Case Report / Olgu Sunumu

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A Case with an Unusual Presentation of Tennis Leg

Tenisçi Bacağının Alışılmadık Sunumu Olan Bir Olgu

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Abstract

The rupture of the fascia at the junction of the medial head of the gastrocnemius muscle and the soleus is called the tennis leg. It mostly occurs when the muscle is overstretched during sports or general daily activities and is often seen in middle-aged and physically active person. This report presents the management of an unusual case of a 61-year-old male who presented with a swelling in his calf and was diagnosed with a tennis leg by imaging methods. The fluid between the medial head of the gastrocnemius and soleus muscles was drained 4 times with ultrasound (US) at intervals of 2 weeks. The patient received two US-guided steroid injection and used non-steroidal anti-inflammatory drug (celecoxib 200 mg/day) for one month. The swelling and pain in his calf disappeared and no fluid collection was detected on US at the 3-month follow-up. US may be preferred as a useful tool in evaluating the specific reason of calf injury, guessing the severity of the damage, and monitoring the recovery process.
Keywords: Tennis leg, imaging methods, management

Öz

Gastrokinemius kasının medial başı ile soleusun birleşim noktasında fasyanın yırtılmasına tenisçi bacağı denir. Çoğunlukla spor veya genel günlük aktiviteler sırasında kasın aşırı gerilmesi sonucu ortaya çıkar ve sıklıkla orta yaşlı ve fiziksel olarak aktif kişilerde görülür. Bu yazıda baldırında şişlik şikayeti ile başvuran ve görüntüleme yöntemleriyle tenisçi bacağı tanısı konulan 61 yaşındaki erkek hastanın alışılmadık bir olgusunun yönetimi sunulmaktadır. Gastrokinemius medial başı ile soleus kasları arasındaki sıvı 2 hafta arayla 4 kez ultrason (US) ile boşaltıldı. Hastaya iki kez US rehberliğinde steroid enjeksiyonu yapıldı ve hasta bir ay boyunca non-steroid anti-enflamatuvar ilaç (selekoksib 200 mg/gün) kullandı. Üç aylık takibinde baldırındaki şişlik ve ağrı kayboldu ve US'de herhangi bir sıvı toplanmasına rastlanmadı. US, baldır yaralanmasının spesifik nedeninin belirlenmesinde, yaralanmanın ciddiyetinin tahmin edilmesinde ve iyileşme sürecinin izlenmesinde yararlı bir araç olarak tercih edilebilir.
Anahtar kelimeler: Tenisçi bacağı, görüntüleme yöntemleri, tedavi

Introduction

The gastrocnemius medial head distal muscle-tendinous junction damage is called tennis leg. Although tennis leg is seen in people who are involved in different sports, especially tennis, it can also occur during participation in common daily activities. While the damage was initially paid attention to be a rupture of the plantaris tendon, it has recently been shown that the most common lesion is actually gastrocnemius injury. Even though the injury can appear anywhere from the proximal origin to the mid-abdominal and soleus-facial junction, it is often seen at the junction of the fascia between the medial head of the gastrocnemius and the soleus. Fluid accumulation occurs between the medial head of the gastrocnemius and the soleus muscle (1,2).

Tennis leg is acute mid-calf pain caused by an injury that occurs during forced dorsiflexion of the ankle and forced extension of the knee during sports or common daily activities as well as namaz praying. This position causes simultaneous contraction and passive stretching of the gastrocnemius muscle, contributing to the occurrence of injury. It most commonly occurs in middle-aged adult males in the fourth to sixth decades of life. A sudden pain, usually starting in the calf, with a popping or tearing sensation as if kicking the back of the leg are characteristic symptoms. The pain is often accompanied by difficulty walking. On physical examination, there is ecchymosis and localized tenderness. Severe pain and swelling usually improve in 1-2 days of damage. Imaging methods such as magnetic resonance imaging (MRI) or ultrasound (US) might aid in confirming the

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diagnosis and assessing the extent of the injury. In the differential diagnosis, Achilles tendon rupture, deep vein thrombosis (DVT), ruptured Baker's cyst, thrombophlebitis, hematoma, arthritis, bursitis, infection/abscess, vascular abnormality, stress fracture, and tumor should be considered (1-3). This report presents the management of an unusual case of a 61-year-old male who presented with a swelling in his calf and was diagnosed with a tennis leg by imaging methods.

