Case Report

A Seldom Cause of Exercise-Related Leg Pain in a Young Soldier-Athlete: A Case Report

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Keywords

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Abstract

Chronic leg pain is a common problem for young soldier-athletes. Differential diagnosis of this issue is extensive and includes more common entities such as medial tibial stress syndrome and tibial stress fracture and other scarce causes. Therefore, making a correct diagnosis proves to be vital for appropriate care. This topic discusses the case of a 36-year-old soldier who was diagnosed with a schwannoma of the left tibial nerve as a rare cause of leg pain. Its literature is scarce and intends to add further data about recommendations for investigation and management for this kind of lesion.

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Introduction

Exercise-related leg pain (ERLP) is most common among the active population, especially athletes and military personnel [1]. The high incidence of lower extremity injuries, ranging from 12.8% to 82.4%, requires a correct diagnosis in order to provide appropriate care [2, 3].

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Medial tibial stress syndrome (MTSS), chronic exertional compartment syndrome, and stress fracture are the most common origins of overuse injuries of the legs of soldier-athletes. In this regard, it is worth pointing out that there are also unusual but important conditions such as vascular or neurogenic causes that must be sought. So, the implementation of physical examination and investigations remains essential for making an effective diagnosis [1–3]. In this article, we discuss the diagnosis and treatment of a rare case report of lower leg pain in soldier-athletes.

Case Report

A 36-year-old soldier presented to our department with approximately 8 months of left lower extremity pain that began insidiously in the left leg during slope running but subsided during the cessation of training. There was no specific injury, and his workout intensity had been similar to previous training periods. According to the patient, he ran 40 km per week, for an approximate total of 8 h of exercise. His unit medical officer prescribed him analgesics including sports activities cessation for 1 month with rehabilitation sessions for further gradual resumption. He was then transferred to our structure due to worsening of his symptoms when resuming training and following unpleasant feelings because of electrical shocks experienced constantly in his left leg.

The palpation along distal portions of the inner tibial bone was nonpainful, and dural tension signs were negative. Direct pressure over the left calf produced severe deep pain. There was no palpable mass. His lumbar spine and sacrum were completely nontender with full range of motion. Neurologic and vascular examinations of his lower extremities were normal.

Plain radiographs were found to be unremarkable. The left leg MRI demonstrated a well-defined, solid mass located in the deep posterior compartment along the course of the tibial nerve, isointense on T1 weighted, hyperintense on T2, and intensely enhanced after gadolinium injection. This mass measured 41 × 35 × 32 mm and was contiguous with the tibial nerve as shown in Figure 1. There was no associated muscle denervation or edema and no locoregional signs of aggressiveness.

In the operating room, the patient was placed in the supine position with the left leg externally rotated. Surgical removal was performed through a 10-cm longitudinal incision along the postero-medial border of the tibia. After subcutaneous tissue and fascia incision, the operation was carried on between the superficial and deep posterior compartments so as to locate the posterior tibial pedicle in which a firm and encapsulated tumor was found out (shown in Figure 2); a longitudinal incision was then performed along the direction of the nerve fibers, and the dissection was slightly done into the potential space between the tumor and the parent nerve, and finally the tumor was removed in 1 piece, leaving the parent nerve anatomically intact, as shown in Figure 3. A postvac drain was placed in the resection bed, and the wound was closed in layers.

After surgical resection, the patient's lower leg discomfort resolved completely; the drain was removed in 24 h, and the motor and sensory examinations of his left ankle and foot were normal (shown in Figure 4). Formal histopathology revealed a typical schwannoma with no atypia or evidence of malignancy.

The patient achieved complete healing and a symptom-free state after 3 months. He was able to walk and resumed his sport activity without pain or paresthesia.

Discussion

Lower leg pains are common presentations and a source of disability in young athletic and military personnel. MTSS, chronic exertional compartment syndrome, and stress fracture are the most common causes of ERLP in young soldiers [2, 4]. Thus, exploration of these diagnostics by

Fig. 1. Leg MRI. **a** Coronal DP-weighted image showing a fusiform well-defined mass, limited on the course of the left tibial nerve in heterogenous hypersignal with a hyperintense rim. Postcontrast axial FAT-SAT T1-weighted image showing an oval well-defined mass along the path of the left tibial nerve, well limited with a necrotic center (**b**), intensely enhancing at the periphery.

Fig. 2. **a** Surgical approach with the patient in the supine position. Intraoperative photograph showing the posterior tibial pedicle (**b**). Progressive blunt dissection and exposure of a firm and encapsulated tumor (**c, d**).

