Heartworm disease in dogs is a common disease that is likely to appear on boards. It is less common in cats, but there are important species differences to understand. This PowerPage discusses the life cycle of *Dirofilaria immitis*, the signs it causes in dogs and cats, and treatment and prevention methods.

**Key Points**
- Life cycle of *Dirofilaria* and transmission depend on mosquito
- Heartworm antigen test is effective in dogs but not in all cats
- Treatment with melarsomine (dogs) must be done carefully to avoid complications
- Prevention with monthly ivermectin (or other comparable product) is recommended

**Pathophysiology**

Adult *Dirofilaria* worms can be 15-30 cm long and can live 3-5 years. They reside in the pulmonary artery and right ventricle, causing right ventricular hypertrophy. The worms are transmitted as L3 larvae through mosquito bites. Dogs develop much higher worm burdens than cats. In recent years, the bacterium *Wolbachia* has been identified in heartworms (a bacterium that infects the heartworm itself). Doxycycline is often given to treat *Wolbachia*.

**Clinical Signs**

**Dogs**
- Signs may be consistent with right heart failure.
  - Exercise intolerance
  - Cough
  - Dyspnea
  - Ascites
Clinical Signs (Cont.)

Cats
- Signs may be acute and severe.
  - Salivation, tachycardia, shock, neurologic symptoms, sudden death.
- Signs may be chronic, associated with **HARD** (heartworm-associated respiratory disease).
  - This is a syndrome in cats that appears similar to asthma (**coughing, wheezing**) but occurs secondary to heartworm infestation.
- **Vomiting** and **weight loss** are also common chronic symptoms.

Diagnosis

Dogs
- **Heartworm antigen test** is the test of choice.
  - Detects Ag from adult female worms
- **Modified Knott’s test** may detect microfilaria (less sensitive than antigen test).
- Other diagnostic findings may include:
  - **Right sided cardiac enlargement** on thoracic radiographs (reverse D)
  - **Enlarged pulmonary arteries**
- Heartworm infection may cause proteinuria or an increased eosinophil count.

Cats
- Heartworm antigen test may have false negatives due to low worm burden in cats.
  - All-male infections can occur.
- **Heartworm antibody test** indicates exposure but not necessarily active infection,
- In many cases, antigen and antibody tests are both required and they must be interpreted in light of clinical signs to obtain a diagnosis.
- In some cases, thoracic radiographs and/or echocardiography can aid in diagnosis.
Heartworm Disease

Treatment

Dogs

- The treatment of choice for dogs with heartworm is melarsomine. Currently, no matter the disease stage, the American Heartworm Society recommends a split protocol for these injections (a single injection followed in 4-6 weeks by 2 injections 24 hours apart).
- Confinement after treatment with melarsomine helps to decrease the chance of thromboembolism (throwing a clot or dead worm to the lungs).
- Wohlbachia, the bacteria found in heartworm, can be treated with doxycycline, azithromycin, or rifampin, which may enhance effectiveness of heartworm treatment.
- You may hear clients reference the “slow-kill” treatment method. This involves starting monthly heartworm preventative and waiting for adults to die. This treatment method is not recommended by the American Heartworm Society.

Cats

- Cats do not tolerate melarsomine (immiticide).
- Treatment is usually symptomatic with bronchodilators and/or corticosteroids until the worms die (2-3 year life span of worms in cats).

Prevention

Several options are available and effective for heartworm prevention in dogs and cats including:

- Oral
  - Ivermectin (Heartgard™)
  - Milbemycin (Sentinel™)
  - Moxidectin (Trifexis™)
- Topical
  - Selamectin (Revolution™)
  - Moxidectin (AdvantageMulti™)
- Injectable
  - Moxidectin (Proheart™)

References

- Ettinger, Feldman - Veterinary Internal Medicine, 3rd ed. pp 937-963.