



PATIENT PRESENTING CLINICAL SIGNS

Cedar Belmont

Recently presented to our hospital for evaluation of dentition and heart murmur (grade 5/6, PMI over right thorax) was noted on exam. At 4 months of age, radiographs and cardiomegaly was noted. Owner reports he's been somewhat unthrifty and isn't gaining weight and is smaller size than expected. Abnormal PE/Chem/CBC/UA Results: Grade 5/6 right sided murmur. BCS 4/9 Radiographs - severe cardiomegaly, no pulmonary edema or pleural effusion.

SPECIES

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE HEART

BREED

Labrador Retriever

SEX

Male

AGE

7 Months

WEIGHT

20.8 kg

CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base; Swe)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT		3.2	NM		30		0.1
CANINE CARDIAC PARAMETERS	HR (BPM)	AV VMAX (m/s)	PV MAX (m/s)	BODY WEIGHT (kg)	LA 2D short axis Base view (cm)	LVIDd Avg; 2D and m-mode short axis (cm)	LVIDs Avg; 2D and m-mode short axis (cm)
NORMAL PARAMETER	50-100	0.7-1.7	0.7-1.6				
PATIENT		1.5	1.4		3.14	3.0	

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Jolee Stegemoller

HOSPITAL NAME

North Idaho AH

REFERRING VET

Dr. Jeffrey Poulsen

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33807

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12/29/21

Cardiac Presentation

The echocardiogram in this patient demonstrated normal **left atrial** size based on 3 separate methods of LA evaluation. The cranial and caudal **mitral** valve leaflets presented normal linear structure, extension in systole, and union in diastole with normal kinesis. The **left ventricle** presented paradoxical septal motion and septal flattening. The **myocardium** presented normal echogenicity without subjective evidence of significant fibrotic or ischemic disease. **Contractility** of the ventricular walls was adequate and in normal range for this patient evidenced by the fractional shortening measurement and subjective evaluation of the different regions of the myocardium. The **left ventricular outflow** tract demonstrated normal laminar flow and subjective structural integrity. **Tricuspid** valve revealed an elongated and clubbed free wall leaflet with a tethered and shortened septal leaflet with severe tricuspid insufficiency. Tricuspid insufficiency velocity of 3.2 m/sec is likely underestimated. Severe **right atrial** enlargement and **right ventricular** dilation noted. Inspissated blood was noted in the right atrium as well. This may be a precursor to clot formation. Atrial septal flattening also noted. No evidence of atrial septal defect. The **pulmonic** outflow was unremarkable other than volume overload. The visible **pericardial** or free pleura fluid was noted. The cranial **mediastinum and pericardial and extra-cardiac** regions were free of masses in the visible window. Hepatic veins were dilated and overdilated, consistent with emerging right-sided heart failure.

ULTRASONOGRAPHIC FINDINGS

- Right atrial enlargement and right ventricular dilation
- Severe tricuspid insufficiency



