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CASE REPORT

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Tibialis Anterior Muscle Hernia: A Case of Chronic, Dull Pain and Swelling in Leg Diagnosed by Dynamic Ultrasonography

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Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

Summary

Background: Symptomatic muscle hernias are not uncommon in the lower extremities and are a rare cause of chronic leg pain. They are most commonly seen in the tibialis anterior muscle, occurring through fascial defects, usually after trauma. There are about 200 cases of muscle hernias described in the literature. The diagnosis is challenging as most of the patients present with non-specific chronic leg pain. Dynamic muscle ultrasonography at rest and at stress is often used for the diagnosis.

Case Report: We describe a case of tibialis anterior muscle hernia presenting with persistent dull pain and swelling along the anterior aspect of the leg on straining the leg muscles. Dynamic ultrasonography was performed, which showed a defect in the fascial sheath of the muscle through which the tibialis anterior muscle herniated and produced a focal bulge along the anterior aspect of the leg. Based upon physical examination and dynamic ultrasonographic findings, a diagnosis of tibialis anterior muscle hernia was made.

Conclusions: Tibialis anterior muscle hernia is a rare diagnosis and should be included in the differential diagnosis in a patient with chronic leg pain and swelling. Dynamic ultrasound is crucial in confirming the diagnosis and should be done on straining the muscles of the affected limb.

MeSH Keywords: Muscle Fibers, Skeletal • Posterior Tibial Tendon Dysfunction • Ultrasonography, Doppler, Color

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Background

Muscle hernias of the extremities are most commonly seen in the leg and affect mostly the tibialis anterior muscle. They occur as a result of a defect in the fascial sheath of the muscle secondary to trauma or due to constitutional causes. Most of symptomatic patients usually present with chronic leg pain and occasionally with soft tissue swelling. The diagnosis is challenging as the swelling disappears at rest and reappears during muscle straining. This finding suggests the diagnosis of this entity. Imaging, especially dynamic ultrasonography, plays the most important role in making the diagnosis.

Case Report

A 28-year-old male presented with complaints of dull pain in the left leg for 6 months that was accompanied by a swelling of the left leg noticed only during straining leg muscles (e.g. prolonged standing, walking, running etc.). The patient had a history of blunt trauma to the left leg 4 years before.

Local examination revealed no obvious swelling in the leg at rest, with patient lying in the supine position (Figure 1.). On standing and straining the leg muscles, there was a soft, non-tender swelling, measuring approximately 6.5×3.0 cm, seen along the anterior aspect of the leg in its mid-part (Figure 2.). There was no evidence of any sensorineural deficit or varicose veins. Axial sonogram of the patient lying in the supine position showed a defect of approximately 9.5 mm in the fascia of the tibialis anterior muscle with no bulging of muscle fibres (Figure 3.). The patient was asked to stand and strain the leg muscles by dorsiflexion of the foot. Then, the axial sonogram revealed a herniation of muscle fibres through the defect, producing a focal bulge at

Figure 1. Clinical picture of the left leg – patient lying in the supine position, shows no obvious swelling in the leg (leg muscles relaxed).

Figure 2. Clinical picture of the left leg – patient standing and straining leg muscles, shows a soft, non-tender swelling, measuring approximately 6.5×3.0 cm, on the anterior aspect of the leg.

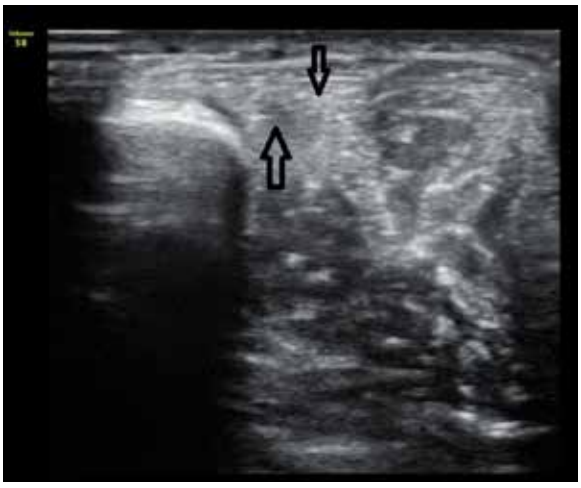

Figure 3. Axial sonogram of the anterior leg – patient lying in the supine position, shows a defect (black arrows), measuring approximately 9.5 mm, in the fascial sheath of the tibialis anterior muscle.

the anterior aspect of the leg (Figure 4.). Based upon physical examination and dynamic ultrasonographic findings, a diagnosis of tibialis anterior muscle hernia was made.

