Bowel anastomosis in emergency intestinal surgery-hand sewn versus stapler: a comparative study

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Objective
The choice between a stapler and a hand-sewn intestinal anastomosis is based on surgical experience as well as individual preference. The purpose of the study was to compare the results of hand-sewn versus stapled anastomoses in urgent intestinal procedures.
Patients and methods
The study included 96 patients who, between October 2020 and October 2022, received emergency intestinal anastomoses at our associated university institutions. Randomly selected patients were assigned to two groups: group A (n=50) received stapled anastomoses, and group B (n=46) received hand-sewn anastomoses.
Results
Patient information, duration of operation, anastomotic leak incidence, and complications following surgery were all documented.
Findings
Group A's operating time was substantially less (P=0.0001). There was no discernible difference in blood loss, leakage rate, wound infection, or mortality between the two groups.

Keywords:
bowel anastomosis, emergency, hand-sewn, stapler

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Introduction

Whether stapled or hand-sewn, intestinal anastomosis aims to preserve the blood supply and achieve a tension-free, accurate approximation of the tissues [1]. Since Ravitch and Steichen created a modified version of the Soviet-developed stapling devices in the 1960s, a variety of stapler types and stapling procedures have been used globally [2]. For intestinal anastomoses, there are two primary stapler types: linear staplers for functional side-to-side anastomoses and circular staplers for anatomical end-to-end anastomoses. Numerous studies have concluded that the introduction of staplers rendered hand-sewn anastomoses obsolete [3,4]. Compared with traditional hand-sewn anastomoses, stapled intestinal anastomoses consume less time and have an acceptable low rate of problems associated to anastomosis [5,6]. Stapled anastomoses, however, are not always regarded favorably. There are not many articles comparing mechanical and hand-sewn anastomosis in emergency intestinal surgery, as far as we know [7]. In order to compare the stapling approach with hand-sewn suturing in emergency intestinal surgery, we therefore carried out this prospective randomized trial.

Patients and methods

All the 96 patients who had emergency intestinal surgery with anastomoses at our associated university hospitals between October 2020 and October 2022 were included in the study. We were granted approval by our Institutional Ethics Committee. Written informed consent has been obtained from every patient. Each patient was randomly assigned to one of two groups: group A (no. 50 patients) received stapled anastomoses, while group B (no. 46 patients) received hand-sewn anastomoses. Prior to surgery, the patients' clinical history, physical examination, BMI, and test results were evaluated. Anastomoses from side to side, end to end, and end to side were all present. GI staplers, including circular, cutting, and linear models, were used to perform stapled anastomoses without suturing the staple line. Anastomoses were hand-sewn using a double-layer approach with 2/0 absorbable polyglycolic acid sutures (Vicryl), with a seromuscular second layer and a full-thickness continuous layer. Patients having stomas that diverted were not accepted. Data about the patients were gathered prospectively. Included were all anastomoses performed in emergency surgery by a top surgeon. Antibiotic prophylaxis was administered as a single intravenous cefazoline 1 g dose during the

induction of anaesthesia. For every patient, an intra-abdominal drain was inserted. Patient information, surgical results, duration of operation, anastomotic leak incidence, and complications following surgery were all documented.

Study definitions

- Operative time: the time from skin incision until skin closure.
- Clinical leak: anastomotic dehiscence confirmed by reoperation, development of enterocutaneous fistula or bowel contents in the drainage tube.
- Wound infection: purulent fluid in the laparotomy incision.

Statistical analysis

By using SPSS ver.18, data were analyzed using independent samples T-test to compare mean values and χ^2 tests used to compare proportion of two values.

