

Aortoenteric fistulae and their multidisciplinary approach

Fístula aortoentérica y su manejo multidisciplinario

Haydée Calvo-García^{1*}, John H. Herrera-Kok¹, Antonio Álvarez-Martínez¹, Silvia Maqueda-Ara², José M. Ortega-Martín², Tomás Elosua-González¹, and María V. Diago-Santamaría¹

¹Servicio de Cirugía General y del Aparato Digestivo; ²Servicio de Angiología y Cirugía Vascular. Complejo Asistencial Universitario de León, León, España

Abstract

Aortoenteric fistula is an uncommon life-threatening condition which remains associated with significant morbidity and mortality. It can be primary (aneurysm, neoplasms, radiation therapy, infection) or secondary to vascular prosthesis. Early diagnosis and aggressive surgical treatment are very important to achieve optimal outcomes in these patients. The aim of this article is to highlight the importance of early diagnosis and multidisciplinary approach of aortoenteric fistula through the presentation of a clinical case.

Keywords: Aortoenteric fistula. Enteroparaprosthetic fistula. Vascular prosthesis. Gastrointestinal bleeding. Sepsis.

Resumen

La fístula aortoentérica es una patología poco frecuente, pero de riesgo vital, asociada a alta morbimortalidad. Puede ser primaria (aneurisma, neoplasia, radioterapia, infección) o secundaria a prótesis vascular. El diagnóstico precoz y el tratamiento quirúrgico agresivo son los pilares fundamentales para lograr buenos resultados en estos pacientes. El objetivo de este trabajo es destacar la importancia del diagnóstico precoz de la fístula aortoentérica y su manejo multidisciplinario, mediante la presentación de un caso clínico.

Palabras clave: Fístula aortoentérica. Fístula enteroparaprotésica. Prótesis vascular. Hemorragia digestiva. Sepsis.

Introduction

Aortoenteric fistula (AEF) is a rare but life-threatening condition characterized by an abnormal connection between the aorta and the GI tract. It can be primary if it arises de novo due to compression from an aneurysm, a neoplasm, previous radiation therapy, or infection, resulting from mechanical or inflammatory factors,

or it can be due to vascular device implantation after an aortic reconstructive procedure.

Secondary fistula can present in 2 forms: as an anastomotic communication between the aortic lumen and the intestine (true enteroprosthetic fistula), and less frequently as aortoenteric erosion (enteroparaprosthetic fistula) due to direct contact between the vascular device and the intestine.

*Correspondence:

Haydée Calvo-García

E-mail: hcalvog@saludcastillayleon.es

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The objective of this study is to emphasize the importance of the early diagnosis of AEF and its multidisciplinary management.

Case report

This is the case of an 80-year-old woman with a past medical history of hypertension, smoking, stage IIIb chronic kidney disease, who underwent aortobifemoral bypass surgery and subsequent femoro-femoral bypass due to right graft branch thrombosis, who presented with sepsis of probable abdominal origin, anemia, and lower back pain.

The esophagogastroduodenoscopy performed due to GI bleeding (Fig. 1) revealed the presence of a foreign body consistent with a partially emergent device from the duodenal lumen with adherent clots, but without active bleeding. The coronary computed tomography angiography (CCTA) (Fig. 2) confirmed the decubitus ulceration of the duodenal wall due to the prosthetic material of the aortobifemoral bypass, probable hematoma, or infectious process in the right psoas, and right ureterohydronephrosis.

With a diagnosis of enteroparaprosthetic fistula, surgical intervention was scheduled (Figs. 3-5), involving left axillofemoral bypass, section of the infrarenal aorta, suturing of the proximal stump, and ligation of the device left branch. During the procedure, perforation of the posterior side of the third-fourth portion of the duodenum due to intrusion of the aortic prosthesis was reported; Cattell-Braasch maneuver, duodenal section, pyloric exclusion, and Roux-en-Y reconstruction were performed.

