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Case Report

Secundum Atrial Septal Defect in a One-Year-Old Kangal Dog

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Abstract: A secundum atrial septal defect (ASD) was diagnosed in a 1-year-old Turkish Kangal dog after dissection for student education. The defect was 21.99 mm in maximum length and 8.37 mm in maximum width and was elliptical. The dog had no clinical disorders. This is the first case of a secundum ASD reported in an adult Kangal dog.

Key Words: Heart, congenital cardiac defect, foramen ovale, Kangal dog

Bir Yaşındaki Kangal Köpeğinde Sekundum Atrial Septal Defekt

Özet: Anatomi Anabilim Dalı'na eğitim amaçlı olarak getirilen bir yaşlı Kangal köpeğinde diseksiyonu takiben sekundum atrial septal defekt (ASD) görüldü. Defekt eliptik şekilde olup, 21,99 mm uzunluğa ve 8,37 mm genişliğe sahipti. Klinik olarak köpekte herhangi bir bulgu gözlenmemiştir. Bu olgu, ilk defa bir Kangal köpeğinde tespit edilen sekundum ASD olgusudur.

Anahtar Sözcükler: Kalp, kongenital kalp defekti, foramen ovale, Kangal köpeği

Introduction

Atrial septal defects (ASDs) are among the most common types of congenital heart defects in humans (1). In dogs and cats, ASD has been reported rarely (2,3). The defect results from a continued postnatal communication between the 2 atria due to a hole in the interatrial septum that fails to close (4). There are 3 types of ASD, namely ostium primum ASD, ostium secundum ASD and sinus venosus ASD (2,5). The position of ostium primum ASD is low in the interatrial septum, whereas ostium secundum ASD is at or near the fossa ovalis, and sinus venosus ASD occurs dorsal and cranial to the fossa ovalis (4,5). Primum ASD is more common in cats, whereas secundum ASD has been more frequently reported in dogs (6). This report describes the first case of secundum ASD in a 1-year-old Kangal dog.

Case History

A 1-year-old, male, Kangal dog of 25 kg bodyweight, with no known clinical disorder, was submitted to the Department of Anatomy from the Animal Production Research and Application Center of the Veterinary Faculty for student education. After the preparation of the cadaver with 10% neutral buffered formalin, routine dissection sets were used for cadaver dissection.

Results and Discussion

Macroscopically, the heart was normal in position and shape. After the dissection of the heart, an atrial septal defect was seen in the fossa ovalis of the interatrial septum (Figure 1). The defect, measured by electronic compass (Mitutoya Corporation, Kawasaki, Japan), was 21.99 mm in maximum length and 8.37 mm in maximum width and was elliptical. The edges of tissues surrounding the defect were regular (Figure 2). The atria and ventricles were normal in shape. No cardiac hypertrophy or dilatation was determined.

Tissue specimens surrounding the defect were fixed in 10% neutral buffered formalin, passed through alcohol and xylene series, embedded in paraffin, sectioned at 5-

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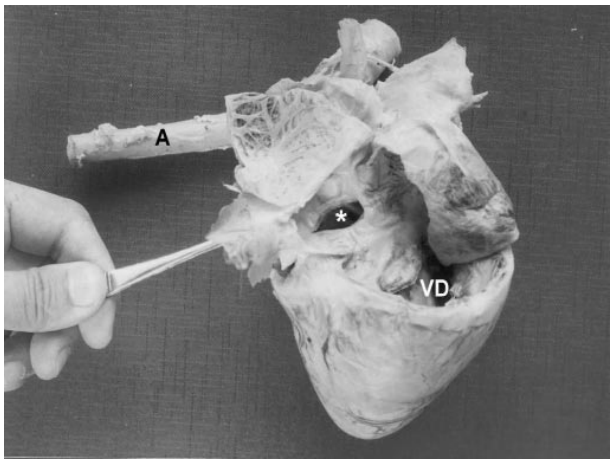

Figure 1. Heart; Kangal dog. Atrial septal defect viewed from the right atrial surface of interatrial septum. *: ASD, A: aorta, VD: ventriculus dexter.

