Popliteal vein aneurysms are an uncommon pathology that can result in significant morbidity and mortality. Given the rarity of the condition, the demographics, true incidence, and etiology are poorly understood. The condition tends to occur more frequently in females and more commonly over the left lower extremity. We hereby report symptomatic popliteal vein aneurysm.

CASE REPORT

A 43-year-old man presented with abrupt onset of chest pain that subsided by the time he arrived at the hospital. His past medical history was significant for pulmonary embolism about 10 years ago and coronary artery disease with obtuse marginal stenting 2 years ago. Upon arrival, the patient was hemodynamically stable, but he reported intermittent left lower extremity swelling during admission.

The patient was admitted for cardiac workup, which was negative for acute coronary syndromes. As a result of the patient’s history of pulmonary embolism, he underwent a computed tomography (CT) chest scan. The scan was negative for pulmonary embolism. Given the left lower extremity symptoms, a lower extremity venous ultrasound was performed and revealed left popliteal vein aneurysm (Figure 1). Subsequently, a CT left lower extremity venogram was performed in order to further assess the popliteal vein aneurysm anatomy, extent, and size. The CT venogram revealed 4.3 × 8.8 cm left popliteal vein aneurysm (Figures 2 and 3). The location of the aneurysm was challenging because it started just distal to the adductor canal, making it difficult to potentially obtain proximal control through the posterior approach.

The situation was discussed with the patient, and intervention was recommended as a result of the patient’s intermittent swelling in the left lower extremity, history of unprovoked pulmonary embolism, and the potentially fatal consequences of pulmonary embolism. No endovascular treatment options are reported to date on popliteal vein aneurysm repair. Thus, the durability of an

ABSTRACT: Popliteal venous aneurysms are a rare entity that at times can be fatal in the setting of pulmonary emboli. We report a case of a large popliteal venous aneurysm in a patient with a history of pulmonary embolism. We performed a posterior surgical approach technique and used a tourniquet to get atraumatic proximal and distal control of this large aneurysm in a challenging location that starts just distal to the adductor canal.


Key words: popliteal venous aneurysm, pulmonary embolism, venous aneurysm

Figure 1. Duplex ultrasound revealing popliteal vein aneurysm.

Figure 2. CT scan with axial view of the popliteal vein aneurysm.
endovascular option for popliteal vein aneurysm is unknown, and the option was not offered. We recommended anticoagulation and open surgical repair, which means plication of the aneurysm. If the exposure was inadequate, then the alternative would be exclusion of the popliteal vein aneurysm through proximal and distal ligation and proceeding with a venous bypass graft. We also recommended starting the patient on anticoagulation given the risk of deep venous thrombosis in the setting of a popliteal vein aneurysm. The patient was discharged home on anticoagulation, and elective surgery was scheduled for repair of the left popliteal vein aneurysm.

For the repair, the patient was placed in prone position, a “lazy S” incision was performed, and subcutaneous flaps were created. When the popliteal vein aneurysm was encountered (Figure 4), the vein was dissected off the popliteal artery. We proceeded with anticoagulation prior to inflation of the tourniquet, using heparin 80 units/kg intravenous bolus and activated clotting time above 250 throughout the case.

Next, we placed a tourniquet and then wrapped an Esmarch bandage on the leg in order to have the leg “exsanguinated” prior to inflation of the tourniquet, which was placed on the mid to distal thigh of the patient. We decided to use a tourniquet instead of clamping in order to reduce the trauma to the vein that might be caused by clamping and to provide better access proximally for the venous aneurysm and its challenging location with the proximity of the vein cephalad to the adductor canal.

After heparin was given, the tourniquet was inflated. The popliteal vein aneurysm was dissected proximally and distally, with care being taken to avoid and preserve the tibial nerve. The aneurysm was opened, and no thrombus was found in the aneurysm (Figure 5). Next, aneurysmorrhaphy was performed using 6-0 Prolene sutures in a running manner over a 20F chest tube (6.6 mm), which was inserted inside the lumen in order to ensure the aneurysmorrhaphy was adequate and did not constrict the vein significantly (Figure 6). The chest tube was pulled prior to finishing the aneurysmorrhaphy, the tourniquet was deflated, and closure was performed with multi-layer with 2-0 and 3-0 PDS for the subcutaneous tissues and the skin was approximated with 3-0 Prolene sutures (Figure 7).

The patient was started on full anticoagulation and discharged home on postoperative day 1. He will be followed up on an outpatient basis with serial ultrasounds at 1 month then every 6 months. Since there are no guidelines for anticoagulation in the setting of popliteal vein aneurysm, we decided to treat the patient as a provoked thromboembolic event patient with a 3-month anticoagulation plan.
Popliteal venous aneurysms are a rare etiology of venous pathology and can be asymptomatic or symptomatic. Popliteal venous aneurysms typically present with symptoms ranging from local symptoms of knee pain and swelling to more serious thromboembolic complications that include deep venous thromboses and pulmonary emboli. Fatalities have been reported in the literature secondary to pulmonary emboli in the setting of popliteal vein aneurysms. Most popliteal venous aneurysms have thrombus formation and are saccular in nature as compared to our reported case, which was fusiform and did not appear to have thrombus at the time of exposure.

Open surgery has been the modality of choice for treatment of popliteal vein aneurysms; no endovascular cases have been reported thus far. The typical approach is through posterior surgical exposure and aneurysmorrhaphy. Other techniques include resection with end-to-end anastomosis and interposition grafting. The relatively young age of our patient led us to proceed with aneurysmorrhaphy and avoid interposition graft placement. The technique we used with a tourniquet can be very helpful for large aneurysms, especially in the proximity to the adductor canal.

In the literature, most patients received anticoagulation. Given our patient’s history of pulmonary embolism, we opted for a course of at least 3 months of anticoagulation postoperatively along with compression stockings.

In conclusion, popliteal venous aneurysms can be a rare cause of pulmonary emboli and are typically detected on an ultrasound venous duplex scan. In the setting of large venous aneurysms that extend cephalad to the adductor canal, proximal control can be challenging through the posterior approach and a tourniquet can be a valuable asset for the approach.

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