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# Aortoenteric Fistula Diagnosed by Double Balloon Enteroscopy: A Case Report

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A secondary aortoenteric fistula (AEF) is a direct communication between the gastrointestinal tract and the aorta in a patient who has undergone major surgery on the aorta, often an aorta graft operation. We experienced a patient who had undergone graft interposition for abdominal aortic aneurysm and was admitted due to three episodes of hematemesis and following hamatochezia. Gastroscopy, colonoscopy, and radioactive iodine scan failed to identify the bleeding site in the patient. He was diagnosed with AEF by double balloon enteroscopy and recovered after surgical intervention.

**Key Words:** Aortoenteric fistula; Double-balloon enteroscopy

## INTRODUCTION

An aortoenteric fistula (AEF) is an abnormal communication between a portion of the gastrointestinal (GI) tract and the aorta. It is classified as primary and secondary according to the presence of prior aortic surgery. The prognosis of AEF mainly depends on the time interval between the first clinical manifestations and operative treatment. Therefore early diagnosis is essential for elective surgery since reconstruction in the massive bleeding stage has a mortality of up to 80%. We report a case of AEF diagnosed by double balloon enteroscopy (DBE).

## CASE REPORT

A 48-year-old man was admitted to our institution because of three episodes of abrupt hematemesis. Four years ago, he underwent graft interposition for abdominal aortic aneurysm. On initial examination, he had acute ill-looking appearance. His blood pressure was 110/70 mm Hg, pulse rate 120/min, respiratory rate 20/min, and body temperature was 36.5°C. Laboratory tests revealed hemoglobin (Hb), 12.0 g/dL (normal, 15.3±3.0); platelet count, 368,000/μL (normal, 220,000±100,000); and white blood count, 11,100/μL (normal, 7,500±3,500). Emergency esophagogastroduodenoscopy (EGD) was performed to detect the bleeding focus in the upper GI tract; however, there were no specific findings in EGD. Hematochezia occurred again on the second day, but we could not find the bleeding site in the lower GI tract by colonoscopy. Also there were no specific findings in ileoscopy with a standard colonoscope and radioactive iodine bleeding scan. Severe hematochezia occurred on the third hospital day, and the level of Hb dropped to 8.4 g/dL. The patient required transfusion with four units of packed red blood cells. Immediately, we performed a DBE via the oral route, which disclosed flat elevated erosion with silk in the proximal jejunum (Fig. 1). Endoscopic findings showed a fistula that opened and closed on the central portion (Fig. 2). This lesion suggested AEF. The patient was finally diagnosed with secondary AEF by emergency multidetector computed tomography (MDCT) (Fig. 3) and angiographic findings (Fig. 4). Because he was in a state of hypovolemic shock after massive hematochezia, an embolization was performed during the angiography. After 1 day, he was treated with surgical intervention. The patient recovered and was dis-

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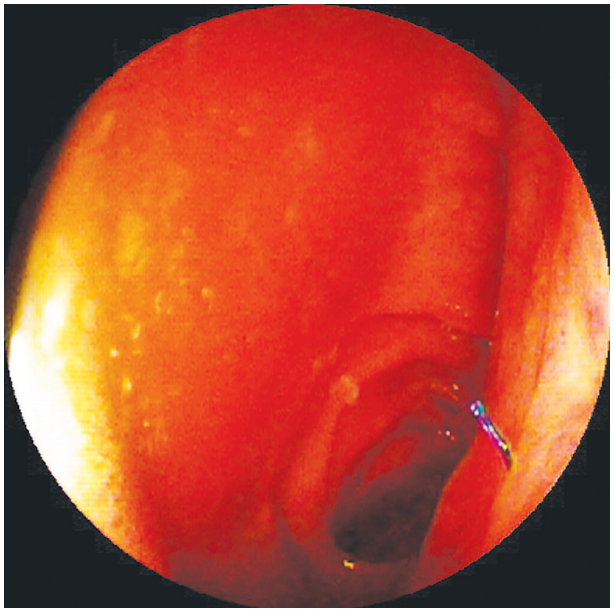

