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NEWSLETTER

Therapy of *Bartonella* Infection and Disease[©]

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Summer 2008

Vol. 7, Number 3

In This Issue:

The summer 2008 issue of the NVL newsletter will discuss the therapy of *Bartonella* infected cats. We will present ways to assess *Bartonella* therapy considering various treatment outcomes.

Clinical Aspects of *Bartonella* Therapy

Healthy Cats:

Since healthy cats do not show clinical inflammatory signs, evaluation of the elimination of *Bartonella* infection can only be accomplished using the therapy titration test.

Cats with Inflammatory *Bartonella* Diseases:

Many inflammatory diseases of cats have a polymicrobial etiology. That is, *Bartonella*, other bacteria, fungi and viruses can act together, in various combinations, to cause chronic inflammation in many organ systems. Follow-up evaluations of 7,086 treated cats with inflammatory diseases show that 80% had a greater than 50% improvement and 33% had total resolution of their diseases (Table 1).

Table 1
 Clinical Response of 7,086 Cats with *Bartonella* Diseases

% Clinical Improvement	Number of Cats	% of Cats Improved
Excellent 100%	2,370	33%
Excellent 80-99%	1,892	27%
Good 60-79%	735	10%
Fair 50-59%	712	10%
None <50%	1,314	19%
Worse	63	1%
Totals:	7,086	100%

Tables 2 and 3 present various clinical therapy scenarios that the practitioner may face when treatment of *Bartonella* infected diseased cats results in only partial clinical resolution. The tables give likely explanations for observed therapy outcomes and make recommendations as to further clinical protocols to follow.

Bartonella infected cats with inflammatory diseases can be evaluated for resolution of their clinical signs and for the elimination of *Bartonella* infection using the therapy titration test. The observation of clinical signs does not always correlate with the successful elimination of *Bartonella* infection. For example, a cat with severe gingivitis may show no clinical improvement even though antibiotic therapy has

eliminated *Bartonella* infection. In this case, the cause of the gingivitis was not due to *Bartonella* and *Bartonella* was only "in the background" in the cat. Cats that show 50-75% disease improvement, with a titer decrease, also probably have multiple causes of their disease.

Most often, cats with *Bartonella* inflammatory diseases, treated with azithromycin, rifampin, or doxycycline, will show significant clinical improvement of their disease (Table 1 & Figures 1 & 2).¹⁻⁴ However, we are often asked by practitioners what to do when a *Bartonella* infected cat with inflammatory disease does not respond fully, or at all, to antibiotic therapy. Tables 2 & 3 present a summary of the various scenarios that may occur when practitioners treat *Bartonella* infected cats with inflammatory diseases.

How to use Table 2: Evaluate the clinical response to therapy of the treated cat and go to the row corresponding to the % improvement observed. Choose the appropriate further therapy in the corresponding columns to the right.

Figure 1
 Gingivitis before therapy



Figure 2
 After therapy- 80% improved. See Table 2 rows 5 & 6 for further therapy.



Jan Corbishley, VT, Oradell Animal Hospital, Paramus, NJ

Table 2 Clinical Management of <i>Bartonella</i> Inflammatory Diseases		
Disease Improvement at End of 21 Days of Azithromycin Therapy	Veterinarian's Decision: Further Therapy Possibilities	Recommendations
1. No improvement	Assume <i>Bartonella</i> is not eliminated: Re-treat for <i>Bartonella</i> with rifampin for 21 days	Submit therapy titration test 6 months after initial 21 days of therapy
2. No improvement	Assume <i>Bartonella</i> is eliminated: Treat with other antibiotics- Clindamycin, Amoxicillin, etc. for 2 weeks	Submit therapy titration test 6 months after initial 21 days of therapy
3. 10-49% improved	Assume <i>Bartonella</i> is not eliminated: Re-treat for <i>Bartonella</i> with rifampin for 21 days	Submit therapy titration test 6 months after initial 21 days of therapy
4. 10-49% improved	Assume <i>Bartonella</i> is eliminated: Treat with other antibiotics- Clindamycin, Amoxicillin, etc. for 2 weeks	Submit therapy titration test months after initial 21 days of therapy
5. 50-99% improved	Assume <i>Bartonella</i> is not eliminated: Re-treat for <i>Bartonella</i> with rifampin for 21 days	Submit therapy titration test 6 months after initial 21 days of therapy
6. 50-99% improved	Assume <i>Bartonella</i> is eliminated: Treat with other antibiotics- Clindamycin, Amoxicillin, etc. for 2 weeks	Submit therapy titration test 6 months after initial 21 days of therapy
7. 100% resolved	No further therapy	Submit therapy titration test 6 months after initial 21 days of therapy
8. 100% resolved but disease recurred	Assume <i>Bartonella</i> is eliminated: Treat with other antibiotics- Clindamycin, Amoxicillin, etc. for 2 weeks	Submit therapy titration test 6 months after initial 21 days of therapy
9. 100% resolved but disease recurred	Assume <i>Bartonella</i> is not eliminated: Re-treat for <i>Bartonella</i> with rifampin for 21 days	Submit therapy titration test 6 months after initial 21 days of therapy

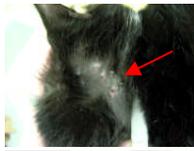


Figure 3
Dermatitis- papules before therapy.



Figure 4
After therapy- 90% improved. If there is a titer decrease-see Table 3 row 6- columns 3 and 4 to the right for interpretation and recommendation.

Dr. Patricia Burke, Tiogue Veterinary Clinic, Coventry, RI.

