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The benefits of protective defunctioning ileostomy in ileal perforation surgery

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ABSTRACT

Background: Perforation of bowel, particularly ileal perforation, is a significant emergency surgical problem in developing and underdeveloped nations and usually associated with high morbidity and mortality. The study is focussed on evaluating the impact of protective ileostomy in ileal perforation and to compare its outcome in term of post operative complication, hospital stay, psychological impact and mortality with primary surgery without ileostomy and observe its effect on prognosis of patient as a whole. Aim of the study we compared two modalities of treatment, primary surgery without ileostomy v/s primary surgery with protective defunctioning ileostomy with respect to post operative complications, duration of hospital stay, morbidity, mortality and psychological impact.
Methods: We studied 50 patients of ileal perforation (diagnosed per-operatively) admitted to tertiary level hospital and operated upon for laparotomy. Patients were divided in 2 groups: Group A = Protective defunctioning ileostomy along with primary surgery, and Group B = Primary surgery alone. Primary surgery includes primary closure of perforation or resection and end to end anastomosis.
Results: The commonest cause of non-traumatic ileal perforation was typhoid (52%) followed by non specific, tuberculosis and diverticulitis. Different types of operative procedures were performed. In Group A, total no. of dreaded complications like faecal fistula was 1 while in Group B, 10 patients developed faecal fistula. Other complications like wound infection and wound dehiscence were 28% in Group A while 96% in Group B. Overall mortality rate was 24% with 12% mortality in group A and 36% in group B. Mean hospital stay in Group A patient was 12.640±5.75 days (1-23 days) and those of group B was 23.760±16.04 days (5-59 days).
Conclusions: Construction of protective defunctioning ileostomy in case of distal ileal perforation repair or anastomosis greatly reduces the dreaded complication and mortality in comparison to perforation repair or anastomosis without protective ileostomy. Although it is associated with ileostomy related complications, but they are only temporary and obviously no more than the price of life saved.

Keywords: Defunctioning ileostomy, Faecal fistula, Ileal perforation, Protective ileostomy

INTRODUCTION

Perforation of bowel, particularly ileal perforation, is a significant emergency surgical problem in developing and underdeveloped nations and usually associated with high morbidity and mortality. Most common cause of ileal perforation is typhoid; other may be tuberculosis, trauma and non specific enteritis. Patients usually present with abdominal pain and tenderness with signs of peritonitis like abdominal guarding and rigidity etc. Late cases may present with severe toxic state. Surgical intervention is the definite treatment for it. Various

operative procedures were advocated by different authors, such as the following: (i) simple primary repair of perforation (ii) repair of perforation with ileotransverse colostomy (iii) primary ileostomy (iv) single layer repair with an omental patch (v) resection and anastomosis.[1]

Of all the postoperative complications reported, faecal fistula remains the most life threatening; the rate of its occurrence has been reported to be around 12% with a very high mortality rate. In view of this alarming situation, a shift in favour of a defunctioning ileostomy following primary closure of the perforation has been observed in the recent years.[2]

Defunctioning loop ileostomy is constructed when both, diversion of intestinal flow and decompression of small bowel are required. It protects the distal primary repair done in septic tissue and also reduces risk of post operative leakage. Though ileostomy is a lifesaving procedure in such cases, it may result in significant number of complications as well. A small intestinal diverting stoma carries significant morbidity, mostly due to fluid/electrolyte imbalance and nutritional depletion. Peristomal skin irritation is perhaps the commonest complication of ileostomy leading to skin excoriation. Other complications after ileostomy are bleeding, ischemia, obstruction, prolapse, retraction, stenosis, para-stomal herniation, fistula formation, residual abscess, wound infection, and incisional hernia. In addition, ileostomy is known to adversely affect the quality of life due to physical restrictions and psychological problems.[3]

The study is focussed on evaluating the impact of protective ileostomy in ileal perforation surgery and to compare its outcome in term of post operative complication, hospital stay, psychological impact and mortality with primary surgery without ileostomy and observe its effect on prognosis of patient as a whole.

Aim of study

We compared two modalities of treatment, primary surgery without ileostomy versus primary surgery with protective defunctioning ileostomy with respect to post operative complications, duration of hospital stay, morbidity, mortality and psychological impact.

