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CASE REPORT

# Fatal Aortoduodenal Fistula Caused by a Ruptured Abdominal Aortic Aneurysm - a Case Report

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**ABSTRACT**

**Introduction:** Ruptured abdominal aortic aneurysm (AAA) has a high mortality, even when the patients reach the hospital in time and the intervention is expeditious. **Case presentation:** We present the case of a 66-year-old male patient, with a known history of AAA, presenting to the emergency room in a state of hypovolemic shock due to massive bleeding in the upper and lower gastrointestinal tract and acute abdominal pain, which presented an abrupt onset one hour before presentation. The computed tomography angiography identified an aortoduodenal fistula with a trajectory toward the D3 segment of the duodenum, as well as a common iliac artery occlusion and extensive atherosclerotic stigmas. The patient was rushed to the operation room where he was resuscitated with intravenous fluids, two units of packed red blood cells, and hemostatic agents. The bleeding was stopped by clamping the aorta above the aneurysm. The duodenum was sutured, and the aorta was reconstructed with an aorto-bifemoral graft. Unfortunately, even though intensive care procedures continued for a few hours after surgery, all therapeutic efforts failed and the patient had succumbed.

**Keywords:** aortoduodenal fistula, abdominal aortic aneurysm, open repair, hematemesis, emergency

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## INTRODUCTION

Primary aortoenteric fistulas (AEFs), secondary to atherosclerotic abdominal aortic aneurysms (AAAs), are very rare, with an annual incidence of 0.007 per one million cases. When they occur, the result is catastrophic bleeding, which leaves barely enough time for the medical teams to resuscitate the patient and successfully stop the bleeding.[1]

A rapid diagnosis is the key for promptly reacting and reaching the operating room in time. The clinical signs include abdominal pain and gastrointestinal bleeding (hematemesis, melena),[2] accompanied by signs of hypovolemic shock. Therefore, it is very useful to know the medical history of the patient and, in order to achieve an accurate diagnostic conclusion, to have access to high-quality imaging. Once the AAA is seen, there are also other orienting radiological signs that can guide toward the etiologi-

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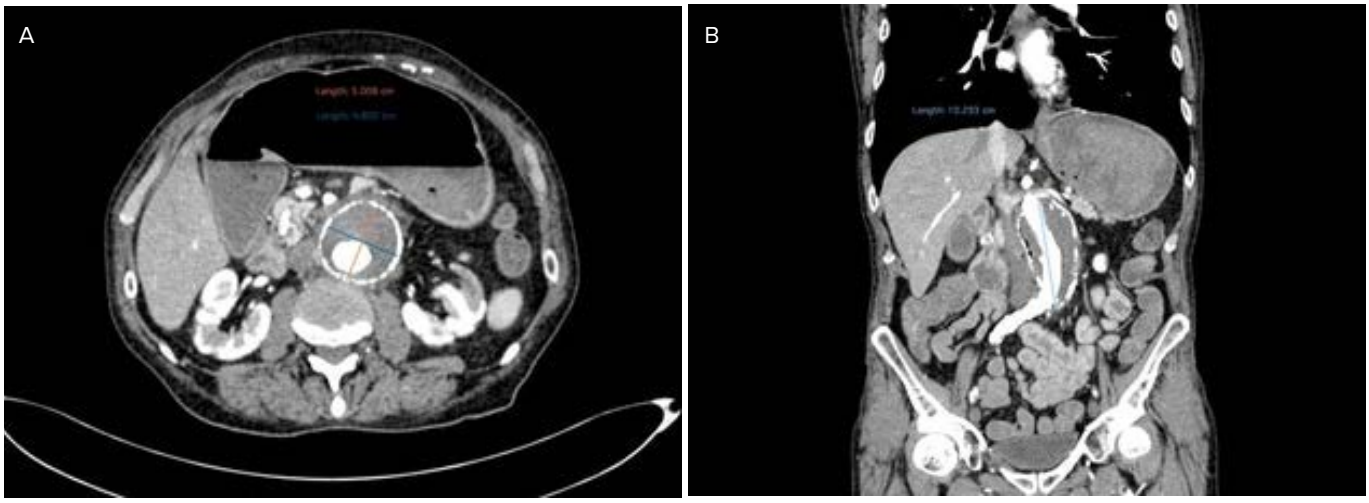


