Journal of Chiropractic Medicine (2014) 13, 134–138

ELSEVIER

JCM Journal of Chiropractic Medicine

www.journalchiromed.com

Ultrasonography and Radiography to Identify Early Post Traumatic Myosistis Ossificans in an 18-Year-Old Male: A Case Report

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Received 17 March 2014; received in revised form 6 May 2014; accepted 7 May 2014

Key indexing terms:
Myosistis ossificans;
Athletic injuries;
Heterotopic ossification;
Chiropractic

Abstract

Objective: The purpose of this case report is to describe a patient with post traumatic myositis ossificans (PTMO) of the anterior thigh following blunt trauma and discuss the incidence, clinical presentation, management, and imaging findings.

Clinical features: An 18-year-old male presented to a chiropractic clinic with a chief complaint of left knee pain and reduced range of motion after an impact injury to his left anterior thigh during hurdling 6 weeks earlier. Immediately after the injury, he presented to the emergency department where radiography of the left knee was negative and he was diagnosed with a muscle sprain. Follow-up radiography and ultrasonography of the left knee in a chiropractic radiology department revealed ossification consistent with PTMO within his vastus intermedius.

Intervention and outcome: The patient underwent a course of rehabilitation for 2 months including ice, class IV cold laser and vibration applied to his anterior thigh, and myofascial release of his quadriceps musculature with targeted and progressive rehabilitative exercises. His left knee pain resolved within 2 weeks of care. He resumed sports participation (American football) pain-free, while wearing protective padding over the affected thigh, 1 month after presentation, which was approximately 2 1/2 months following his injury.

Conclusion: This case demonstrates that ultrasonography may have the capability to detect early phases of PTMO approximately 2 weeks prior to radiographic evidence and to monitor progression throughout its course.

Introduction

Post traumatic myositis ossificans (PTMO) is a well understood, although uncommon, clinical entity.[1] There

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http://dx.doi.org/10.1016/j.jcm.2014.06.004
1556-3707/

are several subtypes of myositis ossificans (MO) including PTMO, nontraumatic/pseudomalignant myositis ossificans, and myositis ossificans progressive (congenital form).[2] Over 90% of sports related injuries are diagnosed as muscle strains or contusions with PTMO developing in approximately 9% to 20%.[1,3,4] PTMO develops commonly after a single direct blow to the musculature or through repetitive minor trauma.[5] Patients report a history of trauma in 60% to 75% of cases.[5,6] The formation of MO without history of trauma may be related to increased levels of neuro-inflammatory Substance P.[7] Although any muscle can be involved, the most common location for PTMO is the anterior thigh musculature.[8] Signs and symptoms typically include pain, edema, swelling, and decreased range of motion with a palpable mass.[9–11] This entity increases morbidity with its relationship to pain, loss of range of motion and function, and local tenderness lasting an average of 1.1 years.[1,10,11] Ryan et al found that development of PTMO was associated with the following 5 risk factors: knee flexion less than 120°, injury during football, previous quadriceps injury, delay in treatment more than 3 days, and ipsilateral knee joint effusion.[3]

Histologically, PTMO represents degeneration and necrosis of damaged muscle tissue resulting in bone formation.[5] Differential diagnosis includes hematoma, abscess, focal rhabdomyolysis, and malignant primary or secondary soft tissue tumors.[12] Early and accurate diagnosis is imperative as many symptoms overlap and appropriate treatment is vital to an optimal outcome.[12] Various imaging techniques are available to evaluate the presence and progression of PTMO including radiography, computed tomography, magnetic resonance imaging (MRI), skeletal scintigraphy, and diagnostic ultrasonography (US). US is a sensitive modality in the detection of PTMO and is at the forefront of investigation into musculoskeletal athletic injuries; however, only a few case reports describing the US appearance of PTMO have been reported.[5,13] The purpose of this study is to present a case of an 18-year-old male hurdler and an American football player that was diagnosed with PTMO utilizing radiography as well as US and monitored with interval follow ups.

Case Report

An 18-year-old male track and American football athlete presented to our clinic with a chief complaint of left knee and thigh pain. Patient consent was provided for publication of de-identified clinical information and images. Six weeks prior, while running, he impacted his left anterior thigh on a hurdle. At that time, he went to the emergency department where radiography of the femur was performed and interpreted as negative. He was diagnosed with a strain of his left quadriceps. Approximately 1 week after the injury, his thigh pain subsided but his left knee developed severe swelling and pain which he rated 7/10 on the numerical pain rating scale. The patient did not report his knee pain to his parents or medical providers until his presentation at our clinic 4 weeks later. Physical examination revealed edema in the suprapatellar area of the left knee and tenderness with a hard mass palpable in his left thigh. A full orthopedic examination was not possible at that time due to pain and reduced knee flexion.

He underwent left knee and femur radiography which revealed a lamellated, poorly organized calcification adjacent to the anterior midshaft of the femur measuring approximately 12.5 cm by 2.2 cm (Fig 1). A large suprapatellar joint effusion was also evident. The following day knee and femur US was performed utilizing a GE Logiq E9 (GE Healthcare, Milwaukee, WI) linear array transducer operating at 8 to 15 MHz. The US exam revealed a mass within the vastus intermedius consisting of mixed hypoechoic and hyperechoic areas with disorganization of muscular fibers. The mass represented an intramuscular hematoma. Also noted was calcification within the vastus intermedius muscle measuring 11.5 by 4.5 cm consistent with lamellar bone (Fig 2). A normal US

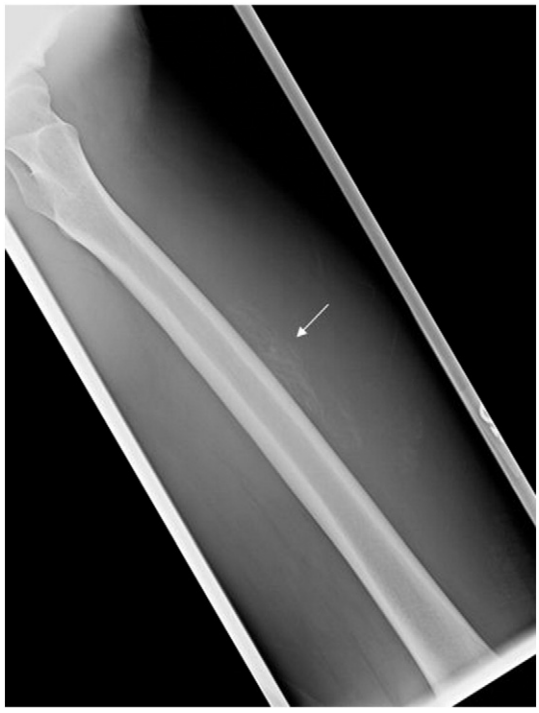

Fig 1. Conventional radiography of the femur approximately 6 weeks post injury demonstrating faint heterotopic ossification within the anterior thigh musculature (arrow).