

## Secondary aortoduodenal fistula without gastrointestinal bleeding directly detected by CT and endoscopy

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We describe a 50-year-old man with a secondary aortoduodenal fistula who presented with high fever and right leg pain one year after undergoing an aortoiliac bypass with a polyester graft. Gangrene had developed in the right ankle, and contrast-enhanced computed tomography revealed that the graft had penetrated the third duodenal segment and obstructed the right graft limb. Esophagogastroduodenoscopy confirmed that the graft had perforated the duodenum. A preoperative diagnosis of aortoenteric fistula can be very difficult. In spite of the lack of gastrointestinal bleeding in this case, we directly diagnosed secondary aortoduodenal fistula preoperatively using computed tomography and esophagogastroduodenoscopy. Secondary aortoenteric fistulae should be suspected when a patient with an aortic prosthesis shows symptoms in the lower limb.

### Introduction

Secondary aortoenteric fistulas (AEFs) are rare but often fatal complications after open aortic reconstruction. A precise diagnosis can be very difficult because imaging modalities and endoscopy often overlook AEF. We describe a secondary aortoduodenal fistula without gastrointestinal bleeding that was preoperatively diagnosed with computed tomography (CT) and esophagogastroduodenoscopy (EGD) findings. Contrast-enhanced CT is preferred for the first workup of suspected AEF.

### Case report

A 50-year-old man was admitted with a high fever and pain in the right leg. His medical history included diabetes and an open aortobiliac bypass using a polyester graft to treat Leriche syndrome one year previously. A physical examination revealed swelling in the right knee and ankle. Laboratory findings were leukocytosis (16890 / $\mu$ L), hematocrit 29.4%, hemoglobin 9.9 g/dLm, and mild liver dysfunction. Blood cultures were negative. Based on the local swelling in the knee and ankle, antibiotic therapy was initiated under a diagnosis of cellulites. In spite of additional surgical debridement, gangrene developed gradually in the right ankle. At 1.5 months after admission, contrast-enhanced CT was performed on suspicion of impaired arterial blood flow and revealed that the graft had penetrated the third duodenal segment and occluded the right graft limb (Figs. 1 and 2). A pulsating vascular endoprosthesis perforating the transverse portion of the duodenum was revealed by EGD with a pediatric-type colonoscope (Fig. 3). The patient underwent emergency laparotomy to remove the prosthetic graft, followed by in-situ graft replacement with omental filling and fistulectomy with duodenojejunostomy. An additional left axillofemoral bypass was performed due to breakdown of the left distal anasto-

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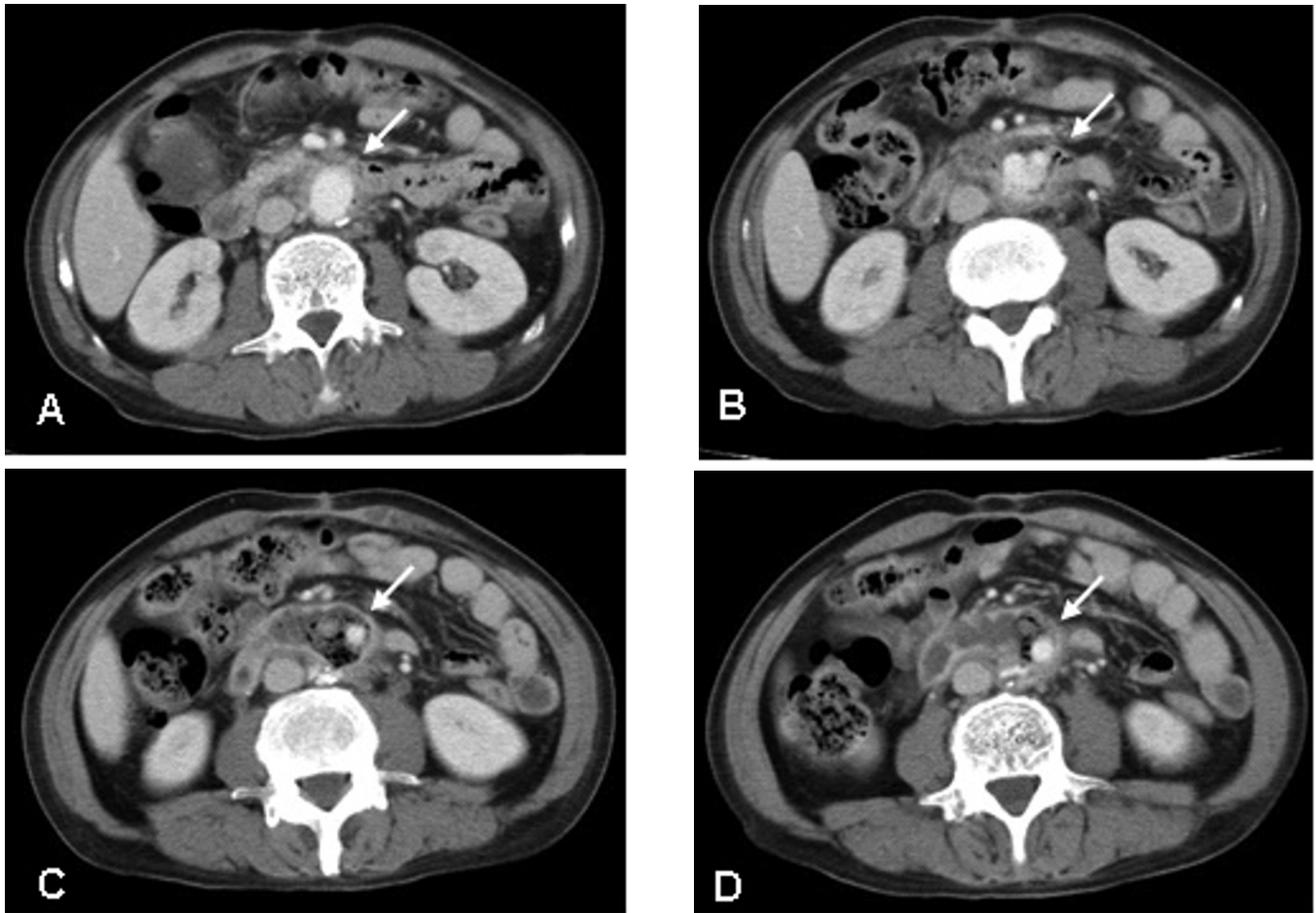


