Aneurysm resection interposed with a spiral saphenous vein graft in a patient with a popliteal venous aneurysm with thrombosis

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ABSTRACT

We describe the case of a 46-year-old man with pulmonary thromboembolism caused by a popliteal venous aneurysm with thrombosis. The aneurysm was fusiform and partially saccular with a thrombus, and the caliber of the native popliteal vein was large. Tangential aneurysmectomy with lateral venorrhaphy was difficult because of the aneurysm type, and graft interposition was required because of the large venous diameter of the anastomosis site. The patient underwent aneurysm resection interposed with a spiral saphenous vein graft. The postoperative course was uneventful, and the graft was patent at 1 year after surgery. (J Vasc Surg: Venous and Lym Dis 2019;7:898-901.)

Keywords: Popliteal vein; Varicose veins; Vascular surgical procedure

Popliteal venous aneurysm (PVA) is a rare disease that can lead to deep venous thrombosis and pulmonary thromboembolism (PTE). Surgical treatment of PVA is recommended in addition to anticoagulation therapy because of the high risk of associated PTE.[1,2] Several surgical procedures have been reported for aneurysm treatment, and tangential aneurysmectomy with lateral venorrhaphy is the most common method implemented.[2] However, some cases require interposition grafting because of the aneurysm's shape and large peripherocentral diameter. We present a case of PVA that was successfully treated by aneurysm resection interposed with a spiral saphenous vein graft. Consent was obtained from the patient for publication.

CASE REPORT

A 46-year-old man without noteworthy past medical history presented to another hospital with exertional dyspnea and swelling and pain of the left lower limb. Computed tomography revealed bilateral PTE and a left PVA with thrombosis (Fig 1). A temporary inferior vena cava filter was placed, and direct oral anticoagulation (DOAC) was started at the cardiologist's discretion. The patient was then transferred to our hospital for treatment of the PVA. Duplex ultrasound examination revealed a 25 × 50 × 30 mm^3 fusiform and partially saccular aneurysm with thrombus of the left popliteal vein. The caliber of the native popliteal vein was 10 mm at the periphery and 12 mm at the proximal site (Fig 2). We planned an aneurysm resection and reconstruction with a spiral vein graft based on the type of aneurysm and the venous diameters of anastomosis sites.

Under general anesthesia, the right saphenous vein graft was harvested from the thigh in the supine position. After switching the patient to a prone position, we exposed the popliteal vein through a posterior approach. The spiral saphenous vein graft was performed on the exposed popliteal vein (Fig 3), and the graft diameter was decided according to the smaller site (peripheral site) of the popliteal vein (10 mm).The aneurysm was essentially fusiform and partially projected. We performed the aneurysm resection interposed with the spiral saphenous vein graft. The aneurysm contained a thrombus (Fig 4).

We started low-molecular-weight heparin on the day of the operation and resumed DOAC from postoperative day 1. The inferior vena cava filter was removed. The postoperative course was uneventful. The patient continues to receive DOAC because he was diagnosed with protein C deficiency during the postoperative examination. A duplex ultrasound scan has been performed periodically, and the graft has remained patent 1 year later.

DISCUSSION

PVA is an uncommon but potentially life-threatening disease because it is associated with venous thrombosis and can result in PTE.[1] Thrombolytic therapy has been performed as part of the initial treatment. In patients with a prior venous thromboembolism, surgical repair is indicated as the first treatment option because of the high incidence of recurrence.[1,2] Surgical treatment is recommended for patients with asymptomatic saccular or large (>20 mm) fusiform aneurysms.[1,2]

Various surgical procedures have been performed for aneurysm treatment. Tangential aneurysmectomy with lateral venorrhaphy, vein bypass or venoplasty, end-to-end anastomosis, and simple ligation or resection were

