Femoral Head Chondrosarcoma Causing Femoroacetabular Impingement in an Adult Professional Football Player

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Abstract

Femoroacetabular impingement (FAI) is often diagnosed as a cause of hip pain in athletes. Benign tumorous conditions presenting with FAI symptoms have been described in the literature, but there is no mention of any malignant lesion causing impingement.

We report the case of a femur head chondrosarcoma in a 23-year-old professional football player who presented with FAI symptoms. Magnetic resonance imaging of the hip showed a bumpy outgrowth (hyperintense T_2-weighted signal) from the anteroinferior portion of the femoral head without any signal changes in the rest of the head or in the hip joint. Clinical, laboratory, and radiologic findings remained inconclusive regarding a specific diagnosis. The lesion was excised through an anterior approach to the hip. Histologic evaluation of the specimen revealed an undifferentiated chondrosarcoma. Six months after surgery, the patient, completely free of pain and impingement symptoms, resumed his sports activity. At 3-year follow-up, there was no limitation in activity, and there was no evidence of tumor recurrence.

Although rare, bony malignant conditions of the hip can present with FAI symptoms and a complete radiologic evaluation is warranted prior to any surgical intervention.

Figure 1. Radiograph shows lesion arising from inferomedial portion of femoral head.

Since the advent of magnetic resonance imaging (MRI) and flexible instrumentation for hip arthroscopy, diagnosis and treatment of hip pathology have improved substantially.[1] Femoroacetabular impingement (FAI) is a suggested diagnosis for hip pain in the absence of other apparent causes, in which abnormal anatomy or superphysiologic motion produces eccentric loading of the joint or actual impingement on the femur by the acetabular rim.[2,3] The impingement symptom arises because of abnormal contact between the proximal femur and the acetabular rim. This is increasingly being diagnosed in athletes and sports players, as abnormal contact can occur in activities that require repeated hip motion to an extreme range.[2] In addition, it can result from an abnormal anatomical configuration to the bone such that contact occurs with motion even in the normal range.[4-6] There are reports of benign tumorous lesions of the femoral head or hip joint (eg, synovial chondromatosis of hip, juxta-articular osteochondroma) presenting as FAI.[7,8] However, there is no mention of a malignant condition causing the impingement. When impingement features are noticed in athletes, the diagnosis of malignant lesion becomes challenging.

In this article, we report the case of a femur head chondrosarcoma in a 23-year-old football player who presented with FAI symptoms. To our knowledge, this is the first report of an intra-articular chondrosarcoma arising from the femoral head.

The patient provided written informed consent for print and electronic publication of this case report.

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Figure 2. Computed tomography shows lesion (in anteroinferior portion of femur head) causing symptoms of femoroacetabular impingement.

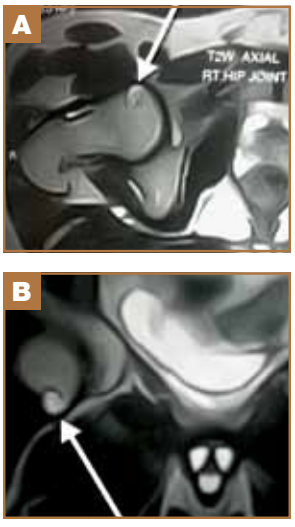

Figure 3. Coronal and transaxial magnetic resonance imaging shows T_2-weighted hyperintense signal in bumpy lesion arising from anteroinferior portion of femoral head. Acetabular rim shows no evidence of labral tear, detachment, or chondral pathology.

Figure 4. Excised specimen shows nodular growth on surface of femoral head and erosion of nearby articular cartilage.

Case Report

A 23-year-old professional football player presented with pain in the right hip joint. He reported a 4-month history of right groin pain of insidious onset. This pain was precipitated by running, twisting, and high-flexing of the hip on kicking, and often lasted for 12 to 24 hours after a long day of training. The patient had 2 physiotherapy sessions before presenting to our clinic. There was no history of significant trauma or constitutional symptoms, and no apparent systemic or local hip joint pathology before this hip pain. On examination, the pain was reproduced with the typical maneuver of flexion, adduction, and internal rotation of the hip (impingement test positive).[4] The hip impingement test result can be positive in labral tears, synovitis, arthritis, developmental dysplasia of the hip, and even iliopsoas tendinitis. These possibilities were kept in mind as the patient was further evaluated.[9] Hip movements of flexion, adduction, and internal rotation were restricted to 90°, 10°, and 10°, respectively. Other joint movements were normal and painless. Distal neurovascular status was intact. Modified Harris Hip Score (HHS) score was 66, indicating poor hip function.

