

Our experience of symptomatic and asymptomatic popliteal venous aneurysm

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ABSTRACT

This report describes 7 cases of popliteal venous aneurysm, including 2 cases with tachypnea, 3 cases discovered during investigation for chronic venous disease, and 2 cases presenting with pain and mass in the popliteal fossa. Successful treatment was achieved by surgery or conservative treatment. Based on the treatments for popliteal venous aneurysm, surgical repair is primarily used in symptomatic patients; however, conservative treatment or a regular clinical and duplex ultrasound follow-up is recommended for asymptomatic patients. (J Vasc Surg Cases and Innovative Techniques 2018;4:1-4.)

Popliteal venous aneurysm (PVA) is a rare pathologic condition. However, it could lead to severe consequences. For instance, pulmonary embolus (PE) is the first clinical presentation in 70% to 80% patients. By 2015, there were 212 cases reported,¹ and most of the knowledge is based on these reports. Herein, we present our treatment of PVA and review the literature. Consent from the patients was obtained to present their cases.

CASE REPORT

Patient 1. A 58-year-old woman presented to the emergency department with chest tightness and tachypnea. The electrocardiogram showed S₁Q₃T₃, and the computed tomography pulmonary angiography examination diagnosed PE. Deep venous thrombosis-related symptoms and venous insufficiency of the lower extremities were absent. Duplex ultrasound examination revealed a dilation of the popliteal vein without intraluminal thrombus (Fig 1, A); phlebography demonstrated a 15- × 15- × 20-mm³ saccular aneurysm at the right popliteal vein (Fig 1, B). Finally, the patient underwent tangential aneurysmectomy and lateral venorrhaphy. In addition, she was prescribed warfarin for 3 months.

Patient 2. A 58-year-old woman presented to the hospital with pain in the right popliteal vein. No other signs were found during palpation of the popliteal fossa. Duplex ultrasound examination showed a PVA (Fig 1, C); the phlebography examination demonstrated a 25- × 25- × 60-mm³ saccular aneurysm at

the right popliteal vein (Fig 1, D). The treatment was similar to that of patient 1.

Patient 3. A 63-year-old man presented to the department with varicose veins of the lower extremities. Phlebography was performed to exclude the Cockett syndrome. In addition, a 15- × 15- × 20-mm³ saccular PVA was incidentally found in his left popliteal vein (Fig 2, A). However, the patient was not willing to undergo surgery for PVA; thus, we informed him about the risks of this disease. Finally, the high ligation of saphenous vein and stripping surgery was performed in the left lower extremity. Considering the potential risks of PE, we suggested prophylactic anticoagulation for 6 months to the patient.

Patient 4. A 52-year-old man presented to our department because of varicose veins of the lower extremities. Similarly, PVA was discovered in the left popliteal fossa during the investigation for chronic venous disease; the shape of the aneurysm was fusiform, with dimensions of 15- × 15- × 25-mm³ (Fig 2, B). The diagnostic methods and treatments were the same as those for patient 3.

Patient 5. A 60-year-old man presented to the hospital because of varicose veins of the left lower extremity. A 20- × 20- × 30-mm³ saccular PVA was found in the left popliteal vein (Fig 2, C). The diagnostic methods and treatments were the same as those for patient 3.

Patient 6. A 63-year-old man was admitted in the orthopedics department because of a soft mass in the right popliteal fossa. The surgeons misdiagnosed this mass as a cyst and prepared for exploratory surgery. During the operation, the surgeons confirmed a 30- × 30- × 40-mm³ PVA and hence terminated the operation because of unpredictable risks. Subsequently, the patient was transferred to our department, and phlebography was performed to re-evaluate the lesion (Fig 2, D). However, the patient refused a reoperation of the aneurysm; warfarin was recommended for 6 months after discharge.

Patient 7. A 37-year-old man presented to the emergency department with acute shortness of breath. The physical examination did not reveal any pathologic process, and findings

