

## Medical treatment of postoperative complications of popliteal artery aneurysm surgery

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### ABSTRACT

Popliteal artery aneurysms are the most common peripheral artery aneurysms, although they are rarely seen. These aneurysms can be treated by surgical and endovascular methods. Detection of the type of popliteal artery aneurysm by preoperative imaging methods is the most important step to determine the appropriate treatment method for the individual patient. Patient-specific treatment strategy reduces postoperative complications and recurrent interventions. In this article, we present a case who underwent surgery for a popliteal artery aneurysm eight months ago and developed critical leg ischemia.

**Keywords:** Critical limb ischemia; peripheral artery aneurysm; popliteal artery.

Popliteal artery aneurysm (PAA) is the most common form of peripheral artery aneurysms and is a serious clinical condition which may cause limb loss and mortality due to thromboembolic complications. It is commonly seen in males between ages 60-70 and has incidence of less than 0.1%.<sup>[1]</sup> While atherosclerosis is the main etiologic factor in elderly patients, popliteal artery entrapment syndrome, cystic adventitial degeneration, osteochondroma, and injury play a role in younger patients.<sup>[2]</sup> Almost two-thirds of patients are symptomatic. Symptoms are encountered as chronic limb ischemia (15%), nerve or venous system compression (4%), and rarely as rupture.

While the optimal treatment option of PAA is under debate, surgical methods are frequently used for treatment. Interposition grafting is used in surgical treatment, but endovascular methods can also be applied. In this article, we present our treatment approach for recurrent symptoms of a patient who underwent surgical treatment for acute leg ischemia caused by thrombosed popliteal artery aneurysm.

### CASE REPORT

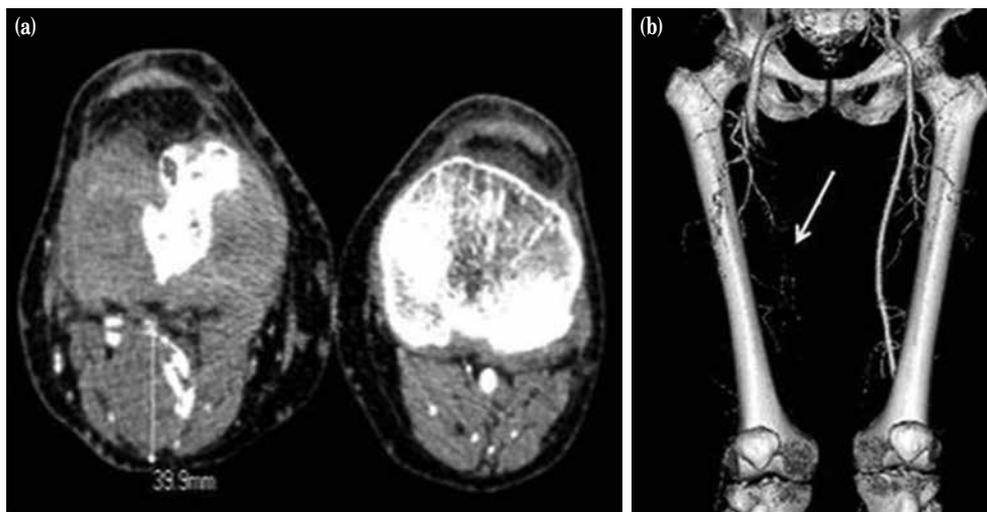
A 63-year-old male patient presented with rest pain in the right leg, bruising in the second and third toes, and wound with discharge in the inner thigh. The patient's history revealed sudden severe pain and coldness in his right leg that began eight months ago and that thrombosed popliteal artery aneurysm of 39 mm in diameter in the 10 cm segment from the proximal right superficial femoral artery (SFA) extending to the tibioperoneal trunk was detected at another center (Figure 1a), the patient had been taken under operation upon these findings and that thrombectomy failed to provide adequate flow and bypass was performed on the posterior tibial artery distal to the main femoral artery with composite graft (8 mm ringed synthetic saphenous vein graft); the patient had been discharged with low molecular weight heparin, however, thrombectomy was performed on postoperative day 15 due to graft occlusion. The patient was admitted to our center after symptoms recurred in the second postoperative month.