Bartonella Therapy- 8 Years

During our first 8 years of *Bartonella* testing, we have performed 9,782 therapy titration tests to determine elimination of infection in *Bartonella*-seropositive pet cats 6 months after treatment with: azithromycin (n=9,162), rifampin (n=469) and doxycycline (n=151). A 2 fold titer decrease occurred in 1,119 cats (11.4%) and a 4 fold or greater titer decrease occurred in 7,583 cats (76.5%). Thus, post therapy titer decreases (treatment success) occurred in 87.9% of *Bartonella*-infected cats. 78 of 88 (88.6%) *Bartonella*-seropositive dogs also had post therapy titer decreases (2 fold n=8, 4 fold or greater n=70). Antibiotic therapy of *Bartonella*-seropositive cats and dogs can be effectively monitored using a comparative WB titration test.

Disease Recurrence after Therapy:

Although we do not have accurate statistics for the recurrence of disease following *Bartonella* therapy, we estimate that approximately 15% of cats with inflammatory disease have some degree of recurrence following successful therapy. Most of these cats have a *Bartonella* titer decrease which suggests that the recurrence is due to something other than *Bartonella*.

Table 4
Disease Recurrence and Therapy Titrations: in 103 Cats

Therapy Titer Result	No.	%
Increase titer	8	8%
No titer decrease	14	13%
2 Fold titer decrease	26	25%
4 or > Fold decrease	55	54%

What Does a Positive *Bartonella* Test Mean?

Healthy cat: cat is infected but not showing any inflammatory disease.

Cat with Inflammatory Disease:

1. Cat is infected and *Bartonella* is the sole agent causing the disease or;
2. Cat is infected and *Bartonella* is the partial cause of the disease (polymicrobial disease) or;
3. Cat is infected and *Bartonella* is not the cause of any of the disease- *Bartonella* is "in the background" or;
4. Cat is NOT infected and the positive test (detection of antibody) is an indication of past infection. The cat cleared the infection before the test was taken. This is not common (~5%) as most cats remain infected for years, if not their entire lives.

Practitioner's Clinical Evaluation: Disease Improvement	Therapy Titration Test: <i>Bartonella</i> Infection Status	Evaluations Based on Clinical Response and Therapy Titration Test	Recommendations
1. No improvement	No titer reduction Still infected	Unsuccessful disease and <i>Bartonella</i> therapy	Retreat for <i>Bartonella</i>
2. No improvement	Titer reduction Infection eliminated	Unsuccessful disease therapy but successful <i>Bartonella</i> therapy. <i>Bartonella</i> is not the cause of disease	Retreat for other causative agent(s) with Clindamycin, Amoxicillin, etc. for 2 weeks
3. 10-49% improved	No titer reduction Still infected	Unsuccessful disease and <i>Bartonella</i> therapy	Retreat for <i>Bartonella</i>
4. 10-49% improved	Titer reduction Infection eliminated	Unsuccessful disease therapy but successful <i>Bartonella</i> therapy. <i>Bartonella</i> is not the cause of disease	Retreat for other causative agent(s) with Clindamycin, Amoxicillin, etc. for 2 weeks
5. 50-99% improved	No titer reduction Still infected	Partial successful disease therapy but unsuccessful <i>Bartonella</i> therapy. <i>Bartonella</i> is not the cause of disease	Retreat for <i>Bartonella</i>
6. 50-99% improved	Titer reduction Infection eliminated	Partial successful disease therapy and successful <i>Bartonella</i> therapy	Retreat for other causative agent(s) with Clindamycin, Amoxicillin, etc. for 2 weeks until totally resolved
7. 100% resolved	No titer reduction Still infected	Successful disease therapy but unsuccessful <i>Bartonella</i> therapy. <i>Bartonella</i> is not the cause of disease	Retreat for <i>Bartonella</i>
8. 100% resolved	Titer reduction Infection eliminated	Successful disease and <i>Bartonella</i> therapy. <i>Bartonella</i> was the cause of the disease	CELEBRATE!!
9. 100% resolved but disease recurred	No titer reduction Still infected	Unsuccessful disease and <i>Bartonella</i> therapy	Retreat for <i>Bartonella</i>
10. 100% resolved but disease recurred	Titer reduction Infection eliminated	Unsuccessful disease but successful <i>Bartonella</i> therapy. <i>Bartonella</i> is not the cause of the recurrence	Retreat for other causative agent(s) with Clindamycin, Amoxicillin, etc. for 2 weeks until totally resolved

How to use Table 3: Evaluate the clinical response to therapy of the treated cat and go to the row corresponding to the % improvement observed. In the column to the right, find the therapy titration result and follow the evaluations and recommendations in the last 2 corresponding columns.

Bartonella Re-infection

***Bartonella* treated cats can be re-infected by fleas or ticks after successful therapy. Thus, it is imperative that life-long flea control be instituted. We do not have a test that can determine if a cat has been re-infected. If you suspect that a cat has been re-infected the only option is to re-treat for presumed *Bartonella* infection.**

References:

1. Hardy, W.D., Jr., Zuckerman, E.E., Corbishley, J. *et al.* Successful therapy of *Bartonella henselae* bacteremic healthy pet cats. Annual Mtg, Infect Dis Society of America, New Orleans, September, 1996.
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3. Hardy, WD, Jr., Corbishley, J., & Zuckerman, E.E. Azithromycin therapy of *Bartonella*-infected cats with gingivitis and stomatitis. Am. Vet. Dental Soc. Meeting, Savannah, GA, October 2002.
4. Ketring, KL, Zuckerman, EE & Hardy, WD, Jr. *Bartonella*: A new etiologic agent of feline ocular diseases. JAAHA, 40: 6-12, 2004.