

Heart-base Tumors in Three Yorkshire Terriers

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Abstract : Three Yorkshire Terriers (12-year-old, 13-year-old, and 15-year-old castrated males) with respiratory distress, coughing and anorexia were the subjects of this report. In laboratory examinations, there were no remarkable findings. However, the thoracic radiographic findings included a large mass of soft tissue density in the cardiac base region, tracheal elevation, and aortic bulging in all three Yorkshire Terriers. There were no remarkable findings in the abdominal radiographs. In echocardiography, a homogeneous hyperechoic mass around the aorta and bicuspid valve regurgitation were found in all three dogs. There were no remarkable findings in abdominal ultrasonography. Computed tomographic findings showed a large well -defined heterogeneous mass in the cranial vena cava, which was dominant in the left side in all three Yorkshire Terriers. The mass sizes were about 3×4 cm. In post-contrast scanning, contrast enhancement was evident. These cases were diagnosed as heart-base tumor. Treatments provided to the three dogs were based on symptomatic medical management of cardiac failure and tracheal collapse. Case 1 (12-year-old) survived for 3 months, case 2 (13-year-old) for 5 months, and case 3 (15-year-old) for 32 months after the diagnosis. Our results show that the clinical findings, thoracic radiography, echocardiography, computed tomography (CT) and symptomatic medical management in dogs suspected to have heart base tumor.

Key words : Computed tomographic, heart base tumor, symptomatic medical management, Yorkshire Terriers.

Introduction

Heart tumors are not common in dogs and even more uncommon in cats (5,13). Like other tumors, cardiac tumors occur as primary and metastatic lesions. In human, the proportion of metastatic heart tumor is 20-40 times greater than primary heart tumor. However, even though the true percentage of primary and metastatic heart tumor is unknown in veterinary field, there are more reports of primary heart tumor than metastatic (2,3,7,15).

The most common cardiac tumor in human is myxomas (11), however malignant hemangiosarcoma is the most common cardiac tumor in dogs (1,2,9). Most primary cardiac tumors involve the right side of the heart, especially the right atrium in dogs. Aortic body tumors also occur relatively often in dogs and arise from chemoreceptor cells at the heart base. Cardiac myxoma, ectopic thyroid or parathyroid tumors at the heart base, pericardial mesotheliomas or other neoplasms are very rare but reported to occur (6,7,8,12,13). The functional role of neoplasms of the aortic and carotid bodies in animals is unknown, and structural lesions themselves can cause various clinical signs depending on their anatomical location and associated hemodynamic disturbance (4,13).

For tentative diagnosis, clinical history, physical examina-

tion, radiographic findings, echocardiographic or computed tomographic examination are performed. Ultimate therapies for patients with cardiac tumors are surgery, radiotherapy and chemotherapy. However, even with these kinds of therapies, the prognosis in dogs is poor and the average survival period is four months. Therefore, in most cases, treatments are limited to symptomatic medical management (10).

This case report shows the clinical findings, thoracic radiography, echocardiography, computed tomography (CT) and symptomatic medical management in heart base tumor of three Yorkshire Terriers.

Case

Three castrated male Yorkshire Terriers were present with respiratory distress, coughing and anorexia. Case 1 was 12-year-old and 3.4 kg, Case 2 13-year-old and 2.8 kg, and Case 3 15-year-old and 8 kg. In terms of complete blood counts (CBC) and serum biochemistry, there were no remarkable findings in all three dogs at the first visit.

Right lateral thoracic radiograph demonstrated a large mass on the heart base (Fig 1A) in all three dogs. In terms of ventrodorsal thoracic radiographic findings, a lobulated soft tissue opacity was overlying the craniodorsal aspect of the cardiac silhouette in the left hemithorax (Fig 1B). There were no remarkable findings in the abdominal radiographs.

In echocardiography, a homogeneous hyperechoic mass (2

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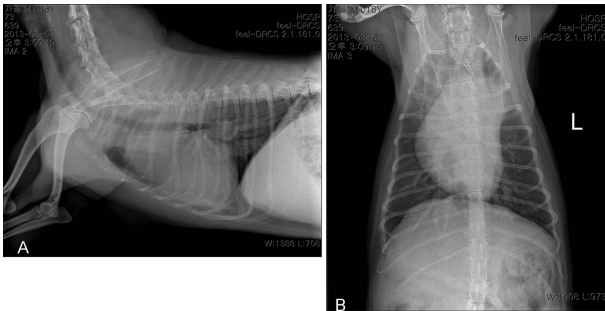


Fig 1. Thoracic radiograph of a dog A. A large mass on the heart base is shown on right lateral thoracic radiograph B. A lobulated soft tissue opacity overlying the craniodorsal aspect of the cardiac silhouette in the left hemithorax on ventrodorsal thoracic radiographic findings.

