

Gastrointestinal hemorrhage caused by secondary aorto-duodenal fistula: a case report

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Abstract. – Aortic graft-enteric fistula is a life-threatening complication of aortic reconstruction surgery. It is a rare condition but its frequency is rising because of an increase of patients who underwent to aortic aneurysm repairs with prosthetic implants.

We report a case of a 72 years-old man with a secondary aorto-duodenal fistula. The man presented haematochezia and mild normocytic anaemia; the patient had undergone an aortic-bifemoral bypass 8 years earlier because of subrenal abdominal aortic aneurysm. An urgent upper endoscopy showed the aortic graft crossing the third segment of the eroded duodenal wall with no signs of bleeding from the prosthesis. He underwent an emergent operation to repair the graft-enteric fistula, to have the partial removal of the graft, as well as an aneurysmectomy and implantation of new endoaortic graft. The post-operative course was uneventful and the patient was discharged two weeks after the operation. He received a regular follow up.

A secondary aorto-duodenal fistula is rarely diagnosed in an early phase as a herald haemorrhage. A precocious identification of this condition is thus essential to refer the patient to an urgent operation and to reduce the associated mortality.

Key Words:

Aorto-duodenal fistula, Aortic prosthesis.

Introduction

Case Report

A 72 years-old man was hospitalized because of haematochezia and evidence of mild normo-

cytic anaemia from a full blood examination. Two months before he had received a right hemicolectomy because of a caecum adenocarcinoma. He had also undergone an aortic-bifemoral bypass 8 years before because of subrenal abdominal aortic aneurysm with a thrombus in the right external iliac artery extended to the right common femoral artery. During the operation, an aortic-bifemoral Dacron graft was placed while the abdominal aneurysm was left in situ.

The upper endoscopy performed two months before the admission was normal and a staging intravenous contrast-enhanced CT had shown no graft's complication, but the tight contact between the graft and the distal duodenum was already evident (Figure 1).

At the admission, an urgent upper endoscopy showed the aortic graft crossing the third segment of the eroded duodenal wall, with no signs of bleeding from the prosthesis (Figure 2).

The patient underwent an emergent operation to repair the graft-enteric fistula, to have the partial removal of the graft, as well as an aneurysmectomy and implantation of new endoaortic graft. During the operation, a hole of approximately 3 cm (Figures 3 and 4) was found in the posterior segment of the third portion of the duodenum, through which the vascular graft was protruding (aorto-duodenal fistula, ADF).

Before the removal of the graft, the duodenal fistula was closed in two layers and with an omental patch (Figure 5). The culture of the resected vascular graft grew *Enterobacter aerogenes*, *Klebsiella pneumoniae spp pneumoniae* and *Candida species*. The post-operative course was uneventful and the patient was discharged two weeks after the operation. He received a regular follow up.



Figure 1. Intravenous contrast-enhanced TC image showing thrombized aortic abdominal aneurysm (*black thick arrow*) pushing the prosthesis (*black thin arrow*) on the third portion of the duodenum (*white thick arrow*). Air bubble probably caused by aerobic pathogens within the prosthetic's wall (*white thin arrow*).

Discussion

Aortic graft-enteric fistula (AEF) is a rare but life-threatening complication of aortic reconstruction surgery¹. As it is well-known, AEFs can be classified as *primary*, due to a spontaneous communication between the lumen of an aortic



Figure 2. EGDs showing the aortic prosthesis crossing the third segment of the duodenal wall.



Figure 3. Isolated prosthesis in the context of eroded duodenal wall during laparotomy.

aneurysm and intestinal loop, and *secondary*, due to surgical repair of aneurysms with prosthetic implants.

Secondary AEFs can be also subdivided into *direct* – direct communication between bowel lumen and graft; *indirect* – communication between bowel wall and a proximal pseudoaneurysm of the prosthesis; *paraprosthesis* – when a prosthesis erodes and replaces the bowel wall without a direct connection to aortic lumen².

The frequency ranges from 0.17% after elective resection of an aortic aneurysm and 0.2% after elective aortic reconstruction for occlusive disease to 1.7% after emergency surgical treatment³.



