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Myxomatous mitral valve disease in a miniature poodle

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ABSTRACT: A 3.54 kg female Miniature Poodle presented with persistent daily cough. Examination revealed a cardiac murmur on auscultation, and blood pressure indicated systemic hypertension at 170/120 mmHg. Thoracic radiography demonstrated cardiomegaly with pulmonary edema, suggesting cardiogenic respiratory compromise. Color-flow Doppler echocardiography showed thickened, irregular mitral valve and endocardial surface, left atrial enlargement, and mitral regurgitation, consistent with valvular insufficiency. Based on clinical signs, radiographic findings, and echocardiographic abnormalities, the dog was diagnosed with stage C myxomatous mitral valve disease. Bronchitis and dilated cardiomyopathy were considered differential diagnoses. Prognosis was dubius-infausta because of congestive changes and advanced valvular dysfunction. Treatment consisted of pimobendan, enalapril, furosemide, and potassium L-aspartate supplementation.

Keywords:
dog, mitral regurgitation, myxomatous mitral valve disease, murmur

■ INTRODUCTION

Myxomatous Mitral Valve Disease (MMVD) accounts for more than 75% of all canine cardiac disease cases, primarily impacting small to medium-sized breeds, while occurrences in larger breeds have also been recorded (Parmar *et al*. 2022). This disease mainly involves the progressive degeneration of the mitral valve, located between the left atrium and ventricle. The degenerative process results in many morphological and functional abnormalities, including mitral valve prolapse and regurgitation, which may ultimately progress to congestive heart failure (CHF) in advanced stages (Lam *et al*. 2021). Canines with MMVD frequently exhibit mitral valve regurgitation because of the thickening and degeneration of the valve leaflets. Progressive cardiac remodeling linked to MMVD results in volume overload of the left atrium and ventricle, consequently exacerbating the clinical presentation of CHF. This article presents a case study of MMVD in a Miniature Poodle, highlighting the importance of comprehensive examination in confirming disease severity and designing therapeutic management.

■ CASE

Signalment: A 6-year-old female Miniature Poodle dog named Lovi, weighing 3.54 kg, was presented to the Petlove Center Veterinary Clinic, Jakarta. **Anamnesis**: The owner reported a history of near-daily coughing. The dog's vaccination history included rabies, DHPPi (canine distemper, hepatitis, parvovirus, and parainfluenza), and *Bordetella* vaccines. **Physical examination**: The rectal temperature was 37.7 °C, cardiac auscultation revealed a murmur, and all other regions (head, skin, limbs, etc.) were normal. **Ancillary examinations**: (1) Thoracic Radiography revealed cardiac dilatation (Figure 1); (2) Blood pressure measurement showed systemic hypertension, with an average reading of 172/120 mmHg; (3) Echocardiography with color-flow Doppler (Figure 2) demonstrated thickening of the mitral valve, endocardial thickening, left atrial enlargement, and valvular insufficiency consistent with mitral regurgitation. **Differential diagnoses**: bronchitis and dilated cardiomyopathy. **Diagnosis**: MMVD stage C. **Prognosis**: dubius-infausta. **Treatment**: Pimobendan 0.25 mg/kg PO q12h as an inodilator, Enalapril Maleate 0.5 mg/kg PO q12h, Furosemide 3 mg/kg PO q12h, and Aspar K® 300 mg (1/5 tablet) PO q12h for 15 days.

■ RESULTS AND DISCUSSION

Blood pressure was 170/120 mmHg, above normal range. Dogs with MMVD reportedly have higher systolic blood pressure than healthy dogs, typically 130–150 mmHg in breeds or asymptomatic stages (Petit et al. 2013). Hypertension is a common MMVD complication due to severe mitral regurgitation or comorbidity (Keene et al. 2019). Thoracic radiography revealed enlargement with a vertebral heart score (VHS) of 10.5 vertebrae (Figure 1); the VHS for Miniature Poodles was 9.94 ± 0.60 vertebrae (Na et al. 2022). Left atrial enlargement was confirmed by echocardiography (Figure 2); Lovi had a LAAs:AoDd ratio of 1.58:1 in the short-axis view (Figure 2A).

