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Deep vein thrombosis after "Tennis Leg" injury: A clinical case

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Abstract

Background "Tennis leg" is a common lesion in sports with quick accelerations and stops, consisting of an injury to the fascia joining the soleus muscle with the medial gastrocnemius. In these cases, a differential diagnosis must be performed, considering possible complications such as a deep vein thrombosis (DVT) of the veins of the deep musculature of the lower leg. The aim of this clinical case is to alert professionals regarding possible complications of these injuries and to train professionals to detect a possible vascular problem.

Case Description A 42 year old male who attends a physical therapy consultation 24 hours after suffering a "muscle pull" in the gastrocnemius. After a medical diagnosis of tennis leg he received appropriate standard regulated physical therapy treatment procedures. A follow-up ultrasound exam was performed eight days after the injury and at 14 days after a worsening of symptoms, at which point a vascular alteration was detected which was diagnosed and treated as DVT.

Results The patient came for consultation and we observed a vascular alteration and therefore we referred the person to the emergency room, where he was diagnosed with DVT.

Discussion DVT is a possible complication of gastrocnemius injuries. The present case describes a clinical presentation of DVT after 14 days evolution. It is essential to evaluate and reevaluate the clinical condition of the patient with all the diagnostic tools possible to detect possible red flags.

Conclusion Ultrasound is an essential tool for the detection of possible complications after a musculoskeletal injury.

Keywords
- tennis leg
- deep venous thrombosis
- ultrasound

Introduction

"Tennis leg" is a type of muscle lesion which occurs in the medial aspect of the lower leg, associated with a knee extension gesture together with forced ankle dorsiflexion,[1] normally in sports which require quick starts and stops, as occurs in racket sports or running sports. This injury was first described by Powell[2] in 1883 in a tennis player, hence its name, and, for many years, it has been attributed to the rupture of the plantaris muscle.[1,2] However, according to recent studies, possible causes for this lesion include the rupture of the medial gastrocnemius, the rupture of the fascia that joins the medial gastrocnemius and soleus, and even deep vein thrombosis[1] (DVT).

Delgado et al[1] presented 141 cases of "tennis leg" in which fiber rupture of the medial gastrocnemius represented 66.7% of the total cases, the collection of liquid in the fascia between the medial gastrocnemius and soleus without rupture of the same was observed in 21.3% of the total patients and rupture of the tendon of the plantaris muscle and soleus were residual findings, with two (1.4%) and one (0.7%) case, respectively, of the total sample. The presence of DVT was an isolated finding in 9.9% of cases.

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The presence of a thrombus, which is usually comprised of fibrin, platelets and red blood cells, and the accompanying inflammatory response, is what is known as venous thrombosis or thromboflebitis.[3] In the case of a large thrombus, permanent destruction of venous valves occurs, which results in post-thrombotic syndrome and chronic venous insufficiency. The popliteal vein divides the deep venous system of the lower limb into a distal deep venous system and a proximal venous system. The thrombus located at the popliteal level or in more proximal areas presents a greater risk of producing a pulmonary embolism.[3] The physiopathology of DVT is summarized via the triad of Virchow[4]: blood stasis, endothelial injury and hypercoagulability. These three circumstances, isolated or combined, contribute to the development of a thrombus. Most of the distal DVT are asymptomatic, with the following main symptoms and signs[5]: 1) pain; 2) pitting edema at the beginning of the process; 3) local heat; 4) changes in skin color; 5) collateral circulation, dilation of superficial veins; 6) palpable cordlike venous segment; 7) Homans' sign[6] (presence of calf pain when performing passive ankle dorsiflexion with the knee flexed at an angle of 30°).

Complementary tests include a blood test, by analyzing the D dimer, which is a product of the degradation of fibrin and is found in the blood current when this degrades, although this test is insufficient for determining DVT. Doppler ultrasound is the imaging method of choice as it enables the possibility of visualizing the behavior of veins in response to compression of the probe and provides information on the blood flow. The sensitivity is between 89 and 96%, and specificity is between 94 and 99% in the diagnosis of symptomatic DVT affecting the proximal veins of the lower limb, with a positive predictive value of 97%.[3] Phlebography and nuclear magnetic venography have been displaced by Doppler ultrasound, the first for its possible adverse reactions, and the second because of its elevated cost. The ideal diagnostic strategy in symptomatic patients is the combination of D dimer and Doppler ultrasound.

Case Description

A male patient aged 42 years who attended a consultation 24 hours after feeling a "pulled muscle" on the left lower leg while playing paddle tennis, which forced him to stop playing. The physical examination revealed an inability to stand on tip toes on his left leg, pain when performing resisted manual dorsiflexion with knee extension, localized pain in the area where the medial gastrocnemius joins the soleus. No differences were found regarding temperature, color and muscle volume compared with the contralateral side. In the ultrasound exam, an increase of liquid was found in the fascia between the medial gastrocnemius and the soleus, which led to a suspicion of a muscle lesion. During the following eight days, the patient was treated at his work insurance provider with physical therapy, which consisted of diathermia, ultrasound, magnetotherapy and static cycling, a treatment approach that is considered appropriate for the diagnosis,[5] during this period the evolution was favorable. On day eight, he began to run on the treadmill and he felt increased tightness in the area most proximal to the gastrocnemius. Because of this discomfort, he returned to consultation to receive an ultrasound examination to examine the evolution of his muscle injury. He received treatment on the medial gastrocnemius with dry needling due to the increased muscle tone in this structure and the lack of elasticity, after which the symptoms improved post-treatment. Twenty-four hours later, the patient informed us by telephone that afterwards, his walking improved and he felt much less tightness. In the subsequent days, once again his pain increased, making it impossible to walk again; therefore, on day 14, he returned to the consultation, and an important increase was observed in the volume of the left lower leg. In addition, the patient referred pain and tightness especially when performing dorsiflexion (+ Homans sign); he also declared that he was unable to walk normally, having to use a walking cane on the contralateral side.

