

# Comparision of single and double layer intestinal anastomosis in Ahwaz educational hospitals (2005-2006)

S Askarpour, M Sarmast, M Peyvasteh, B Gholizadeh

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## Abstract

**Backgrounds and aim:** This study evaluated complications of intestinal anastomosis in urgent and elective patients with two methods: single- or double-layer anastomosis. **Patients and methods:** This case-control study was carried out from July 1, 2005 to Aug 31, 2006 (14 months) in 3 university hospitals. Patients who had an indication for intestinal anastomosis (urgent or elective) were included. In this study, 126 patients with an average age of  $31.39 \pm 21.08$  years were divided into two groups: single-layer (63 patients) and double-layer (63 patients) intestinal anastomosis. In the single-layer group, intestinal anastomosis was carried out in continuous or interrupted method with absorbable or non-absorbable suture. Double-layer anastomosis was carried out in internal layer with continuous suture and external layer with interrupted suture. Post-operation complications were evaluated for fistula, wound infection, intra-abdominal abscess and stricture of anastomosis site. All intestinal anastomoses were carried out with the hand-sewn method. **Results:** In single-layer intestinal anastomosis, 5 patients (7.9%) had wound infection, 2 patients (3.2%) intra-abdominal abscess and one patient (1.6%) enterocutaneous fistula, and in the two-layer group, 7 patients (11.1%) had wound infection, 2 patients (3.2%) intra-abdominal abscess and 4 patients (6.3%) fistula. No patient experienced stricture of the intestinal anastomosis site. **Conclusion:** Single-layer anastomosis is safe. Complications of single- or double-layer anastomosis were similar. In addition, we have decreased operation time and total cost by the single-layer method.

## BACKGROUNDS AND AIM

The basic principles of the intestinal suture were established more than 100 years ago by Travers, Lambert and Halsted<sup>1</sup>. Two-layer anastomosis was done by Larry in the 19<sup>th</sup> century<sup>2</sup>. Historically, two-layer anastomosis using interrupted silk sutures for an outer inverted seromuscular layer and a running absorbable suture for a transmural inner layer has been standard for most surgical situations. Some recent reports have described single-layer continuous anastomosis using monofilament sutures as requiring less time and cost than any other method, without incurring any added risk of leakage<sup>3, 4, 5, 6</sup>. The single-layer continuous anastomosis is a contemporary innovation first described by Hautefeuille in 1976<sup>7</sup>. In the USA, the first mention of this technique was by Allen et al.<sup>8</sup> Length of surgery was less in single-layer than in two-layer anastomosis and lesser trauma was caused in single-layer anastomosis. Two systematic reviews of randomized controlled trials (RCTs) comparing stapled with hand-sewn colorectal anastomosis found no difference between the two methods.<sup>9</sup> Many surgeons probably now use single-layer suturing due to reduction in ischemia, tissue necrosis, or narrowing of the lumen

compared to the two-layer methods. This study evaluated complications of intestinal anastomosis in urgent and elective patients with the two methods of single- or double-layer anastomosis.

## PATIENTS AND METHODS

This case-control study was carried out from July 1st, 2005 to Aug. 31, 2006 in 3 university hospitals (Golestan, Abuzar, Imam Khomeini). One hundred and twenty-six patients who needed intestinal (large or small) anastomosis were included in this study. Patients who needed gastric, duodenum, and rectal anastomosis were excluded. These patients with average age of  $31.39 \pm 21.08$  years were divided into two groups: single-layer and double-layer intestinal anastomosis (63 patients in each group). In the single-layer group, intestinal anastomosis was carried out in continuous or interrupted methods with absorbable or non-absorbable suture. Double-layer anastomosis was carried out in an internal layer with continuous suture and an external layer with interrupted suture. Postoperative complications were evaluated for fistulae, wound infection, intra-abdominal abscess and stricture of anastomosis site until 30 days after

surgery. All intestinal anastomoses were carried out with the hand-sewn method. Chi-square tests were used for analysis.

## RESULTS

In the single-layer group, 5 patients (7.9%) had wound infection, 2 patients (3.2%) intra-abdominal abscess and one patient (1.6%) enterocutaneous fistula and in the two-layer group, 7 patients (11.1%) had wound infection, 2 patients (3.2%) intra-abdominal abscess and 4 patients (6.3%) fistulae. No patient experienced stricture of intestinal anastomosis site. The intra-abdominal abscesses were associated with minimal or no leakage.

