

Surgery of the aortoduodenal fistula: two cases with survival

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SUMMARY: Surgery of the aortoduodenal fistula: two cases with survival.

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We report on two cases of aortoduodenal fistula. The patients underwent the positioning of an aortic stent 1.9 and 5 years before, respectively. They complained of fever and abdominal pain and were admitted to the hospital. A stent infection was suspected and an angio-CT confirmed the suspicion.

Each patient was brought immediately to the operating room, where the fistula was individuated and resected, with closure of the aortic wall and excision of a part of the ulcerated intestinal loop involved. The infected stent was removed and an extra-anatomic bypass was performed. The patients survived and were discharged from hospital 38 and 29 days after the surgery, respectively, with no postsurgical sequelae and in good health. These patients are alive and in good health respectively 18 and 19 months (mo) after the procedure.

If performed immediately upon diagnosis, this technique permits achievement of an optimal result.

RIASSUNTO: Fistola aorto-duodenale: casi clinici.

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Vengono riportati due casi clinici di pazienti entrambi affetti da fistola aorto-duodenale. In entrambi i era stato posizionato uno stent aortico rispettivamente 1,9 e 5 anni prima.

La febbre ed il dolore addominale sono stati i sintomi di esordio clinico in entrambi i malati e l'angio-TC confermava la diagnosi.

L'intervento chirurgico è stato risolutivo ed i pazienti sono stati dimessi rispettivamente in 38 e 29 giornata post-operatoria. Essi sono vivi rispettivamente a 20 e 21 mesi dall'intervento.

Se effettuato tempestivamente dopo la diagnosi, l'intervento chirurgico può essere risolutivo e senza mortalità.

KEY WORDS: Aorta - Aneurysm - Gastrointestinal hemorrhage - Aortoduodenal fistula - Surgery.
Aorta - Aneurisma - Emorragia gastrointestinale - Fistola aorto-duodenale - Chirurgia.

Introduction

Aortoduodenal fistula (ADF) is an uncommon complication of conventional aortic surgery, with an incidence of up to 2.4% and a mortality range of 55% to 90% (1-10). Secondary ADF follows a previous operation for aortic aneurysm and is a complication of prosthetic aortic grafting (2).

Recently, the role of the standard treatment for secondary aortoenteric fistula by infected graft removal and extra-anatomic bypass has been criticized for its high rates of death, amputation, and disruption of aortic closure (8). The purpose of this work is to report two cases of ADF surgically treated with good outcome.

Case reports

Case n. 1

A 61-y-old male patient was admitted to the hospital because he had experienced for about 2 mo fever and severe abdominal pain localized at the lower right quadrant. Deep palpation to the abdomen was painful and difficult to perform. He presented a WBC count of $12.80 \times 10^9/L$; hemoculture identified *Staphylococcus epidermidis*. At 21 mo prior to the hospitalization he had received an endovascular stent-graft system.

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Upon hospitalization, an angio-CT revealed the presence of liquid around the graft, causing a remodeling of the dimension of the right iliac fossa (Fig. 1), and obliteration of the left graft jaw. A graft infection was suspected, and the patient was led immediately to the operating room for surgery.

At the xifopubic laparotomy, 1000 ml of blood were aspirated. The fourth duodenal portion was strictly adherent to the aorta, and an abscess was present in the retroperitoneal area covered by jejunal loops (Fig. 2). These loops and the fourth duodenal portion were detached, revealing the complete lack of the aortic wall and the close contiguity between the aorta and intestinal loops. The entire graft was removed. Then, a part of the first jejunal loop and of the fourth duodenal portion were resected. The second jejunal loop was anastomized in latero-lateral with the second part of duodenum and the caudal part of this loop was anastomized in Roux-Y with a gastro-entero anastomosis. Finally, the operator subcutaneously and sovrappubically positioned a subclavian-bifemoral bypass.

Fever was present during the whole postsurgical period and was treated with antibiotics. The patient was discharged 38 days after surgery with no adverse consequences.

Case n. 2

A 71-y-old male patient, presenting a continuous fever for 5 mo, was admitted to the hospital. He had undergone the positioning of an aortofemoral bypass 5 y before. Upon examination the patient showed a septic necrosis of the toes, perhaps caused by microembolization. At the superficial and deep palpation the patient complained of abdominal pain. WBC count was $15.90 \times 10^9/L$. Hemoculture was performed and identified *Escherichia coli*. The angio-CT showed an endoluminal thrombus at level of the graft, with reduction of its lumen; it was surrounded by pathologic tissue. The patient was brought immediately to the operating room.

By a midline incision, the aortofemoral bypass was individualated. It showed strong adherences with the fourth duodenal portion. After the duodenum was split, a wide perforation of the loop communicating with an aortic breach was identified. After an aortic clamp was applied and heparinization performed, the breach was closed, the aortofemoral bypass was removed, and a raffia of the fourth duodenal portion was performed. A gastro-entero anastomosis and a jejuno-duodenal anastomosis were performed with antrectomy. A new femoro-femoral bypass was positioned sovrappubically and subcutaneously.

Fever persisted for 18 d and was treated with antibiotics (vancomycin). The patient was discharged 29 d after operation with no postsurgical sequelae.

Discussion

In patients with ADF, the aorta or the aortic graft is in continuity with the interior of the duodenum (7). ADF is an uncommon complication of conventional or endovascular aortic surgery, with an incidence of up to 2.4% and a mortality of 55% among the patients who are not operated on in a timely fashion (1). Of those patients who are submitted to surgery, the 90% die in the operating room (10).