Case Report

A 61-year-old male patient complained of pain and swelling in the left leg for 20 days. He had no history of trauma and strain or bleeding and coagulation disorders. The individual was no physically active. The pain and swelling had appeared after kneeling for a long time. He was experiencing pain with activity such as stairs, walking and jogging. He had no chronic disease. On physical examination, there was swelling in the left leg (Figure 1). His left knee and ankle had normal strength and range of motion but there was pain in the mid-calf with palpation while the ankle is passively dorsiflexion with the knee maximal extension. Moreover, there was pain in the calf with forced ankle plantar flexion with the knee in maximum extension. The pain disappeared when the knee was brought to maximum flexion. Left leg US was performed on the patient. There was no DVT in the popliteal and calf veins on doppler US imaging but there was a longitudinal partial tear of the medial head of gastrocnemius muscle. Also, a 24 cm long hypoechogenic area (haematoma) extending from the myotendinous junction to the Achilles tendon was detected between the soleus and the medial head of the gastrocnemius (Figure 2). All surrounding structures and the myotendinous junction was normal. Under US guidance, a 21 gauge needle was inserted into the fluid collection area and 300 mL of hemorrhagic fluid was aspirated. Dramatic pain reduction was observed after aspiration. Afterwards, the patient was started on a non-steroidal anti-inflammatory drug (NSAID, celecoxib, 200 mg/day). Moreover, passive and active stretching exercises together with ice, leg elevation and rest were recommended. Since fluid accumulation was detected again by US in the follow-up two weeks later, a 21 gauge needle was inserted into the fluid collection area under US guidance again, and 150 mL of serosal fluid was aspirated. Then, US guided steroid injection (1 mL of 20 mg triamcinolone hexacetonide) was applied. In the follow-up two weeks later, a 21-gauge needle was inserted into the fluid collection area under US guidance, since fluid accumulation was detected again by US. At this time, 30 mL of hemorrhagic fluid was aspirated. Therefore, left cruris MRI was performed. MRI releaved 13 cm long hematoma at the myotendinous junction between the medial head of the gastrocnemius muscle and the soleus muscle and partial gastrocnemius rupture (Figure 3). At this time, 30 mL of serosal fluid was aspirated. Then, US guided steroid injection (1 mL 20 mg triamcinolone hexacetonide) was administered for the second time. The patient was advised to use a elastic bandage and do isometric exercises. In the 3-month follow-up, almost complete improvement was obtained. The swelling and pain in his calf disappeared and no fluid collection was detected on US. The patient returned to normal physical activity such as stairs, walking and jogging.

Figure 1. Clinical images of the patient's left calf and aspirated hemorrhagic and serosal fluids

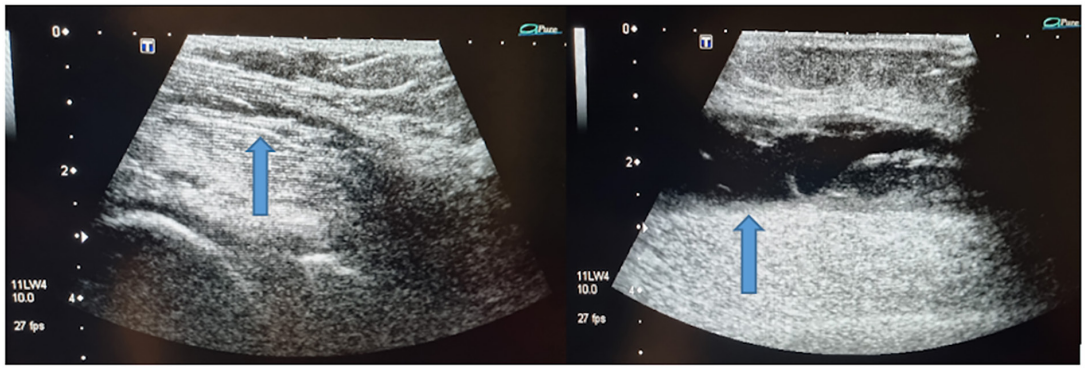

Figure 2. Longitudinal ultrasound images of the left calf (left picture: a partial tear of the medial head of gastrocnemius muscle; right picture: a hypoechoic haematoma between the medial head of gastrocnemius and the soleus muscle)

