

## TELESCOPIC BOWEL ANASTOMOSIS IN THE INTRA-ABDOMINAL INFLAMMATORY ENVIRONMENT

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### ABSTRACT

**Introduction:** Our aim of this study was to investigate a new method of repairing intestinal injuries in the intra-abdominal inflammatory environment and compare it with simple hand suturing method. This method which includes imaginative or telescopic bowel anastomoses previously used in urologic operations.

**Method:** 16 dogs were divided into two equal groups of 8. Intra-abdominal infection was induced in all dogs by a small perforation in the small bowel. After 24 hours the perforation was closed either by simple hand suturing technique (n=8, group A) or by our method of telescopic anastomosis (n=8, group B). After 8 weeks of follow-up the dogs were operated and the site of anastomosis was resected and sent for radiologic evaluations.

**Results:** Stenosis was significantly more observed in the group B with telescopic anastomosis ( $P < 0.05$ ). Leakage was not seen in both groups. Abdominal condition of both groups was the same.

**Conclusion:** Our results show that telescopic anastomosis is accompanied with a higher rate of post anastomosis stenosis.

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### INTRODUCTION

The small bowel is one of the most enigmatic of organs. It occupies most of the space in the abdominal cavity and plays a critical nutritive function in the wellbeing of the individual (Koltun wa, 2007). Numerous surgical conditions require the resection of bowel segments and the creation of reliable anastomoses. As such, anastomotic techniques have been central to the development of modern surgical practice. Traditionally, a wide variety of suture materials have been used to create hand-sewn anastomoses (Martel, 2007). For the first time Travers used suture for closure of intestinal ulcers in one layer including mucosa and serosa (1).

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However, Lembert showed that closure of serosa is necessary and protrusion of mucosa between the sutures can cause leakage at the site of anastomosis (Marecik, 2007). Halsted promoted double layer anastomosis for the first time in the history of small bowel surgery (Clifford, 2006). Nowadays there are wide variety of anastomotic techniques for small bowel surgery ranging from simple hand-sewn anastomoses to robotic small bowel surgery with stapling devices or bio-fragmentable rings or bio glue like materials (Marecik, 2007 and Nakamoto, 1990). One of proposed issues in anastomoses is telescopic or invaginative anastomoses techniques especially in urologic operations. Cedenho in 1987 used this technique in anastomosis of vasodeferen in animal model and showed patency of anastomosis area with histological examination (Cedenho, 1987). This kind of anastomosis also applied for attachment of pancreatic duct to small bowl in whipple's operation with successful follow up in 80% of cases (Rieger, 1995). Despite these facts there is no pure study on telescopic

bowel anastomosis for the small bowel yet, and in this study, we assessed telescopic bowel anastomose outcome in animal model.

## MATERIALS AND METHODS

In shiraz university of medical sciences in animal lab after ethical approval and permission from *ethic committee* of shiraz university we selected 16 German sheperd dogs. dogs (Wt: 20-30 Kg) were divided in to 2 equal groups. Animal were NPO from previous midnight of first operation. All animals were sedated with Acetyl promazine (1 mg /kg) and anesthetid with 15 mg/ kg Pentothal which was followed with halothane 2% and oxygen 100% and tracheal intubation with endotracheal tube No8. After midline incision of the abdomen (vertical incision), skin and fascia wereopened, and an Intra-abdominal inflammation was produced in 16 all dogs by 1\*1 Cm hole, in the small intestine 40 cm distal to duodenu-jejunal junction finally abdominal incision was closed with Nylon in continuous fashion. After 24 hours re-exploration performed the perforation was closed by a simple separate suturing technique with prolyne 3 O (n=8) in group A or by telescopic anastomosis (which included refreshing perforation edges and invagination two adjacent segment of bowel in two each other for the length of 4 cm -2 cm form proximal and 2 cm from distal margins to the ulcer and fixation of invaginated segment with prolyne 3 O) method in group B (n=8). Infection was evident in the abdominal cavity 24 hrs later. During both operations dextrose-saline solution was injecting to the cephalic vein and continued till feeding the animals started. Also we started penicillin IV 22000 units per kg in the second operation and continued for 5 days 3 days after operation water and fluid was initiated and advanced to regular diet on fifth day postoperatively the Dogs were observed for detecting the signs of opening in abdominal closure site or infection signs such as weakness due to possible leakage of bowel material in to the peritoneum and stenosis signs like food intolerance and vomiting. The inspectional information wascollected, and data were analysed with Mann Whitney software.

