Heartworm Disease

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

**Key Points:**
- Lifecycle of *Dirofilaria* and transmission depend on **mosquito**
- Heartworm **antigen test** is effective in dogs but not in all cats
- Treatment with **melarsomine** in 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**. This results in 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 *Wohlbachia* has been identified in heartworms (a bacterium that infects the heartworm itself).

**Doxycycline** is often given in conjunction to prevent a secondary bacterial infection.

**Clinical Signs:**

Dogs
- Signs may be consistent with right heart failure.
  - Exercise intolerance
  - Cough
  - Dyspnea
  - Ascites

Cats
- Signs may be acute, severe, and include salivation, tachycardia, shock, neurologic symptoms, or even sudden death.
- Signs may be more chronic, leading to **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.
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**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 appearance)
  - **Enlarged pulmonary arteries**
- Heartworm infection may cause proteinuria or an increased eosinophil count

**Cats**
- Heartworm antigen test has false negatives from low worm burden or all male infections
- **Heartworm antibody test** indicates exposure but not necessarily infection
  - In some cases, thoracic radiographs and/or echocardiography can provide a diagnosis

**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 readily treated with doxycyline, azithromycin, or rifampin, which may enhance effectiveness of heartworm treatment
- An alternative to treatment with melarsomine is the use of monthly heartworm preventative and waiting for adults to die; this is not currently recommended by the American Heartworm Society

**Cats**
- Cats do not tolerate melarsomine (immiticide)
- Treatment is usually symptomatic with a heartworm preventative, 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™)
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- Topical
  - Selamectin (Revolution™)
  - Moxidectin and imidacloprid (Advantage Multi™)

References

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