**Fig. 1.** Double balloon enteroscopic finding. Neutral endoscopic view showed central erosion with silk.

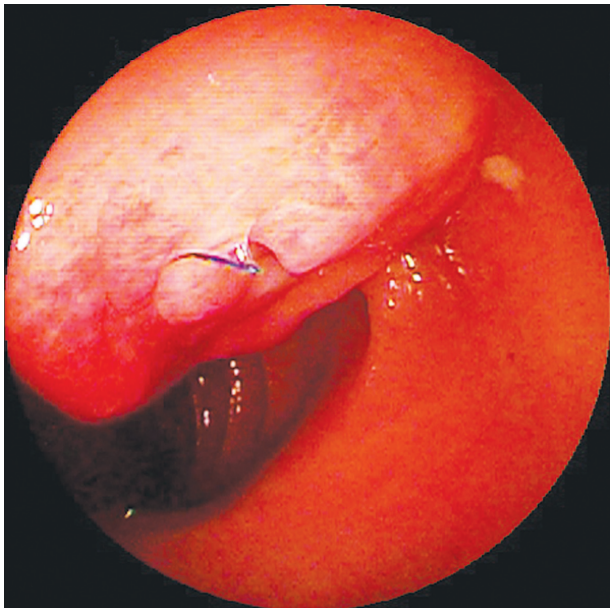

**Fig. 2.** Double balloon enteroscopic finding. Retroflexion view of endoscopy showed flat elevated lesion with silk in the central erosion.

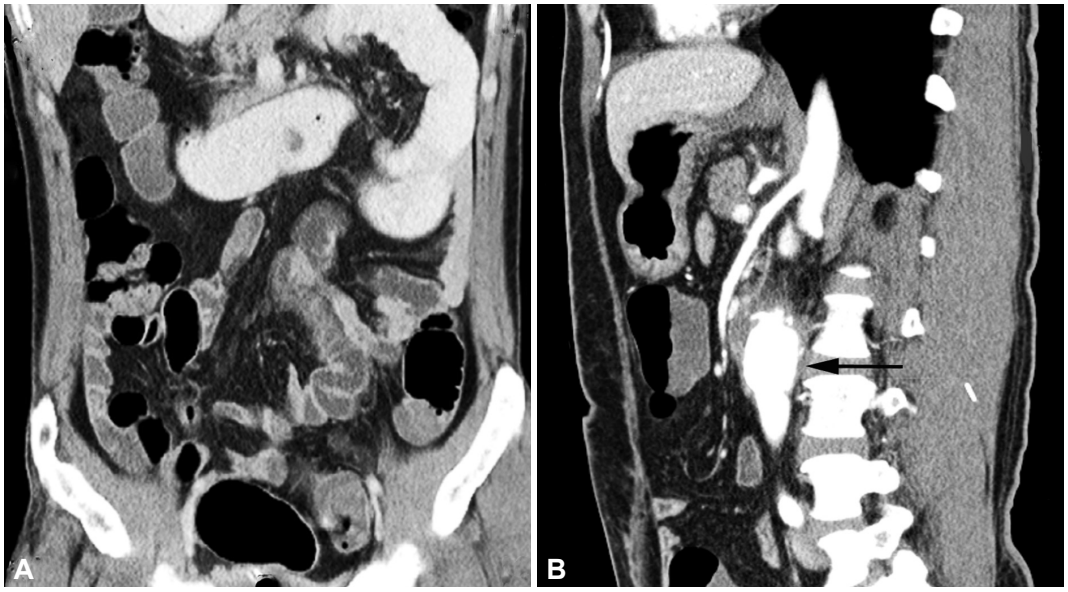


**Fig. 3.** Computed tomography (CT) findings. (A) The sagittal CT scan during arterial phase of contrast enhancement shows focal thickening and irregularity of the aortic wall, but not direct extravasation of contrast material. (B) On the delayed coronal CT scan obtained 4 minutes after the initial contrast injection shows markedly dilated proximal small bowel loops (black arrow) filled with high density of fluid suggesting active bleeding to the bowel lumen.

charged 27 days after surgery. In our case, the DBE was a helpful approach to make correct diagnosis of AEF.

## DISCUSSION

Nagy and Marshall1 have defined primary AEF as a communication between the aorta and the GI tract caused by a disease, mainly due to an abdominal aortic aneurysm. In contrast, secondary AEF develop following aortic reconstructive surgery and abdominal bypass procedures.[1-3] Secondary AEFs were first described by De Castro et al.[4] in 1956 and successfully reconstructed by Heberer[5] in 1957.

