INTRODUCTION

Intestinal tumours, obstructions, and peritonitis caused by abdominal trauma or perforated bowel are common surgical problems that can be treated with resection and anastomosis, which joins two parts of the bowel together with accurate approximations and a good blood supply to both parts.\(^1\) The anastomotic process is one of the most important variables affecting surgical outcomes. The primary element of gastrointestinal surgery after excision of bowel loops is anastomosis of the gut loops.\(^2\) Hand-sewn and stapled sutures are the most often used anastomotic procedures in GI surgery.\(^3\) The mainstay of gastrointestinal surgery is the seromuscular suture method. As reported by Matheson of Aberdeen, single-layer extra mucosal anastomosis is more often utilised currently because it can induce less tissue necrosis or luminal constriction and has mostly supplanted catgut and silk.\(^4\)

The development of mechanical sutures by stapler devices is a technical innovation that aids in the anastomosis of bowel loops with less tissue harm and a shorter treatment time.\(^5\) Staplers were invented to solve the apparent problem of patency (security against blood or bowel contents leaking) in anastomoses in particular. The Stapler method is more beneficial than hand-sewn anastomosis.\(^6\) It is currently widely utilised by numerous surgeons. It is more beneficial than hand-stitched anastomosis.
regarding safety, ease of access, process length, and efficiency.[6] Many surgeons are sceptical about the stapler's usage at crucial anastomosis sites. Over the last 30 years, the evolution of trustworthy, disposable staplers has dramatically revolutionised surgical practice. Technical flaws in modern devices are uncommon, and anastomosis in difficult-to-reach locations is simpler.[7]

The time necessary for anastomosis, function restoration, good hemostasis, tissue damage reduction, and avoidance of postoperative morbidity, such as leak (sepsis), are all aspects to consider.[8] Accurate approximation without stress and a strong blood supply, whether suturing or stapling, is critical. Staplers have been designed to meet the majority of these requirements. Some randomised trials in colorectal surgery have found no differences in the rate of leakage, hospital stay length, or morbidity between these two anastomosis techniques.[9] Another research found no difference between hand-stitched and stapler-based anastomosis regarding stricture creation, anastomatic haemorrhage, anastomotic time, reoperation rate, death rate, or intra-abdominal abscess formation.[10] Staplers can cut and staple simultaneously, eliminating the need for clamping. The higher cost of staplers is countered by the shorter operating time.[11] Circular staplers provide greater access in low pelvic surgery, preventing many patients from needing a permanent colostomy. Suturing or stapling can be used to perform anastomosis.[12] As a result, it is useful to investigate the two ways to bowel anastomosis. Very few studies have compared the superiority of stapled vs hand-sewn anastomosis in general procedures for digestive tract tumours, and the results are contradictory.

Aim
The study aimed to compare the time length of surgery, hospital stay, duration of bowel function restoration, and postoperative morbidity using hand-sewn anastomosis and stapler anastomosis procedures.

MATERIALS AND METHODS

This prospective research was conducted at Coimbatore Medical College Hospital from June 2016 to July 2017. During the study period, patients admitted to the surgical ward and emergency department for gastrointestinal anastomosis (> 13 years of age) were separated into two groups based on the anastomosis process, hand-stitched or stapler technique.

Exclusion criteria
Patients above the age of 13, pancreaticoduodenectomy with triple bypass, hepatocutaneous anastomosis, and patients who had already had chemoradiation were all excluded from the trial.

Anastomosis method
Patients were divided into groups based on the kind of anastomosis, hand-sewn or stapler. Hand-sewn anastomosis is performed using a two-layer, continuous suturing method. Linear cutting staplers were employed in anastomosis. The factors evaluated include operation length, hospital stay, postoperative leak, gastrointestinal function restoration, and postoperative morbidity. The most frequent anastomosis procedures are gastro-jejunoanastomosis anterior and posterior, jejunojejunalostomy, ileocolic, and colorectal.

Statistical Analysis
The data were statistically evaluated using the independent samples T-test to compare mean values between techniques and Chi-square testing to compare the proportions of the two values.

