

Transanal Total Mesorectal Excision (TaTME) for Rectal Cancer: Short and Midterm Results

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Abstract

Background: Colorectal cancer is the third most common cancer affecting males and females in most Western countries and is the leading cause of cancer-related deaths. The primary goal of surgery is complete removal of rectal cancer. Total mesorectal excision (TME) is the cornerstone of curative therapy for rectal adenocarcinoma. Transanal total mesorectal excision (TaTME) was introduced for mid and lower rectal cancer and is proposed to allow a precise mesorectal dissection through better visualization in the anatomically limited pelvis. We aimed to check the feasibility of TaTME in terms of the quality of TME, circumferential resection margin positivity, lymph node yield, operation time, mean blood loss, postoperative complications, conversion rate, and hospital stay.

Methods: This was a cohort study from July 2018 to June 2020 to validate the efficacy of TaTME in our setup. It included biopsy-proven low and mid-rectal cancers (4-8 cm from the anal verge), T1 with node-positive disease or T2 and T3 with or without nodal disease. Statistical analysis was done by using SPSS software v24.

Results: Out of the total patients studied (n=35), 30 (85.7%) were males, and the rest were females. Fourteen patients received neoadjuvant therapy (40%). Overall, 30 (85.7%) had complete mesorectal excision, 4 (11.5%) patients had near complete mesorectal excision, and one had poor excision. 25 (71.4%) had moderately differentiated adenocarcinoma, 7 (20%) had poorly differentiated adenocarcinoma, and 3 (8.6%) had well-differentiated adenocarcinoma. Thirty-four patients (97.2%) had normal distal resection margins, and only one (2.8%) had positive distal resection margins. Only 2 (5.8%) patients had positive circumferential resection margins (CRM). The mean tumor distance from the anal verge was 4.97 cm. The mean lymph node yield was 7.86±1.73. The mean operation time was 2.095 ±0.461 hours. The mean blood loss was 48.57±11.92 ml. Most patients (71.4%) had no postoperative complications at one month. However, urinary tract infection (8.6%), surgical site infection (5.7%), acute kidney injury (2.9%), anastomotic leak (2.9%), incontinence (2.9%), stromal retraction (2.9%), and rectovaginal fistula (2.9%) were noted. After three months, most patients had no complications (88.6%), though subacute intestinal obstruction occurred in 2 (5.7%) and sexual dysfunction occurred in 2 patients (5.7%). The mean hospital stay was 11.09±2.08 days.

Conclusion: The present study suggests TaTME is a feasible method for oncologic resection of locally advanced mid- and distal-rectal cancer with curative intent. Intraoperative outcomes regarding conversion, surgical times, and intraoperative complications were very satisfactory. Short-term morbidity and oncologic outcomes were as good as in other laparoscopic TME series.

Keywords: Colorectal cancer, Rectal cancer, TaTME

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Introduction

Colorectal cancer is the third most common cancer affecting males and females in most Western countries. It is the leading cause of cancer-related deaths, with rectal cancer accounting for 43,030 of these new cases in the United States annually (1). The optimal approach to treating rectal adenocarcinoma depends upon many factors, of which the location in the rectum and local disease extent are most important. Total mesorectal excision (TME) is the cornerstone of curative therapy for rectal adenocarcinoma. The two most common procedures are lower anterior resection (LAR) and abdominoperineal resection (APR) (2, 3).

Transanal total mesorectal excision (TaTME) was introduced for mid and lower rectal cancer and is proposed to allow a precise mesorectal dissection through better visualization in the anatomically limited pelvis (male, narrow, obese). There are several acceptable local options to treat early rectal cancer, including transanal excision (TAE), transanal endoscopic microsurgery (TEM), and transanal minimally invasive surgery (TAMIS). They all avoid the consequences of radical excision of the rectum but also have the disadvantages of the need for increased vigilance after treatment and greater local failure rates, even in appropriately selected patients.

Transanal TME (TaTME) overcomes the most cumbersome phase of a laparoscopic approach to the distal mesorectum. TaTME occurs when at least the lower third of the rectum is mobilized and resected transanally according to TME principles. It is said to take all the major surgical developments of the last three decades in CRC care (TME, laparoscopy, NOTES) and roll them into one procedure (4-6). It is purported to be particularly helpful in patients with a narrow pelvis or significant visceral obesity in whom laparoscopic pelvic dissection is challenging. Still, the procedure has a steep learning curve, and familiarity with laparoscopic TME and transanal approach to lesions are important prerequisites. Previously rare complications such as urethral injuries have emerged as the most common major complication of this procedure (7). Fortunately, this can be avoided with proper training and understanding of the anatomy. Experts have also recommended initial experience with benign diseases, female patients, and subjects without prior pelvic irradiation (8).