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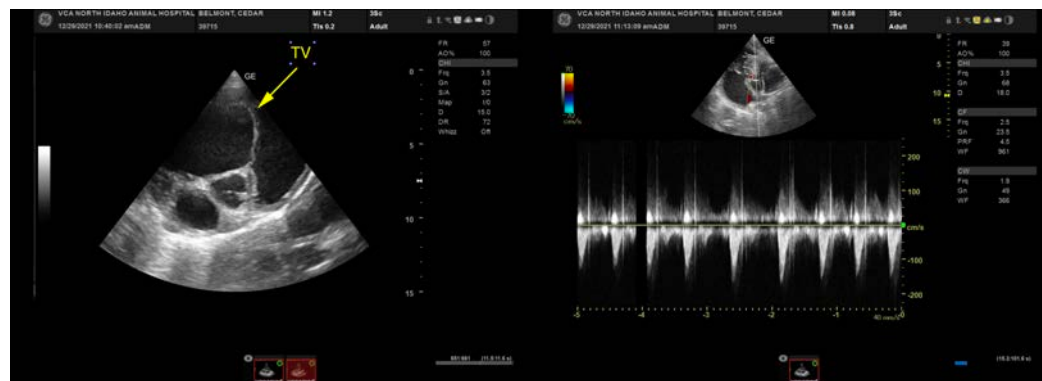
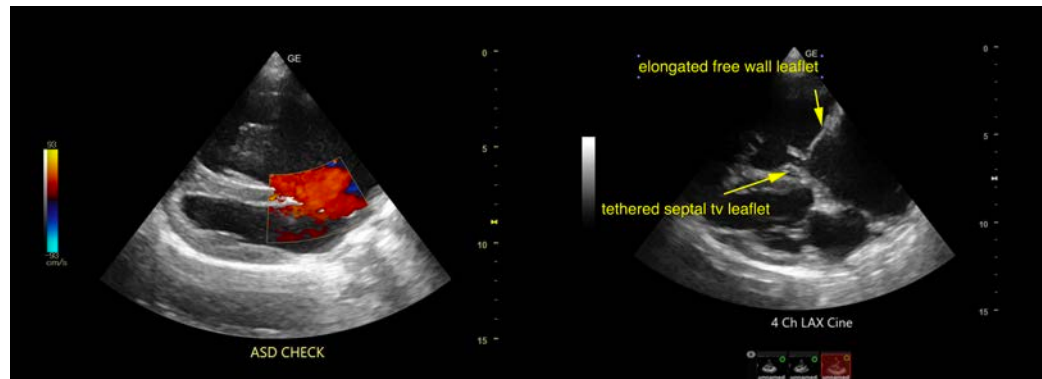
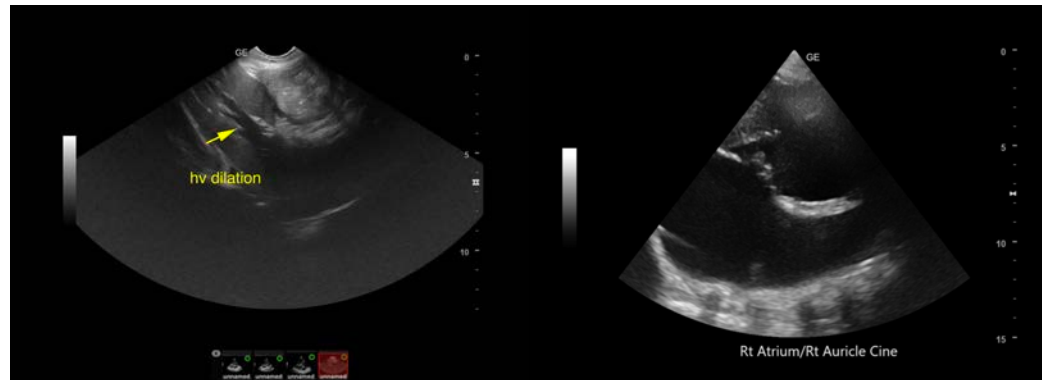
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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Cardiology referral recommended for further management. However, prognosis is extremely guarded to poor given the degree of right-sided volume overload. Breeding lines should be evaluated for similar tricuspid dysplastic changes.





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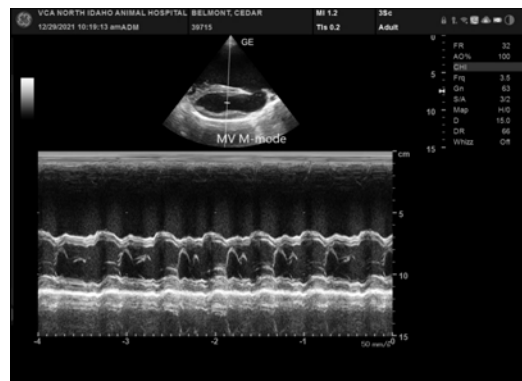
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AGE

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The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

Eric Lindquist, DMV, DABVP, Cert. IVUSS, CEO of SonoPath.com
info@SonoPath.com

Tricuspid Dysplasia

<http://www.sonopath.com/TVDysplasia>

<http://www.sonopath.com/EchoModler>

Description: Tricuspid dysplasia (TD) accounts for 3.1-7.5 % of congenital diseases in dogs; it is also sometimes found in cats. Predisposed breeds include the Labrador, Golden Retriever, Great Dane, German Shepherd, Irish Setter, and Boxer, as well as the Chartreux cat.



