

SPONTANEOUS OSTEONECROSIS OF THE KNEE

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Spontaneous osteonecrosis of the knee is mainly seen in women over 60 years of age. This condition is distinguished from secondary conditions such as corticosteroid-induced osteonecrosis. It was originally described and is most common in the medial femoral condyle but can also occur in the tibial plateaus and on the lateral side of the femur also. The radionuclide bone scan will show focally increased uptake before the radiographs are abnormal. Magnetic resonance imaging can also be diagnostic, but the findings may be normal early in the course of the disease. The etiology remains unknown, but it is speculated that primary vascular ischemia or microfractures in osteoporotic bone are causative. Many patients have a benign course followed by resolution of symptoms. Therefore, conservative management is indicated initially. If progressive collapse accompanied by severe symptoms occurs, high tibial osteotomy, unicompartmental replacement, and total knee replacement are therapeutic alternatives. Recognition of this entity is important to avoid needless surgical intervention.¹ The case is being reported to sensitize orthopaedic surgeons to the fact that with a normal knee X-ray if the patient complains of severe pain then he may be having a spontaneous osteonecrosis of the knee which can be diagnosed early by a radionuclide scan or a MRI of the knee joint.

CASE REPORT

A 53 year old female presented to the

Orthopaedic OPD with severe pain in her right knee since 2 months. (Figure 1) She had no history of trauma, fever or steroid intake. On examination there was a fixed flexion deformity of 10 degrees, wasting of the thigh muscles, a normal straight leg rising test, and knee flexion and normal local temperature around the knee. She had severe bony tenderness on her medial femoral condyle.

AN X-RAY OF THE KNEE REVEALED NO BONY PROBLEMS.

In view of severe pain not responding to NSAIDS the patient was advised a MRI scan of the knee which revealed a spontaneous osteonecrosis of the medial femoral condyle with early osteoarthritic changes and an asymptomatic osteonecrosis of adjacent proximal medial tibial condyle. (Figure 2 and 3) She was diagnosed as a case of grade 3 spontaneous osteonecrosis of the knee and was advised non-weight bearing mobilization. NSAID and rest for the next month along with active physiotherapy to the knee. In view of early osteoarthritis the patient was started on S- Adenosyl Methionine 200 mg twice daily for the next 6 weeks as a DMOAD (Disease modifying osteoarthritic drug).

DISCUSSION

Osteonecrosis of the knee entails three distinct pathologic entities: secondary ON, spontaneous ON, and postarthroscopic ON. Spontaneous osteonecrosis of the knee involving the medial femoral condyle was first described by Ahlback et

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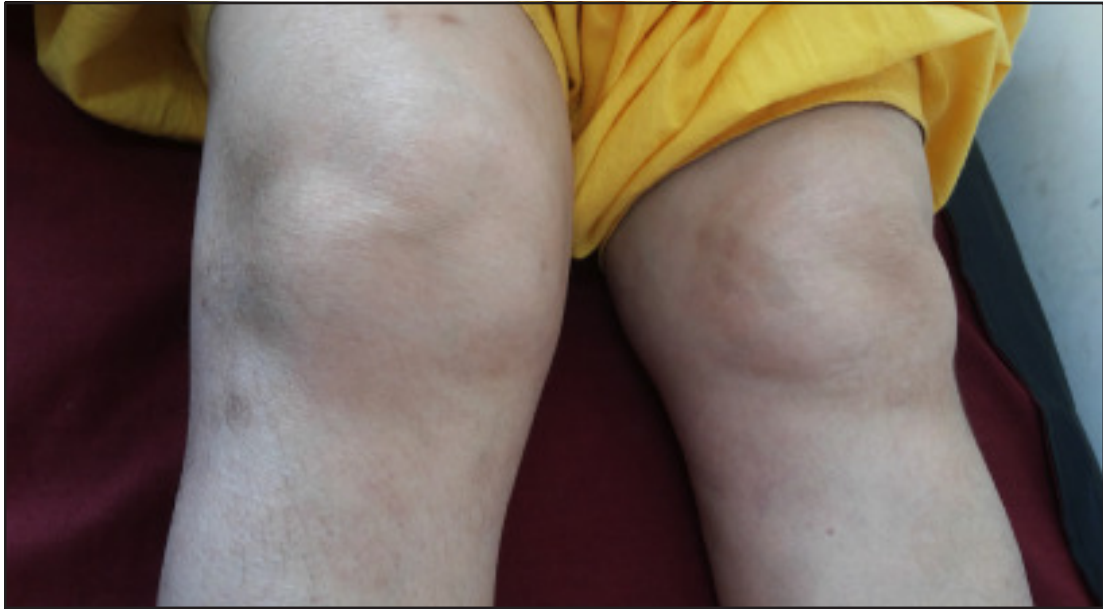


Figure 1 : 53 year old lady with pain on medial femoral condyle. Her Xray was normal



