



Multiple Spontaneous Iliac and Femoral Arteriovenous Fistulas: A Case Report

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An arteriovenous fistula (AVF) refers to an anomalous connection between an artery and a vein. It can arise from traumatic or iatrogenic injuries. The occurrence of multiple spontaneous AVFs is rare. We present a case that used endovascular therapy to treat multiple spontaneous AVFs involving the internal iliac, common femoral, superficial femoral, and profunda femoris arteries and veins.

Key words: Arteriovenous malformation, arteriovenous fistulas, endovascular surgery, transarterial embolization, case report

INTRODUCTION

Arteriovenous fistulas (AVFs) in the limbs can have different causes. Traumatic incidents such as gunshot injuries or penetrating wounds, as well as iatrogenic factors including catheter insertion through the groin or surgical procedures, are known to contribute to the development of AVFs.^{1,2} Although spontaneous AVFs in the limb have been documented, instances of multiple spontaneous AVFs are relatively uncommon. Here, we present an exceptional case of multiple spontaneous AVFs involving various vessels, specifically between the internal iliac artery (IIA), the common femoral artery (CFA), the superficial femoral artery (SFA), and the profunda femoris artery (PFA), and their adjacent veins.

CASE REPORT

We present the case of a 69-year-old female patient with comorbidities of hypertension and left hemiplegia due to a previous cerebral infarction. She had no history of limb trauma nor catheter intervention of the left groin or limb but had a surgical history of total abdominal hysterectomy 30 years ago. She experienced left foot swelling a year prior, which gradually worsened and extended to her calf and

thigh [Figure 1]. During her illness, she reported experiencing pain, paresthesia (itchiness perceived as pain and coldness as numbness), and a noticeable increase in warmth, with the affected side being significantly warmer to touch than the unaffected side. The patient exhibited normal muscle power in the right extremity, which was graded 5. However, in the left leg, muscle power was significantly reduced to Grade 3. The circumferences of the right and left thighs were 35 cm and 54.5 cm, respectively, while for the right and left calves, they were measured at 26 cm and 39.5 cm, respectively. Computed tomography (CT) of the lower limbs revealed obliteration of the left common iliac vein accompanied by an engorged subcutaneous collateral connection between bilateral femoral veins [Figure 2]. In addition, unusual early contrast opacification in the veins of the left lower limb was observed, raising suspicion of an arteriovenous malformation or AVF at the pelvic cavity level, with reversal of blood flow toward the direction of the foot.

The patient subsequently underwent transarterial embolization combined with angiography and percutaneous angioplasty. During the procedure, angiography revealed the presence of multiple AVFs originating from the IIA, CFA, PFA, and SFA [Figure 3]. To address these findings, one stent each was placed in the SFA (GORE VIABAHN

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Figure 1: The swollen left leg contrasts with the normal right leg

VBJR071002W), PFA (GORE VIABAHN VBJR060502W), and CFA (GORE VIABAHN VBJR081002W). Furthermore, coil embolization was performed on the AVF on the PFA using COOK MWCE-35-6/3-tornado 2 coils, and on the IIA using COOK MWCE-35-8/3-tornado 5 coils and COOK MWCE-35-14-10-NESTER coil.

After the procedure, the patient's left leg edema gradually subsided and skin folds began to appear. The sensation of warmth decreased. After a few days of observation, the circumference of the left thigh decreased to 45 cm and the circumference of the left calf decreased to 32 cm. No postoperative complications occurred, and the patient was successfully discharged from the hospital.

DISCUSSION

AVFs in the limbs can manifest with specific clinical features. Unilateral edema occurs because of venous hypertension, whereas limb ischemia can arise because of the steal phenomenon. In addition, a high degree of left-to-right shunting in AVFs can lead to cardiac failure. Notably, the simultaneous presence of unilateral limb ischemia and edema is a distinctive characteristic of AVFs.³ The occurrence of multiple AVFs is infrequent. Traumatic AVFs of the limbs, such as those resulting from gunshot wounds, can cause multiple lesions.⁴ Among the etiologies of abdominal and pelvic AVFs, penetrating traumatic injuries continue to be the prevailing cause.⁵ Managing multiple AVFs are challenging because of the need to achieve complete closure. Typically, open surgical repair is the preferred treatment approach to maximize the chances of complete AVF closure. However, in cases involving multiple AVFs, as observed in the present case, complete closure cannot be achieved through open repair alone because of the wide extent of the fistulas. Open surgical repair of iliac