Given these clinical findings, FAI was suspected. Plain radiographs showed a small abnormal growth—not clearly defined, but lytic—on the anteroinferior non–weight-bearing portion of the femoral head (**Figure 1**). The rest of the femoral head was spherical and contained within the acetabulum; there was no evidence of lateral migration of femoral head or acetabular dysplasia. Computed tomography confirmed the lesion arising from the anteroinferior femoral head and growing inside the hip joint (**Figure 2**). MRI was used to determine lesion size (2×1.5 cm), extent, and (localized to inferomedial non–weightbearing part of femoral head. The lesion was hyperintense on T_2-weighted MRI and isointense on T_1-weighted MRI (**Figure 3**). There was no evidence of subchondral degeneration or edema in the femur head or acetabular roof. Homogenous low signal intensity of the labrum, triangular configuration, and continuous attachment of the labrum and the acetabulum excluded possibilities of labral tear, detachment, and degeneration. There was no synovial reaction in the joint. The other parts of the femur and acetabulum were normal. These clinical and radiologic findings were not conclusive of any diagnosis. Differential diagnoses of intra-articular osteochondroma and chondroblastoma were made, and excisional biopsy of the lesion was planned.

The patient was placed in the supine position, and the anterior Smith-Petersen approach was used. An incision was extended from the anterior superior iliac spine to the anterolateral thigh. A superficial internervous plane was created between the sartorius and the tensor fascia lata. A deep surgical plane was created between the gluteus medius and the rectus femoris. Straight and reflected heads of the rectus femoris were released to gain exposure to the hip joint capsule. A T-shaped capsulotomy exposed the femoral head and made it easy to visualize the lesion; this was helped by a figure-of-4 maneuver of the leg. The lesion was excised en bloc with adequate normal bony margin. The labrum and the chondral regions of the acetabular rim were assessed, and there was no evidence of labral tear, detachment, or chondral pathology.

Macroscopic examination of the specimen revealed a nodular lesion on the surface of the femoral head, and the cut section showed multiple lobulations (**Figure 4**). There was erosion of articular cartilage in surrounding bone. Microscopic findings were suggestive of a multiloculated tumor in the chondroid background, with intervening compressed fibrous septa; hypercellularity, pleomorphic chondrocytes, and mitosis with

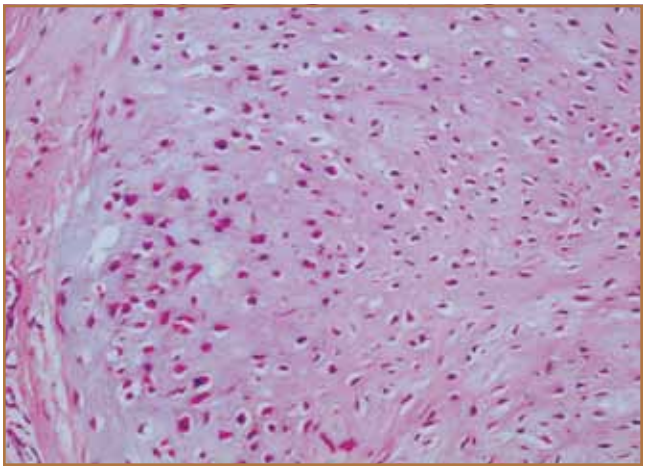

Figure 5. Low-power microscopic image of histologic specimen shows multiloculated tumor in chondroid background with intervening compressed fibrous septa.

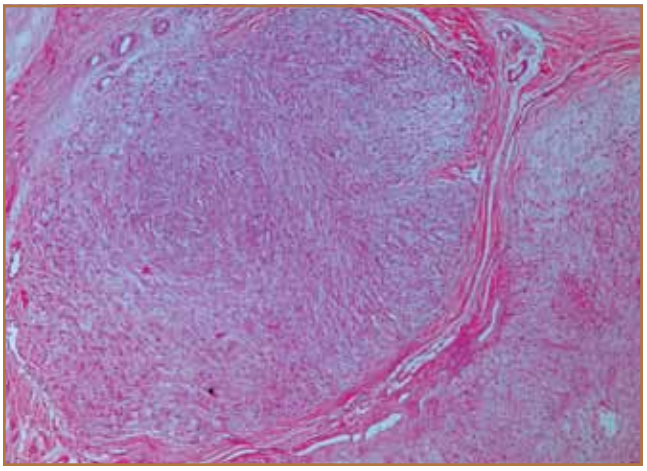

Figure 6. High-power microscopic image shows hypercellularity, pleomorphic chondrocytes, and mitosis with minimal cellular atypia.

minimal cellular atypia were noticed. These findings were suggestive of an intermediate-grade malignant chondrosarcoma (**Figures 5, 6**). Excised specimen margins were tumor-free.

