

Emergency Surgical Treatment of Popliteal Artery Aneurysm with Associated Femoral Artery Thromboembolism

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What is known on this subject?

True peripheral arterial aneurysms are rare, with popliteal artery aneurysms (PopA) representing the most common type among lower extremity aneurysms. PopA frequently present with thrombotic or embolic complications rather than rupture, often leading to acute limb ischemia. Surgical repair remains the standard treatment, particularly in symptomatic cases, and autologous vein grafting is widely accepted as the preferred revascularization method. Early diagnosis and prompt intervention are essential to prevent limb loss.

What this study adds?

This case highlights the successful emergency surgical management of a popliteal artery aneurysm complicated by femoral artery thromboembolism in a patient with prior contralateral PopA repair. The report emphasizes the importance of rapid decision-making, the effectiveness of the posterior popliteal approach for direct aneurysm control and thromboembolism, and the durability of autologous great saphenous vein graft reconstruction in acute ischemic settings. It also underlines the need for vigilant follow-up in patients with bilateral aneurysmal disease.

ABSTRACT

True aneurysms of peripheral lower extremity arteries are rare, with popliteal artery aneurysms (PopA) being the most common form. This case report presents the emergency surgical treatment of a PopA complicated by femoral artery thromboembolism. The patient, who had a history of contralateral PopA repair, presented with acute limb ischemia. The clinical condition was classified as Rutherford grade IIb acute limb ischemia. A posterior approach via the popliteal fossa was used to expose the aneurysm and perform thromboembolism. Revascularization was achieved using an autologous great saphenous vein graft. Distal run-off was assessed intraoperatively as adequate, with three-vessel patency. The postoperative course was uneventful, with resolution of symptoms and stable clinical status. Postoperative anticoagulation was initiated with low-molecular-weight heparin and then transitioned to oral anticoagulants (warfarin) for at least 3–6 months. Timely surgical intervention is critical in cases of severe ischemia and embolic complications.

Keywords: Popliteal aneurysm, posterior approach, CT, saphenous vein

Introduction

True aneurysms of the peripheral arteries of the lower extremities result from degenerative changes in the vascular wall and are infrequently

encountered in vascular surgical practice. Among peripheral aneurysms, popliteal artery aneurysms (PopA) are the most commonly diagnosed. Other peripheral arterial aneurysms of the lower extremities are considerably less frequent: the



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prevalence of femoral artery aneurysms is approximately 5 cases per 100,000 population, whereas PopA is up to 20 cases per 100,000 population. Bilateral PopA is observed in 26% of cases (1).

The most frequent complications of peripheral arterial aneurysms include aneurysmal thrombosis, distal embolization, neurovascular compression (particularly of the popliteal vein or sciatic nerve), and rupture. According to the literature, rupture of a popliteal artery aneurysm is rare (2–2.5%) and typically occurs in giant aneurysms exceeding 7–8 cm in diameter (2).

In cases of PopA complicated by thromboembolism, emergency surgical intervention is associated with higher mortality and an increased risk of limb loss compared with elective procedures. Two principal surgical approaches are used to access the popliteal artery: medial and posterior (3). While the medial approach is commonly preferred due to a lower risk of injury to adjacent structures, the posterior approach provides superior exposure, particularly in large or thrombosed aneurysms.

In recent years, endovascular and hybrid treatment options have gained increasing popularity in the management of PopA. However, in the presence of acute limb ischemia, thrombosis, and distal embolization, open surgical repair remains the gold standard.

This report presents a case of successful surgical management of a popliteal artery aneurysm complicated by femoral artery thromboembolism, performed via a posterior approach.

Case Report

Informed consent was obtained from the patient for publication of this case and accompanying images.

A 64-year-old male patient with a history of hypertension, diabetes mellitus, and prior surgery for a left popliteal artery aneurysm presented to the emergency department with a 3-day history of pain, pallor, coldness, and numbness in the right foot. On physical examination, distal pulses were absent, and both motor and sensory deficits were present, consistent with Rutherford grade IIb acute limb ischemia.

A three-day delay in presentation was considered clinically significant because it increased the risk of ischemic injury to muscle and nerve and of reperfusion syndrome following revascularization.

Computed tomography revealed absence of contrast enhancement extending from the proximal segment of the right femoral artery to the popliteal artery (Figure 1).

