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Clinical Sonography & Telecytology
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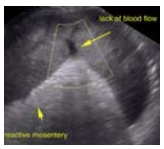
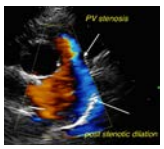
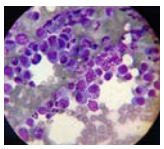
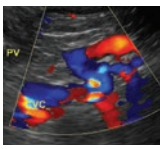

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1-800-838-4268 info@sonopath.com

PATIENT
Lizzy Baronio

SPECIES
Canine

BREED
Doberman

SEX
Female

AGE
11 Months

WEIGHT
88.1 Pounds

INTERPRETED BY
Lisa Carioto, DVM, DVSc, Diplomate ACVIM

IMAGING PERFORMED BY
Dr. Alex McFeely

HOSPITAL NAME
Straley Vet Associates

REFERRING VET
Dr. Alex McFeely

INVOICE
39369

DATE
7/8/22

PRESENTING CLINICAL SIGNS

Lizzy presented for a cardiac diagnostic work-up today to establish a baseline. According to the Embark DNA testing, she has 1 copy of the DCM1 (PDK 4) gene and 2 copies of the DCM2 (TTN) gene, so is potentially at increased risk for development of dilated cardiomyopathy. Lizzy was lightly sedated with 8mg butorphanol IV today for the ultrasound, and her BP was normal ranging from 121/67 (85) to 129/79 (96) mmHg systolic/ diastolic (MAP). Her chest radiographs looked normal with a VHS of 9.5.

ULTRASONOGRAPHIC EXAMINATION OF THE HEART

CANINE CARDIAC PARAMETERS	**MR VMAX** (m/s)	**TR VMAX** (m/s)	**LA/AO** (Boon method)	**LA/AO** (Heart Base; Swedish)	**FS** (%)	**EF** (%)	**EPSS** (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT	Trivial, not measurable	NM	1.17 = 1.2	1.34	24 (acceptable for Doberman	NM	0.57
CANINE CARDIAC PARAMETERS	**HR** (BPM)	**AV VMAX** (m/s)	**PV MAX** (m/s)	**BODY WEIGHT** kg	**LA** 2D long 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	--	NM	0.50	40.0	3.46	4.34	3.29

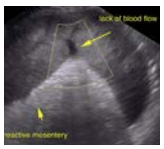
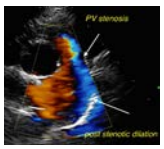
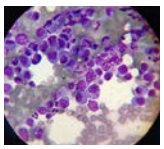
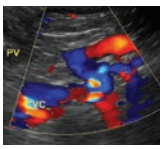
Adapted from June Boon, Veterinary Echocardiography, 1998
Sisson D et al. JVIM 1991; 5: 232, and Jacobs et al. Am J Vet Res 1985; 46:1705

Echocardiographic findings

No ECG, but sinus arrhythmia during echocardiogram

Mitral valve

- No abnormalities with valve leaflets
- No prolapse of leaflets
- Trivial mitral regurgitation
- No left auricular enlargement
- LA: Ao ratio: within normal limits (WNL)
- LA normalized for BW (LAN = 0.98), WNL
- LVIDd normalized for BW (LVIDND = 1.47), WNL
- LVIDs normalized for BW (LVIDNs = 1.03), WNL

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Aortic valve

- No obvious abnormalities
- Not evaluated

Tricuspid valve

- No abnormalities with valve leaflets
- No prolapse of leaflets
- Not evaluated
- No right ventricular, atrial or auricular enlargement

Pulmonic valve

- Not visualized
- No pulmonary insufficiency
- Main pulmonary artery within normal limits

Other

- No signs of pericardial or pleural effusion
- No evidence of pulmonary edema.

ULTRASONOGRAPHIC FINDINGS

Lizzy's results are within the normal reference ranges for a Doberman*, however, they are at the high end of the normal reference range. The caveat is that it is not possible to determine the effect of sedation on the results, therefore, her results may, in fact, be superior.

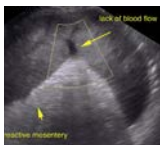
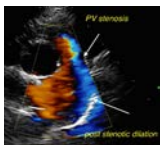
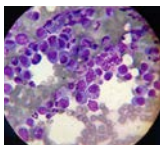
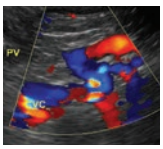
As a precaution, a re-evaluation of Lizzy's echocardiogram is recommended in 6-8 months to ensure the results remain stable. A Holter monitor is also suggested.

