

Clinical insights on severe dilated cardiomyopathy and atrial fibrillation in a young Pomeranian

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ABSTRACT: Dilated cardiomyopathy (DCM) and atrial fibrillation are severe cardiac conditions in small-breed dogs that are often linked to carnitine and taurine deficiencies. This case study assesses the effectiveness of carnitine supplementation and a cardiac-specific diet in a 4-year-old, 3.8 kg Pomeranian named Boxy, who presented with symptoms including appetite loss, vomiting, exercise intolerance, and dyspnea. Initial diagnosis revealed severe heart enlargement (VHS 16.2V), right auricular bulging, tracheal collapse, and atrial fibrillation. Treatment with Cardi-B, Capritazine syrup, and Royal Canin cardiac diet significantly improved after 30 days, with normalised blood pressure (103/59 mmHg) and a reduced VHS of 13.7V. Echocardiography revealed no tamponade. Boxy remains on daily Cardi-B and Royal Canin Cardiac for ongoing evaluation until the heart size and ECG readings normalise.

Keywords:

cardiac enlargement, dilated cardiomyopathy, atrial fibrillation, young dog, Pomeranian

■ INTRODUCTION

Heart disease commonly affects adult and senior dogs, especially in breeds predisposed to cardiac issues, such as Poodles, Pomeranians, Maltese, Bichon Frise, and brachycephalic breeds. The risk factors include obesity, poor nutrition, and metabolic disorders. Common symptoms include exercise intolerance, panting, weakness, and dyspnoea. The most frequent arrhythmias include sinus arrhythmia, atrial fibrillation (Pedro *et al.* 2020), ventricular tachycardia, premature beats, and atrioventricular blocks (Ward *et al.* 2016). Cardiac arrhythmias occur in 3.2% of the general dog population, increasing to 39.5% in those referred for ECG evaluations (Noszczyk-Nowak *et al.* 2017).

Diagnosis of heart disease in dogs involves ECG, echocardiography, X-ray, and BNP tests, with ECGs being crucial for monitoring heart rate, rhythm, and detecting coronary artery disease, heart attacks, and arrhythmias (Ferreira *et al.* 2023). Despite its life-threatening nature, heart disease is often overlooked due to a lack of awareness and diagnostic tools. A study in Jabalpur revealed 137 cases of cardiac disorders among 5,110 dogs (Sahoo *et al.* 2021), but no cases have been reported in Indonesia.

Heart disease is more common in dogs, with 6.8-8 cases per 1,000, compared to 0.2-1 per 1,000 in cats. Dilated cardiomyopathy (DCM), associated with carnitine and taurine deficiencies, is the most common myocardial disease in dogs (Richardson *et al.* 1996). This study explored the early diagnosis and targeted treatment of DCM and atrial fibrillation, particularly in small-breed dogs.

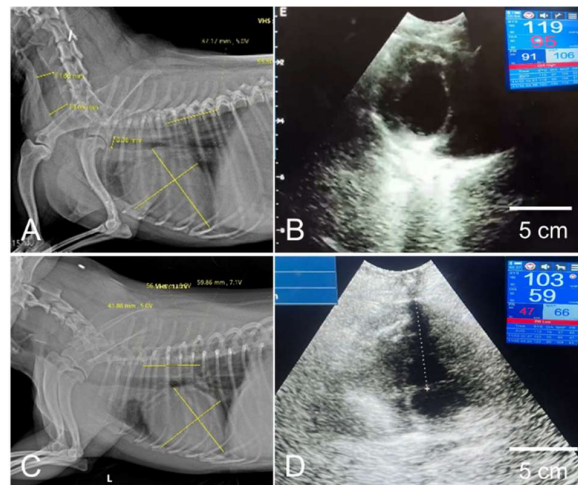


Figure 1. Radiographic and ultrasound images of the dog. (A) VHS of 16.2V, bulging right auricle, unstructured interstitial pattern, and tracheal collapse. (B) No tamponade in the right ventricle with a blood pressure of 119/95 mmHg. (C) VHS reduced to 13.7V and without tracheal collapse. (D) Right ventricle diameter of 25.4 mm (from RV apex to tricuspid valve), no tamponade, and normal blood pressure (103/59 mmHg).

■ CASE

Signalment: Boxy, a 4-year-old male Pomeranian, weighing 3.8 kg. **Anamnesis:** Boxy presented with symptoms of loss

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of appetite, vomiting, occasional coughing while lying down, exercise intolerance, panting, and dyspnea. **Clinical Signs:** Physical examination revealed high diastolic blood pressure (119/95 mmHg) and a heart rate of 114 bpm. **Diagnosis:** X-ray results showed a vertebral heart size (VHS) of 16.2V (severe enlargement), right auricular enlargement, unstructured interstitial pattern, and tracheal collapse. Echocardiography indicated no tamponade, and electrocardiography confirmed atrial fibrillation (Figure 1).

■ RESULTS AND DISCUSSION

Boxy, a 3.8 kg Pomeranian, was diagnosed with severe dilated cardiomyopathy (DCM) and atrial fibrillation due to carnitine and taurine deficiencies based on anamnesis, physical examination, and laboratory tests. After 30 days of treatment with Cardi-B (carnitine), capritazine syrup, and Royal Canin cardiac diet, Boxy's condition improved.

DCM can develop in dogs with carnitine and taurine deficiencies and supplementation often extends survival. In severe cases, it may lead to pulmonary artery hypertension secondary to left-sided heart failure. Electrocardiograms (ECG) help evaluate arrhythmias, but are insufficient to diagnose DCM alone (France & Adin 2004). Radiographs typically show cardiomegaly, left atrial enlargement, and pulmonary issues (Dukes-McEwan *et al.* 2003). M-mode and 2D echocardiography are crucial for the diagnosis of myocardial failure (Feldhütter *et al.* 2022).

Although DCM is rare in small breeds, Boxy's case is significant because of its size and nutrient deficiencies. Previous studies have highlighted the impact of low carnitine and taurine levels on breeds, such as Standard Schnauzers, Portuguese Water Dogs, and Cocker Spaniels (Harmon *et al.* 2017). Taurine supplementation improves the survival of affected dogs (Delaney *et al.* 2003).

Treatment with Cardi-B was continued once daily, with moderate heart enlargement still visible. A significant improvement in vertebral heart size (VHS) was observed during follow-up, indicating progress. Further echocardiographic assessments should focus on the left ventricular internal dimension in diastole (LVIDd) to monitor DCM progression (Figure 2).

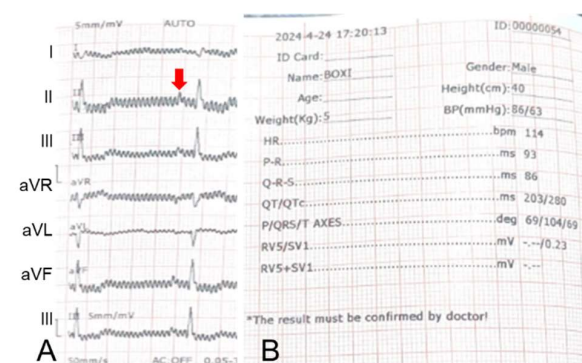


Figure 2. ECG on amplitude 5 mm/mv and paper speed 50mm/s, Lead II with interpretation irregular rhythm, no P-waves, wide QRS, T bi-phasic (elevated) (red arrow).

■ CONCLUSION

Diagnosing heart disease relies on X-rays, echocardiography, and electrocardiography as gold standards. Boxy is under treatment with carnitine and a Royal Canin cardiac diet for ongoing management, with regular monitoring to assess progress and adjust treatment as needed.

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