Original Research Article

DOI: http://dx.doi.org/10.18203/2349-2902.isj20175481

A clinical comparative retrospective cohort study in the surgical management of enteric perforation, by comparing primary closure and closure with free omental sheet graft

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Received: 11 November 2017 **Accepted:** 21 November 2017

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ABSTRACT

Background: Typhoid ileal perforations have high morbidity and mortality rates irrespective of the type of surgeries performed. The aim of this study is to evaluate the morbidity, mortality and cost-effectiveness of a free omental sheet graft in perforated typhoid enteritis, in comparison with a primary ileal perforation closure.

Methods: This study includes a total of 81 patients with enteric perforations in a span of 5 years from March 2009 to February 2014. The study was divided into two groups; group 1 included 40 cases in which primary enteric perforation closure was done and group 2 included 41 cases in which a free omental sheet graft was used in typhoid enteritis with perforation. The outcomes were measured in relation to various postoperative complications and mortality.

Results: 90% of the patients in Group 1 had surgical site infection and 65% of the patients in Group 2 had surgical site infection. Intra-abdominal abscess was seen in 5% of the patients in Group 1, whereas no such morbidity was found in Group 2. 25% of the Group 1 patients had fecal fistula compared to none in Group 2. The mortality rate in Group 1 was 10% and no mortalities were seen in Group 2.

Conclusions: Primary closure with free omental sheet graft has shown better results, compared to primary closure alone, in terms of morbidity, mortality and length of hospital stay, irrespective of the site of perforation.

Keywords: Enteric perforation, Fecal fistula, Free omental sheet graft

INTRODUCTION

Enteric fever is a very common entity in developing countries like India where the standards of hygiene are still poor.¹ A small bowel perforation can be a serious complication of enteric fever. Often, enteric perforations are multiple. Some cases are associated with many impending perforation sites that may leak in the early postoperative period.

Enteric perforations have several unique features likefriable margins of the perforation, extensive surrounding inflammation, oedema, poor general condition of the patient and overwhelming septicemia.

The diagnosis of enteric perforation is based on history of fever followed by acute onset of pain abdomen, signs and symptoms of perforative peritonitis, positive Widal test, leucocytosis with relative neutropenia and X-ray chest and abdomen showing pneumoperitoneum confirmed on laparotomy.²

Various operative procedures are advice for enteric perforations such as simple repair of the perforation, repair of the perforation with an omental patch, repair of the perforation with an ileo-transverse bypass anastomosis, primary loop ileostomy and resection of the diseased bowel with primary anastomosis.

Even with such a wide range of surgical interventions, enteric perforation surgery carries a high rate of morbidity and mortality.

The aim of the present study is to compare the efficacy of the two commonly performed procedures for enteric perforation-primary closure and primary closure with free omental sheet graft, in an attempt to identify the ideal procedure. Objectives was to evaluate and compare the outcomes of ileal perforation management with primary closure and primary closure with free omental sheet graft.

METHODS

This retrospective comparative study included 81 patients with an ileal perforation admitted in our hospital from March 2009 to February 2014 satisfying all the inclusion criteria mentioned below.

Inclusion criteria

- Cases admitted with peritonitis and diagnosed to have an ileal perforation
- Surgeries performed- either simple primary closure (Group 1) or primary closure with free omental sheet graft (Group 2).

Exclusion criteria

- Other surgeries performed for ileal perforation
- Patients who are defaulters.

The outcomes were measured in relation to postoperative complications and mortality. Postoperative complications such as surgical site infection, intra-abdominal abscess, burst abdomen, faecal fistula, septicemia and mortality were compared. Fisher exact test was used for analysis.

A proximal loop ileostomy was performed in all the patients. Morbidity arising due to ileostomy/ileostomy closure, has not been taken into consideration in this study.

RESULTS

The most common age of presentation of ileal perforation in the present study was in the age group of 25-40 years. The Mean age of presentation was 34.5 years. In this study 84% were males, 16% were females. In the present study as shown in Table 1.

- 90% of the patients in Group 1 had surgical site infection and 65% of the patients in Group 2 had surgical site infection
- Intra-abdominal abscess was seen in 5% of the patients in Group 1, whereas no such morbidity was found in Group 2
- Burst abdomen was observed in 20% of the patients in Group 1 and none were observed in Group 2
- 25% of the Group 1 patients had fecal fistula compared to none in Group 2
- In Group 1, 15% of the patients had septicemia and none in Group 2
- The mortality rate in Group 1 was 10% and no mortalities were seen in Group 2.

Table 1: Comparative data of various morbidities.