*Per the European Society of Veterinary Cardiology screening guidelines for dilated cardiomyopathy in Doberman Pinschers (Journal of Veterinary Cardiology (2017) 19, 405-415)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Suggestions/recommendations include:

- Evaluation of blood pressure; performed and well within the normal reference range.
- Monitoring of the resting (sleeping) respiratory rate (RRR) may be started to obtain a baseline, for example, once or twice a month. The RRR should NOT EXCEED 30 breaths per minute (bpm). If the respiratory rate is greater than 30 bpm, *or* if there is a gradual increase (over a day or two) toward 30 bpm, the patient should be evaluated immediately for congestive heart failure and the appropriate treatment initiated.

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- Although unlikely to occur, clinical signs clients should monitor for in case of decompensation of cardiac function, include coughing (particularly at night), fatigue, lethargy, decreased exercise tolerance (i.e., not being able to walk for as long before becoming tired, or "running out of breath" while playing, or going up and down stairs, as well as syncope (collapsing or fainting spells). Restlessness, or agitation during the night, or being unable to find a comfortable position to sleep are also very common clinical signs.
- Mild salt restriction is suggested (less than 0.9 grams/1000 kcal of food). Monitor salt content in treats.
- Omega-3 fatty acids may be helpful (EPA = 40 mg/kg/day and DHA = 25 mg/kg/day); gradual uptitration of the dose is suggested (once every 3-5 days) to decrease risk of gastrointestinal effects.
- Monitoring for progression of heart disease with a re-evaluation of an echocardiogram in 6 to 8 months, as well as a Holter monitor, is recommended.

If general anesthesia is required in the future, certain precautions are suggested. The following protocol or something similar may be pursued. *Note, this is being overly cautious in Lizzy's case.*

- Premedication with an opioid, such as hydromorphone, butorphanol, or methadone, +/- *low dose* of midazolam. Avoid dexmedetomidine (label indications).
- Avoid acepromazine, atropine and glycopyrrolate. The latter two drugs should only be considered if a patient becomes bradycardic during the procedure.
- Preoxygenation for 10-15 minutes (minimum 5 minutes).
- Induction with alfaxalone, or propofol, if alfaxalone is not available. Avoid ketamine, if possible.
- Monitor arterial blood pressure during the procedure. The mean blood pressure should be between 90 - 100 mm Hg. If the patient's blood pressure is decreased, dobutamine is suggested, i.e. fluid boluses should *not* be administered to avoid volume overload and congestive heart failure.
- The intravenous fluid rate should be approximately ¼ of the DAILY maintenance requirements, or 1.75-2 ml/kg/hour to avoid fluid overload.
- Local anesthetic blocks are strongly recommended to decrease MAC and the amount of isofluorane necessary, as the latter tends to cause hypotension, particularly in cardiac patients.
- *Two shorter procedures are preferable to performing one long procedure, e.g. a long dentistry.
- One could consider sending the patient home with *furosemide in case of an emergency*.
- Monitoring the patient's resting respiratory (breathing) rate twice a day for 4-6 weeks following general anesthesia is suggested to monitor for signs of decompensation of heart disease.
- Do **not** administer the pimobendan (Vetmedin) the morning of general anesthesia.

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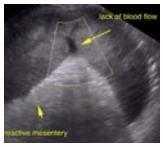
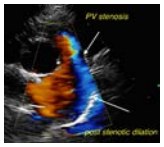
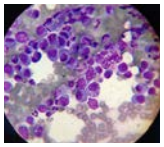
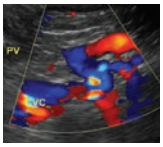

