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Case report

Intra-articular osteoid osteoma in the proximal tibia and its imaging characteristics

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ABSTRACT

Due to mostly non-specific clinical symptoms and variable appearance on magnetic resonance imaging (MRI), the diagnosis of an intra-articular osteoid osteoma (iaOO) is often delayed. We report the case of a 26-year-old male with an atypical clinical manifestation of an iaOO in the proximal tibia and its MRI specific characteristics of tumor progression. The patient presented to our clinic after receiving multiple unsuccessful conservative and surgical interventions due to anterior knee pain, which persisted for 12 months. Prior to the correct diagnosis of iaOO manifestation, the patient was subjected to multiple steroid infiltrations and two arthroscopies including partial meniscal resection. Due to increasing complaints, meniscal transplantation, bone decompression and/or ACL reconstruction were recommended. Subsequent computer tomography (CT) scanning and successful test medication with salicylates (ASS) confirmed iaOO presentation. Only after arthroscopic tumor resection was the patient symptom free at three months of follow-up. The present description of MRI specific characteristics of iaOO progression has the potential to accelerate correct tumor detection in the future.

1. Introduction

Intra-articular osteoid osteoma (iaOO) is a rare entity of a common benign bone tumor, which is characteristically located in the (meta)-diaphysis of long bones and presents with worsening night pain and symptom relief under non-steroidal anti-inflammatory drug (NSAID) treatment [1–5]. However, if located intra-articularly and especially around the knee, the clinical and radiographic presentations may be uncharacteristic, potentially hindering the immediate diagnosis of iaOO [4]. Since other differential diagnoses such as synovitis, stress fracture, or meniscal tear are often initially considered in patients with non-specific knee pain, a magnetic resonance imaging (MRI) is usually performed primarily. However, MRI has a high rate of misdiagnoses of iaOO delaying tumor identification [1,3,4].

In this case report, we present the case of a 26-year-old male with an atypical manifestation of an iaOO, whose correct diagnosis was delayed due to a variety of treatment strategies based on several misguided MRI interpretations. Therefore, the purpose of this report is to highlight the commonly uncharacteristic presentation of an iaOO in a patient with non-specific knee pain and to illustrate image characteristics of iaOO progression.

2. Case

A 26-year-old male presented with non-specific anterior knee pain that had persisted for one year, and developed subsequent to an uneventful long-distance run. Except for pain under load, at full extension and at the lateral tibia plateau (6/10 on the Visual Analog Scale, VAS), physical examination showed no sign of knee instability or meniscus injury. Other than a bone marrow edema of the lateral tibia plateau and minor retropatellar cartilage irregularities, MRI revealed no pathologic findings. An accompanying submeniscal bone impression in the lateral tibial plateau appeared unchanged compared to a previous MRI taken two years before and therefore was diagnosed to either constitute an old fracture or a normal variant (Figure 1A). A subsequent arthroscopy due to a suspected retropatellar chondromalacia revealed a lateral meniscus tear, which was partially resected. During the following four months, worsening resting pain levels at night (VAS 9) resulted unsuccessfully in multiple intra-articular injections of corticosteroids, activity restrictions and NSAID therapy. The bone marrow edema was unchanged (Figure 1B).

After three more months of persistent anterior knee pain and a suggested surgical decompression of a suspected stress fracture, the persisting bone marrow edema was attributed to a post-meniscectomy syndrome and a meniscal transplantation was suggested (Figure 1C).

Abbreviations: FS, fat suppressed; iaOO, intra-articular osteoid osteoma; NSAID, non-steroidal anti-inflammatory drugs; PD, proton density; TSE, turbo spin echo.

