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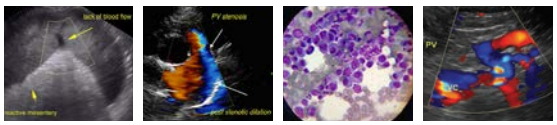

ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Gretta Campbell

SPECIES
Canine

BREED
Dachshund

SEX
Spayed Female

AGE
12 Years

WEIGHT
8.8 Pounds

INTERPRETED BY
Lisa Carioto, DVM, DVSc, Diplomate ACVIM

IMAGING PERFORMED BY
Sara Hansen

HOSPITAL NAME
H&H Veterinary Care

REFERRING VET
Dr. Henery

INVOICE
39958

DATE
7/28/22

PRESENTING CLINICAL SIGNS

grade 1 murmur - left side ejection discovered at last wellness, recommended echo before proceeding with anesthesia for a dental cleaning

Abnormal PE/Chem/CBC/UA Results: 10/2021 cbc/chem wnl no further diagnostics done since Blood Pressure Measurments 152/107/122 - 145/84/122 - 174/132/150 Current Medications Butorphanol @ 10am

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	5.09	0.67		1.51	42	NM	0.18
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	132	1.31	0.77	4	2.42	Long axis 2.66	Long axis 1.53

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

Electrocardiogram (lead II - AliveCor)

Heart rate 125 beats per minute

Sinus arrhythmia

Wandering atrial pacemaker (physiological)

No abnormalities observed

Echocardiographic findings

Received butorphanol to perform echocardiogram

Mitral valve

- Mild thickening and irregularity of the both leaflets (septal mildly more affected compared to posterior leaflet); consistent with myxomatous degeneration
- Mild prolapse of both leaflets.
- Moderate mitral regurgitation.

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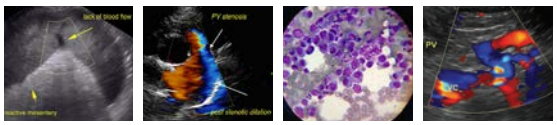

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- Mild left auricular enlargement.
- M to moderate increase of LA: Ao ratio
- LA normalized for BW (LAN = 1.5), moderately enlarged
- LVIDd normalized for BW (LVIDND = 1.8), mildly dilated
- LVIDs normalized for BW (LVIDNs = 1.53); within normal limits (WNL)

Aortic valve

- No abnormalities
- No aortic insufficiency

Tricuspid valve

- Very mild thickening and irregularity of both leaflets (septal mildly more affected compared to posterior leaflet); consistent with myxomatous degeneration
- No prolapse.
- Very mild to mild tricuspid regurgitation.
- No right ventricular or atrial enlargement.

Pulmonic valve

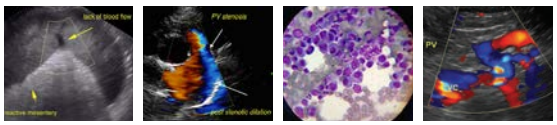
- No abnormalities
- No pulmonary insufficiency.
- Main pulmonary artery within normal limits.
- Pulmonary artery - bifurcation, no abnormalities.
- Pulmonary artery: aortic ratio: no obvious abnormalities (not measured).

Other

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

ULTRASONOGRAPHIC FINDINGS

- Myxomatous degeneration of the mitral (moderate) and tricuspid (mild) valves, ACVIM stage B2, with moderate left atrial and mild left ventricular enlargement.
- Gretta's echocardiographic results meet the criteria from the EPIC study to begin treatment with pimobendan (Vetmedin) to help slow the progression of her heart disease.



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- Although there are increased risks associated with general anesthesia, it is best to pursue general anesthesia while Gretta's heart disease is stable. This will prevent her from experiencing pain associated with periodontal disease. An anesthesia protocol will be suggested to minimize the risks.
- There are no obvious signs of congestive heart failure based on the ultrasound findings.

