

# Popliteal Fossa Venous: Anatomy, Clinical Significance, Imaging, and Treatment - A Mini Review

Natalisa Hvizdosova\*

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## ABSTRACT

The popliteal fossa is an anatomical space located at the back of the knee

joint, which contains a complex network of blood vessels and nerves. Among these structures, the popliteal vein is one of the most important, being responsible for draining blood from the lower limb. In this mini review, we aim to provide an overview of the anatomy, clinical significance, and imaging techniques related to the popliteal vein.

**Key Words:** Popliteal vein; Popliteal fossa; Lower limb; Venous thrombosis; Imaging

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## INTRODUCTION

The popliteal fossa is a small but significant area at the back of the knee, which is often overlooked in clinical practice. This region is formed by a diamond-shaped space bounded by the hamstring muscles (superiorly), the gastrocnemius muscle (inferiorly), the adductor magnus muscle (medially), and the biceps femoris muscle (laterally). Within this space, a complex network of blood vessels and nerves coexist, which play a crucial role in the function of the lower limb [1-3].

Among these structures, the popliteal vein is one of the most important, as it is responsible for draining blood from the lower leg and foot. The popliteal vein originates at the junction of the tibial and fibular veins, which are the two main veins of the lower limb. From there, it ascends through the popliteal fossa, passing between the popliteal artery (anteriorly) and the tibial nerve (posteriorly), until it reaches the femoral vein at the level of the inguinal ligament [4].

## MINI REVIEW

**Anatomy:** The popliteal vein is a relatively short vessel, measuring approximately 3 to 4 cm in length, with a diameter of around 1 cm. It is located deep within the popliteal fossa, lying posterior to the knee joint. The popliteal vein is divided into three segments, based on its relationship with the popliteal artery. The proximal segment runs parallel to the artery, the middle segment lies posterior to the artery, and the distal segment runs anterior to the artery [5-7].

**Clinical significance:** The popliteal vein plays a crucial role in the venous drainage of the lower limb, and any pathology affecting this vessel can lead to significant morbidity and mortality. One of the most common conditions affecting the popliteal vein is deep vein thrombosis (DVT), which is a potentially life-threatening condition that can cause pulmonary embolism (PE). DVT occurs when a blood clot forms within the vein, blocking the flow of blood and causing swelling, pain, and redness in the affected limb [8]. Risk factors for DVT include immobilization, surgery, trauma, pregnancy, cancer, and certain medical conditions such as thrombophilia. Another important clinical condition involving the popliteal vein is popliteal vein aneurysm (PVA), which is a rare but potentially serious condition characterized by the dilation and weakening of the vein wall. PVA can be congenital or acquired, and may lead to thrombosis, embolization, or rupture of the vein. Clinical presentation of PVA can range from asymptomatic to painful swelling, claudication, or limb ischemia [9].

**Imaging:** Imaging plays a crucial role in the diagnosis and management of popliteal vein pathology. Ultrasound is the first-line modality for the diagnosis of DVT, with a sensitivity and specificity of over 95%. Computed tomography (CT) and magnetic resonance imaging (MRI) can also be used for

the diagnosis of DVT, and have the advantage of being able to detect other potential causes of leg swelling, such as tumors, abscesses, or lymph node enlargement. CT and MRI are also useful for the diagnosis of PVA, as they can provide detailed information about the size, location, and morphology of the aneurysm, as well as its relationship with adjacent structures [10-11].

**Treatment:** The treatment of popliteal vein pathology depends on the underlying cause and severity of the condition. In the case of DVT, anticoagulation therapy is the mainstay of treatment, with the aim of preventing clot propagation, reducing the risk of pulmonary embolism, and promoting vein recanalization. In some cases, mechanical thrombectomy or catheter-directed thrombolysis may be used to remove the clot and restore blood flow to the affected limb. In patients with PVA, surgical intervention may be necessary if the aneurysm is large, symptomatic, or at risk of rupture. Options for surgical management include vein ligation, aneurysm resection, and vein reconstruction with autologous or synthetic grafts [12].

## CONCLUSION

The popliteal vein is an important blood vessel in the lower limb, which plays a crucial role in venous drainage. Pathology affecting this vessel can have significant clinical implications, including deep vein thrombosis and popliteal vein aneurysm. Imaging techniques such as ultrasound, CT, and MRI are essential for the diagnosis and management of popliteal vein pathology, and treatment options depend on the underlying cause and severity of the condition. Awareness of the anatomy and clinical significance of the popliteal vein is essential for all healthcare professionals involved in the care of patients with lower limb pathology.

**CONFLICTS OF INTEREST:** None.

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Department of Anatomy, Faculty of Medicine, Pavol Jozef Safarik University in Kosice, Slovak Republic

Correspondence: Natalisa Hvizdosova, Department of Anatomy, Faculty of Medicine, Pavol Jozef Safarik University in Kosice, Slovak Republic. E-mail: natalisa.hvizdosova@upjs.sk

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