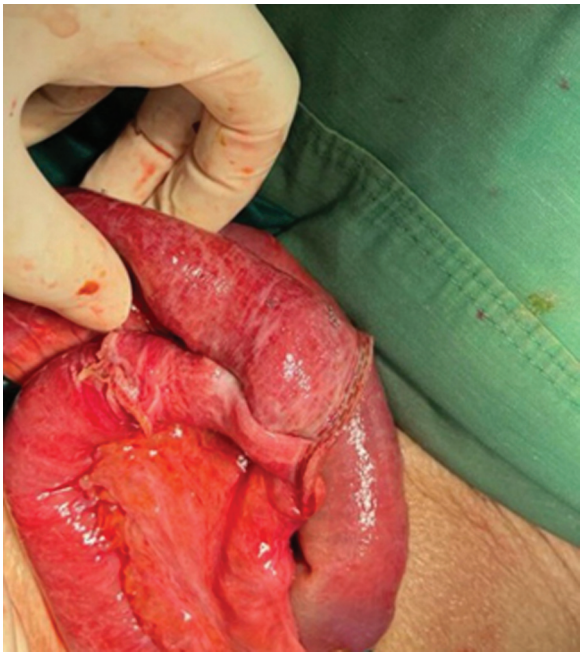
Results

This study involved 96 patients: 46 patients had hand-sewn anastomoses (group B, Fig. 1) and 50 patients had stapled anastomoses (group A, Fig. 2). Tables 1 and 2, respectively, demonstrate the distribution of the various bowel anastomosis segments and the patient characteristics in the two groups. The surgical duration was 128.47±13.11 min in group B and 82.89 ±12.89 min in group A. This difference was statistically significant (*P* value=0.0001) between the two groups. Regarding blood loss, there was actually no discernible difference between the two groups (*P* value=0.06). There was not no statistically significant difference between the two groups (*P* value=1), with the leakage rate in group A being 6% (3 cases) and in group B being 4.3% (2 cases). Concerning leaks between the two groups' colocolic, colorectal, and small bowel anastomoses, there was no statistically significant difference. Two deaths in group A and one in group B were specifically brought on by anastomotic dehiscence. Cardiopulmonary insufficiency was the cause of two deaths, one in each group. There was no statistically significant difference in the 30-day mortality rate between the two groups (*P* value=1). Five (10%) patients in group A and four (8.7%) patients in group B had wound infection (*P* value=1). There was no discernible difference in the length of hospital stay between the two groups (*P* value=0.1).

Figure 1

Hand sewn anastomosis.

Figure 2



Stapled anastomosis.

Table 1 Site of anastomosis in each group

	Group A	Group B	*P* value
Jejunal	17	15	0.7
Ileal	28	26	0.6
Colonic	3	3	1.0
Colorectal	2	2	1.0

Table 2 Clinical and laboratory data of patients in each group

Data	Group A	Group B	*P* value
Age (mean±SD)	42.64±12.48	39.78±12.59	0.3
Sex (Male/Female)	23/27	24/22	0.7
BMI (mean±SD)	27.84±4.86	27.71±4.82	0.9
Hemoglobin (g/dl, mean±SD)	11.79±1.76	11.24±1.61	0.2
WBC count (mean±SD)	12.44±2.39	13.02±2.54	0.2
Albumin (g/dl, mean±SD)	3.12±0.70	2.94±0.76	0.2
Operating time (min., mean±SD)	82±12.89	128.47±13.11	**0.0001**
Blood loss (g/dl, mean±SD)	1.66±0.72	1.39±0.63	0.06
Leak (No., %)	3 (6)	2 (4.3)	1
Wound infection (No., %)	5 (10)	4 (8.7)	1
30 days mortality (No., %)	3 (6)	2 (4.3)	1
Hospital stay (days, mean±SD)	11.15±0.91	11.53±1.38	0.1
Underlying pathology			0.92
Bowel obstruction	27 (54)	25 (54.2)	
Strangulated hernia	10 (20)	9 (19.5)	
Bowel ischemia	6 (12)	5 (11)	
Bowel perforation	4 (8)	5 (11)	
Malignancy	3 (6)	2 (4.3)	

Discussion

Numerous randomised studies have assessed stapling techniques in elective surgery; few, however, have contrasted stapling with manual anastomosis in an emergency situation.In [8]Stapler use has advantages, such as much faster anastomosis, which reduces operating time [9], but the biggest drawback is thought to be their cost. Whether to perform a hand-sewn or stapled anastomosis depends primarily on the experience and desire of the surgeon [10]. The evidence was not strong enough to prove that one strategy was better than the other. Comparable findings have been found in several investigations regarding anastomotic leak, operation duration, and mortality. Anastomoses are performed on emergency surgery patients, who are typically very sick and in challenging circumstances, so cutting down on operating time is essential. Stapler use may therefore be necessary to perform anastomoses more quickly. Not only are emergency surgery patients less prepared than those undergoing elective surgery, but there is also an added risk [7]. In our investigation, the overall incidence of anastomotic leak was 5.2% (5 patients in both groups), which was in line with the majority of series that have been published [5,6,11,12].

Whether it was a small intestine, colonic, or colorectal anastomosis, there was no statistically significant difference in the rate of anastomotic leak between the two groups (*P* value=1). Studies by Kracht *et al.* [13], who found a statistically insignificant difference in leak incidence between the two groups, and MacRaeetal [14], who found a statistically insignificant difference in the incidence of leak in colorectal anastomosis performed manually or with the use of a stapler in a meta-analysis, both support these results. Anastomosis with staples is less economical [15]. In addition, the duration of hospital stay is not reduced compared with hand-sewn anastomosis, indicating that it is undoubtedly more costly because its expenses were not covered [16]. The difference in mean operating time between the two groups was around 50 min, with the hand-sewn group having a significantly longer mean operating time (*P* value=0.0001). The primary cause of this is the amount of time needed to complete manual double layer anastomosis [17]. However, as noted by Anselmi *et al.* [18], there are no benefits to shorter operation times. We so came to the conclusion that, in emergency intestinal anastomoses, stapler-assisted anastomoses can yield results that are on par with manual anastomoses, but that the former is more cost-effective and has the advantage of a shorter operating time. Nevertheless, more research on bigger populations is required to evaluate the distinctions in the effectiveness of the two approaches.

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Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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