Proper usage of access device to keep the surgical plane during the TaTME

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Introduction

- Involvement of the circumferential resection margin (CRM) is the strongest independent factor associated with both survival and local control following rectal cancer surgery . [1]
- TaTME was successfully applied in rectal cancer surgery and potentially lead to better acquisition of intact specimens, low rates of CRM involvement, and decreased conversion rate compared to laparoscopic approach. [2,3]
- TaTME is based on single port surgery principles, the ergonomics is arduous, so keeping the stable image, and the dissecting plane in the center of the screen is important to perform good dissection.
- Dissecting along the lateral walls and posterior planes will change the angle between the instruments and the access device leading to difficulty in maintaining working angle. This also brings the point of dissection to the sides of the visual field in the monitor which underexposes the operative area.

Purpose

- The aim of this study was to use access device adjusting technique for the proper usage of access device to preserve the surgical plane during TaTME.

Patients and Surgical Technique

- We retrospectively analyzed the prospectively collected data of 59 consecutive patients with rectal cancer who underwent TaTME from March 2015 to November 2020.
- Thirty-five consecutive patients were included in Port Adjustment group and 24 consecutive cases were operated without port handling.
- Lock arm (System JP Inc., Hamamatsu city, Shizuoka, Japan) was used to fix the transanal access port.
- We assessed operative time, blood loss, intraoperative adverse events, complications, duration of postoperative hospital stay, quality of TME and pathological findings. According to the Japanese Classification of Colorectal Carcinoma we classified the radial margin (RM) (i.e., CRM) as RM0 (no tumor identified at the RM), RM1 (tumor identified at the RM), or RMX (tumor involvement of the RM cannot be assessed) [4]. The RM of <1 mm was defined as a positive CRM.
- The patients' demographics are shown in Table 1.
- After inserting self retaining anal retractor, (Lone Star Retractor; CooperSurgical, Trumbull, CT, USA), the access device (GelPOINT path; Applied Medical, Rancho Santa Margarita, CA, USA) was introduced through the anus to the rectum and retained it at the neutral position.
- The access device was attached with Lock arm to help adjust the alignment of the port during different phases of dissection.
- The pneumorectum was created via AirSeal platform, a double purse-string suture was applied to tightly occlude the rectum with a 3-cm margin distal to the tumor. Saline irrigation followed by full-thickness rectal transection was performed circumferentially.

Table 1. Patient demographics

S.N.	Patient factors	Port Adjustment (N=35)	No Port Adjustment (N=24)	p- value
1	Age	64 (33-88)	64 (53-85)	0.728
2	Female: Male	9:26	5:19	0.762
3	BMI	23. ±3.4	23.5 ±5	0.980
4	Surgery method			0.941
	ISR	11	7	
	LAR	17	13	
	Ultra-Low LAR	7	4	
5	Neoadjuvant treatment			0.347
	Chemotherapy	21	9	
	Chemo-radiotherapy	1	0	
	None	16	15	
6	Location of tumor			0.076
	Ra-S	4	1	
	Ra	8	11	
	RaRb	4	3	
	Rb	20	9	

- The dissection proceeded along the outer surface of the mesorectum.
- It proceeded towards the presacral plane between the parietal fascia and mesorectal fascia on the posterior side. During the posterior dissection, the access device was directed in posterior and downward direction. (Figure 1A)
- The access device was maintained at neutral position for anterior dissection which proceeded towards the peritoneal reflection between Denonvilliers' fascia (recto-vaginal septum) and the mesorectal fascia. (Figure 1B)
- The dissection then proceeded behind the neurovascular bundle (NVB), keeping the layer of Denonvilliers' fascia (recto-vaginal septum) intact on both lateral sides and identifying the pelvic nerve.
- For right sided dissection, the access device was pointed towards right side and rotated clockwise (Figure 1C).
- Similarly, for left sided dissection, the access device was pointed towards the left direction and rotated anticlockwise (Figure 1D).
- TaTME continued until reaching the rectosacral fascia and then connected to pelvic dissection.
- The adjusted position of the access device and picture while performing surgery on the right side (Figure 2, A and B) and on the left side (figure 2, C and D) are shown.

