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The Role of transanal (Ta) dissection in the management of difficult primary and recurrent rectal cancer

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ABSTRACT

Background The objective of this study was to review the postoperative and short-term oncological outcomes of our first cohort of patients having had a transanal (Ta) approach for primary or recurrent rectal cancer.

Methods A retrospective chart review was performed on all cases of Ta dissection occurring between 2013 and 2016. We reviewed data concerning case selection, tumour characteristics, perioperative and postoperative data and final pathology.

Results A total of 24 males were operated for primary (92% (22/24)) or recurrent rectal cancer (8.3% (2/24)). Four patients (16.7% (4/24)) had a history of previous rectal surgery and two had a history of previous Ta total mesorectal excision (TME). A majority of patients were obese, with 58.3% (14/24) having a body mass index >30. The laparoscopic approach was used in the majority of cases (95.8% (23/24)). Most patients had a low anterior resection (95.8% (23/24)). Sixteen patients received a temporary ileostomy (66.7% (16/24)). Three patients suffered perioperative complications (including colonic ischaemia, rectal perforation and arterial bleeding). Five patients (21.7% (5/23)) had an anastomotic leak treated with Ta drainage in two patients. Final pathology revealed negative margins in 95.8% (23/24). TME was considered complete in 87.5% (21/24) overall and in 95% (21/22) when considering only primary cancer cases.

Conclusion According to our cohort of selected difficult cases, Ta dissection approach helped achieve complete mesorectal excision in complex primary rectal cancer but also allowed for rectal resection in patients with previous rectal surgery. This technique also helped perform a primary anastomosis in these difficult cases.

Summary box

What is already known about this subject?

- Transanal (Ta) dissection is a new technique for dissection of total mesorectal excision with potential to improve the quality of the dissection. It can help the surgeon with difficulties in a conventional laparoscopic dissection in increasing the visibility and access to the deep down pelvis, especially in low and bulky tumours with a narrow irradiated pelvis. It may improve the quality of the specimen, decrease positive resection margins and potentially give better oncological outcomes.
- Like any other minimally invasive technique, they have a learning curve for the surgeon. Actual literature seems promising result as good as conventional laparoscopic approach, but with time and experience.

What are the new findings?

- With this small series, the analyses of our first experience as a group of experimented surgeons in laparoscopic rectal resection and transanal endoscopic microsurgery (TEM) excision demonstrate that we can effectively introduce the Ta dissection approach for selected difficult rectal cancer cases (male sex, obesity, bulky tumour, distal tumour (<6 cm from anal margin), utilisation of neoadjuvant chemoradiation, prior TEM excision or previous rectal resection) and recurrent rectal cancer.
- This series suggests that Ta dissection helped achieve safe oncological result even in difficult rectal cancer cases and recurrent cancer cases.

How might it impact on clinical practice in the foreseeable future?

- Ta dissection may become a standard of care for specific rectal cancer case like difficult rectal cancer cases and recurrent rectal cancer cases.
- This new technique has to be proposed with specific indication from the surgeon.

INTRODUCTION

Surgical excision of rectal cancer in obese men is challenging. Most of the time these patients have a narrow pelvis with a bulky mesorectum rendering a perfect mesorectal excision difficult. Distal transection is also difficult especially with the laparoscopic approach. Although often challenging the laparoscopic approach in these patients has numerous potential benefits in the short and long terms especially with the incidence of ventral hernia. Transanal endoscopic microsurgery (TEM) was first introduced by Buess and colleagues in 1983.[1] Since then, this technique and other transanal (Ta) technique have been further developed and combined

with laparoscopic technique in treatment of rectal cancer. The first transanal total mesorectal excision (TaTME) was performed in 2009.[2] This technique is rapidly growing in popularity and several specialised centres in colorectal surgery are working to develop this approach. Despite the potential technical advantage it may provide, it is nonetheless a new procedure and has been associated with risks such as urethral, vascular and nerve injury.[3] In our unit we started to use the Ta dissection approach in selected cases with expected difficult pelvic dissection in 2013. Our objective was to review the postoperative and short-term oncological outcomes of our cohort of patients having had a Ta dissection approach for primary or recurrent rectal cancer.