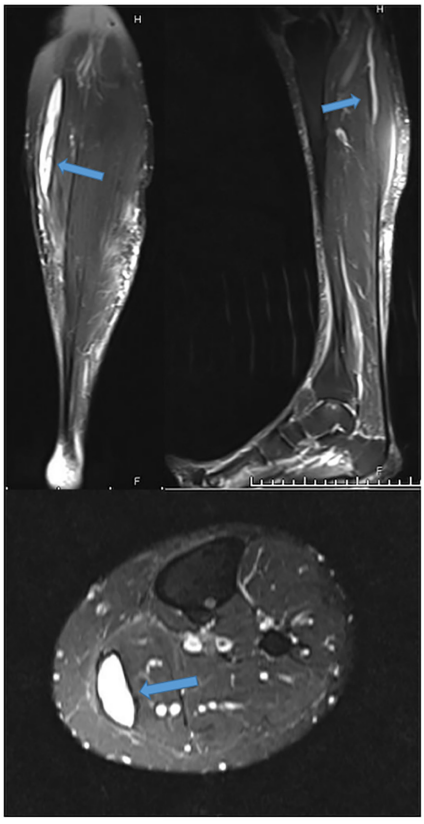

Figure 3. Magnetic resonance images of the left calf (a partial tear of the medial head of gastrocnemius muscle together with a hyperintense fluid collection between the medial head of the gastrocnemius and soleus on T2-weighted sequences) (up picture: coronal and sagital images; down picture: axial image)

Discussion

Since the gastrocnemius muscle owns a great rate of fast-twitch muscle fibers allowing strong contractions and crosses two joints (knee and ankle), it exposed to a high risk of injury (4,5). The medial head of the gastrocnemius is the third most frequently strained muscle in athletes, after the biceps femoris and rectus femoris, and is the most frequently wounded muscle of the posterior segment of the leg (1,5). Both MRI and US are beneficial in diagnosing damages to the medial head of the gastrocnemius, as well as determining the presence of co-existing hematoma (6). In our case, tennis leg developed without any history of injury and the diagnosis of tennis leg was confirmed first by US and then by MRI.

US is an easy, painless and rapid imaging modality that can be used in the assessment of muscle trauma such as partial and complete muscle ruptures (6,7). Sonographically, rupture of the medial head of the gastrocnemius appears as deterioration of the normal parallel linear hyperechoic and hypoechoic aspect of the tendon at insertion. This evidence is paired with the uncertainty of the narrowing distal end of the tendon at insertion. Moreover, fluid collection between the gastrocnemius and soleus muscles can be seen sonographically as a hypoechoic area, especially at the muscle belly or muscle-tendinous junction. Axial US image showing the whole medial head in the same plane is very beneficial in distinguishing partial and complete muscle ruptures. Healing of the tear can also be followed by US and can be seen as heterogeneous echogenicity in the fibrous tissue between the gastrocnemius and soleus muscle (7). US can be used not only to diagnose but also to evaluate response to treatment. Various stages of recovery can be viewed after injury (2,7). In our case, US was used for diagnosis, follow-up and the evaluation of response to treatment. Since DVT may be present in up to 10% of patients with the classic clinical presentation of the tennis leg, doppler US is also required to rule out thrombosis (8). In our case, DVT was ruled out with Doppler US. Pedret et al. (9) found that hematomas are often associated with injuries involving the gastrocnemius aponeurosis at the level of the myoaponeurotic junction, but not the injuries of the myoaponeurotic junction without involvement of the gastrocnemius aponeurosis and the free gastrocnemius aponeurosis (the area free of muscle fibers just proximal to the junction of the gastrocnemius aponeurosis and soleus aponeurosis). In our case, there was a damage to the gastrocnemius aponeurosis at the level of the myoaponeurotic junction and a secondary hematoma between the medial head of the gastrocnemius and the soleus.

