



**JAMES L. VOSS
VETERINARY TEACHING HOSPITAL
COLORADO STATE UNIVERSITY**

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Date: 9/25/2019
Patient ID: 1001069
Client Name: [REDACTED]
Patient Name: [REDACTED]
DOB: 7/6/2013
Species: Canine
Breed: Labrador Retriever
Sex: MC
Weight (kg): 34.2

Dismissal Date: 9/25/19

Student: [REDACTED]

Contact Veterinarian: [REDACTED]

Faculty Veterinarian: [REDACTED]

Cardiology Visit Report

PRESENTING COMPLAINT: Gander is a 6yo MC Labrador Retriever who was presented to CSU Cardiology on 9/25/19 for evaluation of a heart murmur.

CONCURRENT DISEASES: None

GENERAL MEDICAL HISTORY: Gander has had an unremarkable medical history up to this point. About three months ago, he got into a rat trap at the park and there was worry for rat bait toxicity, however, he did not display any signs afterwards. Gander goes on hikes every so often and has not shown signs of abnormal breathing after high energy activity. It has been apparent that he has had low activity levels throughout his life. Otherwise, he has been eating, drinking, urinating and defecating normally.

DIET AND SUPPLEMENTS: Purina Pro Diet, Fish oil supplements

CARDIOVASCULAR HISTORY: A grade II/VI systolic heart murmur was ausculted around 3 months ago. A veterinarian may have heard a heart murmur 2-3 years ago, but it was indefinite at the time.

Prior CHF Diagnosis: No Yes - If so, date of first episode:

Prior ATE: No Yes

Prior Arrhythmia: No Yes

Cough: No Yes

Shortness of breath or difficulty breathing: No Yes

• Additional furosemide administered: No Yes - if so, did it improve RR/RE: No Yes

Syncope or Collapse: No Yes

Sudden Onset Lameness: No Yes

Exercise Intolerance: No Yes

Appetite: Normal Decreased Increased

Prior Heart Murmur: No Yes

CURRENT MEDICATIONS (medication, formulation/tablet size, frequency, needs refills?): None

GENERAL PHYSICAL EXAMINATION:

Attitude: Bright, alert and responsive

Hydration Status: Euhydrated

Heart Rate: 76 BPM

Respiratory Rate: 20 breaths/min

Temperature: 99.1F (axillary)

MM Color and CRT: Pink. CRT = 2-3s

BCS (1-9): 6/9

Muscle Condition: Normal Mild Muscle Loss Moderate Cachexia Marked Cachexia

GI: Normal oral examination and dentition, abdomen soft and non-painful on palpation, no detectable organomegaly, masses or ascites. Rectal examination not performed.

MS: Ambulatory x4, symmetric muscling, minimal atrophy; no overt orthopedic abnormalities. Full orthopedic examination was not performed.

Neuro: Normal menace response and palpebral reflex, no gait abnormalities, no obvious neurologic deficits. Full neurologic exam was not performed.

INTEG: Generalized mild scale of the dorsum. No appreciable masses, alopecia, ectoparasites, or pruritis.

EENT: Eyes clear and visual OU with no ocular discharge. Mild ceruminous debris AU. Normal nasal planum with no nasal discharge.

PLN: Lymph nodes symmetric, non-enlarged, soft and freely movable on palpation.

CARDIOPULMINARY EXAMINATION:

Murmur Grade: None I/VI II/VI III/VI IV/VI V/VI VI/VI

Murmur Location/Description: Right sided systolic heart murmur

Jugular Venous Pulsation

- None
- Bottom 1/3 of neck
- Middle 1/3 of neck
- Top 2/3 of neck

Jugular Venous Distention

- Absent
- Moderate
- Severe

Arterial Pulse Quality

- Weak
- Fair
- Normal
- Strong
- Bounding
- Pulse Deficits
- Pulsus Paradoxus
- Synchronous

Arrhythmia

- None, NSR
- Sinus Arrhythmia
- Premature Beats
- Bradycardia
- Tachycardia

Gallop

- Yes
- No
- Intermittent
- Pronounced
- Other

Pulmonary Assessments

- Eupneic
- Mild Dyspnea
- Moderate Dyspnea
- Marked Dyspnea
- Normal BV Sounds

Abdominal Exam

- Normal with no abd. distension or palpable fluid wave
- Hepatomegaly
- Abdominal Distension
- Palpable Fluid Wave

- Increased BV Sounds
- Decreased BV Sounds
- Pulmonary Crackles
- Wheezes
- Upper Airway Stridor

DIAGNOSTIC PLAN:

- Comprehensive Echocardiogram
- Scanning Echocardiogram
- US Fluid Check
- ECG
- Blood Pressure
- Thoracic Radiographs
- Chemistry Profile
- Renal Profile
- NT-proBNP
- Troponin I
- Other Tests:

ELECTROCARDIOGRAM

HR: 101 bpm
 Rhythm: Sinus arrhythmia
 P wave duration: 0.05 s
 P wave amplitude: 0.6 mV
 PQ interval: 0.14 s
 QRS duration: 0.07 s
 R wave amplitude: 1.2 mV
 QT interval: 0.26 s
 Comments: P pulmonale