Figure 2 and 3 : MRI of the left knee shows spontaneous osteonecrosis of the femoral and tibial condyle medially

all in 1968. It is called spontaneous, idiopathic, or primary osteonecrosis to distinguish it from secondary osteonecrosis, which is associated with corticosteroid therapy. Secondary osteonecrosis is associated with higher incidences of bilateral knee involvement, multiple joint involvement, and involvement of the lateral compartment of the knee than is primary osteonecrosis. Osteonecrosis of the knee is three times more common in women than in men, and most patients are more than 60 years old. The usual complaint is the sudden onset of pain on the medial aspect of the knee, which may have been precipitated by a specific activity or minor injury. The pain is frequently worse at night during the acute phase, which may last 6 to 8 weeks after the onset of symptoms. Depending on the size and stage of the lesion, the severe pain of the acute phase may either resolve gradually or become chronic. Physical examination shows an area of well-localized tenderness over the affected condyle, which is most commonly medial. Mild synovitis accompanied by a small effusion is common. The radionuclide bone scan is performed with technetium-99m and must be positive to make the diagnosis of osteonecrosis. Radiologically the plain-radiographic presentation is divided into five sequential stages.^{2,3}

In stage 1 the radiograph is normal. Diagnosis in this stage depends on the radionuclide bone scan.

In stage 2 there is subtle flattening of the weight-bearing portion of the affected condyle, which may easily be missed.

In stage 3 The typical lesion of osteonecrosis is seen. It consists of a radiolucent area of variable size located in the subchondral bone and bordered proximally and laterally by a sclerotic halo.

In stage 4 the sclerotic halo thickens, and the subchondral bone begins to collapse.

Stage 5 shows the osseous collapse of stage 4 accompanied by secondary degenerative changes in the femoral condyle (i. e., osteophyte formation, jointspace narrowing, and sclerosis).

Magnetic Resonance Imaging Magnetic

resonance (MR) imaging has shown the involvement of the condyle to be more extensive than can be appreciated on plain radiographs. The high-intensity signal on the T1-weighted image normally produced by the fat in the marrow is replaced by a discrete subchondral area of low signal intensity, sometimes surrounded by an area of intermediate signal intensity. On the T2-weighted image, an area of low signal intensity is surrounded by a variable high-intensity signal, which is thought to be caused by edema surrounding the lesion.

Microscopy shows a segment of dead bone in the weight-bearing portion of the femoral condyle associated with subchondral fracture and collapse.¹² The osteonecrotic center has dead bone with empty lacunae and fatty degeneration. The surrounding area shows reparative bone formation, osteoblastic activity, cartilage formation, and bands of fibrovascular granulation tissue.

The etiology of spontaneous osteonecrosis is unknown, but either a vascular or a traumatic cause has been theorized. The vascular theory supposes interference with the microcirculation to the subchondral bone of unknown cause, producing edema in a nonexpandable compartment. The resultant increased pressure in the bone marrow further diminishes the circulation and results in osseous ischemia and the low signal intensity of the marrow seen on the MR study. If the dead bone collapses, the typical radiographic appearance develops. If revascularization occurs before collapse, the lesion may heal, and the symptoms may resolve. The traumatic theory takes into account that most patients are elderly women, in whom osteoporosis is common and in whom, therefore, minor trauma might cause microfractures in the weaker subchondral bone. At this stage, the radionuclide study would be positive, but the MR imaging study could still be normal. It is postulated that fluid eventually enters the marrow space, increasing the pressure and causing ischemia. At this point, the MR image shows an area of low signal intensity. The lesion may then progress or resolve.

Spontaneous osteonecrosis should always be considered in the elderly patient with a painful knee that appears normal radiographically, so that inappropriate arthroscopy and meniscectomy can be avoided. In stages 1 and 2, the treatment of osteonecrosis should be conservative until the size of the lesion and its progression have been defined which may take as long as 6 months. Management consists of analgesics and protected weight-bearing. Antiinflammatory medications are often prescribed, but there is no evidence of an inflammatory component. Small lesions do well, although mildly symptomatic degenerative changes may slowly develop. Surgical treatment options for the patient with larger lesions that progress to the more advanced stages of osteonecrosis include arthroscopic debridement, drilling or core decompression (with or without bone grafting), proximal tibial osteotomy, allografting, and prosthetic replacement.⁴

Secondary ON often involves both femoral condyles, with multiple lesions in the epiphysis, metaphysis, and diaphysis of the bone. Patients are typically younger than 45 years. Secondary ON is bilateral more than 80 percent of the time. Direct risk factors for secondary ON include radiation, chemotherapy, and trauma. Conditions such as sickle cell disease or other myeloproliferative disorders also increase the risk for secondary ON. One indirect risk factor is a certain level of

corticosteroid use, (ie, taking more than 1 gram per month of prednisone or equivalent for 2 or more months, or approximately 30 mg per day). In fact, secondary ON got its name because it was said to be secondary to corticosteroid use. Other factors that can lead to this disease include alcoholism and an inherited coagulation disorder.⁵

The case is being reported to sensitize orthopaedic surgeons to the fact that with a normal knee X-ray if the elderly patient complains of severe pain then he may be having a spontaneous osteonecrosis of the knee which can be diagnosed early, progression delayed or treated in a better manner.

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