



Evaluating The Thirty-Day Complication Rate Following TTSS in Rectal Cancer Surgery: A Prospective Study

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Abstract:

Background Transanal Transection and Single-Stapled Anastomosis (TTSS) is a surgical technique for low rectal cancer, allowing precise distal margin control and potentially reducing anastomotic leakage (AL) compared to the conventional double-stapled approach. **Objective** To evaluate the 30-day complication rate following TTSS in rectal cancer surgery. **Methods** A prospective descriptive analysis was conducted involving 23 patients with middle or low rectal cancer who were candidates for sphincter-preserving surgery using TTSS. Patients aged 18 to 89 years with histologically proven rectal cancer, undergoing elective Low Anterior Resection, were included. The primary endpoint was the 30-day complication rate, with AL grades classified by the International Study Group of Rectal Cancer and the severity of postoperative complications by the Clavien-Dindo classification. **Results** The mean patient age was 48.87 ± 15.91 years. Nineteen patients (82.6%) had uneventful postoperative courses, while four (17.4%) developed grade I Clavien-Dindo complications. Anastomotic leakage occurred in one case (4.3%). Six patients (26.1%) experienced postoperative fever, and four (17.4%) had postoperative paralytic ileus lasting more than 3 days. **Conclusion** TTSS demonstrated a 17.4% overall complication rate, consistent with existing literature. The anastomotic leak rate of 4.3% falls within the reported range for TTSS and is favorable compared to conventional double-stapled anastomosis rates. These findings suggest that TTSS is a safe and effective technique for rectal cancer surgery. Further multicenter randomized controlled trials are recommended to validate these results.

1. Introduction

Transanal Transection and Single-Stapled Anastomosis (TTSS) is a technique for low rectal transection transanally and performing colorectal anastomosis using a single circular stapler (1). The main benefits of TTSS are that it allows precise distal margin below the rectal tumor under direct visual control and to decrease the risk of anastomotic leakage by performing single-stapled anastomosis instead of the classic double-stapled anastomosis (2,3).

Anastomotic leakage (AL) is a major concern after restorative rectal cancer surgery and is associated with increased morbidity and mortality as well as worse oncological outcomes. AL after total mesorectal excision (TME) ranged in literature from 10 to 30 % (4).

In this prospective study, we assessed early postoperative complications after TTSS technique for rectal cancer patients.

Methods

We performed a prospective descriptive analysis involving patients with middle or low rectal cancer who are candidates for sphincter preserving surgery (Low Anterior Resection using TTSS).

Eligibility Criteria

The study included adult patients with rectal cancer (18 to 89 years old) who are candidates for elective Low Anterior Resection (open or minimally invasive) and provided a signed consent form. Low and middle histologically proven rectal cancer cases were included (with distal tumor edge from 4 to 10 cm from anal verge). Locally advanced (T4) and metastatic cases as well as emergency cases (perforated or obstructed rectal cancer) were excluded from the analysis.

Endpoint

The primary study endpoint was 30-day complication rate. Anastomotic leak grades were classified according to the International Study Group of Rectal Cancer (5). Severity of postoperative complications were classified according to the Clavien-Dindo classification (6). All cases received neoadjuvant chemoradiation to downstage the tumor and facilitate oncologically safe sphincter-preserving surgery.

Statistical analysis

Data were coded and entered using the statistical package for the Social Sciences (SPSS) version 28 (IBM Corp., Armonk, NY, USA). Data was summarized using mean, standard deviation, median, minimum, and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data.

Results

This prospective study included 23 cases of rectal cancer for whom transanal transection with single stapling anastomosis procedure (TTSS)

Patients' characteristics

The mean age of our patients at the time of surgery is 48.87 ± 15.91 . Our youngest patient is 19 years old, and our oldest patient is 89 years old. The mean body mass index (BMI) of our patients is 25.22 ± 4.86 ranging from 18 to 35. Regarding sex distribution, 13 patients were males (56.5 %) while 10 patients were females (43.5 %).

Of our 23 cases, 13 patients have no medical comorbidities (56.5 %), 4 patients are diabetic, 2 patients are hypertensive, and 4 patients are diabetic hypertensive.

Regarding the American Society of Anesthesiologists (ASA) class, 13 patients are ASA class I (56.5 %), 9 patients are ASA class II (39.1 %), and 1 patient is ASA III (4.3%). Four patients had previous abdominal surgery (17.4%) while 6 patients were smokers (26.1 %).

Postoperative Complications

We observed the 30-day complication rate after TTSS cases. 19 patients had uneventful smooth postoperative course, while 4 patients developed postoperative events (17.4%). Those four patients had grade I Clavien-Dindo complications and they didn't require radiological, endoscopic, or surgical intervention. Among those four patients, two cases developed postoperative wound infection, one case developed minor anastomotic leakage and one case developed atrial fibrillation which necessitated ICU admission for one week to control AF.