METHODS

We studied 50 patients of non-traumatic ileal perforation (diagnosed per-operatively) admitted to JLN Medical College, Ajmer over the period of July 2012 to December 2014; and operated upon for laparotomy. Children below 14 years of age, very high risk patients with co-morbidities such as Ischemic Heart Disease, diabetes or renal failure were excluded from the study. Patients who did not give consent for construction on ileostomy were also excluded from study.

Complete history taking was done along with detailed clinical examination and data were recorded in Performa. All relevant investigations were done. A diagnosis of typhoid was made only if Widal test was positive or histopathological examination of gut biopsy showed typhoid. When no definite aetiology of non-traumatic perforation was found, it was termed as non specific.

An informed consent was taken for surgery and for possibility of stoma when indicated.

Laparotomy was done; site of perforation, number of perforations, condition of bowel, type of peritoneal fluid were noted. After dealing with perforation and constructing ileostomy, if needed, peritoneal cavity thoroughly washed with saline, drain was placed in pelvis, abdomen was closed in layers.

Patients were divided in 2 groups based on type of operative procedure:

Group A = Protective defunctioning (loop) ileostomy along with primary surgery

Group B = Primary surgery alone.

Primary surgery includes primary closure of perforation or resection of part of the ileum and end to end anastomosis.

Patients were observed for post operative complications like wound infection, dehiscence, faecal fistula, other stoma related complications etc. Total hospital stay was calculated after discharge of the patients from hospital or death.

All data were analysed by using SPSS software version 16.0 and values were calculated such as mean values, standard deviation, standard error, chi-square test.

The value thus calculated was compared at appropriate level of significance for corresponding degree of freedom. The P-value of <0.05 was considered statistically significant.

RESULTS

50 patients of ileal perforation were included in the study. Patients were divided in two groups -

Group A - Primary repair or resection anastomosis along with protective ileostomy.

Group B - Only primary repair (Primary repair or resection anastomosis)

The age of patients ranged from 16-70 years with mean being 38.42 years (Table 1).

There was male preponderance in this study with male to female ratio of 3.5:1 (Table 2).

Most of patient presented with symptoms and signs of peritonitis. The commonest symptoms were pain abdomen, fever, vomiting. The common sign were abdominal tenderness, guarding and rigidity, absent bowel sounds, abdominal distension and obliteration of liver dullness. Gas under right dome of diaphragm was found in 89% of the patients.

Table 1: Age incidence.

Age (years)	Number of cases	Percentage (%)
≤20	5	10
21-30	14	28
31-40	13	26
41-50	8	16
51-60	5	10
61-70	5	10
Total	50	100

Table 2: Sex incidence.

	Group A		Group B		Total	
Sex	**No. of cases**	**%**	**No. of cases**	**%**	**No. of cases**	**%**
Male	19	76	20	80	39	78
Female	6	24	5	20	11	22
Total	25	100	25	100	50	100

The commonest cause of non-traumatic ileal perforation was typhoid (52%) followed by non specific, tuberculosis and diverticulitis. Widal was done in all patients in whom ileal perforation was diagnosed per-operatively. Widal test for typhoid was positive in 52% of patients. Histopathological evidence of typhoid found in 7 cases out of 26 cases of typhoid. Diagnosis of tuberculosis was made in 5 cases and diverticulitis in one case. Rest of cases showed features of non specific inflammation with no definitive aetiology (Table 3).

Table 3: Aetiology of Ileal Perforation.

Diagnosis	Total cases	Percentage (%)
Typhoid	26	52
Non-specific	18	36
Tuberculosis	5	10
Diverticulitis	1	2
Total	50	100

During laparotomy feculent peritonitis was seen in 44% of cases and purulent peritonitis on 56% cases. 74% of patient had single perforation, 16% had two perforations and 10% have three or more perforations. 74% patient had associated ileitis adjacent to perforation, only 26% had healthy bowel.

