



Diagnostic Exercise

From The Davis-Thompson Foundation*

Answer Sheet

Case #: **187** Month: **April** Year: **2022**

Title: *Aortic body tumor (chemodectoma) in a dog*

Contributors: Christina Middendorf, Veterinary student and Fabio Rosa, DVM, MS, PhD, DACVP. Long Island University College of Veterinary Medicine, NY.

fabio.brumrosa@liu.edu

Clinical History:

The owner brought a 9-year-old male neutered Boxer dog to a veterinary clinic with a complaint of acute onset of vomiting. The attending veterinarian sedated the dog with butorphanol to perform abdominal radiographs. The dog collapsed and died upon discharge, even though CPR was performed for more than 20 minutes after collapse.

Necropsy Findings: The patient had a good body level of nutrition. At the heart base near the aortic arch, there was a 5.0x4.0x3.0 cm, multilobulated, pale brown, firm mass (Figure 1). The mass was partially attached to the tunica adventitia and compressed the lumen of the aorta, adjacent arteries, and esophagus. Multifocal, white, smooth nodules thickened the cusps of the mitral valve (Figure 2). Both atria were mildly dilated. The left ventricular free wall of the heart was mildly thickened with a 4:1 left:right ventricular free wall ratio. The lungs were heavy, wet, and diffusely dark red.

Gross Images:

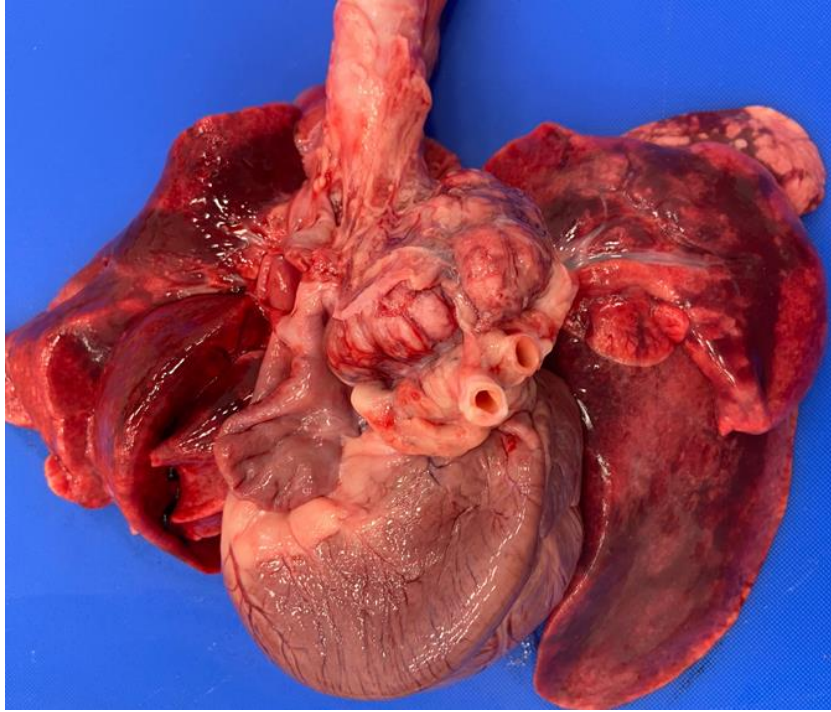


Figure 1. A 5.0x4.0x3.0 cm, multilobulated, pale brown, firm mass is in close proximity to the aortic arch.

