What Is Your Diagnosis?

In collaboration with the American College of Veterinary Radiology

History

A 4.5-month-old 2.5-kg sexually intact male domestic shorthair cat was presented because of a 2-week history of mild weight-bearing lameness of the left hind limb. On physical examination, swelling of the left distal femur was palpated; the swollen region was firm, and no sign of pain was induced. The cat was bright, alert, and responsive and had a rectal temperature within reference limits. No other abnormalities were observed in the cat. The Hct and serum biochemical results were unremarkable. Radiographic images of the left femur were obtained (Figure 1).

Formulate differential diagnoses, then continue reading.

Diagnostic Imaging

Findings and Interpretation

Radiography revealed a focal expansile lesion centered in the distal metaphysis of the left femur, extending to the distal diaphysis, with a smooth brush-border periosteal reaction and a wide transition zone (Figure 2). The distal third cortex was completely destroyed, and multiple regions of permeative lysis were evident. The distal physsis appeared radiographically normal. The radiographic findings were compatible with a monostotic aggressive bone lesion at the distal metaphysis of the left femur. The most likely differential diagnoses for this bone lesion included osteomyelitis (eg, bacterial or fungal) and, less likely because of the young age of the cat, primary or metastatic bone tumors.

Treatment and Outcome

Cage rest was advised, but the swollen femur was more pronounced 5 days later on the second visit, and a subsequent surgical core biopsy of the distal metaphysis of the left femur was performed for histopathologic and microbiological analyses. While awaiting laboratory results, amoxicillin-clavulanate (13.75 mg/kg, PO, q 12 h for 7 days), itraconazole (5 mg/kg, PO, q 24 h for 7 days), and meloxicam (0.05 mg/kg, PO, q 24 h for 3 days) were prescribed. Histopathologic examination revealed no neoplastic lesions in any of the submitted specimens, and histochemical staining revealed small numbers of gram-positive short rod-shaped bacteria in some foamy macrophages, but the aerobic and anaerobic microbiological and fungal cultures yielded no growth. A diagnosis of supplicative to pyogranulomatous osteomyelitis was made histopathologically, and the same antimicrobial medication with amoxicillin-clavulanate and itraconazole was continued for 8 weeks. Sequential follow-up radiography of the left femur was performed on days 45 and 149 from the first visit (Figure 3). On day 45, the lesion extended more proximally with complete cortical destruction at the distal half of the femur; there was less permeative lysis, and some linear trabecular patterns were observed. The periosteal new bone became thinner, and the cat showed no sign of lameness or pain. On day 149, the expansile lesions were radiographically

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smaller; although the distal half of the cortex was completely destroyed, bone remodeling had formed a new cortex and medulla.

Osteomyelitis is uncommon in cats and is clinically characterized by lameness, swelling, heat, pain, draining tracts, and localized erythema. The disease is often caused by infection with pyogenic organisms. It can develop from direct inoculation by penetrating wounds, postsurgical repair, or hematogenous dissemination. The latter condition is less common and typically affects juveniles. Hematogenous osteomyelitis often occurs in the metaphysis and epiphysis of multiple long bones due to the formation of vascular anastomoses that leads to a sluggish blood flow and predisposes to the seeding of bacteria. For the cat of the present report, infection from a previous small trauma wound was more likely than from the hematogenous route because of the monastic lesion and lack of systemic illness.

Radiographic features of osteomyelitis include soft tissue swelling, periosteal new bone proliferation, cortical bone destruction, or bone sequestration. Findings for the cat of the present report demonstrated not only periosteal proliferation and cortical bone destruction but also an expansile appearance, which has not been commonly described. From a literature review, similar imaging characteristics have been described in 2 young cats diagnosed with osteomyelitis. Each demonstrated monostotic aggressive expansile bone lesions at the scapula and ulnar diaphysis with osteomyelitis and sterile osteomyelitis, respectively. Osteosarcoma is another differential diagnosis, which is the most common skeletal neoplasia in cats. It has been reported in young cats (less than 1 year of age), although it is rare. The radiographic changes of osteosarcoma range from purely lytic to proliferative and often involve the metaphysis of the appendicular skeleton. Osteomyelitis cannot be distinguished from osteosarcoma based on radiographic findings alone. Therefore, bone lesion biopsy for histopathologic and microbiological examination is needed to obtain a definite diagnosis.

The most commonly isolated organisms from bacterial osteomyelitis are staphylococcal and streptococcal species. For the cat of the present report, antimicrobial treatment was commenced based on radiographic findings alone. Therefore, bone lesion biopsy for histopathologic and microbiological examination is needed to obtain a definite diagnosis. There are reports of lack of growth in culture, but animals have responded well to antimicrobial treatment. The explanations for microorganisms are not isolated.
no growth on culture include sterile osteomyelitis,4
specimen handling, or limited culture conditions.1,3
Because gram-positive short rod-shaped bacteria were
histopathologically identified in some macrophages,
sterile osteomyelitis was unlikely. No antimicrobials
were prescribed until bone biopsy was performed
in this case, and the cat responded well after anti-
microbial treatment; negative results of microbiological
culture may be associated with specimen handling or
culture technique.

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