

## Iatrogenic arteriovenous fistula of tibialis posterior artery following surgery of inserting plates and screws on a broken ankle: a case report

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Iatrogenic arteriovenous fistulas (AVFs) are seen after vascular trauma or injury. Peripheral arteriovenous fistulas may cause many problems like limb pain, edema, aneurysmal degeneration of the artery, ischemic symptoms, ulceration related to arterial insufficiency, and congestive cardiac failure. We report a 50-year-old man admitted to our clinic with a lower extremity bleeding ulcer and a history of orthopedic surgery a year ago. Following Doppler ultrasound and computed tomography findings, the fistula was treated surgically. Although endovascular stenting is the procedure of choice for such fistulas, surgical treatment is still an option.

Keywords: Iatrogenic arteriovenous fistula; surgery; traumatic arteriovenous fistula.

Iatrogenic arteriovenous fistulas (AVFs) are harmful complications caused by different surgical operations and vascular injuries.<sup>[1]</sup> Most peripheral iatrogenic AVFs need treatment. The shunt increases venous volume and pressure and decreases peripheral vascular resistance. Reduced blood flow to the lower extremity can lead to the onset or worsening of lower extremity ischemic symptoms. The increase in stroke volume and heart rate may lead to a dramatic rise in cardiac output. This case report discusses a unique case of an AVF between the right posterior tibial artery and vein in a patient presenting with leg pain, edema and bruising (Figure 1). The examination and treatment strategies are also discussed.

### CASE REPORT

A 50-year-old man was admitted to our emergency service with pain and bleeding from a varicose vein on his right leg. He had complaints of limb pain and edema. The previous history of surgery of inserting plates and screws on his broken ankle suggested an AVF, and the patient was hospitalized.

During examination, there were many varicose veins in the great saphenous vein (GSV) distribution in the distal leg. Peripheral pulses were palpable. There was a continuous bruit on the left side, if the extremity with a palpable thrill.

A Doppler ultrasound was made to the lower extremity and it only showed venous insufficiency in the GSV. Contrast enhanced computed tomography

of lower extremity was performed which revealed a connection between the right posterior tibial artery to its adjacent vein. In the arterial phase, the varicose veins were filled with blood due to the fistula.

Laboratory analysis revealed no abnormality. Echocardiography demonstrated normal left ventricular systolic and diastolic functions. All valves were reported to be functioning normally without stenosis or insufficiency.

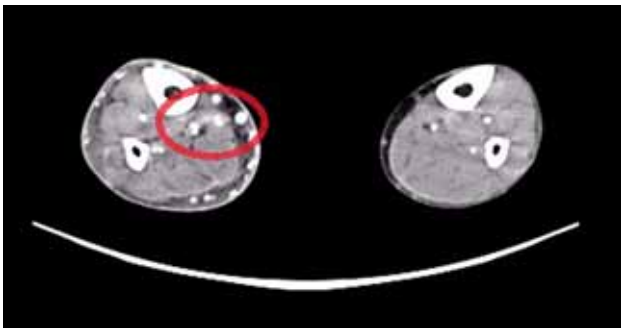
The patient was operated under general anesthesia. A longitudinal incision was made 1 cm below the knee. Trifurcation of the popliteal artery was exposed. Large varicose veins derived from the GSV were ligated. Posterior tibial artery was exposed till the fistulized part. Systemic heparinization was instituted and vascular clamps were applied to the vessels.

The narrow-based AVF between the posterior tibial artery and vein was ligated and divided at arterial and venous ends. The arterial side was primarily repaired. After this procedure, the GSV was ligated distally and proximally and excised.

Surgical repair was successfully performed and clinical signs and symptoms relieved dramatically

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**Figure 1.** Computed tomography-scan showing the fistula between posterior tibial artery and its adjacent vein.

subsequently (Figure 2). The patient was discharged from the hospital at the fifth postoperative day.

Repeated Doppler ultrasound was done and there was no sign of the fistula. At the third postoperative week, the leg was decent with no edema and the venous ulcerations were nearly all treated.

## DISCUSSION

Iatrogenic arteriovenous fistulas usually occur following percutaneous interventions, surgical operations, and trauma. They may remain asymptomatic for many years. Swelling, thrill, and pulse deficit in the limb are the clinical features of the fistula.<sup>[2]</sup> Peripheral AVFs may also cause intermittent claudication or venous hypertension. Progressive symptoms of heart failure may be also seen eventually.

The diagnosis of AVFs can be made by history and physical examination.<sup>[3]</sup> Duplex ultrasonography, computed tomography, magnetic resonance imaging, and conventional angiography may be used to find the localization of the fistula.<sup>[4]</sup> Color-coded Doppler ultrasound is also a non-invasive and simple method, but in our case this method failed to show the AVF.

One-third of all AVFs close spontaneously in one year and for asymptomatic AVFs, watch and wait policy may be used. The type of treatment depends on the cause, acute or chronic nature, size and location of the AVF. Pressure with an ultrasound probe can be applied or bandaging may be done for spontaneous closing of the fistula.<sup>[2]</sup>

Endovascular techniques and surgical repair are two different options in AV fistula treatment. Although endovascular techniques reduce patient morbidity and



**Figure 2.** Edema, hyperemia and pain on the right leg, decreased significantly in the postoperative period.

hospital stay, surgery is still the gold standard.<sup>[2]</sup> Surgical repair offers a 96% chance of closure of the fistula.<sup>[5]</sup> Endovascular modalities of treatment include covered stent implantation, coil embolization and utilization of glue. Using covered stents is technically easy, and said to have a high success rate and a low complication rate.<sup>[6,7]</sup>

Endoluminal coils can be easily traced through the high flow fistula and enter the venous circulation. Therefore, it must be avoided for the treatment of the AVF.<sup>[8]</sup> The use of covered stents and stent grafts in small arteries has a higher risk of thrombosis and vascular stenosis.<sup>[9]</sup>

In conclusion venous hypertension and ischemic complications can be seen in peripheral arteriovenous fistulas. To avoid vascular stenosis and thrombosis, distal AVFs must be treated surgically in trauma patients.

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