



# Mirror Image Incision for Popliteal Aneurysm Repair Tailored to Patient Specific Anatomy

Stella Lioudaki, Nikolaos Kontopodis, and Christos V. Ioannou

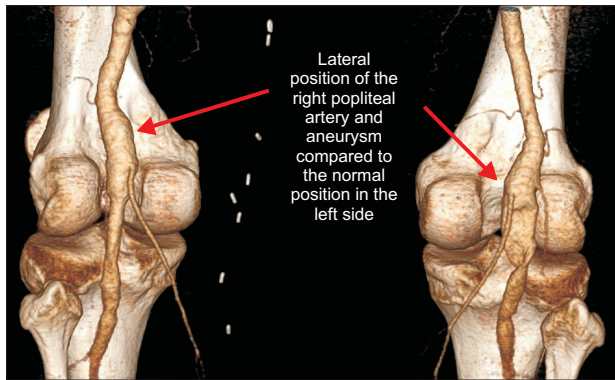
Department of Vascular Surgery, University of Crete Medical School, Heraklion, Greece

Popliteal artery aneurysms (PAAs) account for 70% of all peripheral aneurysms [1,2]. Treatment preferably comprises open surgical repair [3] via either a median or a posterior approach. We describe a patient with a right-sided PAA who underwent a modified procedure.

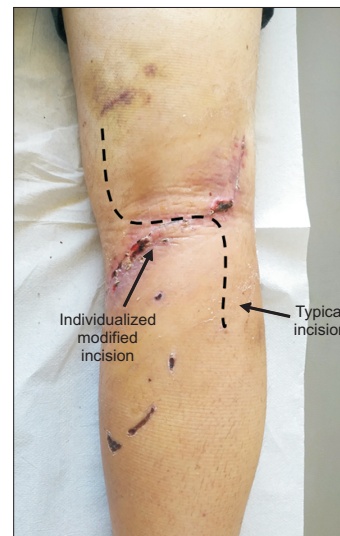
A 55-year-old male presented to the emergency department complaining of sudden onset right-sided intermittent claudication at 100 meters. Computed tomography angiography (CTA) indicated bilateral PAAs. Thrombus in the right-sided aneurysm (25 mm in diameter) caused >90% stenosis. The patient's history included a coronary artery bypass grafting with left great saphenous vein conduit, performed 3 years prior.

Posterior exposure is traditionally used in patients with focal lesions located at the popliteal fossa with no proximal

or distal extension, as was the case in our patient. Repair is typically performed with an “S” shape incision, involving a midcalf incision, curved medially and then sharply curved upward along the posteromedial aspect of the thigh [4]. This allows access to both the great and small saphenous veins, avoids traversing the popliteal crease, and provides adequate exposure of the popliteal vessels. Other types of incision, such as longitudinal or transverse, have been occasionally used without complications [5]. In the current case, an atypical course of PAA was noted in the CTA (Fig.



**Fig. 1.** Three-dimensional reconstruction of the computed tomography angiography indicated the lateral position of the right popliteal artery.



**Fig. 2.** Modified incision allowed the posterior exposure of the popliteal artery aneurysm. The dotted line indicates the typical incision.

Received July 18, 2022, Revised September 2, 2022, Accepted September 5, 2022, Published on September 30, 2022

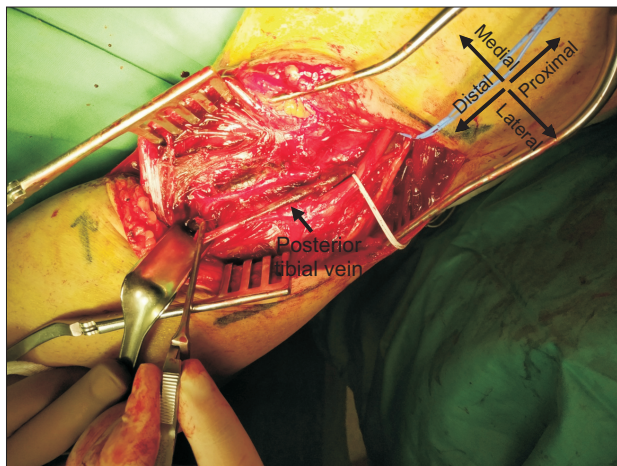
Corresponding author: Nikolaos Kontopodis, Vascular Surgery Unit, Department of Cardiothoracic and Vascular Surgery, University Hospital of Heraklion, University of Crete Medical School, PO-Box 1352, 71110, Heraklion, Greece

