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Popular Article

Cat Scratch Disease: Causes, Symptoms, Diagnosis, and Treatment

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Cat scratch disease is caused by an intracellular gram-negative rod called *Bartonella henselae.* It affects the lymph nodes draining the area where a cat scratch or bite occurs, causing regional lymphadenopathy.

Introduction

Cat scratch disease, also known as cat scratch fever, is a febrile illness that causes subacute regional lymphadenopathy. The infection is caused by the bacteria *Bartonella henselae* and typically resolves on its own within two to four weeks. However, the disease can be more severe and widespread in both healthy individuals and those with weakened immune systems. First described in the 1930s and linked to cats in the 1950s, cat scratch disease should be considered when diagnosing any type of lymphadenopathy, whether acute, subacute, or chronic, especially in patients with a history of cat exposure (1,2).

Etiology

The etiologic agent of cat scratch disease is *B. henselae* a fastidious intracellular gram-negative bacillus. The infection affects the lymph nodes draining the area of inoculation, usually from a scratch or bite of a young cat. There have been clinical descriptions of cat scratch disease for over 50 years, but the bacteriologic agent was not identified for decades. Dr. Douglas Wear, a pathologist, identified a new bacterium in the lymph nodes of cat scratch patients. This led to decades of research to identify the bacteriologic agent. Initially, there was cross-reactivity between *Chlamydia* and

Bartonella species. After the development of electron microscopy, the Warthin Starry stain was used to detect black spots of the bacteria in affected lymph node specimens. The entity of bacillary angiomatosis in the AIDS era identified Warthin-Starry-positive bacteria in the early 1990s and was found to be the same agent as a control group of cat scratch patients (3,4).

Epidemiology

Cat scratch disease typically causes a mild illness in immunocompetent hosts. Fifty-five percent of cases are in children younger than 18 years of age; 60% of these are males. More than one-half occur in September through January in the United States. The distribution is worldwide.

The vector of cat scratch disease is cats that acquire the bacteria from the cat flea (*Ctenocephalides felis*) bite with subsequent bacteremia. The cat is not symptomatic at the time. *B. henselae* is difficult to culture but can be detected by serologic or PCR methods. Infection may be acquired from scratch, bite, or infected saliva through broken skin. Fifty-six percent of cats with bacteremia are less than 1 year of age (5).

Transmission

People become infected with Bartonella henselae from the scratch of domestic or feral cats, particularly kittens. Cats can have fleas that carry B. henselae bacteria. These bacteria can be transmitted from a cat to a person during a scratch that is contaminated with flea feces (poop). Infected cats that lick a person's open wound or bite can also spread the bacteria. Some evidence suggests that these bacteria may spread directly to people by the bite of infected cat fleas, but this has not been proven.

B. henselae infection (CSD) occurs most often in children under the age of 15. Though more common in the Southeast, CSD occurs throughout the United States. Stray cats are more likely than pets to be infected with *B. henselae*. In the United States, most cases of CSD occur in the fall and winter (6).

Signs and symptoms

- Low-grade fever
- Enlarged, tender lymph nodes that develop 1–3 weeks after exposure to a cat
- A papule or pustule at the site of the scratch

Rarely, infections of the eye, liver, spleen, brain, bones, or heart valves can occur. Some of these infections occur primarily in people with weakened immune systems, such as those with advanced HIV infection (6).

