Symptomatic or asymptomatic? Bilateral popliteal artery aneurysms: two sides of the same coin

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Abstract:

Aim: To present a case of bilateral popliteal artery (PA) aneurysms with differing clinical presentations, underscoring the importance of early detection, comprehensive imaging, and timely intervention in preventing limb-threatening complications.

Case: A 63-year-old man with a significant smoking history, type II diabetes, and hyperlipidemia presented with acute limb ischemia due to a thrombosed right PA aneurysm. A non-thrombosed left PA aneurysm was incidentally identified. Urgent angioplasty, stenting, and femoral-popliteal bypass were performed for the symptomatic limb. Five weeks later, elective endovascular repair was performed for the asymptomatic left PA aneurysm.

Conclusion: This case demonstrates the clinical variability of bilateral PA aneurysms, highlighting the importance of early intervention for symptomatic cases and careful imaging and expedited treatment for asymptomatic aneurysms.

Key-words: popliteal artery aneurysm, acute limb ischemia, bilateral aneurysms, endovascular repair, femoral-popliteal bypass

INTRODUCTION

Bilateral popliteal artery (PA) aneurysms account for up to 70% of all peripheral arterial aneurysms and, although relatively uncommon, are of significant clinical concern due to their potential for catastrophic complications. Often asymptomatic until a critical event occurs, these aneurysms may lead to thrombosis, embolization, or rupture, ultimately threatening limb viability[1-3]. While unilateral PA aneurysms are more frequently reported, bilateral cases provide additional diagnostic and therapeutic challenges, especially when presentations differ between the two limbs[4]. Here, we report a case of a patient presenting with acute limb ischemia (ALI) secondary to a thrombosed right PA aneurysm, while an asymptomatic aneurysm in the left PA was incidentally discovered.

CASE PRESENTATION

Patient History

A 63-year-old man with a history of heavy smoking (>60 pack-years), type II diabetes, and hyperlipidemia presented to the emergency room with acute ischemia of the right lower limb. The patient reported severe rest pain and had three active ulcers on his right foot (Rutherford category 5). A digital subtraction angiogram (DSA) performed one month earlier had revealed bilateral common iliac artery (CIA) stenoses (60%) and occlusion of the right superficial femoral artery (SFA), supragenicular popliteal artery, and anterior tibial artery, with minimal collateral flow to the posterior tibial and peroneal arteries.

Diagnostic Findings

An emergent DSA and complimentary computer tomography angiography (CTA) confirmed a thrombosed 1.9 cm aneurysm in the right popliteal artery and a previously unrecognized 1.6 cm aneurysm in the left popliteal artery (Figure 1). The right aneurysm was thrombosed, while the left remained patent and asymptomatic. The patient's clinical presentation and findings indicated an urgent need for revascularization of the right limb to prevent irreversible ischemia.

Treatment

Given the acute nature of the right lower limb ischemia, the patient underwent same-day endovascular angioplasty and stenting of both CIAs using kissing stents. This restored inflow to the lower extremities, and the next day, a femoral-popliteal venous bypass was performed on the right side using a reversed ipsilateral great saphenous vein. Broad-spectrum antibiotics (meropenem and vancomycin) were initiated due to concerns of infection from the active ulcers, and within a week, significant ulcer healing was observed. The patient was discharged seven days postoperatively in stable condition. A 30-day follow-up CTA showed good primary patency of the bypass graft (Figure 2).

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Five weeks later, elective endovascular treatment was performed to treat the asymptomatic left popliteal aneurysm, after meticulous CTA work-up (Figure 3). Two *Viabahn* (Gore Medical, Newark, DE) stent-grafts (8x100mm and 7x150mm) were deployed to exclude the aneurysm and maintain arterial flow (Figure 4). The patient tolerated the procedure well and was discharged the following day without complications.

