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NEWSLETTER

Feline *Bartonella* Diseases: Pathogenesis and Description[©]

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In This Issue:

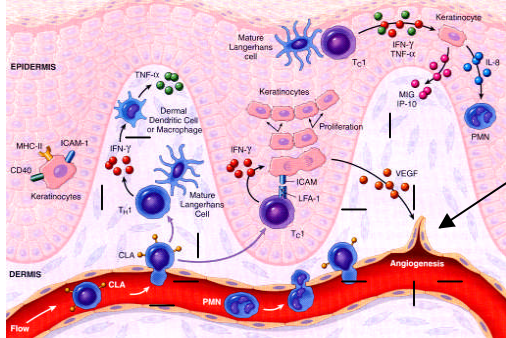
The summer 2003 issue of the NVL Newsletter will review the pathogenesis and the spectrum of feline *Bartonella* diseases.

Bartonella Pathogenesis

Feline *Bartonella* are Gram-negative bacilli that possess pili which are hair-like structures found on the bacteria's surface. *Bartonella* have a strong tendency to stick or clump together in tissues and in culture and to stick to, and penetrate, RBCs and endothelial cells. The ability to adhere to each other, and to the membranes of RBCs and endothelial cells, leads to the wide and varied tissue pathogenesis observed in cats, dogs and people. Pili and a protein called deformin are probably responsible for the sticky properties.¹

The wide tissue tropism of *Bartonella* is due to the adhesion to endothelial cells which are the constituents of capillaries. *Bartonella* proteins stimulate endothelial cells (Figure 1) to proliferate causing neovascularization or angiogenesis. Thus, *Bartonella* induce chronic lymphocytic plasmacytic granulomatous inflammatory reactions in highly vascular tissues throughout the infected animal's body. These tissues are: oral and respiratory mucosa, ocular tissues, the gastrointestinal tissues, the skin, and organs such as the liver, spleen and lymph nodes. In fact, since capillaries are found in all tissues, all tissues are susceptible to the inflammatory effects of *Bartonella*. The tissue reactions are apparent to the cat owners and veterinarians in the mucosa of the mouth, eye and respiratory tract or evidenced in the GI tract by chronic vomiting or diarrhea.

Figure 1 *Bartonella* Inflammation



Legend: The black rods (--) represent *Bartonella* in the skin or mucosa. The bacteria induce angiogenesis (arrow) and an outpouring of inflammatory cytokines which recruit inflammatory cells such as lymphocytes, plasma cells and macrophages.

Feline *Bartonella* Diseases:

Feline *Bartonella* diseases are characterized by chronic inflammation of vascular tissues.²⁻¹⁶ Inflammatory reactions often occur concurrently in multiple sites such as the oral and respiratory tissues, ocular and oral tissues or in other combinations. Although numerous pathogenic organisms can cause inflammatory diseases in various tissues, it appears that *Bartonella* is the cause of about 50% of the following conditions.^{14,16}

Feline *Bartonella* Diseases:

Oral Disease:

- Gingivitis
- Stomatitis
- Oral Ulcers
- Submandibular lymphadenopathy

Respiratory Diseases:

- URI
- Rhinitis
- Sinusitis

Ocular Disease:

- Uveitis
- Chorioretinitis
- Conjunctivitis

Intestinal Diseases:

- Inflammatory bowel disease
- Diarrhea (chronic)
- Vomiting (chronic)

Other Diseases:

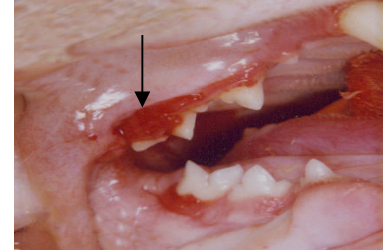
- Lymphadenopathy
- Fever of unknown origin
- Hepatic peliosis
- Bacillary angiomatosis
- Valvular heart disease (murmurs)

Experimentally induced feline diseases include: fever, lymphadenopathy, renal disease, neurological signs, anemia, reproductive failure, cardiac lesions and cholangitis.^{6-8,12,13} We and others have described chronic inflammatory diseases associated with *Bartonella* infections in pet cats.^{2,4,7,14,16} It should be noted that many of these diseases, identical to those seen in cats, were first found to be caused by feline *Bartonella* in humans.

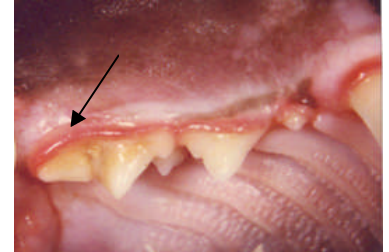
Bartonella references can be obtained at:
www.nlm.nih.gov/

The following are a group of photographs of *Bartonella* diseases of pet cats.