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**Figure 1.** Computed tomography angiography of the (a) right popliteal artery aneurysm and (b) the occluded right superficial femoral artery.

The patient's physical examination showed blood pressure 130/80 mmHg, pulse 80 bpm, and normal sinus rhythm. Right lower limb popliteal artery and distal pedal pulses were non-palpable. The patient had an incision scar over and below his right knee from previous surgery and had a wound with purulent discharge on the route of incision scar over-the-knee. Computed tomography (CT) angiography revealed SFA and the composite graft were occluded (Figure 1b). Surgical treatment was not considered due to inadequacy of vascular bed of the below-the-knee trifurcation and medical treatment was decided. The patient received 10 sessions of iloprost treatment and the purulent wound was dressed. The patient was subjected to bed rest and his walking distance increased to 800 meters; the patient was discharged with antithrombotic, anticoagulant, and cilostazol.

## DISCUSSION

Popliteal artery aneurysm is the most common form of peripheral artery aneurysms and has prevalence of 1%. It is generally bilateral (50-64%) and is frequently concurrent with aneurysms of other regions (femoral artery aneurysm concurrence 40%, abdominal artery aneurysm concurrence 40-62%). About 55-66% of patients are asymptomatic. Almost 85% of patients with symptomatic PAA are admitted to the hospital with lower limb ischemia associated with chronic thrombosis or distal embolization.<sup>[3]</sup> Popliteal artery aneurysm patients who develop acute thrombosis are at high risk of amputation if revascularization is not attempted.

No consensus has yet been reached in the treatment of popliteal artery aneurysm. Aneurysm repair is recommended in symptomatic patients and in asymptomatic patients with a diameter greater than 2 cm or with mural thrombus. Complications (thromboembolism, rupture, etc.), rather than local symptoms, are common unless surgery is performed in PAAs with over 2 cm diameter.<sup>[4]</sup> Complications of the lower extremities may occur within five years in two-thirds of asymptomatic cases.

Popliteal artery aneurysm treatment can be surgical or endovascular. Stent migration, stenosis, and stent fracture may occur after endovascular procedures due to mobility of the knee joint. The goal of surgical treatment of PAA is to isolate the aneurysm to prevent distal embolization and to maintain blood supply. Medial and posterior approaches can be used in surgical treatment. Three types of aneurysm isolation are performed in the surgical repair of popliteal artery aneurysms. In type 1, the isolated artery segment in focal aneurysms is short and short bypass is performed from distal SFA to popliteal artery. In enlarged fusiform aneurysms, or type 2, the composite graft is proximally anastomosed to the main femoral artery. In type 3, the distal of the aneurysm is ligated to avoid distal embolization.<sup>[5]</sup> Bypass of the aneurysm reduces thrombosis risk and aneurysm diameter. Although our patient had a type 1 focal aneurysm, the center that the patient previously admitted to for acute ischemia and SFA occlusion had applied below-the-knee bypass from the main femoral artery to the posterior tibial artery as in type 2 treatment, and thrombosed aneurysmatic

segment excision or ligation was not performed and the patient underwent embolectomy for early graft occlusion. The patient was first managed with optimal medical treatment of inadequate distal flow, and was resolved without the need for surgical intervention. Had the patient's symptoms persisted, limb-salvage surgery or sympathectomy could have been performed.

Popliteal artery aneurysm is a serious disease that can result in critical leg ischemia, limb loss, and mortality. Determining the size and type of aneurysm via CT angiography or magnetic resonance angiography prior to surgical treatment contributes to determining the surgical strategy and preventing postoperative complications.

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