

Brodie's Abscess (Cystic Osteomyelitis)

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Section: Musculoskeletal system

Imaging Technique: CT

Imaging Technique: MR

Case Type: Clinical Cases

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Patient: 42 years, male

Clinical History:

History of mono-arthritis of the right knee. Actually recurrent episodes of pain at the right knee. On physical examination there was swelling and local warmth.

Imaging Findings:

The patient with a history of mono-arthritis of the right knee presented with recurrent episodes of pain at the right knee. On physical examination there was swelling and local warmth. Conventional radiographs, CT scan and MRI were performed. Based on medical history and imaging findings – especially on MRI – the diagnosis of Brodie's abscess with cortical fistulization and paraosseous extension was made. The abscess was drained surgically. The abscess cavity was filled with Gentamycin pearls and antibiotics were given intravenously during 6 weeks. Culture demonstrated presence of *Staphylococcus aureus*.

Discussion:

Acute hematogenous osteomyelitis is most commonly seen in children and characterized by accumulation of the pathogenic organisms in the terminal arterioles and capillars of the bone metaphysis. In children a boy to girl ratio of 3/1 is seen. As edema and granulation occur, the intraosseous pressure may increase and result in bone necrosis due to compression of the vascular structures. These may lead to formation of a Brodie's abscess. In adults other pathogenic mechanisms of osteomyelitis are more common and include traumatic inoculation and spread from a nearby infected focus. Brodie's abscess as located form of chronic osteomyelitis is very common in children, due to high vascularity of the metaphysis and growth plates. Metaphyseal locations are most common before closure of the growth plates. After closure, a metaepiphyseal abscess is most frequent. When not hematogeneous in etiology, they occur most frequently in young adults at the long bones of the lower extremities. Pathologically, the wall of the abscess contains large amounts of granulation tissue, accounting for pronounced rim enhancement on contrast-enhanced MRI or CT scans. The central portions are mainly constituted by necrotic fluid and pathologic organisms. *Staphylococcus aureus* is cultured in half of the cases. The abscess is commonly surrounded by inflammatory changes and edema of adjacent bone marrow. Transcortical fistulization may lead to soft tissue spread. Until recently, early detection of bone abscedation was only possible by bone scintigraphy. This technique however is non-specific, as neoplastic changes or avascular necrosis revealed similar changes. MRI is considered more specific and furthermore allows better anatomical and topographical evaluation of disease extent. Only advanced stages of bone abscess are seen on conventional radiographs as areas of bone sclerosis with central radiolucency

and eventually periosteal reaction and bone sequestration within the abscess.

Differential Diagnosis List: Brodie's abscess

Final Diagnosis: Brodie's abscess

References:

Marti-Bonmati L, Aparisi F, Poyatos CR et al. Brodie's abscess: MR imaging appearance in 10 patients. JMRI 1993; 3: 543. (PMID: [8324315](#))

Resnick D, Niwayama G. Infectious disease. In Resnick and Niwayama, ed. Diagnosis of bone and joint disorders. 2nd ed. Philadelphia: WB Saunders Co; 1988: 2524-2755.

