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A RANDOMISED COMPARATIVE STUDY BETWEEN SINGLE LAYER INTERRUPTED EXTRAMUCOSAL VERSUS DOUBLE LAYER IN INTESTINAL ANASTOMOSIS

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ABSTRACT **BACKGROUND:** Gastrointestinal anastomosis is one of the most common procedure performed by surgeons. Hand sewn intestinal anastomosis is the most commonly used technique worldwide because of the availability and affordability of suture materials and familiarity with the procedure. This prospective comparative study was performed to evaluate single layer interrupted extramucosal technique as compared to conventional double layer technique. **METHODS:** The patients selected for this study were those who were admitted with various clinical conditions requiring resection and anastomosis of small and large bowel. In Group A Intestinal anastomosis was carried out in single layer interrupted extramucosal technique while in group B double layer anastomosis was done. **RESULTS:** The present study was done on 50 patients which were divided into two groups with 25 patients in each Group which were divided randomly.The mean age of group A patients was 40.30±3.16 years. While, the mean age of group B patients was 38.03±2.60 years. In our study of fifty cases in both groups terminal ileal perforation was diagnosed in maximum number of patients i.e. 12 (24%) cases followed by ileastomy closure in 10(20%) patients. The mean duration of surgery in group A was 18.40±3.26 minutes while duration of surgery in Group B was 30.90±1.76 minutes. In our comparative study the mean duration of hospital stay in Group A was 7.62±1.60 days and in Group B it was 7.90±2.16 days. There was no major difference in postoperative complication in both the groups. 4(16%) patients had wound infection in group A while 3(12%) patients had wound infection in group B, there was one intraperitoneal Abscess in group B which was managed conservatively. There was one anastomotic leak in both the Groups, in Group A it was managed conservatively whereas in Group B diversion stoma was constructed. **CONCLUSION:** Single layer anastomosis requires less time to construct, cost effective, reduces the operation time, without increase in risk of anastomotic leak and other complications. So, we came to conclude that the single layer interrupted extramucosal anastomosis is equivalent to the two layer traditional intestinal anastomosis.

KEYWORDS : Single layer anastomosis, Double layer anastomosis, Anastomotic leak, Duration of surgery.

INTRODUCTION:

The word anastomosis comes from the Greek words 'ana' meaning without, and 'stoma' meaning a mouth, i.e. when a tubular viscous (bowel) or vessel (mostly arteries) is joined after resection or bypass without exteriorization with a stoma or having been tied off[1]. Intestinal anastomosis dates back to 1000 B.C., the era of Sushruta "The Great Indian Surgeon" where he described the use of head of black ants[2] for intestinal anastomosis. Lembert[1] described his seromuscular suture technique for bowel anastomosis in 1826. One of the frequently performed surgeries in elective and emergency situations is the formation of intestinal anastomosis. Bowel anastomosis after resection of bowel may be either end to end anastomosis , side to side or side to end anastomosis depending on surgery and the operating surgeon. Different techniques of intestinal anastomosis are single, double layered closure, staples, glue, laser welding[3]. Many techniques have evolved but, the hand sewn suturing technique remains the mainstay for intestinal anastomosis because of availability and affordability of suture material and familiarity with the procedure. There are various factors which influence the healing of anastomosis including blood supply, tension at suture line, surgical technique, and cleanliness of gut at the time of surgery. These factors must be kept in mind along with proper apposition of submucosa of gut wall in order to get improved outcomes[4,5]. The anastomotic technique depends upon site of anastomosis, bowel caliber, quality and underlying disease process, but one important factor in making decision to perform a particular anastomosis, however, remains individual surgical experience and personal preference[6]. Various complications following bowel anastomoses are anastomotic leak resulting into peritonitis, abscess, fistula, necrosis, stricture. Various factors contribute to these complications like suturing technique, suture material, presence of concurrent sepsis, vascular compromise and so on. Leakage from the bowel anastomoses in the gastrointestinal tract is major complication and accounts for about 1.3 to 7.7%, that is often associated with increased morbidity and mortality and prolonged stay[7,8]. However, despite large amount of work done on both single and double layered methods, it is still unclear which method is better in terms of safety and efficacy. This prospective comparative study was performed to evaluate the safety,duration of surgery, duration of hospital stay and post operative complications of single layer interrupted extramucosal technique as compared to conventional double layer technique.

MATERIALAND METHOD:

The comparative study was done on patients presenting to GMC Jammu, either in emergency or elective undergoing resection anastomosis of bowel from July 2015 to August 2016. The patients selected for this study are those who were admitted with various clinical conditions requiring resection and anastomosis of small and large bowel. Based on detailed history, thorough clinical examinations, radiological examinations and ultrasound of abdomen, the diagnosis was made. Cases were allotted to either group alternatively, requiring single layer anastomosis and double layer anastomosis for various clinical conditions of small and large bowel. In Group A Intestinal anastomosis was carried out in single layer interrupted extramucosal technique with 3-0 vicryl and in Group B double layer continuous technique with 2-0 vicryl taking through all layers and seromucusular layer with 3-0 vicryl. Each case was analyzed with respect to duration required to perform intestinal anastomosis,duration of hospital stay, post operative complications. The duration of anastomosis begin with placement of first stitch on the bowel and ended when the last stitch was cut. All cases were followed up to discharge and subsequently for a follow up period of 2 months. A minimum of 50 cases with the following inclusions and exclusion criteria were selected for the study and were allocated alternatively to each of the comparative study group.

Inclusion criteria: Patients undergoing resection and anastomoses of small bowel and large bowel at our hospital, Age more than 14 years.

Exclusion criteria: Patients who are not willing to give written informed consent.

