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Bone Infarcts: Less Well Known Than We Think?

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ABSTRACT

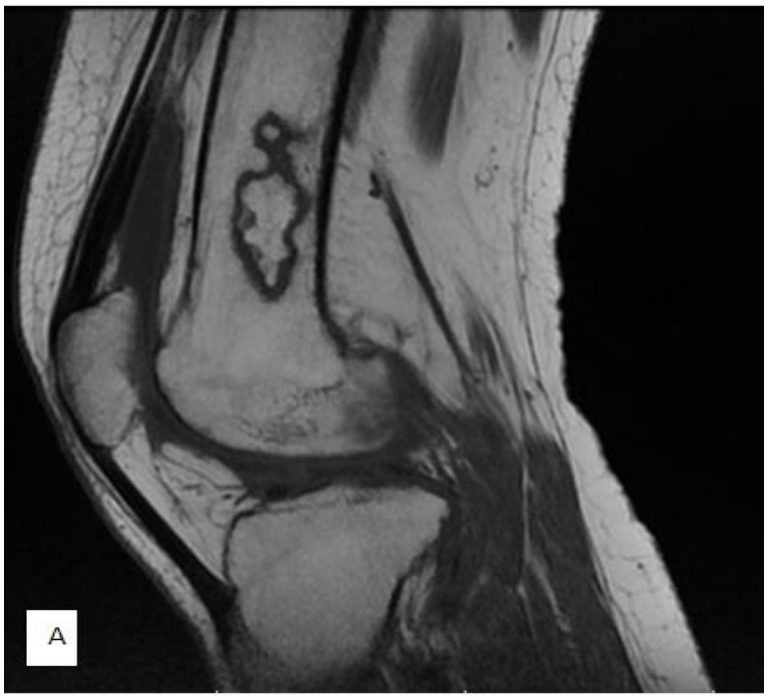
Bone Infarcts are medullary bony lesions that are in the same spectrum of disease as osteonecrosis. Patients typically present with an asymptomatic lesion in the metaphysis or diaphysis of long bones, discovered incidentally on imaging. Diagnosis is made radiographically with the presence of a medullary lesion of sheet-like central lucency surrounded by sclerosis with a serpiginous border, commonly referred to as a "smoke up the chimney" lesion. Treatment is observation as lesions are generally asymptomatic.

Keywords: Bone; Bone infarcts; MRI

CLINICAL HISTORY

A 42-year-old woman, without any previous history, consulted for bilateral mechanical gonalgia that had been evolving for 8 months. The clinical examination did not show any joint effusion, but mobilization of the knee joint was painful and her walking was cautious. The interview noted a self-medication of corticosteroids. The MRI showed a well-defined oval area of altered signal intensity is shown in the distal femoral diametaphysis that is isointense to bone on T1-weighted images with a hypointense serpiginous rim; hypointense on T2-weighted, fat-saturated images with a bright, hyperintense rim; and central low density tissue surrounded by an enhancing rim after Gadolinium enhanced.

IMAGING FINDINGS



A well-defined oval area of altered signal intensity is shown in the distal femoral diametaphysis that is isointense to bone on T1-weighted images with a hypointense serpiginous rim (Figure A: T1 sagittal); hypointense on T2-weighted, fat-saturated images with a bright hyperintense rim (Figure B: T2 FAT-saturated coronal); and Gadolinium enhanced T1 fat-saturated- weighted images demonstrate central low density tissue surrounded by an enhancing rim (Figure C).

FINAL DIAGNOSIS

Medullary bone infarct.

DISCUSSION

There is no precise definition of the term "bone infarct". Traditionally, the term “bone infarct” is reserved for the death of bone and marrow tissue due to ischemia, without infection, and developing in the metaphysis and/or diaphysis of a long bone. The term "avascular necrosis" (AVN) or "osteonecrosis," which is also typically used to indicate ischemic cell death of the carpal and tarsal bones, refers to the same process that occurs at the epiphysis. Both "bone infarction" and "osteonecrosis" names are used in the literature to describe ischemic aseptic cell death that affects flat bones, such as the pelvis, ribs, and skull.[1]

Bone infract can be associated with underlying disease, such as caisson disease, sickle cell disease, systemic lupus erythematosus, Gaucher’s disease, leukemia, or lymphoma. Apart from these diseases, corticosteroid therapy, by far the most frequently found risk factor.[1]

The prevalence of bone infarcts is unknown. Often asymptomatic; or be extremely painful when associated with sickle cell crises. The metaphyses or epiphysometaphyseal areas of the knee (distal femur, proximal tibia, and proximal fibula) are the most common sites, accounting for 85% of all bone infarctions. The proximal femur and distal tibia follow them.[2]

Magnetic Resonance Imaging (MRI) appears to be the most sensitive diagnostic modality. The MR appearance of bone infarction is well documented, with a thin low-signal rim on T1-weighted images and a variable signal at the center. Additionally, a characteristic "double line sign" on T2-weighted images. On T1-weighted images, the double line appears as a single low-signal-intensity band. The recent infarction appears as a low signal on T1-weighted images and as a high signal on T2-weighted images with a thin low-signal margin, corresponding to liquefactive necrosis surrounded by immature reticulin tissue. Mature infarction appears as a low signal on T1- and T2-weighted images, corresponding to dense fibrous tissue within regenerating trabeculae with only small amounts of residual eosinophilic fluid. Surrounding perivascular fibrosis is present, and this appears as serpiginous and radial mottling of the bone marrow signal. Enhanced MR images commonly show intense contrast enhancement at the periphery of the lesion.[3]

Acute bone infarction can be confused with osteomyelitis or malignancy, especially if these conditions are clinically suspected. The absence of increasing infection or malignancy during normal follow-up imaging can also serve as proof of the diagnosis, even though a biopsy may be required for a proper diagnosis.[2]

The prognosis of bone infarcts is excellent, and there is no specific treatment for bone infarcts.[4]

AUTHOR'S CONTRIBUTIONS

All authors contributed to this work. All authors have read and approved the final version of the manuscript.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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