Original Article

The impact of transanal drainage tube on the incidence of anastomotic leakage and small bowel obstruction in radical surgery (Dixon) for rectal cancer: a retrospective cohort study

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Background: Anastomotic leakage (AL) and small bowel obstruction (SBO) are common complications after rectal cancer radical surgery (Dixon). Although the commonly used defunctioning stoma (DS) can reduce the incidence and harm of AL, it increases the probability of other adverse consequences, including SBO. Therefore, a safe and effective method for preventing the complications related to the radical surgery of rectal cancer is urgently needed. Previous studies have found that transanal drainage tube (TDT) can have a positive impact on the incidence of these two complications by draining gas and feces from the intestinal lumen, without causing other serious consequences. Therefore, this article further explores the clinical benefits that TDT can bring by analyzing the clinical data of postoperative patients with rectal cancer.

Methods: This study included 221 patients who underwent radical surgery (Dixon) for rectal cancer in Hubei Cancer Hospital from September 2020 to February 2023, determine whether it meets the inclusion criteria of this study based on preoperative examination, intraoperative exploration results, and treatment methods. DS was used in 70 patients and TDT in 88 patients during the surgery; meanwhile, no protective anastomotic measures were applied in 63 patients. Seventy patients subjected to DS were categorized as group 1, 88 patients subjected to TDT as group 2, and 63 patients with no protective measures for anastomosis as group 3. Through postoperative clinical manifestations, imaging examinations, and laboratory tests, a total of 18 cases of AL and 30 cases of SBO were identified in the three groups. The effectiveness of TDT and that of other surgical procedures in preventing complications, accelerating postoperative recovery, and reducing surgical costs were compared through univariate and multivariate analyses.

Results: The clinical features of the three groups have baseline comparability. No statistically difference was noted in baseline characteristics between three groups (all $P>0.05$). The incidence of AL and SBO in group 1 are 7.1% and 27.1%, in group 2 are 3.4% and 4.5%, and in group 3 are 15.9% and 11.1%. Compared to patients in no protective anastomotic measures with TDT and DS, TDT has a lower incidence of postoperative AL ($P<0.05$) and SBO ($P>0.05$), and faster postoperative recovery ($P<0.05$). The cost of inpatient surgery is not significantly different ($P>0.05$). Although DS can reduce the incidence of AL to a certain extent ($P>0.05$), it significantly increased the incidence of SBO ($P<0.05$), delayed postoperative defecation time ($P<0.05$) and caused higher cost ($P<0.001$). Compared to DS, the incidence of AL in TDT is not significantly different ($P>0.05$), but the incidence of SBO is noticeably lower ($P<0.001$), with faster postoperative recovery and less cost ($P<0.05$).

Conclusions: TDT is a safer, more effective, and more economical surgery for preventing postoperative complications.

Keywords: Transanal drainage tube (TDT); anastomotic leakage (AL); small bowel obstruction (SBO); defunctioning stoma (DS); radical surgery for rectal cancer

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Introduction

The incidence and mortality rates of rectal cancer rank second and fifth among common malignant tumors in China (1), and the incidence rate of rectal cancer accounts for 39% of the total incidence of all colorectal cancer (2). Radical surgery is the mainstream surgical procedure of rectal cancer treatment, but complications such as anastomotic leakage (AL) and small bowel obstruction (SBO), tend to occur in the postoperative period (3,4), adversely affecting patients' quality of life during the perioperative period, increasing the risk of death (4-6), and influencing the prognosis of antitumor therapy (7). Although defunctioning stoma (DS) is often used clinically to reduce the incidence of AL, it is controversial whether DS can indeed reduce the incidence of AL (8,9); furthermore, DS may increase the incidence of hydro-electrolyte disorders, SBO, stoma-related complications, and incisional hernia, which complicate patient care and increase economic burden (10). Thus, it is necessary to develop a simpler, safer, and more effective means to protecting the anastomosis. The therapeutic effect of transanal drainage tube (TDT) was first reported by Klein in 1997 (11). In recent years, multiple studies have further confirmed that it can reduce the incidence and severity of AL (12-14). The principle is believed to be that the anal canal can effectively drain gas and feces from the intestine, thereby reducing intestinal pressure and achieving preventive effects. However, the occurrence of AL is a result of multiple factors, and it is still uncertain whether a single TDT can play a decisive role. There is also limited research on the incidence of other postoperative complications (such as SBO). Therefore, this article conducts a retrospective cohort study to explore the therapeutic effect of TDT. This study retrospectively analyzed the clinicopathological data of 221 patients who underwent radical surgery (Dixon) for rectal cancer in the Department of Gastrointestinal Surgery of Hubei Cancer Hospital from September 2020 to February 2023. The aim of this study was to examine the effect of TDT on reducing the postoperative incidence and severity of AL and SBO and to evaluate the related postoperative recovery and cost. It is hoped the findings can provide insight into the safety and effectiveness of TDT in preventing postoperative complications. We present this article in accordance with the STROBE reporting checklist (available at https://jgo.amegroups.com/article/view/10.21037/jgo-24-537/rc).

