

## Chapter 8

# Colon and Rectal Fistulas

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## Introduction

Colo-rectal fistulas are abnormal communications between colon or rectum and skin or another internal organ. The symptoms of colorectal fistulas depends on the colon or rectum segments participating to fistula formation, but also to the partner organ involved. These fistulas have a better prognosis compared with enteral fistulas (excepting the complications with sepsis). However, the new approaches in intensive care, nutrition, antibiotherapy reduced the morbidity and mortality. An important step to reduce the colorectal anastomotic fistulas was the creation of protective ileostomy or colostomy especially in low anastomosis or irradiated tissues.

## Classification

The colorectal fistulas can be split in two main categories:

1. external fistulas - occurring between colon or rectum and skin
2. internal fistulas - occurring between colon or rectum and other internal organ: stomach, duodenum, small bowel, another segment of colon, urinary bladder, uterus, vagina, urinary tract, an abscess, etc.

For perianal fistulas Park describes a classification relative to anal sphincter [1]:

- Simple fistulas: superficial (intersphincteric/transsphincteric) and low (below the dentate line), without signs of abscess formation or anorectal stricture.
- Complex fistulas: high intersphincteric/transsphincteric/-extrasphincteric/suprasphincteric; multiple openings with abscesses; rectovaginal fistula; anorectal stricture with rectal inflammation.

## **Etiology**

There are many etiologies for colorectal fistulas. Main categories are [2]:

### **1. Spontaneous fistulas.**

Spontaneous fistulas occur without any external factor (like trauma or medical maneuver). Usually it is caused by a disease like: inflammatory bowel diseases, tumors, diverticular disease, lymphomas, radiotherapy, abscesses, fecaloma (constipation), colo/rectum infarction, foreign bodies, etc.

Diverticular disease is a particular pathology leading to colonic fistula secondary to intraabdominal inflammation. The most frequent types of fistula secondary to diverticular disease are colovaginal fistulas in women and colovesical fistulas in men. In some cases it can lead to fistula formation after surgery for diverticular disease [2].

### **2. Traumatic fistulas**

Traumatic causes that can lead to colonic fistulas are wounds after stabbing, gunshots or blunt trauma.

### **3. Iatrogenic fistulas.**

These fistulas occur after a medical maneuver like: surgical anastomosis after a colon/rectal resection; endoscopy with or without biopsy/stenting/clipping/etc; enema; percutaneous abscess draining; radiotherapy.

Malignancy could be also a cause for colorectal fistulas after radiation therapy and especially if surgery follows radiation therapy.

The causes of fistulas are described by formula FRIEND: Foreign body; Radiation; Infection/Inflammation; Epithelialization; Neoplasia; Distal obstruction.

Colorectal fistulas occurring after surgical interventions are in most cases caused by inadequate sutures because of the following reasons: suturing the

anastomotic partners in tension, insufficient blood supply, affected walls especially by irradiation, infection or inflammation in the perianastomotic area [2].

Considering the risk factors, besides the general, common factors, there are different ones whether the leakage is extra- or intraperitoneal.

Major risk factors when discussing extraperitoneal leakage are:

1. the distance from the anal verge
2. obesity
3. the male sex
4. anastomotic ischemia

Some studies show that, considering colorectal surgeries, the risk is higher for anastomosis at 5 cm from the anal verge than ultra-low anastomoses (>2 cm from the anal verge) [3]. The male gender is more likely to develop anastomotic leakages mainly because of the narrower pelvis, which can lead to a more difficult exposure and therefore a challenging technique.

Major risk factors considering intraperitoneal anastomotic leak include:

1. American Society of Anesthesiologists (ASA) score Grade III to V
2. Prolonged operative time (> 4 hours) [4]
3. Emergent surgery
4. Hand-sewn ileocolic anastomosis [5]

## **Clinical Presentation**

The symptoms belongs either to colon or rectum, or other involved organs or both. There are also fistulas with few or none symptoms, which can be identified at imaging studies. In other cases the first symptom could be a complication like an abscess or peritonitis.

For internal fistulas there are various symptoms depending on the site and the partners involved:

1. Gastro-colic fistula: fecaloid vomits, diarrhea containing undigested food, weight loss, in some cases abdominal pain
2. Ileo-colic fistula: diarrhea, weight loss, in some cases abdominal pain
3. Colo/recto-vaginal fistula: gas and fecal content through the vagina
4. Colo/recto-vesical fistula: pneumaturia, fecaluria, recurrent urinary infection

If it is a postoperative fistula, insufficient drained externally, a peritonitis could threaten the patient's life. But in other externally drained colo/rectal fistulas the skin irritation is less intense than an enteral external fistula.