Figure 4. The black arrow shows the hole of about 3 cm in the third duodenal portion.



Figure 5. The duodenal fistula closed in two layers.

The time interval between the initial operation and the development of a fistula varies from two days to more than 14 years⁴. The associated AEF mortality is high, ranging from 35% to 85% in patients who have undergone an operation. The mortality is very high in patients who are unfit for surgery, approaching 100%⁵.

The most common site for graft-enteric fistulas is the duodenum (80%), especially between the third and fourth part (60%) because of their proximity to the aorta. Fistulas between the graft and the jejunum or ileum are uncommon (13%), while communications with the stomach, colon and the rectum are rare. For what concerns the pathogenesis of secondary AEF, mechanical trauma or infections of the graft are considered to be the principal causative agents⁵⁻⁷.

The classical clinical presentation is characterized by an initial, subtle and relatively mild episode of GI bleeding, the herald haemorrhage. During this early stage, intermittent melena, haematochezia or occult blood loss could occur; the erosion of an enteric bowel segment – due to the graft penetration – is the primary cause of the bleeding. Sometimes (30-40%) an abdominal or back pain associated with fever or sepsis is present, because of the graft's infection. An inflammatory mass or abscess can be infrequently generated⁸.

As for the following stage, if the graft wall is eroded by biliary and pancreatic secretions, a catastrophic bleeding – with its consequences – could occur. An episode of intestinal obstruction rarely characterizes the second stage⁹.

Clinical suspicion in a patient with an history of aortic reconstructive surgery is the most important key point to achieve diagnosis in presence of a massive bleeding: it guides to an emergent and lifesaving operation.

The endoscopic procedure, mainly an upper endoscopy until the third/fourth duodenum, is the best diagnostic option to demonstrate the fistula and rule out other possible causes of GI bleeding. The efficacy and accuracy of endoscopic diagnosis range between 25% and 73%⁵, with an improvement of diagnostic accuracy if the endoscopic examination is performed to the fourth portion of the duodenum.

An enteroscopy (push-enteroscopy or double-balloon enteroscopy) may be dangerous, and if the clinical suspect is strong, it should not be performed. Endoscopic findings include active arterial bleeding, fistulous opening or a pulsatile structure in the bowel wall or crossing the lumen¹⁰. Endoscopic procedures must be performed with a surgical backup because of the risk of dislodging a clot from the fistula.

Oral and intravenous contrast-enhanced CT or MRI can help to identify and to classify the fistula, to assess vascular anatomy and to plan vascular reconstruction successively¹¹. The combination of endoscopic procedures and another imaging modality improves the diagnostic accuracy¹⁰. When the diagnosis is still uncertain, laparotomy should be considered.

Because of the high morbidity and mortality associated with non-treated secondary AEF, surgery is always recommended. Several surgical vascular replacement procedures, associated with suture of duodenum, are possible. However, the morbidity (limb loss: 10%-40%) and mortality related to treated secondary aortoenteric fistula are also high (75%), and require preventive measures associated to a delicate surgery including large spectrum antibiotic therapy and intensive care unit hospitalization^{12,13}.

In conclusion, our case report shows the typical early clinical presentation of upper GI bleeding from a secondary paraprosthetic aorto-duodenal fistula (ADF).

We suppose that the pathogenetic mechanism causing the fistula in our patient is both a mechanical trauma and an infective process of the prosthesis. The first is linked to the pulsation of the prosthesis and to the enlargement of the thrombized aortic abdominal aneurysm, pushing the prosthesis on the duodenum third portion. The second is revealed at the CT sequences by a visible air bubble

probably caused by aerobic pathogens within the prosthetic wall (see Figure 1).

A secondary ADF is rarely diagnosed in an early phase as an herald hemorrhage, so a precocious identification of this condition improves the survival.

AEF is a rare complication of the aortic abdominal surgery. It must be suspected whenever a patient with aortic prosthesis has got digestive bleeding or unexplained obstructive syndrome. A quick identification of this condition is essential to refer the patient to an emergent operation with a significant reduction of the associated mortality.

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