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Original Research Article

Typhoid ileal perforation: comparative study of ileostomy versus primary ileal repair and associated morbidity and mortality

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ABSTRACT

Background: Enteric perforation is most frequent encountered acute surgical emergency in Northern India and immediate warrants operative intervention. But the kind of intervention, whether primary repair or ileostomy is always a topic of debate for a long era.
Methods: Sixty cases of ileal perforation were studied retrospectively from Feb. 2016 to august 2017 and information had been accumulated on clinical presentation, demographic profile and laboratory data. Details were obtained for operative findings and appropriate method of operative intervention done and later postoperative course of the patients in fallow up.
Results: Ileal perforation occurred mostly in young males (age 28.2±10.9 years). Male and Female ratio has been found to be 5: 1. In present study 60% of patients had Widal positive supporting typhoid aetiology; Blood culture was positive for salmonella typhi in 21 (35%) cases. 67.3% of patients underwent primary closure, while 32.7% underwent ileostomy. Nature of clinical presentation, laboratory data and operative findings in both groups has been thoroughly analysed.
Conclusions: Authors have carried out this study to label some of the preoperative and intraoperative factors, which can serve as a guideline for decision making in operative intervention in a specific patient.

Keywords: Ileostomy, Morbidity and mortality, Primary repair, Typhoid ileal perforation

INTRODUCTION

Perforation peritonitis is the most common surgical emergency in India. In contrast to the western literature, where lower gastrointestinal tract perforations predominate, upper gastrointestinal tract perforation constitutes the majority of cases of peritonitis in India and subcontinent.[1] The postulated causes of ileal perforation include typhoid fever, tuberculosis, trauma, Crohn's disease, malignancy, nonspecific inflammation, obstruction, tuberculosis and radiation enteritis etc. perforation of the terminal ileum constitutes the fifth most common cause of abdominal emergencies in the tropical countries An exhaustive study in India shows that enteric fever is responsible for nearly 87% of all non-traumatic small bowel perforation with a mortality ranging between 11 to 34%.[2,3] Typhoid fever is an endemic disease in India and other tropical countries. Small intestinal perforation and gastrointestinal hemorrhage are the most common and dreadful complication of enteric fever.[4] The frequency of enteric perforation in typhoid in typhoid fever has been reported variously from 0.8 to 18 %.[5] The enteric perforation was more common in male than in females with a ratio of 6:1. The age ranges from 8-65 year with the maximum number of patient (40%) in their 3rd decade followed by

32% of patients in their 2nd decade. Patients of enteric perforation were admitted throughout the year with the highest number in the months of July and September and also between transition of seasons.[6]

Perforation of the intestine is the most serious complication of typhoid fever and remains a significant problem with in many parts of the world. Typhoid fever is caused by salmonella typhi, a gram-negative bacillus and is acquired by ingestion of contaminated water or food. The disease has a seasonal incidence, peaking at times of heavy rainfall, when water contamination is more likely. The organism passes through payer's patches without causing inflammation. Second week of symptomatic illness the bacteria reach the gut, either via the bile or by bacteramic spread and localize in payer's patches. Ulceration occurs and there is an associated mesenteric adenitis. Enteric fever is a systemic disease caused by *Salmonella typhi* and *Salmonella paratyphi* and is characterised by fever, abdominal pain, relative bradycardia with involvement of the lymphoid tissues.[3]

The organism passes through the Peyer's patches without causing inflammation. Multiplication occurs in the reticuloendothelial system for 10 - 14 days. Seeding occurs in the blood stream corresponding to the clinical onset. During the 2nd week of illness, bacteria reach the gut and localise in Peyer's patches leading to ulceration and mesenteric adenitis.

Necrotic areas appear in lymphoid tissue. Perforation occurs along the long axis of the bowel and where perforation does not occur, and the disease healing occurs without scaring so that late strictures are not seen. Perforation occurs classically on the anti-mesenteric border of the terminal ileum. The size of the perforation varies but true micro perforations are uncommon, and the average diameter is 5 mm.[7]

Various operative procedures have been advocated by different authors such as primary repair of perforation, repair of perforation with ilio-transverse colostomy, single layer repair with omental patch, trimming of ulcer edge and closure, wedge excision and anastomosis. Even with such variety of procedures, enteric perforation still has a high rate of morbidity and mortality. The mortality ranges between 9% to 43% while survivors have wound infection and a history of long hospital stays. Mortality from other post-operative complication ranges 8.8-71.3%.[8] Present study to evaluate morbidity and mortality of those patient who underwent surgical treatment either primary closure or ileostomy.

METHODS

Above study conducted in patients who were operated for typhoid ileal perforation at Heritage institute of medical sciences, Varanasi India from February 2016 to August 2017. It is a one and half year study and conducted after approval of ethical committee.

