

Pediced Ileal Seromuscular Flap-A New Technique for Protection of Intestinal Anastomosis in Patients with Peritonitis

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Abstract

Pediced ileal seromuscular flap- a new technique for protection of intestinal anastomosis in patients with peritonitis. This method involves raising a seromuscular flap on a pedicle from the stump of intestine to be anastomosed. The anastomosis is performed, and then covered with seromuscular flap. The submucosa due to its inherent properties, promotes better healing and reduces the tension on the anastomosis. There has been no previous study to assess the usefulness of this technique. We used a pediced ileal seromuscular flap in twenty consecutive patients with peritonitis who required an ileo-ileal or an ileo-colic anastomosis. Anastomotic leak occurred in two out of twenty patients. The safety and efficacy of this technique involving autologous tissues to reinforce intestinal anastomosis has been demonstrated.

Key Words

Seromuscular Flap; Anastomotic Dehiscence; Emergency Intestinal Surgery

Introduction

Intestinal anastomotic leaks are a dreaded complication for any surgeon. Few surgical procedures that reduce the risk of anastomotic leakage have been described. A novel method of protecting intestinal anastomosis involves the use of a pediced ileal seromuscular flap (1). To our knowledge, there are no papers in literature, which have assessed the usefulness of this technique in patients with peritonitis. Thus, we conducted a prospective study to ascertain the safety as well as efficacy of this technique.

Material and Methods

The study was carried out in a single surgical unit in Department of Surgery, Lady Hardinge Medical College, New Delhi, India between January 2001 and April 2001. Informed consent was taken for the procedure from all the patients. Twenty patients older than 16 years with peritonitis who required ileo-ileal or ileo-colic anastomosis were included and all patient underwent reinforcement of the anastomosis with a

pediced ileal seromuscular flap. All patients were adequately resuscitated before being operated upon. They received intravenous fluids, nasogastric decompression and parenteral analgesics before surgery. Intravenous ceftriaxone 1 gm was given every 8 hours to all the patients. After the clinical diagnosis of peritonitis, abdominal surgery was performed as soon as operating room was available.

Surgical Procedure

All surgeries were done under general anaesthesia. Abdomen was opened by a midline incision of adequate length. After identifying the site of the bowel pathology, necessary length of the bowel was resected. Following intestinal resection, a segment from the proximal intestinal stump, of appropriate length was harvested for the flap. To adequately cover the anastomosis, the segment was kept slightly longer than the circumference of the anastomosis. Approximately, 5 cm of the intestine proximal to the intended flap was

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resected to achieve the mobility of the flap. Inverted anastomosis was carried out in 2 layers as is the standard practice, inner layer consisting of through and through continuous suture with 2/0 absorbable polyglycolic acid sutures, and the outer layer consisting of interrupted seromuscular sutures with 2/0 silk. Following the anastomosis, the flap was prepared by opening the intestinal segment longitudinally along the antimesenteric border. The submucosa was infiltrated by an injection of normal saline and the mucosa carefully removed with scissors, leaving the submucosal surface as thick as possible. The submucosal surface of the flap was approximated to the anastomosis in such a manner that the mesenteric axis of the flap was parallel to the anastomotic line. The flap and the anastomotic line were then sutured with interrupted 4.0 polydioxanon (PDS) at 1-cm intervals. Thorough peritoneal lavage was performed with pressurised warm normal saline. Two tubes drains, one in the subhepatic space and the other in the pelvis were inserted and abdomen closed.

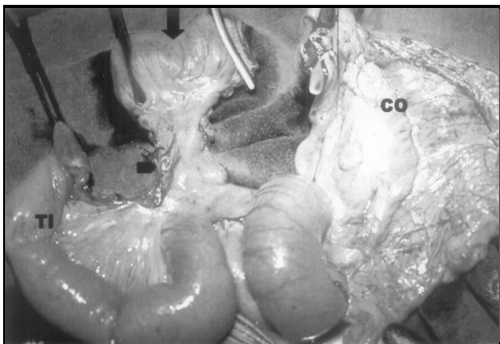


Fig. 1. Photograph taken after right hemicolectomy showing isolated ileal segment (arrow) with an intact pedicle (arrowhead) which was used to fashion a seromuscular flap. TI: Terminalileum; CO: Colon.