Tel: 30-2810-392-393, Fax: 30-2810-375-365, E-mail: kontopodisn@yahoo.gr, <https://orcid.org/0000-0002-6792-5003>

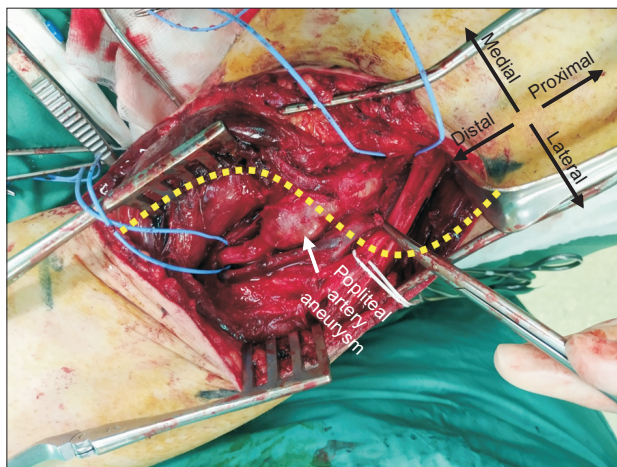
Copyright © 2022 The Korean Society for Vascular Surgery

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

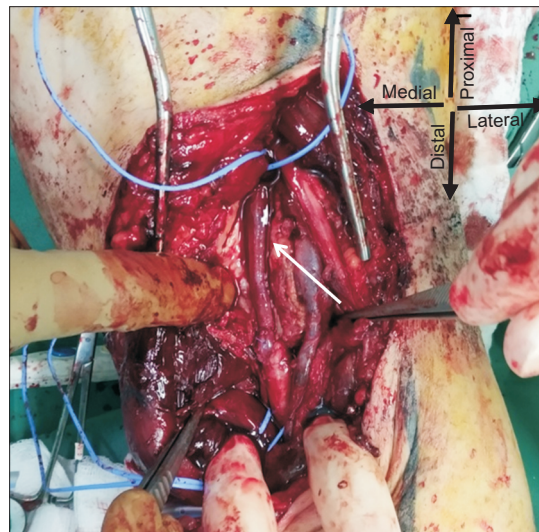
Cite this article; Vasc Specialist Int 2022. <https://doi.org/10.5758/vsi.220034>



**Fig. 3.** Image of the posterior tibial vein that was harvested for use as a graft.



**Fig. 4.** Intra-operative photograph of the dissected popliteal artery aneurysm. The dotted yellow line represents the skin incision that was performed to obtain this exposure.



**Fig. 5.** The excision of the popliteal artery aneurysm and reconstruction with the reversed posterior tibial vein. The white arrow indicates the posterior tibial vein interposition graft.

1), with a path from the lateral to medial. Considering that PAA dissection would be challenging with the standard incision, we performed a mirror-looking incision (Fig. 2) from the lateral side of the thigh to the medial calf to expose the PAA (Fig. 3). Preoperative venous mapping identified an adequate posterior tibial vein that could serve as a conduit for reconstruction. This not only allowed for right great saphenous vein preservation for use during contralateral popliteal aneurysm repair, but also rendered the longitudinal part of the typical incision at the posteromedial thigh unnecessary (Fig. 4, 5).

In conclusion, procedure planning should be individualized according to patient specific anatomic features and future requirements during peripheral vascular reconstruction.

## REFERENCES

- 1) Joshi D, Gupta Y, Ganai B, Mortensen C. Endovascular versus open repair of asymptomatic popliteal artery aneurysm. *Cochrane Database Syst Rev* 2019;12:CD010149.
- 2) Jung G, Leinweber ME, Karl T, Geisbüscher P, Balzer K, Schmandra T, et al. Real-world data of popliteal artery aneurysm treatment: analysis of the POPART registry. *J Vasc Surg* 2022;75:1707-1717.e2.
- 3) Beuschel B, Nayfeh T, Kunbaz A, Haddad A, Alzuabi M, Vindhyaal S, et al. A systematic review and meta-analysis of treatment and natural history of popliteal artery aneurysms. *J Vasc Surg* 2022;75(1S):121S-125S.e14.
- 4) Rutherford RB. *Atlas of vascular surgery: basic techniques and exposures*. Philadelphia: Saunders; 1993.
- 5) Beseth BD, Moore WS. The posterior approach for repair of popliteal artery aneurysms. *J Vasc Surg* 2006;43:940-944.