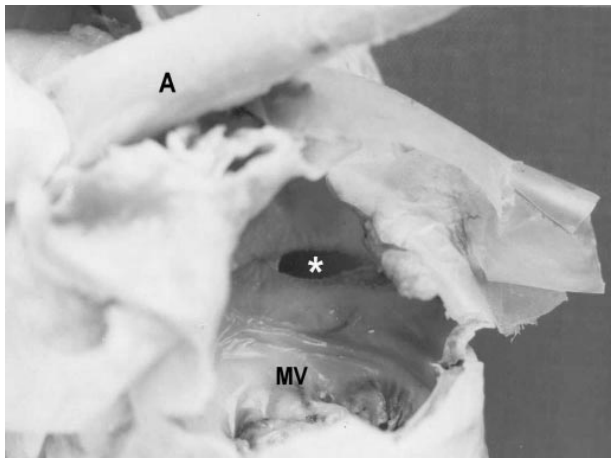

Figure 2. Heart; Kangal dog. Atrial septal defect viewed from the left atrial surface of interatrial septum. *: ASD, A: aorta, MV: mitral valve.

μm thickness and stained with hematoxylin and eosin. Histopathologically the areas surrounding the defect were composed of connective tissue, arranged as varying densities of collagen fibers, and in some areas muscle fibers originating from the endocardium were observed (Figure 3). Nervous tissue was not detected.

A hole found in the wall between the 2 atria is called an ASD after birth (5). There are 3 types of ASD (5) and ostium secundum ASD is the most common one observed in the dog (6,7). In our case, the hole was in the foramen ovale in the interatrial septum. Therefore, it was diagnosed as an ostium secundum ASD.

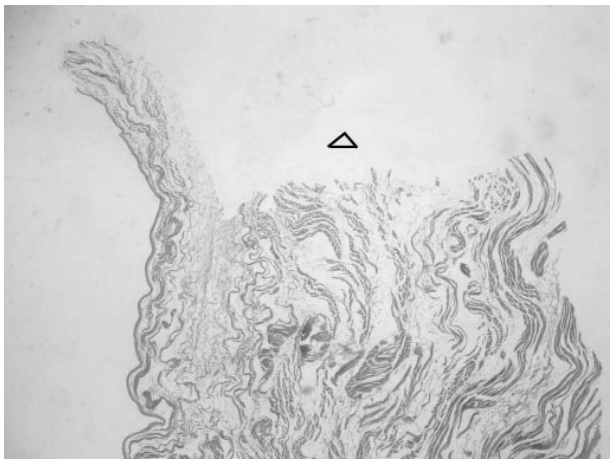

Figure 3. Heart; Kangal dog. Collagen and muscle fibers surrounding the foramen ovale. △ : ASD. 40 x original magnification.

The fossa ovalis, which is a remnant of the foramen ovale, varies in form and size. It can be elliptical, oval, kidney-shaped, and round, and is only large enough to admit a lead pencil (8). The average ASD size is 23 mm (9) and the area of the defect varies significantly during the cardiac cycle from 129 to 51 mm^2 in humans (10). In a survey study on Florida panthers, ASD was observed in 6 of 33 animals and the diameter of the defects was 3-15 mm (5). In our case, the defect was elliptical, and was 21.99 mm in maximum length and 8.37 mm in maximum width, with an area of approximately 144.48 mm^2.

Ostium secundum ASD is characterized by vague and usually nonspecific clinical signs when concurrent cardiovascular diseases are absent (11). Right-sided congestive heart failure usually occurs only when a large defect is present (12). The abnormalities seen in the heart are related to age (5). Even dogs with a large atrial septal defect and partial atrioventricular defects may exhibit no clinical signs during the first years of their life (13). In this study, the dog had shown no clinical signs and the heart was normal. This condition can be explained by the young age of the dog.