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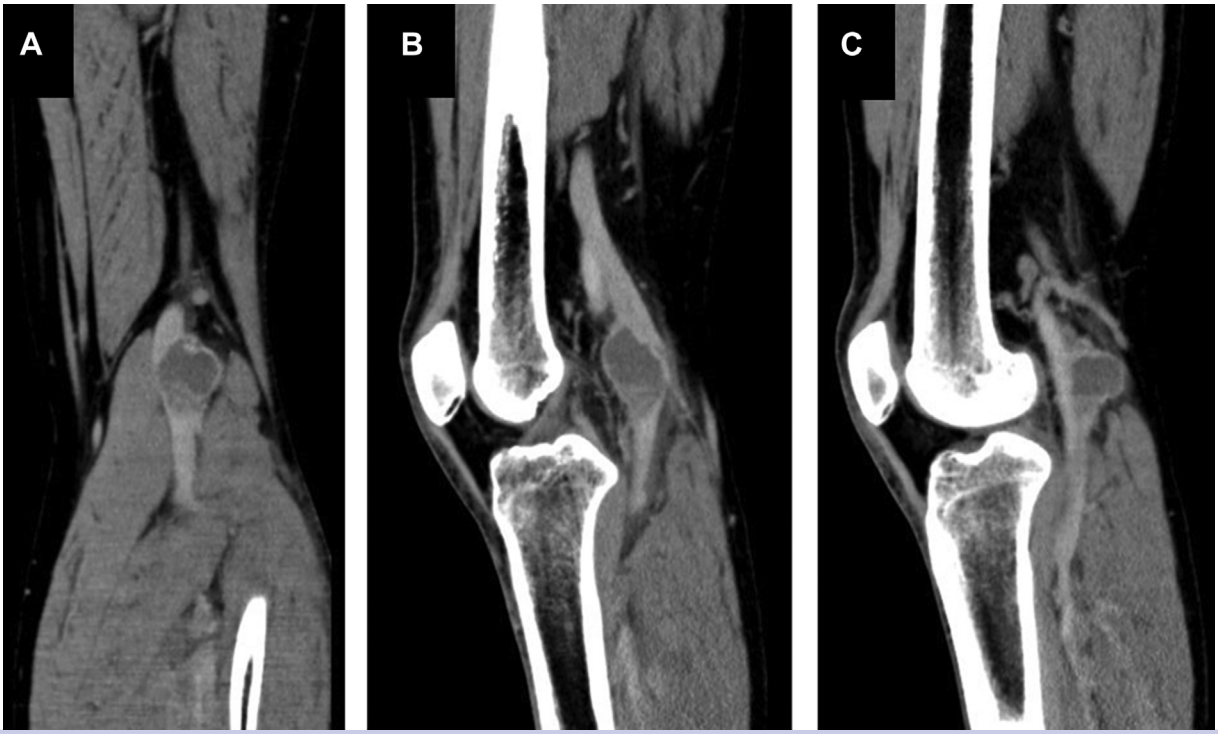

Fig 1. Preoperative computed tomography scan showing the left popliteal venous aneurysm (PVA) with thrombosis. **A,** Coronal view. **B** and **C,** Sagittal view.

mainly reported.[2] The procedure chosen greatly depends on the type of aneurysm. Most PVAs are of the saccular type (62%), whereas the fusiform type is relatively rare (12%).[2] Tangential aneurysmectomy with lateral venorrhaphy is performed most frequently, especially for saccular aneurysms. Although there have been a small number of cases, aneurysm resection with venous reconstruction is needed for many fusiform aneurysms and several saccular aneurysms when tangential aneurysmectomy cannot be reasonably performed. The main reason is that the peripherocentral diameters of the aneurysm are large, and the saphenous vein graft interposition is unsuitable. The cases reported involved resection of the aneurysm with interposition grafting using a synthetic graft and a constructed vein graft.[3-5] We chose a constructed saphenous vein graft rather than a prosthetic graft as we needed to take into account the patency rate and the duration of anticoagulation. Constructed saphenous vein grafts were reported to be patent 1 year later, whereas patency of the synthetic graft is not clear. We used a spiral vein graft because of a better chance for reconstruction than with a panel one.