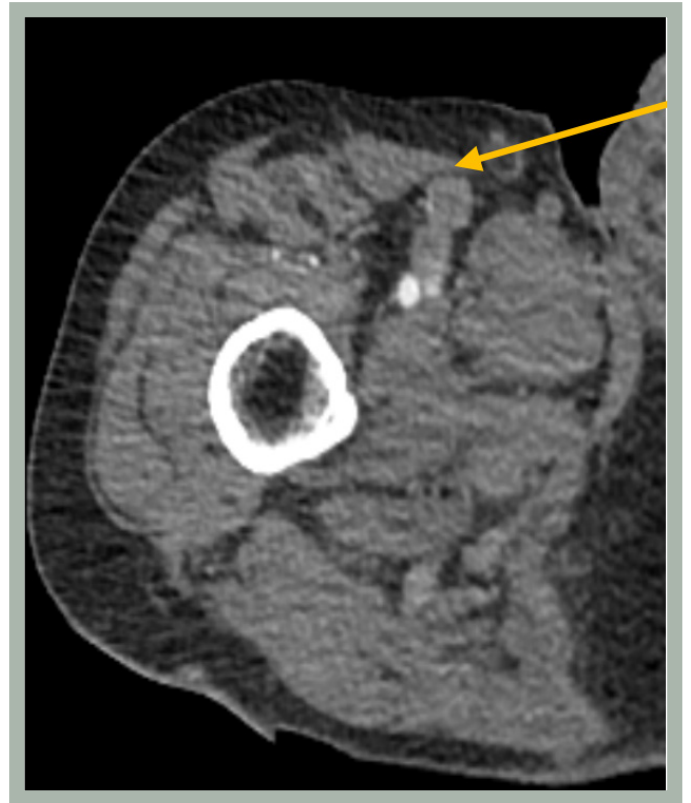


Figure 1. Preoperative computed tomography. Contrast did not reach the right superficial femoral artery

In addition to axial images, coronal and sagittal reconstructions were evaluated to better delineate the extent of the aneurysm and thrombotic occlusion (Figure 2). Based on clinical and imaging findings, the patient was scheduled for emergency surgery. Preoperative assessment suggested limited but present distal run-off.

Given the aneurysm size (5 cm) and the need for direct access to thrombotic material, a posterior approach was selected. This approach was preferred because it provided direct access to the aneurysm sac, facilitated thrombus evacuation, and allowed better control of genicular branches than the medial approach.

The patient was placed in the prone position, and an S-shaped incision was made in the popliteal fossa to expose the aneurysmal popliteal artery (Figure 3). The popliteal vein and tibial nerve were retracted using elastic loops.

An arteriotomy was performed on a healthy proximal segment of the popliteal artery. A Fogarty catheter was introduced through this segment to minimize the risk of dislodging mural thrombus and causing distal embolization. Thromboembolectomy was performed using a 4F Fogarty catheter to restore proximal blood flow.

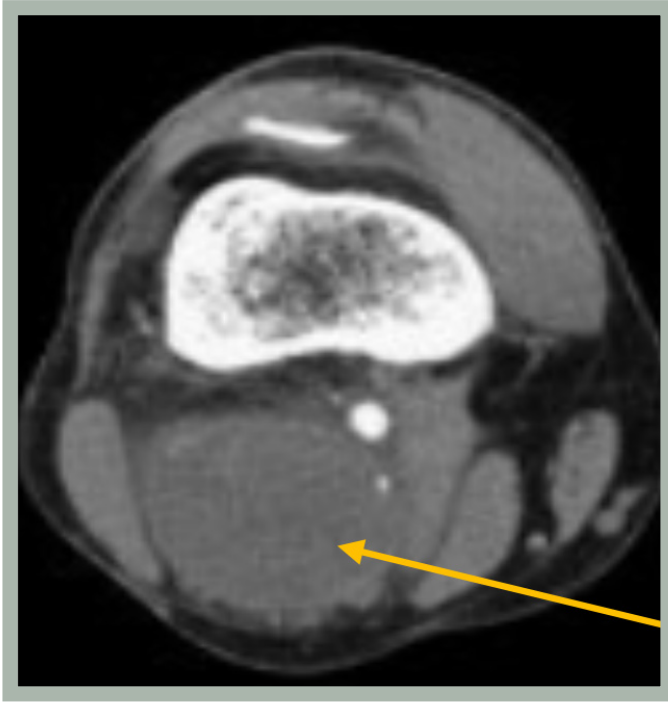


Figure 2. Computed tomography. In addition to axial images, coronal and sagittal reconstructions were evaluated to better delineate the extent of the aneurysm and thrombotic occlusion

The aneurysmal segment was ligated proximally and distally; the sac was opened, and thrombotic material was evacuated. A portion of the aneurysmal wall was resected, and the arteriotomy was closed. A second arteriotomy was performed distally, followed by an additional embolectomy using a 3F Fogarty catheter.

The great saphenous vein was harvested from the same limb and used as a bypass conduit. Anastomoses were performed using 6/0 Prolene sutures. Intraoperative arteriography confirmed successful revascularization and patency of the tibial arteries (Figure 4).

Intraoperative evaluation demonstrated adequate distal run-off with three-vessel patency, which is critical for long-term graft success.

Postoperatively, the patient remained hemodynamically stable and did not require inotropic support. Distal pulses became palpable within two hours of surgery. Anticoagulation therapy was initiated with low molecular weight heparin and subsequently transitioned to oral anticoagulation (warfarin or a direct oral anticoagulant), with a planned duration of 3–6 months.

The patient was mobilized early and discharged in good condition after an uneventful recovery.

