

Heartworm Disease: A Global Problem

Wellness Pages from 2008 (updated), by Jennifer Ng, DVM

Heartworm disease occurs in many countries. In the U.S, heartworms have been reported in all 50 states, although it is more common in the warmer, humid areas, such as the Southeast, Gulf Coast, and Mississippi River Valley. Many of the dogs rescued after Hurricane Katrina were transported all over the country to new homes. A large number of these dogs carried heartworms with them, and heartworm transmission has been documented in all states except Alaska.

As its name implies, heartworms are parasites that reside in the heart of their host. They are more often found in the pulmonary arteries, which carry blood to the lungs for oxygen, but in dogs with a large number of heartworms, the heart itself can be filled with a mass of the spaghetti-like worms. Heartworms are most commonly found in dogs, which are their natural, or definitive host, but they can also infect other species such as cats, ferrets, and wild canids.

Heartworm Life Cycle

Heartworms undergo a complex life cycle which requires mosquito transmission. Adult heartworms living in a dog's heart and pulmonary arteries produce offspring called microfilariae that circulate in the dog's bloodstream. Mosquitoes feeding on an affected dog pick up these microscopic microfilariae. The microfilariae develop into a more mature larval stage within the mosquito, which are then transmitted to a new host when the mosquito feeds again.

Once these microscopic heartworm larvae enter their host, they continue to mature within the animal's soft tissues, migrate into the circulatory system, and travel to the heart and pulmonary arteries. This whole process takes about 6 months for the worms reach adult stage and begin producing microfilariae. The natural lifespan of a heartworm is 5-7 years in the dog.

Clinical Signs

Heartworms cause a chronic inflammatory process that damages the host's heart and lungs. The severity of disease depends on the number of worms and the dog's activity level. More activity leads to greater blood flow, which contributes to more damage to the heart and lungs. Dogs often show no outward signs of heartworm infection until the disease is quite advanced. Symptoms include coughing, tiring easily, decreased appetite, and weight loss. Dogs with severe disease may develop congestive heart failure. Dogs with a large number of worms may show signs of systemic shock with a condition called caval syndrome, where worms back up out of the heart into the vena cava, the large vessels bringing blood back to the heart.

Prevention

Heartworm disease is one that is much easier to prevent than to treat. While there is no way to completely prevent mosquitoes from transmitting heartworm larvae to your dog, the immature larvae can effectively be killed before developing into adult heartworms. Most heartworm preventatives available today are prescription products that are given either orally or topically on a monthly basis, and also protect against a variety of other internal and external parasites. The oral products include Heartgard®, Interceptor®, Sentinel®, and Trifexis™, as well as a number of generic formulations similar to Heartgard. The topical products are Revolution® and Advantage Multi®. There is also an injectable preventative, Proheart-6®, given every 6 months, which is only available on a restricted basis pending FDA re-approval.

For dogs who have not been on prevention, a heartworm test should be performed to check for an existing heartworm infection. Contact your vet to schedule a test and get more information about the preventative options available. Greyhounds have a reputation for being sensitive to medications, but none of the heartworm preventatives have been found to cause problems in the breed. As with any medication, individuals may develop reactions to specific products.

Testing

Heartworm infections are diagnosed through blood tests performed by your veterinarian. The currently available tests only detect adult heartworms, so a dog will not come up positive until roughly 6 months after the bite from an infected mosquito. There are 2 main types of heartworm tests used in dogs. Antigen tests detect proteins produced by adult female heartworms, and microfilariae tests identify circulating microfilariae in the bloodstream.

It is best to test for heartworms yearly, even when giving heartworm prevention consistently, especially in high-risk areas like the Southeast. Just like birth control, heartworm prevention is not always 100% effective. Because dogs may not show any signs of illness in the early stages of heartworm disease, it can be diagnosed much sooner if a test is run on a regular basis.

Treatment

If your dog does become infected with heartworms, there are effective treatment options, especially if the infection is caught early. The recommended treatment for most dogs involves injections with an arsenical compound, Immiticide®, to kill the adult worms. Following the injections, a strict rest period of at least a month is key to reducing the risk of complications.

However, heartworm treatment is not without risk. Prior to proceeding with treatment, it is best to do bloodwork and chest X-rays to assess the dog's overall health and stage of heartworm disease. If significant problems are found, the dog may not be a good candidate for Immiticide treatment right away, or at all.

Even if treatment is not an option, whether for medical or financial reasons, all dogs with heartworm disease should be started on Heartgard as soon as possible. Heartgard is safe for the majority of dogs with heartworms and will prevent infection with even more worms. Studies have also shown that Heartgard shortens the lifespan of the existing adult worms, from the normal 5-7 years, to only 18-24 months. However, in dogs who are good candidates for Immiticide treatment, Heartgard alone is not recommended because the worms continue to do damage to the heart and lungs as long as they are present.

A newer addition to the heartworm treatment protocol is use of the antibiotic, Doxycycline. Research has shown that heartworms often live with, and benefit from, bacteria called *Wolbachia*. Eliminating the bacteria with Doxycycline weakens the heartworms, shortening their lifespan and making them more susceptible to treatment.

One of the serious consequences of heartworms is pulmonary thromboembolism (PTE), or a clot in the lungs, which can be fatal. This risk of PTE is increased when heartworms die and break down. It is a potential complication following heartworm treatment, but PTE can happen at any time in dogs with heartworms as the worms die naturally as well. Given the serious nature and potentially deadly consequences of heartworm disease, many vets are now recommending year-round heartworm prevention for all dogs, not just those in high-risk areas.