

Aortic Body Tumor in a Dog

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Abstract: Aortic body tumors were investigated macroscopically and microscopically in a 2-year-old, clinically normal, male cross-breed dog. Two tumor masses measuring 4 x 4 x 3 cm in size were determined. One of them was located on the A. subclavia dextra and the other one was located on the A. carotis communis dextra and they adhered to the adventitia of these vessels. The tumor masses were encapsulated within a thin capsule and lobulated with yellowish-brown areas and were elastic in structure. Yellowish-white and red-brown focal areas were seen on the cut surface. In addition, a yellowish-white tumor mass measuring 2 x 3 x 3 cm in size was present in the facies auricularis of the heart base at the atrioventricular border, at the level of origos of the sulcus interventricularis paraconalis and at the caudalis of the truncus pulmonalis.

Key Words: Chemoreceptor organ, aortic body tumor, dog

Bir Köpekte Aorta Cisimciği Tümörü

Özet: Bu gözlemlerde 2 yaşlı, erkek melez, klinik olarak normal görünen bir köpekte tespit edilen aorta cisimciği tümörü makroskopik ve mikroskopik bulguları ile tanımlandı. Boyutları 4 x 4 x 3 cm olan iki tümör kitlesi belirlendi. Bunlardan birisi A. subclavia dextra diğeri ise A. carotis communis dextra üzerine yerleşmiş ve bu damarların adventisyasına yapışmıştı. Tümör kitleleri, dışı ince bir kapsülle çevrilmiş, sarı-kahverenginde ve elastiki kıvamlı, kesit yüzleri ise sarımsı-beyaz ve kırmızı-kahverenkli odaklı ve lobüler görünümde idi. Ayrıca kalbin bazisinde facies auricularis'te, atrioventricular sınırda bir kısmı sulcus interventricularis paraconalis'in origosu seviyesinde truncus pulmonalis'in kaudalinde 2 x 3 x 3 cm boyutlarında, sarı-beyazımtrak renkte bir tümör kitlesi yer almaktaydı.

Anahtar Sözcükler: Kemoreseptör organ, aorta cisimciği tümörü, köpek

Introduction

An aortic body tumor is a chemoreceptor tumor that originates from aortic bodies that are clusters of cells embedded in the adventitia of vessels at multiple sites including the innominate artery below the origin of the right subclavia artery, on the anterior surface of the aortic arch, beneath the arch between the ascending aorta and pulmonary artery near the left coronary artery and scattered in the wall of the pulmonary artery (1-6).

Aortic body tumors located at the base of the heart are encountered frequently in dogs, but are rarely seen in cattle and cats (2,4,7-10). The frequency of aortic body tumors increases with age and, in general, most cases occur in dogs over 6 years old; male dogs appear to have a greater frequency of aortic body tumor than females (1,2,4,8,11). Aortic body tumors have been frequently

found in brachiocephalic breeds such as the bulldog, Boston terrier and boxer as they are genetically predisposed (1,8,9,11,12). However, they were described by Metin (10) in a local shepherd dog and by Kıran and Erer (5) in a Kangal dog in Turkey.

The tumors rarely metastasize, but the local invasion of aortic body tumors to the arteries near tumor masses, and the atrium and pericardium is frequently seen (1-3,8,13). Metastases have been most frequently found in the lung and liver, although they have also been reported in the kidney, spleen and mediastinal lymph nodes as well as the duramater of the cerebellum and the heart (2,5,8).

Aortic body tumors in animals are not functional. They are generally seen accidentally during necropsy. They cause functional disturbances due to space-occupying lesions. Although leukocytosis is seen in some

cases (10,14-16), the hematological values are generally within the normal range (2-4,7).

In the presented case, the macroscopical and microscopical findings of aortic body tumors were described in a cross-breed dog.

Case - Definition

This case was observed accidentally in a 2-year-old, cross-breed male dog during a necropsy procedure for an experimental study that was conducted in our laboratory following clinical examination and the recording of body temperature as well as heart and respiration rates.

