Journal of Surgery
[Jurnalul de Chirurgie]
Research Article Open Access

Fistulas after Low Anterior Resection with TME

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Abstract

Despite advances in modern anastomotic techniques for colorectal surgery, anastomotic fistulas are still considered a dreaded complication, with a reported rate varying from 2 to 25%. Although fistulas can appear after any bowel anastomosis, it seems that low colorectal anastomosis are the most prone to such complications. Herein we aim to provide a review on our own experience with postoperative anastomotic fistulas after low colorectal anastomosis. Between 1998 and 2016, 62 patients had a LAR procedure with TME and low colorectal anastomosis. The mean age was 62.29 years. Triple stapled side to end colorectal anastomosis was the preferred technique with protective ileostomy. We report a fistula rate of 9.67% (6 cases) after Low Anterior Resection including blind fistula seen on first month follow-up endoscopic evaluation. While blind fistulas generated little morbidity, clinically manifested fistulas posed significant management challenge. Nevertheless we report no mortality related to fistula. Indubitably, more research is needed to establish a proper prevention guideline for anastomotic leaks, a "golden-standard" anastomotic technique and ideal management criteria for fistulas.

Introduction

Widely proclaimed as one of the most dreaded complications after colorectal surgery, anastomotic fistulas are indeed a major cause of morbidity, prolonged hospital stay, decreased quality of life and increased costs [1-4]. Anastomotic fistula rates vary considerably among different studies, with values ranging from 2 to 25% [5,6]. Moreover, the true prevalence of fistulas is difficult to establish, as many are asymptomatic (commonly referred to as "blind"). Clinically manifested fistulas usually present as localized or generalized peritonitis or fecal discharge form the drain. Lately, intensive research has been directed towards defining risk factors and prevention criteria for fistula formation. Even so, risk factors described in literature are hazardous and it seems that after 30 years of research on improving surgical technique, the incidence of anastomotic fistulas has not dropped significantly.

With regards to the location of anastomotic fistulas, studies report an increase of incidence as the colo-rectal anastomosis is lowers [7-11]. This is a prominent feature especially when considering patients with colorectal cancer which are treated with Low Anterior Resection (LAR) and Total Mesorectal Excision (TME) followed by low colorectal anastomosis. Professor Bill Heald revolutionized surgical technique in rectal cancer with his description of TME [12]. Since then it became the "gold-standard" operation for rectal cancer. The addition of stapling devices made the procedure even more feasible as the burden of a manual anastomosis in a narrow space was no longer an issue. However, fistula rates haven't decreased and, furthermore, TME is highlighted as a risk factor for anastomotic leaks [13,14]. With TME the overall survival rate has increased, but on the other hand, anastomotic leaks became more frequent with a 17% leak rate, due to a lower anastomosis. This fact has led surgeons to seek solutions, with protective ileostomy being one of them [15].

Materials and Methods

We retrospectively studied a group of 62 patients with rectal cancer in a series of 164 consecutive patients who were operated for colorectal cancer by a single surgical team between 1998 and 2016 (Table I). All 62 patients were diagnosed with rectal cancer and underwent LAR with TME.

Preoperative evaluation varied among patients depending if they were diagnosed before or after 2011 as not until then a standard preoperative work-up protocol was applied, which includes: digital rectal exam, endoscopy with biopsy, x-ray, abdominal ultrasound, ECG, standard blood and urine analysis, CA 19-9 and CEA markers, CT/IRM. Overall, 58.06% (36) of patients had preoperative radio-chemotherapy for down-staging, however only 31.57% before 2011, whereas 69.76% underwent preoperative neoadjuvant treatment after 2011 (Table II). Patients had preoperative colon prep with Fortrans® and were put on NPO diet the night before surgery. Thromboprophylaxis was ensured with low molecular weight heparine in normocoagulant dosage. Antibiotherapy was restricted to prophylactic dosage preoperatively (with repeated dosage for prolonged procedures) with Cefuroxime 2 g intravenously. If significant contamination occurred during procedure, postoperative antibiotics were recommended for 24 h. All procedures were performed with patients under general anesthesia.