### Figure 1

Table I: Distribution of complications with two methods of anastomosis

| Method of anastomosis | Intra abdominal abscess |       | Fistula |   | Wound Infection |       |
|-----------------------|-------------------------|-------|---------|---|-----------------|-------|
|                       | %                       | N     | %       | N | %               | N     |
| Single-layer          | 3.2                     | 2     | 1.6     | 1 | 7.9             | 5     |
| Two-layer             | 3.2                     | 2     | 6.3     | 4 | 11.1            | 7     |
| P-value               |                         | 0.171 |         | 1 |                 | 0.554 |

## DISCUSSION

Single layer anastomosis is safe. In this study, we found that complications of single-layer anastomosis are similar to double-layer anastomosis and this finding was similar to the study of Chittmittrapap et al. <sup>10</sup>. Abscess formation was seen in 3.2% of cases with single-layer and two-layer anastomoses. A similar rate of abscess formation was reported by Burch et al. <sup>11</sup> and Skakun et al. <sup>12</sup>. Shikata et al. reported that two-layer intestinal anastomosis offers no definite advantage over single-layer anastomosis in terms of post-operative leak. <sup>13</sup> As shown above, single-layer anastomosis may be a better choice than two-layer anastomosis. In addition, we found decreased operation time

and total cost with the single-layer method.

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## References

1. Brooks DC, Zinner MJ: Surgery of Small and Large Bowel. In Maingot's Abdominal Operations, Volume 2. 10th edition. Edited by: Zinner MJ. Stamford: Appelton & Lange; 1997: 1309-1310.
2. Cohen Z, Sullivan B: Intestinal anastomosis. In: Wilmore DW et al., ACS Surgery, Principles and Practice. New York, WebMD. 2002-803-5.
3. Thompson WHF, Robinson MHE: One-layer continuously sutured colonic anastomosis. Br J Surg; 1993; 80: 1450-1451.
4. AhChong AK, Chiu KM, Law IC, Chu MK, Yip AW: Single-layer continuous anastomosis in gastrointestinal surgery: a prospective audit. Aust NZ J Surg; 1996; 66: 34-36.
5. Sarin S, Lightwood RG: Continuous single-layer gastrointestinal tract anastomosis: a prospective audit. Br J Surg; 1989; 76: 493-495.
6. Brodsky JT, Dadian N: Single-layer continuous suture of gastrojejunostomy. Am J Surg; 1997; 63: 395-398.
7. Hautefeuille P. Reflexions sur les sutures digestives: a propos de 570 sutures accomplies depuis 5 ans au surjet monoplane de monobrin. Chirurgie 1976; 102: 153-165.
8. Allen TW, Salem RJ, Stirman JA: Continuous sutures for single layer enteroanastomoses. Read before the Texas Surgical Society, Austin, Tx, Oct. 1, 1979.
9. MacRae HM, McLead RS: Handsewn vs. stapled anastomoses in colorectal surgery: a meta-analysis. Dis Colon Rectum; 1998; 41: 180-189.
10. Chittmittrapap S, Kitisin P: One layer continuous anastomosis of the alimentary tract with absorbable polydioxanone suture. J Med Assoc Thai; 1993; 76 (5): 264-70.
11. Burch JM, Franciose RJ, Moore EE, Biffl WL, Offner PJ: Single-layer continuous versus two-layer interrupted intestinal anastomosis: a prospective randomized trial. Ann Surg; 2000; 231(6): 832-7.
12. Skakun GB, Reznick RK: The single-layer continuous polypropylene colon anastomosis. Dis Colon Rectum; 1988; 31(3): 163-8.
13. Shikata S, Yamagishi H, Taji Y, Shimada T, Noguchi Y. Single-versus two-layer intestinal anastomosis: a meta-analysis of randomized controlled trials. BMC Surg; 2006; 6: 2.

**Author Information**

**Shahnam Askarpour**

Associate Prof. of Pediatric Surgery, Dept. of Surgery, Imam Khomeini Hospital, Joundi Shapour University of Medical Sciences, Ahwaz, IRAN

**Mohammad Hossein Sarmast**

Associate Prof. of General Surgery, Dept. of Surgery, Imam Khomeini Hospital, Joundi Shapour University of Medical Sciences, Ahwaz, IRAN

**Mehran Peyvasteh**

Assistant Prof. of Pediatric Surgery, Imam Khomeini Hospital, Joundi Shapour University of Medical Sciences, Ahwaz, IRAN

**Behnam Gholizadeh**

Resident of general surgery