In this study, we aimed to check the feasibility of TaTME in terms of the quality of TME, circumferential resection margin positivity, lymph node yield, and secondarily to check the feasibility of TaTME in terms of operation time, mean blood loss, postoperative complications, conversion rate, and hospital stay.

Patients and Methods

This was an observational cohort, retrospective

study conducted in the Department of General & Minimal Invasive Surgery (Colorectal Division), Sher-i-Kashmir Institute of Medical Sciences, Srinagar, from July 2018 to June 2020, to validate the efficacy of TaTME (Figures 1-5) in our setup.

Inclusion Criteria

- Biopsy-proven low and mid-rectal cancers (4-8 cm from the anal verge).
- T1 with node-positive disease and all T2 or T3 without nodal disease.



Figure 1: A GelPort was inserted in the rectum.



Figure 2: Team of surgeons simultaneously performing abdominal and rectal dissection in TaTME surgery.

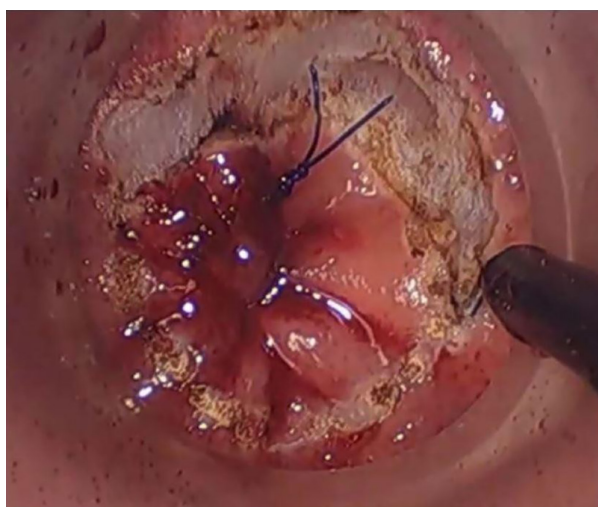


Figure 3: Transanal total mesorectal excision purse string and proctectomy.



Figure 4: Transanal total mesorectal specimen delivered out through the anus.

Exclusion Criteria

- Metastatic rectal cancer.
- T4 with or without nodal disease.
- Patients with poor clinical response to neoadjuvant chemoradiotherapy.
- Upper rectal cancers.
- Patient's unwillingness.

Patients underwent clinical evaluation, including carcinoembryonic antigen (CEA) levels, serum chemistry, and complete blood count. A total colonoscopy was done to rule out synchronous lesions. Distance from the anal verge was determined by rigid proctoscopy/sigmoidoscopy. Computed tomography (CT) scans of the abdomen and pelvis and magnetic resonance imaging (MRI) of the pelvis were carried out in all patients.

Patients with T3, T4 lesions, and positive nodal disease were subjected to neoadjuvant treatment and taken for surgery after 8 to 12 weeks after reassessment.

The hospital's ethics committee approved the procedure, and all the patients signed an informed consent form for this new approach.

Statistical Method

Statistical analysis was done by using SPSS software v24. All categorical data are shown in the form of frequency and percentage.

Results

Out of the total patients studied (35), 30 (85.7%) were males, and the rest were females (14%). Only 14 patients received neoadjuvant therapy, and 21 patients underwent upfront surgery (60%).

Quality of Total Mesorectal Excision (TME)

Out of the patients studied, 30 (85.7%) had



Figure 5: Quality of total mesorectal excision.

complete/good mesorectal excision, 4 (11.5%) had near complete/intermediate mesorectal excision, and 1 (2.8%) had poor/incomplete mesorectal excision.

Histopathology Impression

On histopathology, the majority of the patients (71.4%) had moderately differentiated adenocarcinoma (Table 1).

Distal Resection Margins

Out of the total patients studied, histopathology of the specimen revealed that 34 patients (97.2%) had normal distal resection margins, and only one patient (2.8%) had positive distal resection margins.

T-staging of Tumor

Of the patients studied, 14 (40%) had stage T2, and 19 (60%) had stage T3 rectal adenocarcinoma.