Results

The majority of tumors before neoadjuvant therapy were T3 (56.1%) while T1 and T2 accounted for 31.5%, hence the large number of patients operated without neoadjuvant therapy. Only 12.2% of tumors were in a locally advanced stage (T4). The most common lymph node stages were N0 and N2 both sharing the same rate of 31%. Few patients (1.7%) presented in a N3 stage. In the group of patients who received neoadjuvant therapy, a down-staging trend was seen. After radio-chemotherapy 43.6% of tumors were T3 and, at the same time, the number of T1 and T2 rose. 9% of tumors were staged as T0. Also, T4 tumors roughly halved their numbers, reaching a 5.4% rate. Lymph node invasion decreased after radio-chemotherapy. The overwhelming majority of patients (65%) were N0 and no patient was staged as N3

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Received December 13, 2016; **Accepted** December 27, 2016; **Published** January 02, 2017

Citation: Morarasu S, Frunza T, Rotundu A, Lunca S, Dimofte G. Fistulas after Low Anterior Resection with TME. Journal of Surgery [Jurnalul de chirurgie]. 2017; 13(1): 25-29 DOI: 10.7438/1584-9341-13-1-5

Table I: Distribution according to sex and age in patients with LAR and TME.

	Number	Percentage	Mean age
Male	49	79.03%	62.29 years
Female	13	20.96%	

Table II: Preoperative management among patients before and after 2011.

	Tumor Markers	Neoadjuvant Therapy
Before 2011	21.05%	31.57%
After 2011	100%	69.76%

Table III: Distribution according to cancer stage (2017 Version NCCN staging system).

Before neoadjuvant therapy				After neoadjuvant therapy			
Tumor		Node		Tumor		Node	
Stage	Percent	Stage	Percent	Stage	Percent	Stage	Percent
T0		Nx	12%	T0	9%	Nx	1.6%
T1	3.5%	N0	31%	T1	5.4%	N0	65%
T2	28%	N1	24.1%	T2	36.3%	N1	23.3%
T3	56.1%	N2	31%	T3	43.6%	N2	10%
T4	12.2%	N3	1.7%	T4	5.4%	N3	0%

Table IV: Overview of patients with anastomotic fistulas.

Patient	Age	Neoadj. therapy	Protective Ileostomy	Type of fistula	Presentation	Management
G.A.	63	No	No	Symptomatic	Fever, acute abdominal pain, peritonitis	Terminal colostomy
S.V.	61	Yes	Yes	Symptomatic	Drain blood discharge Pelvic Abscess	Abscess drainage Fistula drain (inefficient) Terminal colostomy due to relapse
S.M.	55	No	Yes	Symptomatic	Urinary retention Acute abdominal pain Peritonitis	Terminal Colostomy
N.N.	60	Yes	Yes	Symptomatic	Fever Abdominal pain	NPO+Ertapenem Ileostomy closure delayed for 6 months
V.P.	74	No	Yes	Blind	Asyptomatic Fistula diagnosed on colonoscopy follow-up	Ileostomy closure delayed for 3 months
A.V.	57	No	Yes	Symptomatic	Anal bleeding Perianal pain	Ileostomy closure delayed for 3 months

(Table III). Regarding tumor location, patients were split as follows: 15 had cancer in the superior rectum, 47 in the middle rectum. Mean distance from the anal verge was 9.3 cm.

Operative Technique

In all cases a LAR procedure was performed with complete TME. The mesorectum was dissected completely within the mesorectal fascia. Denonvillier's fascia was preserved on the specimen down to the prostate, aiming for R0 resection in the anterior mesorectum. Once the rectum is fully mobilized, two 45 linear staplers are loaded and fired, dividing the rectum and producing a quality specimen which is sent to histopathology analysis. The rectal stump is washed with sterile water in order to kill floating tumor cells freed during dissection. For some tumors located near the anorectal ring we extended our dissection until the anal canal was reached, thus performing an ultra-low anterior resection (ULAR). Only 13.1% of cases demanded ULAR.

