

## Case Report

# Aneurysmectomy and Revascularization of Anterior Tibial Artery Aneurysm: Case Report

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An 86-year-old man presented with a pulsatile mass in the anterior compartment of the right lower leg. He had become aware of it two months earlier. Computed tomography angiography revealed a fusiform 3.2×5 cm aneurysm of the anterior tibial artery. Mural thrombosis in the aneurysm was absent. Peripheral pulse was normal. We performed aneurysmectomy and revascularization using a saphenous vein graft. Histological findings revealed that the mass was a true aneurysm. The clinical course was good, and the graft has remained patent for six months.

**Keywords:** true aneurysm, anterior tibial artery aneurysm, revascularization

## Introduction

Infrapopliteal aneurysms are exceedingly rare, and only a few published reports describe aneurysms of the anterior tibial artery.<sup>1)</sup> While a treatment policy has not been established, it should be based on the size and/or symptoms. In this study, we describe a patient with a true aneurysm of the anterior tibial artery.

## Case Report


An 86-year-old man presented with a pulsatile mass in

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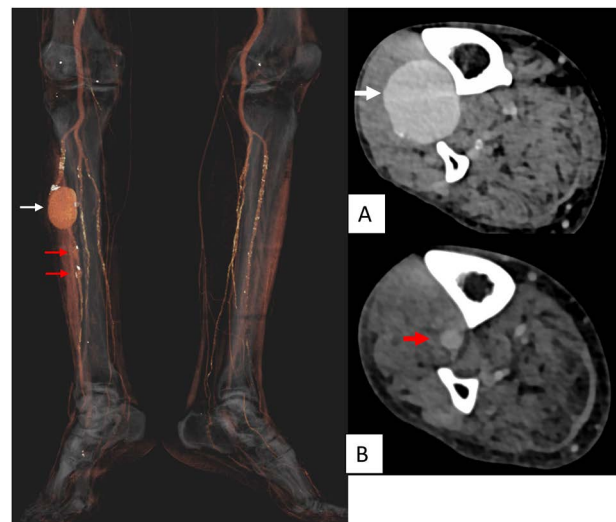
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his right leg that had persisted for two months. He had a history of hypertension, diabetes mellitus, hyperuricemia, and atrial fibrillation. He had been hospitalized for acute pancreatitis in the past. However, he did not have a history of relevant episodes of injury or infection. Clinical findings of Behcet, von Recklinghausen, and any other connective tissue diseases were absent.

A physical examination revealed a pulsatile mass, about the size of a hen egg, on the lateral face of his right leg. All peripheral pulses were normal.

Computed tomography (CT) angiography revealed a 3.2×5 cm aneurysm of the anterior tibial artery, another two aneurysmal changes (0.8×0.7 cm) on the distal side of the aneurysm, and patent peripheral arteries (Fig. 1). The aneurysm contained no mural thrombosis, and the posterior tibial and peroneal arteries were patent. No other aneurysms were evident.

Surgery was initiated through a tibialis anterior lateral approach. The incision was made vertically about 10 cm above the aneurysm, and the tibialis anterior muscle and



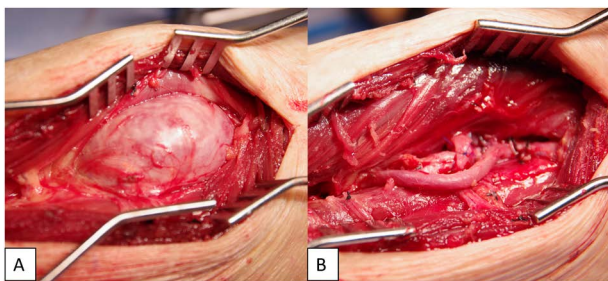
**Fig. 1** Computed tomography showing (A) anterior tibial artery aneurysm (white arrow) and (B) another aneurysmal change on the distal side (red arrow).

Color figure can be viewed in the online version on J-STAGE and PMC.