**FIGURE 1.** CT angiography: **A** – axial section: infrarenal aortic abdominal aneurysm AP and LL diameter; **B** – coronal section, aortic abdominal aneurysm CC diameter

cal diagnosis, such as leakage of the contrast media in the digestive tract and ectopic gas bubbles inside the aortic lumen.[3,4]

## CASE PRESENTATION

We present the case of a 66-year-old male patient, known smoker, with NYHA II heart failure with moderately reduced ejection fraction. The patient, who also had a history of AAA with parietal thrombosis but was unwilling to seek any medical treatment before this event, presented to the emergency room in hypovolemic shock (hemoglobin: 4.9 mg/dL, hematocrit: 15%). He presented massive hematemesis and hematochezia, high-intensity abdominal pain, and symptoms suggestive of acute post-hemorrhagic anemia. Furthermore, clinical examination revealed the absence of the left femoral pulse. Computed tomography (CT) angiography described a large amount of blood in the gastric cavity and an infrarenal AAA with dimensions of 5 × 4.8 × 10.3 cm (Figure 1).

CT angiography also revealed a fistulization with a measured orifice of 1.85 cm between the AAA and the D3 segment of the duodenum. Gas bubbles were also seen within the ruptured aneurysm, a typical discovery in aortic communications with a digestive segment (Figure 2).

Surgical intervention was performed without any other delay by a mixed team of general and vascular surgeons in an emergency operating room. The endovascular approach


**FIGURE 2.** CT angiography: **A** – coronal section: the arrow shows the fistula between the AAA and the D3 segment of the duodenum; **B** – axial section, the fistula orifice diameter, and the presence of a massive thrombus in the stomach

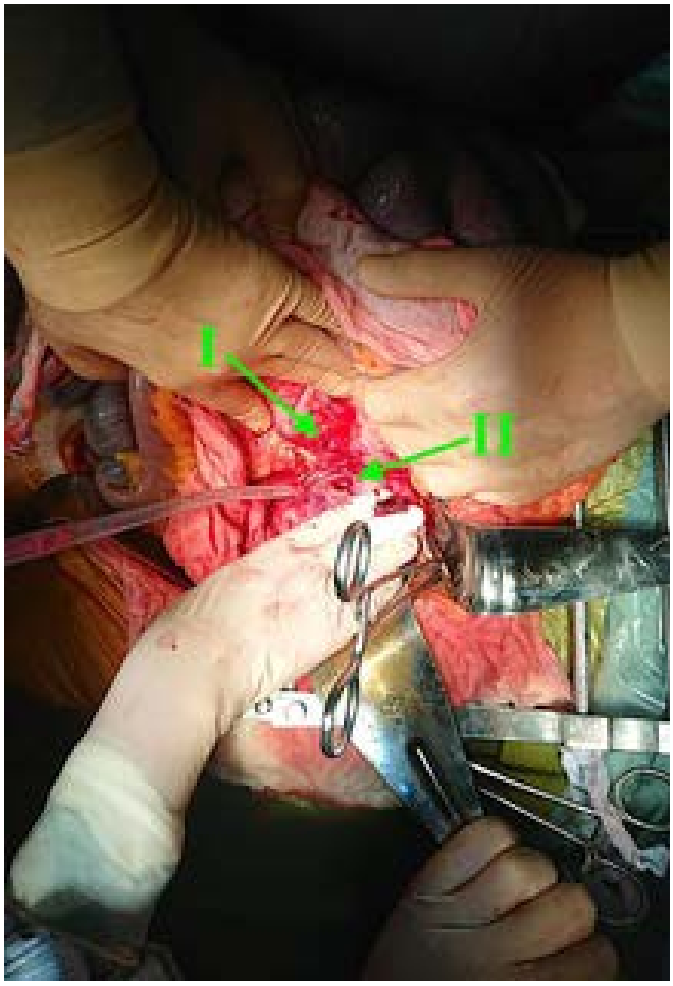


**FIGURE 3.** Intraoperative photo: arrow I is pointing to the duodenum orifice, and arrow II is pointing to the aortic orifice.

was prohibited by the high likelihood of failure, due to complicated atherosclerotic lesions of the iliac arteries. A median laparotomy was performed, and hemostasis was sought by clamping the infrarenal aorta, followed by a careful dissection of the communication between the AAA and the D3 segment of the duodenum (Figure 3).