Results

- Thirty-five consecutive patients were included in the Port manipulation group and 24 consecutive patients were included in the no port manipulation group.
- No significant difference was found in total operation time, time for TaTME alone, bleeding, postoperative complications, and postoperative hospital stay.
- There were no intraoperative complications in each group.
- TME was complete (RM0) in all cases in Port manipulation group whereas it was incomplete in 1 cases and nearly complete in 3 cases in No port manipulation group (p value=0.023).

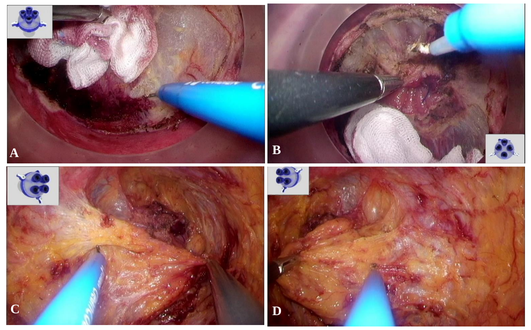


Figure 1, Images A,B,C,D show the intraoperative field of vision during TaTME dissection along the posterior, anterior, right and left sides respectively. The position of the access device in shown in the inset.

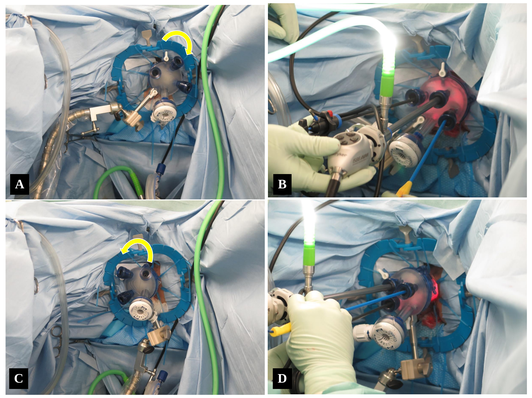


Figure 2, A and B: adjusted position of the access device and picture while performing surgery on the right side. (C and D): Access port position during left sided dissection.

Table 2. Surgical outcomes and Pathology

S.N.	Variables	Port Adjustment (N=35)	No port Adjustment (N=24)	p- value
1	Surgery time, min	348.6 ±74.7	332 ±80	0.327
2	TaTME time, min	123.8 ±56.5	133 ±33.5	0.786
3	Blood loss, ml	70.7 ±90.2	82.3 ±98.4	0.805
4	Postoperative complications			0.454
	no	29	17	
	yes	7	7	
5	Clavien-Dindo Grade			
	II	5	5	
	IIIa	2	0	
	IIIb	0	2	
6	Postoperative hospital stays, days, median	14	13.5	0.125
7	TME grade			0.023
	Complete	35	20	
	Incomplete	0	1	
	Nearly complete	0	3	
8	pStage			0.348
	pStage 0	2	0	
	pStage I	11	12	
	pStage II	11	3	
	pStage III	5	5	
	pStage IV	6	4	
9	Number of resected LN	17.5 ±6.8	16.5 ±7.3	0.573
10	Maximum diameter of tumor	37.5 ±18.6	37.1 ±15	0.920

Discussion

- Dissection along the wrong plane leads to injury to surrounding structures and NVB and it is important to be careful during the TME dissection to avoid uneven dissection and progression towards wrong plane.
- Identification of traingles and 'Os', which are the results of appropriate insufflation and traction, is recommended in order to stay in the correct plane. The correct plane is suggested to be at the tip of the triangle when the tissues are stretched. [5]
- Keeping the dissecting plane in the center of the screen is important to perform good dissection
- In our study, adjusting the orientation of access device resulted in better TME completion in the manipulation group.
- Adjusting the access port was not time consuming as there was no difference in overall surgery time and TaTME time.
- Limitations: Inherent limitations of retrospective study, small patient number, effect of learning curve.

Conclusion

- Adjustment of the access device for its proper alignment helps surgeons to stay in surgical plane, prevent positive margin and perform better dissection.

References

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