Highlight box

Key findings

- The incidence of complications such as anastomotic leakage (AL) and small bowel obstruction (SBO) after rectal cancer surgery is relatively high. The use of transanal drainage tube (TDT) can safely and effectively reduce the incidence of these complications.

What is known and what is new?

- Defunctioning stoma (DS) is often used as a way to protect the anastomotic site after rectal cancer surgery, but its effectiveness is controversial, and the incidence of complications such as SBO after surgery is high, which increases the nursing and economic burden on patients.
- The results of this study can provide a more ideal choice for surgeons in reducing the incidence of AL and SBO after rectal cancer surgery, as well as accelerating patient recovery after surgery.

What is the implication, and what should change now?

- Due to the single center nature of this study, there may be certain limitations, and the number of cases screened is relatively small. To further validate the effects of TDT, a larger sample size prospective multicenter study needs to be designed and conducted.

Methods

Patient data

This retrospective clinical study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and approved by the Hubei Cancer Hospital Ethics Committee (No. LLHBCH2024YN-066). The requirement for informed consent was waived due to the retrospective nature of the study. The inclusion criteria were as follows: (I) all patients undergoing elective surgery,

with preoperative examination and postoperative pathology confirming early or advanced rectal adenocarcinoma; (II) neither preoperative examination nor intraoperative exploration suggestive of abdominal implantation metastasis; (III) no previous history of abdominal surgery, all complications occurring within 30 days, grade A or grade B AL severity according to the grading of AL of the International Study Group of Rectal Cancer (ISREC), all complications cured after conservative treatment with no unplanned second operation or death within 30 days after surgery, and only one kind of postoperative complication occurring in a patient; (IV) DS of only terminal ileostomy, with all patients who underwent DS being subjected to stoma-reversal surgery without complications; (V) the anal tube uses the same model of soft silicone tube (diameter 7.3 mm) as the drainage tube, and the head of the anal canal crosses the anastomotic in the intestinal cavity and reaches 5 cm above the anastomotic; (VI) radical surgery (Dixon) for rectal cancer performed by the same group of surgeons from September 2020 to February 2023 in the Department of Gastrointestinal Surgery of Hubei Cancer Hospital.

Reference standards and clinical data

SBO was diagnosed according to the criteria of the Chinese Expert Consensus on Diagnosis and Treatment of Small Bowel Obstruction (2023 Edition) (15), AL was diagnosed and grade according to Chinese Expert Consensus on the Diagnosis, Prevention and Operation of Defunctioning Stoma in Rectal Surgery (2019 edition) (16), and AL was graded according to the of definitions developed by the ISREC (17). The data collected included the patients' gender and age, ability of the endoscope to pass the tumor, distance from tumor to anus (cm), degree of differentiation, depth of tumor infiltration (T), lymph node metastasis (N), preoperative treatment history [neoadjuvant chemotherapy, neoadjuvant chemoradiotherapy (nCRT)], surgical approach (laparoscope or laparotomy), protection of the anastomosis (using DS or TDT or no protective measures for anastomosis), complications (AL or SBO), the time of first postoperative defecation (including anal exhaust and defecation and via the stoma or anal canal), the total cost of the surgical hospitalization (in patients requiring prophylactic stomas, the cost included the cost of the radical surgical hospitalization and the stoma-reversal surgical hospitalization), among other clinical and pathologic data.

Statistical analysis

Statistical analysis was completed via SPSS 26.0 software (IBM Corp., Armonk, NY, USA). P values were two-sided, and P<0.05 were considered statistically significant. Measurement data and enumeration data were compared using the independent samples *t*-test and χ^2 test.

