Peroneal tendon disorders

Poster No.: P-0069
Congress: ESSR 2013
Type: Scientific Exhibit
Authors: H. T. Sanal; Ankara/TR
Keywords: Extremities, MR, Diagnostic procedure, Trauma
DOI: 10.1594/essr2013/P-0069

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR’s endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys’ fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org
Purpose

Pathologies of the peroneus longus, peroneus brevis tendons such as tenosynovitis, degeneration and tears can lead to persistent lateral ankle pain and functional problems when unrecognized. Other lesions such as hemangioma originating from the tendon sheath, PVNS, lipoma, abscess can also be observed on MR images.

The goals of this review are i) to illustrate the anatomy of the peroneal tendons briefly, ii) and to present some of the disorders pertain to these tendons with emphasis on their MR imaging appearances.
Methods and Materials

First, the anatomy of the peroneal tendons will be reviewed, second, some of the pathologies of the peroneal tendons such as degeneration, tenosynovitis, tear, hemangioma, PVNS, lipoma and abscess observed on MRI will be displayed.
Results

Anatomy

Peroneus longus (PL) and brevis (PV) tendons are important lateral stabilizers of the ankle joint.

In their course from the ankle to the foot, both tendons share the same tendon sheath behind the fibular malleolus (Fig.1). In this fibular groove, both tendons and their sheath are kept in secure by superior peroneal retinaculum which inserts both medial and lateral edges of the sulcus.

Distally, PL, right next to calcaneus passes beneath a tunnel created by inferior peroneal retinaculum. Further distally, PL tendon is adjacent to the cuboid bone. After passing inferior to the cuboid bone this tendon lies within a groove enveloped by a second synovial sheath. The tendon then inserts on the lateral side of the base of the first metatarsal bone and medial cuneiform (Fig. 2). At the edge of the cuboid bone, a sesamoid of the tendon either cartilaginous or bone can be observed (Fig.3).

PB tendon inserts on the lateral aspect of the base of 5th metatarsal bone (Fig.3).

Tendinosis and tenosynovitis

Fluid within the sheath of the peroneal tendons, altered tendon size and increased intratendinous signal intensity can be observed on MRI (Fig.4). Differentiation of physiologic fluid and pathologic may be difficult (Fig.5). Besides, tears of the calcaneofibular ligament may allow communication of the ankle and peroneal tendon sheath creating fluid in the sheath with patients of recent ankle trauma. In cases of tendinosis and tenosynovitis marrow edema adjacent the area of involvement is common.

Rupture

Rupture can occur after a trauma or spontaneously. Ligamentous injuries and laxity of the ankle joint accompanies most of the time. Spontaneous ruptures occur mostly in young adults involving mainly the PV tendon. Partial tears are common than complete tears. Though partial tears can occur at the same time, complete tears of both tendons are rare.
Longitudinal split tears of the PV begin at the tip of the fibula extend proximally or distally (Fig.5). In some situations the tear divides the tendon into two. Tears of the PL is often distally at the level of the cuboid bone.

Retraction of peroneal tendons are rare.

**Hemangioma**

Hemangioma of the tendon sheath is extremely rare. The reported cases are mostly in the forearm, wrist and hand (1). The origin of synovial hemangiomas of the tendon sheaths, is controversial whether they are the late stages of post-trauma or true neoplastic vascular proliferations (2). The clinical examination and plain radiographs do not yield much in reaching a diagnosis of synovial hemangioma. On MR imaging the lesion is hyperintense on fluid sensitive sequences with lobular contours, having hypointense flebolites, best seen on GRE images. The lesion enhances after contrast administration like other hemangiomas seen in other locations (Figs 6 and 7).

**Pigmented villonodular synovitis (PVNS)**

PVNS though was considered to be a reactive lesion previously, recent observations support a neoplastic origin (2). It represents the diffuse and intraarticular form of proliferative disorders of the synovium (3). The deep stroma in PVNS is filled with a sheet like proliferation of histiocytes (intra- and extra- cytoplasmic deposits of hemosiderin) and multinucleated giant cells. PVNS has a significant risk of recurrence On MR imaging, the diffuse thickening of the synovium shows low to intermediate signal intensity as compared to muscle on T1-weighted images and is low on T2-weighted images. Areas of low signal intensity are more manifest on gradient-echo images. Abnormal synovial tissue may be in continuity with articular space and tendon sheath (Fig.8).

**PT abscess**

Tendon infections generally result from contiguous spread of foot infection from predisposing conditions such as diabetes, vascular disease, altered biomechanics or neuropathy (4). Contrast enhancement of the tendon and peritendinous fluid seen on T2-weighted image is not specific for infection, rather it can be observed with inflammatory conditions, PVNS and degenerative processes of the tendons. However, circular enhancement of a tendon is accepted specific, especially if the tendon is passing through an area of cellulitis (Fig.9) (4).

**Peroneus tertius lipoma**

Tumor of tendons and of tendon sheaths are very rare that fibroma, lipoma and chondroma are some examples that can be encountered. Lipoma is more frequent, and occurs in two forms: as lipoma arborescens or simplex. They may both grow within the
sheath, surrounding the tendon, or outside it, connected with the sheath directly or by means of a pedicle (5). They can be identified on CT by typical negative HUs (Fig.10). They are bright on T1 weighted images and hypointense on fat saturated sequences.
Fig. 1: 3D reformatted image showing PL and PB tendons extending behind the lateral malleolar groove, adjacent to the calcaneus.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Fig. 2: Axial PD image demonstrating the distal PL tendon inserting on the lateral tubercle of the base of the 1st metatarsal (arrowhead). A slip arising from the medial half of the tendon proper is seen to attach to the medial cuneiform (arrow). C: Medial cuneiform, MT: Metatarsal.

© Department of Radiology, UCSD, 2008
Fig. 3: Axial PD weighted MR images of the plantar aspect of the feet of two different specimens. In both of the images, a fibrous expansion (arrow) is seen to connect the PL tendon (*) at the level of the sesamoid to the origin of the short flexor (**) of the 5th toe forming the anterior frenular ligament. Cb: Cuboid bone, MT: Metatarsal.

© Department of Radiology, UCSD, 2008
**Fig. 4:** PV tendinosis at its insertion on 5th MT base, showing enlargement and intermediate signal intensity.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Fig. 5: Fluid, representing tenosynovitis in the common peroneal tendon sheath. Note the longitudinal tear of PV tendon.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
**Fig. 6:** Axial fat saturated T2-weighted image showing lobulated hyperintense mass involving the sheath of peroneal tendons, previously operated and reported as hemangioma.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Fig. 7: Sagittal fat saturated T2-weighted image, same case as in Figure 1, showing lobulated hyperintense mass involving the sheath of peroneal tendons, previously operated and reported as hemangioma.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Fig. 8: Signal void areas on GRE sequence in the peroneal tendon sheath as well as ankle joint synovia compatible with PVNS.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
**Fig. 9:** Pain and swelling at the dorsum of the foot after a traumatic injury. Rim type contrast enhancement in the sheath of peroneus tertius, longus and brevis tendons and the nearby soft tissues compatible with infection and abscess formation.

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Fig. 10: Lipoma of the peroneus tertius tendon sheath on the right side is seen with its well defined border and negative HU (calculated in the workstation).

© Radiology, Gulhane Military Medical Academy - Ankara/TR
Conclusion

With its inherited high contrast resolution, MR imaging displays abnormalities related to substances of the peroneal tendons and soft-tissues associated with these anatomic structures.
References