Many investigators continue anticoagulation for 3 to 6 months, although the optimal duration of

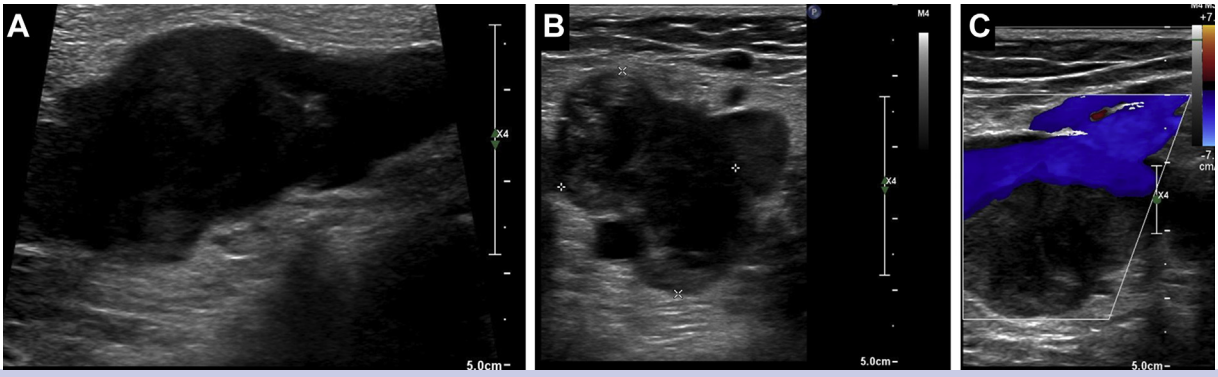

Fig 2. Preoperative ultrasound examination. Ultrasound examination revealed a fusiform and partially saccular popliteal venous aneurysm (PVA) with thrombosis. The diameters of the peripherocentral parts were large. **A,** Long-axis view. **B,** Short-axis view. **C,** Short-axis view with color Doppler imaging.

