Maximizing Drain Tube Effectiveness in Colorectal Surgery: Evaluating the Efficacy of Extra-Peritoneal Tunneling (EPT) Method for Drain Fixation Compared to Conventional Drain Insertion

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Purpose

Postoperative drain displacement compromises the efficacy of the drain tube. This study aimed to evaluate the effectiveness of the extra-peritoneal tunneling (EPT) method for drain fixation compared to the conventional drain insertion method after anterior resection (AR).

Material and Methods

- Retrospective review of prospectively collected medical records
- All patients underwent Anterior resection or Low anterior resection between January 2020 and April 2023
- Patients were excluded if they underwent additional bowel resection during the main surgery, had permanent stoma formation, did not receive drain insertion, or experienced unintentional drain removal.

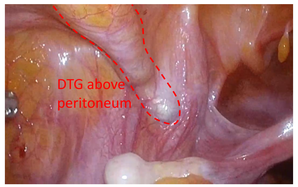
- Convetional drain tube insertion
  the drain tube was inserted through the left lower quadrant (LLQ) trocar insertion site and positioned near the anastomosis

- Extraperitoneal tunneling (EPT) methods
  the use of the DTG (JSR Medical Co., Ltd., Daegu, Korea,)

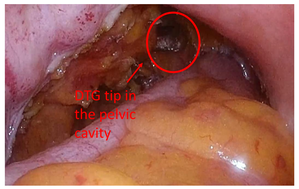


Surgical procedure

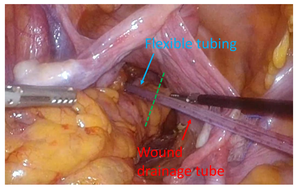
1) inserting the DTG through the LLQ trocar site



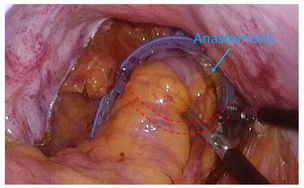
2) dissecting the preperitoneal space towards the pelvis near the anastomotic site using the DTG



3) accessing the pelvic cavity using the DTGTM tip

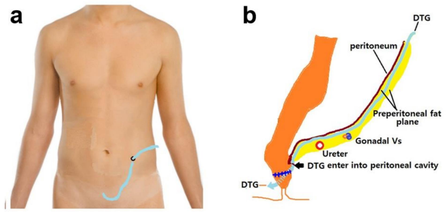


4) inserting the drain tube through the DTG hole and removing the DTG from the body



5) positioning the drain tube at the desired location

Fig 1. The schematic drain postion of EPT fixation



Results

Table 1 Clinical Characteristics

Characteristics	
Age, year, mean ± SD	66.2 ± 11.5
Gender, n (%)	
Male / Female, n(%)	190 (69.3) / 84 (30.79)
BMI, kg/m², mean ± SD	23.6 ± 3.5
Op. methods, n (%)	
Lap. / Robot	248 (90.5)
Open / conversion	26 (9.5)
Op. name, n (%)	
Anterior resection	146 (53.3)
Low anterior resection	128 (46.7)
Anastomotic height, cm, mean ± SD	9.3 ± 5.7
Fecal diversion, n (%)	
Yes	82 (29.9)
No	192 (70.1)
Drain insertion method, n (%)	
Conventional	188 (68.6)
EPT fixation	86 (31.4)

Table 2 Rate of drain displacement according to drain tube insertion method

Drain displacement	Conventional method	EPT Fixation	p-value
No	114 (60.6)	82 (95.3)	<0.001
Yes	74 (39.4)	4 (4.7)	

★ No complications related to the drain insertion procedure were observed.

Table3 Factors related to the drain displacement

	Drain displacement		Multivariate Analysis	
	No (%)	Yes (%)	Odd ratio (95% CI)	p-value
BMI, kg/m²				0.195
< 25	133 (68.9)	60 (31.1)	Ref.	
≥ 25	63 (77.8)	18 (22.2)	0.635 (0.320-1.262)	
OP time (min)				0.479
<180	130 (75.6)	42 (24.4)	Ref.	
≥ 180	66 (64.7)	36 (35.3)	1.267 (0.659-2.437)	
Anastomotic Height				0.120
≥ 5 cm	165 (74.7)	56 (25.3)	Ref.	
< 5 cm	31 (58.5)	22 (41.5)	1.854 (0.852-4.038)	
Postop. ileus				0.002
No	147 (78.2)	41 (21.8)	Ref.	
Yes	49 (57.0)	37 (43.0)	2.673 (1.449-4.930)	
Drain fixation				<0.001
EPT fixation	82 (95.3)	4 (4.7)	Ref.	
Conventional	114 (60.6)	74 (39.4)	14.644 (4.996-42.928)	

★ Anastomotic Leak (17 patients, 6.2%)
7 patients with drain displacement--> 5 patients need intervention
10 patients with no drain displacement → 1 need intervention

Conclusion

The EPT drain fixation method was an effective and safe approach to prevent drain displacement. Further research and clinical validation are required to establish the feasibility and effectiveness of this technique in routine surgical practice.