Different types of operative procedures were performed. Out of 25 patients in Group A; in 19 cases, primary closure of perforation(s) with proximal loop ileostomy and in 6 cases, resection anastomosis of ileum with proximal loop ileostomy was done. Out of 25 patients in Group B; in 20 cases, primary closure of perforation(s) and in 5 cases, resection anastomosis of ileum was done (Table 4).

Table 4: Operative procedures.

Group A		Group B	
Procedure	**Number**	**Procedure**	**Number**
Primary closure of perforation(s) with proximal loop ileostomy	19	Primary closure of perforation(s)	20
Resection anastomosis of ileum with proximal loop ileostomy	6	Resection anastomosis of ileum	5
Total	25	Total	25

Post operative complications were encountered in varying proportions in both groups. Faecal fistula was most dreaded fatal complication. In Group A, total no. of dreaded complications like faecal fistula was 1 while in Group B, 10 patients developed faecal fistula. Other complications like wound infection and wound dehiscence were 28% in Group A while 96% in Group B. In Group A, Ileostomy related complications like Skin excoriation, Ileostomy prolapse, Ileostomy retraction, etc. were also present. Overall mortality rate was 24% with 12% mortality in group A and 36% in group B (Table 5).

Table 5: Post-operative complications (n=25) in each group.

Complications	Group A		Group B	
	No. of patients	**%**	**No. of patients**	**%**
Wound Infection	5	20	14	56
Wound Dehiscence	2	8	10	40
Skin Excoriation	18	72	0	0
Ileostomy Prolapse	1	4	0	0
Ileostomy Retraction	5	20	0	0
Electrolyte Imbalance	4	16	1	4
Faecal Fistula	1	4	10	40
Psychological Symptoms	7	28	8	32
Death	3	12	9	36

Mean hospital stay in Group A patient was 12.640±5.75 days (1-23 days) and those of group B was 23.760±16.04 days (5-59 days).

DISCUSSION

Spontaneous ileal perforation remains a formidable surgical condition in developing world. In this study the commonest cause of ileal perforation was typhoid (52%) followed by non-specific inflammation 36%, and tuberculosis 10%, Wani et al and Bhalerao, Karmakar report the same finding with typhoid fever and non specific inflammation being most common cause of ileal perforation.[4,5] There was male preponderance in this study with male:female ratio 3.5:1. Published literature show a similar finding with reported ratio of 23:1 to 61:1. This may be due to the fact that young men in search of job are compelled to eat unhygienic food outside home.[6]

Most of patients in study presented with features of peritonitis. Pain abdomen (100%), fever (60%), vomiting (48%) were commonest symptoms. Abdominal tenderness (98%), guarding and rigidity (88%), Abdominal distention (48%) are important clinical findings which are similar to those reported by Chowdhury et al and Ansari et al Pnemoperitonem is seen in 88% of patient which is similar to incidence 75-82.5% reported by some studies.[7-9] Widal test was suggestive of typhoid in 25 out of 26 cases of typhoid. In one case, histopatholological report was suggestive of typhoid. Widal test was reported positive in 75.5% of cases by Jarret and 73% by Vaidyanathan.[10,11]

In present study single perforation was noted in 74% of cases and two or more were noted in 26% of cases. Choudhury et al reported 52% of cases with single perforation and 6% with double perforation.[12] 44% of patients present with faecal peritonitis and 56% with purulent peritonitis. Late presentation may be owing to delayed referral of patient or may be due non availability of efficient health care at nearby to the patient.

Ileal perforation is best treated by surgery but exact nature of procedure remains controversial. Surgery is associated with high morbidity. Morbidity and mortality in these patients depend on many factors such as time lag between disease and treatment, aetiology of perforation, number of perforations, type of the surgery performed etc. One or the other type of surgery is associated with various complications. Faecal fistula remains the most dreaded complication with an incidence of 22% in our study. Reason may be dehiscence of anastomosis or primary repair or synchronous impending perforation in adjacent inflamed bowel that has been missed at time of initial surgery or development of metachronous perforation of diseased ileum during post operative period.[13] In our study; 10 out of 25 patients in group B, where no protective ileostomy was constructed, developed faecal fistula; while only 1 patient out of 25 patients in group A, where protective ileostomy was constructed, developed faecal fistula. The most dreaded complication, Faecal fistula was much more in Group B patients with p=0.002. Loop ileostomy does not provide complete de-functioning but temporarily protect a distal anastomosis. It decreases the incidence and severity of sepsis following a leak from an anastomosis.[14]

