

HEARTWORM DISEASE

What causes heartworm disease?

Heartworm disease (dirofilariasis) is a serious and potentially fatal disease in dogs. It is caused by a worm called *Dirofilaria immitis* that actually live in the heart and large adjacent vessels of infected dogs. The female worm is six to 14 inches (15 to 36 cm) long and 1/8 inch (5 mm) wide, the male is about half the size of the female. One dog may have as many as 300 worms.

How do heartworms get into the heart?

Adult heartworms live in the heart and pulmonary arteries of infected dogs & can survive for up to 5-7 years. During this time, the female produces millions of young (microfilaria). These microfilaria live in the bloodstream, mainly in the small blood vessels. The immature heartworms cannot complete the entire life cycle in the dog; the mosquito is required for some stages of the heartworm life cycle. The microfilaria cannot grow to adulthood in the dog – although they do cause problems.

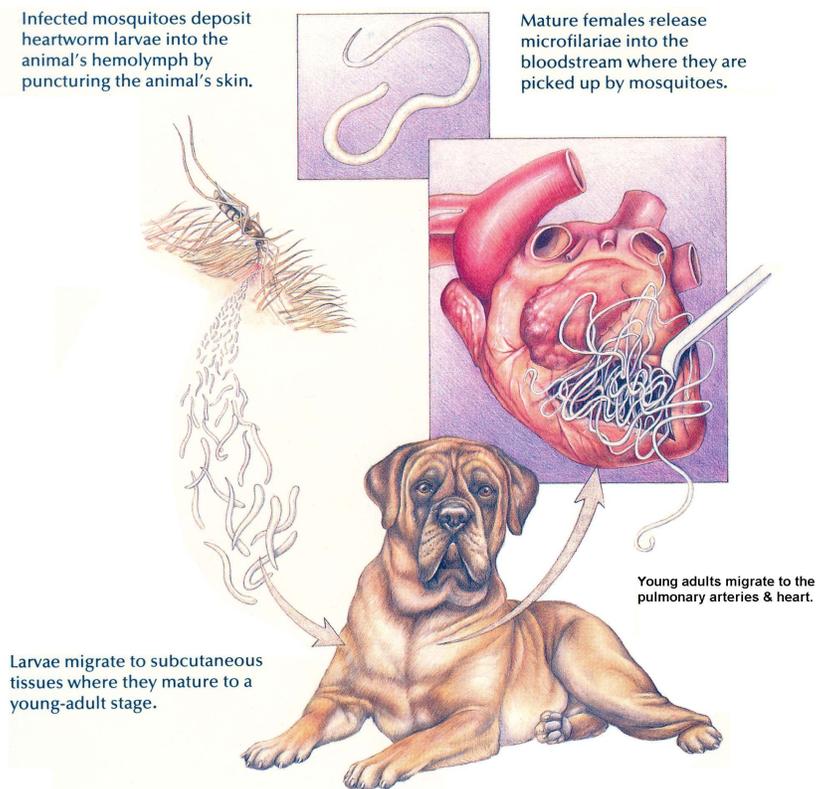
The female mosquito bites the infected dog and ingests the microfilaria during a blood meal. The microfilaria continue to develop for 10 to 30 days in the mosquito and then enter the mouthparts of the mosquito. The microfilaria are now called infectious larvae because at this stage of development, they will grow to adulthood when they enter a dog. The mosquito bites the dog and transmits the infectious larvae.

The infectious larvae enter the bloodstream and move to the heart and adjacent vessels, where they grow to maturity in two to three months and start reproducing, thereby completing the full life cycle.

What do heartworms do to the dog?

Adult worms: Adult worms cause disease by clogging the heart and major blood vessels leading from the heart. They interfere with the valve action in the heart and over time can permanently damage the heart. By clogging the main blood vessels, the blood supply to other organs of the body is reduced, particularly the lungs, liver and kidneys, leading to malfunction of these organs.