We are proponents of the latero-terminal anastomosis using a 29mm circular stapler. The quality of the anastomosis is checked with the air leak test, by filling the pelvis with water and injecting air into the rectum. In 2 cases the anastomosis was performed manually due to stapler misfiring events. A diverting ileostomy was performed in 85.48% of cases. More stomas were performed after 2011, when the protocol was strictly implemented. Before 2011 63% of patients had protective ileostomy, while after 2011 the percentage increased to 95%.

All patients were evaluated for fistula before ileostomy closure. The early cases (before 2011) were checked using barium enema, while the latter were scoped and visually checked for the integrity of the suture line.

Anastomotic Fistulas

We report a fistula rate of 9.67% (6 cases) after LAR with TME. Mean age for this group is 60.8 years, lower than the overall average, with 3 males and 3 females. All cases were diagnosed with mid-rectum cancer. Fistulas occurred in two patients who received preoperative radio-chemotherapy and in four cases without neoadjuvant therapy. All six patients had LAR and TME with protective ileostomy, except patient G.A. in whom ileostomy was not performed (Table IV). We believe in two patients (S.V. and N.N.) the main cause for anastomotic leaks was a staple misfiring event. In patient N.N. after acknowledging that the staple misfired, the anastomosis was performed manually. Our protocol for managing fistulas is briefly sketched in (Figure 1).

Patient S.V. developed fistula after staple misfire. He presented in the third postoperative day with important blood discharge on the drain. Later on, he developed a pelvic abscess and reintervention was demanded to drain the abscess. A large fistula was identified endoscopically and a drain was placed. Initially the fistula closed, confirmed with barium enema exam, but the patient presented later with reopening of the fistula and pelvic abscess. A terminal colostomy was indicated. His state improved and remained stable, however he maintained a blind fistula on colonoscopy follow-up (Figures 2-4).

In patient N.N. the stapled misfired and the anastomosis was performed manually. Postoperatively, the patient developed fever, abdominal pain and leukocytosis. Colo-supraanal fistula was identified on colonoscopy and was treated at first conservatively with antibiotics

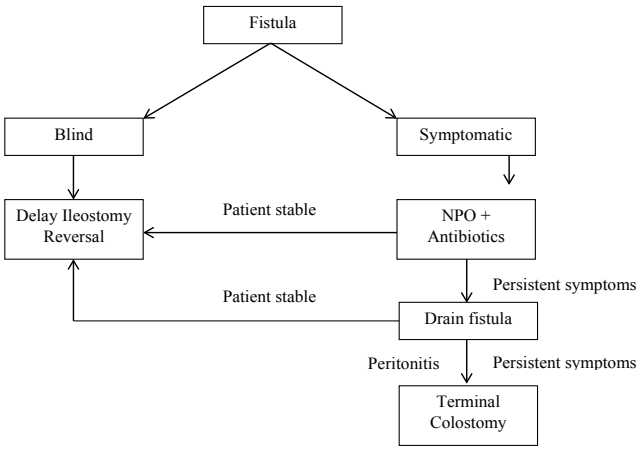

Figure 1: Management of fistulas overview.

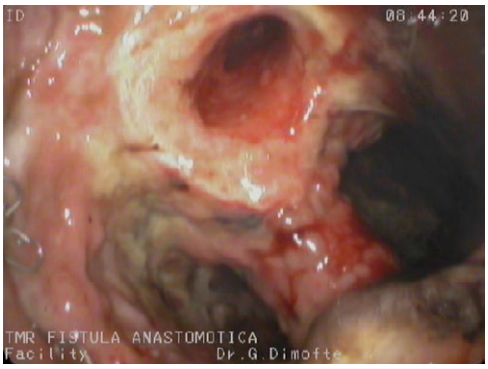

Figure 2: Fistula diagnosis on colonoscopy.

Figure 3: Early follow-up. Persistent fistula.

(Erapenem), nutritional support and antipyretics. A small drain was placed into the fistula to allow for irrigation and drainage of the abscess cavity (Figure 5). The patient's condition improved and the fistula resolved without relapse on colonoscopy follow-up (Figures 6 and 7). Ileostomy reversal was delayed for 6 months.

