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Balloon dilation of an imperforate cor triatriatum dexter in a Golden Retriever with concurrent double-chambered right ventricle and subsequent evaluation by cardiac magnetic resonance imaging

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KEYWORDS

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Abstract A 12-week-old male Golden Retriever was presented with signs of right-sided congestive heart failure and a grade V/VI left craniosternal systolic murmur. Echocardiography identified a double-chambered right ventricle and dilated coronary sinus (CS) running into an inter-atrial chamber. This was confirmed to be an imperforate cor triatriatum dexter (CTD) by selective angiographic studies. To the authors' knowledge this is the first case reported of imperforate CTD successfully treated by membranostomy and balloon dilation. Cardiac MRI confirmed the echocardiographic and angiographic findings and provided a more precise understanding of the venous abnormalities.

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Abbreviations

CdRA	caudal right atrium
CdVC	caudal vena cava
CrRA	cranial right atrium
CHF	congestive heart failure
CS	coronary sinus
CTD	cor triatratum dexter
DCRV	double chambered right ventricle
MR	magnetic resonance
PFO	patent foramen ovale
PLCVC	persistent left cranial vena cava
RVOT	right ventricular outflow tract

A 12-week-old male Golden Retriever was presented to the Small Animal Teaching Hospital of the University of Liverpool in June 2008 for further investigation of a cardiac murmur and signs of right-sided congestive heart failure (CHF).

On clinical examination the dog was small (7.15 kg) and in poor body condition. He had ascites, distension of the jugular veins and a positive hepatojugular reflux. A grade V/VI left cranio-sternal systolic murmur was detected on auscultation, radiating dorsally and throughout the chest but not to the thoracic inlet. Thoracic radiographs showed right-sided enlargement of the cardiac silhouette, widening of the caudal vena cava (CdVC) and unremarkable pulmonary vasculature and lung fields.

Doppler echocardiography showed subjectively mild dilation of the pulmonary trunk and main pulmonary arteries with no apparent abnormalities noted in the pulmonic valve leaflets at this stage of the evaluation (Fig. 1). A thin band of tissue in the right ventricular outflow tract, 24 mm beneath the pulmonic valves, was consistent with a double-chambered right ventricle (DCRV) lesion (Fig. 1). This was resulting in a pressure gradient of 45 mmHg in the right ventricular outflow tract (RVOT), causing mild concentric hypertrophy of the proximal right ventricle, and interventricular septum flattening. A dilated, spherical caudal right atrium (CdRA) was identified (Fig. 2A, B) with a dilated coronary sinus (CS) entering it, coming from the left atrioventricular groove (Fig. 2C). The CdRA had a small communication with the left atrium (patent foramen ovale, PFO), with right to left flow at peak velocity of 1.5 m/s. However there was no flow identified using colour flow Doppler echocardiography, between the CdRA and cranial right atrium (CrRA). Echocontrast studies,

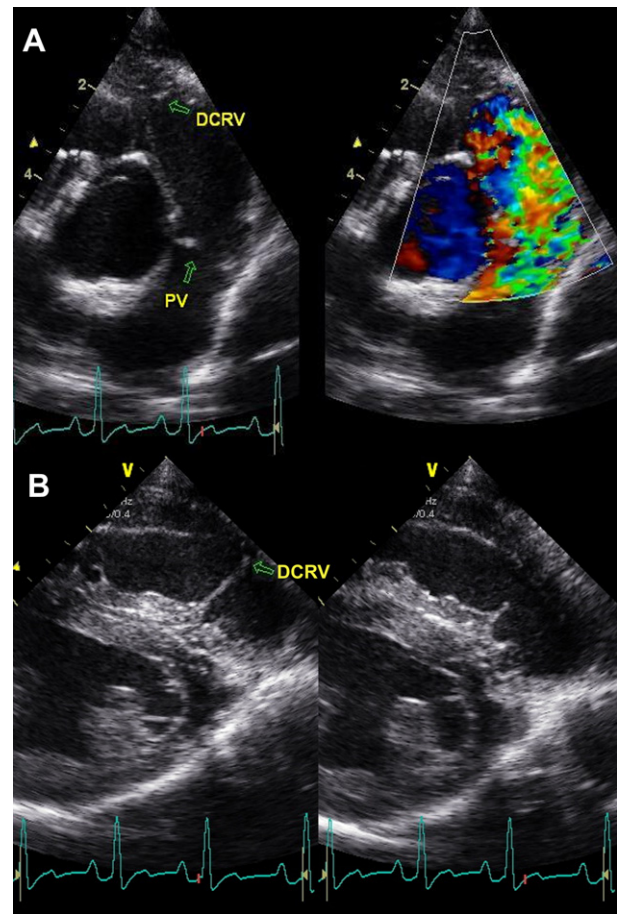


Figure 1 Echocardiographic examination of the right ventricle outflow tract. A) Simultaneous 2-dimensional and colour Doppler echocardiographic right parasternal short axis view, optimized for the right ventricular outflow tract, pulmonic valve leaflets (PV) and pulmonary trunk. A turbulent high velocity jet can be observed in early systole, originating at the double-chambered right ventricular (DCRV) lesion, with colour variance continuing into the pulmonary trunk. B) End-diastolic and early systolic echocardiographic frames obtained from the right parasternal short axis view at the level of the papillary muscles, optimized for the right ventricular outflow tract. It shows the sub-pulmonic fibrous diaphragm causing DCRV, with hypertrophy of the right ventricular free wall proximal to the DCRV lesion (apparent in the near field) and flattening of the interventricular septum.

using agitated colloid^e and saline^f solutions, mixed, 1:1, total volume 4 mL for each injection, were performed. Injection into the left cephalic and left saphenous veins both resulted in positive

^e Sodium Chloride 0.9%. Aquapharm Sodium Chloride 0.9% w/v. Animalcare Limited, Common Road, Dunnington, York, YO19 5RU. UK.

^f Hetastarch. Voluven 6%. Fresenius Kabi Limited, Cestrian Court, Eastgate Way, Manor Park, Runcorn, Cheshire. WA7 1NT. UK.

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