



# Holey Moley

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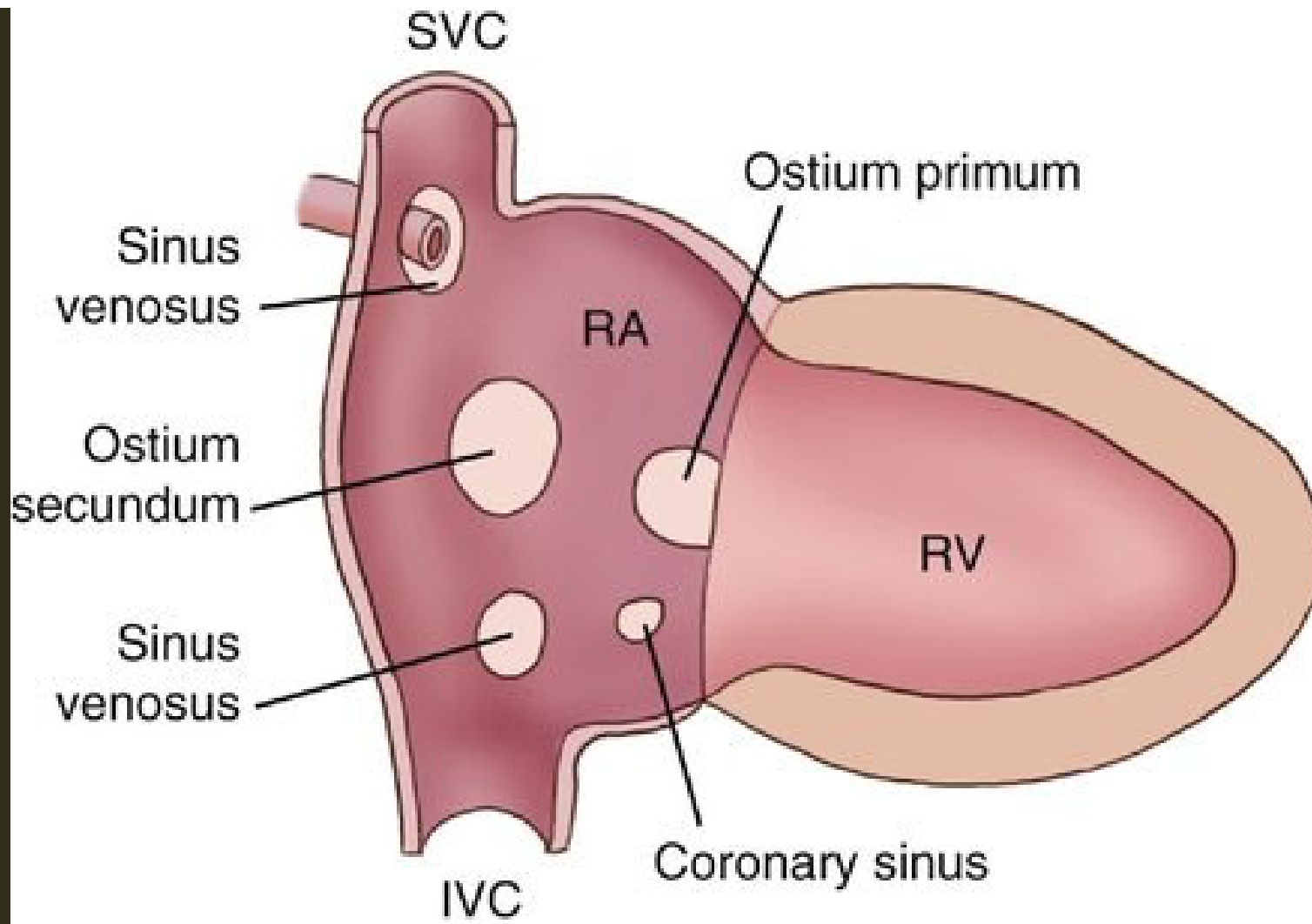
# Atrial Septal Defects

- The second most common congenital heart defect
- Associated with genetic mutations: T-21, NKX2.5, TBX5, GATA4
- Many patients are asymptomatic early in life; exercise intolerance and fatigue are common symptoms at presentation

Atrial Septal Defects in the Adult Recent Progress and Overview

Gary Webb and Michael A. Gatzoulis

Originally published 10 Oct 2006 <https://doi.org/10.1161/CIRCULATIONAHA.105.592055> Circulation. 2006;114:1645–1653