Figure 1. Axial CT images at four levels (A-D). The prosthesis penetrates the third duodenal segment, and the right graft limb is occluded (white arrows).



Figure 2. Sagittal CT image shows the prosthesis penetrating the third duodenal segment (black arrow).

mosis about 20 days later. Since the right leg appeared to be recovering, he was transferred to another hospital on postoperative day 69.

### Discussion

AEFs are communications between the gastrointestinal tract and the aorta. Primary AEFs are defined as communications between the aorta and intestine resulting from diseases at either side such as abdominal aortic aneurysm, infectious aortitis, penetrating peptic ulcer, and tumor invasion (1). Secondary AEFs are relatively rare but life-threatening complications of aortic prosthetic grafting, and occur in 0.3% to 2% of patients (2). Although the exact pathogenesis of secondary AEF is unknown, pulsating pressure of the graft on the bowel wall and bacterial infection of the prosthesis might be involved (3). The most common site of secondary AEF is the duodenum (73%), especially the third part (2, 4). The interval between aortic reconstruction and the development of fistula can range from months to years (5). Symptoms of secondary AEF involve gastrointestinal bleeding (80%), abdominal pulsatile mass

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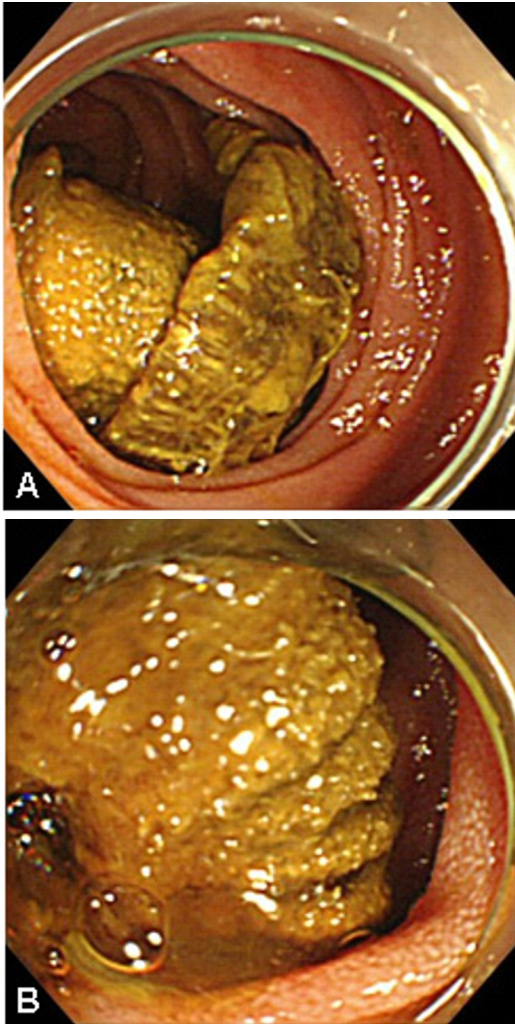


Figure 3. Endoscopic images show polyester vascular endoprosthesis perforating the transverse portion of duodenum. Distant (A) and close (B) views.

(56%), sepsis (44%), and abdominal pain (30%) (4). The absence of bleeding episodes in our patient was due to partial graft failure as a result of infectious thrombosis that prevented communication between blood flow and the duodenum. Septic emboli were considered as the cause of leg symptoms.

The diagnostic sensitivity of CT for secondary AEF is 45% (4), and AEF are rarely directly visualized. Highly suggestive features of AEF include ectopic gas within or adjacent to the aorta, loss of the normal fat plane between the aorta and the bowel, extravasation of aortic contrast media into the enteric lumen, or leakage of enteric contrast media into the paraprosthesis space (6).

The diagnostic sensitivity of EGD for secondary AEF is 24% (4). Endoscopy using a pediatric colonoscope or an enteroscope might be useful for many stable patients (7, 8). Endoscopists should carefully examine up to the fourth portion of the duodenum with surgical backup, because the

risk of serious bleeding is high. Although AEF are rarely diagnosed by endoscopic recognition of a graft, suggestive findings include a pulsating extraluminal mass, ulceration, erosion, submucosal tumor with a small ulcer, or active hemorrhage (3, 9).

Fortunately, an aortoduodenal fistula was visualized clearly by CT and EGD in our case. Notably, the absence of CT and endoscopic findings does not rule out AEF (10). The diagnostic sensitivities of other imaging modalities are lower than those of CT (4). Exploratory laparotomy is indicated in some patients with severe hemorrhage or negative diagnostic findings (1).

The mean time from admission to diagnosis of secondary AEF is 2 months (4). A precise diagnosis of secondary AEF by current diagnostic modalities can be complicated, yet early diagnosis is needed since the mortality rate without surgical treatment is 100% (4). Clinical suspicion is the most important factor contributing to the right diagnosis. Secondary AEF should be kept in mind as one of the differential diagnoses when a patient with a past history of aortic graft surgery shows symptoms in the lower limb.

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