

Uncommon Cause of Unilateral Leg Pain in a Collegiate Athlete

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ABSTRACT

The following case report describes a collegiate athlete with long-standing unilateral lower extremity exertional pain and associated vague neuropathic symptoms initially diagnosed as Chronic Exertional Compartment Syndrome (CECS). After surgical intervention failed to resolve these symptoms, the athlete presented to our group for further evaluation and was diagnosed with a less common etiology of pain masquerading as CECS. This article includes a less invasive ultrasound guided treatment which was successfully performed resulting in a favorable outcome. In summary, this case discusses the importance of a thorough diagnostic workup in athletes with Exertional Leg Pain (ELP) as well as utilizing less invasive interventions in a step-wise fashion.

Keywords

Ultrasound Guided, Chronic exertional Compartment Syndrome (CECS), Saphenous Nerve Entrapment.

Introduction

The following case describes a collegiate athlete presenting to our group following surgical intervention with persistent unilateral pain and neuropathic symptoms associated with exertion. She was not able to compete due to these symptoms and was seeking further treatment to assist a safe return to play.

HPI

19 year old Female freshman college basketball player presents to our sports medicine clinic with 4 years of right lower extremity pain with localized to the mid-tibial region. The pain was sharp with associated paresthesia down the anteromedial tibia and begins with any exertional activity (i.e. running). She had imaging two years ago showing Medial Tibial Stress Syndrome (MTSS) which was treated with rest and activity modification. Despite treatment she continued to have pain along with paresthesia and was diagnosed with Chronic Exertional Compartment Syndrome (CECS) with elevated post-exercise compartment pressures (posterior deep compartment: 31 mmHg 1 minute post-exercise). She subsequently underwent fasciotomy of the superficial and deep posterior compartments at an outside facility. This procedure

improved her pain somewhat, but did not improve the paresthesia in the anteromedial tibial region. Upon her initial presentation to our clinic a repeat MRI was performed and showed a grade 3 tibial bone stress injury (TBSI). Her pain at that time was attributed to TBSI and she was treated conservatively. She was diligent with physical therapy, rest, and activity modification aimed at treating her TBSI. Yet, again she failed to fully return to play. Her symptoms persisted and she followed up approximately 12 weeks later. Her persistent symptoms prompted a metabolic workup and a repeat MRI, neither of which revealed cause of the associated paresthesia. The repeat MRI did show improvement of her TBSI. Her exam at the time of this case report and further treatment are presented below.

Physical Exam

Vital Signs

BMI-21.71, HR-71, BP-117/61

Lower extremity exam:

Gait: Normal

Inspection: Minimal swelling of the right lower extremity versus left. Right tibial skin has scaly texture when compared contralaterally.

Tenderness: Marked + anterior and medial tibia pain with light palpation, no specific point tenderness, pain along most of the mid-shaft of bone.

ROM: FROM knee and ankle
Strength: 5/5 in plantar, dorsiflexion
Neuro: Negative straight leg raises B/L, Mid-tibia shaft distally to ankle tenderness with loss of soft touch sensation when compared to contralateral side, Patellar & Achilles DTRs +2/4.
Pulses: 2+

Labs

CBC: WBC-6.5, Hb-14.2, Hct-45.2, Plt-246, MCV-86
TSH: 3.72 (0.34-5.66 μ IU/mL)
25-OH Vitamin-D: 43 ng/mL
Ferritin: 7 (11-204 ng/mL)
CMP: Na-138, k-4.1, Cr-1.1, Glu-92, Ca-9.3, LFTs (wnl)

Imaging

POC MSK US 5/21/20:

+ Hyperechoic scar tissue entrapped distal Saphenous Nerve branch.
+Sonopalpation eliciting subjective provocation of symptoms.

MRI R Tib/Fib 3/16/2020

Impression:
Overall improved appearance of right tibial mid-diaphyseal stress reaction.
Compared to 10/5/2019 MRI.

MRI: Tib/Fib 10/05/2019

Impression:
Right tibial mid-diaphyseal stress reaction, grade 3.

X-Ray: R tibia/fibula 9/30/2019

There is anatomic alignment of the tibia and fibula bilaterally.
No fracture.
No abnormal cortical thickening.
No destructive bone lesion.
No dislocation.
Limited evaluation of the ipsilateral knee and ankle is unremarkable.

