Diagnostic Exercise

From The Davis-Thompson Foundation*

Case #**260**; Month: **May**; Year:**2025**

Answer sheet

Title: *Angiostrongylus vasorum* infection in a fox

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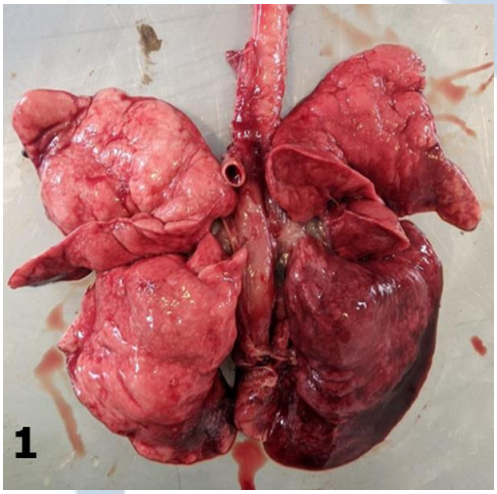
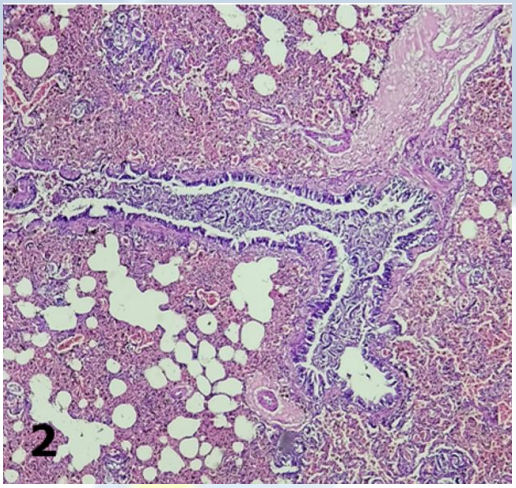
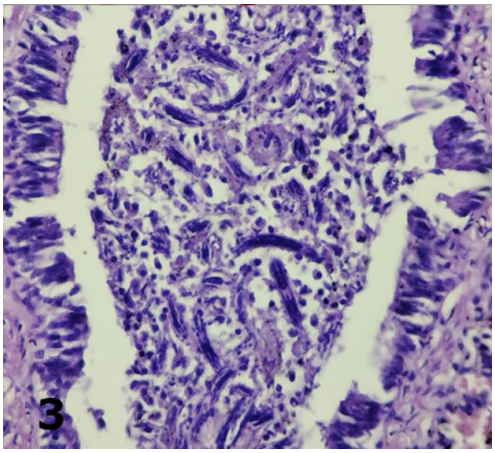
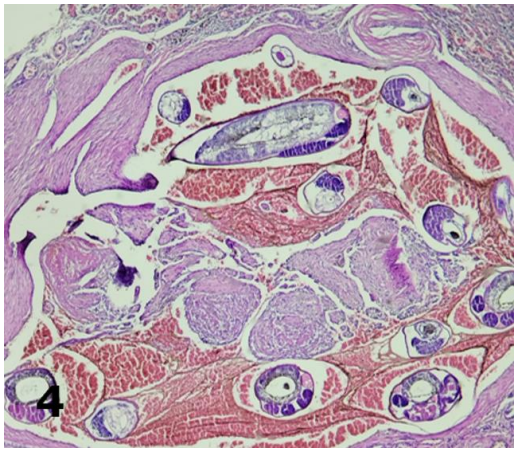
History: A juvenile gray fox was brought by the zoo with dehydration, depression, and poor body condition. It died the day after arrival.

Necropsy findings: Grossly, both lungs (Fig. 1) were markedly edematous and firm, and did not collapse upon opening of the thoracic cavity. Samples from both lungs (Figs. 2, 3, 4) were submitted for histology.









Histologic description:
Lung (Figs. 2 - 4): There is an inflammatory process in the blood vessels and pulmonary interstitium, with adult nematodes within the vascular and airway lumen. These nematodes are 270-350 µm in diameter and have a thin eosinophilic cuticle surrounding a coelomyarian musculature. The pseudocoelom has an intestine lined by tall multinucleate cells. The pulmonary arteries have a thickened tunica intima and are infiltrated by lymphocytes, eosinophils, plasma cells, and macrophages. There is intimal hyperplasia. The pulmonary interstitium has multiple nodules composed of macrophages and lymphocytes. In the center of these nodules and free within the alveolar spaces there are moderate to large numbers of 20 x 80 µm in diameter nematode larvae and fewer multinuclear and uninuclear eggs. There is proliferation of type II pneumocytes, alveolar hemorrhage, hemosiderin-laden macrophages, alveolar emphysema, and arterial thrombosis. Some thrombi are organized and recanalized.

Morphologic diagnosis:
Granulomatous pneumonia, multifocal to coalescing, chronic, with arterial thrombosis and intralesional nematodes morphologically consistent with *Angiostrongylus vasorum.*

Etiology: *Angiostrongylus vasorum.*

Comments:

Angiostrongylus vasorum is a nematode with an indirect life cycle, belonging to the superfamily Metastrongyloidea (2). Definitive hosts include wild and domestic dogs, but also other closely related carnivore species, such as mustelids and the red panda. Intermediate hosts include slugs and snails, while frogs and chickens can be paratenic hosts (1).

Canids get infected by eating intermediate or paratenic hosts with infective L3. Following ingestion, the L3 penetrates through the intestinal wall and migrates to

the mesenteric lymph nodes, where they mature to L5. Via the mesenteric lymphatics and hepatic and portal veins, L5 migrate to the right ventricle and pulmonary arteries and become adults, where they reproduce and release larvae and eggs in alveoli and bronchioles. L1 are then coughed up, swallowed, and passe with the feces (3).

Clinical signs of angiostrongylosis vary from mild to severe respiratory disease; *cor pulmonale* may develop in response to chronic pulmonary vascular disease and lung fibrosis. Other less common clinical signs include neurologic signs associated to cerebral hemorrhage because of disseminated intravascular coagulation, as well as miscellaneous signs that reflect aberrant migration of larvae in a variety of organs (1). Ectopic locations of both adult worms and larvae include the eye, pericardium, and urinary bladder (4).

Histologically, adults must be differentiated from *Dirofilaria immitis*, a common nematode that also infects the pulmonary arteries and heart of dogs. Adult *Angiostrongylus* spp*.* are 270-350 µm in diameter with thin coelomyarian musculature, a large intestine composed of few tall multinucleate cells, and eggs in the uterus. In contrast, *Dirofilaria* spp. have well-developed coelomyarian musculature, a smaller intestine, and a uterus containing microfilariae (1).

Angiostrongylosis has worldwide distribution, although it is commonly considered sporadic (6). There are few reports of the infection in Latin America, resulting in limited knowledge about its distribution and prevalence in this region. Some of these reports are from infected foxes, making this species an important potential factor for the propagation and sylvatic life-cycle maintenance of the parasite in South America. Clinicians involved in small and wildlife practice should consider angiostrongyliasis as a differential diagnosis when encountering cardiopulmonary disorders in canids (5).

References:

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