BLOOD PRESSURE

Cuff size: 4
 Location: Right forelimb
 Position: Sternal recumbency
 Average systolic measurement: 106 mmHg

ECHOCARDIOGRAM

General/2-D Findings:

Gander was sedated with butorphanol 0.4 mg/kg IM and acepromazine 0.02 mg/kg IM - adequate sedation achieved. The left ventricular wall thickness is normal and the LV cavity size is normal. The LV systolic function is mildly decreased based on FS 23%, mildly increased end-systolic dimension, and EF 53.8%. The left atrial dimension is normal. The mitral valve apparatus appears normal with no insufficiency. The aortic flow profile and velocity are normal. The right atrium is moderately dilated. The right ventricular wall thickness remains subjectively normal when compared to the LV with moderate RV dilation. There is severe tricuspid insufficiency present secondary to valvar dysplasia. The septal tricuspid leaflet is tethered to the septum, which is restricting motion. The parietal leaflet is attached to a papillary muscle. The mitral inflow velocities are summated. There is no pleural, peritoneal, or pericardial effusion. The hepatic veins do not appear distended.

Doppler Insufficiencies

Mitral Valve	Tricuspid Valve	Pulmonary Valve	Aortic Valve	Mitral Inflow Pattern
---------------------	------------------------	------------------------	---------------------	------------------------------

- | | | | | |
|------------------------------------------|--------------------------------------------|------------------------------------------|------------------------------------------|---------------------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> None | <input checked="" type="checkbox"/> None | <input checked="" type="checkbox"/> None | <input checked="" type="checkbox"/> Normal |
| <input type="checkbox"/> Trace | <input type="checkbox"/> Trace | <input type="checkbox"/> Trace | <input type="checkbox"/> Trace | <input type="checkbox"/> Delayed Relaxation |
| <input type="checkbox"/> Mild | <input type="checkbox"/> Mild | <input type="checkbox"/> Mild | <input type="checkbox"/> Mild | <input type="checkbox"/> Pseudonormal |
| <input type="checkbox"/> Moderate | <input type="checkbox"/> Moderate | <input type="checkbox"/> Moderate | <input type="checkbox"/> Moderate | <input type="checkbox"/> Restrictive |
| <input type="checkbox"/> Severe | <input checked="" type="checkbox"/> Severe | <input type="checkbox"/> Severe | <input type="checkbox"/> Severe | <input type="checkbox"/> Summated |
| <input type="checkbox"/> Not Eval. | <input type="checkbox"/> Not Eval. | <input type="checkbox"/> Not Eval. | <input type="checkbox"/> Not Eval. | <input type="checkbox"/> Not Eval. |

DIAGNOSIS AND ASSESSMENT

1. Tricuspid Valve Dysplasia
2. Mildly decreased LV systolic function - r/o diet related vs. variant of normal

TREATMENT GOALS AND RECOMMENDATIONS

Gander required sedation for a BP and echocardiogram. Initially 0.2mg/kg butorphanol IM did not lead to adequate sedation. To reach appropriate sedation, he was administered an additional 0.2mg/kg butorphanol IM and 0.02mg/kg acepromazine IM. Echocardiography revealed tricuspid valve dysplasia with severe tricuspid regurgitation and moderate right atrial and ventricular enlargement. Right heart failure is a common sequelae of tricuspid valve dysplasia, which Gander may develop if the disease process continues to progress. We recommended rechecking Gander annually through CSU Cardiology to monitor for progression of disease.

Additional recommended diagnostics: None

Medications: None

Exercise: Avoid strenuous activity that would lead to over-exertion.

At Home Monitoring: Please monitor for signs of right-sided heart failure at home such as labored/difficulty breathing, collapse/fainting/weakness, decreased appetite, and abdominal distension.

PROGNOSIS

Short term prognosis is fair to good given that Gander is asymptomatic. Long term prognosis is poor for severe TVD with dogs typically developing CHF early in life.

Veterinarian Approval:


Cardiology resident

Normalized Reference Ranges	Normalized Value	95% CI	
Left Ventricle Diastole			
IVSd	0.37	0.29	0.59
LVIDd	1.36	1.27	1.85
LVPWd	0.40	0.29	0.6
Left Ventricle Systole			
IVSs	0.45	0.43	0.79
LVIDs	0.97	0.71	1.26
LVPWs	0.50	0.48	0.87
left Atrium		0.63	0.96
Aorta		0.59	0.97