Patient V.P. was discharged after LAR with TME and protective ileostomy for mid-rectum cancer in a stable condition. On 4 weeks follow-up the patient underwent colonoscopy in order to monitor the anastomosis and verify the possibility of stoma reversal. On colonoscopy we found an anastomotic fistula of 3 mm (Figure 8). The patient was asymptomatic, therefore ileostomy reversal was only delayed for 3 months. After three months the fistula healed and the patients had the stoma reversed.

Patient A.V. presented two weeks post-op with blood anal discharge and perianal pain. Blood tests revealed important leukocytosis (25.000/mm^3), neutrophilia (18.000/mm^3), elevated urea and creatinine levels. We ruled out intra-abdominal collections based on CT scan, and there were no signs of peritoneal irritation. The patient was scoped and a fistula of 3 mm diameter was identified (Figure 9) leading to a pelvic abscess that was evacuated. The fistula was washed with Betadine and water. The patient was managed with antibiotics and hydration and recovered both clinically and paraclinically. The fistula was weekly checked and washed with Betadine on colonoscopy. The ileostomy reversal procedure was delayed for 3 months.

We report no mortality related to fistula formation but 50% of patients who developed fistula after LAR have a permanent stoma, which in at least 2 cases was due to our lack of experience to deal with such problems. We assume those cases to be on our learning curve, which included 1 case with a misfiring event.

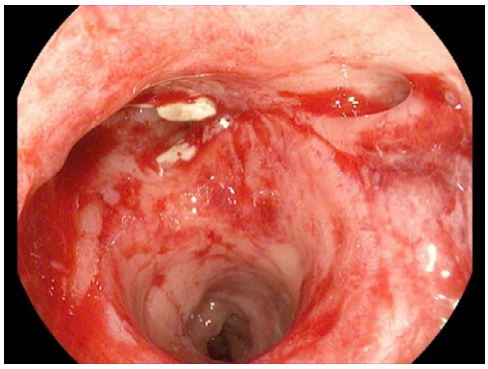

Figure 4: Late follow-up (10 years). Persistent blind fistula.

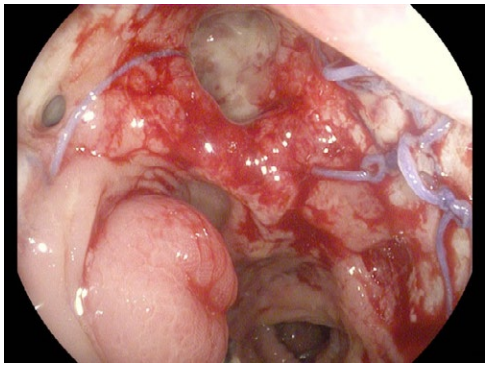

Figure 5: Fistula diagnosis. Drain placement.

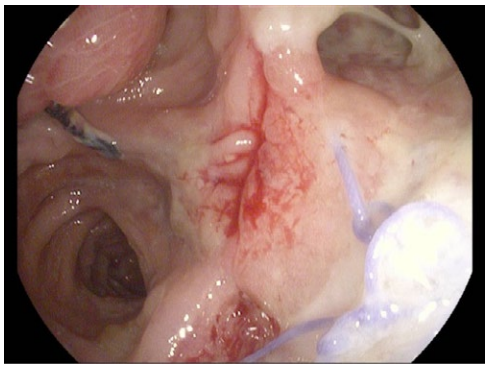

Figure 6: Early follow-up. Drain efficient.

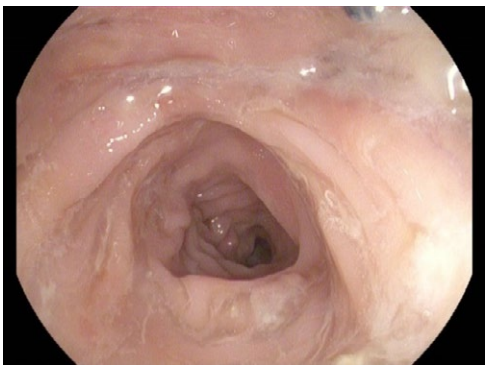

Figure 7: Late follow-up (1 year). Healed fistula.

