



Single Layer Continuous Suture for Small Bowel Anastomosis

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ABSTRACT

Intestinal anastomosis is an integral part of surgeries on the digestive tract. Traditional double-layered technique for creating an anastomosis is time consuming and may be associated with more incidence of luminal narrowing. Surgical staplers help in reducing the time taken to create an anastomosis but are costly. Usage of single layer monofilament continuous suture may aid in faster anastomosis creation and has lesser chances of luminal narrowing.

KEYWORDS : single layer anastomosis, anastomotic leak, monofilament, continuous

Introduction

Surgery involving the digestive tract frequently involves resection, followed by reconstruction with anastomosis. Various methods and techniques are employed for the purpose of creating an anastomosis. The methods used in constructing the anastomosis influence the outcome of surgery, post-operative complications, and quality of life and morbidity scores.

Western literature frequently reports origin and development of intestinal anastomosis techniques to 19th century, however, the technique and awareness of intestinal injury repairs dates back to as early as 1000 BC, with use of black ants for intestinal closure by Indian surgeon Sushruta. (1)

Modern interest in techniques of intestinal anastomosis, somewhere started in 19th century with description of techniques by Travers, Lembert and Halstead.(2) The basic principles of intestinal anastomosis have undergone little change since then. The controversy of double layer anastomosis versus single layer also dates back as early as 19th century, wherein Halstead described the technique of single layer anastomosis.(3) Over period of time, double layer intestinal anastomosis became the standard practice. Such technique uses continuous full thickness absorbable suture and interrupted silk sutures for outer inverting seromuscular layer.

Traditional manual double layered anastomoses are time consuming. Introduction of staples for intestinal anastomosis added another dimension in surgical procedures. Both liner cutter and circular stapling devices are available and are frequently used by surgeons. There are two strategies available to reduce the time consumed for constructing an anastomosis: use of stapling devices and other is single layer continuous suture.

For creating an anastomosis, the factors that play a role are time required, restoration of bowel function, and effective haemostasis at the site of suture line, lesser tissue trauma, and prevention of postoperative complication like anastomotic leak. The two most important factors are tension free approximation of tissues and the other is well vascularised cut ends of the parts to be sutured. (4,5)

Traditionally, hand-sewn technique has been the standard for fashioning anastomosis in gastrointestinal surgery. To gain wider acceptance, an innovative technique should be efficient and speedy without safety compromise.

However, there was recent resurgence in interest for single layer anastomosis with reports suggesting shorter time for construction, lower cost and lower complications of anastomotic leakage. (6,7,8)

Many surgeons prefer to use single layer hand sewn anastomosis due to ease of construction, shorter time, reduction in ischemia to bowel and less narrowing of lumen. We have been following selective use of single layer continuous full thickness monofilament intestinal anastomosis for small intestine in selective cases based on surgeon's preference. The aim was to study the data pertaining to such technique at our centre.

Aim:

The study was conducted to study the efficacy and safety of single layer intestinal anastomosis for small intestine using continuous monofilament non absorbable suture material.

Materials and Methods:

The study was done as prospective analysis of all patients who underwent single layer small intestine anastomosis during the study period from January 2015 to December 2015.

Inclusion criteria:

All emergency and elective cases of end to end small bowel anastomosis with single layer continuous monofilament suture were included in the study

Exclusion criteria:

Patients aged less than 18 years of age and above 65 years of age

Patients with albumin of less than 2.5 gm/dL

Patients who required more than one anastomosis

Patients who underwent side to side anastomosis

Patients with ileo-colic anastomosis

Fifty six patients underwent small intestine resection anastomosis for various indications. Of these, 23 patients underwent single layer anastomosis with continuous monofilament suture.

One patient died in post-op period on 3rd post-operative day due to myocardial infarction and was excluded from this study. The data was analysed for remaining 22 patients.

Technique of anastomosis:

The anastomosis was constructed with 3-0 polypropylene round body needle. The anastomosis was started from the anti-mesenteric side and full thickness bites were taken and then after completing the entire circle, the suture was tied at the starting point. The mesenteric defect was then closed with suture in interrupted fashion. (Fig 1)

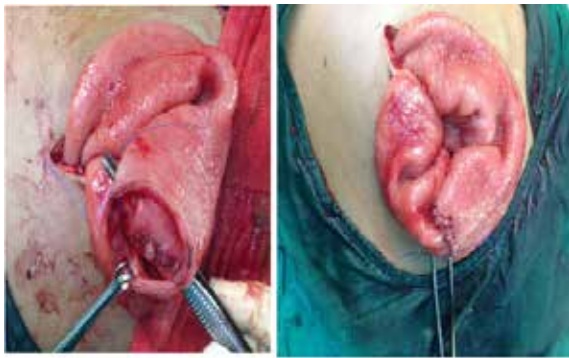


Fig 1: Use of monofilament polypropylene for single layer continuous anastomosis

Time taken for anastomosis was noted, from the start of antimesenteric suture till the completion of anastomosis.

