

CLINICAL VIGNETTE

Tennis Leg: Is It Under Diagnosed? Swelling of the Calf is not always a DVT, It Might be Strain of the Medial Head of Gastrocnemius Muscle or Tennis Leg!

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A 66-year-old male with a past medical history of hypertension, OSA (obstructive sleep apnea) and obesity presented with a painful swollen right calf for 7 days. The condition started when he was in Brazil. He was walking when he hit his great toe stepping down from the curb. He immediately felt severe pain in the back of his right leg and heard a popping sound. His calf remained swollen from below the knee down to the middle of his calf and the pain persisted. He used over the counter analgesics, muscle relaxants, and topical products with no improvement. He is a contractor who travels frequently between the USA and South America. He had no insurance in South America and waited until his return home to seek care. He recently increased his physical activity to lose weight, exercising and walking daily. He works many hours on the computer and also noticed ankle swelling by end of the day.

Physical examination showed localized swelling on his right calf, more on the medial side than the lateral side. There was tenderness on palpation of the posterior calf. Medial swelling extended from below the knee down to the upper third of the posterior calf. Popliteal artery, and dorsalis pedis pulsations were intact and the Achilles tendon was intact. There was 1+ pitting edema in the right ankle. Left lower extremity was normal, and the rest of his physical exam was not pertinent.

Because of the asymmetrical leg swelling, his recent prolonged travel from Brazil with increased factors of DVT, he was sent for urgent ultrasonography.

Duplex Ultrasound evaluation showed normal veins of the right leg without thrombophlebitis. Targeted sonography of the posterior mid-calf in the area of tenderness demonstrates mild edema of the medial head of the gastrocnemius muscle with a small amount of fluid along the deep fascia, superficial to the soleus muscle. There is no large hematoma or muscle tear appreciated. The findings are consistent with a strain of the medial head of the gastrocnemius muscle, or so-called "tennis leg."

Discussion

Tennis leg was first described in 1883. Physicians thought these injuries were related to isolated plantaris rupture until operative exploration found intact plantaris with isolated tearing of the medial head of the gastrocnemius.¹

Misdiagnosis of Tennis Leg as thrombophlebitis or ruptured baker's cyst was documented in previous reports.^{1,2} DVT is included both in the differential diagnosis and as a complication of this condition. Assessment of the calf veins at the time of the scan is standard.³

Differential diagnosis should also include popliteal artery entrapment, Achilles tendon rupture, chronic exertional compartment syndrome, and acute compartment syndrome, plantaris injury, and Soleus syndrome, injuries to the structures of the deep compartment (tibialis posterior, flexor digitorum longus, and flexor hallucis longus).³

Clinical symptoms and signs of DVT are not specific, and some reported up to 42% of patients receiving anticoagulation.^{1,3} Anticoagulation if undertaken before confirmation of the diagnosis can have serious adverse consequences, including severe hemorrhage, hematoma or compartment syndrome.

The use of ultrasound to diagnose Tennis leg, was first described in a case report in 1998 by Bianchi et al. Tennis leg is rarely mentioned in literature. Bright reported only 78 cases of tennis leg in the literature in 2017.⁴

Tennis leg is known to happen more frequently in poorly conditioned male athletes in the fourth to sixth decade of life.^{1,4,5} Patients report sudden onset pain in the calf and audible or palpable pop in the medial aspect of the posterior calf. Physical examination of Tennis leg will typically disclose a painful swollen calf with significant local tenderness on the medial side as was found in my patient's physical examination. Achilles tendon is usually unaffected.^{2,5}

The mechanism of injury is described as sudden push off when initiating a sprint or jump causing the ankle to rapidly change from plantar flexion to dorsa flexion with the knee remaining in full extension or hyperextension.^{1,4,6}

It is crucial to differentiate it from thrombophlebitis as treatment with anticoagulation can increase bleeding in the affected gastrocnemius.⁴

Findings on ultrasound depend on size of the injury. It may vary from a small lesion with local disrupted arrangement of the

muscle fibers and fibro adipose septa to a larger tear with fluid collection separating the injured medial head of the gastrocnemius from Soleus muscles. Severity of the trauma ranges from Grade 1 strain to grade 3 complete muscular rupture. Effusion represents the hematoma and is seen as anechoic. Ultrasonographic findings also depend on the time of exam not just the size of the tear or the severity of the rupture of the muscle.³

In my patient, the ultra-sonographic findings were positive for significant edema of the medial head of the gastrocnemius muscle with normal Doppler findings excluding DVT and documenting the Tennis leg diagnosis (Figures 1, 2).

