



Case Report

Primary aortoduodenal fistula repair with a bovine pericardial patch and *Streptococcus equi* isolation

Reparación de fístula aortoduodenal primaria con parche de pericardio bovino y aislamiento de *Streptococcus equi*

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Abstract

Introduction: aortoenteric fistulas are rare complications of abdominal aortic aneurysms. They are classified as primary or secondary, the latter being associated with previous open or endovascular procedures, while primary fistulas result from erosion into the intestinal wall. In untreated patients, mortality reaches 100%, and ranges between 30% and 40% in those who undergo surgical intervention. The standard treatment consists of open surgical repair combined with broad-spectrum antibiotic therapy.

Case report: we present the case of a 70-year-old male patient with no comorbidities, admitted for upper gastrointestinal bleeding, who was diagnosed with a primary aortoduodenal fistula. He was successfully treated with a bovine pericardial patch xenograft and targeted antibiotic therapy.

Discussion: it is important to consider the type of graft used for aortic repair, as vascular graft infection significantly increases morbidity and mortality. Allografts are a recommended option in infected patients; however, they are difficult to obtain and have limited durability. Therefore, the use of xenografts, such as bovine pericardial patches, are advised due to their resistance to infection, accessibility, and long-term durability. Bovine pericardial patches are a suitable graft option for the repair of primary aortoenteric fistulas due to their safety in infected patients, durability, and properties.

Keywords:

Aortoenteric fistula. Abdominal aortic aneurysm. Gastrointestinal hemorrhage. Xenograft.

Resumen

Introducción: las fístulas aortoentéricas son complicaciones poco comunes de los aneurismas de la aorta abdominal. Se clasifican entre primarias y secundarias; estas últimas, asociadas a procedimientos endovasculares o abiertos previos, mientras las primarias se deben a la erosión de la pared intestinal. En pacientes que no reciben tratamiento la mortalidad alcanza el 100 %, y entre el 30 y el 40 % en aquellos que logran recibir tratamiento quirúrgico. El tratamiento estándar es la reparación por vía abierta y antibióticoterapia de amplio espectro.

Caso clínico: se presenta el caso de un paciente de 70 años, sin comorbilidades, que ingresa por hemorragia de las vías digestivas altas, diagnosticado con fístula aortoduodenal primaria, manejada con un xenoinjerto de parche de pericardio bovino y antibiótico dirigido.

Discusión: debe tenerse en cuenta el tipo de injerto para la corrección de aorta, ya que la infección del injerto vascular aumenta la morbimortalidad. Los aloinjertos son los más recomendados en pacientes infectados, pero son difíciles de conseguir y tienen menor durabilidad, por lo que se recomienda el uso de los xenoinjertos, como el parche de pericardio bovino, que es resistente a infecciones, accesible y duradero. El parche de pericardio bovino es un injerto adecuado para la reparación de fístulas aortoentéricas primarias debido a su seguridad en pacientes infectados, a su durabilidad y al material con el que está hecho.

Palabras clave:

Fístula aortoentérica. Aneurisma de aorta abdominal. Hemorragia gastrointestinal. Xenoinjerto.

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INTRODUCTION

Aortoenteric fistula is a rare and potentially lethal complication of abdominal aortic aneurysms (1). Aortoenteric fistulas are categorized into primary and secondary. The former has an incidence rate of 0.007 cases per million patients, with only 25 cases being reported until 2021 (2). The latter is more prevalent and usually occur in patients with a past medical history of abdominal aortic aneurysm endovascular or open repair (2).

This disease mainly shows as upper GI bleeding, which can be mild or massive, and lead to a fatal outcome. It can also present as septicemia due to the translocation of organisms from the GI tract to the aorta, causing aortitis-like pain (2). Patients present signs or symptoms such as pain and a pulsatile mass on palpation.

In this article, we present the case of a man with primary aortoenteric fistula causing septicemia and bleeding, which was later corrected by open surgery with a bovine pericardial patch followed by antibiotic treatment based on the culture of the aortic wall.

CASE REPORT

A 70-year-old man with a past medical history of benign prostatic hyperplasia and inguinal herniorrhaphy admitted due to hematemesis and syncope. Upon admission, the patient was hypotensive (85/60 mmHg) and anemic (hemoglobin 9.9 g/dL), with an adequate response to fluids and transfusion. The esophagogastroduodenoscopy (EGD) revealed the presence of an extrinsic pulsatile compression between the 2nd and 3rd duodenal portions, with an adhered clot. Afterwards, we performed a coronary computed tomography angiography (CCTA).

The CCTA revealed the presence of a 31 mm × 44 mm × 43 mm irregular saccular aneurysm at the origin of the inferior mesenteric artery that compromised the lumen of the infrarenal abdominal aorta, and came into contact with the 3rd portion of the duodenum (Fig. 1).

The vascular surgery service recommended open surgery to correct the aneurysm and close the fistula. A bovine pericardial patch was chosen due to the risk of infection by enteric organisms, which reduces the risk of infection and graft erosion (3).

