

# Chapter 7

## Enteral Fistulas

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## Introduction

Enteric fistula is a communication between the gut lumen and another hollow organ (stomach, colon, bladder, vagina or the small intestine) or skin. Symptoms depend both on the enteral fistula and partner organ. This enteric fistula has a marked impact on the patient's condition and on follow-up, in some cases with unfavorable prognosis, with high morbidity and mortality. Also the hospitalization costs are increased and the socio-professional reintegration is impaired. Morbidity and mortality were much improved after the introduction of antibiotic therapy, parenteral nutrition, monitoring and imbalance corrections in ICU. However, the frequency of this pathology has remained high due to more complex surgery and advanced surgical diseases.

## Classification

The enteral fistulas can be split in two main categories:

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

Another classification divides the fistulas according to their flow amount:

1. small: <200 ml/zi
2. moderate: intre 200-500 ml/zi
3. high: >500 ml/zi

The fistulas also could be divided into:

1. primary - type I: caused by an disease of the intestinal bowel
2. secondary - type II: caused by an injury of the normal enteral wall

(iatrogenic or traumatic)

## **Etiology**

There are many etiologies for enteral fistulas, but the main categories are:

### 1. Spontaneous fistulas.

Spontaneous enteral fistulas may occur regardless any external factor (trauma or medical procedure). It is caused usually by a disease: inflammatory bowel diseases (ex: Crohn disease), tumors, diverticular disease, lymphomas, appendicitis, foreign bodies. Spontaneous fistulas occur in 15-25% of cases [1].

Fistulas occurring in the case of Crohn's disease is due to progression of aphthoid ulcers present in the small intestine in this pathology, which progresses through all layers of the intestinal wall and makes communication with the skin or another organ. In most cases the fistulas in Crohn's disease are internal. Also under this condition appear perianal fistulas; recurrence of a perianal fistulas should raise the suspicion of Crohn's disease.

Entero-vascular fistula - and in particular the aorto-enteric - occur most frequently due to the presence of arterial aneurysms or previous insertion of synthetic vascular prosthesis is manifested by digestive hemorrhage. These fistulas are manifested by hematochezia which can be fatal without surgical intervention. If detected in time the surgeon can attempt surgical cure but the results have a high mortality.

A number of enterocutaneous fistulas could be due to synthetic mesh inserted as replacement for the abdominal wall, especially when the intestines have not been protected from synthetic mesh by the peritoneal sac.

### 2. Traumatic fistulas

Causes of injury that can lead to enteric fistulas are: stab wounds (with weapons like knives or swords), gunshot wounds and crush wounds during accidents.

### 3. Iatrogenic fistulas

The enteral fistulas occur after a medical procedures like: surgical anastomosis after a jejunal/ileal resection; endoscopic exploration with or without any other therapy like biopsy/stenting/clipping/etc; draining of a percutaneous abscess. The most enteral fistulas occur as a complication of surgery (75-85%) [1].

The etiologies of fistulas are described by mnemonic FRIEND: Foreign body; Radiation; Infection/Inflammation (Tuberculosis, Crohn disease); Epithelialization; Neoplasia; Distal obstruction.

Enteric fistula occurring after surgery is most likely due to an inappropriate suture, a previously unnoticed intraoperative injury (eg. cautery injury), etc. Causes of inadequate sutures are tension in the suture, compromised blood supply of anastomosis partners, anastomosis of the intestines with affected walls, perianastomotic abscess or peritonitis [1].

## Clinical Presentation

Usually the symptoms belongs either to small bowel and the skin (in external fistulas) or to small bowel and another organ (in internal fistulas). Also some symptoms could depend on how much gut is by-passed. Some internal fistulas could be asymptomatic, the diagnosis being incidental during imaging studies or surgery [1, 2].

Internal fistulas may present with following symptoms depending the partners of the fistula:

1. for gastro-intestinal fistula: vomits with enteral content, diarrhea with undigested food, abdominal pain and weight loss
2. for ileo-colic fistula: weight loss, diarrhea , abdominal pain
3. for entero-vesical fistula and colo-vesical fistula: recurrent urinary

infections; pneumaturia; fecaluria

4. for entero-vascular fistulas (usually after vascular prosthesis insertion or arterial aneurysm): massive hematochezia

External enteral fistulas are manifested by the triad: malnutrition, fluid and electrolyte imbalance and sepsis associated to enteral loss through the skin defect [1, 3].

