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Surgical repair of large aortocaval fistula with limited shunt: Case report

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Abstract

A 67-year-old man was admitted with severe back pain and bilateral lower limb swelling. Enhanced computed tomography showed an infrarenal abdominal aortic aneurysm (92 × 75 mm^2) and a short aortocaval fistula (7 mm). Immediately afterward, circulatory collapse occurred, and the patient was rushed to the operating theater. A much larger aortocaval fistula (22 × 35 mm^2) than that demonstrated by preoperative computed tomography was found and was repaired with a Dacron patch while using two balloon-tipped catheters to control bleeding. Then, the abdominal aortic aneurysm was replaced with a bifurcated graft. The patient's postoperative course was uneventful. In this case, enhanced computed tomography detected the aortocaval fistula, but could not assess its size accurately. Successful surgical repair of an aortocaval fistula depends on early accurate delineation of the fistula and prompt control of bleeding.

Keywords

Enhanced computed tomography, aortocaval fistula, two balloon-tipped catheters

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Introduction

Aortocaval fistula (ACF) is a rare complication of abdominal aortic aneurysm (AAA) and is a life-threatening condition with complex clinical features. It is important to make a preoperative diagnosis of ACF and to plan appropriate surgical treatment to reduce morbidity and mortality.

Here, we report a patient with spontaneous ACF arising from an AAA. Although the fistula was found to be larger at operation than was shown preoperatively by enhanced computed tomography (CT), repair was performed successfully. We discuss the surgical strategy required in this emergency situation, highlighting control of bleeding from the fistula. Reporting this case was approved by the Review Board of JA Nagano Koseiren Shinonoi General Hospital, Nagano, Japan. The patient has provided written informed consent for publication of his information and images in an international medical journal.

Case report

A 67-year-old man was admitted at 3 h after the onset of severe back pain and bilateral lower limb swelling. He had a history of stroke and hypertension. On arrival at our hospital, his systolic blood pressure was 80 mm Hg, and he had bilateral leg edema with cyanosis. There was no abdominal bruit, elevation of the jugular venous pressure, or dyspnea. Enhanced CT showed an infrarenal AAA (92 × 75 mm^2) and a short fistula (7 mm) running between the right lateral wall of the AAA and the inferior vena cava (IVC) (Figure 1(a) and (b)). The IVC was compressed by the aneurysm (Figure 1(c)). Angiography was not performed. Just after CT scanning was completed, circulatory collapse occurred, and the patient was rushed to the operating theater. The AAA (90 × 70 mm^2) was identified via the transperitoneal approach, but there was no retroperitoneal hematoma. After heparinization, the infrarenal aorta was clamped, the aneurysm was opened, and the

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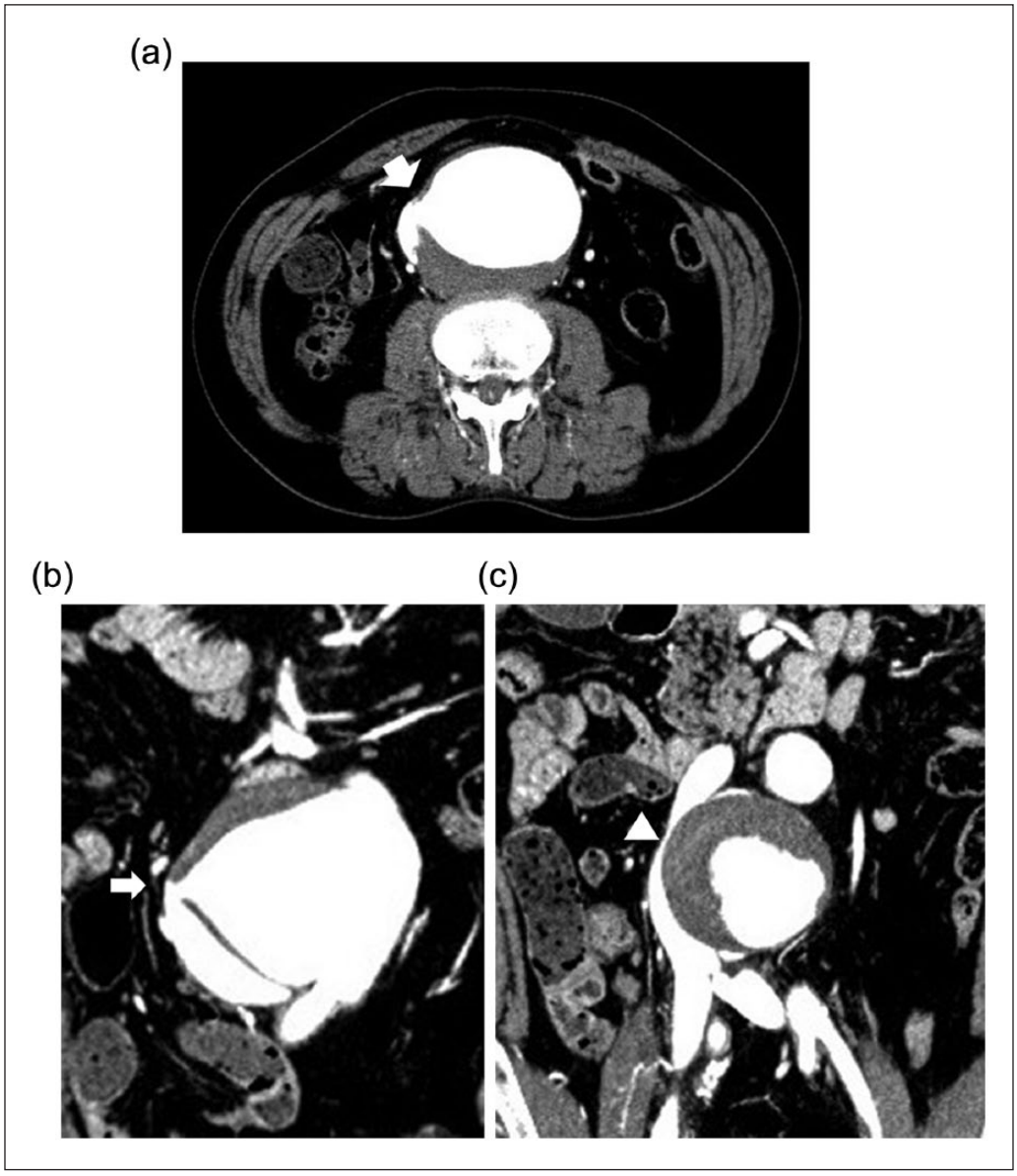