Those requiring anastomosis to the stomach or to the duodenum, rectum or proximal diversion were excluded

Resection anastomoses done for perforation with gross contamination of peritoneal cavity. Associated co-morbid diseases like sepsis, known cardiovascular disease, grossly deranged liver function.

RESULTS:

The present study was done on 50 patients who were divided into two groups with 25 patients in each Group which were divided randomly. The mean age of Group A patients was 40.30±3.16 years. While, the mean age of Group B patients was 38.03±2.60 years. In Group A (single layer) there were 17 (68%) males and 8 (32%) females. In group B (Double layer) there were 15 (60%) males and 10 (40%) females. The two groups were comparable as far as age and sex was concerned.

In our study of fifty cases in both groups terminal ileal perforation was diagnosed in maximum number of patients i.e. 12 (24%) cases followed by Ileaostomy closure in 10(20%) patients.

Table 1: Causes Of Resection Anastomosis.

	Group A	Group B	Total (%)
Blunt trauma abdomen	2	3	5(10%)
Mikels diverticulam	2	0	2(4%)
Ileostomy closure	6	4	10(20%)
Ileal perforation	5	7	12(24%)
Abdomen kochs	1	1	2(4%)
Intestinal obstruction	3	3	6(12%)
Gut malignancy	1	2	3(6%)
Colostomy closure	3	4	7(14%)
Obstructed hernia	1	1	2(4%)
Sigmoid volvulas	1	0	1(2%)

The maximum number of anastomosis in group A was performed at ileo ileal level in 16 (64%) patients, next at ileo colic site in 4 (16%) patients and at colo colic site in 4 (16%) patients. In group B (double layer),out of 25 anastomosis maximum number anastomosis was performed at ileo ileal level in 14 (56%) patients, next common site for anastomosis was at ileo colic site in 6 (24%) patients and followed by colo colic site in 4 (16%) patients.

Table 2: Type And Number Of Procedure Performed.

	Group A	Group B
Jejunojejnal	1(4%)	O
Jejuno-ileal	0	1(4%)
Ileo-ileal	16(64%)	14(56%)
Ileo-colic	4(16%)	6(24%)
Colo-colic	4(16%)	4(16%)

The mean duration of surgery in group A was 18.40±3.26 minutes while duration of surgery in Group B was 30.90±1.76 minutes which was statistically significant p value<0.05. In our comparative study the mean duration of hospital stay in Group A was 7.62±1.60 days and in Group B it is was 7.90±2.16 days which was not statistically significant. There was no major difference in postoperative complication in both the groups. 4 patients had wound infection in group A while 3 patients had wound infection in group B, there was one intraperitoneal Abscess in group b which was managed conservatively. There was one anastomotic leak in both the Groups, in group A it was managed conservatively whereas in group B diversion stoma was constructed.

Table 3: Postoperative Complications.

Postoperative complications	Group A	Group B	P value
Wound infection	4	3	
Intraperitoneal abscess	0	1	
Anastomotic leak	1	1	

DISCUSSION:

A wide variety of techniques have been proposed for gastrointestinal anastomosis for the last 150 years[9], but the ideal surgical procedure has not been discovered as yet. Anastomotic techniques should be safe, easy to learn, rapidly performed and at the same time it should not add significantly to the cost of medical care. In double layered closure technique, mucosa and seromuscular layers are sutured separately and it has been proposed that there are more chances of strangulation of mucosa because of damage of submucosal vascular plexus. However, in single layer technique, bowel is approximated using single layer of sutures either continues or interrupted and incorporates the submucosa of gut (strongest layer of intestine). This technique causes less damage to submucosal vessel and it has been proposed that there are less chances of necrosis in single layer technique and some may consider this to be better option for anastomosis[10,11].

The mean age of Group A patients was 40.30±3.16 years, While, the mean age of Group B patients was 38.03±2.60 years. Similarly a study done by Shyam M et al[12] the mean age in single layer Group was 42.97±13.68 and in double layer mean age was 41.00±13.16.

In our study of fifty cases in both groups terminal ileal perforation was diagnosed in maximum number of patients i.e. 12 (24%) cases followed by ileaostomy closure in 10(20%)patients. In contrast to our study Maurya et al[13] found bowel volvulus leading to gangrene as the leading cause (24.15%) for bowel resection and anastomosis, followed by tubercular bowel lesion (23.13%). McEntee et al[14] in 1987 observed obstruction in 34% cases, perforation in 18% cases and malignancy in 26% cases.

The mean duration of surgery in group A was 18.40±3.26 minutes while duration of surgery in Group B was 30.90±1.76 minutes which was statistically significant. In the study conducted by Ordorica-Flores et al[15] it was 26 min in the single-layer group and 43 min in the double-layer group. . In our comparative study the mean duration of hospital stay in Group A was 7.62±1.60 days and in Group B it is was 7.90±2.16 days which is almost equal to mean duration of stay in Ahmed N[16] study (7.32 and 7.92days

There was no major difference in postoperative complication in both the groups. 4(16%) patients had wound infection in group A while 3(12%) patients had wound infection in Group B, there was one intraperitoneal abscess in Group B which was managed conservatively. There was one anastomotic leak in both the Groups, in Group A it was managed conservatively whereas in Group B diversion stoma was constructed. Similarly in Garude et al[11] study 4 (5.4 %) patients had anastomotic leak in single layer and 3 (4.1%) had anastomotic leak in double layer whereas in Niyaz Ahmed[16] study 1 (4%) leak was present in single layer and 2 (8%) in double layer.

Conclusion: Single layer anastomosis requires less time to construct, cost effective, reduces the operation time, without increase in risk of anastomotic leak and other complications. So, we came to conclude that the single layer interrupted anastomosis is equivalent to the two layer traditional intestinal anastomosis.

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