## **Differential Diagnosis**

Other diseases that can mimic the colo/rectal fistulas are: abscesses of the abdominal wall, perianal abscesses, infections of the surgical wound, intraabdominal abscesses, inflammatory bowel diseases, abdominal tumours, diverticular disease.

## **Workup**

### **Blood Tests**

Standard blood test including complete biochemistry should be assessed in order to evaluate the biologic status of the patient. Of special importance will be: urea, creatinine, albumin, total protein. Also the complete blood count could show leukocytosis or anemia.

### **Microbiology**

Samples for bacteriology should be taken from all apparent leaks: abscesses, vaginal secretion, wounds or fistula itself. Also urinalysis and uroculture in

cases with suspicion of colo/recto-vesical fistula will be sent to the lab. In patients with sepsis a hemoculture is important to check the bacteremia and also for antibiogram.

## **Histology**

In the suspicion of malignancy a biopsy can help for the diagnosis - this could be sampled either by colonoscopy or through fistula (in external fistulas).

## **Imaging Studies**

Colonic or rectal fistulas may also occur as complications of digestive anastomoses. Their diagnostic strategy may be different depending on their location. Thus, in colonic fistulas (or enterocolic anastomosis), we will prefer radiographic techniques with hyperdense contrast product administered in the form of an enema. Due to the risks of causing a chemical peritonitis we will use a water-soluble and not barium contrast product.

The direct sign will be to highlight the fistula with the hyperdense contrast product. Indirect signs will be a collection near anastomosis, the presence of extradigestive air in relation to the fistula (time after operative act) and the accumulation of the hyperdense contrast product at the collection level.

Besides information about the existence of a fistula, the techniques with hyperdense contrast product will also provide us information regarding the flow of such a fistula and the exact location of the fistula opening in the digestive wall.

We will also appreciate the permeability of anastomosis. Computer tomography may also provide additional information on the involvement of organs around the fistula in the pathological process. For example, a colo-vesical fistula will be difficult to detect by standard radiology, but CT will be easily appreciated. Computer tomography, apart from the actual visualization of the fistula tract, will also have indirect signs such as the presence of air and

enteral contents inside the bladder.

The rectal fistula is evaluated primarily by MRI. This is because it does not require transanal contrast (the examination is native, intravenous contrast is not required) and for excellent tissue resolution that makes MRI the choice technique in the diagnosis of male and female pelvic pains. A limitation of radiological or CT techniques in the diagnosis of rectal fistulas is that they may overlook any low rectal fistula - the contrast product is administered with a transanal introduced cannula and the contrast product may not reveal fistulous tracts whose opening orifice to the rectal wall is inferior to the end of the cannula. Also, freshly operated patients with low anastomosis are not advised to have a transanal cannula inserted or receive a contrast product under pressure (we risk worsening of a possible fistula). Finally, there are patients in whom transanal contrast delivery is impossible or unnecessary in evaluating a possible fistulous tract (patients with rectal amputation or patients with temporary protective colostomy), so only one virtual fistula could be seen in these cases).

The main MRI quality in rectal fistula evaluation is the excellent ability of this method to highlight the fluid. Fundamentals in examining fistulas are T2 high resolution (HR) and T2 fat suppression (the fat will also appear in hyperstimulation on T2 weights and, by suppressing it, we will have a much clearer definition of the fistula tract and eventual collections).

In addition to asserting the existence of the fistula tract, MRI will provide the following information: the location and sometimes the diameter of the fistulae in the rectal wall, the trajectory of the fistula (it is important for an adequate therapeutic management, the description of the fistula's relationship with the anal sphincters), communication between the fistula and possible collections/abscesses (also will give a very accurate description of their dimensions and relationships), the existence of a communication between the fistula tract and other organs (such as bladder or intestine).

As a recent application, MRI can also be used in the study of colic fistulas other than rectal. The accuracy in their characterization will be weaker for several reasons - HR sequences can not be performed throughout the abdomen; examination of the abdomen is much more dependent on the patient's collaboration comparing with the examination of the pelvis. Thus, abdominal examination without false images depends on the patient's ability to remain motionless and to work together in terms of breathing rate (short periods of apnea alternating with normal breathing as regular as possible). As these conditions are difficult to accomplish by an immediate postoperative patient, transrectal contrast-enhanced CT achieve better results in the colo-colic fistulas or entero-colic anastomosis.