Number of suture lengths used was also noted.

Patients were then monitored post-operatively for temperature, pulse, blood pressure, intake and output charts, distension of abdomen, time of return of peristalsis, passage of flatus, starting of oral diet, any clinical signs of peritonitis, and any clinical or radiological evidence of internal or external fistula.

Age distribution:

The age range was 22 to 63 years of age and mean age was 40.2 years.

There were 18 males and 4 females in the study.

Clinical Presentation:

Pain: 21 (95%)

Vomiting: 16 (73%)

Abdominal distension: 14

Obstipation: 17 (64%)

Bleeding per rectum: 1 (5%)

Indications for anastomosis:

Intestinal Obstruction: 13

Perforation peritonitis: 6

Intussusception: 2

Closure of ileostomy: 1

Observations:

Mean duration of anastomosis was 23.5 mins and range was 19 mins to 28 mins.

Anastomotic leak was seen in 1 patient (4.5%)

Re-exploration was done in 1 patient (4.5%)

Return of bowel sounds was mean of 4.2 days.

Mean of starting of oral intake was 5.6 days.

Surgical site infection was seen in 6 patients (27.2%)

Post-operative hospital stay ranged from 11 to 23 days and mean of 13.3 days.

Discussion:

Since the very beginning of development of techniques of intestinal anastomosis, the controversy of single layer versus started. Travers

and Lembert (2) preferred to follow the technique of double layer anastomosis whereas proponents of single layer anastomosis included the famous American Surgeon William Halstead (3) who did an experimental study and reported continuous single layer anastomosis technique. Hauteufille was one of the earliest surgeons to have reported single layer interrupted suture technique for intestinal anastomosis in 1976.(9)

Prolonged surgical time may influence the post-operative surgical outcomes. Prolonged exposure of abdominal viscera results in a more prolonged post-operative paralytic ileus and also results in hypothermia. Any procedure or manoeuvre that reduces the surgical time can benefit the patient by resulting in lesser morbidity and an early return of bowel activity. A good anastomosis requires a good mechanical connection that prevents early leaks and promotes a complete natural healing to prevent the late anastomotic leaks and enhance the restoration to normal bowel function. (10) It is one of the most essential and important component of the overall surgical procedure.

Following any surgical intervention the normal motility of the intestines is impaired due to many factors. Resumption of this bowel motility is of paramount importance after digestive tract surgery and an important quality of life and successful post-operative recovery. Postoperative hypomotility may affect the entire GI tract, but with differential recovery times for each part (11,12,13,14). Small intestine function normalizes first, often within a few hours; normal gastric motility returns within 24–48 h, and colonic motility returns last within 48–72 h after surgery (12,13,15)

Findings from our study:

It is always desirable to have a randomised controlled trial in a large series to effectively propose a new change or to strengthen the efficacy of an existing technique. However, the idea of our study was study the effectiveness and results of single layer anastomosis technique at our centre.

Single layer anastomosis may be preferable due to several reasons. For any anastomosis to be successful, it requires to have a good vascular supply. Since single layer anastomosis may result in less invasion of tissues in comparison to double layer anastomosis, lesser length of bowel needs to be cleared of mesentery on both the cut edges and hence resulting in more satisfactory vascularity to the cut edge. The double layered anastomosis results in more narrowing of the lumen in comparison to single layer anastomosis and hence single layer anastomosis may be more desirable.

Also, in the technique of double layer anastomosis the inner layer is supposed to be haemostatic which in itself is a double edged sword. Inadequate haemostasis of the mucosal layer will lead to anastomotic site bleeding and over enthusiastic haemostasis will lead to strangulation of mucosa which may be responsible for anastomotic leak.

Bailey (16) describes that a continuous single layer suture line resembles a circular coiled spring, which may be able to expand and contract depending on the intraluminal forces, which explains the less incidence of bowel stenosis.

Conclusion:

We conclude that single layer continuous suturing technique is safe and an easy to learn which can be incorporated by surgeons in their daily practice. Also, since single layer technique uses only one suture length it results in lesser cost of surgery to the patient. Single layer continuous anastomosis takes less time to fashion and may help in early post-operative recovery and reduce morbidity.

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