The ultrasound exam revealed that the muscle injury was in the same conditions; however, on this occasion, the patient referred pain that was more proximal and more medial. In this area, two gastrocnemius veins were observed with a very large diameter (►**Fig. 1**), and we applied pressure over the same using the probe, finding that they did not collapse. Subsequently, we performed a color Doppler and power Doppler exam, which revealed that there was no flow in either of the two veins, although there was collateral circulation (►**Fig. 2**). Therefore, a report was issued, stating a suspicion of vascular problems, and referring the patient to the emergency room.

In the emergency room, the patient was diagnosed with DVT by the doctor specialized in vascular disorders, and he was admitted to hospital for two days and administrated low-molecular-weight heparin (LMWH) for one week, and oral anticoagulants (OAC) for six months. Thereafter, he was prescribed a latex-free compression bandage of 23 mm Hg, from the foot to the groin, which he had to wear for 24 hours over one year. During these six months, the patient was on sick leave, and every week he received checkups, including ultrasound exams and blood tests.

Discussion

Despite the correct physical exploration performed in the first consultation, no suspicion of vascular pathology was observed, but the signs were only of muscle lesion. However, after day 14, the possible signs of DVT were present (+ Homans' sign, increased muscle volume, pain and tightness in the area proximal to the gastrocnemius…) making us question whether it was masked and the treatment brought it to light, or whether it simply appeared after and was idiopathic and unavoidable. Thus, in any pathology of the neuromuculoskeletal system it is recommended to consider possible complications of other types and know how to detect red flags. A detailed history, together with certain clinical findings, enable us to predict a DVT. The physical therapists trained in ultrasound have important access to acute and subacute pathologies and may be faced with

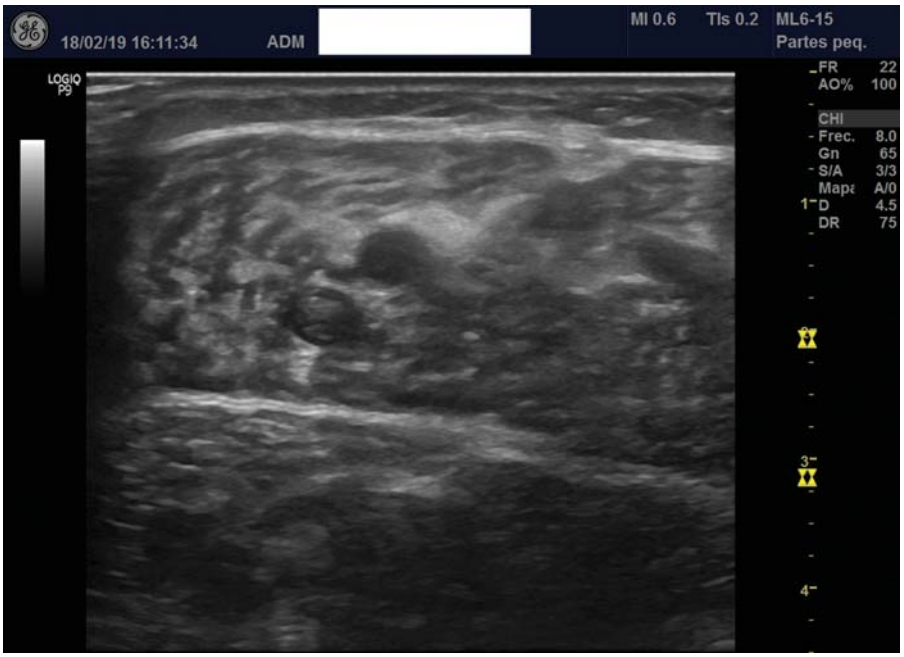

Fig. 1 Transverse section of the medial gastrocnemius in B mode. An important increase of the diameter of the gastrocnemius veins is observed, plus a hyperechoic image within each of these, which corresponds with the thrombus. When pressure is applied upon these veins, there is no collapse, which leads us to suspect DVT.

Fig. 2 Transverse section of the medial gastrocnemius in B mode with PDI activated. An absence of flow can be observed in both gastrocnemius veins and the presence of collateral blood circulation. The arrow indicates a hyperechoic image in the lumen of the vessel which corresponds to the thrombus.

different situations in which a differential diagnosis is required and they must therefore know when to refer a patient to a specialist without delay. Knowing how to identify or at least suspect a DVT in a muscle injury of the lower limb is of vital importance for patients. Due to the high percentage of DVT associated with tennis leg injuries, it is essential to include ultrasound in these types of lesions to rule out any type of vascular problem.[7] Training in vascular ultrasound should therefore be included in the academic curriculum, both in degree training as well as post-graduate training in all degree subjects where ultrasound is involved.

Conclusion

Cases such as the present highlight the importance of a rigorous physical examination for establishing a diagnosis in physiotherapy, independent of a medical diagnosis which the patient has been given. An assessment based on clinical reasoning and supported as much as possible by precise tools such as ultrasound will increase the odds of detecting red flags.

Ultrasound is a useful tool for the detection of possible complications after any injury to the locomotor system and, concretely, vascular ultrasound is helpful for the detection of cases such as DVT.

Conflict of Interests
The authors have no conflict of interests to declare.

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