

Extramucosal Single Layer Interrupted Intestinal Anastomosis-A Better Alternative

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Objectives: To evaluate the technique of extra mucosal interrupted single layer intestinal anastomosis in different diseases where anastomosis is needed in different parts of gastrointestinal tract both in elective and emergency situations.

Design: Prospective study. **Place and Duration of Study:** Surgical Unit 1 Jinnah Hospital Lahore, over a period of 2½ years from December.2000 to June 2003. **Material and Methods:** In this study 123 anastomosis were performed in 100 patients. All these patients were operated upon by the senior surgeons in the emergency/elective operating rooms. Single layer interrupted extramucosal anastomosis with vicryl 2/0 or 3/0 was done in all cases. **Results:** Overall anastomotic leak was just 0.81%. Wound infection was observed in 6%, without any increase in morbidity and zero percent mortality.

Conclusion: Extramucosal single layer interrupted intestinal anastomosis is the safest technique both for the small and large bowel, with minimal possible complications.

Key words: Extramucosal, interrupted, anastomosis leak, morbidity.

The history of bowel anastomosis is very old which started with the use of the jaws of ants to present modern technique. In 1812. It was Travers who reported that gut would heal by adhesive inflammation binding down the serosal coat.

In 1826 Lembert described a suturing technique in which the serosal apposition was obtained. Senn In 1983 described two layers interrupted anastomosis¹ while Halsted favoured the one layer anastomosis without luminal penetration.

The Intestinal anastomosis is one of the common procedures being performed in the surgical department for a number of indications both in the elective and emergency operating rooms. The anastomotic leak is one of common problem faced which is the major cause of morbidity and mortality after such operations^{2,4}.

No. of techniques have been devised at different times to overcome the problem yet there is no single technique which is internationally accepted⁴.

The outcome of the intestinal anastomosis depends upon many factors which include experience of the surgeon, suture material used, suture technique, facilities in the operating rooms, general condition of the patient, underlying pathology resulting in anastomosis of the gut^{4,5}.

In spite of different sutures and techniques being used since 1887 still the problem of leak is there even in the best and most experienced hands, due to number of reasons⁵.

Different studies suggest that anastomotic technique is one of the major determinants of outcome of the intestinal anastomosis specially leak and surgical outcome. The objection against the conventional technique is that it causes the inversion of mucosa without properly apposing the incision margins which is one of the basic prerequisites is of wound healing^{2,3}.

The inversion of suture line results in formation of a diaphragm with a narrow hole in it and it might be the cause of intestinal obstruction.

The continuous suture line may cause the purse-string effect and leads to narrowing of the area. The outer layer usually makes thick mass at the anastomotic site. All these different factors lead to the ischaemia of the gut and make it prone to poor healing resulting in leak or intestinal obstruction. Over and above all these it requires more suture material and more operating time. In comparison the technique of single layer interrupted intestinal anastomosis is safer and based on scientific principal and does not cause any significant damage to the blood supply of the gut wall and so no ischaemia and no leakage¹.

In this study the technique has been evaluated for the safety and the efficacy of the procedure.

Patients and methods

Prospective study was done on 100 patients from Dec. 2000 to June 2003 in surgical unit 1 of the Jinnah Hospital Lahore for intestinal anastomosis for different indications both in the emergency and elective situations.

All these cases were operated upon by the senior surgeons. The suture material used was 2/0 or 3/0 polyglactin (vicryl). The antibiotics used were 2nd generation cephalosporin (cefurexime) and metronidazole for 5-7 days.

All the patients were kept NPO for five days and Nasogastric tube was put in and kept till the bowel started working usually three days. All the patients were more than 12 years of age and of both the sexes.

Exclusion criteria,

Following patients were excluded in whom there was gross peritonitis and the gut was very friable and patients presented late i.e., 3 days after the peritonitis. The patients in whom the anastomosis was performed on stomach, oesophagus and low anorectal regions. Patients with comorbid conditions as jaundice, uraemia, cirrhosis. Preparation of the large bowel was done only in elective

cases. Bowel preparation was both Mechanical & Chemical.

Mechanical

Picosulfat was given in the form of syrup 30ml twice a day before surgery and kleen enema was given in the evening and in the morning before surgery.

