Chronic Cough in a Dalmatian

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A 3-year-old intact male Dalmatian presented for a persistent and progressively worsening cough of approximately 1-month duration.

History
Vaccinations were up-to-date. The dog and the client had spent about 1 year in Copenhagen, Denmark, and the dog developed the nonproductive cough approximately 2 months after returning to the United States. A heartworm antigen test performed shortly thereafter was negative.

Physical Examination
The dog appeared lethargic and depressed. His weight was 28 kg, and body condition was normal. Hydration was normal. The dog’s temperature and pulse were also normal, but respiratory rate was elevated at 64 breaths/minute. No abnormal heart or lung sounds were detected on auscultation. A cough was elicited on tracheal palpation. The dog coughed during the examination and at one point had an episode of retching and gagging. Several soft subcutaneous masses were palpated in the submandibular and thoracic regions.

Diagnostics & Imaging
Hematology and serum chemistry panel results were normal. Slightly prolonged bleeding at the venipuncture site was noted after collection of the blood sample. Fine-needle aspiration cytology indicated that one of the subcutaneous masses was a hematoma. Thoracic radiography revealed increased pulmonary density and a diffuse interstitial pattern. The heart appeared normal. Coagulation testing was not performed.

Fecal Examination
Routine fecal examination had been conducted annually. Because the animal had not been tested for over a year, the client brought in a fresh fecal sample. As part of the routine fecal examination process, direct smears were conducted on all samples in addition to centrifugal fecal flotation. The direct fecal smear revealed a single motile first-stage nematode larva (L1). Because there was a high level of background debris obscuring the tail, identification of the L1 was not possible. Larvae were also detected on fecal flotation, although identification was not possible because of the adverse osmotic effects of the high specific gravity flotation media on the L1 morphology.

Ask Yourself
1. Is fecal examination a necessary part of the baseline data in the diagnostic investigation of a dog or cat showing respiratory clinical signs?
2. What helminth parasites endemic to North America can produce respiratory signs similar to those seen in this case?
3. What parasite species should be considered when first-stage nematode larvae are detected in canine feces?
Acquired through the ingestion of infective third-stage larvae contained in the tissues of terrestrial gastropods or frogs. Angiostrongylosis should be considered in any case of cardiorespiratory disease and/or bleeding disorders in dogs with a history of travel to known endemic regions (see Angiostrongyulus vasorum: Coming to an Area Near You?). The dog in this case was most likely infected while in Denmark, where A. vasorum infection has become increasingly common over the past 2 decades.

A. vasorum infection in dogs ranges from subclinical to fatal and tends to be chronic. Clinical signs can be variable but most often are cardiorespiratory in nature. Chronic cough, dyspnea, lethargy, and exercise intolerance are commonly observed. Poorly understood bleeding disorders, suspected in this case because of hematomas, occur with some infections. Sudden death can occur from fatal cerebral, thoracic, or abdominal hemorrhage. Diagnosis occurs by detection of L1 by Baermann examination of feces; fecal flotation has poor sensitivity for A. vasorum L1.

Therefore, at least 3 Baermann examinations should be pursued before ruling out the possibility of angiostrongylosis. Paradoxically, in more than half of the cases of natural infection, L1 can be detected by direct fecal smears, which use only a small amount of feces; this indicates high shedding levels. L1 tail morphology (kinked tail, dorsal spine) is characteristic for A. vasorum.

Fecal larval shedding is erratic, resulting in the possibility of false-negative fecal examination results. Therefore, at least 3 Baermann examinations should be pursued before ruling out the possibility of angiostrongylosis. Paradoxically, in more than half of the cases of natural infection, L1 can be detected by direct fecal smears, which use only a small amount of feces; this indicates high shedding levels. L1 tail morphology (kinked tail, dorsal spine) is characteristic for A. vasorum.

Diagnosis

*Angiostrongyulus vasorum* infection

**Diagnostic Investigation**

The feces was further examined by the Baermann technique, during which a large number of motile larvae were recovered (Figure 1A). Larvae were immobilized for detailed examination by adding a drop of dilute iodine solution (color of weak tea) to the edge of the coverslip. The larvae were about 360 microns in length, with a cephalic button at the anterior end. In addition, the length of the esophagus was almost half the length of the larvae, and the tail was kinked and contained a dorsal spine (Figure 1B). The size and morphology of the larvae were consistent with *A. vasorum*, the French heartworm.

*A. vasorum* is a metastrongyloid infecting the pulmonary artery and right heart of wild and domestic canids. Infection is acquired through the ingestion of infective third-stage larvae contained in the tissues of terrestrial gastropods or frogs.
A vasorum: Coming to an Area Near You?  

First reported in France, A. vasorum has been introduced into other geographic regions and currently is seen in parts of Europe, Africa, South America, and North America. In Newfoundland, A. vasorum has been reported in dogs, red foxes, and coyotes. Recently, infection was diagnosed in a red fox in West Virginia. Whether this is a recent introduction or a longstanding endemic focus is unknown. The potential spread of A. vasorum to other parts of North America is a grave concern: Computer modeling suggests that conditions are suitable for the establishment of A. vasorum in the east half and the western coastal areas of the continent.

References