History

A 7-year-old 4.7-kg (10.3-lb) neutered male domestic longhair cat was examined because of a swelling of the right forepaw. The right metacarpal area was swollen (widest diameter, 1.5 cm), and a draining tract was visible on the cranial aspect.

Clinical and Gross Findings

Palpation of the limb did not elicit signs of pain, and no other abnormalities were noted during physical examination. Results of a CBC and serum biochemical analyses were within reference limits. A test for circulating FeLV antigen and anti-FIV antibodies yielded negative results.

Hair on the lower portion of the right limb was clipped, and the area was cleaned with chlorhexidine gluconate. Fusidic acid cream was applied topically once. Based on the suspicion that bacterial cellulitis was the cause of the swelling, an SC injection of cefovecin sodium (8 mg/kg [3.6 mg/lb]) was administered.

The cat was reevaluated 1 week later. The owner reported that the swelling on the right forelimb had ruptured at the caudal aspect 3 days earlier and had since been bleeding sporadically. On physical examination, swelling of the metacarpal area was moderately increased and a 1-cm-diameter circular ulcerated lesion was present on the caudal aspect. The cat had weight-bearing lameness (grade, 3/5) of the right forelimb; palpation of the limb elicited mild signs of pain. A fine-needle aspirate specimen was collected, and an in-clinic microscopic examination revealed inflammatory cells (later characterized as neutrophils and histiocytes) and extracellular bacteria. Because of the lack of response to antimicrobial treatment and the clinical appearance of the lesion, additional aspirate specimens were submitted to the Diagnostic Services Laboratory at the Atlantic Veterinary College for cytologic evaluation. Bacterial culture of a specimen was requested following this cytologic evaluation. An interval of 3 days elapsed before culture results became available, during which the ulcerated lesion increased to 2 cm in diameter (Figure 1).

Figure 1—Photograph of the right metacarpal area of a cat obtained 10 days after initial evaluation. At the initial evaluation, the right forepaw and right metacarpal area were swollen (widest diameter, 1.5 cm) and a draining tract was visible on the cranial aspect of the metacarpal region. Four days later, the swollen area had ruptured, and over the next 3 days, a circular ulcerated lesion developed on the caudal aspect of the metacarpal region.
Cytologic and Microbiological Findings

The fine-needle aspirate specimens were processed for microscopic examination. In Wright-Giemsa–stained smears, high numbers of both nucleated cells and erythrocytes and a low number of platelets were evident. Moderate numbers of extracellular bacteria (approx equal numbers of chains of coccidi and short rods) were noted. A differential count of 300 nucleated cells revealed 49% neutrophils and 48% macrophages; the remaining 3% of cells was composed of approximately equal numbers of small lymphocytes, eosinophils, and plasma cells. Approximately 33% of the macrophages had basophilic coccoid to rod-shaped bacteria within the cytoplasm (Figure 2). Leukocytophagia was commonly noted, with occasional erythrocytophagia. Neutrophils rarely contained intracellular coccoid to rod-shaped bacteria. In acid-fast–stained smears, the bacteria were unstained.

Results of bacterial culture of an aspirate specimen revealed the characteristic appearance of Rhodococcus equi as a single colony in a light growth of mixed flora on a sheep blood agar plate. Mass spectrometry of bacteria from the single colony on the agar plate was performed, and results confirmed the organism as R equi.

Cytologic Diagnosis

Neutrophilic and histiocytic inflammation with intracellular bacteria (consistent with R equi).

Comments

Primary causes of neutrophilic and histiocytic inflammation include foreign bodies, chronic bacterial infections (especially mycobacterial infections), fungal infections, or neoplasia. No evidence of neoplasia was identified via cytologic examination of the fine-needle aspirate specimens obtained from the cat of this report. Engulfed bacteria are routinely found within neutrophils in cytologic samples obtained from septic lesions, but detection of bacteria within macrophages is uncommon. However, Mycobacteria spp and Rhodococcus spp should be most strongly considered when phagocytized bacteria are observed in both macrophages and neutrophils.