MRI often shows both partial or complete rupture of muscle fibers and intramuscular hematoma and fluid collection with a variable degree of surrounding subcutaneous soft tissue edema located between the medial head of the gastrocnemius and the soleus muscles. A high signal intensity could be obserced on T2-weighted images both at the myotendinous junction and within the muscle fibers. The fluid collection might include bleeding with a suitable hyperintense signal at T1-weighted images. MRI can define macroscopic foci of scar tissue with focal tendon thickening and peritendinous muscle atrophy in chronic cases (3,10). Dai et al. (11) divided the injury into three distinct groups: Grade 1-edema, but no architectural deterioration or macroscopic tear, Grade 2-hematoma or partial disruption of the muscle with local disruption of musculature, and Grade 3-a local hematoma or tendon filling the tear space complete disruption of the muscle with its rupture. They proposed that the tendon rupture opening of the gastrocnemius and/or soleus can be detected by MRI, since it is difficult to show the anatomical structure of soft tissues with US. They also suggested that repair tissue at the distal myotendinous junction of the medial head of the gastrocnemius might be an significant specific indicator of chronic tennis leg (11). Moreover, the accompanying tears of both the soleus and gastrocnemius are probable. A combination of palpation, stretching, and strength testing can help to distinguish strains of the soleus and gastrocnemius (12). US can not rule out a co-existing soleus injury, as only ~30% of soleus injuries are seen on US. MRI is the gold standard for diagnosing soleue tears (13). Although our case had pain in the mid-calf with palpation, with passively ankle dorsiflexion and with forced ankle plantar flexion with the knee in maximum extension, MRI was performed to detect possible a co-existing soleus injury. The MRI of our case was compatible with radiological grade 2 and there was no soleus tear.

Treatment is activity restriction and rest. As conservative treatment, passive and active stretching exercises together with elevation, ice, NSAID and neoprene case sleeves can be preferred (1,7,10). US guided hematoma evacuation and steroid/analgesic injections can also be applied. In the existence of compartment syndrome, fasciotomy can be applied as a surgical method. In addition, surgical treatment can be performed in patients who do not improve with conservative treatment (1). Healing of a muscle tear is slow and can take 3 to 16 weeks to complete. For this reason, activity restriction should be applied for 4 to 12 weeks, depending on the size of the tear, until pain-free walking is achieved (7). It is thought that an intense muscle tear being treated conservatively may possibly recover with fibrotic scar tissue, thus increasing the risk of re-damage. It has also been suggested that the superior anatomical and functional results may occur after surgical maintenance compared to conservative treatment. Surgical treatment should also be considered in large intramuscular hematomas (3,5). Therefore, Pereira et al. (5) recommended surgery at 3-4 weeks after the damage without too much delay in patients with severe gastrocnemius medial head muscle injury that did not improve after a short-term conservative treatment. The paper of Pereira et al. (5) involved two active young individuals with complete muscle tears, which are not representative of the patient in this case. Our case was an inactive elderly person with a partial muscle tear and accompanying hematoma and no history of trauma. Therefore, no surgery was initially considered. The fluid between muscles was drained 4 times with US at intervals of 2 weeks. Moreover, the patient used NSAID (celecoxib 200 mg/day) for one month. Celecoxib was preferred due to its lack of antiplatelet effect (12). Although corticosteroid applications have a blunting effect on the tissue healing response, treatment doses in clinical practice are generally below the level required to inhibit wound healing. It has been shown in animal studies that low-dose and short-term corticosteroid applications have no a negative effect on wound healing (14). In this case, corticosteroid injection was applied twice during serous fluid drainage and no negative effect on wound healing due to the application was observed. Kwak et al. (15) demonstrated that early compressive therapy reduces the amount of bleeding and allows for early ambulation. Therefore, the patient used an elastic bandage for one month. Moreover, the patient was initially recommended passive and active stretching exercises followed by isometric exercise. He recovered within 3 months with a close follow-up.

Conclusion

Even if it is suggested that tennis leg etiology may result from injuries of various tissues alone or in combination, medial gastrocnemius rupture is the most widespread damage of the posterior compartment of the lower extremity. US and MRI provide very useful information in diagnosing the disease, defining the degree of the damage, and in the differential diagnosis of other possible conditions. Moreover, US may be preferred as a useful tool in evaluating the specific reason of calf injury, guessing the severity of the damage, and monitoring the recovery process. The superior anatomical and functional results may occur after surgical maintenance compared to conservative treatment in patients with younger physically active and complete muscle ruptures. However, we think that a conservative treatment applied appropriately could give a good result in patients with older physically inactive and muscle tears.

Ethics

Informed Consent: Written informed consent was obtained for publication of the case report and accompanying images.

Footnotes

Authorship Contributions

Surgical and Medical Practices: E.Y., M.A.İ., Concept: E.Y., Design: E.Y., Data Collection or Processing: E.Y., M.A.İ., Analysis or Interpretation: E.Y., M.A.İ., Literature Search: E.Y., Writing: E.Y.

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