2D Measurements		95% CI
Aorta (2D) (mm)(Rishniw)	23.8	
LA (2D) (mm) - (Rishniw)	32.1	
LA / AO (2D)(Rishniw)	1.3	<1.6
Aorta (2D) (mm)(Swedish)	24.8	
LA (2D) (mm) - (Swedish)	32.1	
LA / AO (2D)(Swedish)	1.3	<1.3
Main PA diameter (mm)	19.7	
MPA / AO	0.79	.80 - 1.15
Ao root (long axis) (mm)	17.90	
LA dimension (4 chamber)	29.40	
LA/AO (4ch)	1.64	<2.5
LV Length - d (mm)		
LV Length - s (mm)		
LV Sphericity		>1.64
Simpson LV d vol (ml)		
Simpson's LV d Vol index (ml/m ²)		
Simpson's LV s vol (ml)		
Simpson's EF		
LV Area d (cm ²)		
LV Area s (cm ²)		
LV area % Δ		

Echocardiographic Measurements			
		95% CI	
Septum - d (mm)	8.6	10.6	12.0
LV chamber - d (mm)	38.7	33.2	44.9
LV wall - d (mm)	9.1	8.6	9.7
Septum - s (mm)	10.6	16.2	17.7
LV chamber - s (mm)	29.8	19.6	29.9
LV wall - s (mm)	11.1	13.8	15.3
Fractional shortening (%)	23.0	30.0	46.0
Heart rate			
Aorta (mm)		26.8	28.7
Left atrium (mm)		25.2	27.7
LA / AO		0.8	1.3
EPSS (mm)	7.9	<7.7	
IVSd / LVIDd	0.22	0.22	0.34
LVIDd / LVPWd	4.3	>3	<5
PEP (msec)		47	61
LVET (msec)		144	174
PEP / LVET		<.40	

Doppler Measurements		Normal
Aortic Flow (m/sec)	1.1	<2.0
Aortic Flow PG (mm Hg)	4.8	
Pulmonary Artery Flow (m/sec)	0.9	<1.6
Pulmonary Artery Flow PG (mm Hg)	3.2	
Pulmonary Artery Flow acc time (ms)		52 - 120
Pulmonary Artery Ejection Time (ms)		
PA Acc time / Ejection time		>.32
Tricuspid Reg (m/sec)	2.4	<2.5
Tricuspid Reg PG (mm Hg)	23.8	
Mitral Reg (m/sec)		
Mitral Reg PG (mm Hg)		
Mitral Valve E (m/sec)	0.33	.52 - .81
Mitral Valve A (m/sec)	0.23	.45 - .78
MVE / A	1.43	.68 - 1.42
MV Edt (msec)		72 - 81
Isovolumic Relaxation Time (msec)		31 - 73
MVE / IVRT		
MLAP predicted from IVRT and MVE		



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Patient Name: Gander
DOB: 7/6/2013
Species: Canine
Breed: Labrador Retriever
Sex: MC

CARDIOLOGY DISMISSAL INSTRUCTIONS

Dismissal Date: 9/25/19

Student: Troy Cabral

Contact Veterinarian: Sloan, Caroline

Faculty Veterinarian: Ames, Marisa

Diagnosis:

1. Tricuspid Valve Dysplasia
2. Mildly decreased LV systolic function - r/o diet related vs. variant of normal

Clinical findings: Thank you for bringing Gander in for evaluation of his heart. Gander was diagnosed with Tricuspid Valve Dysplasia on an echocardiogram (heart ultrasound). The contractility of his heart muscle was also mildly decreased, which may be related to his previous grain free diet history or may be a variant of normal. This is not a concerning finding at this time.

Tricuspid valve dysplasia means the tricuspid valve does not close appropriately and allows regurgitation of blood across the tricuspid valve. The severe tricuspid regurgitation is resulting in severe volume overload and severe dilation of the right sided chambers. Gander may develop congestive heart failure some time in his life span or he may never develop heart failure as his disease progression appears to be slow. It is difficult to predict when/if that will occur. The prognosis after the onset of congestive heart failure is around 6-12 months. Treatment for tricuspid valve dysplasia is limited. There are no medications shown to slow disease progression. Open heart surgical repair may be considered in the future if Gander appears closer to developing congestive heart failure.

Monitoring at home:

Please monitor for signs of right-sided heart failure at home such as labored/difficulty breathing, collapse/fainting/weakness, decreased appetite, swelling of the abdomen and increased resting breathing rate.

Medications: None at this time. We recommend using Trazodone (at least 150 mg) 30 minutes before appointments with a veterinarian to reduce stressful experiences for Gander.

Diet suggestions: Continue current diet (Purina Pro). Avoid grain-free or exotic diets.

Exercise Recommendations: Restrict strenuous activity that would lead to overexertion.

Recheck Visits:

Gander should have recheck visits and echocardiogram every 12 months or sooner if clinical signs develop.

Prognosis:

Short-term prognosis: Good with absence of clinical signs.

Long-term prognosis: Variable depending on progression of disease. Since Gander has not shown any abnormal signs up to this point, it appears that his Tricuspid Valve Dysplasia is progressing slowly. It is possible that this disease will not lead to heart failure, but this is dependent on a case-by-case scenario.

Thank you for entrusting us with Gander's care. Please do not hesitate to contact the CSU Cardiology Service at 970-297-5000 or VTH_cardiology@colostate.edu with any questions or concerns.

Veterinarian Signature:


Cardiology resident