The patient experienced a postoperative complication (Clavien-Dindo IIIa) in the form of an abdominal collection, which was resolved with percutaneous drainage and antibiotic therapy. She was eventually discharged 29 days after surgery.

Discussion

Concept

AEF is an uncommon but highly morbid and mortal condition¹⁻³. It is defined as an abnormal connection between the aorta and the GI tract, being the duodenum the most frequent location. There are 2 types: primary and secondary. The former occurs de novo as a result of compression of an abdominal aortic aneurysm (AAA) against the intestine, with mechanical, inflammatory, and infectious factors being involved in its pathophysiology⁴⁻⁶. The latter, more common,

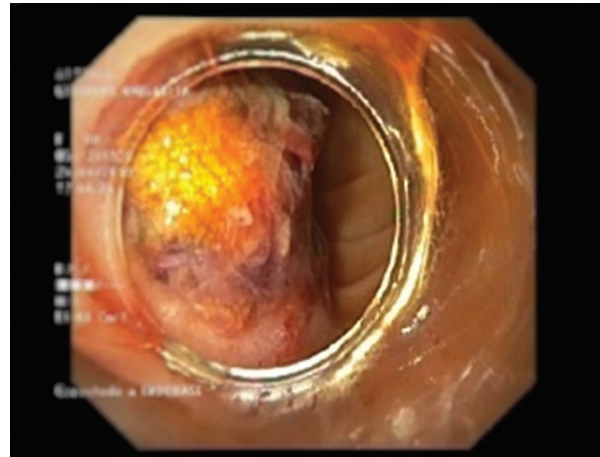


Figure 1. Gastroscope: yellowish material consistent with a prosthesis emerging into the lumen in the 3rd portion of the duodenum.



Figure 2. Coronary computed tomography angiography, coronal section, showing contrast extravasation from the aortic lumen to the duodenum (arrow).

results from surgical reconstruction^{7,8}, through erosion of aortic prosthetic material onto the adjacent intestine, which can also occur in endovascular procedures^{9,10}.

AAA is the most important risk factor for developing AEF, either as a cause of primary fistula or as subsequent repair leading to secondary fistula¹¹. Fistulas are more common in men, parallel to the incidence of AAA and aortic surgery.

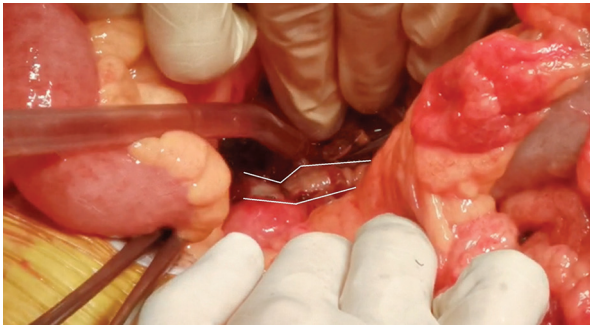


Figure 3. Surgical intervention: aortobifemoral prosthesis intimately adhered to the duodenum (white contour).

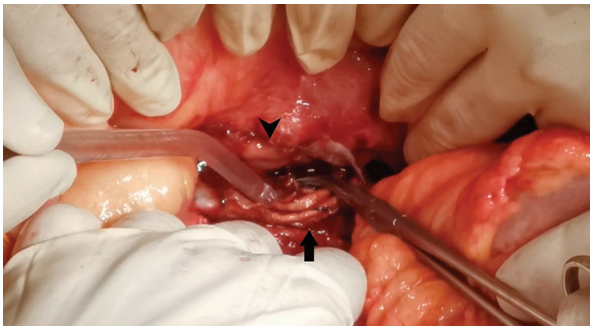


Figure 4. Surgical intervention: duodenal mucosa (arrowhead) and aortobifemoral prosthesis (arrow).

