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Heartworm

Issue Description

Heartworm is a parasitic roundworm that is spread from host to host through the bites of mosquitoes. The heartworm is a type of filaria, a small thread-like worm. The definitive host is the dog but it can also infect cats, wolves, coyotes, foxes and other animals, such as ferrets, sea lions and even, under very rare circumstances, humans. The parasite is commonly called "heartworm" because the adult reproductive stage of its life cycle resides primarily in the right atrium of its host where it can live for many years. Heartworm infection may result in serious disease for the host; infected dogs that are untreated may die and treatment also has risks. The best defense against heartworm disease is the use of prophylactic treatment given monthly.

Other Names

Dirofilaria Immitis

Causes

Although at one time confined to the southern United States, heartworm has now spread to nearly all locations where its vector, the mosquito, is found. Transmission of the parasite occurs in all of the United States (except Alaska) and the warmer regions of Canada. The highest infection rates are found within 150 miles of the coast from Texas to New Jersey, and along the Mississippi River and its major tributaries. It has also been found in South America, Southern Europe, Southeast Asia, the Middle East, Australia, and Japan.

Symptoms

Dogs show no indication of heartworm infection during the 6 month long prepatent period prior to the worms' maturation, and current diagnostic tests for the presence of microfilariae or antigens cannot detect prepatent infections. Rarely, migrating heartworm larvae get "lost" and end up in unusual sites such as the eye, brain, or an artery in the leg, which results in unusual symptoms such as blindness, seizures and lameness.

Many dogs will show little or no sign of infection even after the heartworms have matured. These animals usually have a light infection and live a fairly sedentary lifestyle. However, active dogs and those with heavier infections may show the classic signs of heartworm disease. Early signs include a cough, especially on exercise and early exhaustion upon exercise. More advanced cases progress to severe weight loss, fainting, coughing up blood and, finally, congestive heart failure.

Diagnosis

A blood test to detect the antigens released from the female reproductive tract is the most common method of diagnosis. The specificity of these tests is close to 100 percent and the sensitivity is more than 90%. False negative tests can result from low worm counts, immature infections and all male infections. Heartworm positive dogs should also be tested for the presence of microfilariae, usually using a concentrating filter test. X-rays are used to evaluate the amount of lung damage caused by the presence of heartworms.

Treatment

If an animal is diagnosed with heartworms, treatment may be indicated. Before the worms can be treated, however, the dog must be evaluated for heart, liver, and kidney function to evaluate the risks of treatment. Usually the adult worms are killed with an arsenic-based compound. The currently approved drug in the US, melarsomine dihydrochloride, is marketed under the brand name Immiticide. It has a greater efficacy and fewer side effects than previously used drug (thiacetarsamide sodium, sold as Caparsolate) which makes it a safer alternative for dogs with late-stage infections.

After treatment, the dog must rest (restricted exercise) for several weeks so as to give its body sufficient time to absorb the dead worms without ill effect. Otherwise, when the dog is under exertion, dead worms may break loose and travel to the lungs, potentially causing respiratory failure and death. According to the American Heartworm Society, use of aspirin in dogs infected with heartworms is no longer recommended due to a lack of evidence of clinical benefit and may be contraindicated. It had previously been recommended for its effects on platelet adhesion and reduction of vascular damage caused by the heartworms.

The course of treatment is not completed until several weeks later when the microfilariae are dealt with in a separate course of treatment. Once heartworm tests are negative, the treatment is considered a success.

Surgical removal of the adult heartworms is also a treatment that may be indicated, especially in advanced cases with substantial heart involvement.

Long term monthly administration of ivermectin (but apparently not moxidectin, milbemycin or selamectin) year round for at least three years at the dose normally used for heartworm prevention may kill adult heartworms. However, this is not the treatment of choice for removal of adult heartworms for two reasons. First, this treatment is not as effective as melarsamine. More importantly, adult heartworms do not begin to die until some 18 months of treatment have elapsed, which is not acceptable under most circumstances.

Prevention

Prevention of heartworm infection can be obtained through a number of veterinary drugs. The drugs approved for use in the US are ivermectin (sold under the brand name Heartgard and several other generic versions), milbemycin (Interceptor and Sentinel) and moxidectin (ProHeart) administered as pills or chewable tablets. These drugs should be given monthly throughout the entire year. Moxidectin is also available in both a 6-month and 12-month sustained release injection, ProHeart 6, ProHeart 12, administered by veterinarians. The injectable form of moxidectin was taken off the market in the United States due to safety concerns. ProHeart 6 remains on the market in many other countries including Canada and Japan. Its sister product, ProHeart 12 is used extensively in Australia and Asia as a 12-month injectable preventive. Topical treatments are available as well. Advantage Multi (imidacloprid + moxidectin) Topical Solution, which utilizes moxidectin for control and prevention of roundworms, hookworms, heartworms, whipworms, as well as imidacloprid to kill adult fleas. Selamectin (Revolution), is a topical preventive that is likewise administered monthly and also controls fleas, ticks, and mites.

Preventive drugs are highly effective and when regularly administered will protect more than 99 percent of dogs and cats from infection. Most failures of protection result from irregular and infrequent administration of the drug. However, the monthly preventives all have a reasonable margin for error in their administration such that if a single month's dose is accidentally missed, adequate protection is usually provided so long as the next two monthly doses are administered on schedule.

Heartworm prevention for cats is available as ivermectin (Heartgard for Cats), milbemycin (Interceptor), or the topical selamectin (Revolution for Cats).

Monthly heartworm prevention should be administered every month throughout the entire year. No matter what the season, it is essential for all pet owners to continue heartworm preventative every month. Mosquitos can bite at any time and remember that it only takes one bite.

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