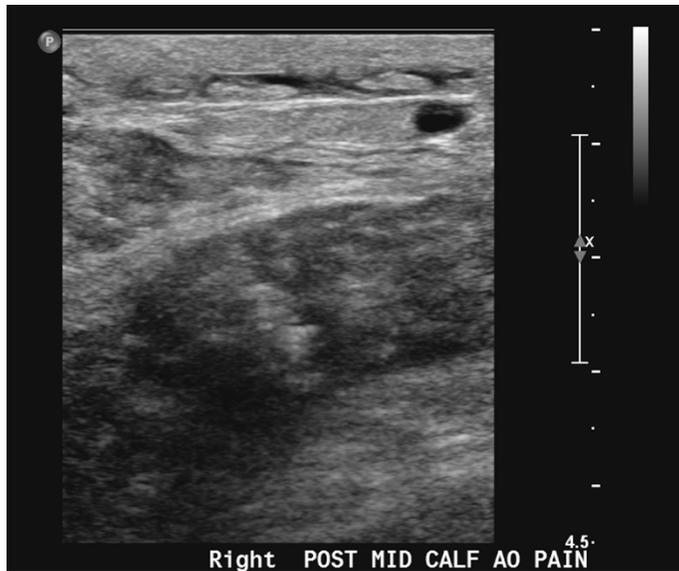


Figure 1. Targeted ultrasonography of posterior mid-calf showing edema of the medial head of the gastrocnemius (thick white arrows) with a small amount of fluid along the deep fascia and superficial to the soleus muscle.

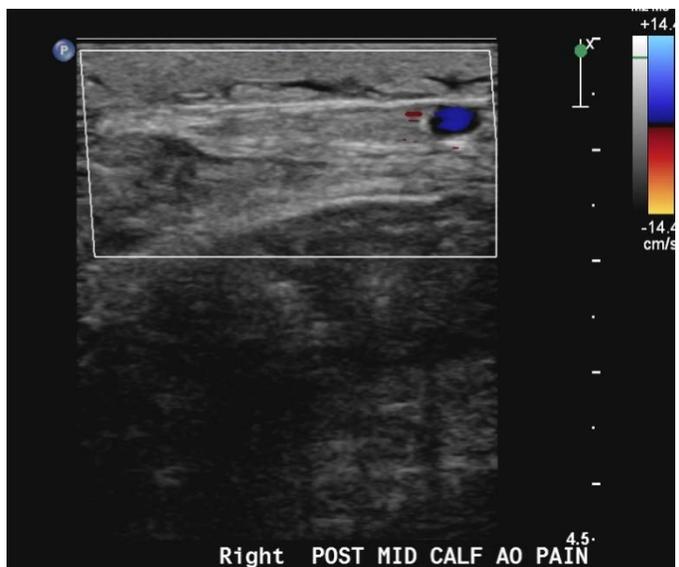


Figure 2. Right popliteal vein real time greyscale, color and spectral Doppler imaging showed normal patency and compressibility (short arrow shows the edema, long arrow shows the vein).

Conservative treatment with leg elevation, compression and ibuprofen for pain control was advised. Three weeks later, the patient returned for follow up, with complete resolution of his swelling and pain. He was able to return to his prior baseline function of his leg. Ultrasound can be used to document healing. This was not needed as his pain improved, the medial edema resolved and he was able to move normally with no pain.

In conclusion, Tennis leg is an underdiagnosed entity in primary care. Ultrasound is a useful, low cost modality to evaluate patients with clinical suspicion of tennis leg (7). Adding soft tissue Ultrasonography to those sent for DVT exclusion would be more useful and will increase the positive findings of tennis leg and other underdiagnosed conditions causing edema and tenderness of the calf.

Soft tissue ultrasonography is easy to perform and is a fast and safe way to evaluate patients with clinically suspected Tennis leg. Findings differs according to the size of the injury and time of the ultrasound exam. Small lesions are seen as a disrupted arrangement of muscle fibers and fibro adipose septa. Larger tears have associated fluid collections separating the injured head of the gastrocnemius muscle from the soleus. Ultrasound is a low cost method to differentiate muscle strains from thrombophlebitis of popliteal vein, ruptured Baker cyst and Achilles tendon rupture.

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