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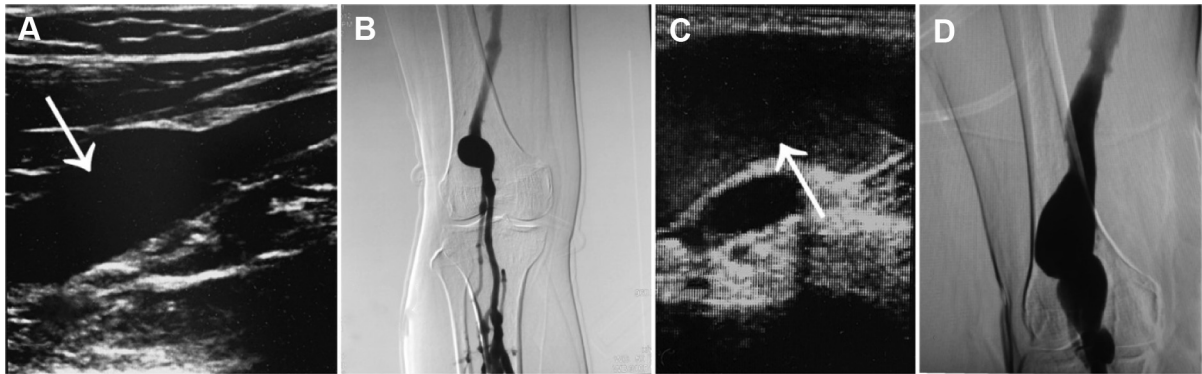


Fig 1. Patient 1 (**A** and **B**) and patient 2 (**C** and **D**). **A**, Ultrasound examination revealed a dilation of popliteal vein (*arrow*). **B**, Phlebography demonstrated a saccular popliteal venous aneurysm (PVA). **C**, Ultrasound revealed a PVA (*arrow*). **D**, Phlebography demonstrated a saccular PVA.



Fig 2. Phlebography images of patient 3 (**A**), patient 4 (**B**), patient 5 (**C**), and patient 6 (**D**).

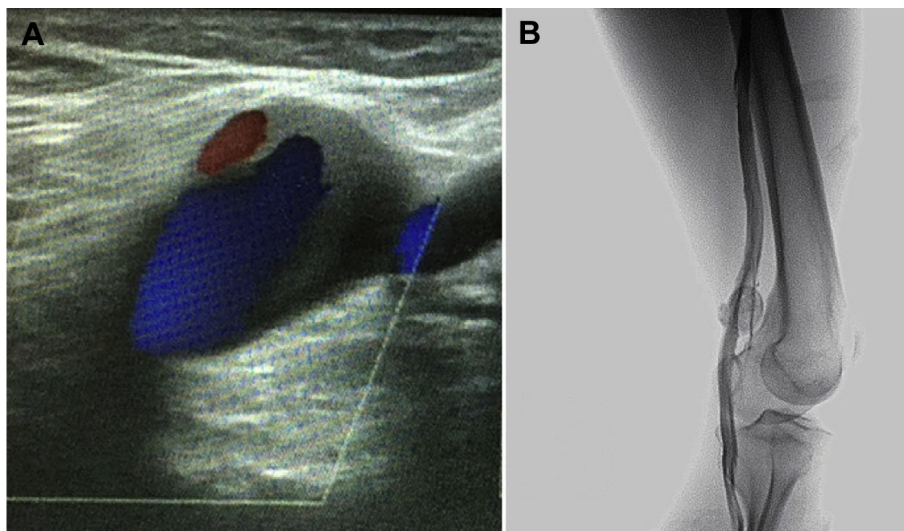


Fig 3. **A**, Ultrasound examination revealed a popliteal venous aneurysm (PVA) without intraluminal thrombus. **B**, Phlebography demonstrated a saccular PVA.

on computed tomography pulmonary angiography were normal. Because a PE was suspected, a subcutaneous injection of low-molecular-weight heparin was administered. Ultrasound examination found a PVA without intraluminal thrombus

(**Fig 3, A**). Subsequent examination revealed a $15 \times 15 \times 20\text{-mm}^3$ saccular PVA in the left popliteal vein (**Fig 3, B**). The patient underwent tangential aneurysmectomy and lateral venorrhaphy (**Fig 4**), with warfarin recommended for 3 months.