MATERIALS AND METHODS

All cases of primary or recurrent rectal cancer treated with Ta dissection in our unit between 2013 and 2016 were included. Our unit is composed of five trained colorectal surgeons with three surgeons having a large TEM experience. In each case, two colorectal surgeons performed the operation. The choice of this approach was made by the surgeon in charge of the patient after case discussion with colleagues. Criteria used for selection included male sex, obesity, bulky tumour, distal tumour (<6 cm from anal margin), utilisation of neoadjuvant chemoradiation, prior TEM excision or previous rectal resection. Standardised retrospective chart review was performed to collect demographic, operative, postoperative and pathological data. Postoperative complications were graded using the Clavien-Dindo (CD) Classification.

Ta dissection technique was introduced in our centre in 2013 by three colorectal surgeons who followed two cadaveric training sessions and lectures. The three surgeons had a large TEM experience and high-volume rectal cancer practice (843 rectal cancer operated between 2013 and 2016). Every patient had routine preoperative workup including a CT scan, pelvic MRI, a full colonoscopy and proctoscopy. All patients had full bowel preparation. Antibiotics and heparin prophylaxis were used according to hospital protocols. Patients were positioned in modified lithotomy position on a stabilisation mattress with both arms tuck in. Table lateral expansion device was used for obese patients. For each case, two surgeons were involved for the Ta dissection. In most cases the Ta dissection was performed first and followed by the abdominal portion. Two types of platforms were used during the study period: a soft disposable platform transanal minimally invasive surgery (TAMIS) (GelPOINT, Applied Medical) or the TEM rigid reusable platform (Richard Wolf system). Choice of platform was done according to surgeon's preference and platform availability, height of the tumour (<6 cm anal margin) and patient's body habitus. For distal lesion when the TAMIS was used, the beginning of the dissection was performed transanally with a regular mucosectomy using a Lone Star retractor up to the top of the anal canal. Then the dissection was continued including the full thickness of rectal wall thickness for an additional 1–2 cm then the TAMIS soft platform was introduced in the anus and fixed to perianal skin. Purse string suture of the open distal rectal end was performed with suture either transanally or with the TAMIS instrumentation. When using the TEM platform, the intersphincteric dissection was performed with the TEM. For more proximal lesion the platform was inserted in the anus, the tumour identified and the distal resection margin marked with the cautery. Transmural incision was performed with the monopolar cautery and a purse string suture of the proximal rectal transection was done. Then the dissection was continued upward with monopolar cautery only. Posterior dissection was performed first then the anterior dissection up to the top of the prostate and finally the lateral dissection of the sidewalls was completed.

Once the Ta dissection was completed the abdominal dissection was performed. All cases were performed with a laparoscopic approach with the exception of one case of recurrent rectal cancer that had an open approach. A conventional lateral to medial mobilisation of sigmoid and left colon was performed. Complete mobilisation of the splenic flexure with high ligation of the inferior mesenteric artery and inferior mesenteric vein was realised. The two dissections were joined and the specimen was extracted through a small left lower quadrant incision. Ta delivery of the specimen was not possible in most cases due to the size of the mesorectum.

Three different types of anastomosis were used: single circular stapler technique, traditional hand sewn coloanal or delayed coloanal anastomosis (Turnbull-Cutait anastomosis). Choice of the technique was made according to surgeon's preference, height of the tumour and patient's body habitus. A diverting loop ileostomy was performed in selected cases.