Meanwhile, the patient was resuscitated with intravenous fluids, 2 units of packed red blood cells, and hemostatic agents, and was given empirical intravenous antibiotic therapy. Duodenoplasty was followed by aortic reconstruction, which started by extracting the content of the aneurysmal sac and was completed by successfully placing an aorto-bifemoral Dacron graft of 14 × 7 mm diameter (as both the iliac arteries were having massive atherosclerotic infiltrations), using a T-T proximal and a T-L distal anastomosis.

After removing the clamps, the graft was fully functional, and the bleeding was stopped. The patient was moved to the intensive care unit, where he received further therapy. Unfortunately, all the joint efforts were unable, ultimately, to save his life. Publication of the patient's data was approved by the local ethics committee, and informed consent was obtained from the patient's family members.

## DISCUSSIONS

AEF is the connection between the aorta and intestinal lumen,[5] while in cases where the duodenum and the abdominal aorta have a direct connection, an aorto-duodenal fistula occurs.[6] There are two types of AEFs: primary and secondary. Primary AEFs are often produced by an AAA corroding into the gut, whereas secondary types are created by abdominal aortic restorative operations.[5] In around 80% of patients, primary AEFs are discovered initially due to gastrointestinal (GI) hemorrhage. In approximately one third of cases, the GI bleeding is self-limited, with a subsequent hemorrhage happening within the first 6 hours.[7] Patients with cataclysmic hemorrhage are a real challenge for joint units that strive to save their lives. The death rate from unmanaged primary AEF is close to 100%. Life expectancy following surgery is 18–93%. Therefore, surgical management is the single most important therapeutic option for survival.[8]

Even though time cannot be lost with non-mandatory investigations, imaging can prepare the surgical and intensive care teams for whatever lies ahead. Alongside rapidly carrying out diagnostic imaging, fluid resuscitation and massive transfusion protocols must be initiated as soon as possible, while the patient is rushed to the operating room.

CT should always be performed on all hemodynamically stable patients,[9] as it is the key diagnostic method for such diagnosis.[8] CT angiography has increased the diagnostic rate of potential primary AEFs by more than 50%. The most obvious aspect in the pathogenesis of a primary AEF is the presence of gas bubbles associated with a hematoma.[9] Regarding the management of bleeding AEFs, an endovascular stent graft may be the first option in the operative repair.[10] The use of endovascular stent grafts results in faster hemostasis and stabilization in patients suffering from hypovolemic shock. This temporary fix may pave the way for a more permanent fix later on.[11] However, this was not possible in the presented case because of the chronic atherosclerotic occlusion of the left common iliac artery. Therefore, open repair surgery remained the only solution. All efforts must be mobilized in order to obtain blood or blood derivatives and to prepare the staff for facing a patient equivalent to major trauma. Mixed teams of general and vascular surgeons are necessary, and quick and

large access through extended celiotomy is required. The most frequent technique is to close the fistula directly.[12] After clamping the aorta and stopping the bleeding, reconstruction takes the usual form, using adapted grafts in terms of diameters and T-T proximal anastomosis. If available, silver-impregnated grafts are the best choice, to avoid the risk of infection.

Unfortunately, the late presentation of patients with comorbidities leads to poor results in terms of survival. Despite successfully stopping the active bleeding and vivaciously resuscitating the patient, the prolonged hemorrhagic shock took its toll. Also, in documented cases, the recurrence of ADF is the primary cause of mortality, although evidence does not demonstrate that this is an independent hazard.

Prompt diagnosis and quick surgical therapy are critical stages in achieving better outcomes. Even in an emergency scenario, intravenous contrast-enhanced abdomen CT scanning provides a quick and accurate diagnosis of an AEF. Although there is no ideal surgical technique for AEF at this time, the most efficient approach can be chosen depending on the surgery findings, the core etiology of the AEF, and the patient's state.[13]

## CONCLUSIONS

Endovascular treatment represents the first choice in the management of abdominal aortic aneurysms. Because of the extensive atherosclerotic stigmas and occlusion of the left common iliac artery in the presented case, open surgery was mandatory and required a multidisciplinary surgical team and a well-prepared intensive care team, ready for prolonged aortic clamping time and massive blood transfusion, if necessary.

## CONFLICT OF INTEREST

None declared.

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