

# Use of Single Layer Extra Mucosal Interrupted Suture Intestinal Anastomosis: Three Year Experience

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## ABSTRACT

**OBJECTIVE:** To see the outcome of single layer extramucosal interrupted suture gut anastomosis.

**STUDY DESIGN:** Prospective analytical.

**SETTING AND METHODS:** This study was carried out in the Department of Surgery Unit-I Muhammad Medical College Mirpurkhas, from August 2004 to July 2007. A total of 72 patients were included in this study in which gut anastomosis was performed with single layer extramucosal interrupted suture. Patients of all ages and sex groups were included in whom end-to-end anastomosis was required in small and large intestine. Polyglactin (Vicryl 2/0 and 3/0) material was chosen on round body needle.

**RESULTS:** End-to-end anastomosis in 72 patients was done in cases of ileal perforation 37 / 72 (51.38%) and right hemicolectomy 09/72 (12.50%). Intussusception was the cause in 11/72 (15.27%) cases, mass at recto-sigmoid junction was found in 02/72 (02.77%) strangulated inguinal hernia in 07/72 (09.72%) patients, jejunal diverticulosis in 01/72 (01.38%), caecal volvulus in 02/72 (02.77%) and sigmoid volvulus in 02/72 (02.77%) cases. Anastomosis leakage occurred in only 02/72 cases. Mortality remained 1/72 (01.38%).

**CONCLUSION:** Single-layer extramucosal interrupted suture gut anastomosis is safe method of hand sewing technique. It is suitable for all anastomosis in the gastrointestinal tract.

**KEY WORDS:** Intestinal anastomosis – single layer extramucosal interrupted.

## INTRODUCTION

Intestinal anastomosis is performed using stapled or hand-sewn techniques<sup>1</sup>. Use of staples for intestinal resection and anastomosis decreases operative time and contaminations, however, staples are expensive and should be used with caution if there is severe bowel inflammation<sup>1</sup>. Hand sewn end-to-end anastomosis can be performed with continuous or interrupted pattern using one or two layers of sutures<sup>2</sup>. As we know that the integrity of the anastomosis depends upon several factors, like tension at the suture line, an adequate blood supply at the two ends of the intestine and a meticulous clean gut at the time of operation<sup>3</sup>. To get all these, interrupted extramucosal single layer gut anastomosis is gaining popularity. We have adopted the same technique in current study.

## PATIENTS AND METHODS

This study was carried out in the Department of Surgery Unit-I Muhammad Medical College Mirpurkhas from Aug 2004 to July 2007. Patients of all ages and sex groups were included. Total of 72 cases were included for this study in which gut anastomosis was performed with single layer extramucosal interrupted fashion. All the cases operated in emergency and electively were included. Polyglactin (Vicryl TM), (2/0 and 3/0) material was chosen over round body needle.

## TECHNIQUE

Gut segments were positioned flat and transected at their healthy margins. Stay sutures were applied at the mesenteric and antimesenteric ends in extramucosal manner and kept on hemostat without tying. The anterior layer was stitched first. Extramucosal interrupted stitching starts from the serosa, the needle is passed to the sub-mucosa but it does not pierce the mucosa. Needle is then passed through the other end in the submucosa to come to the surface through the serosa and knots are tied over the serosal surface. The sutures were tied snugly to achieve apposition rather than inversion of the intestinal ends. Sutures were placed not more than 5mm apart. After the completion of the anastomosis the abdominal cavity was irrigated with copious warm normal saline. Patients were carefully monitored postoperatively for rise in temperature and pulse, leukocytosis, distension of abdomen, time of return of peristalsis and signs of peritonitis.

## RESULTS

Total 72 cases underwent gut surgery in which single layer extramucosal interrupted anastomosis was performed, from August 2004 to July 2007 at Muhammad Medical College Hospital Mirpurkhas. There were 45 (60.5%) males and 27(37.5%) females. Age ranged

from 2 years to 76 years with mean of 35 years. The indications for operation (**Table - I**), were ileal perforation in 37/72 (51.38%) cases, mass in ileocecal region in 9/72 (12.50%), intussusception was found in 2/72 (2.77%), all were paediatric age group. Mass at rectosigmoid junction was cause in 11/72 (15.27%), strangulated inguinal hernias, where small intestine found gangrenous, 07/72(9.72%) cases, jejunal diverticulosis was found in 01/72(1.39%) cases, caecal volvulus in 02/72 (2.77%) and volvulus sigmoid colon in 02/72 (2.77%) cases. Out of 37 ileal perforation cases 16/37(43.2%) had single perforation, 15/37 (40.5%) had multiple perforations and 06/37(16.2%) had perforation proximal to stricture. In cases with single perforation 6/37(43.2%), simple closure in single layer done after refreshing the margin / wedge resection of segment. Out of these 16 cases, 15 (93.75%) healed uneventfully, while in 01/16(6.25%) anastomosis leakage occurred, which required re-exploration and ileostomy. In remaining 21/37 (56.76%) cases where either multiple perforations were there or perforation proximal to stricture, resection of the segment was made and two ends of intestine were taken out as ileostomy. Resected segments were submitted for histopathology. All 16 cases with single ileal perforation had typhoid perforation. While in cases with multiple perforations 3/15 (20%) were proved on histopathology to be tuberculous, while 12/15(80%) were typhoid. Cases having ileal perforation proximal to stricture were all of tuberculosis. Cases where mass in ileocecal regions was found, right hemicolectomy was performed in 5/9 (55.6%) cases and limited right hemicolectomy in 4/9 (44.4%) cases. Out of these 1/9 (11.1%) was adenocarcinoma of cecum, whereas 8/9 (88.9%) were ileocaecal tuberculosis. Anastomosis leakage occurred in 01/72 (1.39%) cases. One patient died due to septicemia.