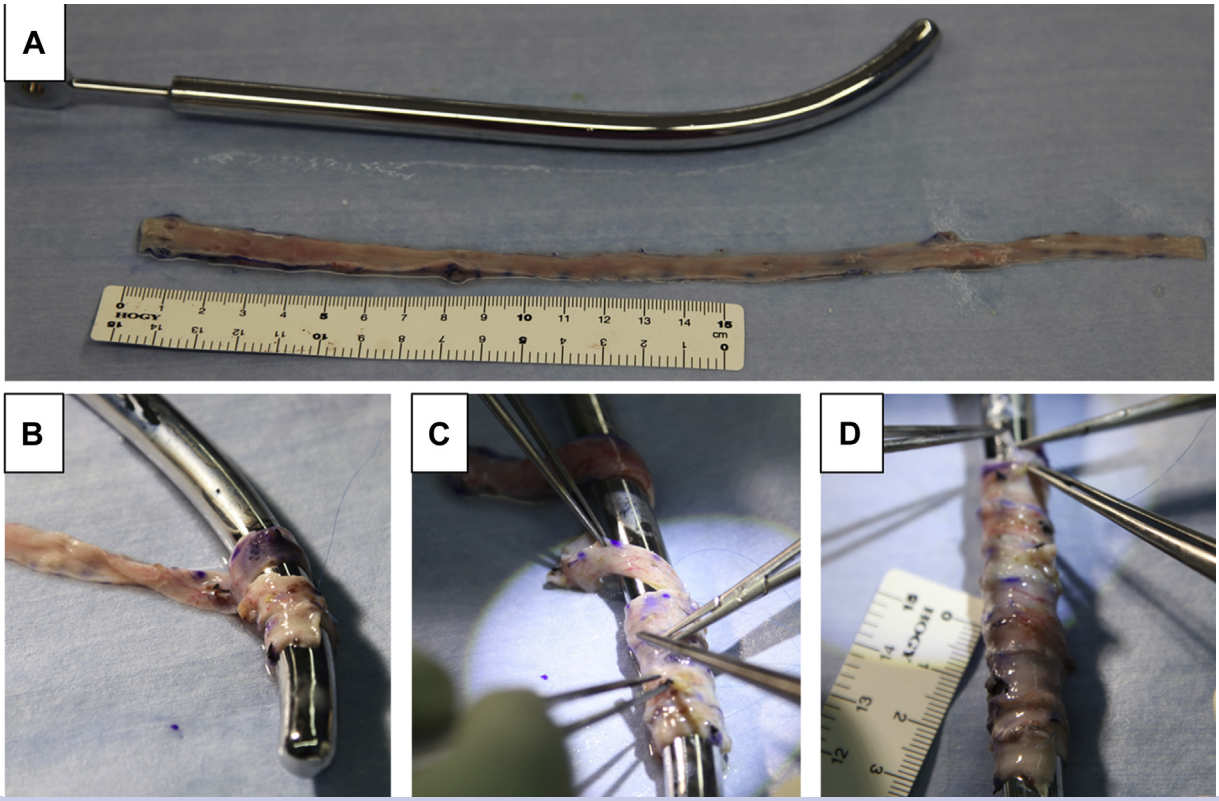

Fig 3. Construction of the spiral vein graft. **A,** The saphenous vein was opened longitudinally. A 10-mm Hegar-type dilator was prepared as a support for wrapping the graft. **B,** The edge of the vein was sutured and wrapped around a Hegar-type dilator. **C,** The vein was sutured with running 7-0 monofilament suture. **D,** The end of suture.

postoperative anticoagulation therapy remains to be clarified.[1,6,7] In our case, we must continue anticoagulation therapy throughout the patient's life because the patient was diagnosed with protein C deficiency during the postoperative examination.

Given the rarity of this disease, patency requires a long-term follow-up to support the treatment choice and to confirm that the interposition by spiral saphenous vein graft is the most adequate option.

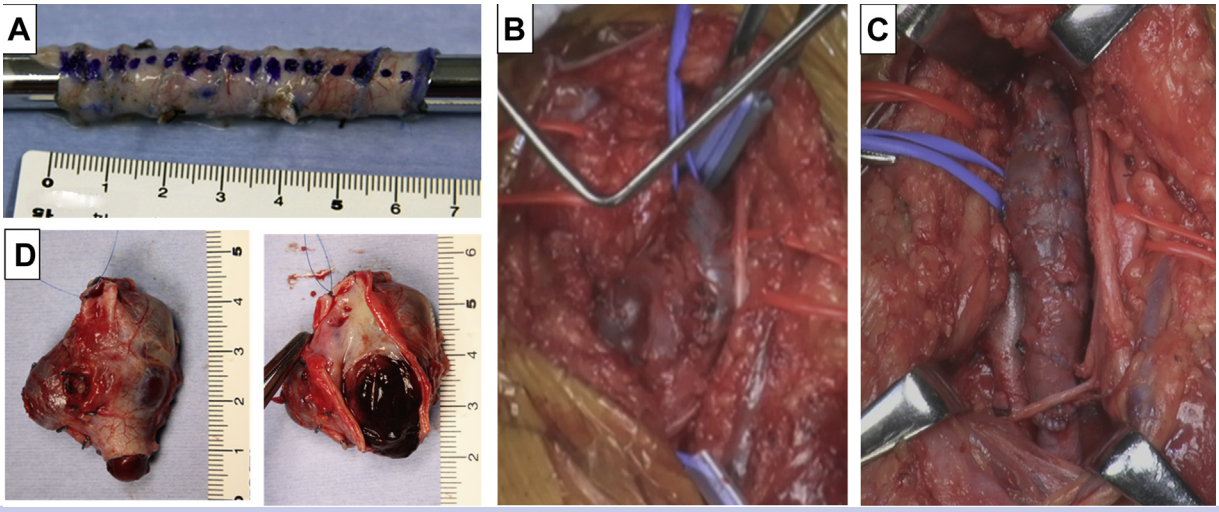

Fig 4. Intraoperative view. **A,** The spiral saphenous vein graft. **B**, Popliteal venous aneurysm (PVA). **C,** Aneurysm resection interposed with spiral saphenous vein graft. **D,** Resected aneurysm.

CONCLUSIONS

The aneurysm resection interposed with spiral saphenous vein graft for PVA was successfully performed. The graft was patent at the 1-year follow-up. This method could be a useful option in cases of PVAs that require graft interposition.

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