

HEARTWORM

By Leslie Manis, Health/Genetics Chairman, ASTC

[Every effort has been made to ensure accuracy of information. However, this is not a substitute for prompt veterinary care. Any similarity to other publications is unintentional. Published online at Sealyhealthguard.org, 5/10/12]

Dr. Betsy Sigmon, founder of Creature Comfort Veterinary Hospital, discussed heartworms in a recent CHF podcast. Heartworm is caused by a filarial nematode, *Dirofilaria immitis*. It is a roundworm, a bloodborne parasite.

It requires two hosts, an intermediate (mosquito), where the larvae live for a short transition period in order to become infective (capable of causing disease). They reach maturity and reproduce inside the definitive host (a mammal, such as a dog, raccoon, coyote). Heartworms can affect over 30 mammalian species, rarely people. Dogs are the preferred host.

Signs: Heartworm disease can be silent for 2-3 years. It begins with signs of heart failure—a cough, lethargy, weight loss. When it becomes advanced, symptoms include difficulty breathing, exercise intolerance, distended belly. An adult heartworm can grow up to 12” long.

Diagnosis: Blood test (antigen test). There is a kit available for the veterinarian to use in the office. The kit shows negative or positive results, but only as of 6 months prior to the test. For example, if you test a rescue dog with an unknown history in June, a negative test means it is negative up to the previous January. It could have immature worms in it, so must be tested again in 6 months to be clear. Then the dog may be tested once a year if it is on monthly prevention.

Treatment: Most veterinarians recommend puppies begin heartworm prevention, such as Heartguard, at six months of age. Then the vet will test for heartworm beginning at age one at the dog’s annual exam. Most heartworm preventives are over 95 percent effective. There are topical, oral and even injectible products, all with similar effectiveness. They must be prescribed by a veterinarian for proper dosage. The most common reasons for loss of effectiveness are improper dosage and infrequent dosage. It is important to give the monthly preventive every 30 days rather than once a month (a dose April 1 then May 25 is much different than April 1 and May 1).

The environment has to be 57 degrees or higher and takes 8 days or longer for a mosquito to bite a positive animal then transmit larvae at the proper age to infect another animal. As the temperature cools, it takes the mosquito longer to be able to transmit them (longer time for heartworm larvae development). When there are a lot of warm days during the winter, it’s much riskier to withhold heartworm preventive during the winter months. Dr. Sigmon strongly recommends giving heartworm prevention all year round.

Heartworm is such an easily prevented disease, and our preventives are so effective, it's easy to become complacent. John W. McCall, MS, PhD, Professor Emeritus in the Dept. of Infectious Diseases at the University of Georgia's College of Veterinary Medicine says that heartworm disease continues to spread throughout the United States for several reasons:

- ⤴ Relocation of heartworm-positive dogs, especially after Hurricane Katrina in 2005;
- ⤴ Natural and man-made environmental changes, leading to more breeding sites for mosquitoes and resulting in an increase in mosquito populations;
- ⤴ Introduction of non-native mosquito species, and native mosquito species expanding their territories;
- ⤴ Enlarging pool of unprotected canid populations, for example, pet dogs that are not on heartworm prevention and wild canids, such as coyotes which are very susceptible to heartworms. The more animals carrying heartworms, the more likely heartworm disease will spread.

Medication Shortage: Until about seven months ago (mid-2011), veterinarians were treating heartworm with Immiticide by Merial (melarsomine dihydrochloride). It was an arsenical product and was very effective. Many of you may not realize that on August 4, 2011, Merial announced that there was an Immiticide shortage. It was the only heartworm adulticide approved by the US FDA for use in dogs. Immiticide hit the market in 1996. Notice of the shortage caused a run; by August 9, Merial was officially "out" of the drug.

The US supplier could no longer produce the active ingredient. The FDA was reluctant to allow Merial's plant in Brussels to fill American orders. The situation "related to technical issues providing finished product to us. The finished product is made by a manufacturing company in the US," explains Natasha Mahanes, a Merial spokesperson. On September 30, the FDA announced that it would allow Merial to import limited quantities of Immiticide from a European supplier to address concerns over a shortage of the drug. The FDA says this is temporary while Merial works out technical issues in the US plant.

The European supplier is an approved source of the product for international markets, but only has a limited supply for importation to the US. It will only satisfy a fraction of the US demand. It will only be available through a restricted distribution program directly from Merial. Veterinarians treating only severe cases of heartworm disease could access the drug on a case-by-case basis with approval from the company.

Some rescue organizations have had trouble placing dogs with a positive heartworm test since Immiticide has become unavailable.

Alternative Treatment: Without Immiticide, veterinarians must now treat adult heartworm by giving an antibiotic, usually Doxycycline, plus monthly heartworm preventive. This treatment lasts 60-90 days. It prevents future infections and the worms

will die in 2-3 years. They do not have a way to kill the adult heartworms. The risks with this treatment are a chance of reaction and producing drug resistance.

Previously, when a dog had problems during heartworm treatment, it was thought to be a reaction to the worms. Recently, it has been discovered it is a reaction to a bacteria that lives inside the heartworms. This bacteria is called *Wolbachia*. It is in the family Rickettsiales. It does not live outside the host, and seems to be necessary for many filarial nematodes, including heartworm, to develop, reproduce and survive long-term in the definitive host. When a worm dies inside of the host, *Wolbachia* are released in massive numbers from the nematode's cells, exposing the host to the bacteria.

A protein found on the surface of the bacteria, called the *Wolbachia* surface protein or WSP, may cause the dog's body to mount a specific immune response. This response may worsen the heartworm disease. Researchers think this may also worsen the lung and kidney inflammation seen in dogs with heartworm disease.

As you can see, it's so important to take good care of our dogs & prevent this terrible disease.

For more information:

Heartworm life cycle:

<http://www.heartwormsociety.org/pet-owner-resources/canine.html>

Parasite prevalence maps:

<http://www.capcvet.org/parasite-prevalence-maps/>

Heartworm FAQ:

http://www.cardiologycarenetwork.org/network/vet_FAQs.php#Group4

Sources:

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<http://antechdiagnostics.com/Main/AntechNews/36.aspx>

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<http://www.fda.gov/AnimalVeterinary/NewsEvents/FDAVeterinarianNewsletter/ucm210100.htm>

<http://www.critterology.com/articles/wolbachia-and-their-role-heartworm-disease-and-treatment>

<http://www.svg-vets.com/heartworm.htm>

<http://www.caninegeneticdiseases.net/DM/ancmntDM.htm>

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