## **Differential Diagnosis**

Differential diagnosis should be made with the following diseases: parietal abscesses, surgical wound infection, intraabdominal abscesses (including those after acute appendicitis), IBD, posttraumatic wounds, aortic aneurism, abdominal tumors, diverticulitis, peptic ulcer perforation

## **Workup**

### **Blood Tests**

Complete biochemistry of the blood including creatinine, urea, albumin, and electrolytes should be obtained in order to evaluate the presence of electrolyte and hydric imbalance, nutritional status and organ failure (especially in high-output fistulas and septic patients). The same with complete blood count which will show an eventual anemia and leukocytosis.

### **Microbiology**

Microbiologic samples should be taken from all abscesses, wounds, blood, especially in septic patients. From the fistula itself the culture will not bring much information.

In cases with suspicion or confirmation of entero-vesical fistula urinalysis or uroculture should be obtained in order to direct the specific antibiotherapy.

The same in cases with entero-vaginal fistulas, a vaginal secretion will be sent to microbiologic assessment and antibiogram.

## **Histology**

In cases with fistulas secondary to malignancy, the histology could show the presence of malignancy either by endoscopy or by direct biopsy (in external fistulas). Also in the cases with fistulas secondary to Crohn disease, the presence of typical aspects will confirm the diseases.

## **Dye Administration**

Dye administration could certify the presence of fistula, but for enteral fistulas many dyes could be absorbed. In some cases of external fistulas charcoal, Congo red or poppy seeds could confirm the external fistula in case of doubt.

In internal fistulas only the imaging studies with contrast could show the fistula.

## **Diagnostic Endoscopy**

Most enteral leaks (75-85%) usually occur after abdominal surgery. Few cases result from endoscopic procedures, like endoscopic mucosal resections (EMR) or endoscopic submucosal dissections (ESD). In some cases endoscopic closure should be attempted [4]. Enteroscopic therapeutic techniques are at beginning at the date.

In cases with entero-vesical fistula a cystoscopy could show the affected portion of the bladder.

## **Imaging Studies**

Unlike gastric fistulas, imaging techniques have a limited role in view fistulas of the small intestine.

By computer tomography, for example, hyperdense contrast product administered orally will take a long time to reach enteral fistula. Thus it arrives at the anastomosis diluted and in small quantities. It is noteworthy that patients with digestive or the early postoperative fistula are often in dynamic ileus and so progression contrast product will be much slowed.

So we have to rely on indirect signs such as the presence of extradigestive air collections near the anastomosis. The increase in volume of a collection associated with impaired general condition and lack of appetite indicates that the fistula is active.

Also other indirect signs may occur in Crohn's disease like area of inflammation in the perifistulous zone. In other cases abscesses or tumors can be identified. For entero-vascular fistulas, CT angiography can provide useful preoperative information if the patient is hemodynamically stable.

Entero-clysis or entero-enema can, in turn, be used to highlight an enteral fistula. This technique has also certain technical difficulties that make it difficult to use. So we will have to use water-soluble contrast because the use of barium can lead to chemical peritonitis. But soluble contrast product has a much higher tendency to dilute with the digestive tract secretions and thus the fistula will be harder to spot than a barium examination.

Fistulography can bring useful information especially when other diagnostic methods have failed. This is achieved by injection of contrast through fistulous path. This highlights the enteral segment affected, the presence of an abscess on fistula path, or other relevant issues.

In the case of entero-vesical fistulas cystography or CT-cystography can be used, and in the case of entero-vascular fistula, angiography will be used for the diagnosis.

## Treatment

Enteral fistula treatment is complex, in many cases requiring besides surgery, supportive hydro-electrolytic, nutritional and metabolic rebalancing. A number of interventional endoscopic and imaging methods developed recently decreased the number of surgeries needed as well as morbidity and mortality in the treatment of this condition.

An important factor especially for external fistulas is the management of skin area where the fistula is localized, skin protection is required against irritant enteral, bile and pancreatic juice and capture them effectively in dedicated stoma bags.