The initial bleeding episodes of secondary AEF can occur on the average between 14 and 52 months after vascular reconstruction.[6,7] Mechanisms include direct mechanical erosion of the suture line into the bowel as well as proximal suture line disruption with pseudoaneurysm formation and fistulization. Graft infections from intraoperative contamination, ba-

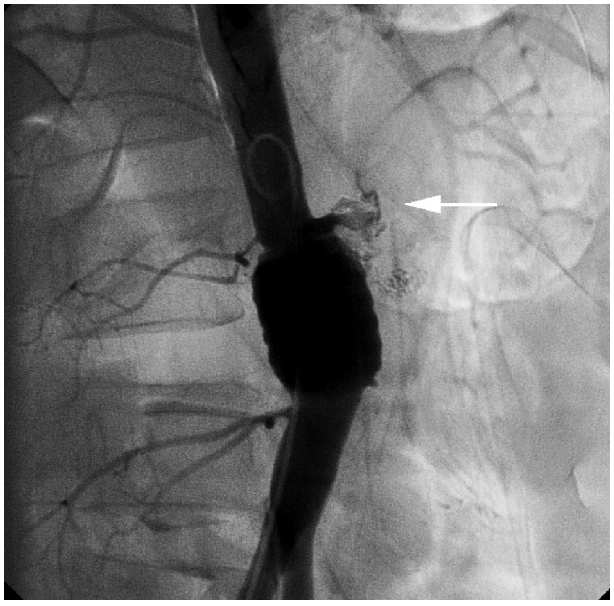

**Fig. 4.** Angiographic findings. The angiography showed direct fistula (white arrow) from aorta to the small bowel at abdominal aorta.

cterial translocation after pressure necrosis of the bowel, or transient bacteremia seeding the graft are the usual sources.[7] More recently there have also been reports of AEF formation after the newer percutaneous angioplasty techniques with migration or kinking of the stent grafts with subsequent erosion directly through the aortic wall.[8-10] Several predisposing factors have been studied and postulated to lead to a higher incidence of AEF formation. Deterioration in certain types of suture has been associated with pseudoaneurysm formation leading to AEFs.[11] Silk, which is absorbable over a period of 7 to 8 years, has been implicated in increased AEF formation over other suture material including Dacron (DuPont, Wilmington, DE, USA), polypropylene, or polytetrafluorourethane. In our case, the AEF developed following direct mechanical erosion due to silk material.

AEFs are often difficult to diagnose. Preoperatively a full history and physical examination should alert physicians to previous aortic surgery that might result in an AEF. The most sensitive diagnostic modality is exploratory laparotomy. Many imaging studies may be employed if the diagnosis is in question. However, only one third of patients with AEFs are diagnosed preoperatively.[12] An upper GI endoscopy may help localize the source of bleeding; blood clots, ragged mucosa, pus inside the bowel, or even graft material may be visualized. However, this procedure is diagnostic in fewer than 25% of cases, and its value lies in the ruling out of other sources of bleeding.[13] In our case, upper and lower endoscopic findings were normal but hematochezia and dropped Hb level happened abruptly again. So we performed DBE for detection and management of unknown bleeding focus in the small bowel. Recent literature on the use of MDCT scans with three-dimensional reconstruction report a high sensitivity.[14] Angiograms are useful for surgical planning, but they are generally not helpful in making the diagnosis of an AEF. In our case, MDCT was also a useful tool for diagnosis of AEF. If MDCT was used as the initial diagnostic tool in our case, AEF could be detected earlier. But AEF is a less frequent cause of obscure GI bleeding, which is why we did not recognize AEF. Although it is not easy to detect AEF by endoscopy, we could diagnose AEF by DBE. After that, we performed MDCT and angiogram to diagnose AEF.

Push enteroscopy (PE) traditionally has been used to examine the proximal part of the small bowel when initial gastroscopy and colonoscopy failed to detect the source of bleeding. Looking at the results, we considered that PE might be useful for the detection of AEF in our case. We couldn't find any blood clot by gastroscopy and colonoscopy despite the history of hematemesis in the patient; however, hematochezia happened again with dropped Hb level. We needed to exam the entire small bowel because obscure GI bleeding may occur anywhere throughout the small bowel. We performed DBE to detect the source of obscure bleeding because antegrade DBE is superior to PE in the length of insertion and DBE can be used via antegrade or retrograde routes.

In conclusion, in our case, AEF was diagnosed in the proximal jejunum by DBE and was treated with surgery immediately.

## Conflicts of Interest

The authors have no financial conflicts of interest.

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