Letter to the Editor

An Initial Experience Comparing Robotic Total Mesorectal Excision (RTME) and Transanal Total Mesorectal Excision (taTME) for Low Rectal Tumours

Dear Editor,

Laparoscopic surgery is widely used for the surgical treatment of rectal cancer. However, very low rectal cancer presents with special difficulty. Laparoscopic dissection beyond a protruding sacral promontory, especially in a small confined pelvic space in a fat male pelvis, is technically difficult. This is where the use of the robotic total mesorectal resection (RTME) is thought to be useful. In more recent times, transanal total mesorectal excision (taTME) promises to bring about another novel solution to this issue. Hence, we compared our initial cases of RTME and taTME to assess surgical parameters between these 2 procedures, as a guide to others embarking on these same techniques.

Materials and Methods

The first 21 consecutive patients who underwent RTME using the da Vinci® Si-e surgical system (Intuitive Surgical, Sunnyvale, CA, USA) and the subsequent 6 consecutive patients who had TaTME using the transanal endoscopic operation (TEO) device (Karl Storz Endoscopy, Tuttlingen, Germany) for low rectal cancers were included. All 27 surgeries were performed by a single experienced laparoscopic surgeon (FC Seow) from August 2012 to June 2015. Patients who had low or high anterior resections were excluded. Information was collected retrospectively. Statistical analysis was performed using SPSS version 21 (SPSS, Chicago, IL, USA). Mann-Whitney U test was used for the analysis of non-parametric continuous variables while Fisher's exact test was performed for analysis of categorical data. $P < 0.05$ was taken as significant.

All 21 RTMEs were performed using the 3-armed da Vinci Si-e surgical system. All patients underwent a hybrid technique consisting of an initial laparoscopic vascular ligation and left colonic mobilisation. The patient cart was docked and the rectum was completely mobilised to the anorectal junction. The anorectal junction was then transected using a linear stapler. The bowel was exteriorised via the umbilical camera port site and the appropriate part of the colon was removed. A 3 cm to 5 cm colonic J-pouch was then fashioned. Anastomosis with the remnant anal canal was performed laparoscopically with a transanal circular stapler, after reinsufflation of the peritoneal cavity. A defunctioning ileostomy was created in all patients.

Six patients underwent the taTME procedure. The first phase of this procedure was the laparoscopic management of the inferior mesenteric vessels and left colon. In the perineal phase, the Karl Storz TEO rectoscope was fixed in place with the insufflation pressure set to 12 mmHg with an airflow of 6 L/min. A purse-string was inserted at a distance below the lower edge of the tumour. A circumferential full thickness incision was made below the level of the purse-string. The dissection proceeded to the top of the levator plate and outwards to the pelvic side wall circumferentially to meet the laparoscopic plane. The fully mobilised colon and rectum were then prolapsed through the anal sphincters and amputated. A colonic J-pouch was then created and returned to the pelvis with a long string attached to the inserted stapler anvil for retrieval. A purse-string suture was applied to the distal anal stump, following which, the TEO rectoscope was removed. The J-pouch was pulled down. The distal anal purse-string was tightened securely around the shaft of the anvil and anastomosis was secured. The colonic pouch orientation was checked laparoscopically prior to stapler firing. A right iliac fossa defunctioning ileostomy was then created.

Results

Surgical parameters between the 2 groups are summarised in Table 1. There was no difference between the groups in terms of gender, body mass index (BMI), use of preoperative chemoradiotherapy, tumour size or distance of the inferior edge of the tumour from the anal verge. All resected TME specimens were examined by an experienced histopathologist, with all but 1 being described as complete. Proximal, distal and radial margin lengths were similar in both groups. There was no significant difference in operative duration or length of hospital stay. One patient in the RTME group with locally advanced disease required conversion to open surgery. Of the 3 patients in the RTME group with local recurrence, 2 had locally advanced pelvic nodal disease and 1 had distant metastases at the time of resection. No patient from either group suffered intraoperative or postoperative complications, and none died within the first 30 days post-surgery.