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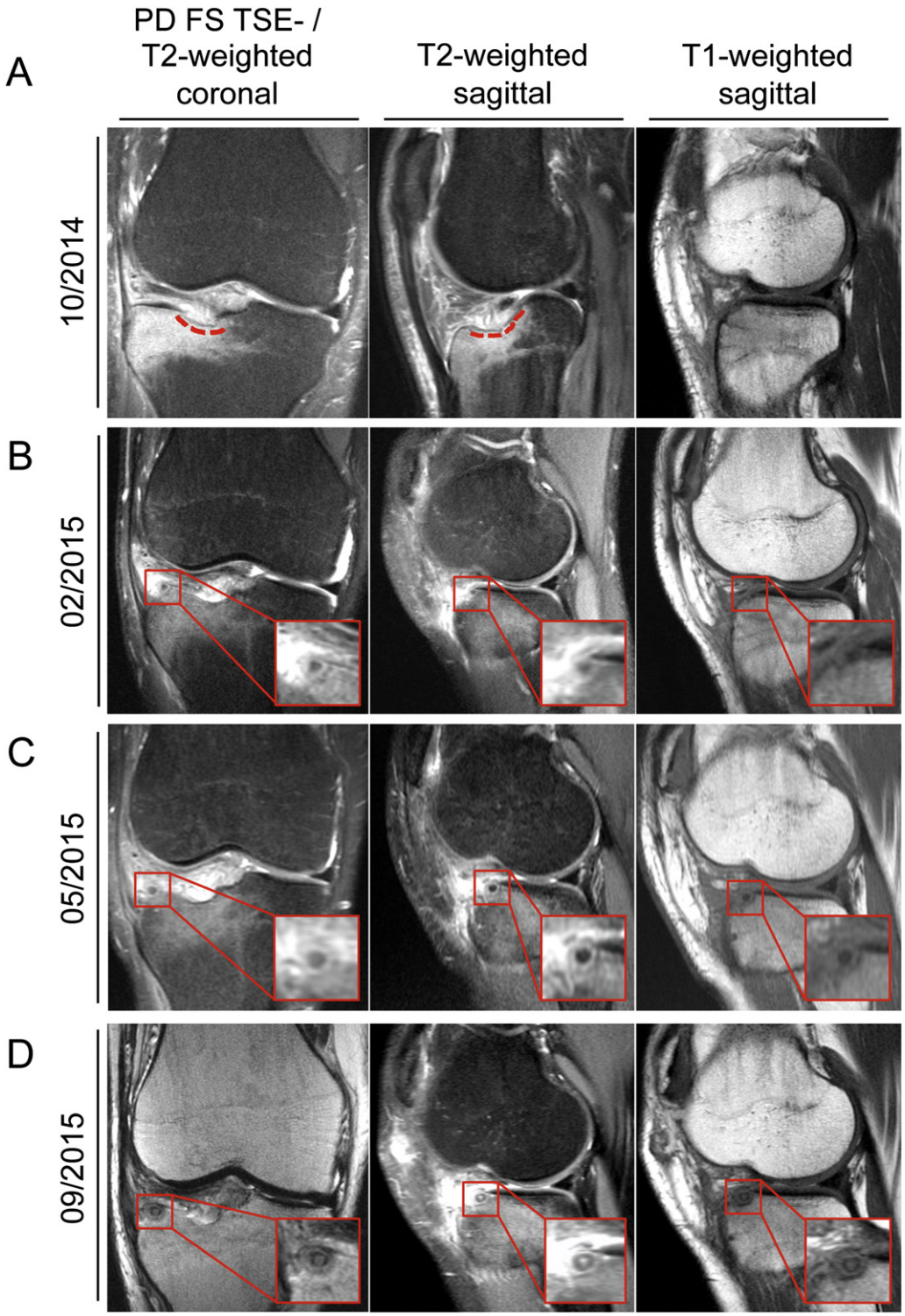

Figure 1. MRI specific characteristics of iaOO progression. Fat suppressed (FS), proton density (PD) weighted, turbo spin echo (TSE) MRI images show an ill-defined high intensity signal of the subchondral bone in the lateral tibia plateau without a specific focus. An old submeniscal bone impression in the antero-central region of the lateral tibia plateau can be seen (dotted line, A). Four months later, PD FS TSE- and T1-weighted TSE images show a poorly demarcated, semi-round lesion with a hypointense center and a diffusely enhanced signal surrounding the nidus (B). Another three months later, the central low signal and its rim enhancement became sharper. A minor, fusiform low intensity signal accompanies the hyperintense rim (C). In the final stage, the central nidus with its low central signal and a more sharply enhanced rim demonstrates a hyperintense center within the low signal nidus on all T1 TSE-, T2 TSE- and PD FS TSE-weighted sequences (D).

As the articular cartilage and the lateral meniscus structures appeared intact on an additional follow-up MRI (Figure 1D), another arthroscopy revealed no aspects of osteoarthritis or meniscal injuries to be treated. Instead, the anterior cruciate ligament (ACL) appeared elongated and partially ruptured. Even though the patient did not report any trauma or subjective knee instability, the clinical symptoms and the bone marrow edema were now attributed to the ACL findings and an ACL reconstruction was suggested.

Given a now intolerable pain level at manual contact, the patient was referred to our clinic. He presented with a slight joint effusion,