Tissue samples taken from tumor masses and the heart base were fixed in 10% neutral buffered formalin, and embedded in paraffin, sectioned (5-6 μm), and mounted on glass slides and the sections were stained with hematoxylin and eosin, periodic acid-Schiff (PAS) and Masson's trichrome and examined using a light microscope (17).

Results and Discussion

In the present case, the dog was clinically healthy and its hematological values were within normal limits (Table). Body temperature was 38.5 °C, respiratory rate was 24/min and heart rate was 110/min.

At necropsy, two tumor masses measuring 4 x 4 x 3 cm were observed. One of the tumor masses was located on the A. subclavia dextra and the other on the A. carotis communis dextra, and they adhered externally to the adventitia of these vessels (Figure 1A). The tumor masses were encapsulated within a thin yellowish-brown capsule. A yellowish-white tumor mass measuring 2 x 3 x 3 cm in size without a capsule was imbedded in the facies auricularis of the heart base at the atrioventricular border, at the level of the origos of the sulcus interventricularis paraconalis and at the caudalis of the

truncus pulmonalis (Figure 1B). The cut surfaces of the tumor masses were lobulated and had yellowish-white, reddish-brown areas (Figures 1C, D, E).

In histopathological examination, it was observed that tumor masses were divided into lobules of different sizes by connective tissue that originated from the fine fibrous capsule that contains hyperemic vessels. These lobules were also further subdivided into smaller compartments by collagen and reticulin fibers with small capillaries. These trabeculae-like structures were thick at the subcapsular areas but they tended to be thinner in the deeper areas of the tumor masses. Inside the fibrovascular stroma, tumor cells were commonly aligned along and around small capillaries, while in some areas tumor cells were very dense. The tumor cells were cuboidal to polyhedral. The cytoplasm was lightly eosinophilic, finely granular and vacuolated. These tumor cells had a large, chromatine-deficient and centrally located nucleus with a nucleolus. In tumor masses, other cells with small spindle-shaped hyperchromatic nuclei and dark-colored cytoplasm were subcapsullary located (Figure 2).

In addition, a few necrotic tumor cells smaller than other cells with picnotic nuclei and eosinophilic cytoplasm were seen. Moreover, focal necrotic areas in tumor masses and a few tumor cells in the vessels were observed. Focal mononuclear cell infiltrations mostly consisting of lymphocytes were seen in the capsula. Similar microscopic findings were determined in the heart muscle at the heart base (Figure 3).

In the presented case, from the localization and microscopical findings, the tumors were diagnosed as aortic body tumors. Although aortic body tumors have been frequently found in brachiocephalic breeds (2-4,8,9,11,13), in two previous cases reported in Turkey (5,10) and in the present study they were determined in nonbrachiocephalic breeds. In contrast to the suggestions of other researchers (2-5,10), in this case aortic body tumors were determined in a young dog. Aortic body tumors were found at necropsy as indicated by the other researchers (2-4). In the present case, the dog was clinically healthy and hematological findings were within reference values and agreed with the results of other cases (2-4,7).

The localization of tumors as well as necropsy and histopathological findings were similar to the results of previous cases (2-7,11,15). In some cases, hemorrhaging

Table. Hematological parameters of the dog.

WBC ($\times 10^3/\mu\text{L}$)	6.1	MCV (fL)	67.2
LY ($\times 10^3/\mu\text{L}$)	2.44	MCH (pg)	23.1
MO ($\times 10^3/\mu\text{L}$)	0.549	MCHC (g /dL)	34.4
GR ($\times 10^3/\mu\text{L}$)	3.111	RDW (%)	13.4
RBC ($\times 10^6/\mu\text{L}$)	7.69	Plt ($\times 10^3/\mu\text{L}$)	412
Hgb (g /dL)	17.7	MPV (fL)	8.0
Hct (%)	51.7	PDW (%)	15.4