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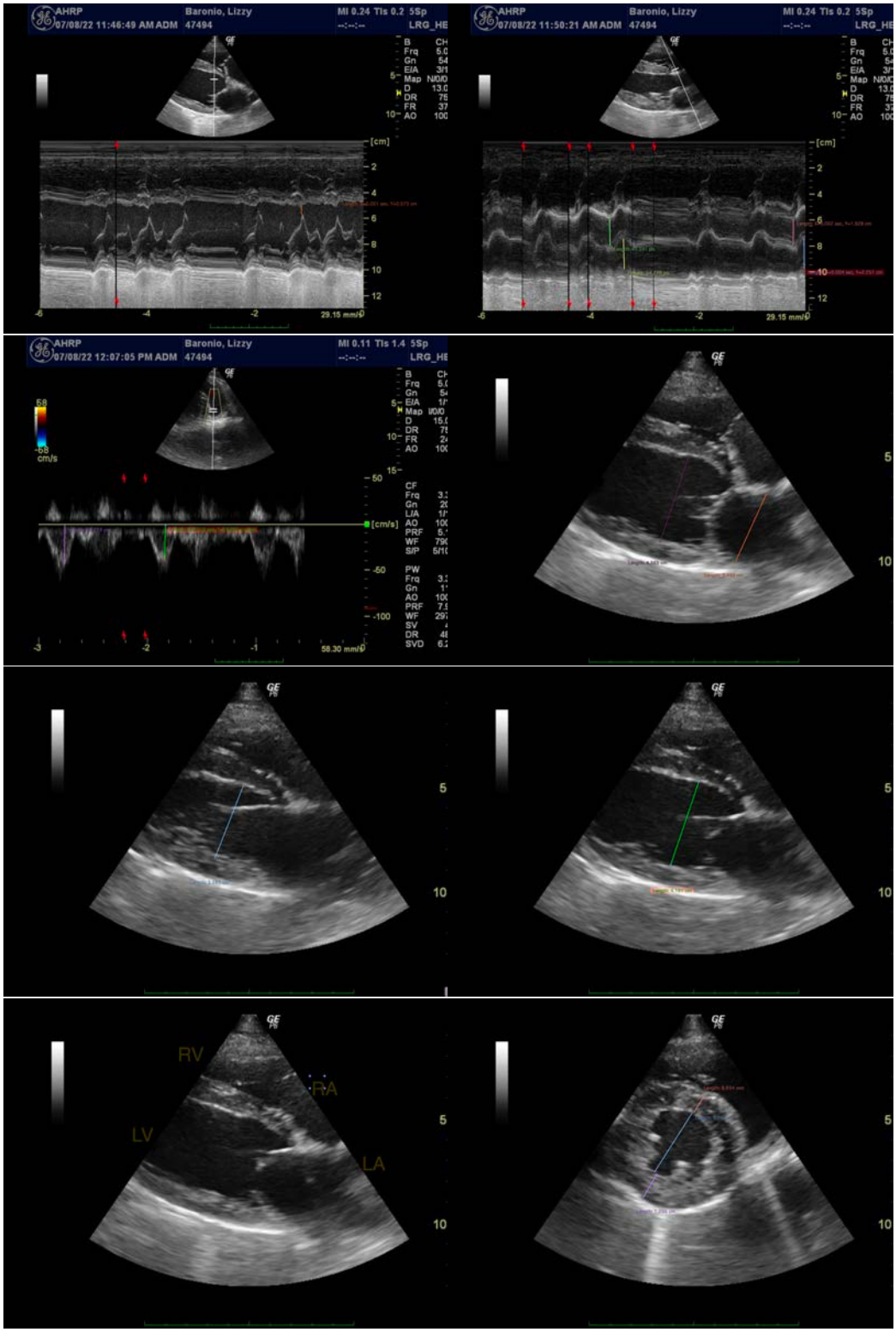

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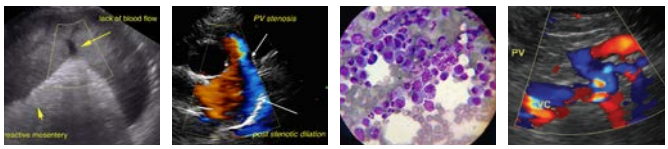

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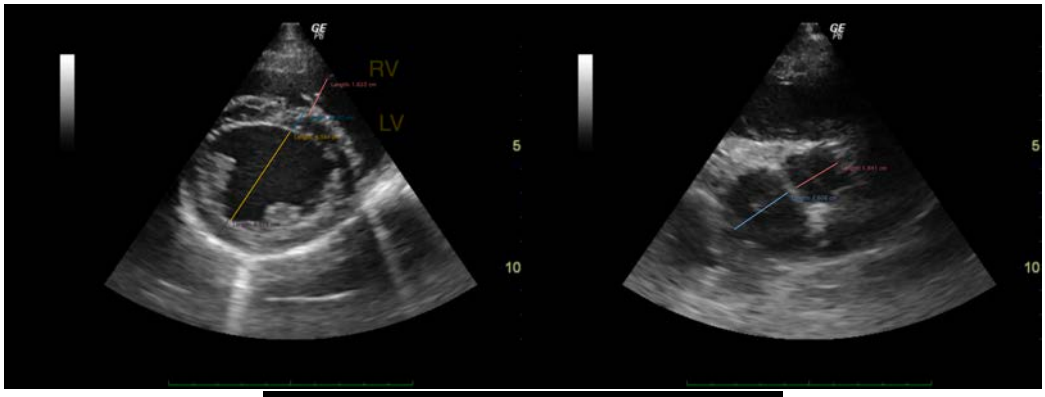

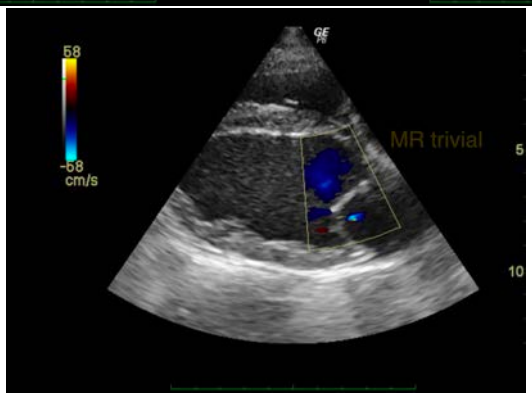

The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

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