

Cellulitis in cats

By Cristina Gans

What happens when it's not your average cat bite abscess?



FIGURE 1: Just prior to sampling for surgical biopsy, a firm mass is present on the right axilla and ventral thorax.

A common reason for taking a cat to a veterinarian is the aftermath of a catfight. Cats may exhibit a variety of clinical signs, including pyrexia, lethargy, anorexia and firm or fluctuant cutaneous swellings. In most cases the diagnoses are straightforward and the patients exhibit rapid responses to treatment. In some cases clinical signs progress despite the clinicians' best intentions.

After a recent history of a cat fight, a seven-year-old female, spayed, domestic-long-haired cat was presented to the veterinary clinic with a swelling in the right axilla. The treatment included drainage of an abscess and administration of antibiotic therapy (amoxicillin with clavulanic acid). On the cat's revisit to the clinic one month later, the mass had not healed, but instead had become thickened, firm and lumpy (Figure 1). Serosanguinous material had oozed from an open wound over the mass.

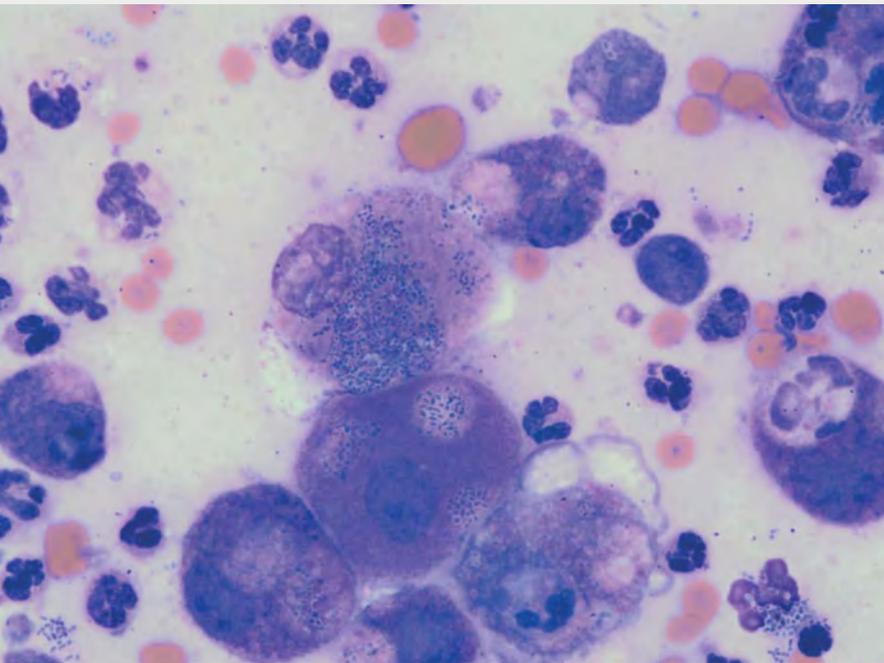
Samples for cytology, histology and culture and sensitivity were collected and submitted to the diagnostic laboratory. Differential diagnoses included mycobacteriosis, cellulitis with bacteria resistant to antimicrobial therapy and underlying neoplasia.

Cytology

Cytology revealed a mixture of large macrophages and similar numbers of degenerate and intact neutrophils. Smaller numbers of plasma cells, lymphocytes and eosinophils, and a few plump spindle cells were also present. Scattered intracellular clusters of darkly staining bacterial coccobacilli were present within macrophages (Figures 2a/b).

Histology

Histology displayed an infiltration of the adipose tissue by large sheets of closely packed macrophages and scattered foci of neutrophils. Also present were large numbers of multinucleated giant cells with up to 10–15 nuclei. Within the cytoplasm of macrophages were aggregates of gram-positive coccobacilli (Figure 3). Special stains for fungal organisms and mycobacteria were negative.



In cats, cutaneous and subcutaneous infections are the most common clinical presentations, although lymph node involvement and pulmonary infections have been reported in immunocompromised cats.

FIGURES 2A AND 2B: Cytology displays neutrophils and macrophages consistent with pyogranulomatous inflammation. Within macrophages are both phagocytosed neutrophils and aggregates of coccobacilli. Modified Wright Stain.

