

Endoscopic management of anastomotic leakage after colorectal cancer surgery in a Moroccan center: A case series and literature review

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Abstract

Endoscopic management has become an alternate treatment to a revision surgery for colorectal fistulas. Eight patients who were treated by endoscopy for postoperative anastomotic leakage to colorectal cancer were included. A univariate analysis was carried out to determine the predictive factors of success. All our patients were treated using metallic clips. The primary efficiency of this technique was 50%. In a univariate analysis, the size of the fistula and its distance from the anal margin had an influence on the efficiency of the endoscopic treatment, which was not the case for either the surgical technique or the use of neoadjuvant radiotherapy. This endoscopic treatment is effective and represents a more secure alternative than revision surgery. In our study, the use of metallic clips showed a 50% success rate, going up to 100% for the group of patients with a fistula ostium of a size ≤ 1 cm, proving the necessity of using this technique.

Keywords

Colorectal cancer, anastomotic leak, endoscopic clips

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Introduction

Colorectal cancer is a major public health concern, representing the first digestive cancer in Morocco.¹

It is one of the most frequent causes of mortality by cancer in lots of industrialized countries, with a mortality rate of 8.8%.²

Nowadays, curative resection with lymphadenectomy is considered a standard treatment for colorectal cancer. However, surgical treatment can cause serious septic complications, given all the bacteria in the digestive tract, making postoperative follow-up full of risks.

One of the most dreaded complications to colorectal surgery is anastomotic leak (AL), with an incidence of 6%–30%,³ responsible for an increased risk of morbidity and mortality, estimated between 4% and 35%.⁴

Its diagnosis is generally made within the 6th postoperative day, established by clinical presentation, and biological tests results, including C-Reactive Protein (CRP), associated with CT scan findings.⁵

Colorectal leaks are found in patients with some risk factors such as: male sex, comorbidities, and radiotherapy.⁶

Until 10 years ago, only two methods were used to overcome this complication: revision surgery and conservative medical treatment.

These past few years, new conservative treatments have emerged both radiological and endoscopic.

Endoscopic management, which has been effective in the treatment of AL in bariatric surgery,⁷ is also used in colorectal leaks.

The methods used are represented by endoscopic clipping, endoluminal stenting, transrectal ultrasound endoscopy treatment, endoscopic vacuum therapy and biologic glue.

The aim of this study was to evaluate the efficiency and the characteristics of the endoscopic management in this indication.

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Case series

In our study, we collected the data from all the patients who had surgical resection for colorectal cancer at the Surgical Oncology Department between January 2018 and March 2020.

For that, we used different resources: Computer system “ENOVA,” “TRELLO” app (ENOVA is a software created by ENOVAR ; Trello was created by Fog Creek Software in 2010), and patient’s paper files.

Written informed consent was obtained from the patient(s) or from the subject’s legally authorized representative (for deceased patient) for their anonymized information to be published in this article and were in accordance with the ethical standards of the responsible committee.

In this monocentric study, all patients with an AL who benefited from an attempted endoscopic treatment were included retrospectively.

In our study, we used the 2015 definition of the International Multispecialty Anastomotic Leak Global Improvement Exchange “IMAGInE.”⁸

The age, sex, body mass index, American Society of Anesthesiologists score (ASA score),⁹ the use of neoadjuvant radiotherapy, the distance between the cancer and the anal margin, the surgical technique used, and the time between surgery and endoscopic treatment were included in each patient’s records.

AL was suspected in the presence of a sepsis or a release of feces through the vagina; associated with increased CRP levels between the 2nd and 4th postoperative days and confirmed with a CT scan or endoscopy.

All the procedures were performed in our endoscopy unit by interventional endoscopists on sedated patients who were prepared using a liquid diet and laxatives.

During endoscopy, we first locate the fistula, clean, and drain the area. Metallic clips are placed across the fistula opening under endoscopic guidance and deployed in a configuration perpendicular to the defect’s long axis to approximate its edges. Multiple clips can be deployed sequentially from the edges to the center.

The distance between the fistula and the anal margin, its ostium size, the number of clips used and the rate of success of the technique are also noted.

Success was defined by the patient’s clinical improvement.