Inclusion criteria

- Out patients presenting to present emergency with signs of hollow viscus perforation.
- Patients with an intra-operative finding of Ileal perforation.
- Patients who consented for emergency exploratory laparotomy.
- Patient operated for pyoperitonium and found to have ileal perforation.

Exclusion criteria

- Patients with hollow viscus perforation other than ileal perforation.
- Patients who refused to undergo exploratory laparotomy.

Various causes of nontraumatic ileal perforation include bacterial infections (Salmonella, Yersinia, and tuberculosis), viral infections (cytomegalovirus, human immunodeficiency virus), fungal infection (histoplasma), parasitic infections (A. lumbricoides, E. vermicularis, and E. histolytica), and others (Wagener's granulomatous and drugs (NAISD e.g., aspirin, paracetamol, mefenamic acid, Ibuprofen, etc). In a significant number of cases the cause of perforation is not known, and it is called nonspecific ileal perforation. The perforation causes gram-negative aerobic and anaerobic infection leading to peritonitis.[9]

Various operative procedures were advocated by different authors, such as the following: simple primary repair of perforation, repair of perforation with ileo-transverse colostomy, primary ileostomy, single layer repair with an omental patch, resection and anastomosis.[9] All patients underwent an emergency explorat. In present study 60 patients undergoing operation were randomized between two groups:

Groups A-dealt with by primary repair.
Group B-dealt with ileostomy of gut.

All the patients initially presented to the casualty department as cases of acute abdomen. On the basis of history and clinical examination, a provisional diagnosis of intestinal perforation was made. All patients were actively resuscitated and started on IV fluids, Third generation cephalosporin and metronidazole and supportive treatment. USG abdomen, X-ray chest and X - ray abdomen were done in all patients. With the confirmation of the initial diagnosis of intestinal perforation then was made. Laparotomy was planned in all cases. Patients were taken after written and inform consent in Operation Theater and under suitable anesthesia (GA) laparotomy were done from midline incision. After opening of peritoneum, peritoneum lavage and exploration of gut was done. Intra operative finding were recorded. Identifying the perforation site (perforation is oval or round ulcer in terminal ileum on

the anti-mesenteric border). According to assessment of the surgeon, primary repair or ileostomy was done.

RESULTS

In present study 60 patients were studied and evaluated and following observation was made. Out of 60 patients, patients managed with primary repair perforation or ileostomy after exploratory laparotomy and followed up for 15 days, 1 month, 3 months and 6 months. The incident ileal perforation maximum occurred in the second to third decade (50.6%). Ileal perforation was more common in males with male: female ratio of 5:1. The patient was 9 years and oldest was 81 years (Table 1).

Table 1: Age and sex distribution.

Age distribution (years)	Male	Female	Percentage
10-20	11 (22%)	0 (10%)	18.3
21-30	14 (28%)	4 (40%)	30.0
31-40	10 (20%)	3 (30%)	21.6
41-50	8 (16%)	2 (20%)	16.6
>51	9 (18%)	1 (10%)	16.6
Total	50	10	100
	83.3%	16.7%	

Most consistent clinical presentations were pain in abdomen, abdominal distension, fever respectively fallowed by vomiting, constipation and diarrhea respectively. All the patients presented with pain which started in lower abdomen and letter radiated to involve whole abdomen. The average duration of pain was 3-4 days. 100 % of patients presented with fever with duration of average 8 days. Fever preceded the abdominal symptoms in these patients (Table 2).

Table 2: Clinical presentations.

Symptom	No. of patients	Percentage
Pain in abdomen	60	100
Abdominal distension	52	86.6
Fever	57	78.3
Vomiting	36	60
Constipation	37	61.6
Diarrhoea	14	23.3

Widal test was performed in 60 cases out of 36 (60%) patients and 24 (40%) Widal negative. Blood culture was performed in 60 cases, which was positive for *Salmonella typhi* in 21 (35%) cases. Rest of the culture was sterile (Table 3).

Table 3: Blood investigations.

Finding	Widal test	Blood culture
Positive	36 (60%)	21 (35 %)
Negative	24 (40%)	39 (65%)

60 cases of ileal perforation were studied, 41 (68.3%) ware managed with primary ileal repair and 19 (31.7%) patients were managed with ileostomy with or without primary repair (Table 4).

Table 4: Operative procedure.

Groups	Procedure	No.	Percentage
Group 1	Primary repair	41	68.3
Group 2	Ileostomy with or without primary repair	19	31.7

Table 5: Complications (local).