Most dogs infected with heartworms do not show any signs of disease for as long as two years. Unfortunately, by the time signs are seen, the disease is well advanced. The signs of heartworm disease depend on the number of adult worms present, the location of the worms, the length of



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time the worms have been present, and the degree of damage to the heart, lungs, liver, and kidneys from the adult worms and the microfilaria.

The most obvious signs are a soft, dry, chronic cough, and shortness of breath, weakness, nervousness, listlessness, and loss of stamina. All of these signs are most noticeable following exercise, when some dogs may even faint.

Listening to the chest with a stethoscope will often reveal abnormal lung and heart sounds. In advanced cases, congestive heart failure may be apparent and the abdomen and legs will swell from fluid accumulation. There may also be evidence of weight loss, poor condition, and anemia.

Severely infected dogs may die suddenly during exercise or excitement.

Microfilaria (Young worms): Microfilaria circulate throughout the body but remain primarily in the small blood vessels. Because they are as wide as the small vessels, they may block blood flow in these vessels. The body cells being supplied by these vessels are deprived of the nutrients and oxygen normally supplied by the blood. The lungs and liver are primarily affected.

Destruction of lung tissue leads to coughing. Cirrhosis of the liver causes jaundice, anemia, and general weakness because this organ is essential in maintaining a healthy animal. The kidneys may also be affected and allow poisons to accumulate in the body.

How is heartworm infection diagnosed?

Diagnosis of heartworm disease is made by a blood test that is done the veterinary hospital. Further diagnostic tests are needed to determine if the dog can tolerate heartworm treatment.

How are dogs treated for heartworms?

There is some risk involved in treating dogs with heartworms, although fatalities are rare. The newer drug available does not have the toxic side effects of the old ones and has a success rate of 95%. Dogs that have been off of preventative for a long time may need to repeat treatment if they test positive after treatment. This is due to the fact that the drug only kills adult worms not the developing infectious larvae.

Treatment to kill adult worms: An injectable drug to kill adult heartworms is given for two days. It kills the adult heartworms in the heart and adjacent vessels. Dogs with more advanced heartworms may need to have the treatment stretched out over a 1-month period.

Complete rest is essential after treatment: The adult worms die in a few days and start to decompose. As they break up, they are carried to the lungs, where they lodge in the small blood vessels and are eventually reabsorbed by the body. This can be a dangerous period so it is absolutely essential that the dog be kept quiet and not be allowed to exercise for one month following treatment. A cough is noticeable for seven to eight weeks after treatment in many heavily infected dogs.

Prompt treatment is essential if the dog has a significant reaction in the weeks following the initial treatment, although such reactions are not common. If a dog shows loss of appetite, shortness of breath, severe coughing, coughing up blood, fever, and/or depression, you should

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notify us. Response to antibiotics, cage rest, and supportive care, such as intravenous fluids, is usually good in these cases.

Treatment to kill microfilaria: Approximately 1 month following treatment to kill the adults, the dog is returned to the hospital for administration of a drug to kill microfilaria. Your dog needs to stay in the hospital for the day.

Are changes made in the treatment protocol for dogs that have severe heartworm disease?

Yes. The state of heart failure is treated as described above. However, we also treat the adult heartworms in a two-stage process. Only one treatment with the drug to kill the worms is given initially. This causes the death of some of the worms. One month later, the full treatment is given to kill the remaining worms. By killing them in two stages, the severe effects on the lungs are much less likely to occur.

How can I prevent this from happening again?

When a dog has been successfully treated for heartworms, you cannot sit back and relax because dogs can be re-infected. Therefore, it is essential to begin a heartworm prevention program. There are three drugs that can be used to prevent heartworm infection. One is a daily, chewable tablet; the others are chewable tablets that are given only once monthly. All three products are very safe and very effective. Their costs are essentially identical. One of these should be started immediately after the treatment is completed.