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# Partial pericardial defect with left auricular herniation in a dog with syncope<sup>☆</sup>

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## KEYWORDS

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**Abstract** Pericardial defects are rare in both people and dogs. They may be congenital or acquired in origin, and partial or total in extent. Commonly, pericardial defects are incidental findings at autopsy; however, diagnostic methods such as thoracic radiography and echocardiography can be useful in the ante mortem diagnosis of pericardial defects. This report describes the first case of a dog with syncope, supraventricular tachycardia, and a partial left pericardial defect with herniation of the left auricle for which extensive ante mortem diagnostic information was available. Partial absence of the pericardium should be considered in dogs with disproportionate enlargement of cardiac chambers for which other congenital and acquired heart diseases are ruled out.

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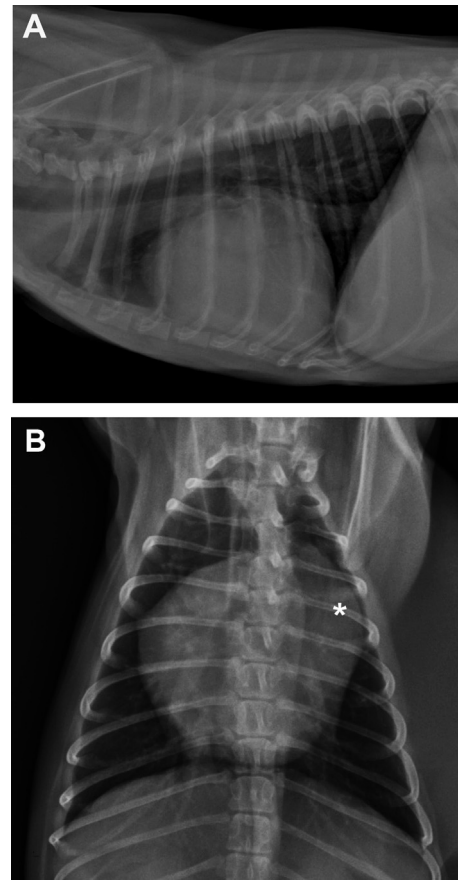
<sup>☆</sup> A unique aspect of the Journal of Veterinary Cardiology is the emphasis of additional web-based images permitting the detailing of procedures and diagnostics. These images can be viewed (by those readers with subscription access) by going to <http://www.sciencedirect.com/science/journal/17602734>. The issue to be viewed is clicked and the available PDF and image downloading is available via the Summary Plus link. The supplementary material for a given article appears at the end of the page. Downloading the videos may take several minutes. Readers will require at least Quicktime 7 (available free at <http://www.apple.com/quicktime/download/>) to enjoy the content. Another means to view the material is to go to <http://www.doi.org> and enter the doi number unique to this paper which is indicated at the end of the manuscript.

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A 14-year-old, spayed female, 3.3-kg Maltese dog was referred to the Ohio State University Veterinary Medical Center for frequent syncopal episodes. Three years prior to presentation, the dog was presumptively diagnosed with left-sided congestive heart failure based on the presence of a grade IV/VI systolic heart murmur and occasional cough. She was treated with oral furosemide (2.7 mg/kg q24h) and enalapril (0.5 mg/kg q24h) which resulted in resolution of the cough. Approximately two years later, the dog had three syncopal events over the course of two days with no obvious triggering events. Adjustments in the medical management at that time included the addition of pimobendan<sup>c</sup> (0.25 mg/kg q12h), an increase of the furosemide dose (2.7 mg/kg q8h) and the enalapril dose (0.5 mg/kg q12h). The dog was examined again seven months later by a board-certified veterinary cardiologist for occasional coughing and continued syncopal events. Degenerative mitral valve disease with mild regurgitation and mild acquired mitral stenosis, severe tricuspid valve prolapse with mild regurgitation, and pulmonary hypertension were diagnosed. The left auricle was found severely enlarged, possibly separated from the left atrium proper by a constricting membrane. Cor triatriatum was determined as the tentative main differential. An electrocardiogram revealed atrial ectopy with runs of atrial tachycardia, and diltiazem (1 mg/kg q8h) was added to the previous medical regimen. The dog continued to have syncopal episodes intermittently over the next three months at which time the dog was referred to the Ohio State University Veterinary Medical Center.

Upon presentation, the dog was bright alert and responsive with temperature, heart rate and respiratory rate and effort within normal limits. Differential diagnoses for syncope at the time of presentation included vasovagal mechanisms, pulmonary hypertension, poor cardiac filling and output leading to systemic hypotension, side effects of vasoactive drugs, and arrhythmogenic causes. Physical examination revealed a grade V/VI right parasternal holosystolic heart murmur, a grade IV/VI left apical holosystolic heart murmur and irregular and normokinetic arterial pulses. Doppler systolic blood pressure was 119 mmHg (reference range, 100–150), and a blood biochemical profile revealed mild azotemia (BUN 45 mg/dL, reference range 5–20) and hypokalemia (3.04 mmol/L, reference range 4.2–5.4). Thoracic radiographs identified mild generalized



**Figure 1** Right lateral (A) and ventrodorsal (B) thoracic radiographs of the dog. Note the large soft tissue density representing the border-forming the left auricle (asterisk) and mild left atrial enlargement.

cardiomegaly (vertebral heart scale 10.6; reference range 9.0–10.5) with prominent bulging of the cardiac silhouette visible in the ventrodorsal projection between 1 and 3 o'clock using clock face analogy suggestive of severe left auricular enlargement (Fig. 1A and B). A 6-lead surface ECG revealed sinus arrhythmia with frequent atrial premature complexes, brief runs of focal atrial tachycardia at a rate up to 375 bpm, and intermittent second degree atrioventricular block with decremental 2:1 to 6:1 atrioventricular nodal conduction (Fig. 2). Based on the morphology of the P' waves in the frontal plane, the arrhythmogenic substrate was assumed to be located near the roof of the left atrium. A comprehensive transthoracic echocardiographic study was performed after sedating the agitated dog with acepromazine (0.025 mg/kg, IM) and butorphanol (0.2 mg/kg, IM) using a sector transducer with a nominal frequency of 5.0 MHz<sup>d</sup> (Fig. 3 and online

<sup>c</sup> Vetmedin, Boehringer Ingelheim Vetmedica, Inc., St. Joseph, Missouri, USA.

<sup>d</sup> GE Medical Systems, Milwaukee, WI, USA.

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