Aortic Body Cell Tumor with Kidney Metastasis in a Dog[1]

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Abstract

In this case, a male Terrier dog, 14-year-old evaluated with a history of cardiac arrhythmias, coughing, rhinorrhagia and exercise intolerance for six months. The dog was died upon worsening of clinical signs. At necropsy, two masses of various sizes were observed in the heart-base region. Microscopically, cells from masses were atypical and polyhedral with eosinophilic-granular cytoplasm and basophilic nucleus with round to oval shape. The neoplastic cells were divided into lobules by connective tissue forming nests. In addition to these findings, metastasis to the left kidney was observed. Immunohistochemically, the tumor cells from both primary and metastatic tissues showed immunoreactivity to monoclonal mouse anti-neuron specific enolase antibody but were negative for cytokeratin, vimentin, chromogranin A, α smooth muscle actin and S-100. Based on the clinical, histological and immunohistochemical findings, malignant aortic body tumor with left kidney metastasis was diagnosed in the present case.

Keywords: Aortic body tumor, Dog, Immunohistochemistry

INTRODUCTION

Chemodectoma is a tumor arising from chemoreceptor cells which regulate level of blood pH, carbon dioxide and oxygen. Chemodectoma represents both aortic body tumors and carotid body tumors [1]. An aortic body tumor is localized in the tunica adventitia of the aortic arch whereas a carotid body tumor is arised in the carotid artery. The tumors in dogs are mostly benign but rarely malign and metastases to spleen, liver, bone, lung and myocardium [2-5]. Immunohistochemically, aortic body tumor cells usually stain for anti-neuron specific enolase (NSE), chromogranin A and S-100 [6-11] antibodies. To the best our knowledge, a case of metastatic-aortic body has not been reported in veterinary literature in Turkey. The aim of this case is to evaluate diagnostic implications for this important neoplastic condition in dogs.

CASE HISTORY

A male Terrier dog, 14-year-old, was submitted with a history cardiac arrhythmias, coughing, rhinorrhagia and...
exercise intolerance to University of Erciyes, Faculty of Veterinary Medicine. The dog died two weeks later. Systemic necropsy was performed. Macroscopically two neoplastic masses were observed on the heart-base region. The first one was found between pulmonary artery and aorta (20x38x32 cm diameter) (Fig. 1). The second one was located upper the first one (40x35x34 cm diameter) (Fig. 1). The walls of truncus pulmonalis, arteria subclavia sinistra and truncus brachiocephalicus which are branches of aorta were thinner by press of tumoral mass. Out of this findings, no gross lesion and metastasis was seen other organs.

The sections were fixed in neutral-buffered formalin and processed routinely. All sections were stained with Haematoxylin-Eosin and stained immunohistochemically for cytokeratin, vimentin, chromogranin A, α smooth muscle actin, S-100 and NSE antibodies. Streptavidin-biotin peroxidase (SABP) complex method with a commercial kit (Invitrogen, USA) was used for immunohistochemistry and reaction was visualized by aminoethylcarbazole chromogen (AEC, Invitrogen, USA) (Table 1). Microscopically, neoplastic cells were polyhedral with eosinophilic-granular cytoplasm and basophilic nucleus with round to oval shape (Fig. 2) and were divided into lobules by connective tissue forming nests. The cytoplasm of some tumor cells contained vacuoles and the cytoplasmic boundaries were usually indistinct but occasionally distinct. Nuclear atypia was marked, and mitotic figures were common. By careful examination of sections of other organs, it was seen metastasis in the cortex of left kidney and cells of metastatic tumor tissue were similar to primary tumor cells (Fig. 2). The tumor cells from both primary and metastatic tissues showed immunoreactivity for NSE antibody but negative for cytokeratin, vimentin, chromogranin A, a smooth muscle actin and S-100. Immunostaining for NSE antibody was diffusely cytoplasmic of the neoplastic cells within in the tumor mass.

**DISCUSSION**

The malignant aortic body tumor is known to prefer local invasion of the pericardium, myocardium and walls of great vessels at the base of the heart. Metastasis is infrequent and it usually spreads to lung, liver and lymph nodes [3-5], in this case metastasis were seen in left kidney. These tumors in animals are regarded as non functional and space- occupying lesions. Therefore, tumor may lead to cardiac functional disturbance. In the present case, exercise intolerance and limping in left leg were important symptoms. This condition may occur due to the stenosis of arteria subclavia sinistra which is supplying left leg. Additionally, the construction of truncus brachiocephalicus may lead to cough. This clinical findings were not suggestive of neoplastic formation, but may relates to the neoplastic growth that leads to decreased blood flow. Aortic body tumors have been reported various brachycephalic dog breeds with sex predisposition and tumor usually seen male and 8 years-old-age or older dog [4,12]. Some brachycephalic breeds such as boxer, boston terrier and bulldog are most often affected [4,12]. Because of stenotic nares, long soft palate and distortion of pharyngeal soft tissues in

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<th>Table 1. Commercial name and dilution rate of the antibody</th>
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<td><strong>Table 1. Antikorların ticari ismi ve sulandırma oranları</strong></td>
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<td><strong>Specifity</strong></td>
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<tr>
<td>Vimentin (MS-129-P0)</td>
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<td>Cytokeratin (SC81714)</td>
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<td>S-100 (PAS-16586)</td>
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<td>ChromograninA (PA1-37445)</td>
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<td>Neuron spesific enolase (LS-C43890-1000)</td>
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<td>α-smooth-muscle actin (MS-113-P0)</td>
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Only NSE antibody positivity was detected in primer and metastatic tumoral cells.

**Fig. 1. a-** The first mass (thick arrow) and the second mass (thin arrow), **b-** The first mass that was well- circumscribed, white-grayish in colour (thick arrow), the second mass that was reddish in colour (thin arrow)

**Şekil 1. a-** Birinci kitle (kalin ok) ve ikinci kitle (ince ok), **b-** Beyaz- gri renkli sınırlı ilk kitle (kalin ok), kirmızımsı renkte ikinci kitle (ince ok)
Brachycephalic dog breeds may be seen chronic hipoxia and this condition possibility causes hyperplasia and afterwards, tumors of aortic body cells [13]. In the present case, 14-year-old male dog was a terrier, which was not a brachycephalic breed but morphologic, anatomic and histologic findings of this case consistent with previous descriptions of diagnosed aortic body cell tumors [8,9]. In this study, immunohistochemically, NSE, chromogranin A and S-100 antibodies were applied for aortic body tumor. On the other hand, cytokeratin, vimentin, α smooth muscle actin antibodies were used selectively to eliminate tumors which may be originated from mesenchymal, epithelial and other nervous system tumors. Both primer tumoral cells and metastastatic cells were strongly positive for NSE but negative for S 100, chromogranin A, cytokeratin, vimentin and α smooth muscle actin. But previously some studies was reported that aortic body tumoral cells were commonly positive for NSE, chromogranin A and S-100 antibodies [7,9]. The variability in negative staining for chromogranin A and S-100 may be related to grade of the neoplasia [14]. Previous studies also indicated that neuropeptides rate decreased in high grade tumors and chromogranin A and S-100 antibodies were positive staining in benign tumors while negative in high grade tumors [6,10,14]. In the present case, malignancy of tumor was high grade because of metastasis, high mitotic figure rate and pleomorphism. The findings of our study are consistent with conclusions of the previous reports. In this case, as a result of tumor localization with histopathological and immunohistochemical findings led us to diagnose aortic body tumor.

REFERENCES