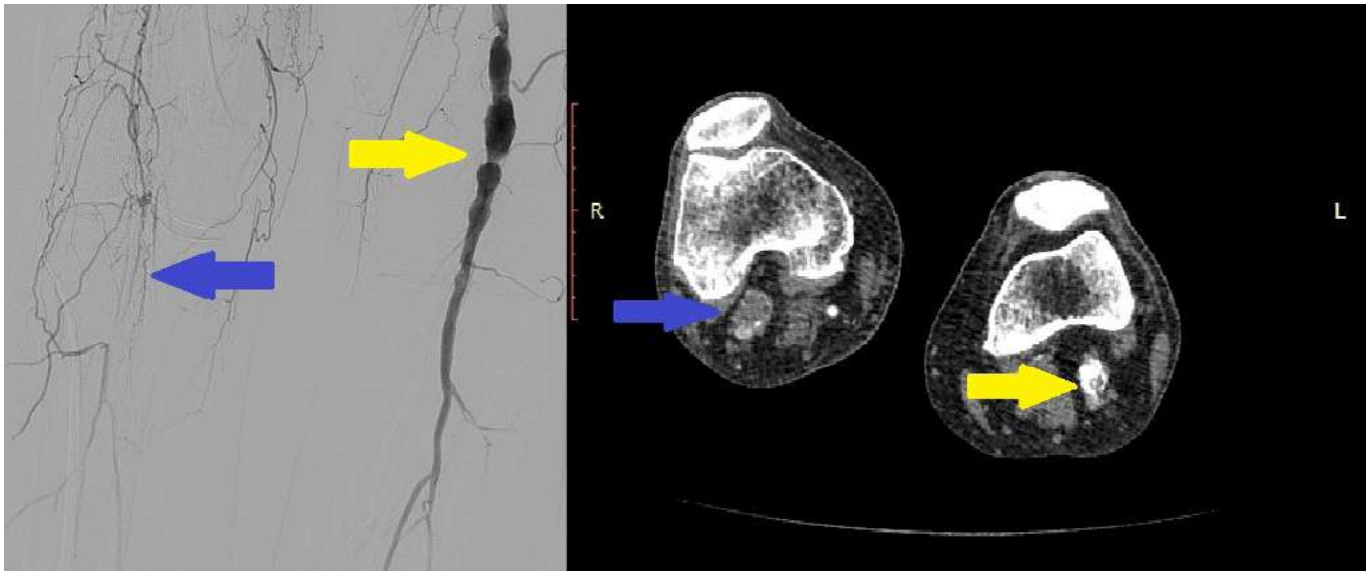

Figure 1. Emergent DSA (left) and complimentary CTA (right) showing bilateral PA aneurysms - the left thrombosed (blue arrow) and the right still patent (pink arrow).