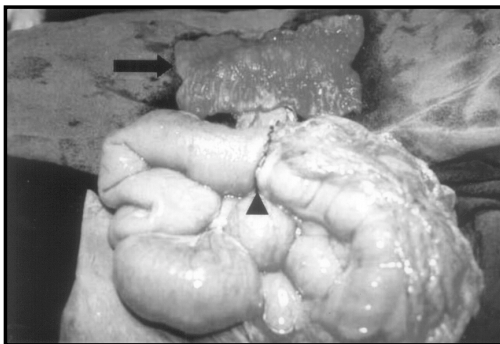


Fig. 2. Photograph showing completed ileo-colic anastomosis (arrowhead) Prepared seromuscular flap (arrow)

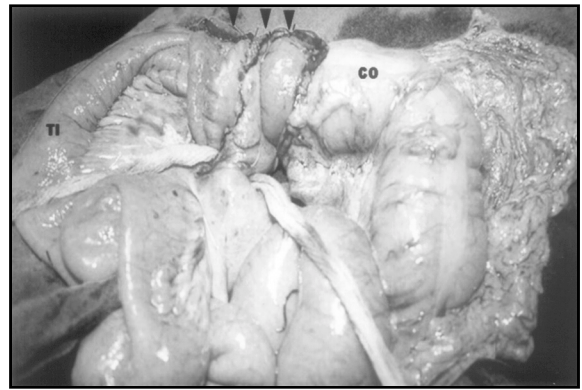


Fig. 3. Photograph showing the final appearance of pedicled ileal seromuscular flap (arrowheads) completely covering the anastomosis.

Postoperative Follow Up

An independent assessor visited every patient in the morning to record the clinical progress and return of normal bowel activity. A clinical leak was defined as an anastomotic dehiscence verified by reoperation, the development of an enterocutaneous fistula, or the evidence of bowel contents in the drainage fluid. Wound infection was defined a purulent discharge from the laparotomic incision.

Results

From January 2001 to April 2001, 31 consecutive patients with a preoperative diagnosis of peritonitis were identified, 20 of whom required an ileocolic or ileoileal anastomosis. The patient characteristics are listed in (Table 1). Out of these twenty patients, eight patients (40%) had typhoid perforation of the ileum, six (30%) had intestinal tuberculosis, five (25%) had perforations due to abdominal trauma and one (5%) had a strangulated incisional hernia. Fifteen patients (75%) patients underwent ileo-ileal anastomosis while five (25%) required an ileo-colic anastomosis.

Table 1. Clinical and laboratory parameters of patients who underwent emergency intestinal anastomosis

Parameter	Value
Mean Age (years)	26±3.2
Male:female	2:1
Mean Weight (Kgs.)	56±10.6
Mean serum albumin (g/dL)	2.72±1.1
Mean operating time (mins)	122±12
Leak rate	2/20 (10%)
Wound infection rate	6/20 (30%)
Mortality	1/20 (5%)

Anastomotic leak occurred in two patients. The first patient had intestinal tuberculosis. Anastomotic leak was noticed on fifth postoperative day, and he underwent a reoperation in which an end ileostomy was done. He was discharged two weeks later and underwent ileostomy closure three months later. The second one had a typhoid perforation of the ileum and a leak was noticed on fourth postoperative day. A reoperation was done and an end ileostomy brought out. After the second surgery, this patient had chest infection and expired 12 days after admission. There was no other mortality in the study.

Discussion

Intestinal anastomosis in the presence of peritonitis has always been a surgical challenge. Various techniques have been devised to make it foolproof but all are fraught with dangers of leakage. Several factors affect the healing of an intestinal anastomosis (1) :

- (a) local blood supply
- (b) surgical techniques such as apposition of the submucosa
- (c) drugs such as corticosteroids, which inhibit collagen production and reduce wound strength
- (d) malnutrition and metabolic disturbances
- (e) peritonitis and amount of fecal contamination of peritoneal cavity.

Anastomosis in emergency surgery are usually performed in critically ill patients under difficult situations. Most of these patients are malnourished or have co morbid conditions. Moreover, patients treated in an emergency situation have not been prepared as in elective surgery, creating additional risk factors (2).

Due to high incidence of anastomotic dehiscence following primary anastomosis only, there has always been a search to reinforce the anastomosis with an autologous material. The greater omentum has been used to protect colonic and rectal anastomosis (3). But omental flaps have some disadvantages. Resection of the omentum is necessary during cancer surgery and when reoperation is necessary massive adhesions may make the use of omentum difficult and also because it lacks strength an omental flap would produce less resistance to tension on an anastomosis and therefore less protection against rupture (1).

The technique used in the present study has been described by Moriura *et al* in patients with intestinal Behcet's disease (1). The submucosa has a rich vascular

and lymphatic plexus which promotes better healing (4). In addition, the flap may reduce tension on the anastomosis caused by peristalsis and externally applied forces which can decrease the local blood flow to the intestine and induce anastomotic failure (5). The usefulness of gastric and jejunal seromuscular flaps in the repair of recurrent bronchocutaneous fistulas, closure of the pancreatic stump and infected aortic stumps is well documented (6-8). These studies support the use of seromuscular flaps to surgically challenging sites.

Anastomotic leak rates following resection and anastomosis vary from 5.2% (2) to 21% (9). Leak rates in our study are 10%. Our study supports the use of a pedicled ileal seromuscular flap to surgically challenging sites where the healing process is perturbed by infection due to peritonitis. The assessment of efficacy of this flap is based on a short term follow up of a small number of reported cases; however these results indicate this approach merits a further randomized trial comparing this technique with primary anastomosis.

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