Case 9768

Sonographic diagnosis of a split peroneal tendon syndrome
Published on 06.02.2012

DOI: 10.1594/EURORAD/CASE.9768
ISSN: 1563-4086
Section: Musculoskeletal system
Area of Interest: Musculoskeletal system
Musculoskeletal soft tissue
Procedure: Diagnostic procedure
Technique: Ultrasound
Technique: PACS
Technique: MR
Special Focus: Trauma Case Type: Clinical Cases
Authors: Evangelos Perdikakis, Theodoros Ntitsias, Ioannis Petkidis
Patient: 38 years, male

Clinical History:
A 38-year-old male military officer presented to the orthopaedics department for evaluation of a left ankle mass. According to the history given, the swelling was first noticed 4 weeks ago after a 10 km marching exercise and the patient did not recall any major traumatic injury.

Imaging Findings:
Physical examination showed a painless, hard, immobile soft tissue mass located anteroinferiorly to the left fibular tip (Fig. 1). Range of motion was severely restricted in all planes. No clinical or laboratory evidence of inflammation or infection was identified. An ultrasound examination showed a superficial, complex, multilocular cystic mass (Fig. 2). Furthermore ultrasound depicted loss of the fibrillar echotexture of the peroneus brevis tendon (PBT), hypoechogenicity compared to the peroneus longus tendon (PLT) and a longitudinal tear of the PBT (Fig. 2). MR imaging verified the presence of a split peroneal tendon syndrome and demonstrated also the complex cystic mass (Fig. 3). The diagnosis of a chronic split peroneal brevis tendon tear associated with a ganglion cyst was thus established and the patient was referred to a specialised podiatric clinic for surgical therapy. The one year postoperative evaluation demonstrated a good cosmetic and functional outcome (Fig. 4).

Discussion:
The primary role of the peroneal tendons is plantar flexion and eversion of the foot at the ankle [1-3]. Furthermore, they act as lateral stabilisers of the ankle joint. The peroneus brevis tendon (PBT) lies between the bony retromalleolar groove and the peroneus longus tendon (PLT) and thus is susceptible to degeneration, tendinopathy and rupture [1-4]. Tears of the PBT at the level of the retromalleolar groove are often associated with predisposing factors: a) traumatic rupture and insufficiency of the superior peroneal retinaculum, b) preexisting chronic rupture of the calcaneofibular ligament and ankle instability, c) normal anatomic variants (e.g. peroneus quartus muscle) and d) retromalleolar groove irregularities. The normal retromalleolar groove demonstrates a smooth and concave shape whereas convexity, straight configuration or irregularity may predispose to PBT tear [1-4]. In our case the irregularity and straight orientation of the retromalleolar groove, in the absence of any major traumatic injury, may have led to split PBT syndrome. MRI is considered the imaging modality of choice for evaluation of possible peroneal pathology [1-3]. The PBT is depicted with a characteristic crescent like configuration between the retromalleolar groove and the
PLT. Loss of this normal characteristic appearance and a resulting bifid configuration with the PLT intervening between the two parts of PBT are the MRI findings of the syndrome [1-4]. Although the MR signs are well documented in the literature, to the best of our knowledge the ultrasound identification of this syndrome is an underreported entity. Recent developments in sonographic technology have enhanced the diagnostic capacity of musculoskeletal ultrasound [5-6]. Excellent details of the superficial structures can be depicted and additional information is gained while performing dynamic examinations [5-6]. In our patient the tear was further complicated by a ganglion cyst, probably due to the chronic nature of the split syndrome. The strenuous activity (marching exercise) was considered retrospectively the triggering factor. Although the association of ganglion cysts with tendon pathology is well documented, the actual aetiology of ganglion cyst formation remains obscure [7-9]. The repetitive-overuse injury to the tendon or tendon sheath with consequent cystic or mucoid degeneration of the tendon’s collagen fibres, cellular hyperplasia and tendon tear with tenosynovitis are believed to be the main pathophysiologic mechanism that precedes ganglion cyst development [7-9]. In our case the tendon tear and the associated ganglion cyst were not suspected clinically but ultrasound suggested the accurate diagnosis and MRI confirmed the findings.

**Differential Diagnosis List:** Split peroneal tendon syndrome with an associated ganglion cyst formation, Normal bifurcated peroneus brevis tendon, Accessory peroneus quartus tendon

**Final Diagnosis:** Split peroneal tendon syndrome with an associated ganglion cyst formation

**References:**


Description: Photographs (a), (b) of the patient’s ankle show a protuberant mass located anteroinferiorly to the lateral maleolus (black arrows). Origin: Dpt of Radiology. 412 G.M.H.-212 M.A.S.H.
Description: Photographs (a), (b) of the patient’s ankle show a protuberant mass located anteroinferiorly to the lateral maleolus (black arrows). Origin: Dpt of Radiology. 412 G.M.H.-212 M.A.S.H.
Description: Ultrasound findings: cystic lesion (arrows and dash line in a, b), intrallesional debris (small arrow), hypoechogenicity and loss of fibrillar structure of PBT (arrows and dash line in c, d) and intervening PLT (thick line). Origin: Dpt of Radiology, 412 G.M.H.-212 M.A.S.H.
Description: Axial (a-b), coronal (c) and sagittal (d) fat saturated T2-w MR images showing the split PBT (open arrows). Note increased signal due to chronic PBT tendinopathy (small arrow) and the complex ganglion cyst (asterisks). **Origin:** Dpt of Radiology 412 G.M.H.-212 M.A.S.H.
**Figure 4**

**Description:** (a) Excellent cosmetic result. Ultrasound images prior to (b), at the level of (c) and post (d) the retromalleolar groove showing normal tendon morphology. Note residual partial hypoechogenicity of PBT fibers (arrow in d). **Origin:** Dpt of Radiology, 412 G.M.H.-212 M.A.S.H.