Results

Analysis of risk factors for postoperative AL and SBO

The patient selection process is shown in *Figure 1*. This study analyzed 221 patients, including 140 males and 81 females, with 18 cases of AL and 30 cases of SBO after surgery. The comparison of patient baseline characteristics between the three groups showed no significant differences in age and sex (*Table 1*). Among the inability of the endoscope to pass the tumor, infiltration depth (T), nCRT, and the incidence of AL were all statistically significant (P<0.05). Inability of the endoscope to pass the tumor, deeper infiltration depth of the tumor (T3 and T4 stages), and nCRT were associated with a higher probability of postoperative AL. Patients with a lymph node metastasis (N2) had a higher probability of developing postoperative SBO (P<0.05) (*Table 2*).

Association of surgical method with postoperative AL, SBO, first postoperative defecation time, postoperative hospital stay, and total cost

The 221 patients were grouped according to the different surgical procedures applied in the operation; 70 patients subjected to DS were categorized as group 1, 88 patients subjected to TDT as group 2, and 63 patients with no protective measures for anastomosis as group 3. The incidence of AL and SBO in group 1 are 7.1% and 27.1%, in group 2 are 3.4% and 4.5%, and in group 3 are 15.9% and 11.1%. The analysis revealed that the different surgical procedures had significantly different associations with the incidence of postoperative AL and SBO (P<0.05), and the probability of postoperative AL and SBO was lower in patients who underwent TDT (*Table 3*). Intergroup analysis indicated patients who underwent DS had a lower incidence of postoperative AL than did the patients in whom no protective measures were applied, although this difference was not statistically significant (P>0.05), but DS significantly increased the incidence of postoperative SBO (P<0.05). Compared with patients with unprotected

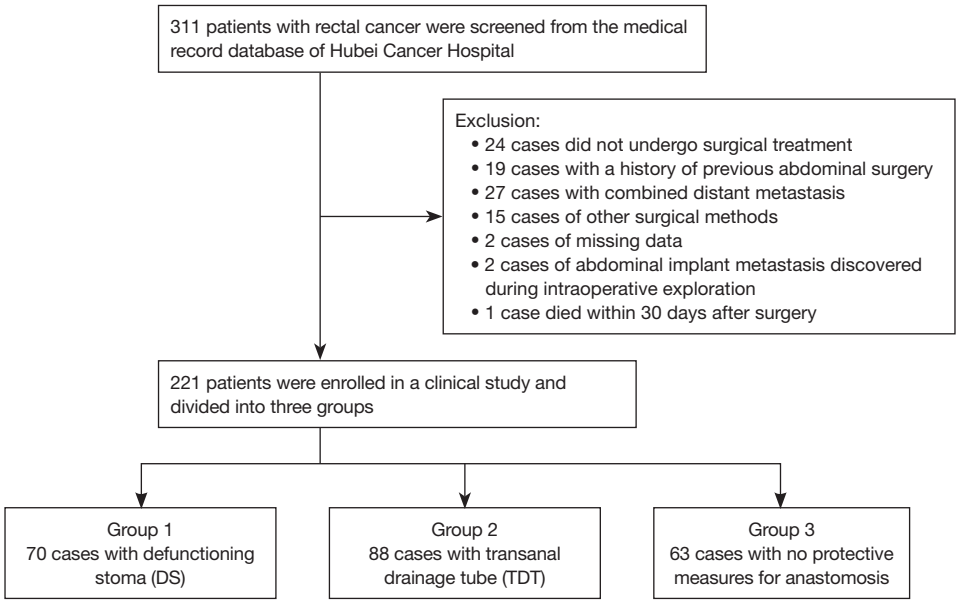

Figure 1 Flow chart of the screening of the patients.