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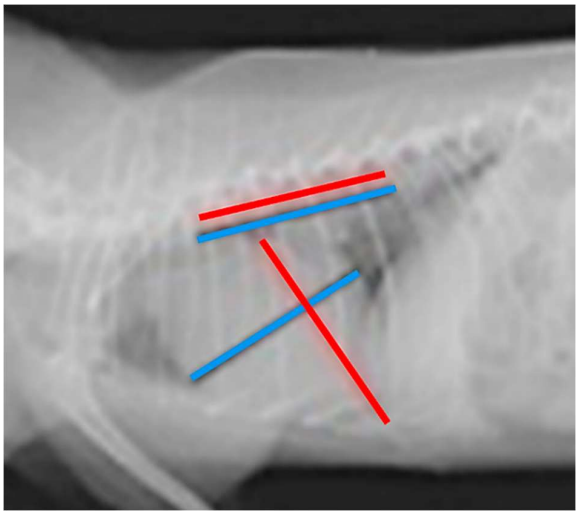

Figure 1. Right lateral thoracic radiograph showing cardiac enlargement. The red and blue lines represent the long and short cardiac axes used to calculate the VHS.

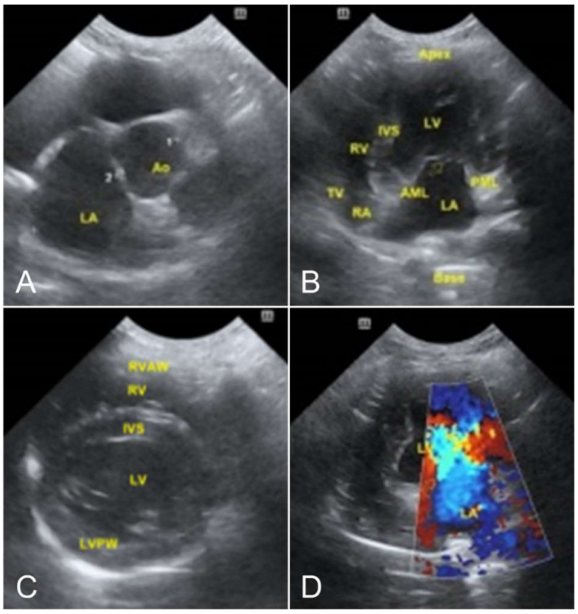

Figure 2. Echocardiographic findings of Lovi. (A) Enlargement of the left atrial chamber (LA), (B) thickening of the mitral valve leaflets (AML and PML), (C) endocardial thickening (LVPW), and (D) mitral valve regurgitation. Note: RVAW= Right Ventricular Anterior Wall, RV= Right Ventricle, IVS= Interventricular Septum, LV= Left Ventricle, RV= Right Ventricle, RA= Right Atrium, TV= Tricuspid Valve, Ao= Aorta.

Based on anamnesis, clinical signs, examination, and diagnostic testing, Lovi was diagnosed with MMVD. Degenerative mitral valve changes predispose to prolapse and regurgitation. Progression causes left-sided remodeling, with left atrial dilation from the regurgitant volume load (Figures 2A and 2D). Backflow from the left ventricle to the left atrium increases pulmonary and capillary hydrostatic pressure, causing pulmonary edema (Lam et al. 2021). In stages, MMVD is associated with weakness, syncope, cyanosis, systemic hypertension, pulmonary edema, and arrhythmia, indicating progression toward congestive heart failure (CHF) (Kim et al. 2017). Stage C MMVD, defined by CHF requiring therapy (Keene et al. 2019), was confirmed in chronic bronchitis and dilated cardiomyopathy.

The regimen included pimobendan, a cardiotonic vasodilator that enhances myocardial contractility in dogs with MMVD; enalapril maleate, an angiotensin-converting enzyme (ACE) inhibitor that improves outcomes in congestive heart failure (Sakatani et al., 2016); and furosemide for pulmonary edema. Potassium L-aspartate (Aspar K) was administered to prevent diuretic-induced hypokalemia. After therapy, the patient improved, with reduced coughing and respiratory effort, no adverse effects, and a stabilized condition.

■ CONCLUSION

This case confirmed stage C myxomatous mitral valve disease in a miniature poodle by thoracic radiography, blood pressure assessment, and Doppler echocardiography. Cardiomegaly, pulmonary edema, and mitral regurgitation indicate advanced disease.

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