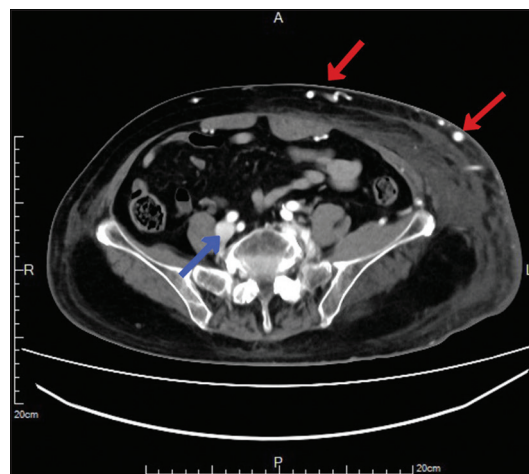


Figure 2: Lower limb computed tomography reveals only the right common iliac vein (blue arrow) and obliteration of the left common iliac vein, with a noticeable engorged subcutaneous collateral network (red arrows)

AVFs carries inherent risks, with reported surgical mortality rates ranging from 9% to 34%, and significant operative blood loss of 6 l or more is a common occurrence.⁶

In our case, despite the absence of a history of limb trauma or catheter intervention, a total abdominal hysterectomy performed 30 years ago could have potentially resulted in an inadvertent injury to the left common iliac vein, which could not be visualized on CT scan. Several years later, the patient presented with unilateral edema attributable to venous hypertension caused by an engorged subcutaneous collateral network. Considering the deep location of the iliac and common femoral AVFs, open repair was not feasible in this case. Therefore, we opted for endovascular therapy because it allowed for the simultaneous closure of AVFs in the SFA and PFA using covered stents. However, complete closure of the AVFs was not achieved due to the lack of precise identification of the internal iliac AVF on the lower limb CT scan. Accurate preoperative detection of AVF location and subsequent simultaneous closure is crucial for the effective treatment of multiple AVFs.

CONCLUSION

This report highlights a case of multiple spontaneous AVFs involving various limb vessels. Successful treatment of AVFs using endovascular therapy demonstrates the importance of precise angiographic detection and simultaneous closure.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent form. In the form, the patient has given her consent for her images and other clinical information to be

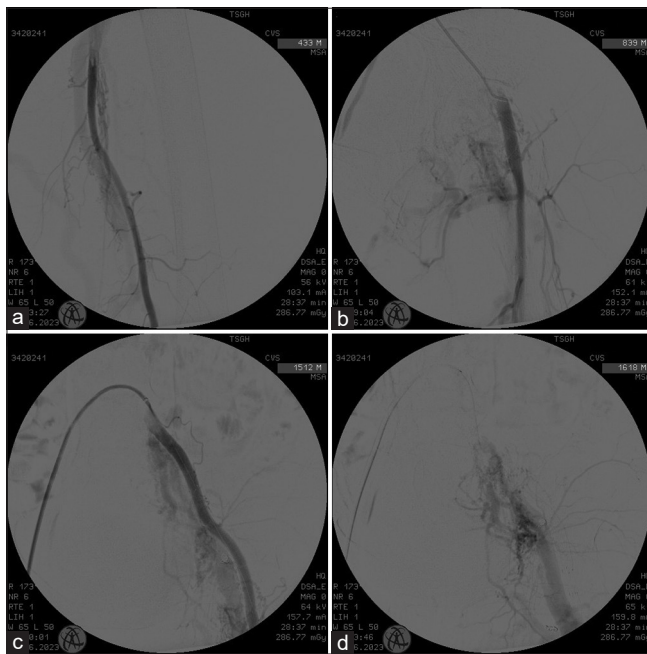


Figure 3: Under continuous angiography, early opacification of the venous system is observed, indicating the presence of an arteriovenous fistula. (a) Superficial femoral artery region, (b) Profunda femoris artery region, (c) Common femoral artery region, and (d) left internal iliac artery region

reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

Data availability statement

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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Conflicts of interest

There are no conflicts of interest.

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