Table 1 Baseline characteristics of patients in three groups

Variables	Group 1	Group 2	Group 3	t or χ^2	P
Age (years)	63.33±11.51	63.18±8.30	63.37±9.92	0.002	0.99
Sex				2.406	0.30
Male	49 (35.0)	55 (39.3)	36 (25.7)		
Female	21 (25.9)	33 (40.7)	27 (33.3)		

Data are presented as mean ± standard deviation or n (%). Group 1, defunctioning stoma (DS); Group 2, transanal drainage tube (TDT); Group 3, no protective measures for anastomosis.

anastomosis, patients undergoing TDT have a significantly lower incidence of postoperative AL (P<0.05), at the same time, TDT also reduced the incidence of postoperative SBO, but the difference was not statistically significant (P>0.05). Although patients treated with TDT had a lower incidence of postoperative incidence if AL than did those who underwent DS, but the difference was not statistically significant (P>0.05); however, their incidence of postoperative SBO was significantly lower (P<0.001) (*Table 4*).

There was a significant difference in the effect of different surgical procedures on the first postoperative exhaust time and total cost (P<0.05), but no significant difference in the effect on the time of first postoperative defecation and postoperative hospitalization (P>0.05) (*Table 5*). Intergroup analysis showed that patients who underwent DS had longer time until first postoperative exhaust and defecation, longer postoperative length of stay, and higher total costs than did those who underwent the unprotected anastomotic approach, with statistically significant differences being present for the time to first exhaust and total cost (P<0.05) (*Table 6*). The time to first postoperative exhaust and defecation time and postoperative length of stay of patients who underwent TDT were significantly lower than those of patients who underwent the unprotected anastomotic approach (P<0.05), whereas the total cost was relatively higher, but not significantly so (P>0.05) (*Table 7*). Patients who underwent TDT had a significantly shorter time until first postoperative exhaust and defecation, shorter postoperative length of stay, and lower total costs than did those who underwent DS (P<0.05), with the difference in time to first postoperative exhaust and

Table 2 Analysis of postoperative risk factors of AL and SBO

Variables	AL				SBO			
	No (n=203)	Yes (n=18)	*t* or χ^2	P	No (n=191)	Yes (n=30)	*t* or χ^2	P
Age (years)	63.00±9.55	66.44±10.22	0.010	0.92	62.99±9.40	65.13±10.96	0.046	0.83
Distance from tumor to anus (cm)	9.59±3.54	10.39±3.57	2.131	0.14	9.81±3.55	8.63±3.62	0.174	0.67
Sex			0.042	0.51			1.491	0.22
Male	129 (92.1)	11 (7.9)			118 (84.3)	22 (15.7)		
Female	74 (91.4)	7 (8.6)			73 (90.1)	8 (9.9)		
Ability of endoscope to pass the tumor			9.662	0.002			0.033	0.85
Yes	165 (94.8)	9 (5.2)			150 (86.2)	24 (13.8)		
No	38 (80.9)	9 (19.1)			41 (87.2)	6 (12.8)		
Degree of differentiation			1.661	0.43			0.982	0.61
High differentiation	16 (100.0)	0			15 (93.8)	1 (6.3)		
Moderate differentiation	142 (91.6)	13 (8.4)			134 (86.5)	21 (13.5)		
Low differentiation	45 (90.0)	5 (10.0)			42 (84.0)	8 (16.0)		
Infiltration depth (T)			16.372	0.001			1.935	0.58
1	16 (100.0)	0			12 (75.0)	4 (25.0)		
2	25 (100)	0			22 (88.0)	3 (12.0)		
3	152 (92.1)	13 (7.9)			144 (87.3)	21 (12.7)		
4	10 (66.7)	5 (33.3)			13 (86.7)	2 (13.3)		
Lymph node metastasis (N)			1.623	0.44			11.399	0.003
0	90 (93.8)	6 (6.3)			86 (89.6)	10 (10.4)		
1	71 (88.8)	9 (11.3)			73 (91.3)	7 (8.8)		
2	42 (93.3)	3 (6.7)			32 (71.1)	13 (28.9)		
Neoadjuvant chemotherapy			0.379	0.53			0.256	0.61
No	149 (92.5)	12 (7.5)			138 (85.7)	23 (14.3)		
Yes	54 (90.0)	6 (10.0)			53 (88.3)	7 (11.7)		
nCRT			14.442	<0.001			2.052	0.15
No	200 (93.0)	15 (7.0)			187 (87.0)	28 (13.0)		
Yes	3 (50.0)	3 (50.0)			4 (66.7)	2 (33.3)		
Surgical procedures			2.910	0.08			3.921	0.052
Open surgery	142 (89.9)	16 (10.1)			132 (83.5)	26 (16.5)		
Laparoscopic surgery	61 (96.8)	2 (3.2)			59 (93.7)	4 (6.3)		

Data are presented as mean ± standard deviation or n (%). AL, anastomotic leakage; SBO, small bowel obstruction; nCRT, neoadjuvant chemoradiotherapy.

