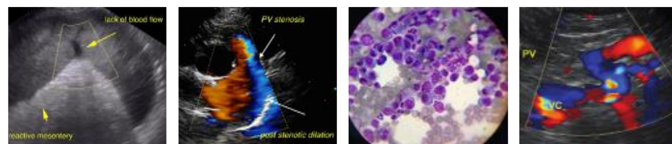
# SonoPath

Clinical Sonography & Telecytology

EDUCATIONAL TELECONSULTATION SERVICES™




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

**PATIENT**
Finnigan Smith

**SPECIES**
Feline

**BREED**
DSH

**SEX**
Male

**AGE**
6 months

**WEIGHT**
8.1lbs

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

**IMAGING PERFORMED BY**
Alastair Westcott, DVM

**HOSPITAL NAME**
Dr. Alastair Westcott

**REFERRING VET**
Dr. Westcott

**INVOICE**
26601

**DATE**
9/28/22

## PRESENTING CLINICAL SIGNS

History: Grade 4/6 heart murmur noted at a presurgical/neuter examination. The heart murmur was originally noted in July of this year. The patient has a normal ProBNP and is feline leukemia/FIV negative. There was a mild monocytosis noted on previous blood work.

## ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Normal mitral valve leaflets with no obvious prolapse into the left atrial lumen. Trace mitral regurgitation. Normal left atrial dimension. Normal LV diameter with normal myocardial function. The LV wall is normal. The tricuspid valve appears normal with trace tricuspid regurgitation present. Moderate right atrial dilation. The right ventricular is enlarged with significant hypertrophy. A fibrous narrowing is visualized in the mid-RV most consistent with a double chamber right ventricle. Flow can be seen accelerating through the region and through the pulmonary artery. Max pulmonary artery velocity is mildly elevated with a severely elevated flow through the stenotic region (4.5m/s). The PV appears normal. Mild post-stenotic dilation of the RVOT. The aortic valve is normal. Normal aortic outflow velocity. A small perimembranous VSD is noted on color flow and 2D imaging with right to left flow entering the aortic root. No additional cardiac shunts are visualized. No pericardial or pleural effusion noted.

## CARDIAC CHART

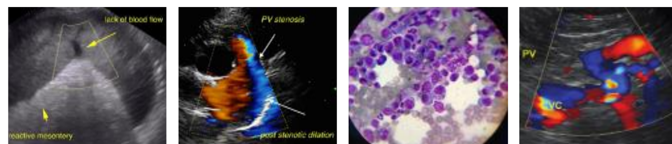
| FELINE CARDIAC PARAMETERS | BODY WEIGHT (kg) | HR (BPM) | IVSd (cm) (Moise, Pipers) | LVIDd (cm) (Moise, Pipers) | LVWd (cm) (Moise, Pipers) | FS (%) | EF (%) |
|---|---|---|---|---|---|---|---|
| NORMAL PARAMETER | ------ | 150-240 | 0.35-0.55 | <2 (mean 1.5) | 3.5-0.55 | 35-67 | 80-100 |
| PATIENT | 3.66 | NM | 0.5 | 1.1 | 0.48 | 68 | 96 |
| **FELINE CARDIAC PARAMETERS** | **LA/AO** (Boon) | **LA/AO HEART BASE (Swe)** (Abbott) | **LA** 2D short axis Base view (cm) (Abbott) | | **LVOT VEL** (m/s) | **RVOT VEL** (m/s) | **E max** (m/s) |
| NORMAL | <1.5 | <1.3 | <1.2 | | <1.6 | <1.3 | <0.9 |
| PATIENT | NM | 1.1 | 1.0 | | 1.0 | 1.9 | NM |

**Note: All measurements based upon multi-modal images and methods. An average value is reported.*
Adapted from June Boon, Veterinary Echocardiography,1998
Abbott J & MacLean H JVIM 2006;20: 111-119, Moise et al. Am J Vet Res 47:1476, 1986. Pipers et al. Am J Vet Res 40:882, 1979.

## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cause of the murmur is a significant stenosis through the mid-RV. This is most consistent with a double chamber right ventricle (DCRV) causing a tunnel stenosis through the region. The velocity through the stenosis is severely elevated and is creating both RA enlargement and moderate RVH (reflecting pressure overload). There is also a small VSD appreciated. While the shunt appears hemodynamically insignificant, the direction of flow is right to left secondary to elevated RV pressures. Fortunately, the size will limit hemodynamic significance in this case. No obvious additional issues are identified. Referral should be considered in any congenital case, as small additional abnormalities may be easily missed.