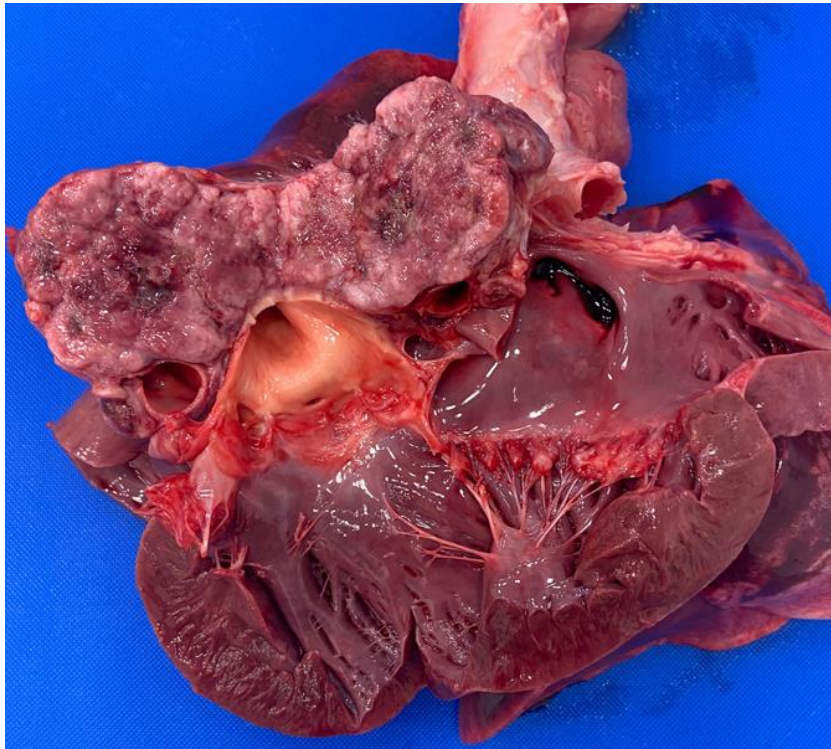


Figure 2. Cross section of the mass and the heart. The mass is partially attached to the tunica adventitia and compressing the lumen of the aorta, adjacent arteries, and esophagus. Multifocal, white, smooth nodules are visible on the cups of the mitral valve.

Histologic Description: Expanding the fibroadipose tissue is a well demarcated, non-infiltrative, multilobular, densely cellular mass composed of polygonal cells arranged in packets separated by fine septa of fibrovascular stroma (Figures 3 and 4). The polygonal cells have abundant eosinophilic, granular cytoplasm with distinct borders and round hyperchromatic nuclei (Figure 5). Anisocytosis and anisokaryosis are mild and no mitotic figures are observed.

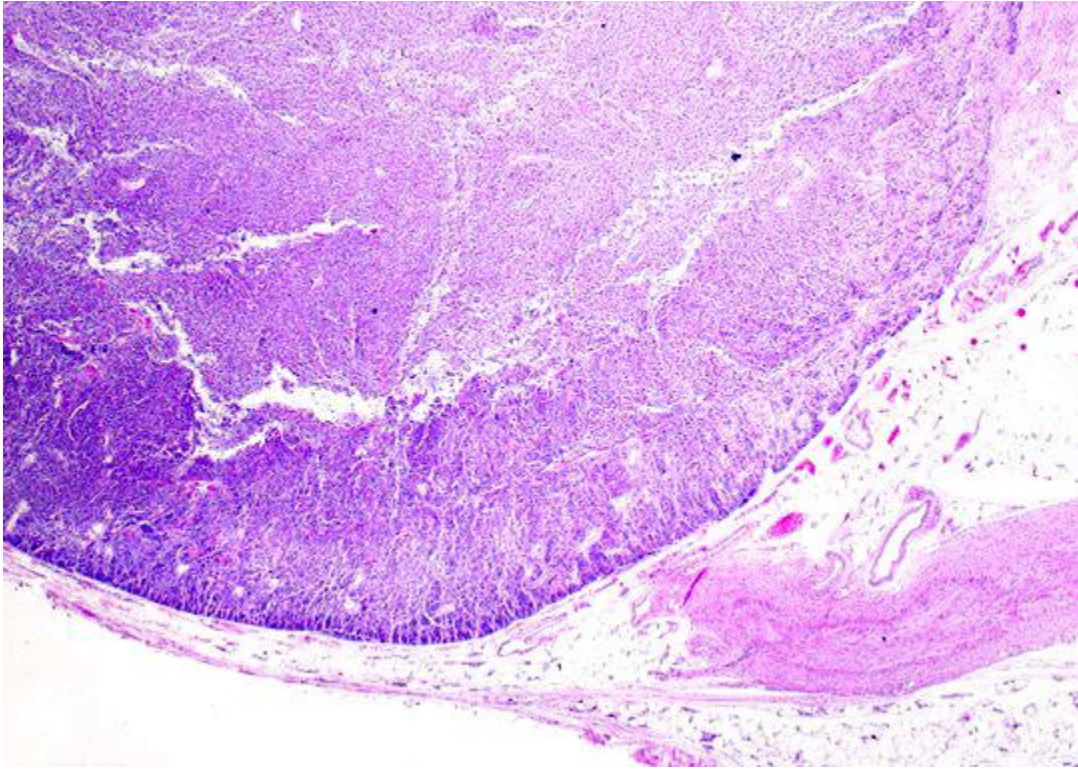


Figure 3. Heart base: Well demarcated, expansile, densely cellular mass.