# Indications for closure

- $P \cup \{a\}^* \cap \{a\}^* = \{a\}^*$   
 $S \cup \{a\}^* = \{a\}^*$   
 $\{a\}^* \cup \{a\}^* = \{a\}^*$
- $\{a\}^* \cup \{b\}^* = \{a, b\}^*$
- $\{a\}^* \cap \{b\}^* = \{\epsilon\}$

$\{a\}^* \cup \{b\}^* = \{a, b\}^*$

$\{a\}^* \cap \{b\}^* = \{\epsilon\}$

$\{a\}^* \cup \{b\}^* \cap \{c\}^* = \{a, b, c\}^*$

# Case #1

- 25 year old female.
- Reports shortness of air when climbing up stairs and recent palpitations.
- Systolic flow murmur heard at the upper left sternal border.
- Vitals: HR- 91bpm, BP- 129/82, Height 5'4", 83.4 kg, O2 saturation 97% on room air.

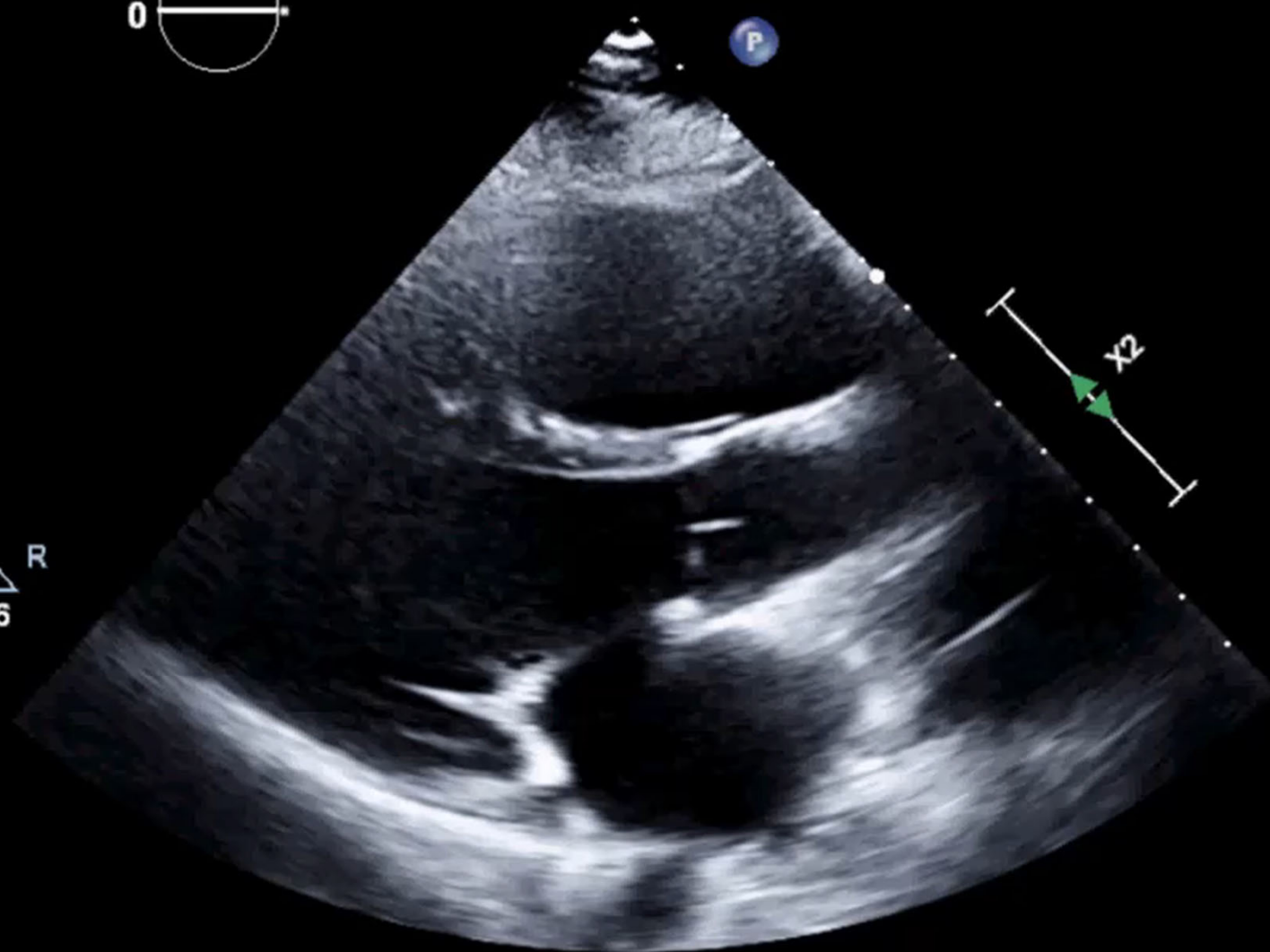
X5-1  
50Hz  
14cm



M3



2D  
62%  
C 53  
