MER BLEUE
Veterinary Hospital

Heartworm disease- What you need to know living in eastern Ontario

What exactly is heartworm disease?

Heartworm, also called Dirofilariasis, is a parasite which resembles a thin long white worm. Dogs and their cousins (foxes, coyotes, wolves) are considered the main host for this parasite. Cats can be infected, but they are more resistant.

A dog becomes infected with heartworm by being bitten by a mosquito. The mosquito will initially bite another dog who has heartworm. When taking their blood-meal the mosquito will also ingest the heartworm larva (an immature stage of the parasite). These larvae are so small, they can only be seen through a microscope.

The mosquito is an essential part of the heartworm's life cycle, since the larva can only mature once inside of the mosquito. The larva will go through two molts inside of the mosquito, from stage 1 larva (L1) into stage 3 larva (L3). It is only the L3 which can be passed to a dog.

The entire maturation process (L1 to L3) takes 10 to 18 days, depending on the temperature. Since mosquitoes are cold-blooded creatures, their body temperature is the same as their surroundings. When the environment hits below 14 degrees Celsius, so does that of the mosquito and the heartworm larva's maturation is paused.

If the temperature is ideal and the larva is able to mature to stage 3, when the mosquito bites a dog, the larva will hitch a ride into the dog during the exchange of fluid between the mosquito and the dog's bloodstream. Once in the dog, the heartworm larva will further mature through another two molts, into stage 5 larva (L5). At this point, the larva will travel through the bloodstream and find its way into the arteries of the heart. It takes about 5 months for the stage 5 larva to become a fully mature adult and 6-7 months before it starts to produce its own offspring (stage 1 larva; L1).

Thanks for that mental picture, but what does Heartworm do to my canine friend?

Once the adult worm has found its home in the arteries of the heart, it will attach itself to the inside wall of the artery to feed on blood. This attachment will lead to inflammation of the artery. The heartworm is also host to its own bacteria called Wolbachia. This bacterium further contributes to the inflammation. Moreover, additional inflammation results from the infected

dog's body developing an allergic reaction to the parasite. The total severity of the inflammation depends on the degree of the allergic reaction and the number of worms present.

Eventually this inflammation can spread to the lungs (responsible for bringing oxygen into the body), liver (responsible for metabolizing nutrients, eliminating waste and producing important enzymes) and kidneys (responsible for eliminating the body's waste). Excessive inflammation can lead to the failure of the affected organs (heart, lungs, liver, kidneys).

Once the larva becomes an adult, it may take less than 6 months for some dogs to develop clinical signs of heartworm disease. In other dogs it may take a year or more.

The first signs of an infection are coughing, mild fatigue and weight loss. As the disease progresses more severe signs are observed; including constant fatigue, severe coughing, difficulty breathing (often due to an accumulation of fluid in the lung tissue), episodes of collapse, evidence of liver and kidney failure (vomiting, loss of appetite, diarrhea). This will ultimately lead to death.

What can I do if my canine friend does have heartworm?

The good news is that heartworm can be treated in dogs. The most common treatment is a drug called Melarsomine. This is a potent arsenic-based drug which is strictly regulated and must be carefully administered as a minor overdose or improper method of administration can lead to severe side-effects.

It is only for use in dogs as it is toxic to cats. Treatment occurs over at least three months, and may last longer depending on the body's response to the therapy.

Prior to starting treatment, dogs must undergo several tests, including; repeating the heartworm blood tests, an organ function test, a complete blood count test (evaluating red blood cells, white blood cells and platelets), radiographs of the chest and ultrasounds of the heart.

These tests are necessary to be certain there is truly heartworm disease as we do not want to accidentally treat a dog with a single false positive heartworm blood test.

How worried should I be living in Ottawa?

The good news is that in Ottawa, heartworm is rare. Most veterinarians in the area will go through their entire careers without ever seeing a positive heartworm case. The few that do

see heartworm positive dogs usually discover these dogs were adopted from other parts of the world such as the southern United States or the Caribbean.

According to the Canadian Parasitology Expert Panel Guidelines, as of 2019, prevalence of heartworm disease in Ontario is 0.5%. Most cases, over 80%, occur in Southern Ontario between Hamilton and Sarnia. Certain areas in southern Ontario have up to 5-10% prevalence of heartworm disease.

This means that a dog born in eastern Ontario without any travel history is at a very low risk of getting heartworm disease.

If heartworm is so rare in Ottawa why should I start preventives?

That will very much depend on how risk averse you are when it comes to disease. Low risk does not mean no risk. Every year a small number of “home grown” heartworm cases will be diagnosed in eastern Ontario.

We are also seeing increasing numbers of dogs being adopted from outside of Canada including the Caribbean, Mexico, northern Africa and the Middle East. These dogs coming to Canada are at a higher risk of having heartworm which means they could introduce more of the parasite into the environment.

As climate change continues, we will likely continue seeing more extreme weather such as longer periods of hot weather in the spring, summer and fall which makes it a more ideal environment for heartworm to survive and mature.

The treatment of heartworm disease is quite expensive and difficult on the patient receiving treatment. Melarsomine injections can lead to severe pain in the muscles and dogs being treated cannot be active for most of the treatment period, which usually lasts 3 to 4 months. This means no walks, running or playing during the period treatment. As the heartworm dies, it can cause a temporary increase in inflammation, especially in the heart and lungs. This means that the body will not be able to cope with increased demands to the heart and lungs which comes with exercise.

Heartworm prevention is much safer and simpler than treating an actual infection.

If I am treating my canine friend with a heartworm preventive, do I need to have them tested every year?

If your canine friend has never received heartworm preventive in the past, if they have spent a period of time in a high-risk area or if you have missed several doses of preventive in the previous year, your Mer Bleue veterinarian will strongly advise testing your friend for heartworm.

A heartworm test involves collecting a small sample of blood. This sample is sent to our partner laboratory to look for antigens (molecules produced by the heartworm which can cause an immune-response).

If your canine friend is not in the high-risk category as described above, your Mer Bleue Veterinarian will advise performing a heartworm test every 2 to 3 years. This becomes important if you believe you have missed a few doses as your furry friend will have been at risk of being infected with heartworm during those unprotected months.

The heartworm test is not mandatory to start your friend on heartworm prevention. If a dog has lived their entire lives in eastern Ontario (or Western Quebec) and has never traveled, then they are considered at low risk of having heartworm.

There is an extremely small risk with putting a dog with an unknown heartworm status on a preventive. Even though preventives are meant to kill the larvae, they may also kill some of the adults. This risk is that if a dog with heartworm gets a preventive and some of the adults are killed by the preventive, they could possibly cause a life-threatening allergic and inflammatory reaction. . This risk is extremely minimal, but it is important to be aware of its existence.

Conclusion

Ultimately you will have to decide whether to start your canine friend on a heartworm preventive. This will mainly depend on your aversion to risk.

At Mer Bleue Veterinary Hospital, we are strong advocates for preventive medicine. This means that given the severity of heartworm disease, we advise all of our canine patients to receive heartworm prevention.

If you have any questions or concerns regarding heartworm or the heartworm preventives please contact us at Mer Bleue Veterinary Hospital.