Endovascular Management of Secondary Aortoduodenal Fistula: The Importance of Gut Restoration

Konstantinos G. Moulakakis, MD¹ John Kakisis, MD¹ Ilias Dalainas, MD¹ Vasilis Smyrniotis, MD²
Christos D. Liapis, MD¹

¹ Department of Vascular Surgery, Athens University Medical School, "Attikon" University Hospital, Athens, Greece

² 4th Department of Surgery, Athens University, Medical School, "Attikon" University Hospital, Athens, Greece

Address for correspondence Konstantinos G. Moulakakis, MD, PhD, MSc, FEBVS, Department of Vascular Surgery, Athens University Medical School, "Attikon" University Hospital, Athens, Greece Rimini 1 Street (e-mail: konmoulakakis@yahoo.gr).

Int J Angiol 2015;24:55–58.

Abstract

Secondary aortoenteric fistula (SAEF) is a rare, life-threatening complication of aortic reconstructive surgery. Graft excision associated with gut repair and extra-anatomic bypass or in situ aortic reconstruction is the best option. However, it is associated with high mortality rates, especially when undertaken in unstable patients with severe comorbidities. We present a case of SAEF successfully treated by endovascular repair and gut restoration. After laparotomy, a dense inflammatory "frozen" mass was found around the involved part of the duodenum and the aortic sac. Because of his comorbidities, the difficulty in dissection of the aortic sac and the risk of damage in adjacent organs, the initial plan for aortic reconstruction was abandoned. A surgical isolation of the third portion of the duodenum and a duodenum–jejunal anastomosis were performed. An Endurant endograft 32–16–16 mm (Medtronic, Inc., Minneapolis, MN) was implanted to achieve aortic continuity. Twenty months postdischarge, the patient remains in good general condition, afebrile, and with normal laboratory tests and inflammation markers. In high-risk patients, endovascular intervention combined with gut repair without further aortic reconstruction can be a permanent solution requiring, however, close surveillance.

Keywords

- ▶ secondary
- ▶ aortoenteric fistula
- ▶ endovascular
- ▶ gut repair

Secondary aortoenteric fistula (SAEF) is a rare, life-threatening complication of aortic reconstructive surgery. The first SAEF was reported in 1953 by Brock, who described a fistula between the proximal anastomosis of an aortic homograft and the duodenum.¹ The annual incidence of SAEF is 0.6 to 2%,² and approximately 80% of cases affect the duodenum, mostly the third and fourth parts. Despite prompt diagnosis and treatment, SAEF remains a highly lethal condition with mortality rates of approximately 50%.³

Graft excision associated with gut repair and extra-anatomic bypass, or in situ aortic reconstruction, has been considered the best option.⁴ However, open conventional repair is associated with a high mortality rate, especially

when undertaken in unfit patients with severe comorbidities.⁴ Over the last decade, the endovascular treatment of SAEF (EV-AEF) has emerged as an alternative procedure to open surgical repair.⁵ A comparison in the literature of open repair and EV-AEF concluded that the latter should be considered a bridge procedure, because of high rates of late recurrence.⁶

We present a case of SAEF successfully treated by endovascular repair and gut restoration. This report addresses the concern over whether the strategy of endovascular repair of SAEF, combined with restoration of bowel continuity, may have a role in treating high-risk patients unfit for aortic reconstruction.

Case Report

A 74-year-old man was presented to the Department of Vascular Surgery with a fever up to 39°C and hematochezia. He was under oral antibiotic treatment for the past 6 months for a presumed aortic graft infection. In his medical history, the patient reported open aortic reconstruction with a tube Dacron graft 5 years earlier for an abdominal aortic aneurysm, a left iliac-femoral bypass (inverted autologous saphenous vein) for a common femoral artery aneurysm 4 years ago, and a popliteal artery reconstruction with an polytetrafluoroethylene graft for aneurismal disease. He also suffered from coronary disease, arterial hypertension, dyslipidemia, and diabetes mellitus.

A contrast-enhanced computed tomography (CT) revealed the presence of free air in the aneurysmal sac and attachment of the third portion of the duodenum (►Fig. 1). Laboratory tests showed hemoglobin 10.6 g/dL, hematocrit 31.5%, white blood cell count 5,900 cells/mm³, platelet count 233,000 cells/mm³, and creatinine 1.9 mg/dL.

An open laparotomy was performed. A dense inflammatory “frozen” mass was found around the involved part of the duodenum and the aortic sac. Because of his comorbidities, the difficulty in surgical dissection of the aortic sac, and the risk of damage to adjacent organs, the initial plan for aortic reconstruction was abandoned. Surgical isolation of the third portion of the duodenum and a duodenum-jejunal anastomosis for bowel continuity restoration were performed (►Fig. 2). After closure of the abdomen and bilateral femoral artery preparation, an Endurant endograft 32–16–16 mm (Medtronic, Inc., Minneapolis, MN) was implanted to achieve aortic continuity and control the peptic hemorrhage.

