

COMPLICATIONS IN TRANSANAL TOTAL MESORECTAL EXCISION (TATME) – EARLY EXPERIENCE

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Summary

Transanal total mesorectal excision (TaTME) is a trending and promising surgical procedure to treat rectal cancer with oncologically oriented precision. Complication rates are promising after the learning curve is passed. A prospective study on the first 12 consecutive TaTME patients was done. The primary aim was the intraoperative and the early and late postoperative complications rate. One persisting failure as an intraoperative complication was reported: two anastomotic leaks and a ventral hernia as postoperative complications. TaTME is safe in terms of intra- and postoperative complications.

Keywords: rectal cancer, laparoscopic surgery, complications

Introduction

Transanal total mesorectal excision (TaTME) is a trending and promising surgical procedure to treat rectal cancer with oncologically oriented precision [1, 2]. Laparoscopic TME has already shown its advantages over open total mesorectal excision (TME) in terms of short-term and long-term oncological and perioperative results. Initial results from TaTME have demonstrated that it has the potential to overcome some difficulties in pelvic dissection in patients with low- and mid-rectal cancer and may have benefits in lowering the rate of positive circumferential resection margins (CRM). CRM is reported to be one of the essential features connected to oncological outcomes (disease-free and overall survival). The main advantages of TaTME are in patients with cancer in the mid- and lower rectum, especially in obese male patients with narrow pelvis [3-5]. The technique could also increase the rate of sphincter-saving procedures [3, 6-9]. Although TaTME may improve oncological outcomes, more complication rates must be studied. Complication rates in TaTME are promising after the learning curve is passed [7]. Whether TaTME has the same or lower complication rates compared to laparoscopic TME is to be

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proven. Nevertheless, new complications, such as urethral injuries, are faced [10, 11].

Materials and methods

A prospective study on the first 12 consecutive TaTME patients was done from April 2020 to February 2021 in the Department of surgical oncology, Medical University – Pleven, Bulgaria. The primary aim was the intraoperative and the early and late (post-discharge) postoperative complications rate. This study was conducted after approval by the Medical University local ethics committee №552/04.07.2019. This work was supported by the European Regional Development Fund through the Operational Programme “Science and Education for Smart Growth” under contract №BG05M2OP001-1.002-0010-C01(2018-2023).

Results

Eight men and four women with mid-and low rectal cancer were operated on. The mean age of the patients was 73.4 years. The mean body mass index was 27.11 kg/m². Neoadjuvant radiotherapy was conducted in five patients (5/12), neoadjuvant chemoradiation – in three patients (5/11), and no neoadjuvant therapy – in two patients (2/12). The mean operative time was 273 min (range 210-360 min). In all patients, the simultaneous two-team approach was used (Cecil approach)(Fig. 1). The blood loss was 0-50ml in 11 cases and 50-100ml in 1 case. Patient characteristics are shown in Table 1. Defunctioning loop ileostomy was done in 10 patients. In one patient, a persisting failure

was reported as an intraoperative complication which was managed with a second 2/0 running prolene suture to close the rectal stump on top of the first one with no other intra- or postoperative complication in this patient. In all patients, a smoke- evacuation problem occurred in the transanal part of the surgery due to the use of a non-continuous smoke evacuation standard insufflation system. No urethral injuries or other major intraoperative complications were seen in all patients. Two significant early postoperative complications were seen – one patient with an anastomotic leak treated conservatively (Clavien-Dindo II) and one with an anastomotic leak requiring ileostomy (Clavien-DindoIIIb). As a late complication, a ventral hernia after ileostomy closure was reported in one patient.

Discussion

Laparoscopic TME can be very difficult in patients with a narrow pelvis, high BMI, bulky mesorectum, and bigger tumours. Hence, this is connected with higher conversion and complication rates. New techniques such as robotic and transanal TME are developed to overcome these difficulties, as well as new platforms and instruments for laparoscopic surgery. Given this, TaTME is implemented in clinical practice to improve oncological outcomes and complication rates in challenging cases by precise pelvic dissection and pelvic nerve preserving surgery.

