

## *Bartonella henselae*

### Disease Agent:

- *Bartonella henselae*

### Disease Agent Characteristics:

- Gram-negative bacillus or coccobacillus, aerobic, nonmotile, nonspore-forming, facultatively intracellular bacterium
- Order: Rhizobiales; Family: Bartonellaceae
- Size: 0.3-0.6 × 0.3-1.0 μm
- Nucleic acid: Approximately 1900 kb of DNA

### Disease Name:

- Cat scratch disease
- Cat scratch fever
- Bacillary angiomatosis
- Bacillary peliosis

### Priority Level:

- Scientific/Epidemiologic evidence regarding blood safety: Theoretical
- Public perception and/or regulatory concern regarding blood safety: Absent
- Public concern regarding disease agent: Very low

### Background:

- In 1909, A L Barton described organisms that adhered to RBCs.
- The name *Bartonella bacilliformis* was used for the only member of the group identified before 1993.
- Several other species of *Bartonella* are known to infect humans, but at present, *B. henselae* represents the most common infecting agent and the one of greatest concern.
- Stable in the population

### Common Human Exposure Routes:

- Primarily by the bite or scratch of cats harboring the bacterium
- Recent evidence suggests exposure to infected fleas and ticks may also play a role.

### Likelihood of Secondary Transmission:

- Unlikely

### At-Risk Populations:

- Persons of all ages at risk, but primarily occurs in children following rough play with cats.
- Immunocompromised persons more likely to have complications

### Vector and Reservoir Involved:

- Chronically infected cats

- Fleas and black-legged ticks (also called deer ticks) of the genus *Ixodes* may serve as vectors, but this has not been proven.

### Blood Phase:

- Agent found in endothelial cells and associated with RBCs in symptomatic cases
- Occult bacteremia sometimes occurs in the absence of specific antibodies.

### Survival/Persistence in Blood Products:

- A spiking study suggests that *B. henselae* added to RBCs can be recovered on solid media through 35 days of storage at 4°C.

### Transmission by Blood Transfusion:

- Theoretical

### Cases/Frequency in Population:

- 22,000 cases per year estimated in the US
- 2-6% in US blood donors
- Cumulative seroprevalence of 7.1% to *B. henselae* and *B. quintana* in US veterinary professionals

### Incubation Period:

- 3-10 days to appearance of papule at inoculation site; regional adenopathy may follow after a few weeks

### Likelihood of Clinical Disease:

- Relatively benign and self-limiting, lasting 6-12 weeks in the absence of antibiotic therapy

### Primary Disease Symptoms:

- Generally mild infection at point of injury and lymphadenopathy involving nodes around head, neck, and upper torso
- Fever, headache, fatigue, nausea and vomiting, sore throat, and poor appetite also occur. Symptoms may be intermittent or chronic with a waxing and waning course.

### Severity of Clinical Disease:

- More severe cases involve bacillary angiomatosis, Parinaud's oculoglandular syndrome, and endocarditis.

### Mortality:

- Unknown, but probably low

### Chronic Carriage:

- Only very limited data to suggest the possibility of persistence in humans
- Persists in many animals, including cats

**Treatment Available/Efficacious:**

- Immunocompetent patients usually do not require treatment, but immunocompromised patients should be treated with macrolide antibiotics (erythromycin, azithromycin, or clarithromycin) or doxycycline.

**Agent-Specific Screening Question(s):**

- No specific question is in use.
- Not indicated because transfusion transmission has not been demonstrated
- No sensitive or specific question is feasible.

**Laboratory Test(s) Available:**

- No FDA-licensed blood donor screening test exists.
- Unlicensed IFA and PCR available
- In immunocompetent at-risk persons, diagnosis of the agent is enhanced by combining PCR with pre-enrichment culture.

**Currently Recommended Donor Deferral Period:**

- No FDA Guidance or AABB Standard exists.
- Prudent practice would be to defer donor until signs and symptoms are gone and any course of treatment is complete.

**Impact on Blood Availability:**

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable

**Impact on Blood Safety:**

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable

**Leukoreduction Efficacy:**

- Unknown

**Pathogen Reduction Efficacy for Plasma Derivatives:**

- Specific data indicate that the multiple steps in the fractionation process are robust and capable of inactivating and/or removing bacteria at concentrations that may be present in plasma.

**Other Prevention Measures:**

- None

**Suggested Reading:**

1. Breitschwerdt EB, Kordick DL. *Bartonella* infection in animals: carriership, reservoir potential, pathogenicity, and zoonotic potential for human infection. *Clin Microbiol Rev* 2000;13:428-38.
2. Breitschwerdt ER, Maggi RG, Duncan AW, Nicholson WL, Hegarty BC, Woods CW. *Bartonella* species in blood of immunocompetent persons with animal and arthropod contact. *Emerg Infect Dis* 2007;13:938-41.
3. Chomel BB, Abbott RC, Kasten RW, Floyd-Hawkins KA, Kass PH, Glaser CA, Pederson NC, Kochler JE. *Bartonella henselae* prevalence in domestic cats in California: risk factors and association between bacteremia and antibody titers. *J Clin Microbiol* 1995;33:2445-50.
4. Chomel BB, Kasten RW, Sykes JE, Boulouis HJ, Breitschwerdt EB. Clinical impact of persistent *Bartonella* bacteremia in humans and animals. *Ann NY Acad Sci* 2003;990:267-78.
5. Koehler JE, Duncan LM. Case records of the Massachusetts General Hospital. Case 30-2005. A 56-year-old man with fever and axillary lymphadenopathy. *N Engl J Med* 2005;353:1387-94.
6. Magalhães RF, Pitassi LH, Salvadego M, de Moraes AM, Barjas-Castro ML, Velho PE. *Bartonella henselae* survives after the storage period of red blood cell units: is it transmissible by transfusion? *Trans Med* 2008;18:287-91.
7. McGill S, Wesslen L, Hjelm E, Holmberg M, Auvinen MK, Berggren K, Grandin-Jarl B, Johnson U, Wikström S, Friman G. *Bartonella* spp. seroprevalence in healthy Swedish blood donors. *Scand J Infect Dis* 2005;37:723-30.
8. Rolain JM, La Scola B, Liang Z, Davoust B, Raoult D. Immunofluorescent detection of intraerythrocytic *Bartonella henselae* in naturally infected cats. *J Clin Microbiol* 2001;39:2978-80.
9. Schulein R, Seubert A, Gille C, Lanz C, Hansmann Y, Piémont Y, Dehio C. Invasion and persistent intracellular colonization of erythrocytes: a unique parasitic strategy of the emerging pathogen *Bartonella*. *J Exp Med* 2001;193:1077-86.
10. Zangwill KM, Hamilton DH, Perkins BA, Regnery RL, Plikaytis BD, Hadler JL, Cartter ML, Wenger JD. Cat scratch disease in Connecticut: epidemiology, risk factors and evaluation of a new diagnostic test. *N Engl J Med* 1993;329:8-13.