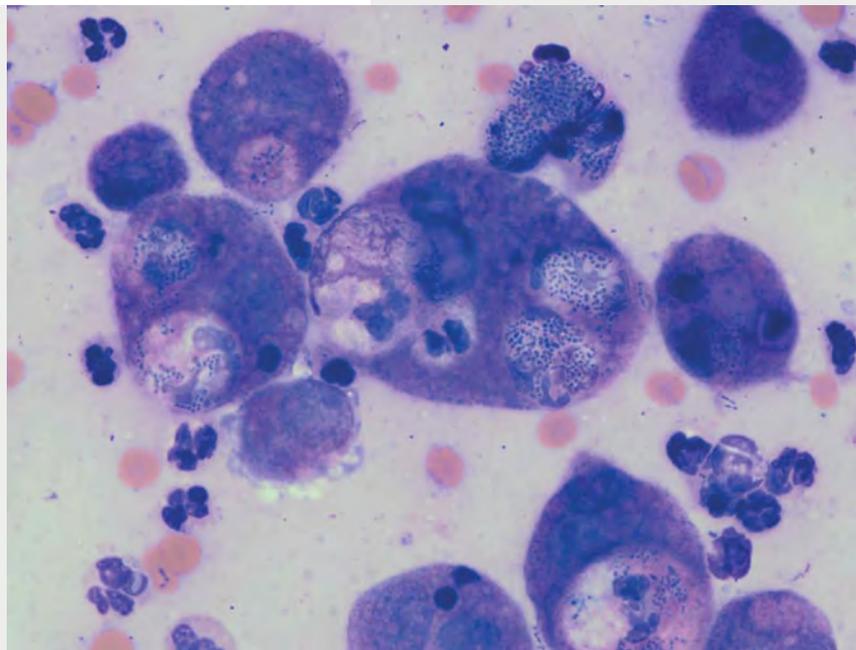
Culture

Culture and sensitivity revealed a moderate growth of *Rhodococcus equi*, which showed an in vitro sensitivity to all antibiotics tested, including amoxicillin and clavulanic acid.

Discussion

Cellulitis is a common presentation in cats, and in most cases diagnosis and treatment are straightforward. However, some cutaneous and subcutaneous masses may be caused by granulomatous or pyogranulomatous inflammation. These have a range of causes, of which many are refractory to treatment with commonly used antibiotics. Potential infectious causes in cats include bacteria such as mycobacteria, *Nocardia* and *Actinomyces* and fungi, including *Microsporum canis* and opportunistic fungi. Non-infectious causes in cats include a foreign body reaction, idiopathic sterile pyogranuloma, cutaneous xanthomas, trauma, pancreatitis, vitamin E deficiency and injection site reactions (Gross et al., 2005; Giuliano et al., 2020).

Cytology may help confirm the presence of granulomatous or pyogranulomatous inflammation, and in some cases a causative agent can be identified. Distribution of lesions and a clinical



appearance may also be helpful in some cases. For example, the fatty tissue of the ventral abdomen is a predilection site for infection due to *Actinomyces*, *Nocardia* or atypical mycobacteria in cats (Gross et al., 2005). Obtaining samples of the inflamed tissue for cytology, histology and culture is recommended to achieve a definitive diagnosis.