RESULTS

Among 50 patients in the study, 58% were males, and 42% were females. Among the 50, 24 were grouped under hand sewn and 26 under stapler. 54.2% of males received hand-sewn anastomosis, while 61.5% received stapler-based anastomosis. Among women, 11 and 10 patients received hand sewn and stapler anastomosis, respectively. Among 46% of elective surgeries, 10 underwent hand-sewn anastomosis, and 11 underwent stapler-based anastomosis. Among women, 11 and 10 patients received hand sewn and stapler anastomosis, respectively. Among 46% of elective surgeries, 14 and 13 underwent hand-sewn and stapler-based anastomosis, respectively. The patients were categorised into five age ranges, up to 30, 31 – 40, 41-50, 51-60, and > 60...
years, resulting in the highest number of patients under age group 41 – 50 (28) and 51 – 60 (26), with the highest frequency of those receiving hand sewn anastomosis under 41 - 50 (29.2%) and least under age group 31-40 years (Figure 1). For stapler anastomosis, age groups 41 – 50 and 51-60 were the highest (26.9%), and the least was up to 30-year age group [Figure 1].

The surgery took 2.8 and 2.28 hours with respective usage of hand-sewn and stapler-based anastomosis, with a corresponding postoperative GIT motility of 6 and 4 days, respectively. Hospital stay was 15 and 12 days in hand-sewn and stapler-based anastomosis, respectively. Hand-sewn anastomosis group were observed with more instances of postoperative complications [Figure 2].

Mean surgery duration for hand sewn and stapler-based anastomosis was 158.38 and 127.88, respectively, with a corresponding Postoperative Git motility of 5.58 and 4.23 days leading to a proportionate mean hospital stay duration of 14.79 and 12.27 days [Table 1].

Anastomosis duration, the appearance of bowel noises and the beginning of oral feeding. The total length of hospital stay has a substantial prognostic value [Table 2]. There was no mortality in either group.

Table 1: Patient distribution based on description and grouping

<table>
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<th>Parameters</th>
<th>Descriptive</th>
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<tr>
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<td>Hand sewn</td>
<td>Stapler</td>
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<td>Age in years</td>
<td>51.10 ± 15.165</td>
<td>52.04± 15.763</td>
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<td>Duration of Surgery in minutes</td>
<td>142.52 ± 28.767</td>
<td>158.38± 26.857</td>
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<td>Postoperative Git motility in Days</td>
<td>4.88 ± 0.849</td>
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<td>Hospital stay in Days</td>
<td>13.48 ± 2.178</td>
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Table 2: Independent samples test

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DISCUSSION

The hand-sewn approach is traditionally the primary surgical technique for fashioning anastomosis in gastrointestinal surgery. A revolutionary approach must be effective and quick without sacrificing safety to win widespread acceptance. It is beneficial to study the two methods of bowel anastomosis. There have been few studies comparing stapled vs hand-sewn anastomosis in general surgeries for digestive tract malignancies, and the findings are conflicting. As a result, the current study compared the time length of surgery, hospital stay, duration of bowel function restoration, and postoperative morbidity utilising hand-stitched and stapler anastomosis approaches.

The findings of a 50-patient trial comparing hand-stitched anastomosis with stapler anastomosis were analysed. The duration of operation, resumption of oral feeds, return of gastrointestinal tract motility, postoperative hospital stay, and complications differ for both hand-stitched and stapler anastomosis groups. They had 18 benign instances in their research (15 in the hand-stitched group and 3 in the stapler group). The remaining instances (52 in all) were cancerous. The majority of the benign cases required hand-stitched anastomosis. The majority of prior investigations have solely included cancer patients. This analysis included all patients with elective GI anastomosis, regardless of pathology (benign or malignant).

The overall duration of the anastomosis is shorter in the stapler group than in the hand-sewn group. The mean value of stapler anastomosis time was 127.88 minutes compared to 158.38 minutes for hand-sewn anastomosis with substantial predictive value. A likely shorter duration of anastomosis time using staplers was reported earlier by Bangaru et al. They also reported faster recovery in terms of bowel...
sounds and starting of oral feeds within patients of the stapler group, similar to our study. Yet, our study reports statistical insignificance of values between the groups. The appearance of bowel sounds and the commencement of oral feeds were sooner in the stapler group, and the mean value of stapler anastomosis was 4.23 days compared to 5.58 days for hand sewn with substantial predictive value. The change was statistically significant but clinically insignificant.