Table 6 shows significance of data of Group A in comparison to Group B. Hospital Stay is significantly less in Group A. Wound Infection and Wound Dehiscence are significantly less in Group A. Skin Excoriation, Ileostomy Prolapse and Ileostomy retraction are present only in Group A patients. Electrolyte Imbalance is low Group B but statistically insignificant. Faecal fistula is significantly high in Group B. Psychological Symptoms are low in Group A but statistically insignificant. Mortality is significantly high in Group B.

Ileostomy specific complication such as skin excoriation (72%), ileostomy diarrhoea (20%), ileostomy prolapse (4%), retrection of stoma (20%) were also noted in Group A patients. They are in accordance with various studies that reported similar complication rate.[14-16] Most of the complications related to ileostomy may be managed by conservative measures.[12]

Mean hospital stay in group A patient is 12.64 days and those of group B was 23.76 days. The longer duration of hospital stay in patient with group B was mainly due to complication like wound dehiscence, and faecal fistula; and is comparable to higher hospital stay in this group as in study by Arshad Malik et al Mean stay was found to be statistically significant with a p=0.000.[17] (Table 6).

The overall mortality rate in present study is 24%. Mortality in group A was only 12% as compared to 36% in group B. The results are similar to the study by Dr J.Ramanaiah et al.[13] It was mainly due to post operative faecal fistula in 40% cases. Group B patient had thrice the mortality when compared to Group A which was statistically significant with P value of 0.040.

Ileostomy is a social trauma to patient due to faecal waste and smell. It has adverse effect on quality of life as well. In present study 7 patients out of 25 (28%) had Psychological symptoms in form of depression in Group A, social withdrawal etc. All these patients gradually improved with time as ileostomy matured and after they were explained about coming back to normal life after closure of stoma. Eight patients in Group B also developed psychological symptoms in reaction to the disease process and complications.

Non-traumatic ileal perforation is still common as a cause of obscure peritonitis in our set up with typhoid fever being one of leading cause followed by non specific enteritis and tuberculosis. Early diagnosis and surgery with adequate resuscitation is the key to successful management of patient of ileal perforation. Outcome is

certainly better when a protective defunctioning Ileostomy is formed to protect the distal anastomosis or perforation closure. Ileostomy specific complications however increase the post-op morbidity. These complications can be reduced, if not out-right eliminated, by proper fashioning of stoma. It is of paramount importance that ileostomies are properly sited and constructed. A stoma should be formed by surgeon who is not only technically skilled but also understands the potential metabolic and mechanical problems associated with ileostomy. Morbidity, mortality and thus, the economic burden was significantly high in group B patients.

Protective ileostomy greatly reduced the occurrence of faecal fistula in patients there by reducing the mortality, although was associated with stoma related complication. Though bothersome, ileostomy is still a life saving and damage control surgical procedure. It should be recommended that ileostomy in these cases is only temporary and extra cost of management is not more than price of life saved.

Table 6: Outcome of study (n=25) in each group.

Complications	Group A	Group B	P value	Statistical significance
Hospital stay (days)	12.64	23.76	0.000	Highly significant
Wound infection	20%	56%	0.009	Significant
Wound dehiscence	8%	40%	0.008	Significant
Skin excoriation	72%	0	0.000	-
Ileostomy prolapse	4%	0	0.312	-
Ileostomy retraction	20%	0	0.018	-
Electrolyte imbalance	16%	4%	0.157	Insignificant
Faecal fistula	4%	40%	0.002	Significant
Psychological symptoms	28%	32%	0.758	Insignificant
Death	12%	36%	0.040	Significant

CONCLUSION

Construction of protective defunctioning ileostomy in case of distal ileal perforation repair or anastomosis greatly reduces the dreaded complication and mortality in comparison to perforation repair or anastomosis without protective ileostomy. Although it is associated with ileostomy related complications, but they are only temporary and obviously no more than the price of life saved. However, further controlled trials may be needed for more details on the matter.

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