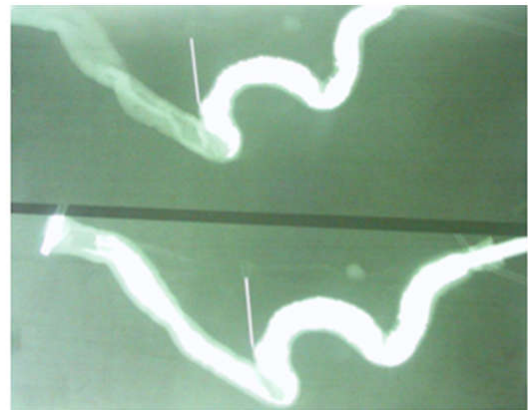
## RESULTS

After 2 months all animals of both groups were sacrificed and there was no evidence of adhesion nor collection in the abdominal cavity of all animals, after abdominal cavity contents evacuation bowel's repaired site was resected with 2 cm proximal and distal margin and sent in physiologic serum to radiologic ward for evaluation with contrast. There was no sign of leakage in both groups (Fig-1) there weren't any signs of perforation in both groups so there was no statistical difference between the two groups with respect to first variant. After the second surgery both groups were observed to detect sign of stenosis or obstruction signs such as food intolerance, vomiting, abdominal protrusion and constipation. As mentioned before, liquid was begun for animals form the 3rd day after operation and changed to regular diet at 5th day. In the study there were no clinical signs of stenosis in both groups, no food intolerance or vomiting. At the radiologic ward, after water-tight closure distal of repaired site, diluted barium was injected with syringe 50cc twice Besides anastomosis site was marked with needle and after each injection the X-ray shot was taken for evaluation anastomosis site for possible stenosis. In the evaluation with contrast material in the first group there were no sign of stenosis in all

8 cases. (Fig 2) but in the second group in 7out of 8 cases severe stenosis and in one case complete obstruction was seen despite absence of any clinical signs(fig -3) Significant statistical deference was detected between two groups for variant B. ( $p < 0.05$ ).



**Fig. 1. No sign of leakage in both groups**



**Fig. 2. In the evaluation with contrast material in the first group there were no sign of stenosis in all 8 cases**



**Fig. 3. The second group in 7out of 8 cases severe stenosis and in one case complete obstruction was seen despite absence of any clinical signs**

## DISCUSSION

In this study there were no significant differences between simple suturing and telescopic anastomosis with respect of leakage from anastomose site and clinical signs of stenosis, but despite the absence of clinical signs there was significant statistical differences in the rate of stenosis in the radiologic evaluation with contrast material, which showed severe

stenosis in the second group. Despite the successful results of telescopic anastomosis in repairing vasodeferan and attachment of pancreatic duct to small bowel as mentioned before we had severed stenosis in the bowel in our study (Rieger, 1995), severe stenosis was also seen the repair of trachea with this technique in other studies (Nakamoto, 1990).

### Conclusion

Our study results showed that telescopic bowel anastomosis is accompanied with higher rate of long term stenosis even in the absence of obstruction sign and symptoms despite safety of this method for vas repair in human because of devastating complications of stenosis and obstruction in GI tract course. We do not suggest this technique usage in human operations at least till further complete studies.

**Disclosure:** The authors declare no conflicts of interest.

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