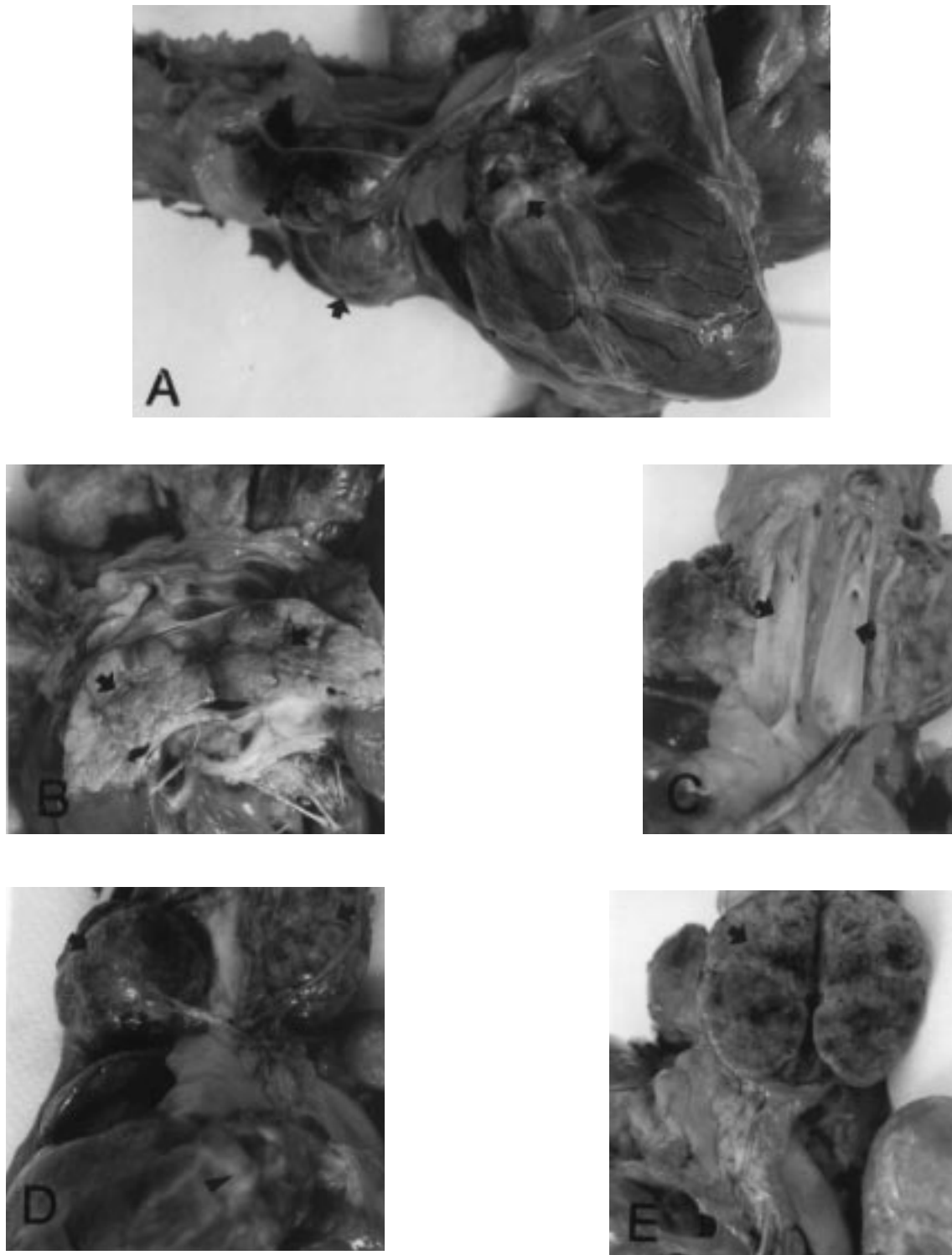


Figure 1. A: Aortic body tumor (arrows). B: The cut surface of the aortic body tumor at heart base (arrows). C: Lack of invasion of aortic body tumors to vessels (arrows). D: The tumor masses 4 x 4 x 3 cm in size, encapsulated with a fibrous capsule (large arrows) and the localization at the heart base (arrowhead). E: The cut surface of the aortic body tumor localized on A. subclavia dextra (arrows).