### **Dye Administration**

For diagnosis of recto-vaginal fistulas blue-methyl could be instilled into rectum and a swab inserted in the vagina will be colored by the dye, thus confirming the presence of the fistula. Other dyes ingested by mouth or instilled by endoscopy could reveal de presence and the level of communication with the colon or rectal lumen.

### **Diagnostic Endoscopy**

Although there have been significant advances and improvements in modern colorectal surgery, colonic anastomotic leaks continue to be an important cause for postoperative morbidity and mortality. The usual treatment of choice in these cases has been the resection in healthy tissue of the colic segment of anastomosis and exteriorization of the stump as a terminal colostomy, but in most cases this leads to a permanent stoma.

Endoscopy is not so used as a diagnostic tool, but as a therapeutic approach.

## **Treatment**

The therapeutic methods used in the treatment of colic or rectal fistula are multiple and involve various medical specialties. First of all, prophylaxis should be mentioned to avoid the occurrence of these complications (especially for postoperative fistulae). Current methods used are conservative, endoscopic and surgical therapies.

### **Prophylaxia**

Prophylaxis for the colic or rectal fistula should be done in all cases where the risk of developing this complication appear. Thus, in cases of rectal resections where the anastomosis is done on irradiated tissues, in the case of low anastomoses or in cases with precarious anastomoses, a protective ileostomy / colostomy will be made to allow for the safe healing of anastomosis.

### **Conservative Treatment**

Conservative treatment can be used in cases where distal transit of anastomosis is not impeded, and the fistula is efficiently drained externally through drain tubes or fistulae without any undrained abscesses or septic condition. There are cases where some perianastomotic collections are drained through interventional radiology through the skin and thus transformed into external fistulas, thus allowing healing without surgery. Antibiotherapy will be used to avoid septic dissemination in the whole body.

### **Endoscopic Treatment**

Newer endoscopic techniques are being utilized to keep functional the colorectal anastomosis when an anastomotic leaks occurs.

Endoscopic stenting using fully covered self-expandable metal stents (FCSEMS) has been used successfully in small sized colonic anastomosis leaks that are not associated with severe sepsis. Stent placement allows for luminal

contents to be diverted from the breach and facilitate spontaneous closure and resolution of the breach, thus preventing extraluminal fluid accumulation and subsequent infection. This method's main disadvantages are that stents can only be deployed inside an end-to-end anastomosis and that they must be placed at a safe distance no less than 5 cm from the anal verge in order to avoid pain and fecal incontinence. Technical success reaches 100%, while clinical success lies between 80-100% in most case series [6-9]. Stents are kept in place for up to 2 months, with periodic reevaluation and removal once the anastomotic leak heals. Plastic stents can also be used, as well as biodegradable ones, which spontaneously resorb 11-12 weeks after placement [8]. One of the more frequent side effects in colorectal stents is migration. Fully covered stents migrate at a more frequent rate than partially covered ones. In these cases, endoscopic repositioning is needed, with optional clipping of the stent to the colonic mucosa to ensure its stay in place. Replacing the stent with a larger diameter one is also an option. Although partially covered stents migrate less frequently, stent removal is more difficult and more time consuming due to tissue in- and overgrowth.

Over-the-scope clips (OTSC) can also be used to endoscopically manage non-surgical perforations as well as postoperative anastomotic leaks. In a cohort of 34 patients, definitive closure of leaks was achieved in 76,5% of patients, with a decrease in hospital stay and cost [10]. In another report, an OTSC was successfully used via colonoscopy to close a gastrocolocutaneous fistula due to a buried bumper syndrome with transcolonic PEG tube migration [11].

OTSC as well as through-the-scope clips (TTSC) can be used to treat perforations following endoscopic resection or dilatation procedures. Rapid recognition and endoscopic intervention along with the use of carbon dioxide may limit the volume of extraluminal insufflation and the need for surgery, provided the bowel is clean and there is no peritoneal contamination with fecal residue at the time of the endoscopy. If the leak is 10 mm or smaller, TTSCs can

be used effectively, while OTSCs should be reserved for larger leaks, of 20 mm or more. For perforations between 10 and 20 mm, OTSCs or TTSCs can be used, depending on the endoscopist's experience and available devices at the time [12].