Current studies comparing laparoscopic TME and TaTME have bias and confounding factors. Thus, structured multicenter randomized clinical trials are needed. Nevertheless, a meta-



Figure 1. Simultaneous two-team (Cecil) approach

Table 1. Patient characteristics

Number	Sex	Neoadjuvant therapy	BMI (kg/m ²)	Operative time (min)	Defunctioning ileostomy	Time from radiotherapy end to operation (days)	Tumour height from ARJ (sm)	Stage (ypTNM)
1	M	Yes	30.668904	360	Yes	57	2	T3N1M0
2	F	Yes	23.306680	300	Yes	62	3	T0N0M0
3	M	Yes	22.598140	280	Yes	65	1	T2N0M0
4	M	Yes	24.930747	275	Yes	68	4	T2N1M0
5	M	Yes	23.183391	300	Yes	57	3	T2N0M0
6	F	Yes	24.034609	240	Yes	63	1	T2N0M0
7	F	Yes	27.990362	210	Yes	70	5	T2N0M0
8	M	Yes	38.062283	310	Yes	65	3	T2N0M0
9	M	Yes	24.724520	310	Yes	64	5	T2N0M0
10	M	No	30.864197	240	No	-	7	T2N0M0
11	M	No	22.857142	225	No	-	8	T3N0M0
12	F	Yes	32.090625	220	Yes	50	7	T2N0M0

analysis of recent studies shows that TaTME has a lower rate of postoperative complications and readmissions compared to laparoscopic TME. There were no statistically significant differences in intraoperative complications between the two groups [10].

TaTME is a challenging technique requiring working in new planes with a different view of pelvic anatomy and proficient laparoscopic skills [11]. The most common complications in TaTME are purse string failure, urethral injury, anastomotic leak, vascular injury, perforation, the wrong plane of dissection, pelvic nerve injury, and gas embolism [12, 13]. Urethral injury is a complication that was not reported in other techniques for total mesorectal excision. The urethra is anterior to the prostate. Therefore, a wrong plane anterior to the prostate must be dissected for urethral injury. Thus, an anterior first approach has been adopted, allowing early identification and entry into the recto-prostatic plane [11-13]. Purse-string rupture is another significant complication unique to this procedure and could theoretically lead to the implantation of tumour cells and bacterial contamination [14]. The learning curve and a proper learning pathway are essential [15-17].

Significant complication rates in TaTME and laparoscopic TME seem similar. The anastomotic leak in both techniques is reported to be 10-15% [18-21].

The precision of surgery and lower rates

of positive circumferential resection margin should theoretically be connected with better oncological results [22-24]. On the other hand, in Norway, a moratorium on TaTME was declared after a 9.5% local recurrence rate was observed after the first 110 TaTME procedures with a follow-up of 11 months [25]. Long-term, good-quality data from multicenter randomized clinical trials such as COLOR III is expected [26].

Conclusions

TaTME is safe in terms of intra- and postoperative complications when performed by an experienced team. Also, the learning curve should be taken into consideration.

References

1. Tuech JJ, Karoui M, Lelong B, De Chaisemartin C, Bridoux V, Manceau G et al. A step toward NOTES total mesorectal excision for rectal cancer: endoscopic transanal proctectomy. *Ann Surg.* 2015 Feb;261(2):228-33.
2. Rouanet P, Mourregot A, Azar CC, Carrere S, Gutowski M, Quenet F. Transanal endoscopic proctectomy: an innovative procedure for difficult resection of rectal tumors in men with narrow pelvis. *Dis Colon Rectum.* 2013 Apr;56(4):408-15.