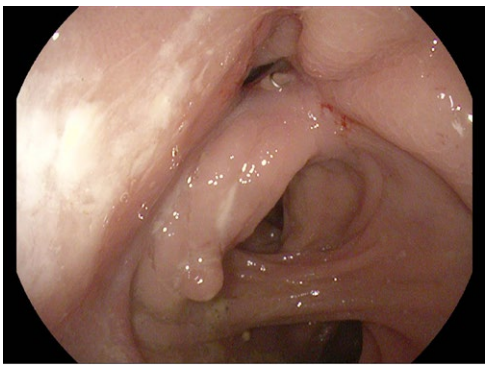

Figure 8: Blind fistula diagnosed on colonoscopy follow-up.

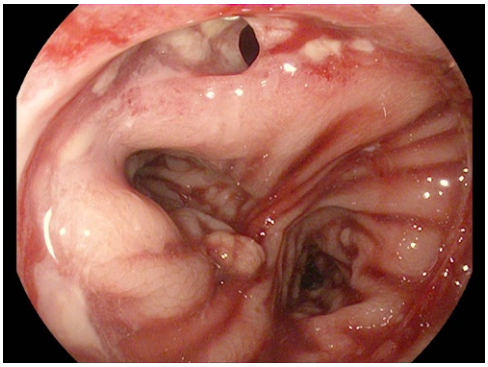

Figure 9: Fistula diagnosed 2 weeks after discharge, manifested with sepsis and anal bloody discharge.

Discussion

LAR with TME clearly enhances survival rates in patients with colorectal malignancies. Dissecting the whole mesorectum demands a meticulous technique, increasing operative time and fistula rate. We report a fistula rate of 9.67%, lower than the published average [3,5,13,16,17]. Out of 62 LAR's with TME only six patients developed anastomotic leaks, even though the majority of patients (58%) underwent preoperative radio-chemotherapy, which is believed to theoretically increase the chance of anastomotic dehiscence and fistula [18]. Moreover, out of the six fistulas, only two had neoadjuvant therapy. With regards to the location of tumors, it is reported that the risk of anastomotic failure increases as the tumor is situated lower in the rectum and, thus, the anastomosis is made closer to the anal canal. Out of the 62 cases, 15 were in the superior rectum and 47 in the mid rectum. All six fistulas developed after mid-rectum tumors. This could be explained by the aforementioned theory, as well as by the fact that the majority of tumors are located in this segment

Barium enema is largely described as a valuable exam for anastomotic follow-up and fistula diagnosis [19]. However, in patient S.V. barium enema couldn't detect the leak in contrast to colonoscopy which proved to be superior in identifying the fistula. We believe colonoscopy is better in monitoring the anastomosis and deciding when to reverse the ileostomy. We routinely evaluate all patients 30 days after LAR with TME and a colonoscopic inspection of the anastomotic lines is for us mandatory before ileostomy closure.

Another risk factor for fistula formation is the misusage of staplers. Currently, stapled anastomosis in colorectal surgery is becoming the "gold-standard' with many surgeons embracing it. It eases the anastomotic technique and reduces bleeding. However, attention should be paid when firing the stapler. In two of our patients the cause of anastomotic leak was misfired linear staplers. In such cases, the anastomosis must be performed manually, which is difficult in a narrow pelvis with suboptimal visualization of the structures.

Conclusion

Anastomotic fistula after LAR with TME is a debilitating complication, but without standardized management criteria. Fistula rates are hazardous among studies and risk factors are various: LAR with TME, stapled vs manual anastomosis, advanced cancer, number of positive lymph nodes, surgeon experience, tumor location, intraoperative transfusion, postoperative anemia and operative time. However we believe that meticulous operative technique, careful monitoring the operative field, ensuring a tension-free anastomosis, pelvic drains and verifying anastomosis integrity after stapling are simple, but effective steps in preventing fistula formation or at least its clinical consequences. Undoubtedly, more research is needed to confirm the exact causes of anastomotic leaks and, perhaps, management guidelines may be established.

Conflict of Interests

Authors have no conflict of interest to disclose.

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