**TABLE I:  
CONDITIONS IN WHICH RESECTION AND ANASTOMOSIS WAS PERFORMED (n = 72)**

Ileal perforation	37 (51.38%)
Intussusception	11 (15.25%)
Mass at ileocaecal junction	09 (12.50%)
Strangulated inguinal hernias	07 (9.72%)
Mass at rectosigmoid junction	02 (2.77%)
Caecal volvulus	02 (2.77%)
Volvulus sigmoid colon	02 (2.77%)
Jejunal diverticulosis	01 (1.38%)
<b>TOTAL</b>	<b>72 (100%)</b>

## DISCUSSION

For many years and for most clinical anastomosis two-layer technique, where all bowel layers were incorporated in the first suture line, had been practiced. Recently a modification in gut anastomosis technique has been adopted world wide. Different trials and clinical studies have proven the superiority of single layer anastomosis, which besides being quicker to create, are apparently as strong as two-layer anastomoses. The results of this study are clearly showing the safety of one layer interrupted gut anastomosis, which is similar to the observation of a local study<sup>1</sup>. In our study majority (63/72) (87.50%) of the cases was operated in emergency. Majority of the patients had ileal perforation (37/72) (51.38%). Obviously these were in worst of conditions. In most of them primarily ileostomy was performed and later on in optimal condition ileostomy closure was done in single layer interrupted fashion. In 16/37 (43.24%) cases with single typhoid perforation of ileum simple closure was done primarily. One must understand the hemodynamics at the cut ends of the bowel<sup>3</sup>, the biochemistry of wound healing and the behaviour of living tissue in the presence of foreign material, sepsis and ischemia<sup>4</sup>. Integrity of the anastomosis depends upon several factors. Lack of tension at the suture line<sup>3</sup>, an adequate blood supply at the two ends of the intestine, a meticulously cleaned gut and attention to technique and choice of proper suture material are all equally and simultaneously important<sup>5</sup>. Under ideal conditions, healing at the anastomotic site occurs rapidly in the presence of adequate tissues perfusion and un-interrupted supply of collagens at the anastomosis site<sup>6</sup>. We have used polyglactin (vicryl 2/0 and 3/0), on round body needle as anastomotic suture material. We believe that the difference in technique accounts, at least partly for difference in reported leakage rates. Olah A (1999)<sup>7</sup> and Connolly DP (1998)<sup>8</sup>, who used single layer continuous absorbable sutures, were well satisfied with their technique. While in another study<sup>9</sup> absorbable polypropylene had been used successfully in single layer continuous intestinal anastomosis. Some degree of collagenolytic activity occurs normally after operation<sup>10</sup>. When this persists, disruption of the anastomosis will occur<sup>10</sup>. Infection, local sepsis, and the presence of foreign material like rubber drain prolong the collagenolytic activity<sup>11</sup>. Two layers of tightly drawn and often continuous suture do not always produce a water tight seal, they strangulate and often cause ischemic necrosis<sup>12,13</sup>. A new technique known as SAINT-fibrin glue procedure<sup>14</sup> has been tried in which a sliding absorbable intra-luminal nontoxic stent (saint) and fibrin glue with limited (minutes) stump margin pressure was described<sup>14</sup>. In our study leakage occurred in only 01/72 (1.38%) case. The case was

simply closed for a typhoid perforation, required ileostomy later on. Mortality remained 1.38% with one patient in septecemia. These observations are slightly different from another studies<sup>15,16</sup>, where anastomosis leakage and mortality were nil in 30 cases with similar technique of anastomosis. Contrary to this Brain AJ<sup>17</sup> has shown complication / leakage rate 07/75 cases. The experience of another study<sup>18</sup> with continuous single layer extramucosal technique shows anastomosis dehiscence rate 1.7% for anastomosis in stomach, 0.3% in small intestine and 2.8% in the colon.

## CONCLUSION

Single layered extramucosal interrupted intestinal anastomosis is simple, safe and associated with less risk of dehiscence.

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