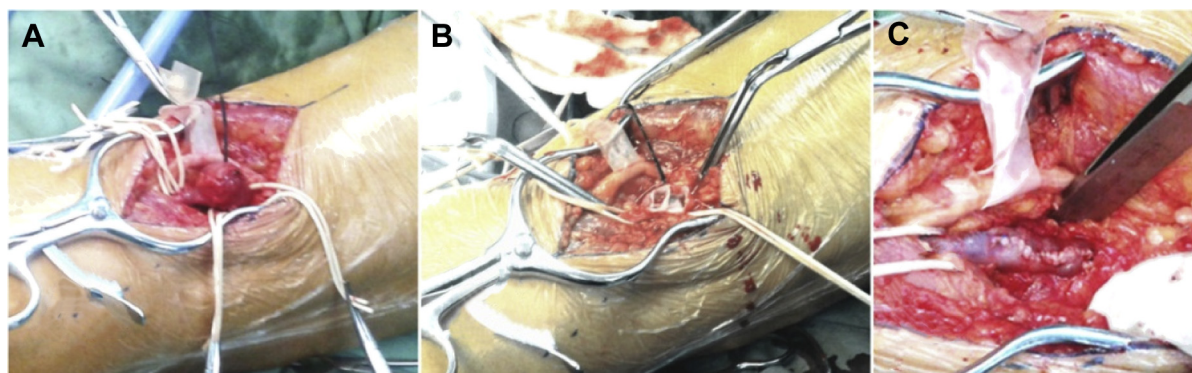


Fig 4. Intraoperative view. **A**, Popliteal venous aneurysm (PVA): surgical isolation. **B**, Tangential aneurysmectomy. **C**, Popliteal vein reconstruction after aneurysmectomy.

Various stages of the PVA condition were classified according to the Clinical, Etiology, Anatomy, and Pathophysiology (CEAP) classification. Patients with varicose veins were categorized as CEAP class C2, whereas other patients were categorized as CEAP class C1. All patients were followed up by a combination of outpatient follow-up and telephone interview until July 2017. No discomfort was noted in the popliteal fossa; no deaths were reported, the ultrasound examination confirmed the patency of the popliteal vein, and no morphologic change was observed in the aneurysms in the patients receiving conservative treatment.

DISCUSSION

Because of the lack of population-based studies and disease-related literature, the prevalence of PVA is difficult to estimate. In this case report, all patients were treated at the Third Affiliated Hospital of Soochow University between March 2011 and August 2016; the prevalence of PVA was approximately 0.28% among patients with lower extremity venous disease, which was higher than that reported in the literature, 0.2%.²

The clinical presentations of PVAs are variable; commonly, they are accompanied by thromboembolic complications. A potentially life-threatening complication of PE occurred in 43% of the patients from a cohort of 105 cases: localized popliteal symptoms in 36%, venous insufficiency in 13%, and deep venous thrombosis in 5.7%.³ However, only one patient had a PE in our institute. A majority of the aneurysms were found incidentally, followed by local symptoms in the popliteal fossa.

Thus, excluding the presence of PVA is essential in the patients with unknown thrombus-derived PE or venous insufficiency of the lower extremities. PVA can be diagnosed by various methods, such as venous ultrasound, phlebography, computed tomography angiography, and magnetic resonance imaging. Venous ultrasound is considered the preferred method for PVA diagnosis and follow-up owing to the advantages of noninvasiveness and lack of ionizing radiation.^{4,5} However, phlebography can accurately present the size of the PVA, which is critical in surgical planning. Most asymptomatic PVAs

were found incidentally during the investigation for chronic venous disease.

According to diverse clinical manifestations, the management of PVA is controversial.⁶⁻⁹ Previous studies suggested that surgery should be performed for most saccular PVAs that are associated with high risk of PE. In our opinion, the treatment of PVA should be based on the thromboembolic events, clinical symptoms, and intraluminal thrombus.

With clear evidence of thrombus and positive symptoms, surgical repair was recommended. Postoperative management primarily consisted of administration of anticoagulants for 3 to 6 months.^{3,5,10-12} PVA, as a source of thrombus, was removed, resulting in a low incidence of PE, and the effect of warfarin completed the endothelialization of the popliteal vein for 3 months after surgery. Postoperative complications include transient common peroneal nerve palsy and hematoma formation.

Conversely, PE recurrence rates were as high as 80% in patients treated with anticoagulation alone.¹⁰ Considering the potential risks of PE, four of our patients were treated with prophylactic anticoagulation as they refused surgery for the aneurysms. During the follow-up, no symptoms of PE or other thromboembolic events occurred in patients subjected to conservative treatment. Remarkably, no adverse events occurred for a prolonged duration after patients terminated the anticoagulation. Furthermore, the role of prophylactic anticoagulation in patients with PVA is not established in the literature. However, lack of clear evidence of thromboembolic events could predict a good outcome. In our experience, a regular clinical and duplex ultrasound follow-up was appropriate for asymptomatic patients.

CONCLUSIONS

Surgery remains the leading treatment of PVA; however, anticoagulation performed better than expected for PE prevention, especially in the event of contraindications to and complications of surgery. In the absence of thrombus, prophylactic anticoagulation may be unnecessary. Nevertheless, a long-term follow-up is

recommended for all symptomatic or asymptomatic PVA patients. Thus, further multicenter studies are imperative to guide the treatment of PVA.

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