ASD is a rarely observed defect of animals such as dogs and cats (2). A genetic basis for ASD has been suspected and there is a known breed predisposition for ASD among boxers, Dobermans, Old English sheepdogs and Samoyeds (14). This is the first report on secundum ASD in a Kangal dog. The results of this report can be of benefit to all investigators studying Kangal dogs.

References

1. Loffredo, C.A.: Epidemiology of cardiovascular malformations: prevalence and risk factors. Am. J. Med. Genet., 2000; 97: 319-325.
2. Wilson, D.I., Cross, I.E., Goodship, J.A., Coulthard, S., Carey, A.H., Scambler, P.J., Bain, H.H., Hunter, A.S., Carter, P.E., Burn, J.: DiGeorge syndrome with isolated aortic coarctation and isolated ventricular septal defect in three sibs with a 22q11 deletion of maternal origin. Br. Heart J., 1991; 66: 308-312.
3. Kittleson, M.D.: Septal defects. In: Kittleson, M.D., Kienle, R.D., Eds. Small Animal Cardiovascular Medicine. Mosby, St Louis, 1998; 231-239.
4. Robinson, W.F., Maxie, M.C.: The cardiovascular system. In: Jubb, K.V.F., Kennedy, P.C., Palmer, N., Eds. Pathology of Domestic Animals. 4th ed., Academic Press, San Diego, 1993; 1-100.
5. Cunningham, M.W., Dunbar, M.R., Buergelt, C.D., Homer, B.L., Roelke-Parker, M.E., Taylor, S.K., King, R., Citino, S.B., Glass, C.: Atrial septal defects in Florida panthers. J. Wildl. Dis., 1999; 35: 519-530.
6. Kittleson, M.D., Kienle, R.D.: Small Animal Cardiovascular Medicine. Mosby, St. Louis, 1998; 218-296.
7. Hamlin, R.L., Smith, C.R., Smetzer, D.L.: Ostium secundum type interatrial septal defects in the dog. J. Am. Vet. Med. Assoc., 1963; 143: 149-157.
8. Dias, S.M., Orsi, A.M., Oliviera, M.C., Silva, Z.: Sur la morphologie de la fosse ovale du coeur chez le chien adulte (*Canis familiaris*). Anat. Histol. Embryol., 1979; 8: 168-171.
9. Holmvang, G., Palacios, I.F., Vlahakes, G.J., Dinsmore, R.E., Miller, S.W., Liberthson, R.R., Block, P.C., Ballen, B., Brady, T.J., Kantor, H.L.: Imaging and sizing of atrial septal defects by magnetic resonance. Circulation, 1995; 92: 3473-3480.
10. Maeno, Y.V., Benson, L.N., McLaughlin, P.R., Boutin, C.: Dynamic morphology of the secundum atrial septal defect evaluated by three dimensional transoesophageal echocardiography. Heart, 2000; 83: 673-677.
11. Guglielmini, C., Diana, A., Pietra, M., Cipone, M.: Atrial septal defect in five dogs. J. Small Anim. Pract., 2002; 43: 317-322.
12. Bonagura, J.D., Lehmkuhl, L.B.: Congenital Heart Disease. In: Fox, P.R., Sisson, D., Moise, N.S., Eds. Textbook of Canine and Feline Cardiology. 2nd ed., W.B. Saunders Co, Philadelphia, 1999; 471-535.
13. Santamarina, G., Espino, L., Vila, M., Suarez, M.L.: Partial atrioventricular canal defect in a dog. J. Small Anim. Pract., 2002; 43: 17-21.
14. Buchanan, J.W.: Causes and Prevalence of Cardiovascular Disease. In: Kirk, R.W., Bonagura, J.D., Eds. Kirk's Current Veterinary Therapy XI. Small Animal Practice. W. B. Saunders, Philadelphia, 1992; 647-655.