Hand Sewn Versus Stapled Anastomosis for Esophagostomy.

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Abstract

Background: The most common method of treating esophageal cancer is esophagectomy. Reconstruction involves the use of esophagogastric anastomosis, and this could be done by either hand-sewing or stapling. Anastomotic issues such as leaks and strictures have a great impact on morbidity, mortality, and postoperative recovery. The best approach is still controversial, and study indicates inconsistent results for both approaches.

Objectives: The objective of the study was to compare hand-sewn and stapled esophagogastric anastomosis among patients who underwent esophagectomy in terms of operating time, anastomotic leakage, stricture, hospitalization, and general postoperative recovery.

Methodology: A prospective comparative study was conducted at Thoracic Surgery department, Lady Reading Hospital Peshawar KPK Pakistan from jan 2020 to jan 2021.based on 100 patients with elective esophagectomy and randomized to the groups of hand-sewn anastomosis (n=50) and stapled anastomosis (n=50). Demographics, comorbidities, the location of the tumor, and preoperative investigations were documented. Measures were taken of operative time, blood loss, intraoperative complications, anastomotic leak, stricture formation, hospital stay, and mortality within 30 days. Statistical tests were done using Student's t-test to analyse continuous variables and the Chi-square test to analyse categorical variables. The data are presented in the mean ± standard deviation (SD), with a p-value of less than 0.05 being regarded as significant.

Results :Mean age was 58.4 ± 9.2 years in the hand-sewn group and 57.6 ± 8.7 years in the stapled group (p=0.68). Operative time was shorter for stapled anastomosis (205 ± 20 min vs 240 ± 25 min, p<0.001). Blood loss was similar (280 ± 50 mL vs 265 ± 45 mL, p=0.12). Anastomotic leaks occurred in 8% vs 6% (p=0.68), and strictures in 12% vs 6% (p=0.27). Stapled anastomosis was associated with shorter hospital stay (10 ± 2 days vs 12 ± 3 days, p=0.004). No 30-day mortality occurred.

Conclusion: Compared to end-to-end anastomosis, stapled anastomosis has shorter operative time and hospitalization and has similar leak and stricture rates. The two methods are safe, but the selection must be based on the experience of the surgeon, the anatomy of the patient, and the conditions during surgery.

Keywords :Esophagectomy, Anastomosis, Hand-sewn, Stapled

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Introduction

Treatment of respectable esophageal cancer is the gold standard, which is esophagectomy, which provides the best opportunity to improve long-term survival [1]. The reconstruction patterns after esophagectomy are the establishment of esophagogastric anastomosis, which is essential in the restoration of gastrointestinal continuity and adequate nutritional intake. Even with current improvements in surgical methods, anastomotic complications like leaks and strictures remain an important factor in the postoperative morbidity and mortality. Anastomotic leaks may extend the length of stay, hike the cost of healthcare, and adversely affect patient outcomes, whereas strictures may cause dysphagia, malnutrition, and re-infections [2,3]. The hand-sewn anastomosis is historically viewed as the conventional method, and it has enabled the surgeon to customize suturing to the anatomy based on the patient [4]. It is a surgical procedure that is demanding of great care and results in an extended period of operation. Conversely, the stapled anastomosis has become popular within recent decades because of the standardized and reproducible technique, possible shortening of the operative time, and technical simplicity [3]. A number of studies have been compared on these techniques, but the results are inconclusive. Some reports indicate that stapled anastomosis has a lower leak and stricture rate than others reveal that there are no significant differences in the outcomes. Patient comorbidities, location of tumor, experience of surgeon, and perioperative care are factors that are likely to affect the outcome, and we can compare them further [5,6]. The decision between hand-sewn and stapled methods is not only technical but has extreme consequences regarding the postoperative recovery and quality of life in the long term [7]. The optimization of anastomotic technique would help to minimize complications, decrease hospitalization, and enhance patient satisfaction [8]. Thus, new studies of the comparison of these methods in modern surgical practice are necessary. The purpose of this study is to present evidence of the comparative results between hand-sewn anastomosis and stapled anastomosis after esophagectomy, examining the parameters of the operation, postoperative complications, and criteria of recovery to determine the basis of surgical decision-making and the outcome of the patient [9,10].