Post OP complications	Primary closure (n=40) Group 1		Free omental graft (n=41) Group 2		P value
	No.	%	No.	%	
Surgical site infection					0.014
No	04	10.0	15	35.0	
Yes	36	90.0	26	65.0	
Intra-abdominal abscess					0.23
No	36	95.0	41	100.0	
Yes	02	5.0	00	0.0	
Burst abdomen					0.005
No	32	80.0	41	100.0	
Yes	08	20.0	00	0.0	
Fecal fistula					0.001
No	30	75.0	41	100.0	
Yes	10	25.0	00	0.0	
Septicemia					0.02
No	34	85.0	41	100.0	
Yes	06	15.0	00	0.0	
Mortality					0.11
No	36	90.0	41	100.0	
Yes	04	10.0	00	0.0	

DISCUSSION

S. typhi (Gram negative bacillus) is a causative agent of Typhoid fever (enteric fever). One of the most dreadful complication of enteric fever in developing countries is intestinal perforation leading to diffuse peritonitis.^{1,2} The disease and its complication rates are higher in young males when they are in their economically productive years. In the present study, >98% of the patients were below the age of 50 years, of which 65 % of the patients were between 25 and 40 years of age. This is consistent with other studies as reported by Singh et al. and Olurin et al.^{3,4} The male to female ratio in our study was 5.25:1. Beniwal et al. and Adensunkanni et al. reported male to female ratios of 6.4:1 and 4:1, respectively.^{5,6}

Various surgical procedures have been tried and tested in an effort to decrease the postoperative morbidity and mortality. Moreover, mortality is related to toxaemia, septicemia, septic shock and multiple organ dysfunction. These factors which are uncontrollable, make the evaluation of the result of any surgical procedure for this condition difficult. Apart from specific definitive surgical intervention, adequate resuscitation, correction of electrolyte imbalances and appropriate antibiotic therapy have been proven to be essential for a successful outcome.

There are many surgical options for enteric perforation like simple peritoneal drainage under local anaesthesia in moribund patients, simple repair of the perforation in two layers, simple repair with free omental sheet graft, resection and anastomosis for multiple enteric perforations, simple repair with ileo-transverse bypass anastomosis as well as the length loop ileostomy in addition to peritoneal toilet and drainage.

Primary repair is the preferred option, in principle, to resection with anastomosis, which is however indicated if there are multiple perforations, regardless of the site.⁷ Postoperative complications increase the agony of the patients, the length of hospital stays and finally the economic burden of the patient and the hospital.

Free omental sheet graft is used to cover a minimum of 10 cm of the diseased ileum (impending perforation sites) on either side of the repaired perforation along with peritoneal toilet and drainage. The use of omentum is not new in general surgery. It has been used in almost every subspecialty of surgery, more commonly in GI surgery. It can be used as Graham's patch in peptic ulcer perforation, wrapping around an enteric anastomosis, esophageal surgery and other surgeries like omentoplasty in hydatid cyst. The omentum fills in small gaps between the sutures and fastens healing. The application of free omental graft can influence wound healing through the augmentation of angiogenesis, cell infiltration and granulation tissue formation.⁸

The incidence of faecal fistula in this postoperative setting as shown in different studies is 16.5% according to Beniwal et al., 8.5% according to Adensunkanni et al., 10% according to Talwar et al. and 16.6 % according to Olurin et al.^{4-6,9}

Here we have compared the incidence of faecal fistula formation in group I (25%) versus simple closure with free omental sheet graft group II (0%) which is very low, consistent with other studies like that of Husain et al. (1.1%).¹⁰

Free omental sheet graft was found to be effective in preventing postoperative faecal fistula. It prevents both "repair leak" and "new perforation" to a great extent, thereby reducing morbidity and mortality.

This is a retrospective, observational study, from which the conclusions that are made are not as good as they would be, if this was a prospective randomized study. Incidences of mortality in this clinical setting as reported by different studies are 10.5% according to Beniwal et al., 14.2% according to Singh et al., 28% according to Adensunkanni et al. and 16.4% according to Talwar et al.^{3,5,6,9}

The result of our present study shows high mortality (40%) in group 1 patients and no mortalities in group 2 patients. The causes of death in group 1 patients were sepsis related.

CONCLUSION

Typhoid perforations continue to have high rates of morbidity and mortality, irrespective of the type of surgical procedure performed. Mortality is significantly affected by sepsis and the development of postoperative faecal fistula. The use of free omental sheet grafts is simple, safe and equally effective. It can be performed by every general surgeon without any extra training and at no extra cost.

Simple perforation repair along with free omental sheet graft was done for enteric perforations with diseased gut and was found to be very effective. This is probably due to the fact that, a free omental sheet graft covers at least 10cm of the diseased gut (having impending perforation sites) on either side of the repaired perforation, preventing repair leak, new perforation, peritonitis, sepsis and faecal fistula, thereby reducing morbidity, hospital stay and mortality.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Raju AGS. A clinical comparative retrospective cohort study in the surgical management of enteric perforation, by comparing primary closure and closure with free omental sheet graft. Int Surg J 2018;5:45-8.