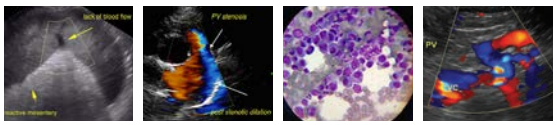
INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Suggestions/recommendations include:

- Evaluation of arterial blood pressure – performed today
- pimobendan (Vetmedin) at a dose of 0.25-0.30 mg/kg PO every 12 hours. If she has a sensitive GI system, the dose should be started at 0.10 mg/kg PO every 12 hours for 3 days prior to increasing to the full dose. Administer with a small amount of food to decrease nausea.
- Monitoring of the resting (sleeping) respiratory rate (RRR) is highly recommended once a day. 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.
- Other clinical signs clients should monitor for 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 to decrease risk of gastrointestinal effects. However, *they should not be introduced at the same time as pimobendan.*
- Monitoring for progression of heart disease with a re-evaluation of an echocardiogram every 6 to 8 months, or sooner if clinical signs develop, is recommended.
- The dentistry should be postponed, if possible if Gretta is not painful, for approximately 2-4 weeks, while initiating therapy with pimobendan, as this will help stabilize her heart prior to the procedure. Analgesics and antibiotics may be considered during this time to improve her comfort.

Example of general anesthesia protocol for a dentistry

- 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).



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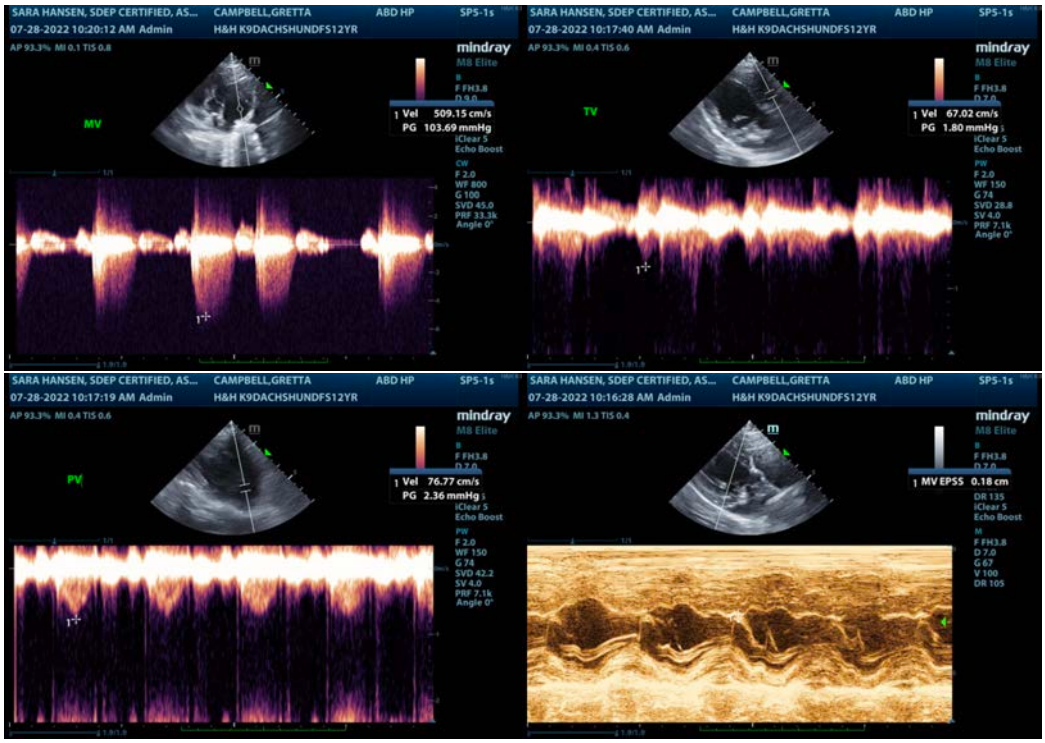
- Induction with alfaxalone, or propofol, if alfaxalone is not available. Avoid ketamine, if possible.
- Monitor arterial blood pressure during the procedure. The mean blood pressure should be between 90 - 100 mm Hg. If the patient's blood pressure is decreased, dobutamine is suggested, i.e. fluid boluses 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.
- **Dental 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, if the dentistry will take longer than originally expected.
- *The procedure should be performed as quickly as possible, i.e. extract loose teeth, perform radiographs and then remove dental calculus (unless the excessive calculus will affect interpretation of radiographs). Polishing of teeth is not a necessity and should be done based on stability of patient (arterial blood pressure, oxygenation, ECG, etc.).*
- 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.
- Weigh and auscultate lungs prior to procedure, upon recovery and prior to discharge from hospital to ensure volume overload has not occurred.



