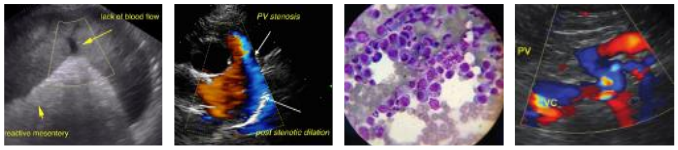
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



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

PATIENT
Ruby Namio

SPECIES
Canine

BREED
German Shepherd

SEX
Female Spayed

AGE
8 months

WEIGHT
65lbs

INTERPRETED BY
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Kara Wallisch, DVM

HOSPITAL NAME
Sondel Family Veterinary Clinic

REFERRING VET
Dr. Wallisch

INVOICE
23777

DATE
4/20/22

PRESENTING CLINICAL SIGNS

History: Presented for routine OVH on 3/9/22. Pre-op BW normal. During spay, V-tach noted on ECG. Patient came on 4/18/22 for ECG recheck. Abnormal rhythm evident, scheduled for further cardiac workup. Patient is not having any symptoms, running/playing/energetic as normal.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.

A single lead ECG is available; 25mm/s, 5mm/mV. The underlying rhythm appears sinus in origin; however, no 2 consecutive sinus beats are noted. Malignant ventricular arrythmias are seen throughout the tracing. mm marks cannot be visualized to measure the heart rate; however, ventricular tachycardia is certainly confirmed.
ECG diagnosis: Underlying sinus rhythm with malignant ventricular arrythmias.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The LV diameter is severely increased with adequate myocardial function. The LV wall thicknesses are decreased with increased sphericity. The LA is severely dilated. The mitral valve is mildly thickened with moderate mitral regurgitation. Normal velocity. The right heart is mildly dilated. The tricuspid valve appears normal with mild to moderate tricuspid regurgitation. Normal velocity. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No obvious aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac masses. Irregular rate and rhythm throughout.

CARDIAC CHART

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	NM	2.1	NM	2.1	36	70	NM
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	BELOW	BELOW	BELOW	BELOW
PATIENT	NM	2.5	2.0	29.5	5.0	6.1	3.9
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
BODY WEIGHT DEPENDENT PARAMETERS *Note: All measurements based upon multi-modal images and methods. An average value is reported.*				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
				10	1.50 (3.8)	3.27 (3.5)	2.06 (3.1)
				15	1.83 (2.0)	3.71 (2.4)	2.43 (2.1)
				20	2.02 (1.9)	4.14 (2.2)	2.80 (2.0)
				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
				35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
				40	2.62 (5.2)	5.48 (6.1)	3.96 (5.4)
				50	2.88 (7.1)	6.07 (8.3)	4.46 (7.4)

Adapted from June Boon, Veterinary Echocardiography, 1998
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435
Hansson et al, Vet Rad and Ultrasound 2002
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995

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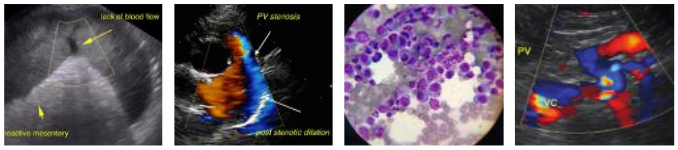

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The primary structural abnormality identified is four chamber dilation. MR and TR are noted which are suspected to be secondary rather than reflecting a primary issue. This is based upon the atypical signalment and overall findings. Some dysplastic component cannot be ruled out, although is considered less likely. The systolic function is intact, and no obvious congenital shunts are visualized. It is important that note that these are easily missed in juvenile animals and advanced imaging may be warranted.

Of equal concern, the ECG does confirm malignant ventricular tachycardia. VT is a highly unstable rhythm and is quite unusual to see in a young dog. That being said, in this particular breed a condition called in Inherited Ventricular Arrhythmias of German Shepherds is likely. This is an idiopathic condition that presents in GSD puppies as VPCs with VT with no apparent cause. These dogs are often asymptomatic; however, syncope and sudden death are also common presentations. The good news is if these dogs survive until 2 years of age, most will improve and are able to come off medications. This is the presumed diagnosis, albeit difficult to prove. Of great concern in this case is concurrent 4 chamber enlargement, as this may limit prognosis going forward.