3. Lacy AM, Tasende MM, Delgado S, Fernandez-Hevia M, Jimenez M, De Lacy B. Transanal total mesorectal excision for rectal cancer: Outcomes after 140 patients. *J Am Coll Surg*. 2015 Aug;221(2):415-23.
4. Muratore A, Mellano A, Marsanic P, De Simone M. Transanal total mesorectal excision (taTME) for cancer located in the lower rectum: short- and mid-term results. *Eur J Surg Oncol*. 2015 Apr;41(4):478-83.
5. Velthuis S, Helbach M, Deijen CL, Velthuis S, Bonjer HJ, Tuynman JB, Sietes C. Transanal total mesorectal excision for rectal carcinoma: short-term outcomes and experience after 80 cases. *Surg Endosc*. 2016 Feb;30(2):464-470.
6. Fernández-Hevia M, Delgado S, Castells A, Tasende M, Momblan D, Díaz del Gobbo G et al. Transanal total mesorectal excision in rectal cancer: short-term outcomes in comparison with laparoscopic surgery. *Ann Surg*. 2015 Feb;261(2):221-7.
7. Penna M, Hompes R, Arnold S, Wynn G, Austin R, Warusavitarne J et al. Transanal total mesorectal excision: International Registry Results of the First 720 Cases. *Ann Surg*. 2017 Jul;266(1):111-117.
8. Penna M, Knol JJ, Tuynman JB, Tekkis PP, Mortensen NJ, Hompes R. Four anastomotic techniques following transanal total mesorectal excision (TaTME). *Tech Coloproctol*. 2016 Mar;20(3):185-91.
9. Velthuis S, Nieuwenhuis DH, Ruijter TE, Cuesta MA, Bonjer HJ, Sietes C. Transanal versus traditional laparoscopic total mesorectal excision for rectal carcinoma. *Surg Endosc*. 2014 Dec;28(12):3494-9.
10. Bin M, Peng G, Yongxi S, Cong Zh, Changwang Zh, Longyi W et al. Transanal total mesorectal excision (taTME) for rectal cancer: a systematic review and meta-analysis of oncological and perioperative outcomes compared with laparoscopic total mesorectal excision. *BMC Cancer*. 2016;16:380.
11. Albert M, Raymond Yap. Surgical complications and pitfalls in taTME. *Dig Med Res*. 2020;3:8
12. Albert M, Aka A. Complication profile of transanal total mesorectal excision and how it differs. *Ann Laparosc Endosc Surg*. 2020;5:28
13. Ratcliffe F, Hogan AM, Hompes R. CO2 embolus: an important complication of TaTME surgery. *Tech Coloproctol*. 2017;21(1):61-62.
14. Martin-Perez B, Otero-Pineiro A, Lacy AM. Purse-string rupture: pitfalls of transanal total mesorectal excision (Cecil approach). *Tech Coloproctol*. 2018 May; 22(5): 393-4.
15. Atallah S, Albert M, Monson JR. Critical concepts and important anatomic landmarks encountered during transanal total mesorectal excision (taTME): toward the mastery of a new operation for rectal cancer surgery. *Tech Coloproctol*. 2016 Jul;20(7):483-94.
16. McLemore EC, Harnsberger CR, Broderick RC, Leland H, Sylla P, Coker AM et al. Transanal total mesorectal excision (taTME) for rectal cancer: a training pathway. *Surg Endosc*. 2016 Sep;30(9):4130-5.
17. Bernardi MP, Bloemendaal AL, Albert M, Whiteford M, Stevenson AR, Hompes R. Transanal total mesorectal excision: dissection tips using 'O's and 'triangles'. *Tech Coloproctol*. 2016 Nov;20(11):775-8.
18. Bjørn MX, Perdawood SK. Transanal total mesorectal excision--a systematic review. *Dan Med J*. 2015 Jul;62(7). pii: A5105.
19. Penna M, Hompes AR, Arnold AS, Wynn G, Austin R, Warusavitarne J et al (2018) Incidence and risk factors for anastomotic failure in 1594 patients treated by transanal total mesorectal excision results from the international TaTME registry. *Ann Surg* 269:700-11
20. Van der Pas MHGM, Haglind E, Cuesta MA, Fürst A, Lacy AM, Hop WCJ et al (2013) Laparoscopic versus open surgery for rectal cancer (COLOR II): short-term outcomes of a randomised, phase 3 trial. *Lancet* 14:210-18.
21. Rubinkiewicz M, Czerwińska A, Zarzycki P, Małczak P, Nowakowski M, Major P et al. Comparison of short-term clinical and pathological outcomes after transanal versus laparoscopic total mesorectal excision for low anterior rectal resection due to rectal cancer: A Systematic Review with Meta-Analysis. *J Clin Med*. 2018 Nov 19;7(11). pii: E448.
22. Xu W, Xu Z, Cheng H, Ying J, Cheng F, Xu W et al. Comparison of short-term clinical outcomes between transanal and laparoscopic total mesorectal excision for the treatment of mid and low rectal cancer: A meta-analysis. *Eur J Surg Oncol*. 2016 Dec;42(12):1841-50.
23. Wu Z, Zhou W, Chen F, Wang W, Feng Y. Short-term outcomes of transanal versus laparoscopic total mesorectal excision: A systematic review and meta-analysis of cohort studies. *J Cancer*. 2019 Jan 1;10(2):341-54.
24. Lei P, Ruan Y, Yang X, Fang J, Chen T. Transanal or trans-abdominal total mesorectal excision? A systematic review and meta-analysis of recent comparative studies on perioperative outcomes and pathological result. *Int J Surg*. 2018 Dec;60:113-19.
25. Detering R, Roodbeen SX, van Oostendorp SE, Dekker J-WT, Sietes C, Bemelman WA et al .Three-year nationwide experience with transanal total mesorectal excision for

rectal cancer in the Netherlands: a propensity score-matched comparison with conventional laparoscopic total mesorectal excision. *J Am Coll Surg.* 2019; 228:235-44.

26. Deijen CL, Velthuis S, Tsai A, Mavroveli S, de Lange-de Klerk ES, Sietes C et al. COLOR III: a multicentre randomised clinical trial comparing transanal TME versus laparoscopic TME for mid and low rectal cancer. *Surg Endosc.* 2016 Aug;30(8):3210-5.