



Case Report

Reconstructive Venous Surgery in Vascular Malformation: Palma Operation – A Case Report

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Abstract

Congenital morphological disorders of the vascular bed, especially located on the main arteries and veins of the extremities, can cause chronic venous insufficiency and venous claudication, creating exacerbated symptoms for the patient and which require intervention. In cases where interventional radiology is insufficient, surgical approaches should be prioritized. Sixty-five years old male patient admitted to our clinic with increased bilateral lower extremity swelling which revealed to be chronic venous insufficiency secondary to congenital disorders. Sapheno-femoral veno-venous bypass (Palma operation) was performed, and patient was discharged on post-operative day 15 without further complaints. Palma Operation is an effective surgical treatment option in venous malformations of lower extremity where interventional radiology is not sufficient.

Keywords: Congenital venous malformation, Palma operation, venous-venous bypass

Please cite this article as "Yanar F, Sal O, Sengun B, Emek E, Azamat IF, Avlanmis O, et al. Reconstructive Venous Surgery in Vascular Malformation: Palma Operation – A Case Report. Med Bull Sisli Etfal Hosp 2025;59(1):134–137".

Vascular malformations are used to describe congenital morphological disorders of the vascular bed. They are divided into two groups: hemangiomas accompanied by endothelial hyperplasia and malformations with a normal endothelial lining.^[1-3] Both types are usually sporadic; however, in patients with familial history, hyperexpression can be detected in the Endoglin gene located on short arm of chromosome 9, which is usually transmitted in an autosomal dominant (OD) manner, leading to vascular proliferation.^[2-5] The Hamburg classification classifies vascular malformations as arterial, venous, arteriovenous, and mixed types.^[6]

Although vascular malformations (VM) vary in different publications, they can be classified according to their histological appearance (arteriovenous, arteriovenous, arteriovenulous) and the presence of A-V shunt (high flow, low flow types). Those with high flow can be listed as hemangioma, A-V fistula, AV malformations, and those with low flow can be listed as capillary malformations, venous malformations, and lymphatic malformations.^[7-10] VM manifest themselves in a spectrum ranging from cosmetic defects to loss of function of the affected organ or extremity, depending on the location of the malformation, the type of artery or vein it is associated with, especially in the presence of A-V shunt.^[11] Life-threatening conditions can be

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Submitted Date: May 03, 2024 **Revised Date:** June 15, 2024 **Accepted Date:** July 03, 2024 **Available Online Date:** March 18, 2025

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seen in cases of involvement of the central nervous system or pulmonary parenchyma, such as Osler Weber Rendu cases.^[10,12] Although patient complaints that indicate surgical treatment are encountered in less than half of the cases. Most of them are cosmetic defects, chronic venous insufficiency, and venous claudication, especially in AVM cases located on the main arteries and veins of the extremities, which debilitate the patient and decrease the quality of life significantly.^[13,14]

Case Report

A sixty-five-year-old male patient, who had been suffering from left leg swelling and difficulty in walking for the last 6 months, was admitted to our clinic with a preliminary diagnosis of left lower extremity deep vein thrombosis (DVT). Doppler ultrasound revealed an AVM at the level of the internal iliac artery. During the examination of the patient, an increase in girth of left lower extremity was observed (Fig. 1A: Thigh, left > right: 54 cm-40 cm, below-knee: left>right: 42 cm-33 cm), hyperpigmentation was also noticed on the inner anterior surface of the calf area, and varicose veins were seen as a sign of collateralization in the suprapubic region. No pathology was detected in bilateral lower extremity arterial system examination. Left aorto-peripheral angiography revealed that the AVM originated from the internal iliac artery located on the pelvic floor (Fig. 2). Angiography showed an AVM originating from the internal iliac artery extending to the left gluteal area, early arterial filling and aneurysmatic expansion in the left internal iliac vein. Furthermore, the common iliac vein and external iliac vein were not observed in the venous phase. With the current findings, it was thought that the AVM in the pelvic floor caused compression in the deep venous system of the left lower extremity, causing chronic venous thrombosis or chronic venous insufficiency accompanied by venous

aplasia, which cannot be distinguished by clinical or angiographic findings. Furthermore, the lesion was not suitable for interventional radiological approach. It was decided to perform a venous bypass procedure in order to reduce the venous hypertension in the lower extremities. Preoperative Doppler ultrasonography revealed that the right great saphenous vein had a patent lumen and was suitable for use as a graft. The genicular part of the right great saphenous vein was completely released and brought to the left femoral vein from the suprapubic region and anastomosed end to side. (Fig. 3A, B). On the post-operative day 7, significant clinical improvement was observed with a decrease of 12 cm (54 cm→42 cm) in thigh circumference and 7 cm (42 cm→35 cm) in tibial circumference (Fig. 1B). The INR value was kept between 2-3 with oral anticoagulant treatment. On the post-operative day 15, late venous phase of CT angiography revealed patency of sapheno-femoral veno-venous bypass (Fig. 4). The patient was discharged on post-operative day 16, and post-discharge Doppler ultrasonography demonstrated patent anastomosis. Due to intermittent tension sensation in the extremity, symptomatic management including compressive stockings, elevation, and venotrophic agents was initiated. Notable clinical im-

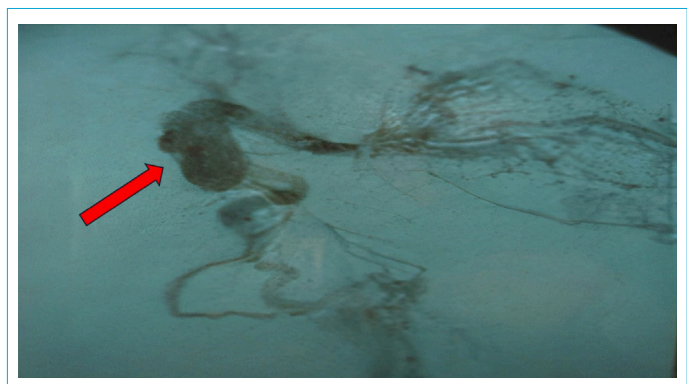


Figure 2. Arteriovenous malformation appearance on the conventional aorto-peripheral angiography.