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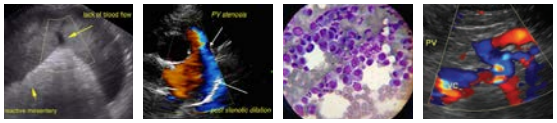

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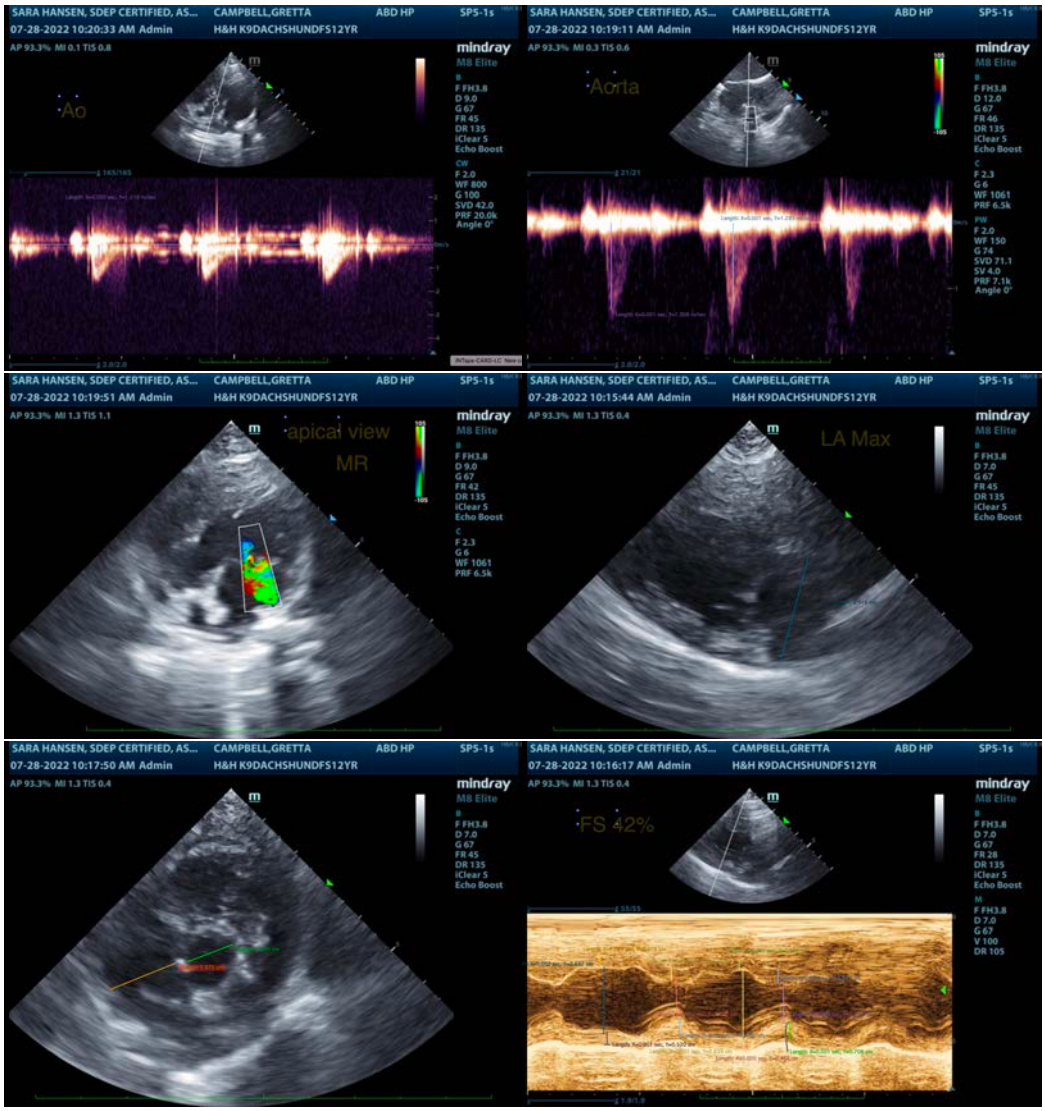

The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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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