Sciatic Nerve Entrapment
Neuropathy: A rare cause at a rare site
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Section: Musculoskeletal system
Area of Interest: Extremities Neuroradiology peripheral nerve Vascular Musculoskeletal soft tissue
Procedure: Diagnostic procedure
Imaging Technique: Ultrasound
Imaging Technique: Ultrasound-Power Doppler
Imaging Technique: Ultrasound-Spectral Doppler
Imaging Technique: MR
Special Focus: Arteriovenous malformations
Inflammation Biological effects Case Type: Clinical Cases
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Patient: 18 years, female

Clinical History:
An 18-year-old female presented to us with complaints of a swelling in the posterior aspect of lower left thigh and pain on walking for the past ten months. On examination, no obvious lump could be seen or palpated. No deformity, color change or local rise of temperature was present.

Imaging Findings:
On ultrasound evaluation (Fig 1), a small hypoechoic lesion was identified in the posterior aspect of distal left thigh showing color uptake and arterial flow. Hyperechogenicity of the biceps femoris was seen suggesting fatty changes. The sciatic nerve adjacent to the lesion also appeared thickened. Hence, a provisional diagnosis of a partially thrombosed vascular malformation infiltrating distal part of sciatic nerve was made.
On MRI study (Fig 2), few abnormal vascular channels were seen in the posterior aspect of distal left thigh abutting the sciatic nerve. The distal part and bifurcation of the sciatic nerve showed thickening and hyperintensity with the fatty atrophy of long-head of the biceps femoris muscle. Mild thickening was also noted in proximal tibial nerve. Few abnormal vascular channels were also noted in the ipsilateral gluteal region.
Motor nerve-conduction velocity study showed reduced compound action muscle potential amplitude in biceps femoris. The sensory conduction was unremarkable.

Discussion:
Background: Arterio-venous malformations (AVMs) are congenital lesions containing multiple feeding arteries and draining veins without intervening capillary bed. The main locations are head and neck (40%), extremities (40%), and trunk (20%) [1]. High-flow malformations make up approximately 10% of vascular malformations in the extremities [2][3].
Clinical Perspective: These lesions may not be evident until thrombosis, trauma, infection, local pressure effects or
Endocrine fluctuations occur [4][5]. They may show rapid growth over a short period of time [6]. They can present as a warm mass with an audible bruit due to high blood flow within. Bone overgrowth or arterial steal phenomenon may occur when they invade the joints [1].

Imaging perspective:
Doppler ultrasonography is the primary imaging modality required to evaluate the nature, extent and complexity of the malformation. Radiographs have a limited role and may show phleboliths indicating hemangioma or venous malformation.

High-flow AVMs can present as mixed echogenicity lesions with feeding vessels. Color Doppler and spectral analysis can be used to characterize the flow pattern. Arterialization of veins may produce pulsatile venous flow, confirming Arteriovenous shunting [7]. However, ultrasonographic assessment of deep lesions, especially those adjacent to the bone, can be challenging [8].

Computed tomography is fast and can identify complications such as acute hemorrhage, calcification and thrombosis. However, because of ionizing radiation and the minimal flow velocity information provided, its role is limited to the emergency presentations, equivocal MRI findings or as an adjunct to interventional or surgical planning [9].

MRI with Angiography shows signal voids due to high-flow feeding arteries and draining veins which appear as high-signal-intensity foci on GRE images. Early venous filling is typically seen in AVMs and contrast rise within 5–10 s is expected [3]. MRI has the added advantage of identifying multiple lesions and their relation with surrounding structures such as nerve entrapment in this case.

Outcome: Percutaneous sclerotherapy or trans-arterial embolisation are the management options for AVMs [9]. However, since these may lead to necrosis/ fibrosis of the adjacent soft tissue and nerve, surgical release of the entrapped nerve is recommended in this case to avoid long-term neuro-muscular complications.

Take home message: Our case highlights the importance of complete anatomical survey of the area under evaluation in cases of suspected AVMs. This may give an important lead for reaching a diagnosis and deciding the management options.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Partially thrombosed AV-Malformation causing sciatic entrapment neuropathy, Venous malformation, Hemangioma

Final Diagnosis: Partially thrombosed AV-Malformation causing sciatic entrapment neuropathy

References:


Description: Grayscale ultrasound image of the posterior part of distal thigh region, showing an ill defined hypoechoic nodular lesion (white arrow) adjacent to the distal part of the superficial femoral artery (asterisk). Origin: Department of Radiodiagnosis, Teerthanka Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA
**Description:** Power Doppler image showing abnormal vascular channel within the lesion (white arrow) adjacent to the superficial femoral artery and vein (A, V). **Origin:** Department of Radiodiagnosis, Teerth tanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA
**Description:** High-resistance arterial flow within the lesion. **Origin:** Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA

**Description:** Grayscale ultrasound image of posterior distal thighs, showing fatty changes of left long-head of the biceps femoris muscle (red arrow) with distal acoustic attenuation in comparison to normal muscle echotexture on right side (white arrow). **Origin:** Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA
Description: Thickened sciatic nerve in the distal posterior thigh

Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP-INDIA
Figure 2

Description: T1W Axial MR image of distal thighs; showing vascular lesion (red-circle), thickened sciatic nerve (white-circle) with fatty biceps femoris muscle on the left side (curved arrow); LH-long head, SH-short head of biceps femoris. Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA
Description: T1W Axial MR image of distal thighs at distal level; showing division of left sciatic nerve into thickened tibial nerve (red-arrow) and normal common peroneal nerve (white arrow). Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA

Description: PDFS Axial MRI image of distal thighs; showing thickened and hyperintense left sciatic nerve (white circle) with vascular malformation (red circles) infiltrating the sciatic nerve and fatty biceps femoris (curved arrow). Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA
Description: T1W coronal MRI images of thigh region, showing thickened distal sciatic nerve and its tibial branch (white arrows), abutting the vascular malformation (red-circle) with fatty atrophy of biceps femoris muscle (curved arrow) Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA

Description: STIR coronal MRI images of thigh region, showing thickened and hyperintense distal sciatic nerve (white arrow) and hyperintense AVMs in lower thigh and gluteal regions on the left side. Origin: Department of Radiodiagnosis, Teerthanker Mahaveer Medical College & Research Center, TMU, Moradabad, UP- INDIA