A DCRV is uncommon in small animals. Due to the significance of the abnormality, there is high risk for complications lifelong, with many patients developing exertional syncope, right-sided CHF, blood clot events and/or sudden death by mid-life. A diagnostic angiogram should be

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considered as the gold standard diagnostic tool, to confirm the diagnosis and further evaluate if any interventional options may be beneficial; however, in a kitten surgery is likely not a possibility regardless. As a more suitable approach, medical management with atenolol may be helpful in the future to decrease heart rate and lessen the obstruction and is recommended as below.

Prognosis is guarded long-term, given the severity of RV changes at such a young age, with high risk for progression to right-sided CHF, syncope, malignant arrhythmias and/or sudden death lifelong.

If needed, anesthetic risk is moderately elevated, and judicious IV fluid rates are advised to avoid fluid overload. **Drugs that stimulate heart rate should be avoided unless clinically necessary (glycopyrrolate, atropine).** Avoid vasodilators as this may worsen the obstruction. A reasonable protocol includes opioid/benzodiazepine premedication, propofol induction, isoflurane maintenance. Additionally, steroids should be used with caution, as even a 'normal' heart can develop evidence of intolerance and fluid retention.

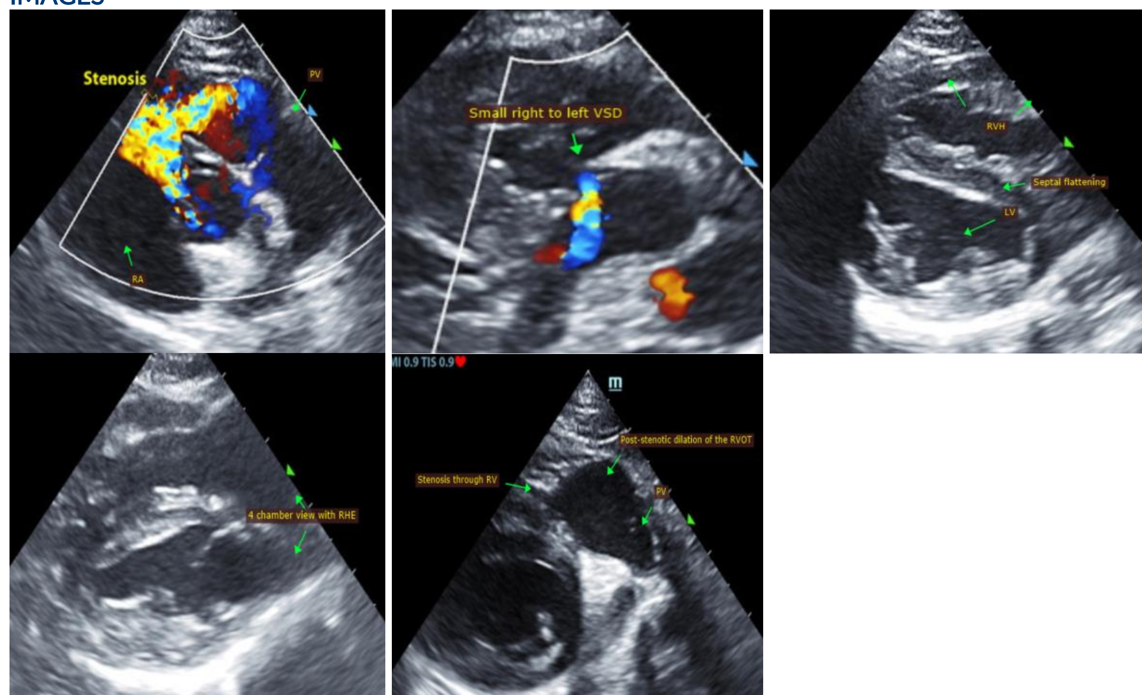
Monitor for development of associated clinical signs (collapse, abdominal distention, cough, labored breathing). Mild exercise restriction is advised.

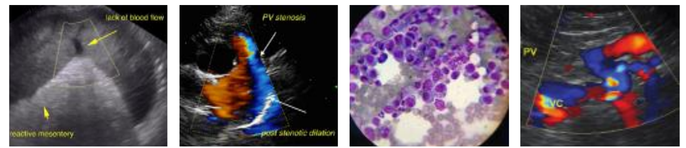
## PLAN

Consider referral as discussed. If declined, institute titrating dose of atenolol: 25mg tablets; Give ¼ tab once daily in the evening. Recheck heart rate in 1-2 weeks with target stressed rate of 140-160bpm 12-24 hours post-administration. Increase as needed until target reached.

Recheck echocardiogram is recommended in 6 months to screen for progressive changes and need for Atenolol therapy.

## IMAGES





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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. 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