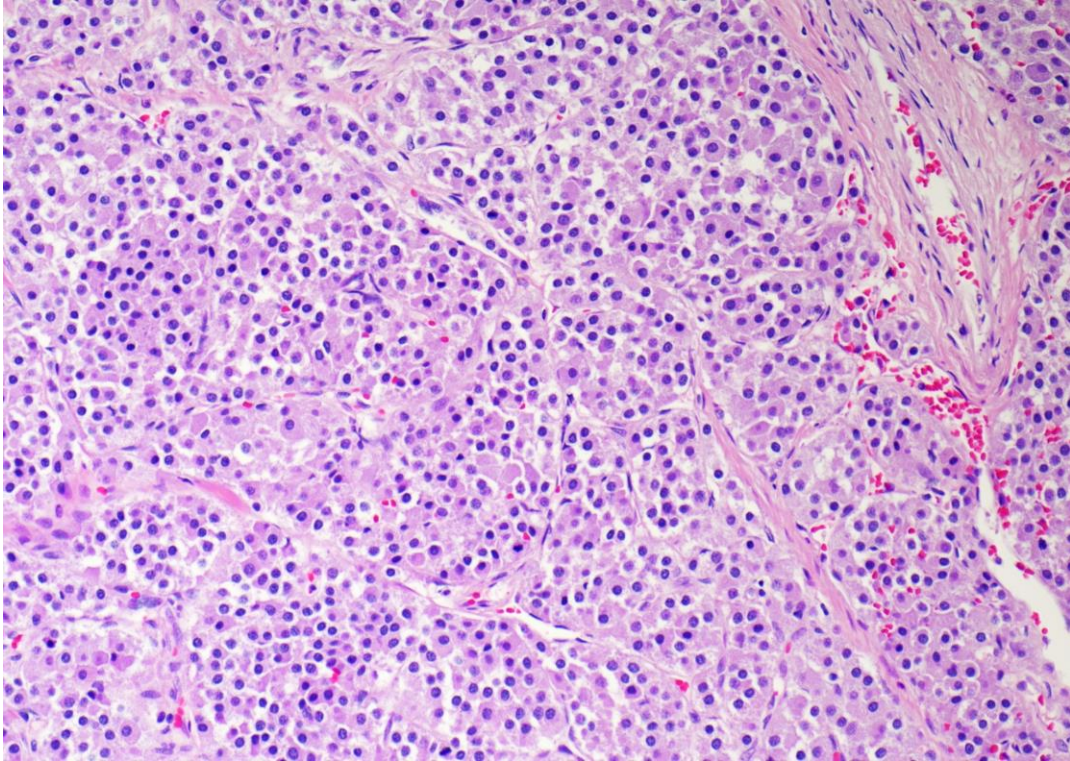


Figure 4. Polygonal cells arranged in packets separated by fine septa of fibrovascular stroma.

