

Bordetella in Squirrels

In the last decade, rehabilitators have reported an increase in the number of squirrels in rehabilitation dying unexpectedly and suddenly with few symptoms and no obvious causes such as trauma or aspiration. *Bordetella* has been confirmed by lab tests in some cases and rehabilitators believed it was responsible for more fatalities. Quickly identifying and treating this serious and contagious respiratory condition improves the animal's chance of recovery and decreases spread of the infection.

Bordetella bronchiseptica is a gram-negative bacterium, commonly found in the respiratory system. It is part of the normal respiratory flora in its non-pathogenic form. The virulent or disease causing form can be activated in animals with compromised health, or by the presence of stressors such as overcrowding, transportation, poor ventilation and other factors. Secondary infections may develop.

Bordetella is a highly contagious bacterium, whose victims include dogs ('kennel cough'), cats, rabbits, and pet rodents. Transmission may be airborne or by direct contact. This includes accidental transfer of bacteria on a caregiver, cage, feeding instruments, etc. Incubation is believed to be 2 to 14 days. Although *Bordetella* infection is not commonly described as zoonotic, some wildlife rehabilitators caring for squirrels with *Bordetella* developed respiratory symptoms, several of which were confirmed as cases of *Bordetella*.

Symptoms of *Bordetella* infection in squirrels include:

- Rapid onset of symptoms.
- Lethargy and weakness.
- Refusal to eat and/or fight attempts to feed, likely due to respiratory difficulty.
- Profuse, frequent urination, sometimes involuntary. While profuse urination often is mentioned in squirrel cases, it has not been mentioned as a common symptom in other species. The profuse urination could be a secondary condition to this infection or another disease process.
- Moderate to high fever.
- Rapid and significant dehydration and weight loss, likely due to profuse urination, fever and difficulty eating.
- A variety of respiratory conditions, which can include sneezing, audible breathing, difficult or oppressed respiration, gagging or coughing. Although respiratory difficulties are not uncommon with squirrels that have aspirated, the profuse urination that has often preceded the visible respiratory symptoms has been very different.

Due to *Bordetella*'s highly contagious nature, rehabilitators are urged to follow strict quarantine and sanitation protocols. Rehabilitators have reported that an orphan squirrel admitted to rehabilitation appeared reasonably healthy on admission but quickly became dehydrated, refused to eat, possibly sneezed, and then died with 24 to 48 hours. Unless strict quarantine was observed for 14 days, exposure may have occurred before the new animal showed symptoms.

Antibiotics, particularly Bactrim (e.g., TMP, SMZ) and Baytril™, have been effective in treating *Bordetella* infections in rodents when used for 14-21 days (many cases

required 21 days). Doxycycline is the antibiotic of choice for dogs and cats and may be used in rabbits, squirrels, and other rodents. Nebulizers were also used for some cases. Since antibiotic treatment often disrupts gut flora, concurrent administration of probiotics may be needed.

A few rehabilitators and veterinarians have treated *Bordetella* infections in rodents with Nuflor, a next generation Chloramphenicol (antibiotic) approved for use with livestock. Nuflor is an off-label use for non-livestock patients and could cause unforeseen side effects. Since it may cause injection site reactions, oral administration has been preferred. Some veterinarians have prescribed it for wildlife since it is only used for 2 doses (loading dose and second after 48 to 72 hrs). Nuflor needs to be handled with extreme care and highly diluted due to potential risks.

Some rehabilitators also have used classical homeopathy and reported positive results, especially when giving the homeopathic remedy *Phosphorus 200c* to treat the active symptoms (e.g., TID for 4-5 days) or *Phos 30c* SID for 7 days on a prophylactic basis to help prevent animals that had been exposed from developing the infection. Some rehabilitators have used an antibiotic and homeopathic *Phos*.

Supportive care is essential, such as limiting activity by keeping in a small cage, providing supplemental heat, ensuring good nutrition, and minimizing stressors such as noise. Use effective hydration protocols with isotonic fluids to avoid dehydration.

As always, consult promptly and closely with a veterinarian on diagnostics and treatments.

Resources

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Authors

Shirley Casey, WildAgain Wildlife Rehabilitation, Inc. in Evergreen, CO is co-author of the *Squirrel Rehabilitation Handbook*. She has published and presented widely on wildlife rehab topics. www.ewildagain.org

Mackenzie Goldthwait, DVM of Denver, Colorado, graduated from Tufts University School of Veterinary Medicine in 1989, with special interest in wildlife medicine. She has extensive experience with wildlife, exotics and small animals. She has been involved in writing for and training rehabilitators.

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