NICOLAS S. PIUZZI, MD
Associate Staff, Adult Joint Reconstruction, Department of Orthopaedic Surgery, Cleveland Clinic

HIBA K. ANIS, MD
Research Fellow, Department of Orthopaedic Surgery, Cleveland Clinic

GEORGE F. MUSCHLER, MD
Department of Orthopaedic Surgery, Cleveland Clinic; Professor, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH

Osteonecrosis of the femoral head with subchondral collapse

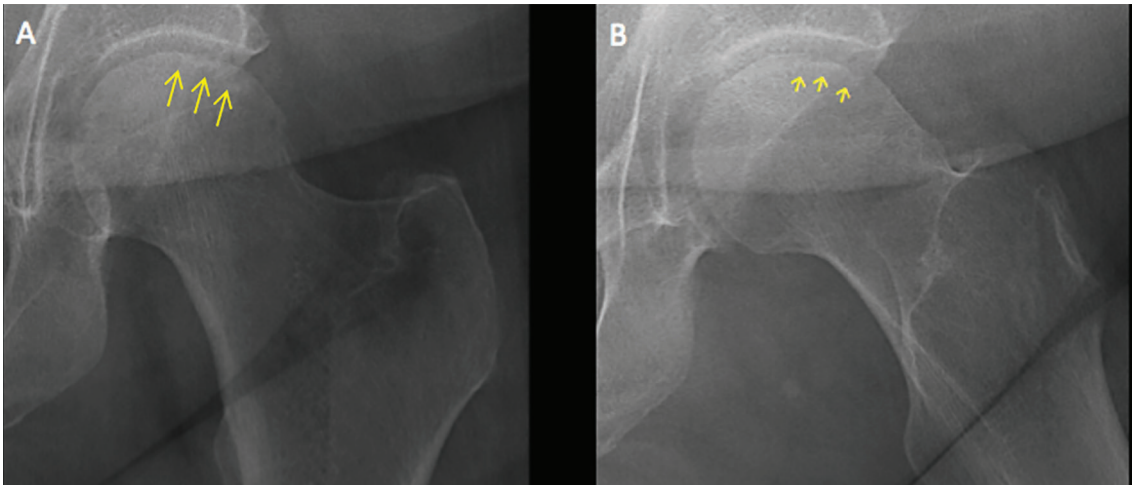

Figure 1. On plain radiography, a subchondral radiolucent line (arrows) was seen on internal rotation of the hip (A), and more clearly on external rotation (B) (arrows).

The 'crescent sign' on radiography indicates an advanced stage of femoral head osteonecrosis

A 45-year-old woman with a history of multiple organ transplants presented with a 1-month history of anterior left hip pain with insidious onset. Although she was able to perform activities of daily living, she reported increasing difficulty with weight-bearing activities.

Physical examination of the left hip elicited pain on passive movement, particularly on internal rotation. Plain radiography of the left hip (**Figure 1**) revealed a subchondral radiolucent line in the femoral head, representing subchondral collapse. This radiographic sign, referred to as the "crescent sign," is seen in advanced stages of osteonecrosis of the femoral head. Recognition of this subtle radiographic sign is important because it represents considerable subchondral necrosis and collapse, and indicates that further collapse is likely.[1]

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RISK FACTORS

Osteonecrosis of the hip is caused by prolonged interruption of blood flow to the femoral head.[2] While idiopathic osteonecrosis is not uncommon, the condition is often associated with alcohol abuse or, as in our patient, long-term corticosteroid use after organ transplant.[3] Corticosteroid use is also the most frequently reported risk factor for multifocal osteonecrosis.

Less common risk factors include systemic lupus erythematosus, antiphospholipid antibodies, coagulopathies, sickle cell disease, Gaucher disease, trauma, and external-beam therapy.

Young age is also associated with osteonecrosis, as nearly 75% of patients are between age 30 and 60.[4]

APPROACH TO DIAGNOSIS

Our patient had a typical clinical presentation of this disease: she was relatively young, was

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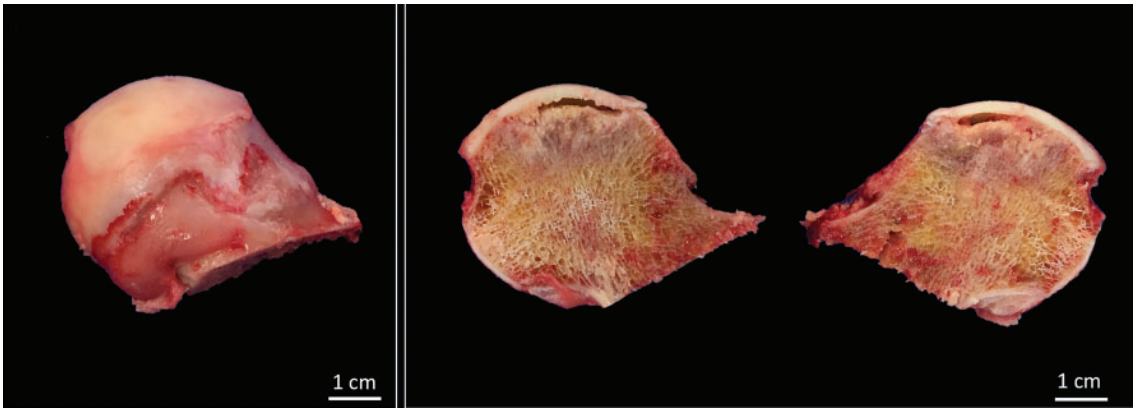

Figure 2. Inspection of the femoral head confirmed palpable chondral softening and necrosis.

on long-term corticosteroids, and had acute anterior groin pain followed by progressive functional impairment.

The diagnostic evaluation consists of a detailed history, with attention to specific risk factors, and a thorough clinical examination followed by imaging, usually with plain radiography. However, plain radiographs are often unremarkable when the condition is in the early stages. In such cases, magnetic resonance imaging is recommended if clinical suspicion for osteonecrosis is high. It is far more sensitive (> 99%) and specific (> 99%) than plain radiography, and it detects early changes in the femoral head such as focal lesions and bone marrow edema.[5]

TREATMENT OPTIONS

Treatment of osteonecrosis is surgical and depends on the stage of disease.[6]

Joint preservation may be an option for small to medium-sized lesions before subchondral collapse has occurred; options include core decompression, bone grafting, and femoral osteotomy to preserve the native femoral head. These procedures have a higher success rate in young patients.

Subchondral collapse usually warrants hip replacement.

OUR PATIENT'S TREATMENT

Our patient underwent total arthroplasty of the left hip. Macroscopic inspection and palpation of the femoral head demonstrated chondral softening. Anatomic specimens (**Figure 2**) showed the distinct correlation between radiographic images and subchondral collapse secondary to the underlying necrotic bone in the femoral head.

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***ADDRESS**: Nicolas S. Piuzzi, MD, Department of Orthopaedic Surgery, A41, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195; piuzzin@ccf.org*

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