Case Report

Muscular Abnormalities as a Cause of the Tarsal Tunnel Syndrome: An Infrequent Bilateral Clinical Case

Marco Di Marco Silvia Elena De Martinis Marcello Truzzi
Roberto Viganò

Department of Rheumasurgery ASST Pini-CTO Hospital, University Faculty of Medicine,
Milan, Italy

Keywords

Tarsal tunnel syndrome · Muscular abnormalities · Neuropathy

Abstract

A clinical case of a female patient affected by bilateral tarsal tunnel syndrome is described. The peculiarity of this case is the difference in the observed anatomopathological muscular abnormalities between the two feet. On one side, an accessory muscular venter of the toes' long flexor was identified. On the other side, posterior tibial nerve compression was determined by an accessory venter of the hallux long flexor, associated with an abnormal venter of the toes' long flexor, with a minor extent if compared to contralateral findings.

© 2019 The Author(s)
Published by S. Karger AG, Basel

Introduction

The tarsal tunnel syndrome is a compression-related neural disease affecting the posterior tibial nerve or its branches (medial plantar, lateral plantar and calcaneal nerve) during the course inside the tarsal tunnel, a fibro-osseous tunnel included between the flexor retinaculum and the medial side of the ankle [1] (Fig. 1).

The compression can be produced by extrinsic or intrinsic factors; the most common extrinsic compression causes include: tendinous cysts, peritendinitis, fracture outcome, post-traumatic or iatrogenic fibrosis [2].

The abnormal or accessory muscular venters, which are intrinsic compression causes, observed by several authors in approximately 7–8% of body dissection [3], were only seldom acknowledged as a cause of the tarsal tunnel syndrome.

While the literature includes specific references to the toes' accessory flexor [4–6], there has never been identification of abnormalities in the hallux's long flexor.

The clinical case we treated shows interesting peculiarities: a bilateral tarsal tunnel syndrome and different anatomopathological findings on both sides.

Case Description

We present the case of a 32-year-old female patient affected by bilateral tarsal tunnel syndrome.

The patient reported an onset of moderate dysesthetic symptoms in the plantar side of the right foot at the age of 31. She then developed similar symptomatology in the left foot after 4 months.

No disorder was found in standard-view radiographs, performed for both feet; normal arthral links were observed and no structural injuries were reported. Routine blood tests were performed and inflammatory markers were assessed but they fell into the normal range; moreover, the electromyographic examination did not show any alteration.

Throughout the following 3 months, the painful symptoms increased, even at rest. The adoption of planar orthoses and physical therapy sessions did not improve the condition.

At our observation, both feet did not show any morphological disorder. Clinical examination evidenced a normochromic and normotrophic skin and no abnormalities were observed in static loading. Tinel's sign was clearly positive bilaterally and a subtalar stiffness was present.

A bilateral tarsal tunnel syndrome was then hypothesized, and a CT scan was prescribed in association with follow-up blood tests (WBC, electrolytes, erythrocyte sedimentation rate, C-reactive protein) including rheumatic tests (reuma test and Waaler-Rose test). Moreover, a ionophoresis session with a steroid drug was required. There was no evidence of pathological results from the blood tests and from the CT scan (Fig. 2, 3).

A baropodometric walking test was then performed and it showed a dynamic loading characterized by alternative supination and hyperpronation loading.

The ultrasound scan, performed in the retro- and submalleolar region of both feet, did not evidence abnormal findings in the tarsal tunnel (Fig. 4). A further electromyographic examination turned out negative for posterior tibial nerve compression.

It was then decided to carry out surgery, due to the persisting bilateral plantar dysesthetic symptoms and to the poor benefit of medical drugs (NSAIDs), such as ibuprofen and ketoprofen, and physical therapy.

A standard access (retro- and submalleolar posterior convexity incision) to the left foot was performed and showed an accessory venter of the toes' common flexor that invaded the nerve for the length of 15 mm (starting from approximately 20 mm proximal to the apex of the medial malleolus) and the nerve had a one-third smaller diameter. The accessory venter was then removed and neurolysis was performed till the nerve's bifurcation.