Table 3 Association of surgical procedure with the incidence of postoperative AL and SBO among three groups

Variables	AL				SBO			
	No	Yes	t or χ^2	P	No	Yes	χ^2	P
Group 1, n (%)	65 (92.9)	5 (7.1)	7.761	0.02	51 (72.9)	19 (27.1)	17.425	<0.001
Group 2, n (%)	85 (96.6)	3 (3.4)			84 (95.5)	4 (4.5)		
Group 3, n (%)	53 (84.1)	10 (15.9)			56 (88.9)	7 (11.1)		

Group 1, defunctioning stoma (DS); Group 2, transanal drainage tube (TDT); Group 3, no protective measures for anastomosis. AL, anastomotic leakage; SBO, small bowel obstruction.

Table 4 Association of surgical procedure with the incidence of postoperative AL and SBO between each group

Variables	AL				SBO			
	No	Yes	t or χ^2	P	No	Yes	χ^2	P
Group 1 *vs.* group 3			2.526	0.11			5.419	0.02
Group 1, n (%)	65 (92.9)	5 (7.1)			51 (72.9)	19 (27.1)		
Group 3, n (%)	53 (84.1)	10 (15.9)			56 (88.9)	7 (11.1)		
Group 2 *vs.* group 3			7.249	0.007			2.343	0.12
Group 2, n (%)	85 (96.6)	3 (3.4)			84 (95.5)	4 (4.5)		
Group 3, n (%)	53 (84.1)	10 (15.9)			56 (88.9)	7 (11.1)		
Group 1 *vs.* group 2			1.131	0.28			16.006	<0.001
Group 1, n (%)	65 (92.9)	5 (7.1)			51 (72.9)	19 (27.1)		
Group 2, n (%)	85 (96.6)	3 (3.4)			84 (95.5)	4 (4.5)		

Group 1, defunctioning stoma (DS); Group 2, transanal drainage tube (TDT); Group 3, no protective measures for anastomosis. AL, anastomotic leakage; SBO, small bowel obstruction.

Table 5 Association of surgical procedure with time to first postoperative exhaust and defecation, postoperative length of stay, and total costs

Variables	Group 1	Group 2	Group 3	t	P
Time to first postoperative exhaust (days)	4.04±2.65	2.92±1.27	3.81±1.91	7.716	0.001
First postoperative defecation time (days)	5.01±3.05	4.14±1.51	4.73±2.34	2.946	0.05
Postoperative hospitalization time (days)	13.50±7.14	13.01±4.62	13.38±5.13	1.594	0.20
Total costs (CNY ¥10,000)	11.1±2.21	7.19±1.25	6.97±1.13	151.694	<0.001

Data are presented as mean ± standard deviation. Group 1, defunctioning stoma (DS); Group 2, transanal drainage tube (TDT); Group 3, no protective measures for anastomosis. CNY, Chinese Yuan.

defecation and total cost being significant (P<0.001) (*Table 8*).

Discussion

Currently, comprehensive treatment for rectal cancer is mainly based on surgery. With the increasing popularity of TME (total mesorectal exclusion) standards and the effective use of neoadjuvant therapy to improve the probability of R0 resection and pathological complete remission, more and more rectal cancer patients have the opportunity for radical surgery (18). With the improvement of surgical techniques and the implementation of nCRT, the anal preservation rate of radical surgery for rectal cancer has gradually increased, but there is still a high risk of AL. AL is linked to risk factors

Table 6 Differences in time to first postoperative exhaust and defecation, postoperative hospitalization time, and total cost between Group 1 and Group 3

Variables	Group 1	Group 3	*t*	P
Time to first postoperative exhaust (days)	4.04±2.65	3.81±1.91	6.634	0.01
Time to first postoperative defecation (days)	5.01±3.05	4.73±2.34	3.330	0.07
Postoperative hospitalization time (days)	13.50±7.14	13.38±5.13	3.547	0.06
Total costs (CNY ¥10,000)	11.1±2.21	6.97±1.13	14.831	<0.001

Data are presented as mean ± standard deviation. Group 1, defunctioning stoma (DS); Group 3, no protective measures for anastomosis. CNY, Chinese Yuan.