Complications	Group 1 (n=41)	Group 2 (n=19)	p-value
Wound infection	8	11	0.567
Primary repair leak	2	-	
Wound dehiscence	1	6	0.381
Burst abdomen	2	3	0.047
obstruction	1	2	0.015
Skin excoriation	-	10	
Ileostomy prolapse	-	2	
Ileostomy retraction	-	1	
Incisional hernia	-	2	
Bleeding	-	-	
Necrosis	-	-	
Stenosis	-	-	
Parastomal hernia	-	-	

As per local and systemic complications were concerned local skin excoriation, obstruction, burst abdomen were more in ileostomy patients (Table 5), post-operative weight loss, electrolyte imbalance and pulmonary infection was significantly high in ileostomy group which was obvious due to long postoperative duration (Table 6).

Table 6: Complication (systemic).

Complication	Group 1 (n=41) (%)	Group 2 (n=19) (%)	p-value
Electrolyte imbalance	02 (4.87)	05 (26.3)	0.017
Pulmonary infection	03 (7.3)	04 (26.3)	0.0457
Septicaemia	02 (4.87)	02 (10.5)	0.42
Weight loss	02 (4.87)	09 (47.36)	0.0001
Renal failure	-	-	-
Shock	01 (2.43)	01 (5.2)	0.58
Mortality	02 (4.87)	02 (10.5)	0.47

Table 7: Morbidity and mortality pattern.

Complication	Group 1 n=41	Group 2 n=19	p-value
Morbidity	12 (29.2%)	12 (63.6%)	0.0116
Mortality	03 (7.3%)	03 (15.8%)	0.3112

Morbidity was found more in group 2, which was related to ileostomy related complication (p value 0.263). Two patients in group 1 and three patients in group 2 expired accounting for mortality (Table 7).

DISCUSSION

Perforation of a typhoid ulcer usually occurs during the third week and is occasionally the first sign of disease. Typhoid perforation is still seen in present environment with higher male incidence. This is similar to reports in other series.[8,9] This may due to in fact young men in search of job are compelled to eat unhygienic food outside the home. In present mean age was 30 year with range of 13-70. Majority of the patients were in the age group 13-30 years (60%). In present study peritonitis was present in all and the contamination was feco- purulent in nature. The majority of the perforation was single (92%) of size less than 1 cm and located within 60 cm of terminal ileum (96%). Adesunkanni observed 86% single perforation and rest had multiple perforations, Wani et al observed 62% had single perforation and rest had multiple perforations.[10] Almost all of the perforations were located on the anti-mesenteric border of terminal ileum. Typhoid perforation is rare under 5 year of age. Patients with enteric perforation were admitted throughout the year with higher number in months of July, August and September. Typhoid ileal perforation is best treated by surgery is universally accepted, but exact nature of the surgical procedure remains controversial to date. In present study, two procedures-primary repair of perforation and ileostomy were performed. Primary repair of perforation was done in 24 patients and proximal loop ileostomy or exteriorization of perforation was done in 26 patients. The morbidity associated with primary repair is 50% which is less then morbidity of 65.5% associated with ileostomy formation. Mortality in present study was 8.33% in primary repair and 11.53% in ileostomy which is low in comparison to other studies which reported about 28%.

However, mortality was unrelated to type of operative performed. Wound infection was the most common post-operative complication about 25% in group 1 and 53.8% in group 2 followed by wound dehiscence, intra-abdominal collection and repair leak which is in accordance with previous study (p value <0.05). The other complication in group 2 was related to ileostomy which hampered quality of life and significantly added to morbidity in these patients.

CONCLUSION

Typhoid ileal perforation still carries high morbidity and mortality. The typhoid ileal perforation should always be treated surgically. There are many operative techniques to deal typhoid ileal perforation, but no one is without complication. Primary repair is to be preferred and choice of procedure in patient with single perforation. Ileostomy was advocated in multiple perforation with ileum is grossly inflamed faecal peritonitis and unhealthy gut due to edema.

However, ileostomy lifesaving procedure in poor condition but patient who underwent ileostomy showed great morbidity and mortality. Significantly added to morbidity in these patients. Authors conclude that early surgical intervention is mandatory for good results. Although, there can be dilemma over choice of surgery, but various parameters can help in guiding to make a decision over choice of primary closure versus ileostomy. Preoperative parameters namely delayed presentation (>72 hours), presence of shock at admission, anaemia, hypoproteinaemia should guide one to choose ileostomy over primary closure. Similarly, operative findings of high volume of intraperitoneal contamination (>1500 ml), feculent smell, perforations close (within 10 cm) to ileocaecal junction and presence of significant bowel wall oedema, one should prefer to make an ileostomy. Making an ileostomy in such patients may sometimes be equivalent to snatching patient's life from hands of death.

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