Study Objectives

To compare hand-sewn and stapled esophagogastric anastomosis in patients who have undergone an esophagectomy, the assessments covered the duration of operation, anastomotic leak, formation of stricture, hospitalization, and general postoperative recovery.

Materials and Methods

Study Design & Setting

This comparative study was a prospective study conducted at Thoracic Surgery department, Lady Reading Hospital Peshawar KPK Pakistan from jan 2020 to jan 2021. The patients who had elective esophagectomy were randomized to hand-sewn or stapled anastomoses.

Participants

One hundred patients aged 35 to 75 years old with decent esophageal cancer were recruited. Patients who had undergone upper gastrointestinal surgery before or had severe comorbidity were excluded. Comorbidities, tumor location, demographics, and preoperative investigations were documented. Informed consent was obtained from all patients, and they were treated according to standardized perioperative protocols.

Sample Size Calculation

The sample size was determined by the findings of the past study that showed comparisons between the anastomotic leak rates. A minimum of 50 patients per group was needed with the assumption of a difference between groups of 10 percent, 80 percent power, and 0.05 1. There was a balance of hand-sewn versus stapled anastomosis that was randomly allocated.

Inclusion Criteria

patients having decent esophageal cancer, ASA I-III.

Exclusion Criteria

Previous GI surgery above, metastasis, extreme cardiopulmonary comorbidity.

Diagnostic Strategy and Management Strategy.

Endoscopy, biopsy, and CT were used as preoperative staging. Normal perioperative and postoperative treatment were used.

Statistical Analysis

The analysis of data was performed through SPSS v. 25. Continuous variables were represented by mean + SD and compared by the use of Student t -test. Chi-square or Fisher's exact test was used to analyze categorical variables. A p-value that was less than 0.05 was regarded as statistically significant. Comparison of groups was done in terms of operative outcomes, complications, and hospital stay.

Results

A total of 100 patients were included (hand-sewn n=50, stapled n=50). The mean age was 58.4 ± 9.2 years in the hand-sewn group and 57.6 ± 8.7 years in the stapled group (p=0.68). Male-to-female ratio was 3:1 in both groups. Operative time was significantly shorter in the stapled group (205 ± 20 min vs 240 ± 25 min, p<0.001). Intraoperative blood loss was comparable (hand-sewn 280 ± 50 mL vs stapled 265 ± 45 mL, p=0.12). Anastomotic leak occurred in 4 patients (8%) in the hand-sewn group and 3 patients (6%) in the stapled group (p=0.68). Stricture formation was observed in 6 hand-sewn patients (12%) and 3 stapled patients (6%, p=0.27). Mean hospital stay was shorter in the stapled group (10 ± 2 days) versus hand-sewn (12 ± 3 days, p=0.004). No 30-day mortality occurred. Overall, stapled anastomosis showed reduced operative time and hospital stay with similar complication rates.

Intervention Outcome

Stapled anastomosis proved to be quicker in operation and shorter in hospital stay with similar anastomotic leak and stricture rates to hand-sewing methods. Both techniques were safe and

effective, and stapling had feasible benefits in terms of efficiency and early postoperative restoration.

Table 1: Demographic and Baseline Characteristics of Patients

Variable	Hand-Sewn (n=50)	Stapled (n=50)	p-value
Mean Age (years)	58.4 ± 9.2	57.6 ± 8.7	0.68
Gender (M: F)	38:12	38:12	1.0
ASA Class (I/II/III)	12/28/10	13/27/10	0.95
Tumor Location (Upper/Mid/Lower)	5/28/17	6/27/17	0.89

Demographic and baseline clinical characteristics of patients undergoing hand-sewn or stapled esophagogastric anastomosis. Values expressed as mean ± SD or number of patients. ASA: American Society of Anesthesiologists physical status.

Table 2: Intraoperative Parameters

Parameter	Hand-Sewn (n=50)	Stapled (n=50)	p-value
Operative Time (min)	240 ± 25	205 ± 20	<0.001
Blood Loss (mL)	280 ± 50	265 ± 45	0.12
Intraoperative Complications	2 (4%)	1 (2%)	0.56

Comparison of intraoperative outcomes between hand-sewn and stapled anastomosis. Values are mean ± SD or number of patients (%).