Circumferential Resection Margins

Only 2 (5.8%) patients had positive circumferential resection margins (CRM). In the remaining 33 patients (94.2%), the CRM was normal.

Conversion Rates

Out of all patients, 6 (17.1%) were converted from laparoscopic to open surgery, while 29 (82.9%) were operated laparoscopically without conversion to open surgery. Reasons for conversion included difficult pelvic anatomy (3), failure to progress (2), and uncontrolled bleeding.

Tumor Distance from the Anal Verge

The patients in which the distance of the tumor from the anal verge was less or equal to 5 cm were 23 (65.7%), and where the distance from the anal verge was more than 6 cm were 12 (34.3%).

Table 1: Histopathological distribution of variants of adenocarcinoma in patients

Impression	Frequency	Percent
Moderately differentiated adenocarcinoma	25	71.4
Poorly differentiated adenocarcinoma	7	20
Well-differentiated adenocarcinoma	3	8.6
Total	35	100

Lymph Node Yield

The lymph node yield was less than 6 lymph nodes in 9 patients (26%) and 7-12 lymph nodes in 26 (74%) patients. The mean average lymph node yield was 7.86 with a standard deviation of 1.734 and range of 5–11 (Table 2).

Operation Time

Operation time in 30 patients (85.7%) was between 1.5 to 2.5 hrs, and the time taken to operate the rest of the patients 5 (14.3%) was from 2.5 to 3.5 hrs.

Mean Blood Loss

The mean blood loss was 48.57 ± 11.92 ml with a maximum of 80 ml and a minimum of 30 ml (Table 3).

Postoperative Complications

Most patients (71.4%) had no postoperative complications at one month. However, urinary tract infection (8.6%), surgical site infection (5.7%), acute kidney injury (2.9%), anastomotic leak (2.9%), incontinence (2.9%), stromal retraction (2.9%), and rectovaginal fistula (2.9%) were noted. After three

months, most patients had no complications (88.6%), though subacute intestinal obstruction occurred in 2 (5.7%) and sexual dysfunction occurred in 2 patients (5.7%) (Table 4).

Patients with a hospital stay of less than 12 days were 29 (82.9%), with a hospital stay of 13-15 days were 5 (14.3%), and 1 (2.9%) patient had more than 16 days of hospital stay.

Clavien Dindo Grading

Clavien Dindo's grading is a measure of postoperative complications and their management. Scoring is done to assess the outcome. Of the studied patients, 24 had grade I, 7 had a grade II, and only four had grade III postoperative complications (Table 5).

Descriptive Statistics

Thirty-five adults aged 28–62 were studied, with a mean age of 45 years. Tumor distance from the anal margin was between 3 and 7 cm, with a mean value of 4.97 cm. The total lymph node yield in the studied group was 5 to 11 lymph nodes. Operation time in hours was an average of 2.094 hours with

Table 2: Number of lymph nodes examined in different ranges

Lymph node yield	Frequency	Percent
≤6	9	26
7–12	26	74
>12	0	0
Total	35	100

Table 3: Mean blood loss (ml) in patients across different ranges

Mean blood loss (ml)	Frequency	Percent
≤40	15	42.9
41-60	16	45.7
≥61	4	11.4
Total	35	100

Table 4: Distribution of postoperative complications at one month and three months

Complications	N	%	
At 1 month	No complication	25	71.4%
	Urinary tract infection	3	8.6%
	Surgical site infection	2	5.7%
	Acute kidney injury	1	2.9%
	Rectovaginal fistula	1	2.9%
	Incontinence	1	2.9%
	Stomal Retraction	1	2.9%
	Anastamotic leak	1	2.9%
At 3 months	No complication	31	88.6%
	Subacute intestinal obstruction	2	5.7%
	Sexual dysfunction	2	5.7%

Table 5: Clavien Dindo's grading of postoperative complications in studied patients

Grade	Frequency	Percent
I	24	68.6
II	7	20.0
III	4	11.4
Total	35	100.0

Table 6: The mean and standard deviation (SD) of different variables studied in the patients

Variable	N	Minimum	Maximum	Mean	SD
Age (yrs)	35	28	62	45	10.636
Tumor distance from anal verge (cm)	35	3	7	4.97	1.131
Lymph node yield	35	5	11	7.86	1.734
Operation time (hrs)	35	1.3	3.5	2.094	0.460
Mean blood loss (ml)	35	30	80	48.57	11.917
Hospital stay	35	8	19	11.0857	2.077

minimum and maximum of 1.3 hours and 3.5 hours, respectively. Mean intra-operative blood loss in patients was a minimum of 30 ml and a maximum of 80 ml, with a mean value of 48.57 ml. The minimum hospital stay in patients was eight days, with a maximum of 19 days and a mean value of 11.09 days (Table 6).