The patients were systematically controlled endoscopically 8–12 weeks after the endoscopic treatment to check its efficiency. The primary efficacy and the material used (clips only) were noted, and a univariate analysis was carried out to determine predictive factors of success.

For statistical analysis, the software “Excel 2020” for Mac was used.

Between January 2018 and March 2020, 237 patients underwent colorectal surgery (145 for rectal cancer and 92 for colon cancer).

In this population, eight patients (3.4%) had an AL confirmed by endoscopy. They represent the patients evaluated in our study (Table 1).

There were five women and three men, with a median age of 48 years.

Seven patients received neoadjuvant chemoradiotherapy.

The surgical techniques used were a total mesorectal excision for 75% of cases and a partial mesorectal excision (PME) for 25% of cases.

The median delay between surgery and the endoscopic treatment was 31 days (from 7 to 350 days).

The fistula was suspected in the presence of sepsis in four patients (50%) and a release of feces through the vagina in three patients (37.5%).

The increase of CRP levels between the 2nd and 4th postoperative days was noted in seven patients (87.5%).

Radiological examination confirmed AL in seven patients (87.5%).

During endoscopy, the average height of the fistula was 5 cm (from 2 to 10 cm), whereas its ostia size was ≤ 1 cm in four patients (50%) and > 1 cm in four patients (50%).

All our patients were treated using metallic clips (Figures 1–4)

The primary efficiency of this technique was 50%. Among the other four patients, three were sent for a surgical cure (Hartmann surgery) and the last one died due to septic shock in reanimation.

The fistula size, and distance from the anal margin in a univariate analysis, had an influence on the efficacy of the endoscopic treatment (Table 2).

We noted a 100% efficiency in the group with an orifice size ≤ 1 cm, whereas it was of 0% in the group with an orifice size > 1 cm.

Moreover, efficiency in the group with a distance between fistula and anal margin ≥ 6 cm was 67%, whereas it was 40% in the group with a distance < 6 cm.

We think that the use of neoadjuvant chemoradiotherapy might have had a negative influence, as the only patient that did not receive it had a successful endoscopic treatment compared to the group of patients that did receive it, which presented an efficiency of 42%.

The surgical technique did not have any influence on its efficiency as results were similar for both surgical techniques (50%).

Discussion

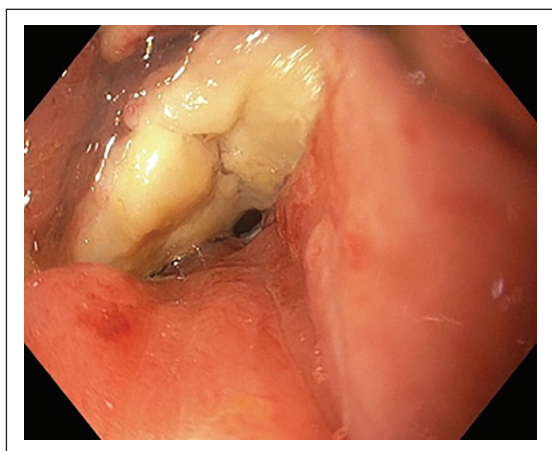
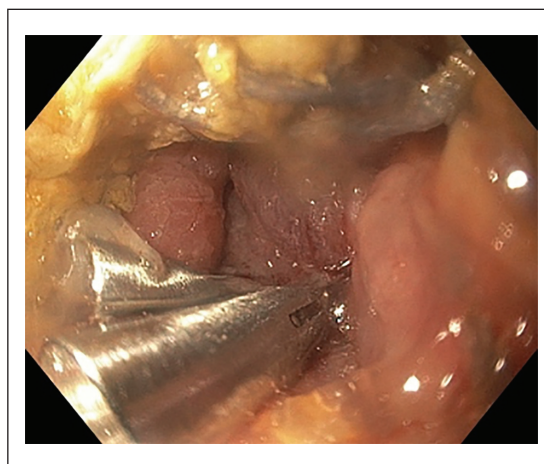
Despite all the studies about AL, the exact causes responsible for the occurrence of anastomotic leakages are not well precise.

Male sex stands as one of the most important risk factors. Rullier et al. showed in their 272 patient’s case series that the rate of AL following colorectal surgery was 2.7 times higher in men compared to women.¹⁰

Table 1. Characteristics of the eight cases of anastomotic leak.