Having already proven its efficiency in managing esophageal leaks, endoscopic vacuum assisted closure (EVAC) seems to be a safe and effective technique in treating colorectal postsurgical leaks. A recent case series of 14 patients was published, with an overall success rate of 79% and a median time for complete healing of 40,5 days [13]. Similar to esophageal EVAC, the sponges have to be changed every 2-3 days, with progressively smaller sizes as the pericolonic cavity diminishes in size.

In a few case reports, where iatrogenic colonic perforations were either large or at a severe tangential angle, endoscopic band ligation was successfully performed using a gastroscope with an endoscopic band ligator [14, 15]. If technically possible, the omentum can be aspirated and interposed between the edges of the perforation, to act as a patch and favor healing.

## **Surgical Treatment**

For colo-colic or colorectal anastomotic fistula that cannot be resolved conservatively or endoscopically, or presents life-threatening complications for the patient (abscess, peritonitis, septic condition) should be resolved by surgery. The operative techniques currently used in these cases are: resection of anastomosis and re-anastomosis; excision of the anastomosis, closure of the distal stump and transformation into terminal colostomy; providing effective drainage and creating a protective ileostomy or colostomy upstream of anastomosis.

In the case of perianal fistulas, the operative techniques are: fistulotomy, fistulectomy, seton placement of silk string or rubber band (Silvestri technique), endorectal advancing flap, fistula plug (with collagen or glue) [2]. For the cases with perianal fistulas emerging from a rectal cancer the abdomino-perineal

resection will be indicated to remove all the lesions in one specimen.

In the case of rectovaginal fistula, endorectal or endovaginal progress flap associated with protective ileostomy / colostomy is used. Another method used is resolving the fistula by transabdominal surgery or the advancement flap.

In case of colo-vesical fistula, the resection of the affected colic segment and the primary anastomosis with the closure of the bladder defect are used, with the insertion of a urine catheter for a period of 2 weeks.

Fistulae occurring spontaneously (secondary to a colorectal / rectal tumor or diverticulitis) and externalized to the skin are treated by resection of the affected segment along with the fistulae and the affected cutaneous portion and the formation of a terminal colostomy, and eventual restoring of the digestive tract after few months.

## **Follow-up**

Surveillance of patients treated for colic or rectal fistula should primarily watch carefully for the risk of developing sepsis that should be treated quickly and effectively. Effective drainage of the content removed through the fistula and avoidance of obstacles distally to the anastomosis must also be ensured.

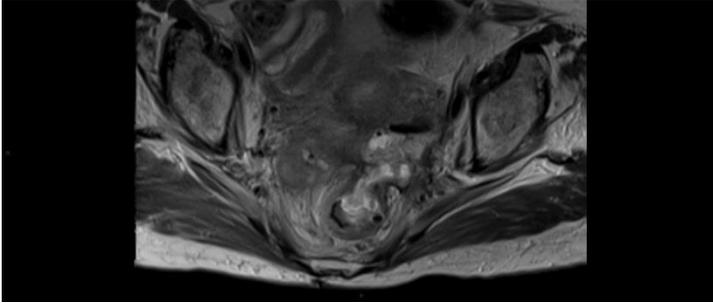
## **Conclusions**

Colic or rectal fistula is a difficult to treat complication that needs to be resolved by experienced surgeons in a specialized center with endowments in endoscopic, imagistic, surgical, intensive and nutritional therapy.

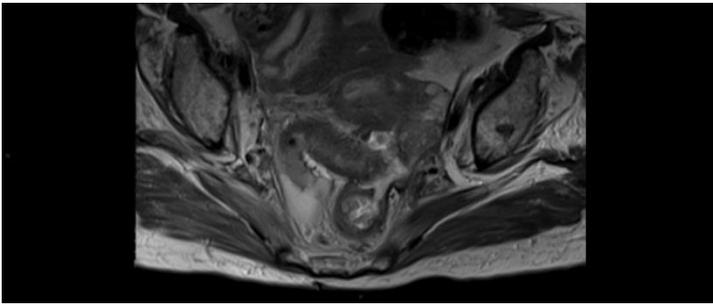
Due to the septic content of the colon and rectum, the internal fistula or the discharge of the contents into the peritoneal cavity can lead to septic complications much more frequently than in other types of digestive fistulas.