Anastomotic leakage (AL) was detected in one case (4.3%). The case was a 60-year-old diabetic lady with locally advanced rectal cancer T3 N2 with partial response to preoperative chemoradiation. The tumor was 6 cm from the anal verge. The procedure was performed smoothly without intraoperative events. Anastomotic leak was diagnosed in postoperative day 4 when the patient had turbid drain output with ileus and low-grade fever. The patient was managed conservatively via nutritional support and electrolyte replacement. The patient was discharged on postoperative day 7 and has done well. She had her ileostomy closed 5 months after resection surgery after checking the healing of rectal anastomosis using double contrast study.

Six patients developed postoperative fever higher than 37.5 degrees representing 26.1% of our study population, while four patients developed postoperative paralytic ileus lasting more than 3 days (17.4%).

Table 1: Patient characteristics

		Count	%
Sex	Male	13	56.5%
	Female	10	43.5%
Medical Comorbidities	DM	4	17.4%
	Hypertension	2	8.7%
	DM, Hypertension	4	17.4%
	Medically free	13	56.5%
ASA score	ASA I	13	56.5%
	ASA II	9	39.1%
	ASA III	1	4.3%
Previous Abdominal Surgeries	Yes	4	17.4%
	No	19	82.6%
Smoker	Yes	6	26.1%
	No	17	73.9%

Table 2: Postoperative complications

		Count	%
30-day complications	Yes	4	17.4%
	No	19	82.6%
Postoperative fever	Yes	6	26.1%
	No	17	73.9%
Postoperative ileus	Yes	4	17.4%
	No	19	82.6%
Anastomotic leakage	Yes	1	4.3%
	No	22	95.7%
Postoperative complications	wound infection	2	8.7%
	Minor leak	1	4.3%
	AF	1	4.3%
	No	19	82.6%
Clavien-Dindo grade for post operative complications	Grade I	4	17.4%
	No complication	19	82.6%
	No	20	87.0%

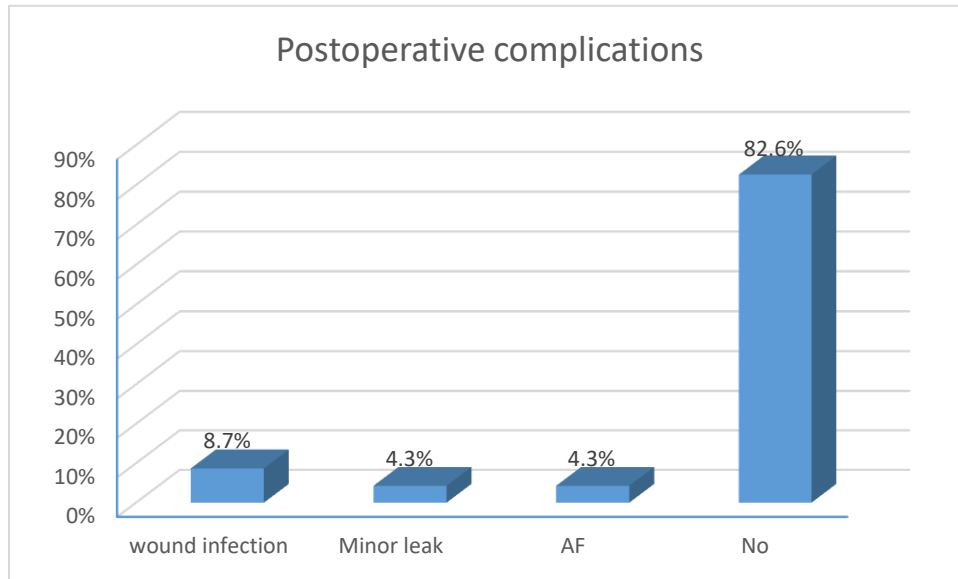


Figure 1 : Postoperative complications

Discussion

TTSS procedure is performed as a technique for low rectal cancer transection and anastomosis which allows precise distal transection with adequate margin (1). One of the main benefits of TTSS is that it allows performing a single stapled (SS) low rectal anastomosis instead of the classic double stapled (DS) anastomosis. Single Stapled anastomosis is superior to DS anastomosis regarding anastomotic leak rates (7). Dog ears and cross-stapling represents structural weakness of DS anastomosis and contribute to increased AL rates (8,9) and consequently increased hospital stay and mortality rates.

For our case series, 17.4% of patients developed postoperative complications. This is consistent with published literature about TTSS overall complication rate which ranges from 16 to 18.5 % (1,2,7). It is worth mentioning, the overall complication rate for minimally invasive rectal cancer surgery ranges from 20 to 30 % (10). This comparison highlights the safety of TTSS technique for rectal cancer surgery.

Anastomotic leak rate for TTSS ranges in literature from 2 to 6 % (1,7). In our study, one case out of 23 cases developed AL (4.3%). For conventional DS rectal anastomosis, the anastomotic leak rate is 6-20 % (11).

We conclude that TTSS is a safe procedure with favorable postoperative complication rate in relation to conventional DS anastomosis. We recommend multicenter randomized controlled trials for further validation of these findings.

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