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Typical characteristics of TD include:

SPECIES

Canine

- Regional or diffuse thickening of the valvular leaflets
- Too short or missing chordae tendinae
- Dysplasia and hypertrophy of the papillary muscles
- Leaflets fixed to the septum
- Tricuspid insufficiency

BREED

Labrador Retriever

SEX

Male

Ebstein's anomaly is a congenital heart defect and a form of TD. It is characterized by an atrialized right ventricle in which the septal and posterior leaflets of the tricuspid valve are displaced toward the apex of the right ventricle, resulting in tricuspid insufficiency. This defect has been identified on chromosome 9.

AGE

7 Months

Clinical Presentation:

WEIGHT

20.8 kg

- Incidental finding (heart murmur without clinical signs)
- Palpable precordial thrill may be present at the right heart base
- Ascites (typically develops later on, if at all)
- Atrial fibrillation (most patients with ascites due to TD develop atrial fibrillation)

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

It should be noted that many patients remain asymptomatic for years.

IMAGING PERFORMED BY

Jolee Stegemoller

Diagnostics: Radiographic changes include right atrial and possibly right ventricular enlargement, as well as a dilated caudal thoracic vena cava, especially when right-sided congestive heart failure (CHF) occurs. Echocardiography will typically reveal right atrial and ventricular dilation, possible hypertrophy of the right ventricle, tricuspid insufficiency (velocity > 2.8 m/sec), and/or pulmonic insufficiency (velocity > 2.2 m/sec, which is consistent with pulmonary hypertension).

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REFERRING VET

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Treatment: No treatment is indicated if the right ventricle and atrium are not severely enlarged. Beginning treatment before the onset of clinical signs is controversial. In cases where ascites is present, one should conduct an abdominocentesis, which can be repeated, as needed, and administer pimobendan (0.25 mg/kg BID), enalapril (0.5 mg/kg PO Q12-24hr) or benazopril (0.25-0.5 mg/kg PO Q12-24hr), spironolactone (2-4mg/kg BID), and furosemide (2-3 mg/kg PO Q12-24hr). In cases of atrial fibrillation/supraventricular tachyarrhythmia, one should give digoxin (0.005 mg/kg BID) or diltiazem (0.5-2mg/kg TID).

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Prognosis: The prognosis depends on the severity of the condition; however, even severely affected dogs with early onset right-sided CHF can usually live for quite a long time.



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References:

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Canine

Chetboul V, Tran D, Carlos C, et al. Congenital malformations of the tricuspid valve in domestic carnivores: a retrospective study of 50 cases. *Schweizer Archiv fur Tierheilkunde* 2004;146:265-75.

BREED

Labrador Retriever

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SEX

Male

Famula TR, Siemens LM, Davidson AD, et al. Evaluation of the genetic basis of tricuspid valve dysplasia in Labrador Retrievers. *Am J Vet Res* 2002;63:816-20.

[Hoffmann G](#), [Amberger CN](#), [Seiler G](#), et al. Klinik für kleine Haustiere der Universität Bern.

AGE

7 Months

Tricuspid valve dysplasia in fifteen dogs. *Schweizer Archiv fur Tierheilkunde* 2000;142:268-77.

Johnson L, Boon J, Orton EC. Clinical characteristics of 53 dogs with Doppler-derived evidence of pulmonary hypertension: 1992-1996. *J Vet Int Med* 1999;13(5):440-47.

WEIGHT

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[Liu SK](#), [Tilley LP](#). Dysplasia of the tricuspid valve in the dog and cat. *J Am Vet Med Ass* 1976;169:623-30.

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

Oliveira P, Domenech O, Silva J, et al. Retrospective review of congenital heart disease in 976 dogs. *J Vet Int Med* 2011;25:477-83.

IMAGING PERFORMED BY

Jolee Stegemoller

Tidholm A. Retrospective study of congenital heart defects in 151 dogs. *J Small Anim Prac* 1997;3:94-98.

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