Fig. 3. **a** The tibial nerve is protected, and the schwannoma is progressively enucleated and removed in block with a microsurgical technique. The continuity of the tibial nerve is preserved at the end of the surgical procedure (**b, c**). Intraoperative photograph showing a tibial nerve schwannoma after gross total excision (**d**).

Fig. 4. **a, b** Motor and sensory examinations of the left ankle and foot were normal.

the medical history, clinical examination (pain timing, location and type of pain, and intramuscular compartment pressure), and imaging is essential for etiological diagnosis for ERLP. Elimination of these pathologies must seek other less common but important conditions including popliteal artery entrapment and nerve entrapment syndromes. This case of tibial nerve schwannomas highlights, through its clinical presentation and surgical management, a rare cause of ERLP.

Schwannomas, or neurilemmomas, are benign encapsulated tumors that arise from the Schwann cells of the peripheral nerve sheaths. They usually grow slowly, which explains the delay in diagnosis, especially in cases with deep localization as found in our patient [5].

Schwannomas commonly occur in the head and neck, which represent 45% of all locations. Their occurrence in the extremities is unusual and accounts for 3–19% in the upper extremities and only about 1–10% in the lower extremities [6]. Indeed, localization of schwannomas in the tibial nerve is extremely rare and constitutes only 10 cases out of Kim et al.'s [7] largest case series of 361 benign peripheral neural sheath tumors.

The diagnosis of a schwannoma arising within a nerve trunk of the upper or lower limb is usually straightforward in superficial localization. Clinical examination finds a painful swelling with firm consistency, with little mobility to the deep planes and vertically fixed. Percussion induces painful paresthesia in the area of the nerve of origin similar to Tinel's sign [8]. But in deep localization such as in the case of our patient, the diagnosis of a schwannoma can often be hard in the early stage because of the impalpability of the mass, and the symptoms are often nonspecific. Hence, the diagnosis of a tibial nerve schwannoma is often kept far down the list of differentials, especially in athletes with leg pain [9].

Clinical examination makes it possible to rectify the diagnosis since the pain in question, compared to the tibial stress fractures, does not improve with the provision of rest. In our patient, pain and tenderness to palpation were deeply felt in the calf, which is not consistent with MTSS in which the pain, located at the posteromedial side of the mid to distal tibia, is typically associated with exercise. Finally, exercise-induced compartment syndrome often presents with predictable bilateral pain during activity and abatement of symptoms when exercise ceases, which is not compatible with our case [2, 3, 10].

MRI of the tibial nerve with pre- and postgadolinium images proves to be an efficacious study for eliciting the diagnosis of a schwannoma and eliminating other diagnostic methods of ERLP. It shows a well-circumscribed and encapsulated mass with a heterogeneous signal and no surrounding edema. The mass is eccentrically placed in relation to the axis of the nerve. The necrotic area found in our case indicates the presence of a long-standing schwannoma that has undergone degeneration [11]. Ultrasonography is also effective [5, 8, 9]. The histological analysis makes the positive diagnosis [5, 8] despite the hard suspicion of the analysis by imaging.

Surgery is the practical treatment for symptomatic schwannomas, provided that recovering the asymptomatic athletic functions of our patient constituted a priority. It consists of excision of the tumor without damaging the conducting elements of the nerve. Adequate exposure of the normal nerve proximal and distal to the tumor is essential. A plane is developed between the nerve bundles and the capsule of the tumor, which is then wholly removed.

In a context where the body of knowledge on ERLP in the military and athletic population is increasing and the overuse injuries continue to have a high incidence, the occurrence of schwannomas of the leg remains rare with their impact on patients' pain and function, which makes them an important differential during the diagnosis of ERLP. The Tinel sign obtained is helpful in these examples and, in case of suspicion, requires not only the diagnosis by MRI but also a confirmed histological examination. Careful operative excision provides favorable outcomes that enable this category of population to resume their full activity.

Statement of Ethics

Written informed consent was obtained from the patient for publication of this case report and for any accompanying images. No identifiers are included in this article pertaining to the patient's identity, and therefore, the study is exempt from Ethics Committee approval.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Taoufik Cherrad and Soufiane Belabbes contributed to the writing and editing of the manuscript. Taoufik Cherrad and Mohamed Sinaa contributed to the submission process. Hassan Zejjari and Jamal Louaste contributed to referencing of this article. Larbi Amhajji contributed to critical revision of the manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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