

Heartworm (Dirofilariasis) in Dogs and Cats

A PowerPage Presented By



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

Key Points

- Lifecycle of *Dirofilaria* and transmission depend on **mosquito**
- Heartworm **antigen test** is effective in dogs but not all cats
- Treatment with **melarsomine** in dogs must be done carefully to avoid problems
- Prevention with monthly **ivermectin** is recommended

Relevant 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 bacteria, *Wohlbachia* has been identified in heartworms.

Clinical Signs

Dogs

- Signs may be consistent with right heart failure
 - **Exercise intolerance, cough, dyspnea, ascites**

Cats

2 presentations of heartworm

- Acute (due to worms dying and resulting embolism/inflammation)
 - Salivation
 - Tachycardia
 - Shock
 - Hemoptysis
 - Neurologic signs
 - Acutely dying
- Chronic
 - **HARD** (Heartworm associated respiratory disease) is a syndrome in cats that appears similar to asthma (coughing, wheezing) but occurs secondary to heartworm infestation
 - Cough, dyspnea, exercise intolerance
 - Vomiting, anorexia, weight loss

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
 - Proteinuria
 - Eosinophilia

Cats

- Heartworm antigen test has false negatives from low worm burden or all male infections
- **Heartworm antibody test** indicates exposure but not necessarily infection
- Thoracic radiographs and/or echocardiography can provide a diagnosis in some cases
 - NOTE: On echocardiogram, heartworms appear as a distinct "**double lined echodensity**"

Treatment

Dogs

- The treatment of choice for dogs with heartworm is **melarsomine**
 - Currently, no matter the disease stage, the American Heartworm Society recommends the **split protocol for adulticide therapy**
 - A single injection followed in 4-6 weeks by 2 injections 24 hours apart
 - There is a low risk of thromboembolic disease, and **confinement** helps to minimize this
- *Wohlbachia*, the bacteria found in heartworm, can be readily treated with doxycycline, 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
- Other historical treatments include thiacetarsamide and levamisole

Cats

- Cats do not tolerate melarsomine well
- Treatment is usually symptomatic with a heartworm preventative, bronchodilators and/or corticosteroids until the worms die (2-3 year life span in cats)

Prevention

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

- Oral
 - Ivermectin (Heartgard™)
 - Milbemycin (Sentinel™)
- Topical
 - Selamectin (Revolution™)
 - Moxidectin and imidacloprid (Advantage Multi™)



References and Links

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

On-line Conference Proceedings from VIN:

<http://www.vin.com/Members/Proceedings/Proceedings.plx?CID=acvim2008&PID=pr23463&O=VIN>

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