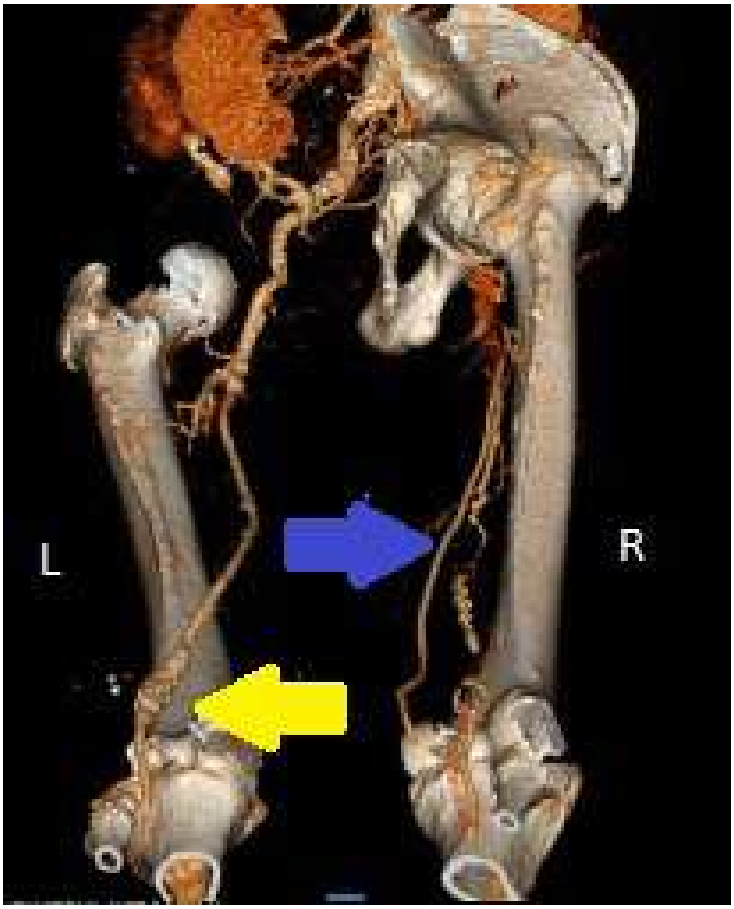

Figure 2. 30d postoperative follow-up CTA in 3D reconstruction, showing a patent venous fem-pop bypass graft (right, blue arrow) and the contralateral popliteal artery aneurysm (pink arrow) scheduled for elective endovascular treatment.

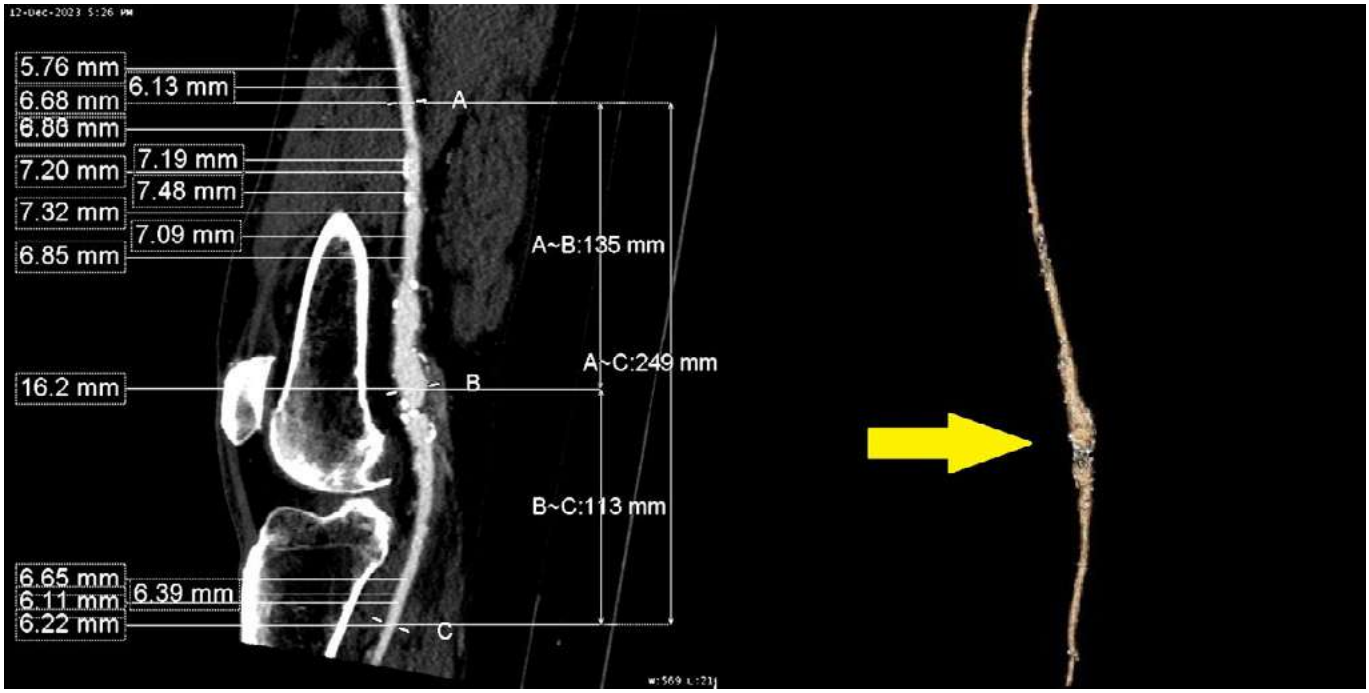

Figure 3. Pre-operative CTA work-up prior to elective endovascular repair of left PA aneurysm.