Table 7 Differences in time to first postoperative exhaust and defecation, postoperative hospitalization time, and total cost between Group 2 and Group 3

Variables	Group 2	Group 3	*t*	P
Time to first postoperative exhaust (days)	2.92±1.27	3.81±1.91	5.022	0.02
Time to first postoperative defecation (days)	4.14±1.51	4.73±2.34	7.216	0.008
Postoperative hospitalization time (days)	13.01±4.62	13.38±5.13	4.878	0.02
Total costs (CNY ¥10,000)	7.19±1.25	6.97±1.13	0.210	0.64

Data are presented as mean ± standard deviation. Group 2, transanal drainage tube (TDT); Group 3, no protective measures for anastomosis. CNY, Chinese Yuan.

Table 8 Differences in time to first postoperative exhaust and defecation, postoperative hospitalization time, and total cost between Group 1 and Group 2

Variables	Group 1	Group 2	*t*	P
Time to first postoperative exhaust (days)	4.04±2.65	2.92±1.27	28.086	<0.001
Time to first postoperative defecation (days)	5.01±3.05	4.14±1.51	21.823	<0.001
Postoperative hospitalization time (days)	13.50±7.14	13.01±4.62	6.487	0.01
Total costs (CNY ¥10,000)	11.1±2.21	7.19±1.25	15.212	<0.001

Data are presented as mean ± standard deviation. Group 1, defunctioning stoma (DS); Group 2, transanal drainage tube (TDT). CNY, Chinese Yuan.

of male gender, short distance from the tumor to the anal verge (19,20), a narrow pelvic inlet, obesity, and use of multiple occluders (21,22). Men's smaller pelvic inlet plane and patients' obesity complicate surgical operation, while tumors closer to the anus similarly add to the difficulty in surgical manipulation and anastomosis, leading to the use of more occluders and increased surgical manipulation time and bleeding. However, our study did find gender and distance from the tumor to the anus to be statistically correlated to the incidence of AL. nCRT can cause radiolucent enterocolitis, which results in rectal destruction of the peripheral blood supply and aggravation of intestinal wall fibrosis, and further reduces the healing ability of the tissues while increasing the risk of AL (23-26). Patients who underwent nCRT in this study all had postoperative DS, but the incidence of AL still reached 50%. To further reduce the risk of postoperative AL due to nCRT, Myerson *et al.* (27) suggested performing proximal enlarged surgery, which improves the safety of the surgery and is suitable for patients who have undergone nCRT. However, it is still necessary to verify the surgery's applicability and to conduct clinical studies with large samples to ascertain its feasibility (28).

Shiomi *et al.* (9) reported that the application of DS was not significantly associated with AL but did find unplanned

secondary surgery to be less frequent in patients who underwent DS. In a meta-analysis by Ahmad *et al.* (29) reported that the incidence of AL and the probability of unplanned secondary surgery were higher in patients who did not undergo DS compared to those who did, but the incidence of complications other than AL caused by DS was significantly higher. However, these findings are limited due to issues such as publication bias and the different quality of the included studies; moreover, high-quality randomized controlled trials are still needed to validate Ahmad *et al.*'s (29) conclusions. Therefore, despite the controversy regarding DS's effectiveness as a common clinical method of anastomotic protection, it has been recognized as capable of reducing the severity of AL-induced complications and the probability of unplanned secondary surgery; moreover, it has demonstrated to provide positive effects for the perioperative management of postoperative AL (9,16). It is generally recommended to perform DS in the form of terminal loop barrel ileostomy (30); however, in addition to the possible complications of DS mentioned previously, terminal loop barrel ileostomy may also result in some patients' temporary stoma becoming permanent, thus precluding reversal surgery, which might heighten the likelihood of infection and intestinal obstruction (31). Mathew *et al.* (32) found that postoperative adjuvant therapy, which demands more appropriate timing of the reversal surgery, also increases the incidence of wound infection, diarrhea, abdominal distension, and other complications. They also found that the incidence of postoperative SBO was significantly higher in patients who underwent DS; therefore, they typically perform DS only in patients who require emergency surgery for tumor obstruction, patients treated with nCRT, or those who require ultralow anus-preserving surgery. Sun *et al.* (33) reported that transcecum catheterization ileostomy is a new surgical procedure for preventing AL, which does not require stoma insertion surgery. Although it cannot completely avoid AL, it can effectively reduce the severity of AL and is also an optional surgical procedure. In addition, Wang *et al.* (34) developed a machine learning tool to predict the intestinal function of patients with low anterior resection syndrome after stoma return surgery. This tool is used to re-evaluate the decision to perform surgery before stoma return surgery, making corresponding efforts to determine whether stoma patients benefit from the return surgery. It also suggests that performing DS will bring more burden.