Table 3: Postoperative Complications

Complication	Hand-Sewn (n=50)	Stapled (n=50)	p-value
Anastomotic Leak	4 (8%)	3 (6%)	0.68
Stricture Formation	6 (12%)	3 (6%)	0.27
Wound Infection	3 (6%)	2 (4%)	0.65
30-day Mortality	0	0	–

Postoperative complications in patients receiving hand-sewn versus stapled anastomosis. Values are expressed as number of patients (%).

Table 4: Postoperative Recovery Outcomes

Outcome	Hand-Sewn (n=50)	Stapled (n=50)	p-value
Hospital Stay (days)	12 ± 3	10 ± 2	0.004
Time to Oral Intake (days)	7 ± 2	6 ± 1.5	0.01
ICU Stay (days)	3 ± 1	2.5 ± 1	0.08

Comparison of postoperative recovery outcomes between hand-sewn and stapled anastomosis. Values expressed as mean ± SD. ICU: intensive care unit

Discussion

The anastomotic method in esophagectomy is still an outstanding issue in surgical decisions and its consequences to the post-operative complications and recovery of the patients. We compared hand-sewn and stapled esophagogastric anastomosis in this paper and found no difference in the rates of anastomotic leak and stricture, but a shorter operative and hospital stay with stapled methods, as has been reported in the current literature, to indicate that methods are equally safe [11]. Recent meta-analysis of large randomised trials on more than 2000 patients showed no significant differences in the occurrence of anastomotic leak or stricture between stapled and hand-sewn anastomosis, but stapled anastomosis was a shorter operation. This reinforces our results and indicates that the two methods are effective when done by skilled surgeons. The absence of short-term morbidity and 30-day mortality difference is an indication that technique, as such, may not be the major determinant of critical morbidity in modern practice [12,13]. Nevertheless, certain undertones can be explored in the wider literature. As one example systematic meta-analysis found evidence was still heterogeneous, but there was an indication of increased leakage and stricture with hand-sewn anastomoses in some environments, especially in cervical anastomoses involving heterogeneous results across studies. This implies that patient subgroups and site location of anastomosis may have an effect, though overall pooled rates may seem similar [14]. Observing results over the last few years also indicates that the technical subtype of stapled anastomosis is important. In a retrospective study of 737 patients, it was discovered that triangular linear stapling (TLS) was found to considerably lower stricture rates in comparison with manual sewing and other stapling designs, especially when the leaks were absent. This points out the fact that not every stapled anastomosis is equal; the staple height and circumferential size may make a significant difference in results, and this may be the cause of discrepancies between studies [15,16].In addition to the technical details, patient-related factors are also very important to the structure and risk of leak [17]. A meta-analysis of stricture risk factors highlighted that anastomotic leakages, cardiovascular disease, and diabetes were major predictors of long-term stricture formation following esophagectomy, but mechanical stapling in itself was not always related to stricture risk [18]. This is in line with the idea that systemic conditions that influence the perfusion and healing of the tissue would override technical differences in the context of late complications [19].Our cohort data with no significant difference in leak or stricture rates is consistent with multiple current trials and meta-analyses, and argues that surgeon experience and patient anatomy must be used to determine the technique to use, not a perceived superiority of a particular technique. Notably, the noted shortened period of operative time and decreased hospitalization with stapled anastomosis is in line with the meta analytic results and might be specifically applicable in high-volume centers or in patients with marginal physiologic reserves [20]. However, there are shortcomings in the evidence available. Numerous comparative studies and meta analyses continue to have an intermediate risk of bias, disparity in the types and methods of stapler, and disparity in experience of surgeons. Minimally invasive and robotic assisted esophagectomy further complicates the issue because hand sewn procedures might prove more difficult on these platforms, and stapled procedures might have some technical benefits with the improved visualization, which demands additional specialized study.

Limitations

The study was carried out in one center that had a rather narrow sample, and this could be a limitation to the generalizability. The differences in experience and methods of stapling by the surgeon might affect the outcomes. Stricture recurrence and quality of life follow-up was not provided in the long-term. Larger cohort multicenter studies are required.

Conclusion

Hand-sewn as well as stapled esophagogastric anastomosis is safe and effective. Stapled anastomosis has also been found to have a shorter operative and hospitalization time, and similar leak and stricture rates. The choice of techniques must be based on the skills of the surgeon, the anatomy of the patient, and the processes during surgery. Additionally, large and multicenter studies are indicated to hone in on best-practice guidelines.

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