Chemical

2nd generation Cephalosporin (cefotaxime) 1.5 g. was given at the time of induction of anaesthesia and 100 ml (400mg) of metronidazole which was later continued for 5-7 days.

Post operative course was recorded especially the complications regarding the anastomotic leak, enterocutaneous fistula and the wound infection. Wound infection was defined as purulent discharge with/without systemic features. Pus was collected for the culture and sensitivity and the infected stitches were removed. The data collected was analyzed using the SPSS 10.0 for windows.

Results

During the study period 123 anastomosis was performed in total 100 patients. Mean age was the 24years (12-50years). 69 patients were female & 31 were male. The anastomosis was done between the different parts of gut. Different operations performed were following. (Table-I)

Enteroenterostomy (ileoileostomy, jejunojejunostomy, ileojejunostomy)	65
Ileocolic anastomosis (right hemicolectomy)	35
Ileostomy closure	13
Colostomy reversal (colocolic anastomosis)	05
Reversal of Hartmans procedure	05

The operations were performed both in the emergency and elective operating rooms. The disease pattern which presented in this study was as below. (Table-II)

Table -II

Trauma abdomen	43
Intestinal obstruction	30
Ileocaecal tuberculosis	18
Carcinoma caecum	07
Carcinoma head of pancreas	02

The anastomotic leakage was seen only in one patient (0.81%) while wound infection was encountered in six patients (6%). This pt; was operated upon in emergency for the mesenteric vascular occlusion and after resection jejunioileal anastomosis was done.

The anastomotic leakage healed with conservative treatment by keeping the patient nothing by mouth (NPO) and on total parenteral nutrition (TPN). The wound infections were observed in 4(4%) patients who were

operated in emergency operating rooms and 2 patients who were operated electively (2%). All these patients were treated by daily dressings and antibiotics according to C/S reports. No. other serious complication was noted.

Discussion

Intestinal anastomosis is the commonest procedure being performed for a variety of pathological conditions of the GI tract and has a profound effect on the morbidity and mortality and surgical outcome of the patients. Healing of the anastomotic site is influenced by the local and general factors⁵.

General factors which affect the healing are age of patient, nutritional status, comorbid conditions like diabetes mellitus, jaundice, uraemia, marked anaemia⁴. Local factors like blood supply of the anastomosed gut, apposition of the edges, tension at the suture site, suture technique and the local sepsis⁷.

Generally classical two layered technique is being practiced with both absorbable and non absorbable Sutures. But this causes excessive mucosal inversion, narrowing of the lumen, and may cause ischaemia of the anastomotic site which can lead to complications of the procedures^{3,4}.

To overcome these problems and to avoid the complications the anastomotic technique the single layer extra mucosal interrupted suturing technique was tried. The advantage of this seromuscular interrupted suturing is 1) proper apposition of the wound edges no inversion. 2) minimal damage to the sub mucosal vascular plexus, no ischaemia, 3) no luminal narrowing^{8,9}. 4) less time for the anastomosis. So this technique has many of the attributes of an ideal anastomosis⁴.

The efficacy and the safety of this technique is now well established for small bowel^{2,7,10,11}. Even the large bowel is being sutured by using the polypropylene a nonabsorbable monofilament suture material by using this technique¹².

This study also favours the technique and confirms its safety and efficacy. Anastomotic failure was seen only in one patient (1%) out of 100 and in one anastomosis out 123(0.81%). The complication rate in this stud is less than mentioned in the literature 1.3-7.7%^{2,9,13,14}.

The reason for this is that we were strictly following the inclusion and exclusion criteria in selecting the patients for the study. All the patients with sepsis and moribund conditions were not included. All patients in which the condition of gut was equivocal were also not included. The wound infection we encountered is in 6 patients out of 100(6%). This is in accordance with what is mentioned in literature 2-11%^{6,12,15,16}.

All the patients were discharged within one week without any significant morbidity in contrast to morbidity mentioned in the literature and zero mortality in this study which is less than that seen in literature 1.5-3.8%^{2,8,10,14}.

This could be because of our strict inclusion criteria and ideal operating conditions and that all the anastomosis were performed by the senior surgeons.

Conclusion

Extramucosal single layer interrupted intestinal anastomosis is the safest technique both for the large and small bowel with minimum possible complications.

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