The presence of basophilic intracellular bacteria predominantly within macrophages made infection with Mycobacterium spp unlikely in this case. Mycobacterium spp are characteristically not stained following Wright-Giemsa staining of smears. The negative acid-fast stain results further ruled out mycobacterial infection and supported R equi as the agent, although R equi can be partially acid fast at some growth stages.

There are numerous case reports of R equi infections in cats; the cutaneous lesions in those cats and the cat of this report were similar, as was the cytologic appearance of smears of fine-needle aspirate specimens. Once the cytologic evaluation supports a diagnosis of R equi infection, bacterial culture and antimicrobial susceptibility testing should be strongly advised because of the variability of antimicrobial resistance of this organism in cats. There has been success in the treatment of infected cats solely with amoxicillin-clavulanic acid, despite R equi being an intracellular organism. However, because of the risk of death as a result of infection with this organism, it is advisable to treat cats with a combination of antimicrobials, at least until the outcomes of additional animals treated with single antimicrobials are reported.

With regard to submission of specimens collected from the cat of this report, the bacteriology staff at the diagnostic laboratory were advised that R equi was the agent of interest; the organism was identified by its characteristic appearance in a single colony in a light growth of mixed flora on a sheep blood agar plate, and results of mass spectrometry confirmed the organism as R equi. The colony would likely have been characterized as a contaminant if the laboratory staff had not been alerted. It is recognized that R equi may be routinely undetected in bacterial cultures as a result of misidentification as a contaminant. Because these organisms are intracellular, bacterial culture may be more successful if submitted biopsy tissue is macerated prior to plating, which releases organisms from cells.

In the cat of this report, results of antimicrobial susceptibility testing indicated that the organism was resistant to cefovecin but susceptible to amikacin, amoxicillin-clavulanic acid, doxycycline, and gentamicin. On the basis of these findings, treatment with...
amoxicillin trihydrate-clavulanate potassium 62.5 mg, PO, q 12 h for 3 weeks) and doxycycline (compound ed with sardine oil 12.5 mg of doxycycline/mL of solution) administered at a dosage of 5 mg/kg [2.3 mg/ lb], PO, q 12 h for 6 weeks) was initiated. The swelling began to decrease after 1 week of treatment and was no longer detectable after 2 weeks. The ulcerated lesion gradually regressed and was healed completely after 3 weeks. The owner elected to discontinue treatment with doxycycline after 4 weeks because the limb was healed completely.

Cutaneous infection with R equi is an emerging disease in cats, with cases reported from Canada, the United States, Australia, Brazil, New Zealand, and the United Kingdom. This organism is an aerobic, gram-positive, pleomorphic coccobaccillus. It has simple nutritional requirements and can be found in soils where herbivore manure is present. It is most commonly associated with bronchial and gastrointestinal tract lesions in young foals, and the number of reports of infections in immunosuppressed humans with HIV is increasing. Immune status should be considered if R equi infection is suspected; however, similar to the present case, all cats (including 1 that died as a result of the infection) described in previous reports were negative for FeLV antigen and anti-FIV antibodies. Although living conditions were not reported routinely, some of the reported cases involved cats that were in contact with areas where horses resided.

The cat in the present report had no known exposure to horses, but as it was an outdoor cat in a rural area, contact with horse-inhabited areas could not be completely ruled out.

In most reports of cats with R equi infections, the lesions developed as draining ulcerated lesions on a limb. Similar lesions on the neck area are also reported. Systemic infection appears infrequent. Cats with lymph node or systemic involvement had poorer outcomes in reported cases, but most treated cats survived.

The case described in this report emphasizes the importance of cytologic evaluation of skin lesions in cats, especially in those instances when the lesion does not respond to empirical antimicrobial treatment within a short time. The finding of coccoid to rod-shaped bacteria within macrophages and the basophilic appearance of the bacteria following Wright-Giemsa staining should heighten suspicion of R equi infection. In such situations, laboratory staff should be informed of the suspicion of an R equi infection and bacterial culture of macerated tissue specimens should be performed, thereby optimizing the chance of successful culture and identification of the organism.

References