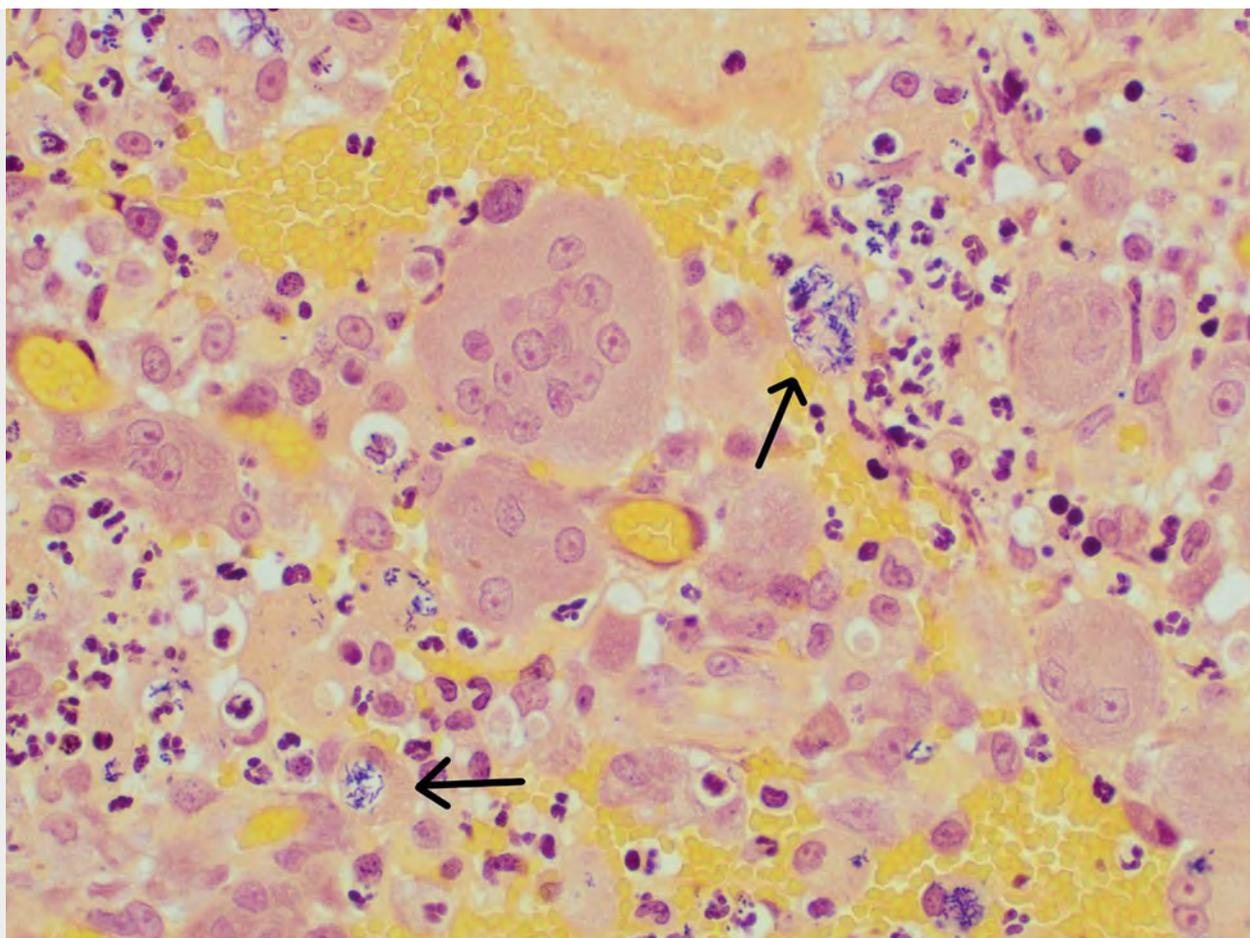


FIGURE 3: Histology displays sheets of tightly packed macrophages, neutrophils and multinucleated giant cells. Intracellular aggregates of Gram-positive coccobacilli bacteria are present (arrowed). Gram stain 50x

In this case, cellulitis was caused by the organism *Rhodococcus equi*. *R. equi* is a Gram-positive, facultative intracellular coccobacillus that establishes itself within macrophages by interfering with phagolysosomal fusion. A subsequent multiplication of the pathogen within macrophages can result in granulomatous inflammation and necrosis (Aslam and Lau, 2019). This persistence of the organism within macrophages may also affect the ability of some antibiotics to effect a cure. In this case, *R. equi* displayed in vitro sensitivity to amoxicillin; however, the in vivo susceptibility to this antibiotic may have been impacted by its intracellular location.

R. equi is more commonly associated with bronchopneumonia and gastroenteritis in foals, but it can produce illness in cats, dogs, goats, cattle, pigs and monkeys as well as

The following tips may be helpful when submitting samples for histology and culture in cases of suspected pyogranulomatous dermatitis and panniculitis.

- Smaller nodular masses can be excised in toto, although fixation of the entirety of the mass for histology will limit availability for culture. Consider keeping a portion of tissue fresh for culture.
- Multiple deep wedge or large punch (8mm) biopsies may be taken from larger lesions, keeping at least one sample fresh for culture. The remaining samples can be placed in 10% formalin for histology.
- Biopsies taken for histology do not need to be surgically scrubbed. For samples to be submitted for culture, remove potentially contaminating bacteria by aseptically scrubbing the surgical site prior to surgical biopsy. If a deep infection is suspected, remove the skin from the fresh tissue sample to be submitted for culture after the biopsy has been obtained.
- Tissue samples for culture can be placed in ESwab® culture media to enable the growth of causative pathogens before submission to the laboratory.
- Consider asking the laboratory for an extended culture, as this can facilitate the identification of slower-growing pathogens. If in doubt, your diagnostic laboratory may be able to provide further information.

other domesticated and wild animals. Infections in people have also been reported, particularly in immunocompromised patients (Aslam and Lau, 2019).

In cats, cutaneous and subcutaneous infections are the most common clinical presentations, although lymph node involvement and pulmonary infections have been reported in immunocompromised cats. Nodular cutaneous and subcutaneous lesions generally develop in the extremities, particularly the distal limbs (Patel, 2002).

The organism is present in the soil and in the faeces of herbivores, particularly horses. While infection via inhalation or ingestion may occur in other species, in cats the most common route of infection is through contamination of a wound, such as during a catfight. Interestingly, most reports of affected cats mention close contact with horses, which was not a feature in this case. However, *R. equi* has also been identified in rabbit and cat faeces, which could suggest other potential sources of infection (Aslam and Lau, 2019; Lechinski de Paula et al., 2019; Patel, 2002). ^{vs}

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