Figure 1. CT findings: (a) axial view of the fistula (arrow) between the AAA and the IVC—atheroma/thrombus surrounds the defect, (b) coronal view of the fistula (arrow) between the AAA and the IVC—atheroma/thrombus is seen around the defect, and (c) compression of the IVC (arrowhead) by the AAA.
CT: computed tomography; AAA: abdominal aortic aneurysm; IVC: inferior vena cava.

bilateral common iliac arteries were occluded with balloon-tipped catheters. Then, we detected a fistula communicating with the IVC via a 7-mm defect in the right lateral wall of the aorta at 3 cm proximal to its bifurcation (Figure 2(a)), corresponding to the lesion detected preoperatively by CT. There was considerable atheroma around the defect. As soon as the atheroma was removed, massive venous bleeding occurred. Despite digital compression, we could not identify the fistula accurately because of massive bleeding. Accordingly, two balloon-tipped catheters (balloon size: 12 Fr) were inserted through the fistula, and the bleeding was controlled. The fistula was found to measure $22 \times 35\,mm^2$ in diameter. It was closed with running sutures of 5-0 polypropylene and a Dacron patch (Figure 2(b)). Then, the AAA was replaced with a $16 \times 8\,mm^2$ bifurcated Hemashield graft (Boston Scientific, Boston, MA, USA). The aortic clamp time was 60 min, and operating time was 161 min. The patient's postoperative recovery was uneventful, and he was discharged on day 16.

Discussion

ACF occurs in about 1% of patients with AAA; the prognosis is poor, and death typically occurs after less than 2 months

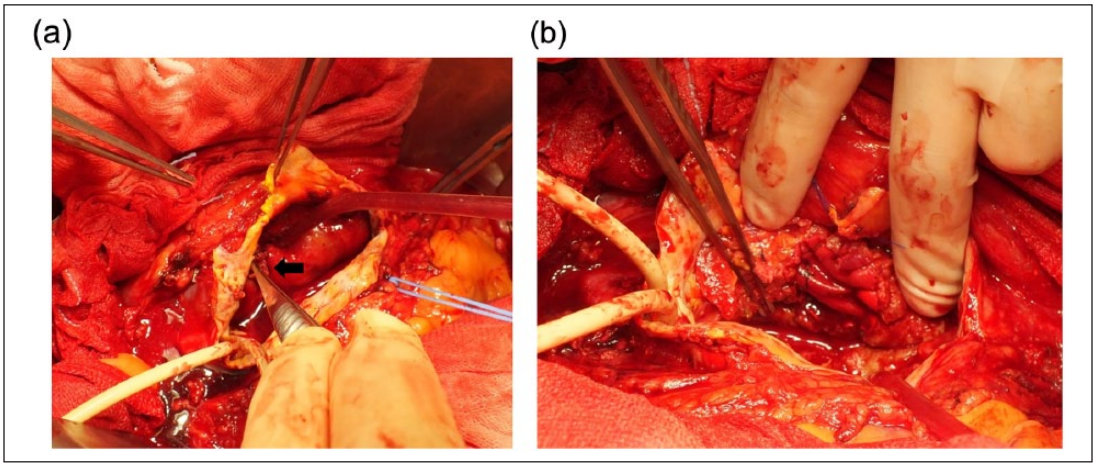

Figure 2. Intraoperative photographs: (a) the fistula is 7.0 mm in diameter and atheroma/thrombus surrounds the defect (arrow) and (b) closure of the fistula with running 5-0 polypropylene sutures and a Dacron patch.