Discussion

Muscle hernias are focal herniations of muscle tissue through a defect in its fascial sheath. They are most commonly found in the lower extremity. They are mostly underdiagnosed or misdiagnosed as muscle hematomas and varicosities [1]. There are about 200 cases of muscle hernias described in the literature. In 1929, Hugo Ihde reported a case series of 12 patients with muscle hernias along with their classification [2].

Ihde divided muscle hernias into two groups: traumatic and constitutional. Constitutional or congenital hernias occur due to weakness in muscle fascia after chronic stress. It has been proposed that there are fenestrations in the muscle compartments through which perforating veins

Figure 4. Axial sonogram of the leg at rest and after muscle straining (second image) shows a focal bulge of muscle fibres (white arrow) through the fascial defect (black arrow).

enter. Due to chronic stress, the fenestrations enlarge and eventually muscle hernias bulge through these openings [3]. Traumatic or acquired hernias are seen secondary to penetrating trauma, direct trauma causing closed fracture with fascial tear and indirect trauma (force applied to contracted muscle causing fascial rupture) [4]. The anterolateral tibial compartment is the commonest site due to being a superficial and tight fascial compartment [5]. A high index of suspicion and awareness of a muscle hernia helps in its early diagnosis. In the lower extremity, tibialis anterior muscle hernia is found most frequently due to the vulnerability of its fascia to trauma. The other muscles affected in the lower extremity are extensor digitorum longus, peroneus longus, peroneus brevis and gastrocnemius [6]. In our case, there was a history of blunt trauma to the leg 4 years before that might have contributed to muscle hernia.

On clinical examination, muscle hernia may present as a palpable bulge, soft tissue mass or subcutaneous nodule. The muscle typically herniates during leg dorsiflexion, also known as "fencer's lunge" position" [7]. The swelling reduces when the patient is supine or the muscle is relaxed. Although the clinical picture points towards the diagnosis, imaging, especially ultrasound, should be used to confirm it. The differential diagnosis of muscle hernias include varicosities, angiomas, arteriovenous malformation, lipomas, ruptured muscle (a pseudohernia) and soft tissue tumours [4]. However, these tumours do not show movement on changing the patient position. Dynamic sonography is diagnostic in detecting a myofascial defect and can confirm the diagnosis. Dynamic sonography can detect a muscle bulge through the fascial defect on muscle contraction and its retraction on relaxation. Sonography is advantageous as it is a real-time modality, so that muscle herniation is detected during a dynamic examination, and the nature of lesion can be shown to the patient, which is reassuring. The examination is done in a standing position or by contracting the muscle [8].

A 3D scan allows for a better delineation of fascial defects with a proper placement of the reference point. A 3D scan highlights the muscle herniation and makes hernia easy to see [9]. MRI is useful in equivocal USG findings and confirms muscle herniations with a better musculofascial demarcation [10]. There is no ideal treatment for muscle herniations described in the literature. Most hernias are asymptomatic and require only reassurance. Mildly symptomatic hernias are treated conservatively with rest, restriction of exercise and the use of compression stockings. Various surgical techniques for symptomatic hernias include decompressive fasciotomy, primary fascial repair – including direct closure of the defect, closure of the defect using autologous or synthetic grafts etc. [11].

Conclusions

Tibialis anterior muscle hernia is a rare diagnosis and should be considered in the differential diagnosis in a patient with chronic leg pain and swelling. Dynamic ultrasound is crucial in confirming the diagnosis and should be done on straining the muscles of the affected limb.

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