Characteristics	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8
Age (y)	50	54	55	47	52	34	50	44
Sex	Male	Female	Female	Female	Female	Female	Male	Male
BMI	31	24	25	32	32	19	20	21
ASA score	I	I	I	I	I	I	I	I
Cancer localization (cm to anal margin)	9	4	10	10	8	3	5	4
Surgical technique	TME	PME	PME	TME	TME	TME	TME	TME
Neoadjuvant radiotherapy	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Clinical suspicion	Sepsis	Feces through vagina	Feces through vagina	NA (Asymptomatic)	Sepsis	Feces through vagina	Sepsis	Sepsis
CRP raise (day 2–4)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
CT scan confirmation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Surgery-endoscopic treatment delay (days)	17	14	8	46	350	7	103	196
Distance fistula-anal margin (cm)	4	6	4	8	4	10	3	2
Ostia size (mm)	6	8 6	25	7	7	20	20	20
Success/failure	Success	Success	Failure	Success	Success	Failure	Failure	Failure
Number of clips	2	9	NA	3	3	NA	NA	NA

BMI: body mass index; ASA score: American Society of Anesthesiologists score; CRP: C-reactive protein; NA: not applicable.

**Figure 1.** A 6-mm fistula localized 4 cm from the anal margin (Patient 1).**Figure 2.** Fistula closure by two endoscopic clips (Patient 1).

Comorbidities such as smoking, diabetes,¹¹ obesity,¹² ASA score ≥ 3 ,¹³ malnutrition, and corticosteroids¹⁴ were also associated with a higher risk to develop a fistula.

In our study, none of those risk factors had been noted. We had more women (five) than men (three) and obesity factor was the only one found among three of our patients.

Moreover, the distance between the anastomosis and the anal margin stands as an important risk factor especially when the latter is less than 6 cm from the anal margin.

Lopez-Kostner et al. showed in their study of 819 patients that the risk to develop a fistula was 0.14% in the group with

an anastomosis located at >15 cm from anal margin, whereas it was estimated at 8.4% in the group with an anastomosis located at <10 cm.¹⁵

In our study, five of our patients had an anastomosis located less than 6 cm from the anal margin.

Several studies also show a close relationship between neoadjuvant radiotherapy and the occurrence of AL. Majbar et al., in their study of 130 patients who had surgical resection with an anastomosis for rectal adenocarcinoma, showed that the rate of anastomotic leakage was significantly higher in patients who received preoperative radiotherapy (34.2% vs 12%).¹⁶

In our study, seven of our patients received a neoadjuvant radiotherapy.

The diagnosis of AL suspected clinically (sepsis signs or feces through the vagina) and biologically with an increase in CRP from the 2nd to the 4th postoperative days was confirmed by a CT scan that stands as the gold standard for AL detection. Its sensitivity and specificity are evaluated at 68%–71% and 84%–100%, respectively.¹⁷

Until 10 years ago, only two methods were used to overcome this complication: revision surgery (Hartmann,¹⁸ temporary ileostomy) and conservative medical treatment.

In the past few years, new conservative treatments have emerged, both radiological (percutaneous drainage) and endoscopic. Different endoscopic techniques can be used.

Since 2007, in Kirschniak et al.'s study,¹⁹ the use of over-the-scope-clipping system is democratized and stands as the most preferred clips to control AL.

A study of Weiland et al. reported an 84.6% success rate.²⁰

Arezzo et al., who used those clips to treat AL <15 mm after colorectal surgery in 14 patients, reported a success rate of 85%.²¹

As those clips were not available in our department, we used two to nine non-Ovesco preassembled metal clips to

close the dehiscence to treat our patients, showing a success rate of 50%, with a 100% success rate for the group of patients with an orifice size ≤ 1 cm.

Those standard endoclips, which are used to control small perforations and bleeding, can close dehiscences measuring up to 3 cm. They help to avoid temporary ileostomy and reduce hospital stay. However, their use is generally limited to AL <1.5 cm without collection.²⁰

In literature more expensive techniques are described.

Endoscopic self-expandable metallic stent (SEMS) appears to be an alternative therapeutic option for selected patients with AL after colorectal surgery when performed by skilled endoscopists. A recent study carried out by the Lamazza team in 2015, and which included 22 patients (largest cohort to date), showed that the use of SEMS had a success rate of 86.4% in patients with fistulas after colorectal surgery.²² Migration and cost are the major limitations of these stents.