RESULTS

A total of 24 men were selected to have a Ta dissection between 2013 and 2016. The median age was 66 years old, ranging from 51 to 81. The majority of patients had a primary tumour (92%; 22/24), while two patients were operated on for localised recurrent rectal cancer. Four patients (16.7%) had previous rectal surgery (two cancer, two diverticulitis) and two had previous TEM tumour resection. A majority of patients were obese with 58.3% (14/24) having a body mass index (BMI) >30. The median BMI was 30.35 (18.2–42.9). Most patients received neoadjuvant radiation therapy (75%; 18/24), the majority having long-course chemoradiation (50%; 12/24), 4 (16.7%) received endoluminal high-dose brachytherapy and 1 (4.2%) had short-course radiation therapy. Median Charlson's index for our case series was 2.5 (2–11). The median distance of the tumour from the anal verge was 5.5 cm (1–12). Majority of rectal lesions were T2 (20.8%; 5/24) or T3 (70.8%; 17/24) on preoperative rectal MRI with 41.7% (10/24) having signs of mesorectal lymph

Table 1 Patient characteristics

n=24 (%) (range)	
Men	24 (100)
Median age	66 (51–81)
Median BMI	30.35 (18.2–42.9)
Charlson's index	2.5 (2–11)
Biopsy at colonoscopy ► Adenocarcinoma ► Villous tumour	n= 24 23 (95.8) 1 (4.2)
Clinical stage ► TIS ► T1 ► T2 ► T3 ► T4 ► N+ ► M+	1 (4.2) 1 (4.2) 5 (20.8) 17 (70.8) 0 (0) 10 (41.7) 1 (4.2)
Distance anal margin (cm) (median)	5.5 (1–12)
Primary cancer Recurrence rectal cancer	22 (92) 2 (8.3)
Neoadjuvant therapy ► Chemoradiotherapy – Long course – Brachytherapy – Short course	18 (75) 13 (54.2) 12 (0.5) 4 (16.7) 1 (4.2)

BMI, body mass index; TIS, Tumor In Situ.

node involvement (table 1). One patient had a prior liver resection for synchronous colorectal metastasis.

The criteria's selection for Ta dissection approach was listed in table 2. We selected patients that we highly suspected difficult surgery by laparoscopy. Most of patients had many of these criteria's selection and all were male patients.

The earlier cases (45.8%; 11/24) began with the abdominal approach before the Ta dissection. With experience, it became clear that dissection was easier

Table 2 Criteria's selection for Ta dissection

n=24 (%)	
Obese patient with BMI >30 ► 30–35 ► 35–40 ► >40	14 (58.3) 8 (33.3) 3 (12.5) 3 (12.5)
Recurrence	2 (8.3)
History of surgery ► Sigmoidectomy for diverticulitis ► Low anterior resection	4 (16.7) 2 (8.3) 2 (8.3)
Post-TEM	2 (8.3)
Others ► Distal tumour (1 cm from anal margin) ► Choice of the surgeon	2 (8.3) 1 (4.2) 1 (4.2)

BMI, body mass index; TEM, transanal endoscopic microsurgery; Ta, transanal.

Table 3 Perioperative outcomes

n=24 (%) (range)	
Dissection by Ta dissection first	13 (54.1)
Port used ► TAMIS ► TEM	 15 (62.5) 9 (37.5)
Abdominal time ► Laparotomy ► Laparoscopy ► Conversion	n = 24 1 (4.2) 23 (95.8) 0 (0)
Type of surgery ► Low anterior resection ► Abdominoperineal resection	n= 24 23 (95.8) 1 (4.2)
Stoma ► Ileostomy ► Colostomy	17 (74%) 16 (69.5) 1 (4.2)
Median operative time (min)	375 (210–720)
Bleeding (mL) (median)	100 (25–2000)
Perioperative complications ► Colonic ischaemia ► Rectal perforation ► Bleeding from left epigastric artery	3 (12.5)
Anastomosis ► Coloanal – Hand sewn – Stapler ► Coloanal pull-through – With ileostomy – Without ileostomy	n=23 15 (65.2) 10 (43.5) 5 (21.7) 8 (34.8) 1 7

TEM, transanal endoscopic microsurgery; Ta, transanal; Tamis, transanal minimally invasive surgery.