Shortening the surgery duration entails less surgical stress, intra-operative blood loss, less local infection, and a lower risk of surgical complications. As a result, individuals in the stapler group spent less time in the hospital. Compared to the manually stitched group, the total length of hospital stay was shorter in the stapler group. The mean value of total hospital stay in stapler anastomosis was 12.27, compared to 14.79 in the hand-stitched group, with a statistically significant predictive value. Another study found that stapling anastomosis reduces postoperative hospitalisation in individuals with stomach and esophageal tumours. The superiority of stapler-based anastomosis in indicating fast postoperative recovery might be explained by minimal surgical trauma surrounding stapler anastomosis and anastomotic tissue contraposition, preventing injury to the stomach mucosa from the cutting thread.

Regarding difficulties, the stapler group had less than the hand-sewn group. Only one incidence of postoperative fistula was reported in Stapler anastomosis, but four cases were detected in hand-sewn anastomosis. Regarding wound infection with lower respiratory tract infection, the stapler anastomosis group had one instance, whereas the hand-sewn group had three. Most problems occurred in emergency procedures rather than elective surgeries in the stapler and hand-sewn anastomosis. Wound gapping was present in 5 of the hand-sewn instances and only 2 of the stapler cases. While Bangaru et al. reported no significant differences in postoperative complications, Anastomotic leak in emergency operations leading to fistula was 3.8% (one case) in stapler and 16.7% (four cases) in hand stitched anastomosis in our series. Three of the five instances with anastomotic leak were treated as emergencies, whereas the other two were treated as elective surgery. One case of stapler anastomosis developed an anastomotic leak, which was treated as an emergency procedure for small bowel and caecal gangrene, with resection of the small intestine, caecum, and jejunal anastomosis. Four incidences of anastomotic leak developed in hand-sewn anastomosis. Two instances were treated as emergencies, while the others were treated as elective procedures. Liu et al. found that stapler suturing is superior to manual suturing in terms of reducing the incidence of anastomotic leakage in gastric carcinoma and colorectal cancer, as well as the incidence of anastomotic haemorrhage in gastric carcinoma, colorectal cancer, and esophageal cancer. According to his findings, the stapler suture substantially reduced the occurrence of stump leaking for colorectal cancer compared to the hand-sewn approach. There was one anastomotic leak in the hand-sewn group after the Whipples surgery in this research. It was handled cautiously. Compared to the hand-sewn approach, the stapler suture successfully reduced the occurrence of stump leaking for colorectal cancer. There was no statistically significant difference in anastomosis leak between the hand-stitched and stapler groups. This followed major meta-analyses, and comprehensive reviews indicate no significant difference in terms of intestinal function restoration, postoperative hospital stay, and postoperative complications. It is recognised that the stapler method generally reduces total operating time and provides better access to difficult-to-reach areas. We found comparable outcomes regarding surgical time and hospital stay, but the stapled approach was preferable in decreasing many problems. A few studies have shown that stapler anastomosis has superior outcomes in reducing problems, consistent with our findings.

Stapled esophagogastric anastomosis may be more efficient than hand-sewn in preventing stricture development without increasing gastroesophageal reflux.

**CONCLUSION**

There are few studies on the functional return of organs following surgery in individuals with digestive tract malignancies. The stapling approach did, however, dramatically decrease the time to GI normal motility following surgery for both gastric and intestinal cancer patients. Stapler anastomosis was less time-consuming than traditional hand-sewn anastomosis. As a result, it can be utilised in patients with poor general health and emergency procedures. Compared to hand-sewn anastomosis, stapler anastomosis required less time to regain bowel functions and less hospitalisation. Hand-sewn anastomosis had a greater rate of anastomotic leak leading to fistula than stapler anastomosis. According to our findings, stapler anastomosis outperforms traditional hand-sewn anastomosis.

**REFERENCES**

5. Mehta A, Sharma P, Pancholi M, Patel P. A retrospective comparative study on stapler versus hand sewn technique in...