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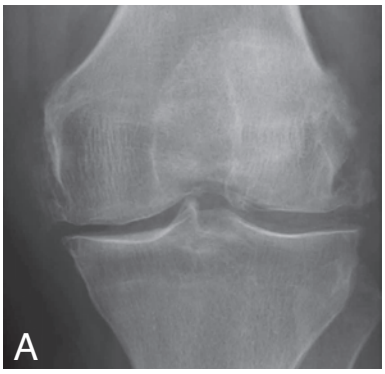
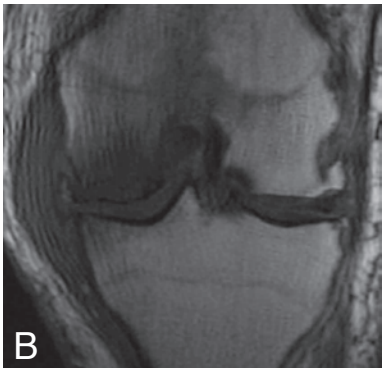
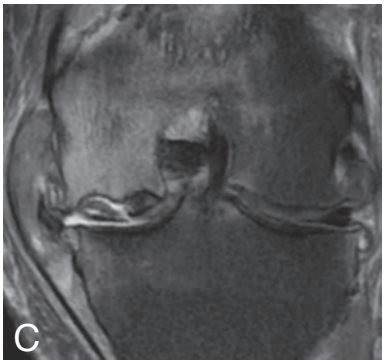
IMAGES IN CLINICAL RADIOLOGY







Spontaneous osteonecrosis of the knee (SONK)

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An 80-year-old woman presented at the emergency department with a sudden non-traumatic pain of the left knee. Supine decubitus plain radiographs of the left knee (Fig. A) reported no evidence of acute traumatic lesion, osteoarthritis bone remodeling, chondrocalcinosis nor mild joint effusion. Chondrocalcinosis crisis was subsequently considered as the final diagnosis and the patient received symptomatic treatment.

Three months later, pain was still present and the patient underwent an MR exploration of the knee. T1-weighted (Fig. B) and proton density with fat saturation (PD FS) (Fig. C) sequences demonstrated a bone marrow edema of the whole medial femoral condyle, as well as a linear low signal intensity subchondral striation involving the weight-bearing portion of the medial condyle. The PD FS images showed evidence of collapse of the subchondral bone outside the striation, surrounded by a high signal synovial fluid rim. No reactive interface nor the typical "double line sign" of usual osteonecrosis were seen seen. Rupture of the posterior horn of medial meniscus with medial extrusion and also severe degenerative articular changes were present.

These findings were consistent with spontaneous osteonecrosis of the knee.

Given the wide extent of the lesion, total knee replacement surgery was planned.

Comment

Spontaneous osteonecrosis of the knee (SONK) or "idiopathic osteonecrosis of the knee" was initially described as a distinct entity of osteonecrosis in 1968 by Ahlbäck, Bauer and Bohne. SONK mostly occurs in elderly individuals, generally after the seventh decade and women are commonly affected. The pain is of sudden onset and severe, causing significant functional disability.

The lesion is generally unilateral and located in the load-bearing area of the medial femoral condyle which differentiates SONK from osteochondritis dissecans, preferentially localized in the lateral aspect of the medial femoral condyle and generally occurring in young patients. SONK differs from secondary avascular osteonecrosis (AON) which is always associated with risk factors such as alcoholism, corticosteroid therapy or systemic disease. At MR exploration, secondary AON differs from the idiopathic form with a typical "double line sign" that delineates the necrotic bone marrow, not present in SONK. In addition, at an early stage, SONK differs from secondary AON showing a curvilinear band of low signal in the sub-chondral bone, similar in appearance with stress fracture.

The etiology of SONK remains unknown. The acute onset of the symptoms, the clear predilection for elderly women often suffering from osteoporosis, the typical location in the load-bearing segment of the condyle and its similarities with stress fracture aspect on early MRI suggest that the initial lesion may be a repeated stress microfracture inducing local vascular impairment. This hypothesis is reinforced by frequent association with medial meniscal tears or meniscectomy. It is considered that repeated and increased cartilage-to-cartilage or cartilage-to-meniscal fragment impact could damage subchondral bone.

An early diagnosis of SONK can stop the evolution of the necrosis and avoid arthroplasty. In this view, MRI of the knee should be considered in case of non traumatic sudden pain of the knee in elderly women with non-contributing initial plain radiographs.

Reference

1. Narváez J., Narváez J.A., Rodriguez-Moreno J., Roig-Escofet D.: Osteonecrosis of the knee: differences among idiopathic and secondary types. *Rheumatology*, 2000, 39: 982-989.

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