Spontaneous Osteonecrosis: A Probable Cause of DJD in the Knee

By Deborah Pate, DC, DACBR

Osteonecrosis involving the knee may be observed in association with steroid therapy, sickle cell anemia, renal transplantation, or can occur in a spontaneous or idiopathic fashion. The resemblance of the superimposed degenerative changes in cases of spontaneous osteonecrosis of the knee to those of typical osteoarthritis has led to the speculation that a significant number of cases of degenerative joint disease (DJD) of the knee have their origin in an ischemic event.

The disease very frequently starts with acute intense pain in the knee, for which the patients (who generally are over 60 years old) find no convincing explanation for the initial symptoms.

The first pathologic radiographic sign to appear is often apparent three weeks after the onset of pain. The earliest sign is a slight flattening of the medial femoral condyle, which is visualized in both the anteroposterior and lateral views. About two months after the onset of pain, the subchondral area of the medial femoral condyle clears until one finally sees a flat defect of the bony contour which may encompass a characteristically even bone shadow. The radiolucency of the subchondral bone and the defect of the bony contour cause an apparent focal increase in the density of the adjacent bone. On occasion, associated changes may appear in the subchondral bone of the adjacent medial condyle of the tibia. Small fragments of bone can become detached from the necrotic bone and end up in the joint space, causing injury to the normal articular cartilage. Occasionally a periosteal reaction can be seen involving the cortex, just superior to the medial femoral condyle.

ARNETTA: SCAN IN FIGURES

Manifestations of Spontaneous Osteonecrosis in the Knee Joint.

A = Normal roentgen finding (at least three weeks after the onset of pain). Scintigraphy with bone-tracing radioisotropes is positive (pathologic accumulation of tracers) sooner that the result of radiologic examination.

B = Slight straightening (flattening) of the medial femoral condyle (early roentgen finding) often accompanied by a very delicate subchondral area of increased density.
C = Two months after onset of the disease at the earliest, increased subchondral radiolucency with more or less pronounced increase in perifocal density of cancellous bone.

D = Oval, trough-shaped defect with increased perifocal density of cancellous bone. The flattened bone plate in the defective contour is a characteristic roentgen finding. Contigent periosteal reaction (arrow).

E = The necrotic plate-shaped portion of bone has been resorbed. In the opposite medial condyle of the tibia an increased density of the spongiosa has appeared which (by no means an indispensable sign) is often deeper and broader than the area of increased density in the femur. Contingent periosteal reaction (arrow).

F = In addition to the changes depicted in E, gradual densification and fragmentation of bone occur in the tibia.

Once there are radiographic findings present, progression to degenerative joint disease is almost a guarantee. If the patient can be treated before the radiographic changes are present, it is possibly that the disease may not progress. Since there is a significant delay in the radiographic findings, about six weeks, a more sensitive modality can be used to diagnose and treat the patient before the condition progresses: a bone scan, for instance. Researchers have found that with early diagnosis (before radiographic findings) and conservative treatment of this condition, the symptoms can be ameliorated and the condition arrested before there is any further destruction of the joint.

Reference


Deborah Pate, DC, DACBR
San Diego, California

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