Case 10523

Posteromedial subtalar coalition causing tarsal tunnel syndrome and abductor hallucis denervation
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Section: Musculoskeletal system
Area of Interest: Musculoskeletal joint Musculoskeletal soft tissue
Procedure: Diagnostic procedure
Imaging Technique: Conventional radiography
Imaging Technique: MR
Special Focus: Congenital Inflammation Cysts Oedema
Case Type: Clinical Cases
Authors: I Bares Fernández
Patient: 47 years, male

Clinical History:

A 47-year-old male patient who complained of pain and numbness in the medial aspect of the sole of his foot for two months, and alteration of the electromyography in that location.

Imaging Findings:

On the lateral ankle radiograph we can see the talocalcaneal C sign (Fig 1), therefore MRI is performed to complete the study.

MRI showed an overgrowth of the posteromedial subtalar facet and posterior-subtalar joint space narrowing associated. These findings were consistent with non osseous posteromedial subtalar coalition. MRI also revealed an increase of soft tissue inside the tarsal tunnel appearing hypointense on T1-weighted images and slightly hyperintense on STIR/T2 fat-satured weighted images, which means inflammation. We can also observe the presence of small cystic lesions inside the tunnel, better seen on STIR/T2 fat-satured weighted images, which are compatible with ganglions. Abductor hallucis is seen hyperintense on the axial T2 fat-saturated image, related to medial plantar nerve denervation oedema, secondary to compression by the posteromedial subtalar coalition.

Discussion:

The tarsal tunnel is a fibro-osseus canal bordered by medial malleolus, the talus and calcaneus laterally; and the flexor retinaculum medially. The posterior tibial nerve travels within the tarsal tunnel, along with the posterior tibial, flexor digitorum longus, and flexor hallucis longus tendons and the posterior tibial vessels. This nerve bifurcates, in this region, into the medial and lateral plantar nerves [1]. The major mechanisms responsible for tarsal tunnel syndrome are:

- Compression neuropathy, secondary to trauma (fracture, surgery, and scarring), space-occupying lesions (tumour, ganglions, varicosities, coalition, anomalous muscles...), and foot deformities (hindfoot valgus and, less typically, hindfoot varus, with forefront pronation, pes planus, and tarsal coalition).

- Tension neuropathy, which is signifi?cantly increased in ankles in dorsi?exion and hindfoot evasion [1, 2].

Patients commonly complain of numbness, burning pain and paresthesias in the toes, sole of the foot, or medial heel aggravated by weight bearing [3]. The most helpful signs are sensory loss along the plantar aspect of the foot...
and a positive Tinel sign at the tarsal tunnel, while the failure of motor function is more rare and late [1].

Magnetic resonance imaging and high-resolution ultrasonography have been used as secondary tools to confirm the presence of nerve entrapment or compression, to identify the cause of neuropathies. The clinical history, physical examination, and electrodiagnostic study, including electromyographic and nerve conduction studies are all the basis of the diagnosis. The characteristic signal intensity patterns of acute and subacute muscle denervation at MR imaging include high signal intensity for denervated muscle on images obtained with fluid-sensitive sequences, such as T2-weighted or STIR images, and normal signal intensity on T1-weighted images. Atrophy and fatty replacement occur in chronically denervated muscles [2].

Only a few series of tarsal tunnel syndrome have been reported, and the report of the talocalcaneal coalition as a cause of the syndrome is more uncommon. Posterior talocalcaneal coalition is more often associated with tarsal tunnel syndrome and the medial plantar nerve is predominantly involved [4].

Surgical decompression is the treatment of choice for tarsal tunnel syndrome when conservative treatment (anti-inflammatory medications, injection of corticosteroids into the area around the nerve, orthotics and changes in footwear) are insufficient [5]. Decompression should be performed early to prevent nerve fibrosis [6].

MR Imaging is an excellent modality for imaging the tarsal tunnel and identifying potential causes of posterior tibial nerve entrapment. Space-occupying lesions can be well depicted at MR imaging.

**Differential Diagnosis List:** Posteromedial subtalar coalition causing tarsal tunnel syndrome and abductor hallucis denervation, Posteromedial subtalar coalition causing tarsal tunnel syndrome and abductor hallucis denervation, No differential diagnosis

**Final Diagnosis:** Posteromedial subtalar coalition causing tarsal tunnel syndrome and abductor hallucis denervation

**References:**

Description: On the lateral ankle (left) radiograph, we can see the C sign, which suggests the existence of a talocalcaneal coalition. Origin: Bares Fernández I, Servicio de Radiodiagnóstico Hospital Morales Meseguer, Murcia, SPAIN.
Description: Coronal T1-weighted image shows an overgrowth of the posteromedial subtalar facet and posterior-subtalar joint space narrowing, which are consistent with non osseous posteromedial subtalar coalition. Origin: Bares Fernández I, Servicio de Radiodiagnóstico Hospital Morales Meseguer, Murcia, SPAIN
**Description:** The posterior tibial neurovascular bundle (inside the yellow circle) is surrounded by inflammatory tissue (intermediate signal intensity) reactive to the coalition. **Origin:** Bares Fernández I, Servicio de Radiodiagnóstico Hospital Morales Meseguer, Murcia, SPAIN
Description: Axial section through the tarsal tunnel. T2 fat-suppressed image shows multiple cystic lesions compatible with ganglions (yellow circle) and, behind these, the posterior tibial neurovascular bundle (blue circle). Origin: Bares Fernández I, Servicio de Radiodiagnóstico Hospital Morales Meseguer, Murcia, SPAIN
Description: Axial T2 fat-saturated shows high signal intensity in the abductor hallucis, which means muscle oedema secondary to medial plantar nerve denervation. Origin: Bares Fernández I, Servicio de Radiodiagnóstico Hospital Morales Meseguer, Murcia, SPAIN