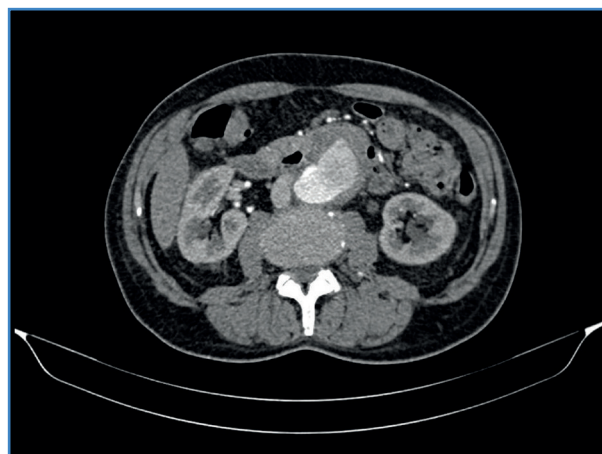


Figure 1. Abdominal CCTA with a 31 mm × 44 mm × 43 mm aneurysm.

During surgery, an aortoenteric fistula was found between the aneurysm and the 3rd/4th portion of the duodenum, along with a juxtarenal infectious aneurysm with aortic walls friability. Reconstruction was performed with a No. 2 9 × 14 bovine pericardium patch, using 5-0 vascular polypropylene suture.

After opening the aneurysm, abundant bleeding was evidenced. The lumbar arteries and the inferior mesenteric artery were occluded with 3-0 vascular polypropylene, remodeling the aortic neck until healthy tissue was found. Termino-terminal anastomoses were performed with the bovine pericardium patch, and the infected aortic segment was resected for microbiological studies.

Finally, the duodenal defect of approximately 4 cm was closed with an inverting suture, and a pedicled omental patch was implanted, which eventually closed the retroperitoneum.

After surgery, the patient remained at the ICU on invasive mechanical ventilation and vasopressor support. Antibiotic treatment with meropenem and vancomycin was started. The patient was extubated 48 hours later and transferred to general hospitalization 4 days later. He resumed oral intake on day 5 without complications (Fig. 2).

Microbiological culture

A sample of the affected aortic wall was taken, and *Streptococcus equi*, a rare microorganism in humans, was isolated. It presents with acute fever, upper respiratory tract infections, mucopurulent discharge,



Figure 2. Images obtained during the surgery of the primary aortoduodenal fistula repair and duodenorrhaphy.

and neck abscesses (4). Although it is associated with close contact with equines, it can also occur from consuming unpasteurized milk (4). The patient reported having consumed unpasteurized milk until he was 8 years old. He was discharged with outpatient antibiotic management and improved with ceftriaxone for 6 weeks.

DISCUSSION

Aortoenteric fistulas have a high mortality rate and require emergency surgery. In 83% of cases they are associated with fusiform aneurysms, with mean diameters of 6.2 cm (5). They are also related to infections (syphilis, tuberculosis, fungal infections, etc.) and gastric conditions (ulcers, intestinal tumors, pancreatitis, etc.) (6). Early diagnosis is challenging, as the classic triad of abdominal pain, pulsatile mass, and digestive hemorrhage is only present in 11% of cases (7). One pathognomonic sign is early or herald bleeding, a self-limited hemorrhage episode due to a clot in the fistula. However, studies such as EGD can remove the clot and cause new bleeding episodes. The CCTA is essential for diagnosis, as it shows air bubbles in the aortic wall and contrast medium in the intestinal lumen, with sensitivity rates between 30% and 61% (1).

The treatment of choice is open surgery. Although the endovascular approach is effective in stopping bleeding, it is associated with recurrent sepsis and should be considered as a bridge to definitive surgery (8).

Bovine pericardium patch: other options

The high morbidity and mortality rate in patients with aortoenteric fistulas and bacterial translocation requires an adequate choice of graft. Vascular graft infection is a common complication (0.5-3.5%) (9), and patients with infected aortoenteric fistulas have higher 30-day mortality. The bovine pericardial patch has proven effective in patients at risk of infection due to its antimicrobial properties and has been successfully used in infected aortic aneurysms (9). Moreover, the material reduces surgical time and thrombogenicity, which generates less need for anticoagulation.

Other options include extra-anatomic bypass, venous prostheses, and cryopreserved homografts. Although autogenous veins have lower reinfection rates, allografts have lower durability and are associated with greater complications. Although rifampicin-impregnated prostheses reduce the risk of graft failure, they have a higher rate of infection (3).

CONCLUSIONS

Open surgical management is the treatment of choice in patients with primary aortoenteric fistulas. The use of grafts with a low infection rate, such as the bovine pericardium patch, is crucial to guarantee the durability of the prosthesis. This material proved useful in the described case, and literature supports it as an effective option for aortic reconstruction in these patients. This is the 2nd case report of aortoenteric fistula published in the literature due to *Streptococcus equi*(4).

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