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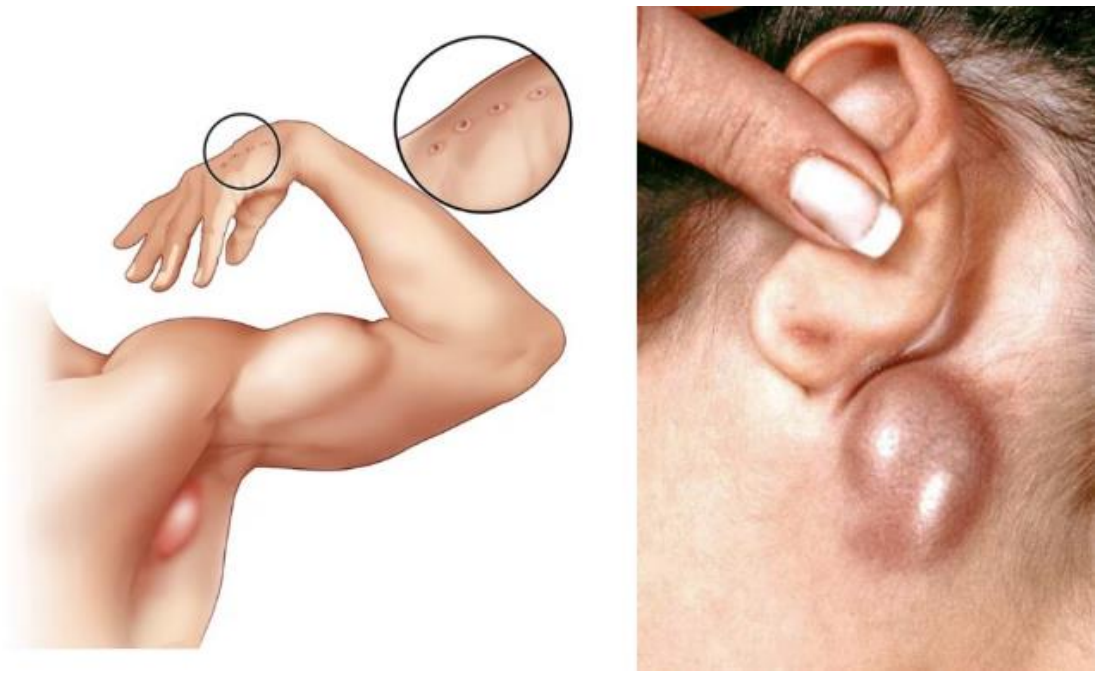

Fig 1. Enlarged lymph nodes are common symptoms of a *Bartonella henselae* infection (courtesy: this picture taken from https://www.cdc.gov/bartonella/about/about-bartonella-henselae.html)

Endocarditis

As with many *Bartonella* species, *B. henselae* can sometimes cause infection of the heart valves, called endocarditis. In many cases, blood cultures might be negative (culture-negative endocarditis), which can make the diagnosis more challenging (6).

Diagnostic Testing

Bartonella species are challenging to culture, making serologic testing the preferred diagnostic method. Serology can be performed using indirect fluorescent assay (IFA) or enzyme-linked immunosorbent assay (ELISA). These tests are more sensitive than culture but lack specificity because many people have positive results due to past asymptomatic exposure, especially cat owners (7).

Serology Testing Guidelines

- **IgG Titers:**
- <1:64: Suggests no current infection
- 1:64 - 1:256: Possible infection; retest in 10-14 days
- >1:256: Indicates active or recent infection
- **IgM Test:** Indicates acute disease but is transient
- **Cross-reactivity:** IgG tests may cross-react between *B. henselae* and *B. quintana*

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Diagnostic Approach

- Consider CSD in patients with unilateral lymphadenopathy
- Take a history of cat exposure and perform serology for CSD
- Diagnosis is confirmed by cat exposure history, lymphadenopathy, and elevated *B. henselae* antibodies via ELISA or IFA

Lymph Node Biopsy: Not usually needed unless lymph nodes do not regress or diagnosis is uncertain. The biopsy may show lymphoid hyperplasia and stellate granulomas (7).

Differential diagnosis

Differential diagnoses include causes of acute, subacute, and chronic lymphadenopathy. The differential does include viral agents such as CMV, HIV, and EBV, but these agents usually cause diffuse lymphadenopathy. Skin papules similar to the lesion at the inoculation site may occur in fungal infections, leishmaniasis, and nocardiasis. In immunocompromised hosts, there may be a myriad of infectious agents to consider. The presentation of HIV as bacillary angiomatosis may be confused with Kaposi sarcoma.

Treatment/ Management

In mild cases, treatment may not be necessary. Supportive care, including antipyretics and anti-inflammatory medications in addition to warm compresses to the inoculation site, may be all that is needed. In mild to moderate presentation in immunocompetent patients, a course of azithromycin may be indicated. Azithromycin for 5 days has been shown to relieve the pain of severe lymphadenopathy but has shown no reduction in the overall duration of symptoms. Azithromycin dose is 10 mg/kg day 1 and 5 mg/kg days 2 to 5. Individuals weighing greater than or equal to 45 kg can receive the adult (maximum) dose of 500 mg on day one and 250 mg on days 2 through 5. Immunocompromised patients should be treated to help prevent the progression to severe systemic disease. Antibiotic regimens including rifampin, trimethoprim-sulfisoxazole, and ciprofloxacin are available for severe, disseminated disease (8).

Prevention

- Avoid cat scratches, bites, and licks, especially from kittens or stray cats. This is especially important for people who have weakened immune systems.
- Wash hands promptly after handling cats.
- Talk to your veterinarian about flea prevention products for your cat. (Never use products that contain permethrin on cats.)

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- Keep cats indoors and away from stray cats. People who have weakened immune systems should avoid owning cats less than one-year-old (6).

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