when starting with the Ta dissection first (54.1%; 13/24). There was no conversion to laparotomy for the abdominal approach. The TAMIS soft platform was used in most cases (62.5%; 15/24) and the TEM rigid platform (37.5%; 9/24) in the remaining. The median operating time was 375 min (210–720) with median blood loss of 100 mL (25–2000). Three perioperative complications occurred, including bleeding from the left epigastric artery, a limited rectal perforation and a colonic ischaemia requiring permanent colostomy. Of the remaining 23 patients, 10 (43.5%) had a hand sewn coloanal anastomosis, 8 (34.8%) a delayed coloanal anastomosis and 5 (21.7%) a single circular stapled anastomosis (table 3).

Sixteen patients (69.5%; 16/23) had a diverting ileostomy. Seven patients having a delayed coloanal anastomosis were not diverted.

Final pathology revealed invasive adenocarcinoma in 21 patients (87.5%; 21/24), 2 patients (8.3%; 2/24) with prior TEM resection had no residual intraluminal tumour and 1 patient (4.2%; 1/24) had tubulovillous adenoma with high-grade dysplasia. The pathological T of the TNM (tumour, node, metastases) classification shows: 8.3% (2/24) had T0, 20.8% (5/24) had T1, 33.3% (8/24) had T2, and 37.5% (9/24) had T3. One patient

Table 4 Pathological outcomes

	n=24 (%) (range)
Histology	
► Adenocarcinoma	21 (87.5)
► No residual tumour	2 (8.3)
► Tubulovillous adenoma	1 (4.2)
Intraluminal tumour	21 (87.5)
Extraluminal tumour	1 (4.2)
Regression grade	n=18
► Grade 0	2 (11.1)
► Grade 1	7 (38.9)
► Grade 2	7 (38.9)
► Grade 3	0 (0)
► Non-applicable	2 (11.1)
Margins	
► Distal (mm)	20 (1–40)
– Negatives	24 (100)
► Circumferential (mm)	8.5 (0–70)
– Negatives	23 (95.8)
► Proximal (cm)	27.5 (18–39)
– Negatives	24 (100)
► Margins negative without extraluminal tumour	23/23 (100)
Mesorectum quality	
Primary tumour and recurrent tumour	n=24
► Complete	21 (87.5)
► Incomplete	3 (12.5)
Primary tumour cases alone	n=22
► Complete	21 (95)
► Incomplete	1 (5)
Lymph nodes	20 (7–50)
Patients with positive lymph nodes	7 (29.2)
► Radiotherapy neoadjuvant	18 (2–50)
– Positive lymph nodes	6
► Radiotherapy neoadjuvant	19.5 (9–24)
– Positive lymph nodes	1

Table 5 Early postoperative outcomes (<30 days)

n=24 (%) (range)	
Medical complication	13 (54.2)
► Urinary retention	6 (25)
► Acute renal failure	3 (12.5)
► Arrhythmia	3 (12.5)
► Delirium	2 (8.3)
► Coronary syndrome	1 (4.2)
► Respiratory failure	1 (4.2)
► Upper limb venous thrombosis	1 (4.2)
Surgical complication	13 (54.2)
► Obstruction	6 (25)
– Internal hernia	3 (12)
– Secondary to stoma	3 (12)
► Anastomosis leak	5 (21.7)
► Abscess	5 (25)
► Ileus	3 (12)
► Dysfunction coloanal pull-through	3/8 (37.5)
Second surgery <30 days	10 (41.7)*
► Revision of stoma	3
► Reduction of internal hernia	3
► Transrectal abscess draining	2
► Revision coloanal pull-through	2
► Abdominoperineal resection for colonic ischaemia	2
Clavien-Dindo	
► Grade I	5 (20.8)
► Grade II	1 (4.2)
► Grade IIIa	1 (4.2)
► Grade IIIb	10 (41.7)
► Grade IV	1 (4.2)
Median time hospitalisation (days)	7.5 (2–25)
Median time alimentation (days)	4 (1–21)
Median time transit (days)	3.5 (1–21)
Rehospitalisation	6 (25)