Negative pressure wound therapy or vacuum-assisted closure is now a well-established treatment modality for chronic and difficult healing-to-heal wounds. It concerns essentially fistulas measuring more than 2 cm located in the lower rectum. This technique is associated with good results. The case series

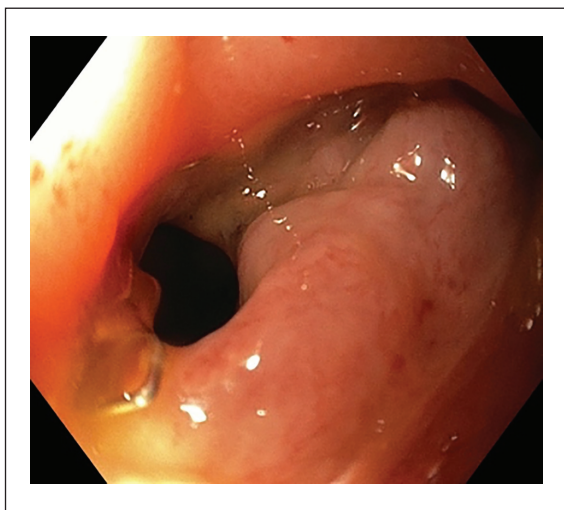


Figure 3. Two fistulas localized 6 cm from the anal margin (Patient 2).

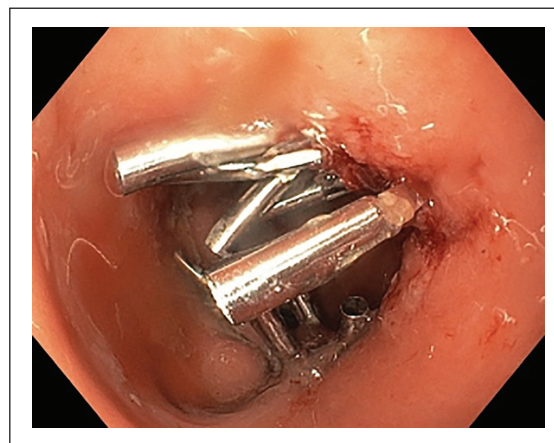


Figure 4. Closure of the two fistulas by the use of nine endoscopic clips (Patient 2).

Table 2. Univariate subgroup analysis for treatment efficacy.

Patients and treatment efficacy	Ostia size		Fistula-anal margin distance		Surgical technique		Neoadjuvant radiotherapy	
	<1 cm	>1 cm	<6 cm	>6 cm	TME	PME	Yes	No
Number of patients	4	4	5	3	6	2	7	1
Endoscopic treatment efficacy	100%	0%	40%	67%	50%	50%	42%	100%

TME: total mesorectum excision; PME: partial mesorectum excision.

of Dr Moussata et al. showed that the Endosponge® system allowed complete healing of colorectal AL in 81% of patients.²³

A transrectal ultrasound endoscopy treatment (metallic or plastic stent) when AL is coupled with a collection can be very effective. Indeed, a 100% technical and 93% clinical success was reported by Puri et al. in their study, involving 14 patients with pelvic abscesses.²⁴

Lippert et al showed in their retrospective study of 47 patients that a fibrin glue injection can be used when AL measures <5 mm.²⁵

Fistula plugs can also be used in this situation and has performed better than fibrin sealant in that role.²⁶

Conclusion

The endoscopic management of anastomotic leakage after a surgical treatment of colorectal cancer is efficient and represents a more secured alternative than revision surgery.

Different techniques can be used; the choice will mainly depend on the size of the fistula and whether the presence of a collection is noted.

The use of metallic clips had an efficiency of 50% in our study, going up to 67% in the group with a distance fistula-anal margin ≥ 6 cm and to 100% in the group of patients with an orifice size ≤ 1 cm, which shows the efficiency of properly using this technique.

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Author contributions

B.A.: Article redaction

A.S., A.C., and M.B.: Patient's data (endoscopy and surgery)

M.A.M., A.B., and L.A.: Article revision

R.M.: Final article approbation

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Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

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representative (for deceased patient) for their anonymized information to be published in this article (Patient 8).

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