Heartworm Treatment
Treatment of Infection

It has been said that the treatment of heartworm infection is somewhat of an art. There are several strategies that can be used including the option of not treating at all. The important concept to realize is that very harsh arsenic based drugs are necessary to kill adult heartworms and that treating for heartworm infection is neither simple nor safe in itself. Let us review some of the dangers and options in clearing the body of this parasite.

Patient Evaluation

Prior to therapy, the heartworm patient is assessed and rated for risk into one of four categories. Important factors include: how many worms are thought to be present based upon the tests performed, the size of the dog, the age of the dog, concurrent health factors, severity of heart disease, and the degree to which exercise can be restricted in the recovery period. Some hospitals use computerized formulas to categorize heartworm infected patients. The categories into which patients are grouped are as follows:

- Class I: Lowest Risk. Young healthy dogs with minimal or no disease evident on radiographs, normal blood work, and no symptoms of illness. They may cough only occasionally if ever, they only fatigue with exercise, and their chest radiographs are normal.
- Class II: Moderately Affected. Healthy dogs with minimal signs as above, occasional coughing, fatigue only with exercise but with radiographs that show definite evidence of heart disease. Lab testing shows mild anemia, urine dipsticks show some protein present but not severe urinary protein loss.
- Class III: Severely Affected. Dog is suffering from weight loss, cough, difficulty breathing, blatant damage to the vasculature is apparent on radiographs, lab work reveals a more severe anemia and marked urinary protein loss.
- Class IV: Caval Syndrome. Dog is collapsing in shock with dark brown urine evident. Heartworms visible by ultrasound in the AV valve of the right side of the heart, very abnormal blood work. These dogs are dying and can only be saved by the physical removal of adult heartworms via an incision through the jugular vein. If such a dog can be saved from this crisis, further heartworm infection treatment cannot be contemplated until the dog is stable enough to fit into one of the other categories above.

After knowing what class the patient fits in, treatment can be determined. The dog has three groups of heartworms in his or her body:

- The microfilaria that are the newborn children of the adult worms living in the heart and pulmonary arteries. The microfilaria are swimming freely in the bloodstream, possibly in large numbers, and it is the microfilaria that can (through a mosquito) spread to other dogs. The microfilaria are killed so as to keep the dog from spreading the disease.
- The new arrival heartworm larvae, delivered from mosquito bites in the last 6 to 7 months. These are L3 and L4 larvae living in the skin (having arrived within the last 3 months). These will continue their maturation and repopulate the heart and pulmonary arteries if they are not killed before the adult worms.
- The L5 larvae and adult worms living inside the heart and pulmonary arteries. This group requires the arsenic compounds for destruction while the other two groups can be killed with less toxic products.

Killing the Microfilaria and Migrating Worms

Happily the microfilaria, L3, and L4 larvae can all be killed by monthly heartworm preventive products (i.e. Heartgard, Interceptor etc.). This step is done before killing the adult worms so as to quickly make the patient noncontagious and to see that there are as few worms as possible present when it comes time to kill the adult worms. We want as few adult worms as possible as targets for our adulticide therapy because adult heartworms are very large and their death is quite inflammatory. Embolism and anaphylactic shock are important risks. Fewer worm dead bodies mean fewer risks.

The problem with giving heartworm preventive to a heartworm positive dog results from the sudden death of large numbers of microfilaria. All those little worms dying at once create inflammation, possibly enough to cause anaphylactic shock. DEC (Filaribits) cannot ever be used in a heartworm positive dog. Other preventives, such as the ivermectin derivatives and milbemycin, kill the microfilaria more slowly and reduce the chance of reaction. That said, while most heartworm positive dogs get away with taking one of these products safely, ideally the dog should be pretreated with anti-inflammatory medication and observed in the hospital for this first day of treatment.

After this crucial period is over, the heartworm preventive is given normally (monthly) for several months before addressing the adult worms. How long one chooses to wait depends on how urgent the dog's need is to remove the adult worms. After all, it is the adult worms that cause heartworm disease, not the immature worms addressed by the preventives.

Killing the Adult Worms

The only product currently available for the treatment of adult heartworms is melarsomine dihydrochloride (Immiticide made by Merial). If one goes by the manufacturers' recommendations, treatment can be done in two doses or three doses depending on the class of heartworm infection. Most universities, however, opt to treat all patients with the three-dose protocol as it creates a more gradual kill of the adult worms (which is safer in terms of embolism and shock).

The patient receives an intramuscular injection deep in the epaxial (lower back) muscles. This is a painful injection with a painful substance and it is common for the patient to be very sore afterwards at home. Pain medication may be needed. Be very careful of the injection site as the pet may bite if you touch it. The site may actually form an abscess that requires warm compresses. Approximately 30% of dogs experience some sort of injection site reaction which resolves in 1 to 4 weeks. Some dogs develop a permanent firm lump at the site of the injection.

In the two dose protocol, the dog comes back for a second injection the next day on the opposite side of the lower back. In the three dose protocol, the dog comes back one month later for two doses 24 hours apart (the first dose representing an introductory treatment to kill some of the more sensitive worms.) Keep in mind, too many worms dying at once creates circulatory shock.

After treatment, the patient must be strictly confined for one month following the final treatment. No walks, no running around. The dog must live the indoor life. The reason for this is that embolism to some degree is inevitable and it is important to minimize embolism-related problems.

Watch for:

- ***Coughing***
- ***Fever***
- ***Nose bleeds***

If any of these occur, report them to the vet as soon as possible. The most critical time is 7 to 10 days following a melarsomine treatment but they can occur anything in the following month.

Ivermectin Only?

Melarsomine treatment is expensive and often out of reach for rescue groups, shelters, and many individuals. If the dog is stable (Class I) one option is to simply leave the dog on an ivermectin-based preventive. This option has led to a great deal of misconception about the ability of ivermectin to kill adult heartworms. Let us lay the rumors to rest now:

- Ivermectin does not kill adult heartworms.
- Ivermectin does shorten the lifespan of adult heartworms.
- Ivermectin does sterilize adult heartworms.
- Ivermectin does kill microfilaria (keeping the dog from being a source of contagion)
- Ivermectin does kill L3 and L4 larvae (preventing new infections).

This means that if one opts to treat a heartworm positive dog with an ivermectin heartworm preventive only, one can expect the dog to remain heartworm positive for a good 2 years and the heartworm disease will be progressing during that 2 years. This is not good for the dog but certainly beats getting no treatment of any kind. This approach should only be considered for patients who are Class I and may be able to withstand 2 years of heartworm infection.

What Is Wolbachia?

Wolbachia is a genus of rickettsial organisms (sort of like bacteria, but not exactly). They live inside the adult heartworm. These organisms seem to be protective or beneficial to heartworms and treating the dog with the antibiotic doxycycline seems to sterilize female heartworms (meaning they cannot reproduce). Wolbachia is also thought to be involved in the embolism and shock that result when heartworms die. The role of this organism is still being investigated. If your veterinarian wants to pre-treat your heartworm positive dog with doxycycline, it may be because of concerns regarding this organism. As new information emerges, we will post here.