# RESPIRATORY PARASITES

## BASICS

### OVERVIEW

- Parasites are organisms that live, grow, and feed on or in another organism; "helminths" are worms, such as roundworms or tapeworms; "arthropods" are animals without backbones (invertebrates) that have a hard, external skeleton (exoskeleton), such as insects
- Respiratory parasites are helminths and arthropods that reside in the respiratory tract or in the blood vessels of the lungs (known as "pulmonary vessels") of dogs and cats
- "Upper respiratory tract" consists of the nose, nasal passages, throat, and windpipe (trachea)
- "Lower respiratory tract" consists of the bronchi, bronchioles, and alveoli (the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged)

### SIGNALMENT/DESCRIPTION of ANIMAL

#### *Species*

- Dogs and cats

### SIGNS/OBSERVED CHANGES in the ANIMAL

- Three basic categories of signs—upper respiratory signs that involve the nose, nasal passages, throat, and windpipe (trachea); lower respiratory signs that involve the bronchi, bronchioles, and alveoli (the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged); and vascular signs that involve the blood vessels to the lungs; signs are based on location and lifestyle of parasite
- Often subtle and long-term (chronic) disease, with few clinical signs
- Breathing problems often not severe
- Upper respiratory signs—sneezing; watery or bloody discharge from the nose; reverse sneezing; nasal irritation or rubbing the nose; nervous system signs with *Cuterebra* (*Cuterebra* is a fly; it lays eggs near rodent burrows and when an animal moves in the area, the eggs hatch releasing larvae that enter the animal; the larvae develop under the skin or in the nose and mouth; they occasionally migrate through the brain)
- Lower respiratory signs—cough that can be stimulated by handling or pressure on windpipe (trachea); occasionally harsh lung sounds; often cause coughing in cats

### CAUSES

- Upper respiratory disease—variety of parasites, including *Pneumonyssoides caninum* (nasal mites); *Eucoleus boehmi* (nasal worm); *Linguatula serrata*
- Lower respiratory disease—variety of parasites in dogs and cats, including *Capillaria aerophila* (rare in cats), *Paragonimus kellicotti* (lung fluke), *Eucoleus aerophilus*; and parasites in dogs: *Oslerus osleri* (*Filaroides osleri*), *Filaroides hirthi*, *Filaroides milksi*, *Crenosoma vulpis;* as well as parasites in cats: *Aelurostrongylus abstrusus*, *Cuterebra*, larval migration of *Toxocara canis*

### RISK FACTORS

- Depends on the specific parasite—some have intermediate hosts (animal hosts [such as mosquitoes for heartworms] in which the parasite must undergo part of its life cycle, prior to infecting the dog or cat) or paratenic hosts (animal hosts in which the parasite may grow or develop, but this host is not required in the life cycle of the parasite; the dog or cat becomes infected after eating the paratenic host; for example, dogs and cats can become infected with *Paragonimus kellicotti* (lung fluke) after eating a crayfish carrying the immature form of the lung fluke); exposure to these hosts increases the risk of infestation with the parasite, putting hunting or scavenging animals at higher risk
- *Crenosoma vulpis*—snails, paratenic host
- *Paragonimus kellicotti*—snails; crabs; shellfish
- *Aelurostrongylus abstrusus*—snails and slugs; transport hosts: rodents, frogs, lizards, birds
- *Linguatula serrata*—ingestion of sheep offal (waste parts of a butchered animal)
- Multi-animal households with unhealthy living conditions—allows transmission of parasites through eating feces-contaminated materials or feces (fecal–oral transmission) or through direct contact with the infective stage of the parasite (direct-contact transmission)

## TREATMENT

### HEALTH CARE

- Outpatient—upper and lower respiratory parasites; may need repeated examinations to monitor response

### ACTIVITY

- No restrictions, unless severe lung/breathing difficulties occur with upper or lower respiratory parasites

### DIET
- No special restrictions

## MEDICATIONS
Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Drugs to kills worms (known as "anthelmintics")—few studies confirm effectiveness for respiratory parasites
- *Pneumonyssoides caninum*—ivermectin (suggested dosage for treatment of respiratory parasites contraindicated in collies, collie breeds, and Australian shepherds because of high incidence of toxicity); milbemycin oxime; selamectin
- *Aelurostrongylus abstrusus*—fenbendazole; possibly selamectin
- Other upper and lower respiratory parasites—fenbendazole; variable success with ivermectin
- *Crenosoma vulpis*—levamisole; fenbendazole; febantel
- *Paragonimus kellicotti*—praziquantel; albendazole
- *Cuterebra*—ivermectin
- Anti-inflammatory agents—generally not required; may reduce effectiveness of drugs used to kill the worms (anthelmintics)

## FOLLOW-UP CARE

### PATIENT MONITORING
- Repeated examination for parasite eggs or larvae—some drugs used to kill the worms (anthelmintics) may suppress egg or larval production in some species of parasite
- Resolution of clinical signs—suggests response to treatment; does not indicate complete clearance of parasites
- Presence of high eosinophil (a type of white-blood cell) counts in the circulating blood (known as "peripheral eosinophilia"), if noted initially, may subside with treatment
- Repeat examination of the airways using a special lighted instrument called an "bronchoscope"—may help assess effectiveness of treatment for *Oslerus osleri*

### PREVENTIONS AND AVOIDANCE
- Avoid activity that increases likelihood of parasite infestations (often not practical)
- Avoid contact with wildlife reservoirs (especially wild canids and felids)
- Consider prophylactic treatment for heartworm
- *Pneumonyssoides caninum* infestation appears to be lower in animals taking heartworm preventive medication, suggesting that ivermectin prevents infestation

### POSSIBLE COMPLICATIONS
- Long-term (chronic) lung (pulmonary) damage—possible with persistent and heavy lower respiratory parasite burdens
- Infestations generally not fatal; however, severe lung damage can result with some species; *Cuterebra* can cause fatal nervous system complications
- *Pneumonyssoides caninum* has been associated with a condition in which the stomach dilates with gas and/or fluid (known as "gastric dilatation"), and subsequently rotates around its short axis (known as "volvulus")—condition known as "gastric dilatation-volvulus" or "bloat")

### EXPECTED COURSE AND PROGNOSIS
- Prognosis is variable; with aggressive management—prognosis usually fair to excellent
- Return to performance—depends on long-term duration of disease and level of long-term (chronic) lung (pulmonary) damage by lower respiratory parasites
- Recurrence possible

## KEY POINTS
- Treatment response and duration depend on the type of parasite
- Risk of recurrence in dogs that maintain lifestyles conducive to transmission of the parasites (such as hunting, sporting dogs, and multi-dog households, out-door cats)