Figure 1. (a) Swelling of the left lower extremity (shown with yellow arrow), difference in bilateral extremity girth and varices on the anterior abdominal wall (shown with red arrow) were observed. (b) Post-operative decrease of the inter-extremity girth difference.

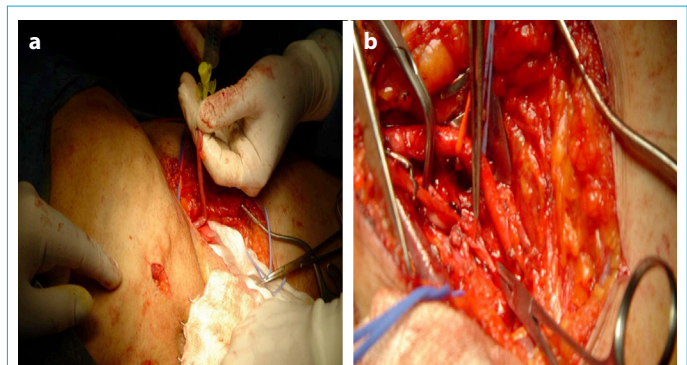


Figure 3. (a) Release of the genicular portion of the great saphenous vein. (b) Approximation of great saphenous vein to the left femoral vein prior to end-to-side anastomosis.



Figure 4. Control Aortoperipheral CT Angiography image showing patency of the venous-venous bypass.

provement was noticed (Fig. 1B). Nonetheless, the patient was lost to follow-up after the third-month examination.

Discussion

Surgical treatment is required in less than 50% of symptomatic, lower extremity AVM cases. Surgical treatment is usually preferred in cases of bleeding, development of high-flow heart failure, arteriovenous hypertension, arteriovenous malformations located in life-threatening areas. However, surgical treatment can also be prioritized in patients with pain, lowered quality of life, cosmetic complaints, vascular-bone syndrome, and recurrent infections.

[13,15,16] Resection is an effective method in macrovascular malformations where cosmetic defects are at the forefront. [17] However, resections combined with interventional radiological techniques can be tried before surgery in deep-seated AVMs belonging to the extremity itself or pelvis that cause loss of function in the lower extremity. However, in most of the cases due to high shunt flow and involvement of muscle tissue, this approach is not possible. The utilization of embolization alone is limited in arteriovenous type AVM cases. [17,18] Treatment methods for AVM include endovascular ablation (sclerotherapy, embolization), surgery (resection, venous bypass), compression and amputation. In this particular case, we have consulted with interventional radiology; however, due to aplasia of the iliac vein and the unconfined nature of the pathology to the truncular region, interventional radiology did not approve embolization or sclerotherapy.

Factors that make the surgical approach challenging are involvement of the muscle and soft tissue with the lesion, inadequate embolization in arteriovenous types, and deep localization. Nevertheless, in such cases, various reconstructive interventions have been described to relieve symptoms and restore extremity functions. [19] The veno-venous cross-bypass technique, defined by Palma in 1984, from the saphenous vein of the healthy lower extremity,

which does not show valve insufficiency, to the superficial or deep femoral vein system of the other lower extremity, can provide significant clinical and subjective improvement in selected cases. [20] In Halliday's case series, which utilized Palma technique, it is stated that the symptom relief was observed in ninety percent of the cases and the bypass patency rate was observed in seventy-five percent of the cases in a 5-year period of follow-up after veno-venous bypass. [21]

Conclusion

Vascular malformations are rare morphological disorders of the vascular system. In modern management, non-operative and interventional radiological interventions are more pronounced. However, in cases with clinical and radiological features similar to the presented case, where surgical resection and angiographic embolization are not possible due to the location of the lesion, venous decompressive reconstruction (Palma operation) should be considered as an effective surgical treatment option to relieve symptoms and restore the functions of the extremity.

Disclosures

Informed consent: Not declared.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declared that they have no conflict of interests to declare.

Authorship Contributions: Concept – F.Y., O.S., B.S., E.E., I.F.A., O.A., F.A.G.; Design – F.Y., O.S., B.S., E.E., I.F.A., O.A., F.A.G.; Supervision – F.Y., O.S., B.S., E.E., I.F.A., O.A., F.A.G.; Fundings – F.Y., O.S., B.S., E.E.; Materials – I.F.A., O.A., F.A.G.; Data collection &/ or processing – I.F.A., O.A., F.A.G.; Analysis and/or interpretation – F.Y., O.S., B.S., E.E.; Literature search – F.Y., I.F.A., O.S.; Writing – B.S., F.A.G., I.F.A.; Critical review – F.Y., F.A.G., O.S.

Financial Disclosure: The authors declared that there is no financial relationship relevant to this article.

Use of AI for Writing Assistance: The authors declared that there is no usage of artificial intelligence, linguistic robot modellings in this manuscript (AI, LLM, ChatGPT and so on).

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