An immediate postoperative improvement of the plantar dysesthesia was achieved. The patient was discharged after few days wearing a plaster brace, and loading was then allowed 4 weeks after surgery.

After these findings, ultrasound scan was performed in the right foot, but it showed no abnormalities.

Eventually, another surgery was carried out also in the right foot and intraoperative findings confirmed the presence of an accessory venter in the toes' common flexor but smaller and less widespread if compared with contralateral findings (Fig. 5); we also found an abnormal venter of the hallux's long flexor reaching beyond the apex of the medial malleolus. The posterior tibial nerve was compressed between the two muscular venters but showed no macroscopic disorder (Fig. 6). A part sized $1 \times 2 \times 4$ cm of the abnormal venter was then removed.

Histological examination on fragments of perivascular fatty tissue of the sheath of the toes' long flexor tendon and of the removed muscular tissue were normal.

The patient was then discharged few days later and after 38 months from surgery symptoms were completely subsided in both feet and normal daily activity had been resumed.

Discussions

The tarsal tunnel syndrome is a well-defined disease, both in etiopathogenetic and in clinical terms, even though imaging is not always useful in providing evidence of the causes (electromyography, CT scan, ultrasound, MRI).

Very few cases of tarsal tunnel syndrome, presenting an accessory venter of the toes' long flexor, have been described in the literature and no author has described any bilateral case so far. In addition, no abnormalities have ever been found in the hallux's long flexor which could give rise to such disease.

Our case is extremely particular because it shows that such a small anatomical structure as the tarsal tunnel can be seriously affected by anatomical abnormalities. An appropriate diagnosis was obtained through a surgical approach. Only a surgical procedure can state this abnormality and provide a definitive solution.

Conclusions

Based on these facts, we described a clinical case that was interesting for two reasons: its etiology and its bilateral onset.

Our finding was considered abnormal since the muscular venter had a considerable size and reached beyond the apex of the medial malleolus, although it is reported that the hallux's long flexor at this level should be completely tendinous.

In the case of a symptomatic patient with a clinical onset of tarsal tunnel syndrome, in the presence of negative diagnostic and radiological examinations, we should always suspect the onset of anatomical abnormalities.

Statement of Ethics

All procedures were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Declaration of Helsinki

of 1964 and its later amendments. Informed consent was obtained from the patient for being included in this case report.

Disclosure Statement

The authors have no conflict of interest to declare.

References

- 1 Yüksel M, Onderoğlu S, Yener N, Yüksel E. An accessory flexor digitorum longus muscle. *Acta Anat (Basel)*. 1993;148(1):62–4.
- 2 Ferkel E, Davis WH, Ellington JK. Entrapment Neuropathies of the Foot and Ankle. *Clin Sports Med*. 2015 Oct;34(4):791–801.
- 3 Abrego MO, De Cicco FL, Gimenez NE, Marquesini MO, Sotelano P, Carrasco MN, et al. Talus Bipartitus: A Rare Anatomical Variant Presenting as an Entrapment Neuropathy of the Tibial Nerve within the Tarsal Tunnel. *Case Rep Orthop*. 2018 Sep;2018:2737982.
- 4 Ahmad M, Tsang K, Mackenney PJ, Adedapo AO. Tarsal tunnel syndrome: A literature review. *Foot Ankle Surg*. 2012 Sep;18(3):149–52.
- 5 Eberle CF, Moran B, Gleason T. The accessory flexor digitorum longus as a cause of Flexor Hallucis Syndrome. *Foot Ankle Int*. 2002 Jan;23(1):51–5.
- 6 Rosson GD, Larson AR, Williams EH, Dellon AL. Tibial nerve decompression in patients with tarsal tunnel syndrome: pressures in the tarsal, medial plantar, and lateral plantar tunnels. *Plast Reconstr Surg*. 2009 Oct;124(4):1202–10.

Fig. 1. Tarsal tunnel.

Fig. 2. CT scan: anteroposterior view.

Fig. 3. CT scan: lateral view.

Fig. 4. Ultrasound image.

Fig. 5. Accessory venter in the toes' common flexor.

Fig. 6. Posterior tibial nerve compressed between toes' common flexor and hallux's long flexor.