Some enteric fistulas can be closed spontaneously depending on their location and applied treatment. Essential factors that can promote spontaneous closure of an enteral fistula are: absence of distal obstacle, a long trajectory from the enteral lumen to the cutaneous orifice, low flow, the absence of foreign bodies, the absence of infection / inflammation, of active neoplasia and irradiated tissues.

An important factor that prevents the closure of an enteral fistula is the prolapsing of enteral mucosae beyond the enteral wall, thus keeping open the fistulous opening.

Most fistulas which closes spontaneously resolve within the first month, and if evolves more than three months, they will no longer close.

## Conservative Treatment

Conservative treatment consists in balancing the hydro-electrolytic and metabolic status of the patients with enteric fistula, especially patients with high output fistulas. At these patients the biological constants correction is dynamic depending on the loss of fluids and electrolytes which are monitored daily. These patients are best treated in intensive care units. Nutritional support is achieved both by the enteral route when possible, as well as parenteral high

protein solutions, electrolytes, lipids, etc. In patients with low rate fistulas (<200 ml / day) the protein intake should represent about 1-1.5g / kg / day and lipid intake approximately 30% of total calories. In contrast, to the high flow rate fistulas (>500 ml / day) should achieve energy intake of 1.5-2 x of basal requirement with the protein to reach a quantity of 1.5-2.5 g / kg / day, and the lipids 3 times higher of recommended daily dose.

Ocreotide (Sandostatin) is an inhibitor of secretion of growth hormone and other hormones of the gastrointestinal tract (gastrin, vasointestinal polypeptide, secretin, motilin, cholecystokinin) and his administration has the effect of decreasing gastric, duodenal, pancreatic secretion, motility of smooth muscle and intestinal blood flow. But its administration use for an enteric fistula is still debated in the literature.

In Crohn's disease complicated with enteral fistula administration of azathioprine has increased the rate of closing fistulas. Azathioprine is an antimetabolite that inhibit the immune system and reduce inflammation. The treatment of infliximab (monoclonal antibody) resulted in increasing the rate of enteric fistula closure in patients with Crohn's disease and reduced the number of relapses.

## **Surgical Treatment**

The surgery for enteric fistula will be delayed several months to correct fluid and hydro-electrolytic and metabolic deficits, and for wound healing in case of postoperative fistulas. This can only be achieved if there are no intraabdominal infection (abscesses, peritonitis) which complicate the patient's condition. Also delaying surgical reintervention is indicated to improve visceral adherence syndrome.

The proposed surgery resides in lysis of adhesions, excision of the enteral segment or involved organs in the creation of fistula and restoring the digestive

tract by anastomosis in healthy tissue area. If the presence of perifistulous abscesses are detected or if the anastomosis cannot be done in maximum safety, the surgeon can opt for a serial intervention to form a stoma and reconstruction in the second time. This algorithm can also be used in patients with malignancies or irradiation.

If entero-vesical / entero-vaginal fistula is present, an enteral segmental resection of affected portion with primary anastomosis and suture of the wall of the organ involved in fistula (for bladder a urinary catheter is placed for a period of 2 weeks).

Aorto-enteric fistulas if treatment is excision of both affected segments, extra-anatomical by-pass or endovascular prostheses.

## **Complications**

Complications that can occur during the treatment of the enteral fistula are: malnutrition, dehydration, damage and irritation of the skin, sepsis, and in case of surgical procedures can occur intraabdominal complications as: abscesses, anastomosis dehiscence, peritonitis, sepsis, bleeding, injury of the neighboring organs. It is necessary to achieve enteral fistula treatment in a specialized center, supported by intensive and experienced surgeon.

## **Follow-up**

In patients with Crohn's disease after solving the fistula, continuation of the specific treatment is mandatory for disease stabilization and to avoid relapse.

## **Conclusions**

Enteral fistulas have a very polymorphic etiology as well as many methods of treatment suggesting that there is no a single ideal method. The evolving techniques of endoscopy, imaging, surgery and intensive care brought a

significant improvement in the prognosis, morbidity and mortality of this multifactorial pathology. The treatment of an enteral fistula is very complex therefore it is better to prevent rather than treat such pathology.



**Figure 1.** Postoperative enteral fistula - probe into the fistulous orifice.

## References

- [1] Stein, D., et al., *Intestinal Fistulas*. 2014, [www.medscape.com](http://www.medscape.com).
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