Figure 1

a

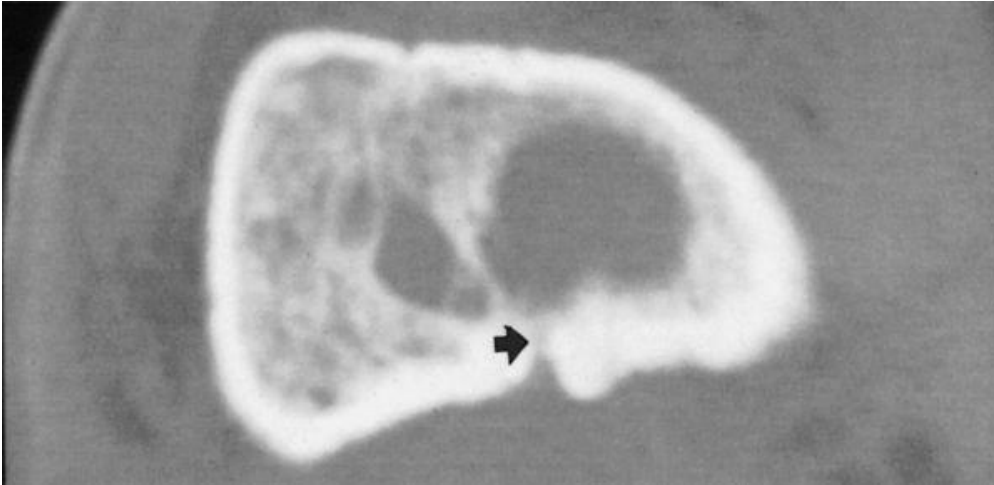


Description: Conventional radiograph of the right knee, lateral view shows an ill-defined radiolucent area at the distal metaphysis of the femur. Radiolucency is pronounced at the small focus just proximal to the physis (arrow), but subtle at the area surrounding this focus (region out-lined by small arrows).

Origin:

Figure 2

a



Description: Axial CT scan of the right knee visualizes multifocal osteolytic areas in the bone marrow and the traject of the cortical fistula (arrow). **Origin:**

Figure 3

a



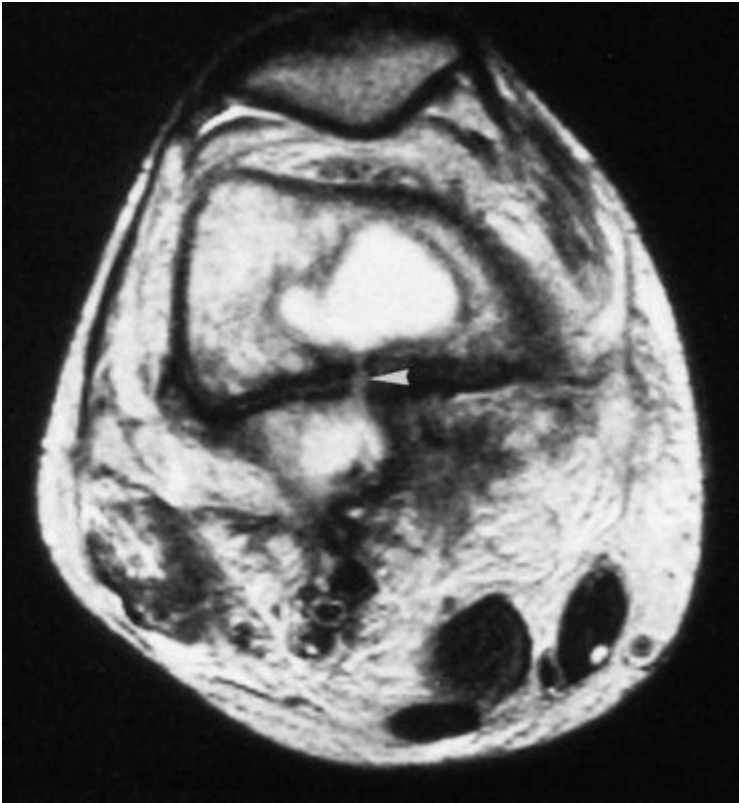
Description: MRI of the right knee shows on the sagittal SE T1-weighted MR-image a large hypointense area bordered by slight hyperintense rim at the distal femur (arrowhead), hypointense surrounding bone marrow, suggesting edema, and diffuse infiltration of the paraosseous fat posterior to the femoral shaft (arrow). **Origin:**

b



Description: Sagittal Gadolinium-enhanced SE T1-weighted MR-image demonstrates pronounced enhancement of the peripheral rim, no enhancement at the center of the lesion, enhancement in the area of surrounding intraosseous edema and paraosseous fat infiltration. A cortical fistula (arrow) is clearly demonstrated. **Origin:**

c



Description: Axial TSE T2 -weighted MR-image shows a uniform, hyperintense intraosseous area, indicating fluid collection, communicating with the paraosseous infiltrated fat through a transcortical fistula (arrowhead). **Origin:**