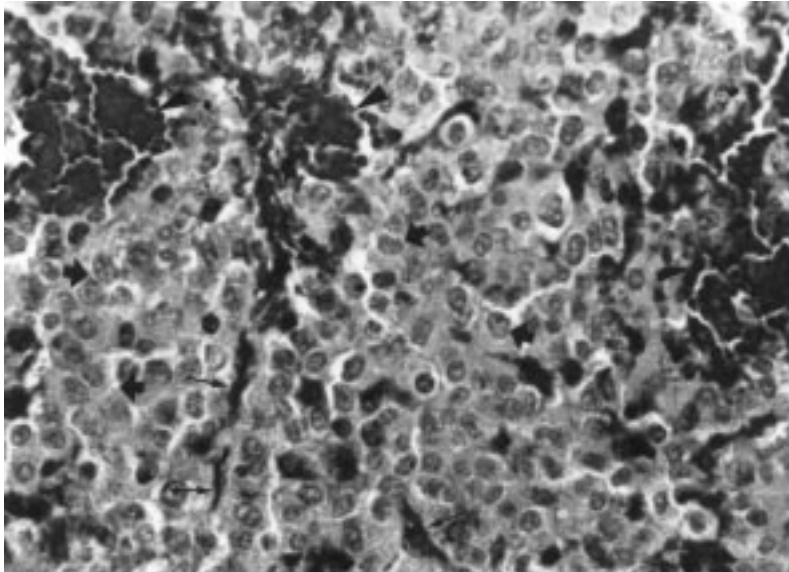


Figure 2. Cells of aortic body tumor (large arrows) and trabeculae of connective tissue (small arrows) and hemorrhagic areas (arrowheads). H x E, x 225.

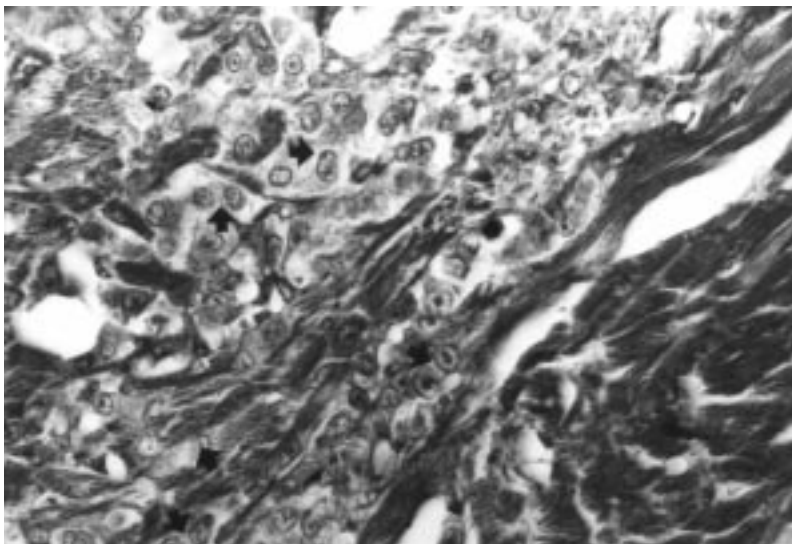


Figure 3. Tumor cells between muscle fibers in heart (arrows). H x E, x 400.

was not determined (1,2,6,12,14,15), whereas in this case it was observed. Lack of invasions to adjacent arteries and to the capsula agreed with the findings of other researchers (4,6,9-11,13,14,16). Although metastasis is rare, the invasion of these tumors occurs frequently (1-4,8,14). In the present case, metastasis was not observed.

It was reported that tumors originating from ectopic thyroid and parathyroid tissue can be observed at the heart-base, and their necropsy and microscopical findings resemble aortic body tumors (1,8,10-14,16).

They consist of the smaller cells with hyperchromatic nuclei and eosinophilic cytoplasm. These tumors are not subdivided into lobules by connective tissue in contrast to aortic body tumors. In addition, these tumors contain primitive follicular structures or colloid-containing follicles (2,3,16). In the present case, the microscopic appearance of the tumors stained by hematoxylin x eosin and Masson's trichrome methods were similar to aortic body tumors, but the absence of follicular structure and lack of positive materials by PAS staining shows that the tumors did not originate from ectopic tissues.

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