Studies suggest the best outcome in these cases is on a combination of Sotalol and Mexiletine therapy. In an asymptomatic dog, it is reasonable to utilize monotherapy to begin, with addition of Mexiletine pending response. Once sotalol is on board, an extended time 6 lead ECG and/or holter monitor is a reasonable next step to allow monitoring of the rhythm throughout 24 hours of a normal day to ensure good rhythm control. **Referral should be considered in this case as lifelong reassessment and management will likely be necessary.**

Unfortunately, regardless of cause there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk unfortunately still persists. Moderate activity restriction is advised for the first 2 years of life.

In addition to treatment of the arrythmia, I would also utilize full cardiac support as below, given a high risk for decompensation. This may be discontinued in the future depending on clinical progression/improvement.

Anesthetic risk is considered moderately elevated and should not be attempted prior to Sotalol and recheck ECG. Avoid ketamine, telazol, Dexdomitor (or other alpha-2 agonists) and acepromazine. Recommend having lidocaine CRI available for use in the event of worsening ventricular arrhythmias under anesthesia (CRI 50—75mcg/kg/min).

PLAN

Institute sotalol 1-2mg/kg PO q12h. Institute Lasix 1mg/kg PO q12. Institute Pimobendan 0.3mg/kg PO q12h. Institute Spironolactone 1-2mg/kg PO q12h. Highly recommend referral in this case for lifelong management.

Recheck ECG in 1-2 weeks to assess response (goal is significant reduction in ectopy without a significant change in underlying sinus rate). Consider holter at this time if desired to determine if Mexiletine is necessary.

Recheck renal panel 1-2 weeks, if doing well and BP is >130mmHg institute ACE-I 0.5mg/kg PO q12h.

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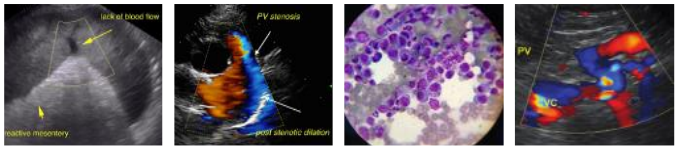

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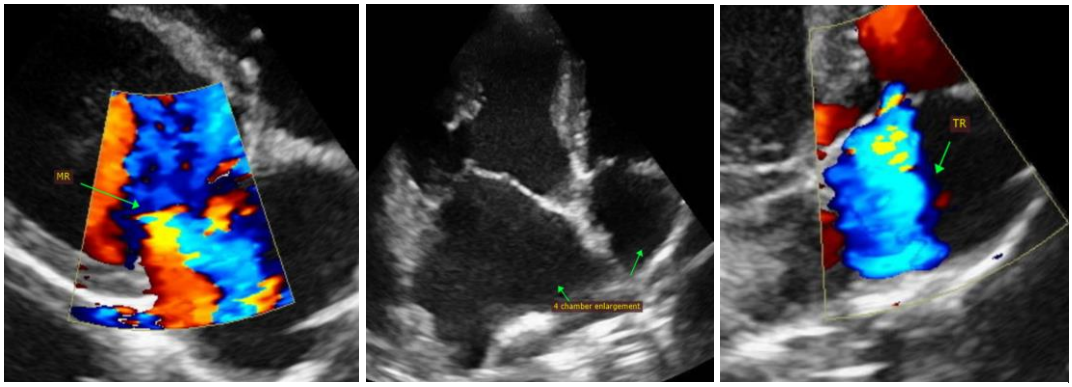
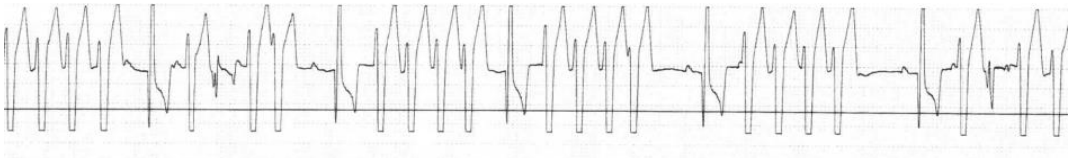
Recheck ECG and/or holter in 6 months to determine progression/control, sooner if any development of associated clinical signs.

IMAGES





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. This report was generated using transcription software, and minor dictation errors may be present. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance, please contact me.

Maggie Machen Lamy, DVM
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)
info@sonopath.com