had a metastatic paraureteral tumour with concomitant adenocarcinoma of the prostate. Among the 18 patients who had neoadjuvant therapy, 11.1% (2/24) had a regression grade of 0; 38.9% (7/24) grade 1; 38.9% (7/24) grade 2; 0% grade 3; and 2 whose grade cannot be calculated. 87.5% (21/24) of cases were intraluminal and 4.2% (1/24) were extraluminal (a recurrent cancer case). The median distal margin was 20 mm (1–40) and all were negative. The circumferential radial margin (CRM) was negative in all cases but one patient (95.8%; 23/24) (table 4).

The patient with positive CRM had a recurrent extraluminal tumour in a chronic anastomotic leak. All patients with primary rectal cancer had negative distal and circumferential margin. Mesorectum integrity was graded by the pathologist as complete or near complete in 95% (21/22) of the specimen for primary cancer cases. The median number of lymph nodes harvested was 20 (7–50) (recurrent cancer cases excluded) and 29.2% (7/24) of patients had lymph node involvement on final pathology.

The median hospital stay was 7.5 days (2–25). The median time to resume diet was on postoperative day 4 (1–21). A total of 54.1% (13/24) of patients experienced postoperative complication. According to CD Classification 20.8% (5/24) were grade I, 4.2% (1/24) grade II, 4.2% (1/24) grade IIIa, 41.7% (10/24) grade IIIb and 4.2% (1/24) grade IV. Thirteen patients experienced (13/24; 54.2%) early complications (<30 days). Six patients had bowel obstruction (6/24; 25%) and five had anastomotic leak (5/23; 21.7%) Complication details are shown in table 5. Ten patients (41.6%; 10/24) required unplanned return to the operative room (OR) : three for ileostomy revision, three for internal hernia reduction, two for Ta drainage of anastomotic leak, one for revision of coloanal anastomosis and one for a permanent colostomy for anastomotic necrosis (table 5).

Two patients required multiple return to OR for Ta drainage of abscess. The treatment for the five anastomotic leaks was by transrectal drainage (2), ileostomy loop (1), anastomotic revision (1) or abdominoperineal

Table 6 Follow-up

n=24 (%) (range)	
Median follow-up (month)	3.35 (0.1–22.1)
Recurrence	2 (8.3)
► Distance	1 (4.2)
– Pulmonary metastasis	1 (4.2)
– Liver metastasis	0 (0)
► Local	
Ileostomy closed	5/16 (31.3)
Mortality	
► Early (<30 days)	0 (0)
► Late (>30 days)	1 (4.2)

resection (1). The median follow-up was 3.35 months (0.1–22.1) (see table 6).

On last clinical follow-up, 8.3% (2/24) of patients had a distant recurrence of disease (pulmonary metastasis and liver metastasis). No local recurrence was demonstrated. Among the patients with ileostomy, 31.3% (5/16) had a surgery for closing of the stoma. Only one mortality was registered over 30 days after the surgery and was not associated with complications.

