

**Prince Frederick Animal Hospital
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CANINE HEARTWORM DISEASE

Introduction

Heartworms are parasites, which primarily infect dogs. They are transmitted from dog to dog by the bite of mosquitoes. A dog infected with heartworms has adult worms up to 14 inches long living in the heart. If the worms are not removed, they can cause permanent heart damage, pneumonia, and even death. The adult worms remain in the heart and produce baby heartworms known as microfilariae. Microfilariae circulate throughout the bloodstream, where they can be picked up by mosquitoes. An infected mosquito can then introduce microfilariae into another dog's blood. These larval heartworms then make their way to the newly infected dog's heart, grow into adults, and start the cycle again by producing more baby heartworms. Heartworm infected dogs, therefore, serve as a reservoir for infection of other dogs in the area.

Symptoms

It is the adult heartworms living and growing in the heart that cause the most problems for the infected dog. Obstruction of blood flow through the heart can cause coughing, fluid accumulation in the abdomen, listlessness, weakness, weight loss, and heart failure. Many dogs with early infections will show no signs at all. The microfilariae circulating through the blood can also cause adverse reactions if certain "deworming" medications are given inappropriately. Heartworm preventative medication, given to a dog that has microfilariae, can cause serious, sometimes fatal, complications.

Heartworm Testing

A quick microscopic exam of a dog's blood can reveal the presence of heartworm microfilariae. A biochemical "antigen" blood test is used to detect adult female heartworms, even if no microfilariae are found. Both tests can be run from the same small sample of blood taken from a dog's vein. The combination of these two tests is, in most cases, effective in confirming or ruling out an infection with heartworms.

Treatment

The elimination of heartworms from infected dogs involves several steps, both at home and in the hospital. A dog which tests positive for heartworms should have a complete physical examination and have a fecal checked for hookworms, whipworms, and roundworms. A dog should be current on vaccinations and have intestinal parasites treated before being admitted to the hospital and beginning heartworm treatment.

The dog is usually hospitalized for 4 days of treatment and observation. Treatment consists of a series of injections of a medicine which kill the adult worms. The heartworms die slowly and are gradually dissolved by the body over a period of 3-4 weeks. Occasionally fever and listlessness may develop and require additional medical attention. Owners are encouraged to call periodically for updates during hospitalization.

Following the initial hospitalization the dog will be sent home to recover. The owner should check the dog's rectal temperature once a day for an additional 4 days, and call us if the temperature exceeds 102.5 F. *It is very important that the dog be kept as quiet as possible during the convalescent period!* Vigorous exercise and excitement cause large movements of dead heartworms from the heart to the lungs causing serious complications and even death.

Three weeks after the initial hospitalization the dog will be admitted for a one day visit. A medication will be given to kill microfilariae (larvae) which remain after the adults are killed. Following the second part of the heartworm treatment, the patient undergoes two heartworm tests. The first test is done after 3 weeks to test for microfilaria. The second test is done after 3 months to test for adult heartworms. If the first test is negative the dog can be safely started on heartworm preventatives. Two negative tests indicate a complete elimination of heartworms.

Heartworm Prevention

Preventing heartworm infection is much easier, safer, and less costly than heartworm treatment! Dogs in our area should be given a medication year round to prevent the development of adult heartworms, even if an infected mosquito bites the dog. Heartworm preventative medications are available in forms to be dosed on a monthly or daily basis depending on the owner's needs and preferences. The recommended products are summarized below:

Heartgard Tablets	Nonchewable	Monthly	
Heartgard Plus	Chewable	Monthly	also prevents hookworms, and roundworms
Interceptor	Chewable	Monthly	also prevents hookworms, roundworms and whipworms

All heartworm preventatives are prescription drugs and require that a dog be examined prior to dispensing the medication. Additionally, all dogs older than six months must have a heartworm test before being started on preventatives. An accurate body weight is also required to assure that the dog receives the proper dosage of the medication. Yearly physical examinations including annual heartworm and fecal checks are recommended to assure the dog remains healthy and parasite free.

Heartworm Treatment

Heartworm treatment is divided into 4 phases. In addition to the treatment, we recommend some initial tests. These tests assess for damage already done by the heartworms, plus help plan the course of treatment. These initial tests may be done when the dog is dropped off for phase 1 of treatment, or may be done on an earlier day.

Workup and Phase 1: We start by doing blood, urine, and x-ray testing. These tests may be done the day before the treatment is started, or done on an entirely separate day. Based on the test results, a heartworm treatment protocol will be recommended. Most of the time, the dog stays here at the hospital for 5 days. This first treatment consists of two injections that initiate the kill of the adult heartworms. The most common side effects during the first 4 days are vomiting, diarrhea, muscle aches, and fever.

Cost=General Health Profile/Electrolytes/CBC/Urinalysis dipstick and sediment/ 2 xrays/5 days hospitalization/1 bottle of Immiticide per 20 lb of dog=_____.

Phase 2: Three weeks later, the dog stays here at the hospital for 1 day. This treatment consists of an oral medication that kills the circulating baby heartworms. Rarely a dog may go into shock if there are a lot of baby heartworms that die all at once.

Cost=Oral Ivermectin/1 day hospitalization=_____.

Phase 3: Three weeks later, schedule an appointment to have your dog tested for baby heartworms. If the test is negative, your dog may be started on monthly heartworm preventative.

Cost=Recheck appointment/Knott's test/Heartworm preventative=_____.

Phase 4: Three months later, schedule an appointment to have your dog tested for adult heartworms. If the test is negative, your dog should stay on monthly heartworm preventative and have a yearly heartworm test.

Cost=Recheck appointment/Heartworm Occult test=_____.