ADF is classified into primary and secondary. Primary fistulae are rare, with a incidence of 0.04-0.07% (2). They arise from atherosclerosis, infections, carcinoma, ulcers, foreign bodies, gallstones, and as a complication of radiation. Secondary ADF is a complication



Fig. 1 - Angio-TC shows liquid around the graft causing a remodeling of the dimensions of the right iliac fossa. Air is present inside the graft as indirect sign of aorto-intestinal fistula.



Fig. 2 - The perforation of the duodenum and the endovascular graft responsible for the aortoduodenal fistula.

of a previous prosthetic aortic grafting, occurring in 0.4% to 4% of all patient who undergo aortic reconstruction (2). There are two types of secondary ADF: type 1, characterized by a direct connection between the bowel and the aortic lumen at the suture line, causing massive hemorrhage; and type 2, characterized by communication between the bowel and perigraft region with a direct luminal connection (3). The pathogenesis of secondary ADF includes a low-grade infection and pseudo-aneurysm formation caused by suture line failure of interposing variable tissue between the graft and the duodenum. Repetitive pulsation on the graft against the duodenum

may cause ischemia of the duodenal wall, erosion, infection, and hemorrhage (3).

Symptoms of a patient with a primary ADF are characterized by alternating relapse and remission (4). Secondary ADF usually presents with a gastrointestinal hemorrhage. The classic triad of abdominal back or flank pain, gastrointestinal hemorrhage, and a palpable abdominal mass occur infrequently, ranging from 0% to 4% (5). The initial bleeding is often transient and self-limiting, owing to the formation of thrombus. It recurs over a period of hours, days, or weeks and it can culminate in massive hemorrhage and hypovolemic shock. In some patients, back pain or fever may be the presenting symptoms (3).

Gastroendoscopy, carefully undertaken because of the risk of hemorrhage, is the most accurate method to diagnose ADF preoperatively. It may also detect the site of fistula. We recommend performing endoscopy in the operating room just prior to the induction of anesthesia. Aortography is also useful in planning surgical intervention because it can provide information on the need for lower-extremity revascularization and graft excision. However, successive arteriography procedures have the risk of removing the clot that is partially occluding the fistula. Angio-CT is an important approach to obtain a diagnosis quickly and to avoid delayed surgery.

Survival is directly connected to the quickness of bringing the patient into the operating room in order to staunch the hemorrhage and to avoid the propagation of the infection. There are three approaches to conventional treatment of ADF. The standard treatment is removal of the infected graft and extra-anatomic bypass, an approach criticized for its high rate of death, amputation and disruption of aortic closure (8) but, if the patient is treated immediately, this technique can allow an optimal result. The second approach replaces the aortic prosthesis with a new graft, eventually impregnated with an antibiotic, and interposes omentum between this new graft and the duodenum. This procedure entails operating in a hostile abdominal environment with possible infection of the new graft (6). The third, more conservative approach involves disconnecting the aortoduodenal communication and closing the defect in the aorta and the duodenum with an interposition of omentum (6). There are potential problems with endovascular repair: because the infected graft is not removed and the duodenum itself is not mobilized, the long-term reliability may be doubtful and can be complicated by endograft migration (6).

In all cases of ADF, assiduous follow-up and adequate antibiotic therapy are mandatory. Patient education regarding compliance with the medication regime can help to avoid serious complications (9).

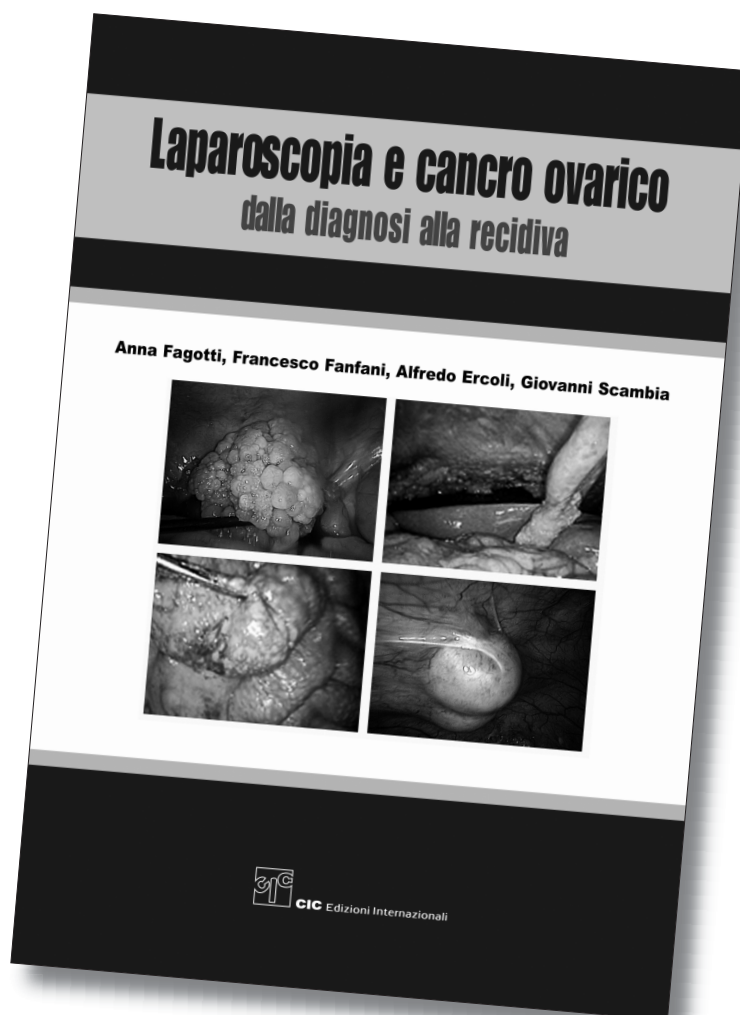
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