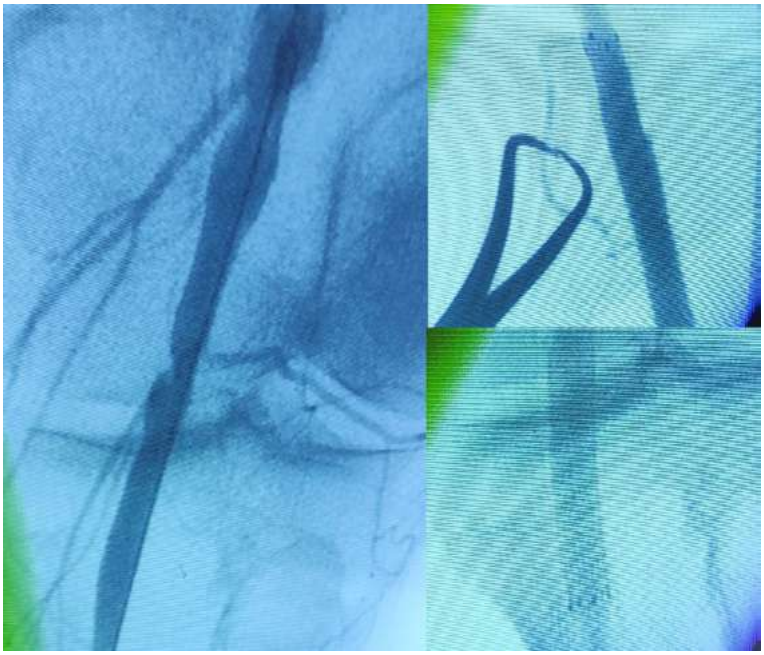

Figure 4. Endovascular elective repair of left PA aneurysm and concomitant atherosclerotic stenoses by placement of 2 Gore/ Viabahn stent-grafts (8x100mm and 7x150mm) under constant fluoroscopy.

DISCUSSION

Bilateral popliteal artery aneurysms are a rare but significant vascular pathology, particularly when presenting with differing symptoms[4]. The patient's right PA aneurysm led to acute limb ischemia, a vascular emergency requiring immediate intervention. ALI secondary to a thrombosed aneurysm often necessitates open surgical intervention, as was performed in this case with a femoral-popliteal bypass. The bypass provided a durable and effective solution, particularly in the already thrombosed aneurysm where endovascular options are limited[5].

In contrast, the left PA aneurysm was asymptomatic and incidentally discovered. Asymptomatic aneurysms may remain stable for years but carry the risk of thrombosis or rupture over time[1,2]. Elective repair of asymptomatic PAAs is typically recommended when aneurysms exceed 2 cm or if there is evidence of rapid growth[5]. In this case, endovascular repair with stent-grafts provided a minimally invasive option with a

favorable profile. The use stent-grafts is well-established for PAAs, offering excellent long-term patency and minimal complication rates[6-8].

This case highlights the importance of comprehensive imaging in the diagnosis and management of vascular aneurysms. The missed left PA aneurysm during the initial DSA underscores the need for meticulous interpretation of imaging studies, especially in patients with known vascular disease. Bilateral involvement may not always present symmetrically, as evidenced by this case, where one side presented with complications while the other remained silent. Early detection of asymptomatic aneurysms allows for planned, elective intervention, which is associated with lower morbidity and better outcomes[9-10].

CONCLUSION

This case report demonstrates the diverse clinical presentations of bilateral popliteal artery aneurysms, highlighting the importance of early and accurate diagnosis. While ALI from a thrombosed aneurysm warrants immediate intervention, asymptomatic aneurysms require careful monitoring and timely elective repair to prevent future complications. Both open surgical and endovascular approaches play a role in the management of PAAs, depending on the clinical presentation and anatomy of the aneurysm. Thorough imaging is crucial to prevent missed diagnoses, as highlighted by the initially overlooked left popliteal aneurysm in this patient.

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