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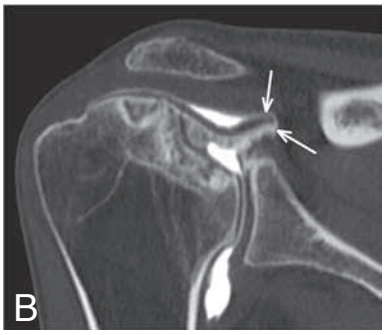
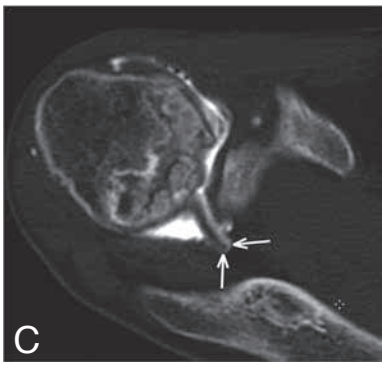
IMAGES IN CLINICAL RADIOLOGY





Epiphyseal «systemic» osteonecrosis of humeral head

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A 47-year-old man presented to the Emergency department for a strong right shoulder pain with functional disability. This pain had evolved for a few weeks, without traumatic notion and in clear worsening in spite of regular taking of antalgics. The shoulder stump palpation woke the pain. The patient's medical history included non-insulin-dependent diabetes, osteoporosis, and stomach ulcer. We also noted an important ethylic and smoking intoxication. A right shoulder radiography was performed (Fig. A) that showed osteonecrosis of the humeral head associating a wide heterogeneous change centered on the epiphysis encircled by a border sclera with an irregular aspect of subchondral bone and collapse of the head. The patient was sent to orthopaedic surgery consultation. CT-arthrography (Fig. B, C) showed a subchondral dissection with an osteocartilaginous fragment (arrows) of practically 2 cms in the upper joint recessus but rest exceptionally attached to the humeral head.

Comment

Avascular osteonecrosis (AVO) presents two variants: local or systemic. Local AVO is epiphyseal, usually caused by traumas or repeated microtraumas (as in the medial femoral condyle osteonecrosis and in vertebral osteonecrosis). Systemic AVO manifests as epiphyseal necrosis or a bone infarct (affecting metaphysis and diaphysis; epiphyseal necrosis can be associated); the origin is multifactorial. The advanced mechanism is a vascular obliteration by microscopic emboli. Several etiologies were described in the systemic AVO : glucocorticoid therapy with high dose (> 0.5 mg/kg), alcohol abuse, organ transplantation, systemic lupus erythematosus, dyslipemia, decompression sickness, sickle cell anemia, antiphospholipid antibodies, Gaucher disease, HIV infection, and idiopathic shape (25% affecting especially males). Systemic osteonecrosis is generally detected 1-6 months after exposure to a risk factor. The starting point in epiphyseal necrosis is subchondral fracture outcome secondarily to collapse of necrotic fragment and mostly affects the femoral head, medial femoral condyle and humeral head. MRI is the most sensitive imaging technique for its early detection. MRI allows diagnosis a few days or few weeks after the beginning of the disorder. In epiphyseal necrosis, the interface between normal and necrotic bone is early and easily seen as an hypointense band in T1 weighted sequence corresponding to granulation tissue. MRI signal of necrotic bone is initially normal. At this stage, radiography or CT are often normal. At a more advanced stage, the interface undergoes calcification and a sclerosis band is visible on radiography or CT. These two examinations present an undeniable diagnostic delay compared to MRI and radionuclide bone scan even if this last technique is non specific. At a later stage, necrosed fragment will be hypointense on all MRI sequences without enhancement and denser than normal bone in radiography or CT. Because of low biomechanical properties of necrotic fragment, it will present stress fractures with irreversible epiphyseal deformations. In our case, radiography allowed to establish easily the diagnosis because of the late stage of AVO. This technique remains essential and allows to assess the sphericity of the humeral head and to look for arthritis. CT is a more sensitive technique than radiography to detect bone sclerosis and loss of trabecular pattern. By using multiplanar reconstructions, it also allows to look for a subchondral fracture or a flattening of the humeral head, sometimes difficult to see in radiography.

Arthrography can be associated to CT to analyze the cartilaginous damage as in this case. It is necessary to underline the superiority of CT compared to MRI in bone subchondral dissection analysis. The main factors of bad prognosis are presence of radiography anomalies and a necrotic fragment size superior to 25% of humeral head (a size < 10% being considered as a factor of good prognosis).

Our patient currently benefits from a conservative management. However, evolution of the AVO of proximal humeral epiphysis is known as very pejorative, mostly requiring a prosthetic replacement after several years of evolution, adapted to the degree of clinical tolerance, the evolution capacities and the possible necessity of an important use of the shoulder in everyday life.

Reference

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