Postoperative recovery was characterized by the absence of melena and a negative fecal occult blood test. A CT scan

Fig. 2 Surgical isolation of the third portion of the duodenum and duodenal-jejunal anastomosis for bowel continuity restoration.

showed no free air or signs of infection in the isolated third portion of the duodenum (►Fig. 3). The patient was discharged on the 25th postoperative day afebrile and under chronic administration of moxifloxacin. One month postdischarge, a Gallium scintigraphy scan was normal (►Fig. 4), whereas one year postdischarge, CT scan showed no signs of graft infection (►Fig. 5). Twenty months postdischarge, he remains in good general condition, afebrile, with normal laboratory tests, and inflammation markers.

Discussion

Deshpande et al were the first to describe an endovascular repair of an SAEF in a high-risk patient.⁶ The advantages of the endovascular approach are the rapid control of hemorrhaging

Fig. 1 Attachment of the third portion of the duodenum on the aortic sac tissue. The arrow shows signs of air.

Fig. 3 Postoperative computed tomography: the arrow shows the isolated third portion of the duodenum with no air or other signs of infection.

Fig. 4 One month postdischarge Gallium scintigraphy scanning: no signs of graft infection.

Fig. 5 One year postdischarge computed tomography scan with no signs of graft infection.

and the avoidance of an intervention in a hostile abdomen or the avoidance of a procedure in patients with severe comorbidities unfit for open surgery. On contrary, the endovascular approach has great limitations as the bowel defect is not repaired; thus, infection, if present, may persist, and retroperitoneum debridement is not feasible. A recent review study on outcomes after the endovascular repair of SAEF by Kakkos et al showed that the endovascular approach was associated

with a high incidence of persistent, or recurrent infection, or recurrent bleeding that significantly limited survival rates.⁷ Prognoses were worse in patients with perioperative sepsis, large bowel fistulization, and no intestinal repair. Bergqvist and Björck also reported that preoperative evidence of sepsis was an indicating factor for unfavorable outcomes.⁴

In dealing with an SAEF, the primary goal of treatment is to save lives. We decided to treat SAEF by endovascular means

combined with duodenum restoration because of the associated periaortic inflammatory reaction that renders aortic dissection risky and dangerous. Unfortunately, the literature lacks insight into patients treated with a combination of endovascular treatment and gut restoration. Despite the gap in the literature, endovascular management of the SAEF without further aortic reconstruction, followed by isolation of the eroded part of the duodenum and appropriate antibiotic therapy, can be considered as a potentially effective treatment. In these patients, repair of the bowel can be assumed to eliminate a septic source and preserve further bacterial contamination of the prosthetic implant.

Our endovascular strategy, which includes repair of gut and chronic antibiotic prophylaxis, may have a role in avoiding SAEF recurrence. It has been 20 months since the last intervention, and the patient is free of any symptoms. He is afebrile with blood tests normal, and the CT shows no signs of infection that is very encouraging. Although treatment conclusions cannot be made from this one case, SAEF treatment using endovascular repair and gut restoration appears promising.

SAEF is a devastating complication of prior aortic surgery. Endovascular intervention can serve as a bridging procedure to open repair offering immediate control of hemorrhage and time to improve the patient's clinical status. In high-risk

patients, endovascular intervention combined with laparotomy and isolation of the eroded part of the bowel without further aortic reconstruction can, with close, continued monitoring, be a permanent solution.

References

- 1 Brock RC. Aortic homografting; a report of six successful cases. *Guys Hosp Rep* 1953;102(3):204–228
- 2 Antoniou GA, Koutsias S, Antoniou SA, Georgiakakis A, Lazarides MK, Giannoukas AD. Outcome after endovascular stent graft repair of aortoenteric fistula: A systematic review. *J Vasc Surg* 2009; 49(3):782–789
- 3 Szilagyi DE. Management of complications after arterial reconstruction. *Surg Clin North Am* 1979;59(4):659–668
- 4 Bergqvist D, Björck M. Secondary arterioenteric fistulation—a systematic literature analysis. *Eur J Vasc Endovasc Surg* 2009; 37(1):31–42
- 5 Batt M, Jean-Baptiste E, O'Connor S, et al. Early and late results of contemporary management of 37 secondary aortoenteric fistulae. *Eur J Vasc Endovasc Surg* 2011;41(6):748–757
- 6 Deshpande A, Lovelock M, Mossop P, Denton M, Vidovich J, Gurry J. Endovascular repair of an aortoenteric fistula in a high-risk patient. *J Endovasc Surg* 1999;6(4):379–384
- 7 Kakkos SK, Antoniadis PN, Klonaris CN, et al. Open or endovascular repair of aortoenteric fistulas? A multicentre comparative study. *Eur J Vasc Endovasc Surg* 2011;41(5):625–634