Table 1. Patient, Disease and Surgery Characteristics

	RTME	taTME	*P* Value
	Proportion (%)/Median (IQR)		
Number of patients	21	6	
Male	14 (67%)	3 (50%)	0.387
BMI	24 (22 – 26)	24 (20 – 27)	0.932
Neoadjuvant CRT	7 (33%)	2 (33%)	0.695
TNM Stage			
I	3 (14%)	0	
II	6 (29%)	2 (33%)	
III	9 (43%)	2 (33%)	
IV	3 (14%)	2 (33%)	
Differentiation			
Well	1 (5%)	2 (33%)	
Moderately	15 (71%)	2 (33%)	
Mucinous	5 (24%)	2 (33%)	
Distance from anal verge (mm)	50 (45 – 85)	70 (55 – 80)	0.662
Tumour size (mm)	35 (21 – 48)	39 (23 – 61)	0.357
Duration of surgery (minutes)	120 (100 – 200)	125 (99 – 135)	0.629
Proximal margin (mm)	70 (60 – 140)	85 (54 – 106)	0.977
Distal margin (mm)	12 (5.0 – 20)	12 (2.0 – 15)	0.512
Radial margin (mm)	5.0 (3.0 – 8.5)	2.3 (1.8 – 21)	0.476
Number of nodes harvested	16 (11 – 22)	13 (4.8 – 52)	0.842
Length of stay (days)	4 (3 – 5)	4 (3 – 7)	0.932
Length of follow-up (months)	28 (22 – 38)	30 (29 – 35)	0.589
Local recurrence	3 (14%)	0	

BMI: Body mass index; CRT: Chemoradiotherapy; IQR: Interquartile range; RTME: Robotic total mesorectal excision; taTME: Transanal total mesorectal excision; TNM: TNM classification of malignant tumours

Discussion

Three recent papers showed that robotic surgery compared to laparoscopic surgery for rectal cancer had a lower conversion rate, with similar overall postoperative morbidity and short-term oncological outcomes.[1-3] This may be taken to mean that robotic surgery has surgical advantages over laparoscopic surgery. Nonetheless, even with robotic technology, ensuring adequate distal and circumferential margins in anatomically unfavourable tumours may not be straightforward.

taTME is logically very attractive. The distal margin may be logically secured before rectal transection, guaranteeing clearance at the start of surgery in taTME. Dissection of the anorectum can also proceed regardless of pelvic narrowness and fat, which would otherwise make conventional laparoscopic or robotic surgery difficult. Recent results from the international taTME registry of 720 patients showed an 85% intact TME specimen rate, a 6.3% abdominal conversion rate from laparoscopic to open or transanal, and a 2.8% perineal conversion rate to a more extensive abdominal dissection.[4] Various recent studies have demonstrated similar postoperative complication rates, pathological and short-term oncological outcomes of taTME compared with laparoscopic TME.[5-8] A 2016 meta-analysis showed that taTME resulted in a larger CRM distance with lower risks of CRM positivity, higher rates of complete TME and a shorter operative duration compared with laparoscopic surgery.[9]

Conclusion

In this study, there was no significant difference in the length of the margins obtained; in particular, distal margins in both groups were similar. Nevertheless, we found it subjectively easier to secure and be confident of the lateral and distal margins for difficult low rectal cancers during RTME and TaTME compared to our prior experience with laparoscopic TME. Other authors have also shown this to be so.[10] As minimally invasive colorectal surgery becomes more widely available, surgeons should not be fixated on any one kind of technique. Instead, adequate training in all modalities of surgery may help combine the advantages of each to produce the best outcome for the patient.

REFERENCES

1. Mak TW, Lee JF, Futaba K, Hon SS, Ngo DK, Ng SS. Robotic surgery for rectal cancer: a systematic review of current practice. World J Gastrointest Oncol 2014;6:184-93.
2. Staderini F, Foppa C, Minuzzo A, Badii B, Qirici E, Trallori G, et al. Robotic rectal surgery: state of the art. World J Gastrointest Oncol 2016;8:757-71.
3. Biffi R, Luca F, Bianchi PP, Cenciarelli S, Petz W, Monsellato I, et al. Dealing with robot-assisted surgery for rectal cancer: current status and perspectives. World J Gastroenterol 2016;22:546-56.
4. Penna M, Hompes R, Arnold S, Wynn G, Austin R, Warusavitarne J, et al; TaTME Registry Collaborative. Transanal total mesorectal excision: international registry results of the first 720 cases. Ann Surg 2017;266:111-7.
5. Chen CC, Lai YL, Jiang JK, Chu CH, Huang IP, Chen WS, et al. Transanal total mesorectal excision versus laparoscopic surgery for rectal cancer receiving neoadjuvant chemoradiation: a matched case-control study. Ann Surg Oncol 2016;23:1169-76.
6. Marks JH, Montenegro GA, Salem JF, Shields MV, Marks GJ. Transanal TATA/TME: a case-matched study of taTME versus laparoscopic TME surgery for rectal cancer. Tech Coloproctol 2016; 20:467-73.
7. Rasulov AO, Mamedli ZZ, Gordeyev SS, Kozlov NA, Dzhumabaev HE. Short-term outcomes after transanal and laparoscopic total mesorectal excision for rectal cancer. Tech Coloproctol 2016;20:227-34.

8. Ma B, Gao P, Song Y, Zhang C, Zhang C, Wang L, 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.
9. 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;42:1841-50.
10. Deijen CL, Velthuis S, Tsai A, Mavroveli S, de Lange-de Klerk ES, Sietses 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;30:3210-5.

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