiary care hospital. A study of clinical features, investigations, operative procedures performed, history with special reference to presence of fever, pain, and abdominal distension was taken. All patients underwent laparotomy under general anesthesia. The amount and type of peritoneal contamination, number, site and size of perforations, and procedure employed were noted.

Results: The age of patients ranged from 15 to 84. Perforation commonly occurred in the second and third decades of life with 60% of patients between the ages of 20 and 40. The male-to-female ratio was 3:1. Typhoid perforation commonly occurred in the second and third decades with the most common cause of ileal perforation was typhoid. 13 patients had non-specific perforations. One patient was diagnosed to have human immunodeficiency virus with ileal perforation. 62% of cases in a similar age group. Simple two-layer closure was the most common procedure done (77.5%), end ileostomy (12.5%), ileo transverse anastomosis (7.5%), and resection and anastomosis in 2.5% of patients.

Conclusion: Typhoid is the most common cause of ileal perforation, followed by non-specific perforations. Patients have a male preponderance and are usually in the second and third decades of their lives. Mortality in ileal perforations, especially typhoid is high, the type of surgical procedure did not influence outcome, either morbidity or mortality.

Keywords: Ileum, Management, Perforation, Typhoid

INTRODUCTION

Ileal perforation is a common problem seen in tropical countries. The most common cause being typhoid fever. In Western countries, the causes are malignancy, trauma, and mechanical etiology, in the order of frequency.[1]

Although intestinal hemorrhage is the most common complication of typhoid fever, intestinal perforation continues to be the most frequent reason behind high morbidity and mortality.[2] Generally, hemorrhage and perforation occur in the terminal ileum secondary to necrosis of Peyer's patches at 2-3 weeks after the onset of the disease. The frequency of perforation varies between 0.8% and 18%, and mortality rates of typhoid intestinal perforation (TIP) cases are reported to be between 5% and 62%. Peri-operative mortality rates are noted to rise up to 80% in patients who received surgery due to late perforations.[2]

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, and the elimination of conservative treatment, better pre-operative, and post-operative care have all significantly contributed to the improvement in patient outcome. It is true that outcomes have improved, but still cases of ileal perforation cause a significant morbidity and mortality that persists despite the significant changes in health care over the years. The present study includes patients of ileal perforation with emphasis on typhoid, non-specific perforations, and the factors influencing outcome.[3]

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MATERIALS AND METHODS

This study consists of patients admitted from May 2010 to October 2012. 40 patients of ileal perforation admitted to Government Rajaji Hospitals during this period were included in the study. A study of clinical features, investigations, operative procedures performed, post-operative morbidity and mortality, and outcome was done. Jejunal, cecal, appendicular, gastric, or duodenal perforations were excluded from the study. Traumatic ileal perforations were also excluded from the study.

History with special reference to presence of fever, pain, and abdominal distension, 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 system was done.

The following investigations were done as a routine:
1. Hemoglobin
2. Bleeding and clotting times
3. Blood sugar and urea and serum creatinine
4. Chest X-ray
5. Electrocardiogram
6. Peritoneal fluid culture
7. 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:
1. Widal test
2. 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. The amount and type of peritoneal contamination, number, site and size of perforations, and procedure employed were noted. The following procedures were employed.
1. Simple two-layer closure
2. Ileostomy
3. Resection and anastomosis
4. Ileo transverse anastomosis.

For both closure and anastomosis, the inner all-coats layer was performed with 3-0 vicryl 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 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 non-specific. Post-operative complications were noted. The factors influencing mortality and morbidity and outcome were assessed.

Statistical Analysis

Data were analyzed using computer software, statistical package for social sciences (SPSS) version 12. Data were expressed in proportion and percentages.

RESULTS

A total of 40 patients of ileal perforation were included in this study. Patients have been grouped into etiological categories, namely, typhoid, non-specific, and miscellaneous. The age of patients ranged from 15 to 84. Perforation commonly occurred in the second and third decades of life with 60% of patients between the ages of 20 and 40. The male-to-female ratio was 3:1. Typhoid perforation commonly occurred in the second and third decades with 62% of patients between

Table 1: Distribution of age, gender, and history among study groups

Variable	*n* (%)
Age	
<20	4 (10)
21-40	20 (50)
41-60	14 (35)
>60	2 (5)
Sex	
Male	30 (75)
Female	10 (25)
H/o fever (days)	
<4	10 (25)
5-10	27 (67.5)
>10	3 (7.5)
H/o abdomen pain	
<2	22 (55)
3-4	14 (35)
5-6	4 (10)
Widal test	
Positive	26 (65)
Non-specific	14 (35)
Total	40 (100)

the age of 20 and 40. The male-to-female ratio was 3:1 (Table 1). Most of the patients presented with symptoms and signs of peritonitis. The most common symptoms were abdominal pain, fever, and vomiting. The most common signs were abdominal tenderness, guarding, intra-abdominal free fluid, and dehydration. Most patients of typhoid gave a history of fever. 12% of patients were in shock.

Typhoid perforation commonly occurred in the second and third decades with the most common cause of ileal perforation was typhoid. 13 patients had non-specific perforations. One patient was diagnosed to have human immunodeficiency virus with ileal perforation. 62% of cases in a similar age group (Table 2). Multiple perforations occurred in 20% of patients, mostly in typhoid. Over 90% of perforations were within 2 feet (60 cms) from the ileocecal junction and 62% within 30 cms (Table 2).