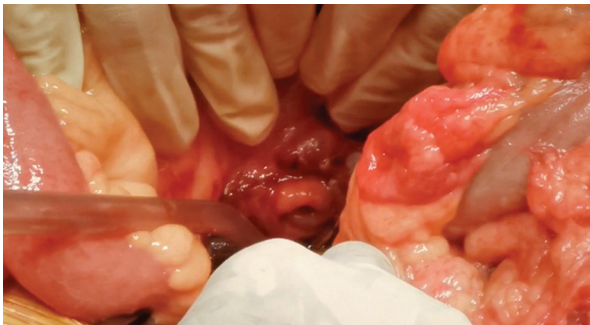


Figure 5. Surgical intervention: duodenal mucosa after release of adhesions to the aortobifemoral prosthesis.

Clinical signs

The most common clinical presentation of AEF is GI bleeding¹² in patients with known or unknown AAA, or previous vascular surgery. GI bleeding can vary in severity due to rupture of the aorta into an intimately adhered portion of the intestine, leading to rapid exsanguination of the patient. Other signs include discomfort, weight loss, sepsis, graft thrombosis with lower limb ischemia, or nonspecific symptoms.

Diagnosis

The classic triad described consists of bleeding, abdominal pain, and palpable mass. However, in practice, diagnosis requires a high clinical suspicion and is often delayed, especially if the aneurysm is unknown, the etiology is different (e.g., aortitis), or idiopathic.

Hemodynamically unstable patients with massive hemorrhage and a known AAA (whether repaired or not) should be taken directly to the operating room for bleeding control and surgical repair. In case of suspected AAA due to risk factors, an emergency ultrasound is required to identify it, although it may not reveal the fistula.

Hemodynamically stable patients with acute GI bleeding generally require gastroscopy, although its sensitivity rate for diagnosing fistulas is only 50%¹³. Therefore, in cases of high suspicion, a CCTA should be performed, and if the CCTA turns out negative, gastroscopy should be considered to visualize the distal duodenum. Thrombus and impacted prosthetic material in this location should not be removed initially¹⁴.

In patients with suspected GI bleeding and possible AEF, a CT scan is advised as a non-invasive imaging modality of choice^{15,16}, although radiological characteristics of the fistula and peri-graft infection may be difficult to differentiate and require additional supplementary studies. Specific radiological findings on the CT suggesting the presence of AEF include ectopic gas adjacent to or within the aorta, focal thickening of the intestinal wall, aortic wall discontinuity, and contrast extravasation into the intestinal lumen^{17,18}. Any tomographic feature of peri-graft infection should raise the possibility of a secondary fistula.

Treatment

Treatment includes initial resuscitation and hemodynamic support, antibiotic therapy, and aortic repair, considering removal of prosthetic material if present. The type and timing of repair should be individualized, while considering the clinical presentation (severity of bleeding or infection), type of fistula (primary or secondary), patient comorbidities, aortic anatomy, etc. Therapeutic options include open and endovascular repair.

Open surgical management includes vascular control, debridement of necrotic and infected tissue

(intestine and aorta), restoration of GI continuity, and revascularization (local repair, in-situ reconstruction, extra-anatomic, etc.)¹⁹.

Endovascular methods, either alone or in combination with open repair, include aortic balloon occlusion²⁰, endovascular coiling²¹, endovascular plug²², fibrin glue²³, and stent graft repair²⁴. These techniques are often performed as temporary measures for hemorrhage control and provide a window period to resuscitate the patient and plan definitive treatment²⁵. In some cases, endovascular procedures can be used as palliative therapy for high surgical risk patients²⁶. In the presence of systemic infection, standalone endovascular repair leads to recurrent infection²⁷⁻²⁹.

Conclusions

AEF is an uncommon condition associated with high morbidity and mortality. Prognosis depends on the speed of diagnosis, patient baseline status, level of infection, and affected aortic portion.³⁰ Therefore, early diagnosis and aggressive surgical treatment are fundamental pillars to achieve good outcomes in patients with this condition.

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Conflicts of interest

None declared.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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