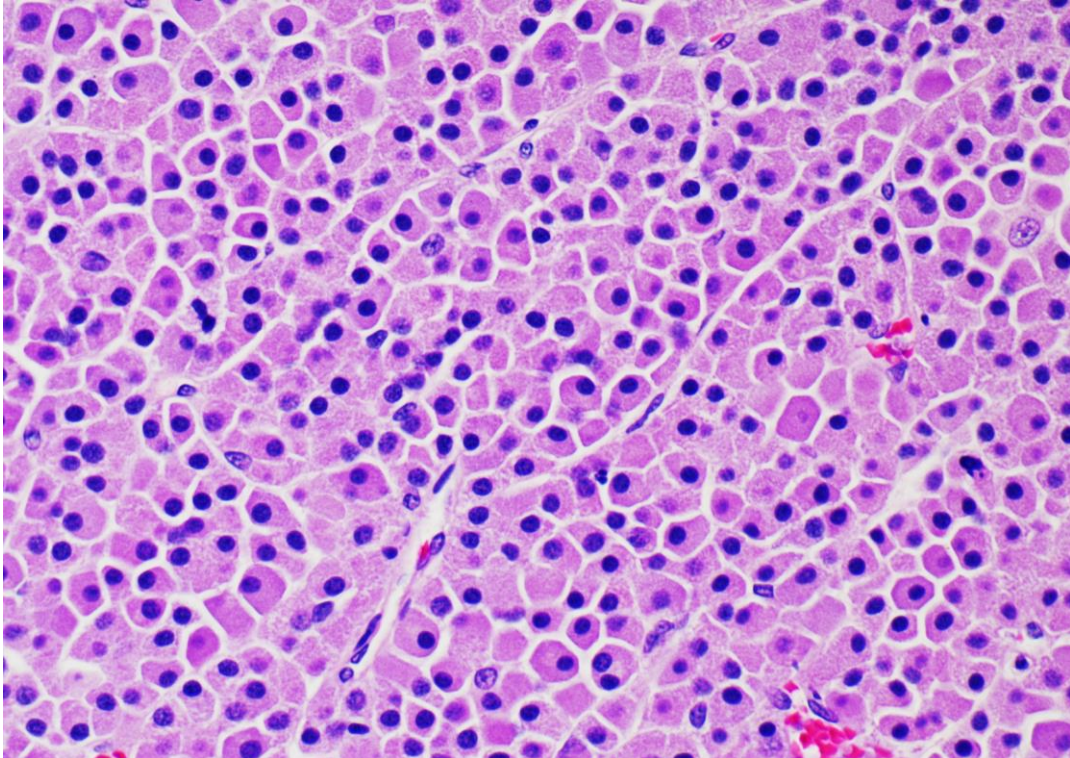


Figure 5. Polygonal cells with abundant eosinophilic, granular cytoplasm with distinct borders and round, hyperchromatic nuclei.

Morphologic Diagnoses:

1. *Base of the heart, aortic arch: Aortic body tumor (chemodectoma)*
2. *Heart, mitral valve: Mild endocardiosis*
3. *Lung: Marked diffuse congestion and edema*

Discussion:

Chemoreceptor organs are characterized by clusters of glomus cells that detect and respond to the partial pressure of oxygen in arterial circulation (3). The carotid body chemoreceptors are located near the bifurcation of the carotid arteries, whereas the aortic body chemoreceptors are adjacent to the ascending aorta at the base of the heart. Chemodectomas more frequently arise from aortic body chemoreceptors in dogs (1). They are nonfunctional, space occupying tumors that vary greatly in size (3).

Boxers and other brachycephalic breeds are predisposed to developing aortic body tumors due to chronic oxygen hypotension. The consistently low parietal pressure of oxygen continually stimulates the chemoreceptors, which can lead to neoplastic transformation.

There are at least three other differential diagnoses for neoplasms located near the base of the heart. Hemangiosarcomas are one of the most common cardiac neoplasms. It can be primary, arising from the right atrium, or secondary, commonly originating from the spleen (2). Grossly, the nodular masses are commonly red and filled with blood. Microscopically, hemangiosarcomas consist of neoplastic vascular endothelial cells that are arranged in streams and bundles forming variably sized vascular channels filled with erythrocytes.

Lymphoma can also cause lesions on the base of the heart. Grossly, the neoplastic infiltration can be diffuse or nodular, and the masses are commonly white and soft. Microscopically, there is significant infiltration of the myocardium by neoplastic lymphocytes (2).

Ectopic thyroid and parathyroid neoplasms are other types of primary heart-base tumors. Grossly, these can look very similar to aortic body tumors. Microscopically, both ectopic thyroid/parathyroid and aortic body tumors can have a neuroendocrine pattern. However, structures resembling thyroid follicles and colloid material has been described in ectopic thyroid tumors, which helps differentiate them from chemodectomas. Immunohistochemistry for thyroglobulin, thyroid transcription

factor-1, calcitonin or parathyroid hormone can be used to confirm the cell origin (3).

References:

1. Diem Z, Szalay F, Glávits R, Bauer A, Cserni G. Carotid body tumor in dog: A case report. *Can Vet J* 2007; 48(8):865-7.
2. Miller LM, Gal A. Cardiovascular System and Lymphatic Vessels: Disturbances of growth. In: Zachary JF, editor. *Pathologic Basis of Veterinary Disease*. 6th ed. St. Louis: Elsevier; 2017. p. 600.
3. Miller MA. Endocrine System: Disorders of chemoreceptor organs. In: Zachary JF, editor. *Pathologic Basis of Veterinary Disease*. 6th ed. St. Louis: Elsevier; 2017. p. 713-4.

*The Diagnostic Exercises are an initiative of the Latin Comparative Pathology Group (LCPG), the Latin American subdivision of The Davis-Thompson Foundation. These exercises are contributed by members and non-members from any country of residence. - Consider submitting an exercise! - A final document containing this material with answers and a brief discussion will be posted on the CL Davis website.

Associate Editor for this Diagnostic Exercise: Ingeborg Langohr

Editor-in-chief: Claudio Barros