Simple two-layer closure was the most common procedure done (77.5%), end ileostomy (12.5%), ileo transverse anastomosis (7.5%), and resection and anastomosis in 2.5% of patients (Table 3). Complications occurred in 4 (10%) of all cases. The common complications seen were wound dehiscence. The highest complication rate was seen with simple closure and the least with resection and anastomosis. The type of surgical procedure did not influence the mortality or morbidity in ileal perforations and also in etiology specific analysis.

In patients with typhoid, simple closure had the highest mortality and resection anastomosis, and the highest complication rate in non-specific perforations simple closure had the highest mortality and complication rate.

Table 2: Details of perforation among study participants

Variable	*n* (%)
Etiology of ileal perforation	
Typhoid	26 (65)
Non-specific	13 (32.5)
HIV	1 (2.5)
Site in cms from ileocecal junction	
<20	14 (35)
20-40	24 (60)
41-60	2 (5)
Number of perforations	
1	36 (90)
2	3 (7.5)
3	1 (2.5)

Table 3: Management of perforation

Management	*n* (%)
Primary closure	31 (77.5)
Ileostomy	5 (12.5)
Ileo transverse anastomosis	3 (7.5)
Resection anastomosis	1 (2.5)
Total	40 (100)

DISCUSSION

The most common cause of ileal perforation in the series was typhoid fever accounting for 65% of cases. Non-specific perforation was the second most common cause in this study accounting for 32.5% of cases. Seven patients of non-specific perforation had a fever before onset of abdominal symptoms. Widal test, blood culture, and histopathology were not suggestive of typhoid. These cases may be undiagnosed cases of typhoid.

Examination revealed tenderness, guarding, distension, and intraperitoneal free fluid. 6 patients were in shock on admission. Chest X-ray is a useful investigation to detect hollow viscus perforation. Free gas was seen under the diaphragm in 78% of perforations and in 75% of typhoid perforation. Abdominal X-ray revealed gas of features suggestive of ileus. Pneumoperitoneum has been reported in 52% to 82% in studies by Keenan and Hadley[4], Archampong[5], Akgun[6], and Vaidyanathan.[7]

Widal was positive in 55% of tested cases and 91% of patients of typhoid perforation. Widal was reported positive in 30% of patients with typhoid perforation by Kaul and in 46.1% of patients by Santillana.[8,9] It was reported positive in 75.5% of cases by Jarrett and in 73% by Vaidyanathan.[7,10]

Salmonella typhi was grown in 4 (10% of tested) patients with ileal perforation in whom blood cultures were done. All cultures were sensitive to ciprofloxacin, cefotaxime, and ceftriaxone. Keenan and Hadley reported positive cultures in 22.2% and Santillana in 48% of patients.[8] Prior antibiotic therapy was probably responsible for the low isolation of the study.[5] Another cause may be delay in plating the samples. In this study, most patients of confirmed typhoid were treated with ciprofloxacin and metronidazole. The rest had a third-generation cephalosporin (cefotaxime) and metronidazole.

In the management of typhoid perforation, some authors advocated conservative management.[11-13] At present, there is no such controversy in the treatment of typhoid perforation with the current recommendation being surgical management.[14] The various methods in use are local drains, simple closure, closure with omental patch, wedge resection, resection and anastomosis, ileotransverse anastomosis, and ileostomy.[15,16] In this study, patients underwent simple closure, omental patch repair, or resection anastomosis. No patients were treated by conservative measures, wedge resection, ileotransverse anastomosis, or ileostomy. Resection was employed in

typhoid or traumatic perforations, wherein multiple perforations were found on laparotomy.

The mortality in this series was 5%. Typhoid perforations in this study thus showed a poorer prognosis than the other etiologies. Taiwan *et al.* reported that mortality was least with early primary closure, and Ameh *et al.* found that mortality was highest with wedge resection and least with resection and anastomosis.[10,16]

In patients of ileal perforation, the significant factors influencing mortality are age >50, female sex, feculent peritonitis, raised blood urea, or creatinine as per the Mannheim peritonitis index. In this study, age >50 and shock at presentation were significant factors influencing mortality. Trends were seen with fecal fistula formations, etiology of typhoid, and pre-operative azotemia. Sex, hemoglobin or albumin levels, number of perforations, and type of peritoneal contamination were not found to be significant.

Archampong reported that urine output before surgery, blood urea, and serum potassium affected survival in patients of typhoid perforation.

Survival was independent of hemoglobin level, shock, sickling status, and number of perforations.[5] Mock reported that increasing number of perforations, generalized contamination of the peritoneal cavity, and single-layer closure influenced survival.[17] Eggleston in his series of 78 patients reported that the shock, uremia, encephalopathy, fecal peritonitis, and post-operative fecal fistula were predictors of mortality.[18]

CONCLUSION

This study was conducted includes 40 cases of ileal perforation admitted to government hospital and showed that typhoid is the most common cause of ileal perforation, followed by non-specific perforations. Patients have a male preponderance and are usually in the second and third decades of their lives. Widal serology is a useful test in the diagnosis of typhoid fever. Typhoid perforations have a significantly higher morbidity rate than non-specific perforations. Mortality in ileal perforations, especially typhoid is high, though the etiology is not a significant contributing factor. The type of surgical procedure did not influence the outcome, either morbidity or mortality. Morbidity was significantly influenced by age >50, hypoalbuminemia, and a diagnosis of typhoid as the cause of perforation. Mortality was significantly influenced by age >50 and shock on admission. Being a hospital-based study, the findings of the study cannot be externally validated, and the authors also recommend further studies with a higher sample size.

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