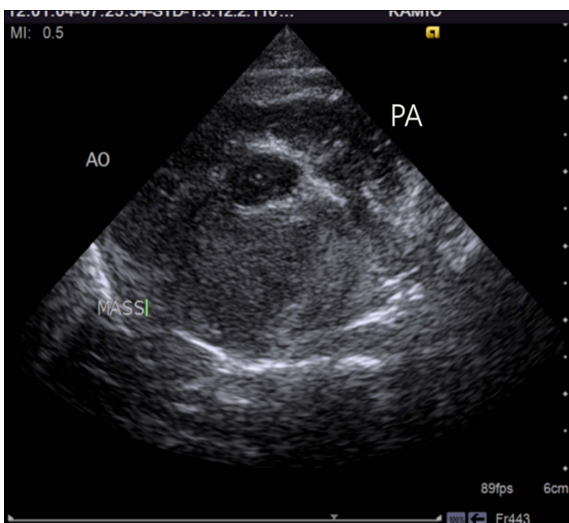


Fig 2. Echocardiography of a dog. A homogeneous hyperechoic mass (3 × 4 cm in Case 3) around the aorta was demonstrated.

× 3 cm in Cases 1 and 2, 3 × 4 cm in Case 3) around the aorta (Fig 2) and mitral valve regurgitation were found in all three dogs. There were no remarkable findings in abdominal ultrasonography. Computed tomographic findings showed a 4.2 × 4.8 cm well-defined mass which has the irregular con-

trast enhancement around the aorta. The mass was located in the medial and cranial part of main pulmonary artery to the 5th rib, which is identified as the aorta at the heart base region. The mass covered around the aorta evenly, and there was no specific anatomical change of the aorta. These phenomena occurred in all three dogs (Fig 3A, B). The three cases were tentatively diagnosed as heart base tumor through these results. Treatments provided to the three dogs were based on symptomatic medical management. Furosemide 1 mg/kg bid, Spironolactone 0.8 mg/kg bid, Benazepril 0.25 mg/kg bid, Aminophylline 10 mg/kg bid, Famotidine 0.5 mg/kg bid were administered.

The prognosis was different in all three dogs. Case 1 died 3 months after diagnosis and Case 2 5 months after due to respiratory distress. However, Case 3 survived 32 months from the date of the diagnosis of heart-base tumor until November 2013.

Case 3 was suffered from respiratory distress 16 months after diagnosis, therefore, Pimobendan 0.12 mg/kg bid was added to his prescription. The symptom was relieved after Pimobendan addition. However, 28 months after diagnosis, he was presented again with vomiting, diarrhea, polyuria and polydipsia. WBC was $22.1 \times 10^9/L$ and RBC was $9 \times 10^{12}/L$ in CBC, and only ALT was a little high (121 U/L) in serum biochemistry. The cortisol concentration (post-ACTH administration) was high (24 ug/dL). Based on cortisol concentration, Trilostane 5 mg/kg sid was given. After the Trilostane administration, the symptoms were relieved for four month until November 2013.

Discussion

Heart-base tumors arise either from the aortic body or carotid body chemoreceptor organs and are collectively termed chemodectomas or heart-base tumors (15). Interestingly, almost all primary cardiac tumors involve the right side of the heart. However, the lesions of all three dogs in this study were in the left side of the heart (13).

Unlike other reports, in which the relative age distribution of the subjects was varied among different tumor types, ages of the three dogs were similar (12, 13, 15 years old each).