The prophylaxis of these fistulas must remain the first intention, and in the

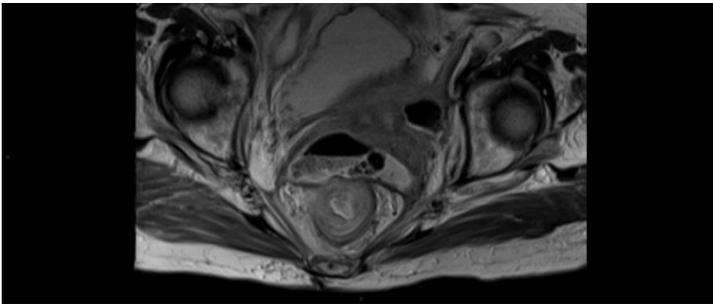
event of these complications, medical judgment must be well balanced between conservative and interventional stages.



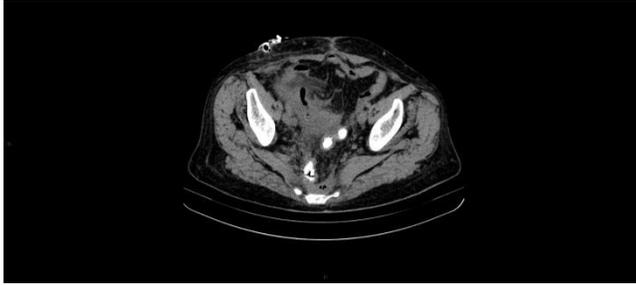
**Figure 1.** MRI appearance of an anastomosis fistula in the rectum. T2-weighted sequences. Large fistulous tract emerging from the rectal anastomosis. It communicates widely in the anterior aspect with the vagina.



**Figure 2.** MRI appearance of an anastomosis fistula in the rectum. T2-weighted sequences. Postoperative wide rectal fistula, situated between 1 o'clock and 2 o'clock. Fistula is located obliquely above and to the left. It shows an offshoot towards medial.



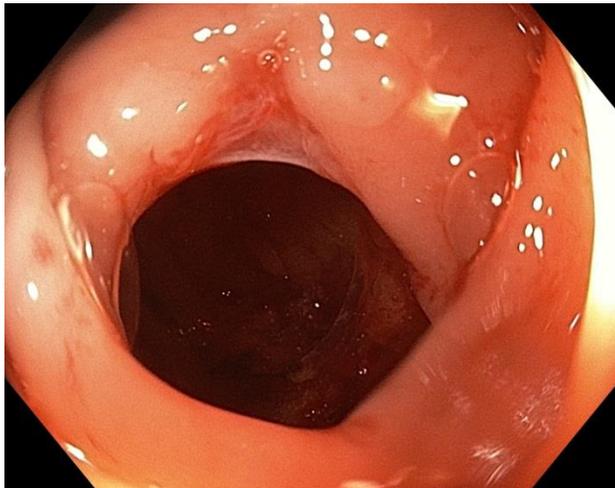
**Figure 3.** MRI appearance of an anastomosis fistula in the rectum. T2-weighted sequences. Voluminous abscess located anteriorly to the rectum, between it and the uterus, formed due to a fistula anastomosis.



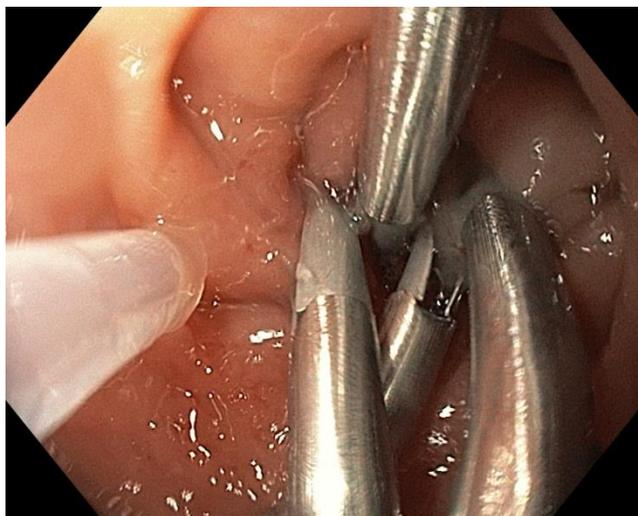
**Figure 4.** Collections developed due to fistula both pre-sacral (posterior of anastomosis) and anterior of digestive lumen.



**Figure 5.** Colorectal anastomosis fistula viewed as a fine air leakage path (shown by the arrow).



**Figure 6.** Iatrogenic perforation at the recto-sigmoid junction.



*Figure 7. Endoscopic through-the-scope clips used to close the perforation.*

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