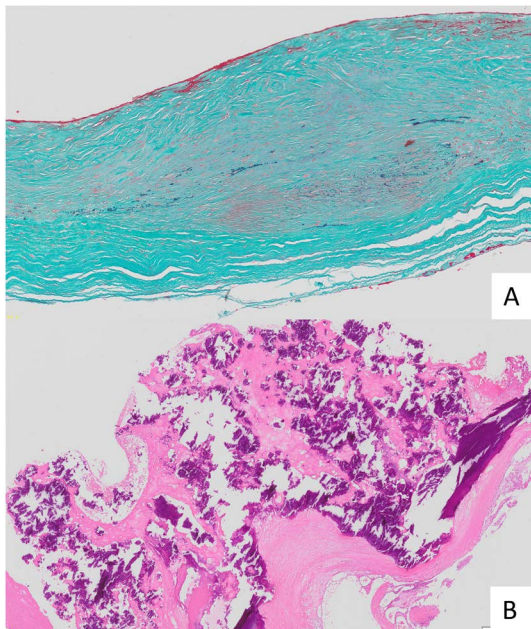
long extensor muscle of the great toe were divided. No adhesions had formed around the aneurysm, and the neurovascular bundle was confirmed. The deep peroneal nerve, located behind the aneurysm, was gently peeled away with careful manipulation. The aneurysm was opened, and the wall was removed. The artery was reconstructed using a reversed greater saphenous vein graft, which was proximally and distally sutured by an end-to-side anastomosis (Fig. 2). Postoperative peripheral pulses were good.

Histological analysis of the aneurysmal wall revealed fibrous thickening of the intima and medial degeneration with calcified atheroma (Fig. 3). Arteritis or dissection was not observed. Thus, the mass was diagnosed as an atherosclerotic, true aneurysm.

The patient was discharged 10 days after surgery with



**Fig. 2** Intraoperative pictures of the (A) anterior artery aneurysm and (B) autologous saphenous vein graft after anastomosis.



**Fig. 3** Histological features of the aneurysmal wall. (A) Fibrous thickening of the intima, atrophy of the muscle layer, and fragmentation of the elastic fibers (Elastic-Masson's stain). (B) Calcification complicated lesion (HE stain).

no signs of ischemia or deep peroneal nerve disorder. Six months after surgery, the graft remained patent on CT images (Fig. 3).

## Discussion

Infrapopliteal aneurysms are exceedingly rare and are generally pseudoaneurysms.<sup>2)</sup> True aneurysms are even rarer; very few reports have described them. Atherosclerosis of an arterial wall or vasculitis, such as polymyositis and Behcet disease, can cause true infrapopliteal aneurysms,<sup>3)</sup> but the cause is not always clear. This patient was at risk of atherosclerosis because of his advanced age and his history of hypertension and diabetes mellitus. In addition to histological findings, we consider that atherosclerosis was the etiology of the true aneurysm.

Treatment usually depends on the size and symptoms of an aneurysm that include, for example, embolism to a peripheral artery and a deep peroneal nerve disorder caused by aneurysmal oppression.<sup>4)</sup> Furthermore, even if asymptomatic, aneurysms should be treated to avoid the risk of rupture, as in our case. Lowell et al. have stated that aneurysms >20 mm should be treated aggressively.<sup>5)</sup>

Endovascular and surgical treatments are presently the choice of therapy. Endovascular treatment involves coil embolization<sup>6)</sup> or deployment of a covered stent,<sup>7)</sup> but reports are sparse and long-term outcomes are unclear. Surgical treatment comprises only ligation or revascularization after resecting the aneurysm.<sup>1)</sup> Ligation and aneurysmectomy without revascularization do not cause lower limb ischemia if two other infrapopliteal vessels are patent.<sup>8)</sup> However, revascularization of the anterior tibial artery is important if collateral circulation on the foot remains insufficient, as shown in the concept of angiosomes.<sup>9)</sup> According to another report, revascularization using an autologous saphenous vein graft can achieve long-term patency.<sup>1)</sup> Although the peroneal and posterior tibial arteries were patent in our patient, we thought that blood flow from the anterior tibial artery should be maintained, if possible, and revascularization should proceed using an autologous saphenous vein graft. Kudo et al.<sup>10)</sup> describe the need for gentle surgical approach to avoid causing a peroneal nerve disorder. We considered that ligation should be chosen only if adhesions were tightly attached around the aneurysm. In our case, no adhesions were found around the aneurysm, and gentle maneuvering and careful examination of the peroneal nerve led to functional preservation. Revascularization is not needed if collateral blood flow is established.

Optimal treatment for an aneurysm of the anterior tibial artery is presently based on individualized strategy because such aneurysms are very rare and treatment has not yet been established.

## Conclusion

We describe an aneurysm of the anterior tibial artery that was treated by aneurysmectomy and revascularization using a great saphenous vein graft. A treatment strategy should be determined in view of the size and symptoms of such aneurysms, and endovascular or surgical approaches, with or without revascularization, should be determined on a case-by-case basis.

## Disclosure Statement

The authors have no conflicts of interest to disclose.

## Author Contributions

Writing: NS

Data collection: NS

Critical review and revision: all authors

Final approval of the article: all authors

Accountability for all aspects of the work: all authors

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