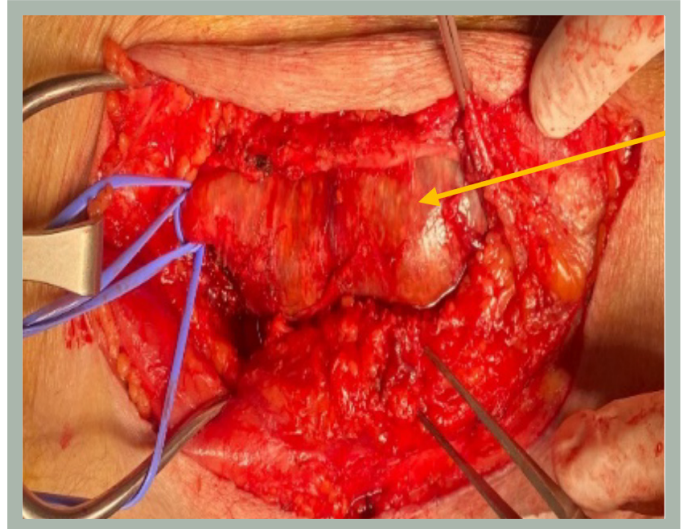


Figure 3. Perioperative image. The aneurysmal popliteal artery was accessed through an S-shaped incision in the right popliteal fossa

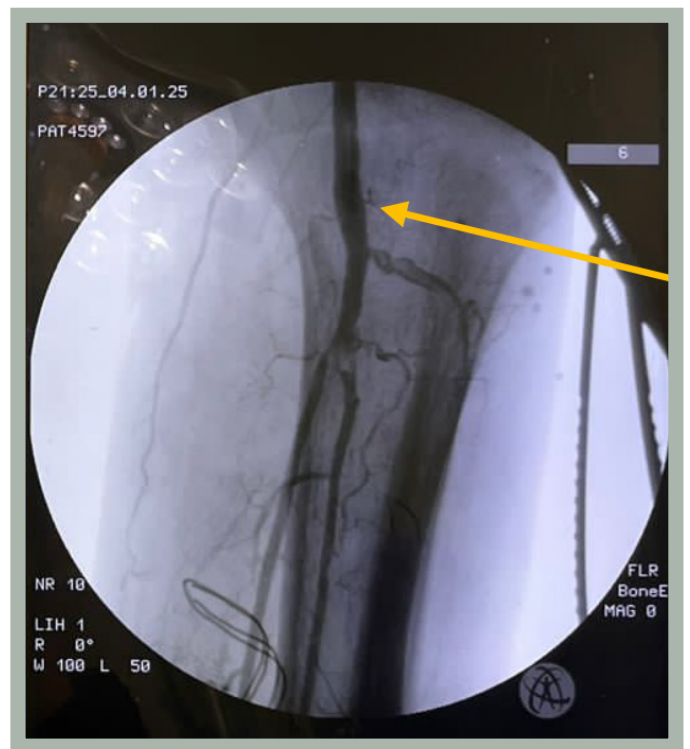


Figure 4. Intraoperative arteriography was performed after bypassing the popliteal artery with a saphenous vein graft. The tibial arteries were patent

Discussion

PopA account for approximately 70% of all peripheral arterial aneurysms. In 30–50% of cases, they coexist with aneurysms in other vascular territories. In this case, the presence of a prior contralateral PopA repair is consistent with this pattern.

Two principal surgical approaches are available for open repair: medial and posterior. The medial approach is technically simpler and less invasive but may provide limited access to the aneurysm sac and genicular branches (4).

In contrast, the posterior approach allows direct access to the aneurysm, improved control of collateral branches, and effective evacuation of thrombotic material, making it particularly suitable for large or complicated aneurysms.

In this case, the posterior approach was preferred not only because of aneurysm size but also because of thromboembolic complications requiring direct thrombus removal. It provided superior surgical control compared with the medial approach.

Although endovascular techniques are increasingly used, open surgical repair remains more reliable in cases of acute limb ischemia with thrombosis and distal embolization. Hybrid approaches may be considered in selected patients.

Mazzaccaro et al. (5) reported no significant difference in long-term outcomes between medial and posterior approaches, although hospital stay was shorter with the posterior approach. Similarly, a meta-analysis by Phair et al. (6) demonstrated advantages of the posterior approach in terms of aneurysm exclusion and graft patency without increased nerve injury risk.

The delayed presentation in this case was associated with advanced ischemia and neurological deficits, increasing the urgency of intervention. Despite the risk of reperfusion-related complications, a successful outcome was achieved with prompt surgical management.

Conclusion

PopA complicated by thromboembolism represent a limb-threatening condition requiring prompt diagnosis and urgent intervention. Early assessment using the Rutherford classification, selection of an appropriate surgical approach, and adequate distal run-off are essential for successful outcomes. The posterior approach is a safe and effective option in selected cases.

Ethics

Informed Consent: Written informed consent was obtained from the patient.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Z.G., S.M.Ş.T., E.A., Concept: Z.G., C.K., E.A., Design: Z.G., S.M.Ş.T., C.K., E.A., Data Collection or Processing: Z.G., S.M.Ş.T., C.K., E.A., Analysis or Interpretation: Z.G., S.M.Ş.T., C.K., E.A., Literature Search: : Z.G., C.K., E.A., Writing: Z.G., S.M.Ş.T., C.K., E.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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