DDx

Medial Tibial Stress Syndrome (MTSS)
Tibial Bone Stress Injury (TBSI)
Chronic Exertional Compartment Syndrome (CECS)
Saphenous Nerve Entrapment
Popliteal Artery Entrapment Syndrome (PAES)

Dx

Lower extremity allodynia secondary to saphenous nerve entrapment

Discussion

Exertional Leg pain (ELP) has three major causes; musculoskeletal, vascular, and neurogenic. The underlying cause of ELP may present in isolation or may be multifactorial. Thorough history and physical exam can help identify the source of the pathology and direct the diagnostic workup accordingly. For instance, vascular causes of leg pain may present with claudication symptoms and

workup might include an Ankle-Brachial Index or a positionally dependent Magnetic Resonance Angiography (i.e. plantar flexed MRA) to rule-out PAES.

Whereas, neurovascular symptoms that present at a set time into exercising and resolves within a few minutes of rest is more consistent with CECS. Exertional compartment testing would be indicated to confirm this diagnosis. History and Physical exam remains the pillar of diagnosing and appropriately working up ELP [2].

The patient presented in this case was treated with fasciotomy based upon a 1-minute post exercise pressure of 31 mmHg with a diagnostic threshold of 30 mmHg. Pedowitz et al. initially presented exertional compartment pressures as being diagnostic when pre-exercise pressure was ≥ 15 mmHg. Post exercise pressures at 1 and 5 minutes of ≥ 30 mmHg and ≥ 20 mmHg respectively were diagnostic of CECS [4]. More recently there is data recommending post-exercise pressures is increased to ≥ 35 mmHg and ≥ 23 mmHg for 1-minute and 5-minutes respectively [3].

This is important to consider when pressures are only mildly elevated in a single compartment. Surgical intervention in this case, as in the majority of cases, should be saved until conservative measures (i.e. Physical Therapy, activity modification) have been thoroughly exhausted. Knowledge of which compartments are most commonly effected is also beneficial with 95% of cases occurring in the anterior and lateral compartments [6].

Definitive diagnoses of the patient's neuropathic symptoms were confirmed by point of care ultrasound which identified the entrapped Saphenous Nerve. Metabolic workup undertaken to identify any underlying cause of neuropathic symptoms was unrevealing other than a low Ferritin which was treated with appropriate nutritional recommendations. Nerve entrapment is an uncommon cause of lower extremity paresthesia, but should be considered in patients with persistent lower extremity symptoms [1,5]. Patients may have pain from other concomitant pathology, in the case presented there was a co-existing grade 3 TBSI.

This type of mixed picture can confound the patient history when multiple pathologies are present. Based upon the patient's ultrasound it was noted that the fasciotomy scarring created further adhesions and likely worsened the pre-existing nerve entrapment. With ultrasound guidance we were able to hydrodissect and perform a diagnostic Saphenous Nerve block (Figure 1). The nerve was identified and injectate visualized traveling along nerve distally to confirm placement. The patient had immediate relief following this procedure. At 1-month follow up he patient had drastically improved subjectively as was objectively which was evident on ultrasound examination (Figure 2). She is currently in the process of returning to full unrestricted play and is progressing well.



Figure 1: Nerve hydrodissection away from scar tissue noted deep to the saphenous nerve in this figure with injectate being introduced separating the nerve from scar.

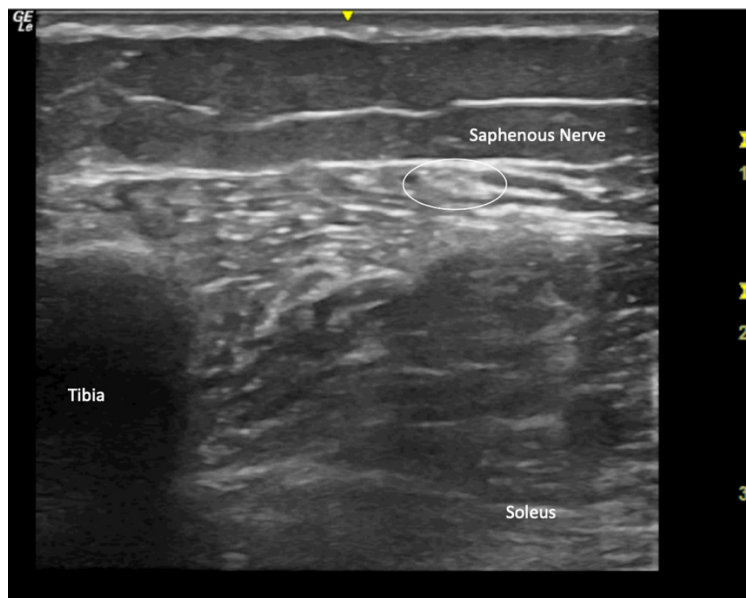


Figure 2: This is approximately 1-month status-post nerve hydrodissection with notably smaller diameter without scar entrapment of Saphenous Nerve.

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