Discussion

This study assessed the feasibility of TaTME in 35 patients aged 28–62, with a mean age of 45 ± 10.64 years. Overall, 30 (85.7%) had complete mesorectal excision, 4 (11.5%) patients had near complete mesorectal excision, and one had poor excision. 25 (71.4%) had moderately differentiated adenocarcinoma, 7 (20%) had poorly differentiated adenocarcinoma, and 3 (8.6%) had well-differentiated adenocarcinoma. Thirty-four patients (97.2%) had normal distal resection margins, and only one (2.8%) had positive distal resection margins. Only 2 (5.8%) patients had positive circumferential resection margins (CRM). Out of all patients, 30 (85.7%) were males, and only 5 were females. This is in accordance with a similar study by Marks JH et al. (9), where 68.9% were males.

Analysis from our study reveals that the rate of circumferential resection margin (CRM) positivity was low with TaTME, i.e., only 5.8% of patients had positive CRMs. Our observation correlates with the study by Denost Q et al. in 2014 (10) with the title “Perineal transanal approach: a new standard for laparoscopic sphincter-saving resection in low rectal cancer, a randomized trial,” which concluded that perineal rectal dissection reduces the risk of positive CRMs, as compared with the conventional abdominal dissection in low rectal cancer.

In our study, the mean tumor distance from the anal verge was 4.97 cm. The mean lymph node yield was 7.86 ± 1.73 . The mean operation time was 2.095 ± 0.461 hours. The mean blood loss was 48.57 ± 11.92 ml. Most patients (71.4%) had no postoperative complications at one month. However, urinary tract infection (8.6%), surgical site infection (5.7%), acute kidney injury (2.9%), anastomotic leak (2.9%), incontinence (2.9%), stromal retraction (2.9%), and rectovaginal fistula (2.9%) were noted. After three months, most patients had no complications (88.6%), though subacute intestinal obstruction occurred in 2 (5.7%) and sexual dysfunction occurred in 2 patients (5.7%). The mean hospital stay was 11.09 ± 2.08

days. Our observations agree with the study by S. Attallah et al. in 2014 (11). In their study “Transanal minimally invasive surgery for total mesorectal excision (TAMIS-TME): results and experience with the first 20 patients undergoing curative-intent rectal cancer surgery at a single institution”, they concluded that mean operation blood loss, average hospital stay, and post-operative complications were minimum with transanal resection of rectal tumors.

Analysis of our study is also in concordance with the study “Transanal Total Mesorectal Excision for Rectal Cancer: Outcomes after 140 Patients” by Lacy TM et al. in 2016 (12), in which they concluded that with this emergence of TaTME surgery, there were less postoperative complications with Clavien Dindo grade +IV only in 10% of patients, which is comparable to our study, where only 11.6% patients had Clavien Dindo Grade III.

Conclusion

The present study suggests that transanal TME is feasible for oncologic resection of locally advanced mid- and distal-rectal cancer with curative intent. Pathologic analysis showed a very good macroscopic quality of TME specimens, the most important prognostic factor in rectal cancer.

Intraoperative outcomes regarding conversion, surgical times, and intraoperative complications were very satisfactory. Short-term morbidity and oncologic outcomes were as good as in other laparoscopic TME series.

It also concluded that TaTME allows wide resection margin and good quality total mesorectal excision. In addition, TaTME showed a better short-term clinical outcome, such as a longer CRM, lower risk of positive CRM, higher complete quality of TME rate, and shorter operative duration. Further prospective studies with long-term follow-up are required.

Our data showed that adequate distal and circumferential margins with very good-quality TME specimens with excellent overall survival can be achieved using this technique. Our study also reveals that TaTME positively impacted the reported QoL, resulting in fewer postoperative complications and better outcomes.

Although the study group was small, the present study demonstrates that TaTME provides surgeons with a novel and effective method to treat lower rectal cancer. In the short-term outcomes, TaTME

achieved better pathological results and disease-free survival and provided good results in experienced hands. More large-scale studies may be needed to

further establish the current study's findings.

Conflict of interest: None declared.

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