Thrombosed popliteal artery aneurysm: ultrasound and MDCTA findings
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Section: Cardiovascular
Area of Interest: Vascular
Procedure: Diagnostic procedure
Procedure: Contrast agent-intravenous
Procedure: Computer Applications-3D
Imaging Technique: Ultrasound-Colour Doppler
Imaging Technique: Ultrasound-Spectral Doppler
Imaging Technique: CT-Angiography
Special Focus: Obstruction / Occlusion Case Type: Clinical Cases
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Patient: 59 years, male

Clinical History:

A 56-years-old male patient was admitted to the emergency department having difficulty walking up to 80 m, with intermittent pain in the left knee for 4 days, extending to the calf, and concomitant swelling. He also complained for coldness of the calf.

Imaging Findings:

The patient was initially referred for ultrasound of the affected limb. Colour Doppler technique revealed the presence of an aneurysmal (maximum diameter: 2.85 cm) popliteal artery, filled by thrombotic material (Fig. 1a). Duplex scan of the right lower extremity arteries demonstrated complete absence of flow in the right popliteal artery while the blood-flow in the right femoral artery appeared normal. (Fig. 1b)

MDCT angiography of the lower extremities was subsequently performed and confirmed the absence of blood flow in the right popliteal artery. The latter appeared dilated with some mural calcifications and filled with thrombus. Blood flow appeared normal in both the superficial femoral artery and the tibial vessels, via the activation of collateral vessels. (Fig. 2a, b, c, d)

Discussion:

The term aneurysm can be used to characterize popliteal arteries larger than 0.7 cm in diameter. Popliteal artery aneurysms (PAA) are considered true when involving every layer of the vascular wall. These aneurysms represent the most frequent peripheral arterial aneurysms, are usually nonspecific and attributed to atherosclerosis. False PAA or pseudoaneurysms are caused by a wall defect which in turn may be caused by trauma, iatrogenic injury or mycotic infections. [1, 2] PAA are rare, as they have a reported incidence of 0.1 to 3%. [3, 4] These aneurysms are bilateral in the majority of cases and may coexist with aneurysms in different locations. It is reported that PAA coexist with abdominal aortic aneurysms in almost half of the patients. As a result, radiologists should always evaluate the contralateral popliteal artery and abdominal aorta once a PAA is identified. [1, 5]

The majority of PAA are diagnosed in male patients in their 50s or 60s. Almost half of these patients report no
symptoms. The rest of them present with symptoms like claudication and rest pain caused by ischaemia. The complications of thrombosis, embolization and rupture are limb-threatening and should be diagnosed early. It is reported that complications occur in 18%-31% of PAA which are not treated surgically. [1, 6] More precisely, arterial occlusion affects 39% of patients with PAA. [5] The occurrence of complications depends on the shape of the aneurysm. Namely, saccular PAA are prone to rupture and compressive symptoms whereas fusiform PAA are associated with thrombo-embolic disease. [3]

Ultrasound constitutes the primary imaging modality to evaluate the popliteal vessels and diagnose a PAA. Colour Doppler techniques investigate their patency and the presence of thrombus. CT and MRI can also be used to evaluate a PAA. Conventional angiography may miss the diagnosis of a PAA due to occlusion of the popliteal artery. [1, 3] It is reported that 26% of PAA do not cause visible arterial dilatation on angiography. Indirect signs like the dog leg sign may raise suspicion of the right diagnosis. [5]

Acute thrombosis of a PAA can be treated with thrombolytic therapy in order to achieve recanalization of the vessels for bypass surgery. As far as asymptomatic PAA are concerned, surgery represents the treatment of choice, especially for aneurysms larger than 20 mm, unless it is contraindicated. This guideline is justified by the high frequency of complications regardless of the aneurysm's diameter and the high amputation rate after complications. [1, 4]

**Differential Diagnosis List:** Popliteal artery aneurysm complicated by thrombosis, Popliteal artery aneurysm, Popliteal venous aneurysm, Baker cyst, Soft tissue tumour

**Final Diagnosis:** Popliteal artery aneurysm complicated by thrombosis

**References:**


Description: While investigating the left popliteal fossa, a large ovoid anechoic structure was found, which was connected with the popliteal artery but showed no blood flow signals. Origin: Radiology Department, AHEPA Hospital
Description: Colour Doppler ultrasound with spectral analysis of the affected knee could not identify any blood flow signals within the popliteal artery. **Origin:** Radiology Department, AHEPA Hospital
Description: Axial contrast-enhanced MDCT image at the level of the popliteal fossa reveals the presence of a 20x23 mm peripherally calcified popliteal artery aneurysm which shows no enhancement.
Origin: Radiology Department, AHEPA Hospital
Description: Sagittal MultiPlanar Reformatted (MPR) image demonstrates the aneurysm's length. There are mural calcifications and no contrast medium inside the aneurysm. Origin: Radiology Department, AHEPA Hospital
Description: Curved MPR image illustrates the full length of the aneurysm as well as the points where normal flow is obstructed and restored through collateral circulation. There are multiple mural calcifications. Origin: Radiology Department, AHEPA Hospital
Description: Volume Rendering Technique (VRT) image showing the absence of contrast medium in the part of popliteal artery affected by the aneurysm (between arrows) due to thrombosis. There is evidence of mural calcifications and collateral circulation. Origin: Radiology Department, AHEPA University General Hospital of Thessaloniki, Greece