After the surgery, the patient recovered from his impingement symptoms. Toe-touch weight-bearing with crutches was allowed for 6 weeks to prevent iatrogenic femoral neck stress fracture. A pillow was placed beneath the thigh to protect rectus femoris muscle repair, and active flexion was avoided for 3 weeks. Abductor strengthening exercises were initiated immediately after surgery. Six weeks later, crutches were discarded and activities resumed as tolerated. Running, jumping, and other athletic activities were discouraged for 6 months. By 6-month follow-up, the patient had painless full range of hip joint motion and had resumed his athletic activities. He was followed up clinically and radiologically for 3 years. At most recent follow-up, there was no evidence of tumor recurrence (**Figure 7**) or impingement symptoms. Hip joint movements were normal and painless. The patient, a football player, was quite active. Modified HHS score was 96, indicating excellent functional outcome.

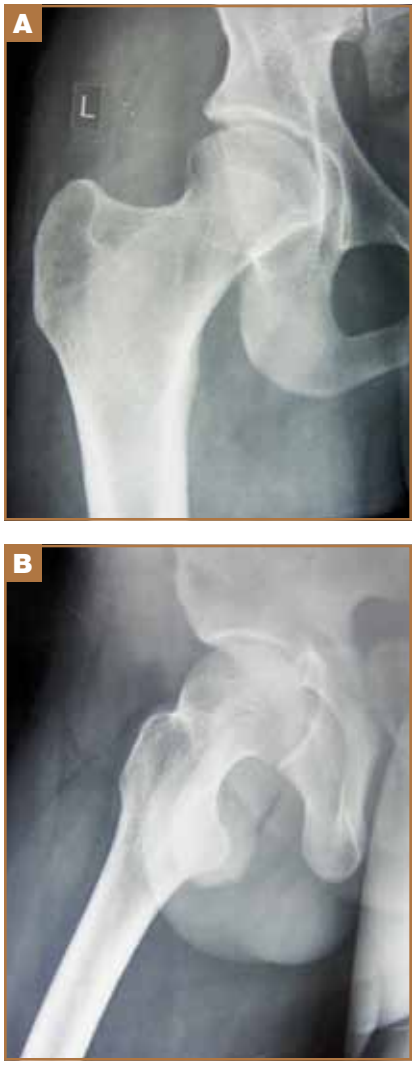

Figure 7. Three years later, radiographs show no evidence of tumor recurrence or degeneration in hip joint.

Discussion

This is the first report of a femur head malignancy with a presentation similar to that of anterior FAI. In FAI, pain and the mechanical symptoms of locking, catching, and giving way indicate a labral pathology (eg, labral tear, detachment, degeneration) or a cartilage delamination lesion. Restrictions in hip movement (eg, flexion, internal rotation) are seen in cases of severe deformity.[10] Our patient's symptoms were purely mechanical, because of outgrowth of the femoral head chondrosarcoma; there were no labral or cartilaginous defects in the acetabular rim. Complete radiologic evaluation, which includes MRI, must be performed ahead of surgical intervention for FAI syndrome.[9,10]

There are few reports of benign tumorous conditions causing impingement symptoms, and, in the cases described, the diagnoses were obvious from the clinical and radiologic evaluations.[7,8] Hussain and colleagues[8] reported a case of osteochondroma presenting with FAI, but the lesion arose from the greater trochanter. Padhy and colleagues[7] reported a case of impingement syndrome secondary to synovial chondromatosis of the hip joint. Obviously, an intra-articular osteochondroma produced the exophytic growth and caused the impingement; in synovial chondromatosis, osteocartilagenous loose bodies cause impingement. There was no mention by Padhy and colleagues that primary chondrosarcoma of the hip produced the exophytic malignant growth with FAI symptoms. In addition, the patient

with the growth was an athlete (a labral pathology is usually expected in athletes).[9,10]

Chondrosarcoma is one of the most heterogenous bone sarcomas that can occur in any part of the body. Its clinical spectrum ranges from aggressive lesions to growths difficult to distinguish from benign tumors.[11-13] The clear cell variant has been found in the femur head, inside the femoral head.[11] Our patient's lesion was eccentric, and occurred in the non–weight-bearing portion of the femoral head, where it could be completely excised without dislocating the joint. As we suspected we might find a tumorous condition, we treated the patient directly, with open excision, rather than with a minimally invasive procedure (arthroscopy).

Orthopedic surgeons should be aware that even malignant conditions of the hip can present with FAI symptoms. A complete radiologic evaluation must be performed ahead of any surgical intervention.

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