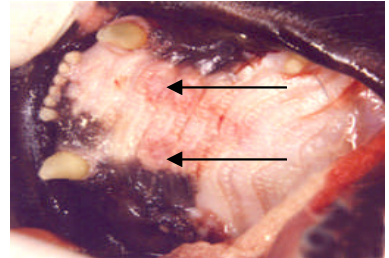
Proliferative gingivitis



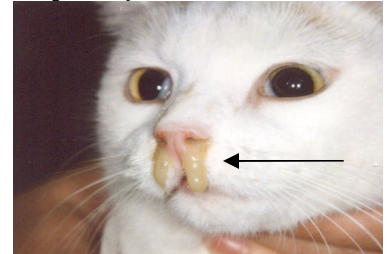
Juvenile gingivitis



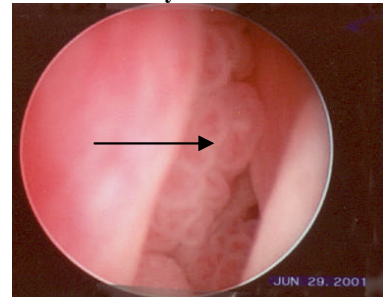
Oral ulcers



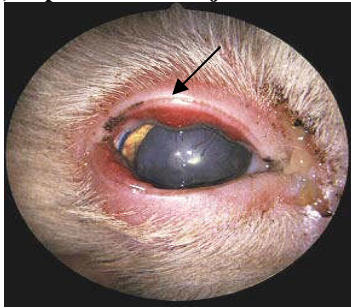
Upper respiratory disease- chronic



Rhinitis- chronic 1.5 years



Uveitis, blepharitis and conjunctivitis



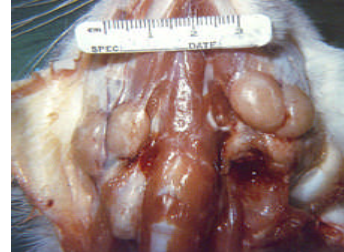
Chronic blepharitis & conjunctivitis



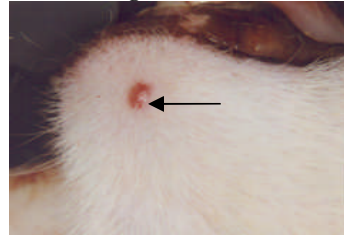
Chronic conjunctivitis



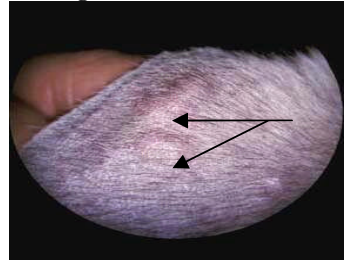
Lymphadenopathy



Skin nodule- acne (granuloma)



Skin nodules- granulomas in ear



Diarrhea- chronic

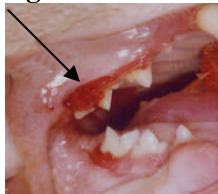


Therapy

Therapy of feline *Bartonella* diseases is relatively easy. We recommend oral azithromycin-10mg/kg once daily for 21 days. We have reported successful therapy results in approximately 80% of cats with *Bartonella* diseases.^{5,15,17} Therapy failures may be explained by the possibility that the presence of *Bartonella*, in these cats, may represent only coincidental infections and may not be the cause of the clinical disease.

Therapy Results:

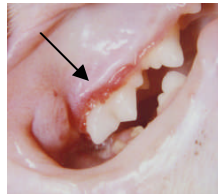
Gingivitis: Before



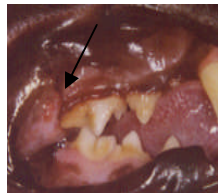
Before



After



After



Respiratory Disease:

Before



After



Conjunctivitis:

Before

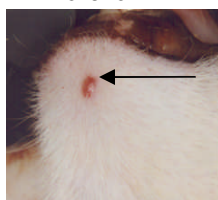


After

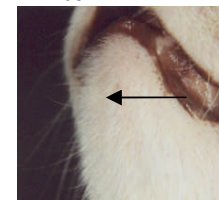


Skin Nodule:

Before

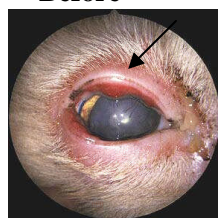


After

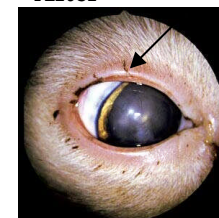


Uveitis & Conjunctivitis:

Before



After



Case photographs courtesy of:

Jan Corbishley, B.S. Oradell Animal Hospital, Paramus, NJ: gingivitis, respiratory disease & skin nodule- chin.
Dr. Jack Broadhurst, Cat Health Clinic, Pinehurst, NC: Blepharitis & conjunctivitis and chronic diarrhea.
Dr. Kerry Ketring, All Animal Eye Clinic, Cincinnati, OH: uveitis & ear skin nodules.
Dr. Larry Kantrowitz, Oradell Animal Hospital, Paramus, NJ: rhinitis.

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