DISCUSSION

We report our experience with our first case of Ta dissection with this retrospective cohort. This approach was selected in specific difficult cases (male, low rectal cancer <6 cm anal margin, high BMI, narrow pelvis, previous rectal surgery). The objective was to introduce this new technique safely in a group of patients who could benefit from it. This series is a small retrospective one and the analysis and possible conclusion that we can have are limited. Also, we have a short follow-up since the first Ta dissection cases. We are aware that we consciously created a bias in selecting carefully our first patient for TaTME approach. Our aim was to be sure that this technique was not harmful in our population of patients and this is why we carefully selected the patient. Our cohort is smaller than other reported ones ([4] (n=140) and[5] (n=80)). This is in line with the very selective criteria we used to select the patients having this approach. We offered this technique only to patients in which a regular laparoscopic approach would have been difficult and at high risk of conversion with poor expected oncological result. This is reflected by the absence of a female patient in our cohort as these patients have usually a wide pelvis and can be treated with standard laparoscopic approach. We were also concerned with the potential surgical trauma to the anal sphincter muscles, which are shorter and often weaker than in males. We also selected obese patients as these are the more challenging rectal cancer cases especially in males. The median BMI in our cohort was 30.4 compared with 25 in the study by Lacy *et al.* [4] and 27.5 in the Veltcamp Helbach *et al.* [5] series. The rate of neoadjuvant chemoradiation treatment was also higher in our cohort, which confirms the selection of difficult cases with large bulky and advanced rectal cancer. There were four cases of previous rectal or sigmoid resection including two cases of recurrent cancer. While the majority of other series have excluded this type of patients we think that these may benefit from this approach.[3] In selected cases of prior rectal or sigmoid resection or small axial recurrence, starting the dissection from the bottom in a fresh plane may help complete the surgery and offer a possibility for coloanal anastomosis in difficult pelvis dissection. Our operative time was longer than reported by others (166 min in the study by Lacy *et al.*,[4] 204 min by Veltcamp Helbach *et al*,[5] and 304 min by Rouanet *et al.*).[6] This could be a reflection of the difficulty of cases selected but also related to the learning curve of this new approach. Evaluation of the quality of specimen according to Quirke method revealed that the quality of the mesorectum was complete or nearly complete, 95% (21/22), which compares with others in our primary rectal cancer cases (97% in Veltcamp Helbach *et al.* series[5] and 100% in Rouanet's study[6]). Circumferential radial margin was negative in all primary cancer resections while one case of recurrent extraluminal cancer had a positive margin. This compares favourably with others, ranging from 2.5% to 13.3%, and may be related to a liberal use of preoperative chemoradiation and MRI restaging.[4–7] Postoperative complication rate appears higher in our cohort also as the anastomotic leak rate compared with others. In a recent study from Penna *et al.* published in 2019, the authors proposed risk factors for anastomotic leak (male gender, obesity, smoking, diabetes, larger tumours and tumour height >4 cm from anorectal junction on MRI).[8] These factors for most of all correspond to our inclusion criteria for Ta dissection. We found a rate of combined medical and surgical complications of 75% compared with 39% in the series of Veltcamp Helbach *et al*,[5] and 34.3% in Lacy *et al.*,[4] but they mentioned only the surgical complications and do not include the medical ones. Our study reveals no perioperative ureteral injury or nerve injury. The majority of cases were completed with a laparoscopic approach (95.8%) in our series with no conversion cases. Ta dissection approach is the potential to improve the rate of laparoscopic cases by allowing the hardest part of dissection, the lower rectum, to be performed from below with a better view. In the recent largest series published in 2019 by Detering *et al.*,[9] the authors concluded that the use of Ta dissection for rectal cancer with laparoscopy decreases the rate of conversion. Also, in this study the oncological result was satisfying in both groups (TaTME vs laparoscopy) even if in the group of TaTME dissection there were more male patients with low and mid-rectal lesions. We selected this approach mostly in male patients having low rectal lesion, obesity or previous rectal resection. We feel that these patients are the ones most likely to benefit from this approach. However, we need more studies to answer the last questions about long-term outcome, the better type of anastomosis with Ta dissection and the population who can benefit most of this technique.[10]

CONCLUSION

We report a series of rectal cancer treated with the Ta dissection starting with bottom-up dissection. We selected difficult cases (males with high BMI, previous rectal surgery and distal tumour) as we believe that this technique is well suited for these. Our small series suggests that a group of experimented surgeons in laparoscopic rectal resection and TEM excision can effectively introduce the Ta dissection approach for selected difficult rectal cancer cases. This approach helped achieve complete mesorectal excision in complex primary rectal cancer but also allowed for rectal resection in patients with previous rectal surgery. This technique also helped perform a primary anastomosis in these difficult cases. However, anastomotic complications remain an issue and need further investigation.

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