Role of US and MRI imaging in tarsal tunnel syndrome

Essay

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By

AYMAN ABDEL WAHAB HAMED

M.B. B.Ch. Cairo University

Supervised by

Prof. Dr. Khaled Mohamed El Shantaly

Professor of radiology
Faculty of medicine
Cairo University

Ass. Prof. Dr. Hatem Mohamed El Azizy

Assistant. professor of radiology
Faculty of medicine
Cairo University

Faculty of medicine
Cairo University
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Abstract

In our essay, we identify the causes of the tarsal tunnel syndrome

and re-evaluate the role of ultrasonography and MRI in diagnosis of

these causes.

High-resolution ultrasound allows direct imaging of the involved

nerves, as well as documentation of changes in nerve shape and

echotexture that occur in compressive syndromes. Ultrasound can

examine a spectrum of extrinsic causes of entrapment, such as

tenosynovitis, partial and complete tendinous tear, ganglia, soft-tissue

tumors and joint abnormalities.

MRI has superior soft-tissue contrast resolution and multiplanar

capability, so it can help to determine the cause of ankle and foot pain. It

demonstrates soft tissue structures including muscles, tendons,

ligaments, cartilages, nerves, blood vessels as well as bony structures

particularly the bone marrow. Also,

Ultrasonography and MRI are two complementary tools of

investigation with the former being used as primary tool of investigation

and the later is done to confirm the diagnosis and extent of the lesion

especially when surgical interference is planned.

Keywords: Role of Us - MRI imaging - Tarsal tunnel syndrome

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List of abbreviations

ANA Antinuclear antibody

AH Abductor hallucis muscles

FDAL Flexor digitorum longus

FDB Flexor digitorum brevis muscles

FDL Flexor digitorum longus

FHL Flexor hallucis longus tendon

FR Flexor retinaculum

LP Lateral planter nerve

LPVB Lateral planter vascular bundle

MC Medial calcaneal nerve

MP Medial planter nerve

MPVB Medial planter vascular bundle

PT Posterior tibial muscle / tendon

PTA Posterior tibial artery

PTF Posterior talofibular ligament

PTN Posterior tibial nerve

PTV Posterior tibial vein

PVNS Pigmented villonodular synovitis

QP Quadratus plantae muscle

RB Retrocalcaneal bursa

TTS Tarsal tunnel syndrome

VB Vascular bundle

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Introduction

Tarsal tunnel syndrome is one of the entrapment neuropathies in which there is entrapment of the posterior tibial nerve or entrapment of its branches (Gianni and Steven, 2004)

It is characterized by burning pain and parathesia along the planter aspect of the heel or radiate proximally along the medial calf. The nerve may be tender at and proximal to the site of compression (*Deutsh et al*, 2005).

Various lesions that occur in the fibro-osseous tunnel can cause nerve compression (e.g,: ganglion cysts, varicosities, bone and joint abnormalities, tumors, tenosynovitis, supernumerary or hypertrophic muscles) (*Delfaut et al, 2003*).

The clinical and electromyographic diagnosis is not often straightforward as electromyography may give false negative result in early cases (Rosenberg and Cheung, 2004).

Accurate nerve examination must performed, particularly in patient with atypical ankle pain to detect focal tenderness and parathesia. Ultrasonography is useful as it yields both clinical and morphologic findings. High resolution MRI provides accurate delineation of nervous system anatomy (*Delfaut et al.*, 2003).

MRI is shown to be useful in preoperative assessment of mass lesion within the tarsal tunnel. Ultrasound and MRI are two complementary methods for examination (*Rosenberg and Cheung*, 2004).

Aim of the work

To highlight the different pathological conditions causing entrapment neuropathies and role of ultrasound and MRI in differentiating them.

Tarsal tunnel

Definition: the tarsal tunnel is a passage way through which the medial ankle tendons and posterior tibial neurovascular bundle pass.

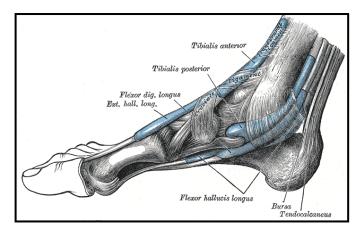


Fig.1 (Tarsal tunnel Medial aspect. (Minn, 2000).

Extension:

Its proximal and distal borders are often difficult to define but, in general, it extends from the level of the medial malleolus to the level of the tarsal navicular. It occupies the medial-posterior aspect of the ankle and extends into the medial plantar aspect of the foot (**fig.1**) (*Deutsh et al*, 2005).

Boundaries:

The tunnel has an osseous floor formed, from proximal to distal by:-

- *1*) Tibia.
- **2**) Talus.
- 3) Sustentaculum tali.
- 4) Medial wall of the calcaneus.