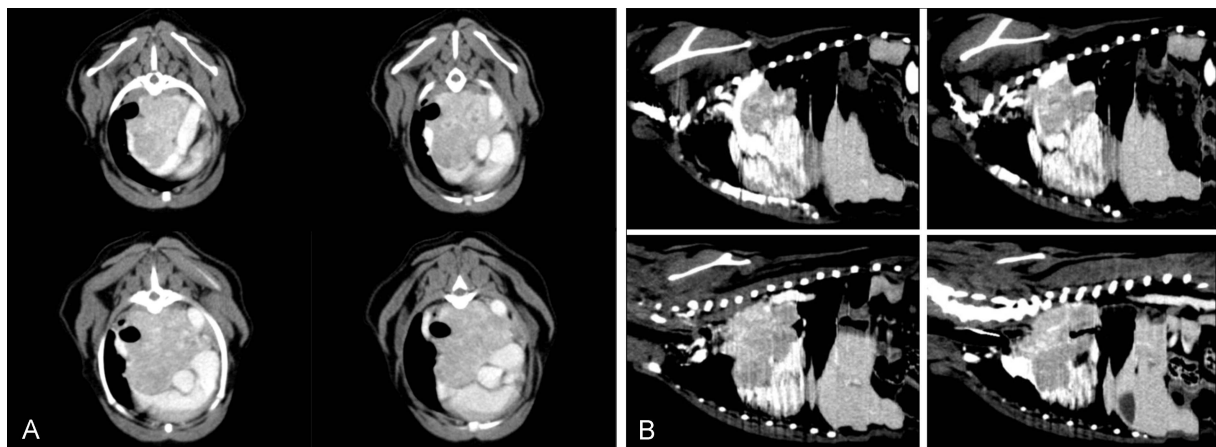


Fig 3. Computed tomographic (CT) of a dog. A. Transverse CT image showed a large soft tissue mass (4.2 × 4.8 cm) at the heart base. In post-contrast scanning, contrast enhancement was evident. CT images showed mass compression on the heart base B. Reconstructed sagittal view-based 3 dimensional reconstructed image revealed the mass at the heart base.

Other reports demonstrated that even with surgical resection of the tumor, the median survival length is 43 days in dogs (10). However, all three dogs in this study survived more than 43 days, one dog survived 3 months and the other survived 5 months. One of the subjects, whose age was 15 years old, survived for 32 months with only symptomatic therapy in this study, surprisingly.

Although the sizes of tumors in Case 1, 2 were smaller than that of Case 3 (2×3 cm in Cases 1 and 2, 3×4 cm in Case 3), only Case 3 survived. This might be because the body size of Case 3 was larger than Case 1, 2 compared to the size of the tumors.

The breeds of dogs which have higher risk of cardiac tumors are Saluki, French Bulldog, Irish Water Spaniel, Flat-Coated Retriever, Golden Retriever, Boxer, Afghan Hound, English Setter, Scottish Terrier, Boston Terrier, Bulldog, and German Shepherd (13). In this study, all three dogs are Yorkshire Terriers. Moreover, there was only one report on heart-base tumor in Korea, which was also on Yorkshire Terriers. We presume that there is a predisposition of the disease in Korean Yorkshire Terriers. One more interesting thing is that all of three dogs were castrated males. One report indicated that spayed females had a 338% greater risk of developing a tumor than intact females (13). And in the case of males, castrated males had a 63% greater risk of developing a tumor than intact males (13). This statistic results are corresponded with this study. With this result, we can suspect that the sex hormone and the heart base tumor have correlations.

Most studies are single case studies and the treatments for heart base tumor invasive, so the prognosis of the patients are poor. Rancilio et al. (2012) was the only case that provided an additional treatment option, using a three-dimensional conformal radiation therapy for a nonresectable heart base chemodectoma in the dog (3,10,14). Fortunately, we could gather the survival and conditional status of all three cases with heart base tumor. Of the 3, the prognosis of one case was good, surviving for 32 months without the additional treatment. However, we could not perform histopathologic confirmation for definitive diagnosis because the owners did not concur.

Acknowledgements

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세 마리 개에서 발생한 심저부 종양 증례

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요 약 : 본 증례는 호흡곤란, 기침과 식욕결핍으로 내원한 세 마리의 요크셔테리어 개 (12년령, 13년령, 15년령)를 대상으로 하였다. 실험실적 검사 상 특이소견은 없었다. 그러나 흉부 방사선 검사상 세 마리에서 모두 심저부위의 종괴를 확인할 수 있었고, 기관지의 상승과 대동맥 용기를 확인할 수 있었다. 복부 방사선 검사 시 특이 소견은 관찰할 수 없었다. 초음파 검사상 균질한 고 에코의 종괴가 대동맥 주위에서 확인되었고 이첨관 역류를 확인할 수 있었다. 복부 초음파 검사 상 특이소견은 관찰할 수 없었다. 컴퓨터 단층 촬영 결과 경계가 명확한 종괴를 좌측 앞대정맥에서 확인할 수 있었다. 종괴의 크기는 대략 3 × 4 cm였고 조영 증강을 확인할 수 있었다. 이상의 검사를 바탕으로 심저부 종양으로 진단하였다. 치료를 위해 심부전과 기관 허탈에 대한 대증 처치를 실시하였다. 진단 후 증례 1 (12년령)은 3 개월, 증례 2 (13년령)는 5개월, 증례 3 (15년령)은 32개월동안 생존하였다. 본 증례는 심저부 종양으로 의심되는 개에서의 임상증상, 흉부 방사선 검사, 컴퓨터 단층 촬영과 대증 처치에 대한 보고이다.

주요어 : 대증처치, 심저부 종양, 요크셔테리어, 컴퓨터 단층 촬영술