Intestinal adhesions after abdominal surgery are the primary cause of postoperative SBO (35), but studies indicate that patients who have undergone DS are more likely to develop SBO during postoperative recovery (*Table 2*). Moreover, it has been shown (36-38) that stoma outlets are a common site of obstruction. Maemoto *et al.* (39) found that the probability of stoma outlet obstruction is higher in patients with thicker subcutaneous fat and rectus abdominis and that stoma afferent loop mesenteric rotation and the internal hernia it forms with ileocecal mesentery may also be among the main causes of SBO. Although obstruction can be relieved by gastrointestinal decompression and the placement of decompression tubes through the stoma in most patients, some still require emergency surgery or early stoma reversal surgery. In addition, intestinal wall edema and prolapse of stoma may also be important causes of SBO (38,40), and all of these factors contribute to the difficult expulsion of bowel contents through the stoma. Fasth *et al.* (41) recommended collaterally rotating the ileum stoma by 180° to prevent bowel contents from entering into the afferent loop of the small bowel, thus reducing the risk of infection caused by AL. However, Marcello *et al.* (38) assert that stoma rotation has no effect on the intestinal fluid flowing into the efferent loop of the small bowel, the occurrence of which can increase the incidence of SBO and other complications and lead to prolonged hospitalization and an elevated likelihood of secondary surgery. The author's hospital usually fixes the input loop of the small intestine below the stoma for DS during surgery, as the stoma is usually positioned slightly below the ileocecal region, which is more physiologically appropriate since the small bowel travels upward through the pelvis and then obliquely enters the colon, but this still cannot reduce the higher likelihood of SBO occurring.

TDT, which was first reported by Klein *et al.* (11) in 1997, can drain the gas and feces in the intestinal lumen to achieve the effect of reducing pressure, thus decreasing the risk of AL. Although the pressure in the intestinal lumen is not the main cause of AL, there have been several papers recently (12-14) attesting to its effect on reducing the incidence of AL.

Zhao *et al.* (42) found that for patients undergoing TDT, the severity of AL can be mitigated by draining away gas and feces in the intestinal lumen. Likewise, the AL observed in this article was either ISREC grade A or B; therefore, performing TDT can have a preventive effect against grade C AL. Moreover, for patients who did not undergo DS, reducing the pressure in the intestinal lumen by performing TDT to drain the intestinal gas and feces may also be one of the reasons for the lower incidence of the postoperative

SBO, which is consistent with the lower incidence of SBO in patients who underwent TDT.

A common adverse effect of TDT is anal pain, the incidence of which in our study was approximately 10.2% (9/88). Moreover, although it has been found (43,44) that TDT may lead to anastomotic bleeding, there was no anastomotic bleeding observed in 88 TDT cases in our study, which may be due to the fact that the anal tubes used in this study were silicone tubes made of comparatively soft material, ensuring the draining effect and minimal irritation to the anus and anastomosis. Overall, for most patients who undergo rectal cancer surgery, TDT is effective and safer in reducing the incidence of postoperative AL and SBO. As for patients with high-risk factors for AL, the effect of TDT still needs to be investigated in large-scale, high-quality, randomized controlled trials.

Conclusions

Compared with conventional DS, TDT in radical surgery for rectal cancer (Dixon) can significantly reduce the incidence of postoperative anastomotic AL without increasing the incidence of postoperative SBO while avoiding the impact of stoma-related complications. Furthermore, TDT is safer and allows patients to recover faster postoperatively with lower total costs.

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Footnote

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://jgo.amegroups.com/article/view/10.21037/jgo-24-537/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and approved by the Hubei Cancer Hospital Ethics Committee (No. LLHBCH2024YN-066). The requirement for informed consent was waived due to the retrospective nature of the study.

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