without intervention.[1] The mortality rate of ACF patients is reported to range from 10% to 36%. Successful surgery generally depends on prevention of bleeding through the fistula into the IVC,[2–4] so preoperative diagnosis of ACF is important as it allows appropriate planning to reduce morbidity and mortality.[5]

Making a definite diagnosis of ACF from clinical findings can be difficult. Brewster et al. reported a triad of signs associated with ACF, which were cardiac failure, abdominal bruit, and lower extremity edema (detected in 35%, 80%, and 40% of their patients, respectively). However, our patient only had bilateral swelling and discoloration of the lower limbs due to venous hypertension.[4]

Enhanced CT is valuable for diagnosing ACF and often provides details of the vascular anatomy. In our patient, enhanced CT demonstrated the location of the ACF preoperatively and suggested that it was small enough for bleeding to be controlled by digital compression.[6] At operation, however, we found that mural atheroma in the aneurysmal sac had covered part of the fistula, and its diameter was larger than that shown by enhanced CT. Partial obstruction of the fistula by atheroma may have restricted blood flow and prevented progression to high-output congestive heart failure and multiple organ failure, so that our patient only had venous hypertension, which was also related to IVC compression by the aneurysm.

The most important point with respect to surgical repair of ACF is achieving control of bleeding from the fistula. In previous reports, bleeding was generally controlled by digital compression, IVC clamping, and use of a balloon catheter.[6] In our case, the fistula was so large that two balloon catheters were required to control bleeding. This method was also useful for preventing pulmonary embolism due to atheroma or air. Because of its size, a patch graft was required to close our patient's ACF, with careful suturing since the tissue around the fistula was friable.

Antoniou et al.[7] reported that endovascular repair of arteriovenous fistula (AVF) has a success rate of up to 96% with no short-term mortality, but type 2 endoleak occurs in about 22% of patients. In addition, Janczak et al.[8] reported that endovascular exclusion appeared to be as effective for a large AVF as conventional open repair, because follow-up CT did not reveal any evidence of endoleaks or residual fistula after 3 months. Thus, endovascular procedures might become an attractive option in the future.

In conclusion, successful surgical repair of ACF depends on early detection of the fistula and prompt control of bleeding during surgery. Determining the size of an ACF preoperatively is extremely important for planning the surgical strategy, because size influences the amount of bleeding, but the present case emphasizes that enhanced CT is not always accurate for this purpose.

Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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References

1. Nennhaus HP and Javid H. The distinct syndrome of spontaneous abdominal aortocaval fistula. *Am J Med* 1968; 44: 464–473.
2. Salo JA, Verkkala KA, Ala-Kulju KV, et al. Hematuria is an indication of rupture of an abdominal aortic aneurysm into the vena cava. *J Vasc Surg* 1990; 12: 41–44.
3. Gilling-Smith GL and Mansfield AO. Spontaneous abdominal arteriovenous fistulae: report of eight cases and review of the literature. *Br J Surg* 1991; 78: 421–425.
4. Brewster DC, Cambria RP, Moncure AC, et al. Aortocaval and iliac arteriovenous fistulas: recognition and treatment. *J Vasc Surg* 1991; 13: 253–264.

5. Jakanani GC and Chong PL. Pre-operative diagnosis of an unusual complication of abdominal aortic aneurysm on multidetector computed tomography: a case report. *Cases J* 2008; 1: 231.
6. Unosawa S, Kimura H and Niino T. Surgical repair of ruptured abdominal aortic aneurysm with non-bleeding aortocaval fistula. *Ann Vasc Dis* 2013; 6: 209–211.
7. Antoniou GA, Koutsias S, Karathanos C, et al. Endovascular stent-graft repair of major abdominal arteriovenous fistula: a systematic review. *J Endovasc Ther* 2009; 16: 514–523.
8. Janczak D, Chabowski M, Szydelko T, et al. Endovascular exclusion of a large spontaneous aortocaval fistula in a patient with a ruptured aortic aneurysm. *Vascular* 2014; 22: 202–205.