P Low  
HPen



76 bpm



X5-1  
25Hz  
17cm

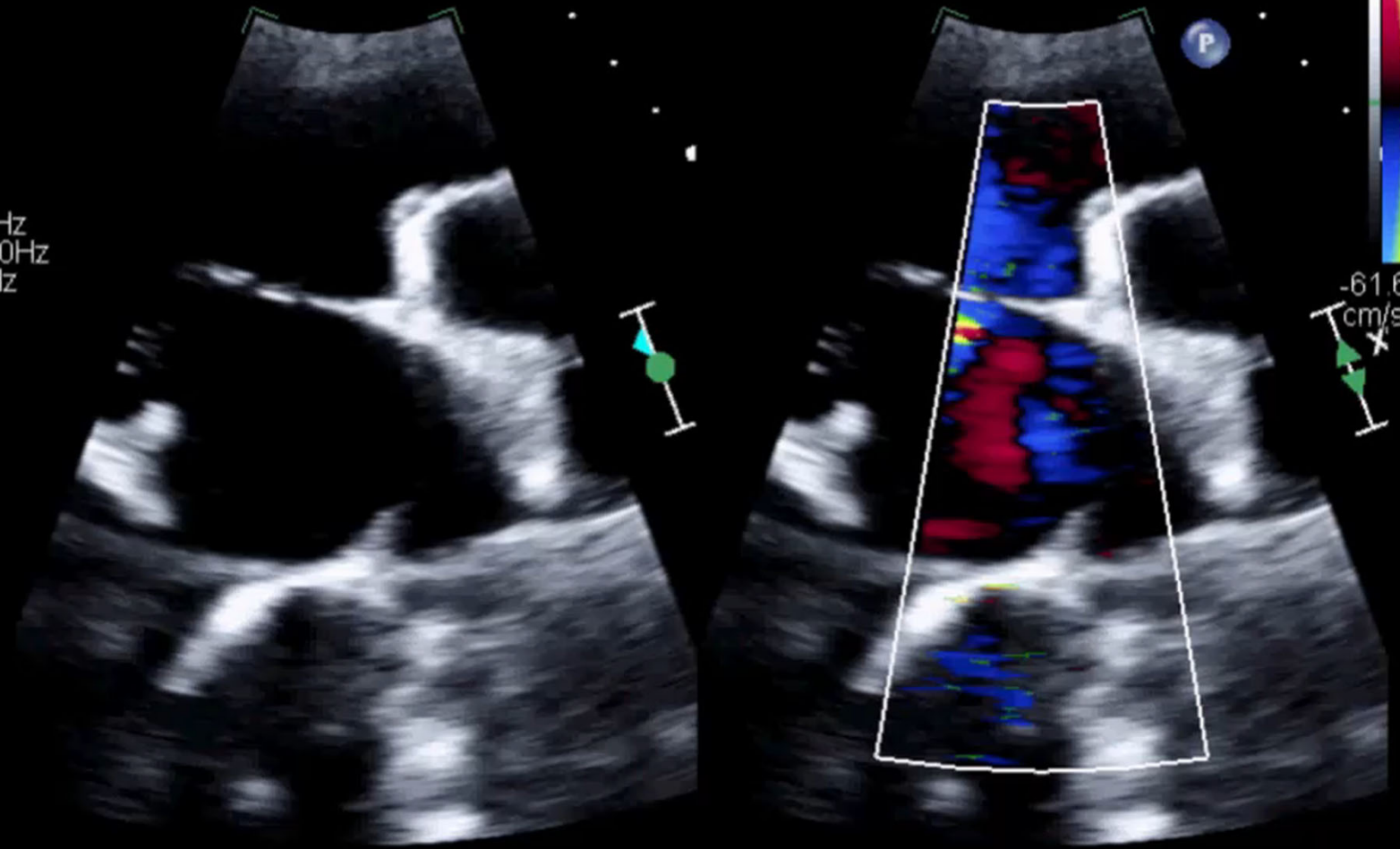
2D  
61%  
C 53  
P Low  
HPen

CF  
50%  
3200Hz  
WF 320Hz  
2.0MHz

M3  
+61.6

-61.6  
cm/s

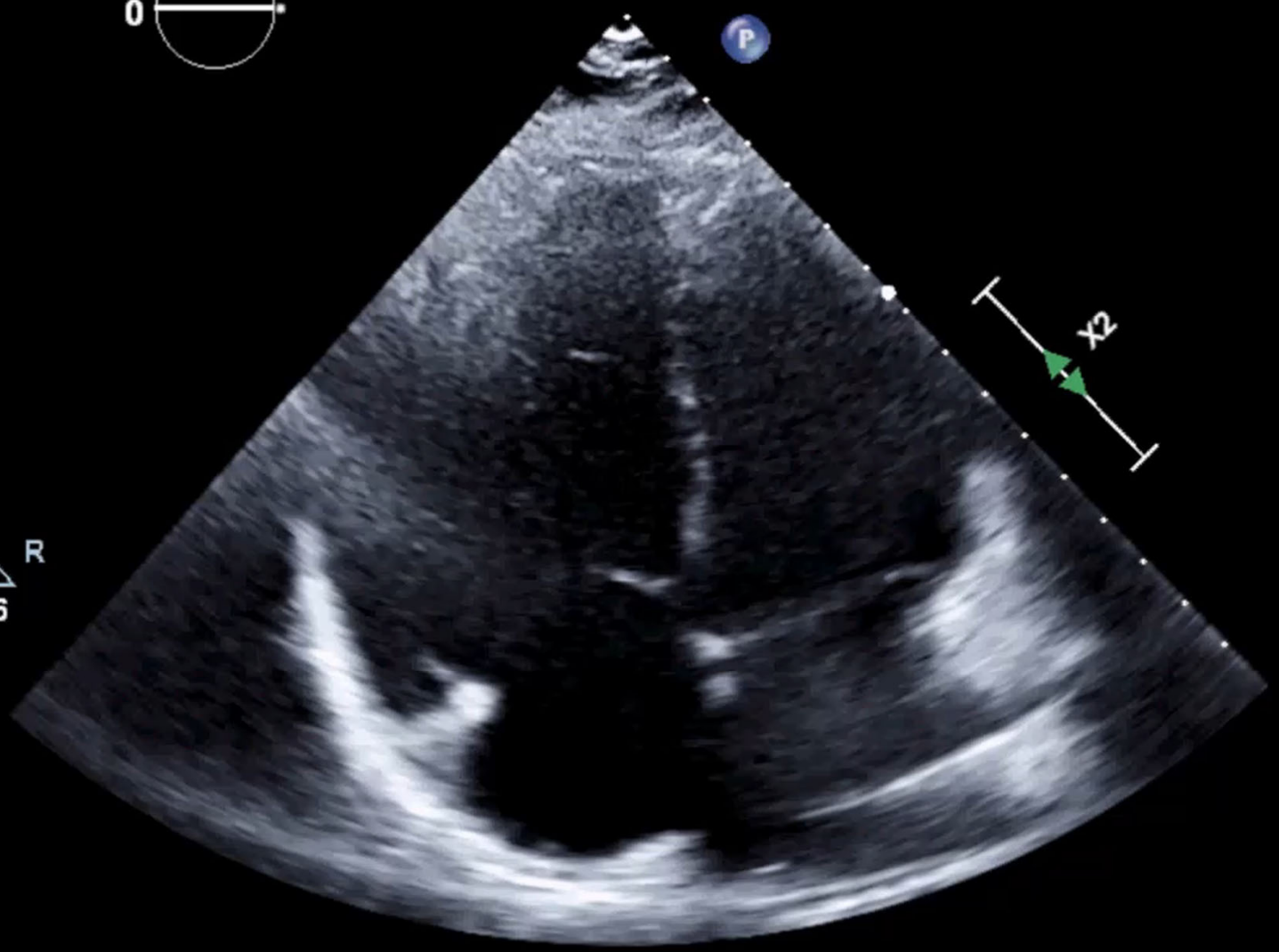
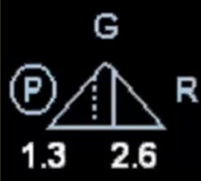
75 bpm



X5-1  
50Hz  
16cm



2D  
61%  
C 53  
P Low  
HPen



M3



67 bpm

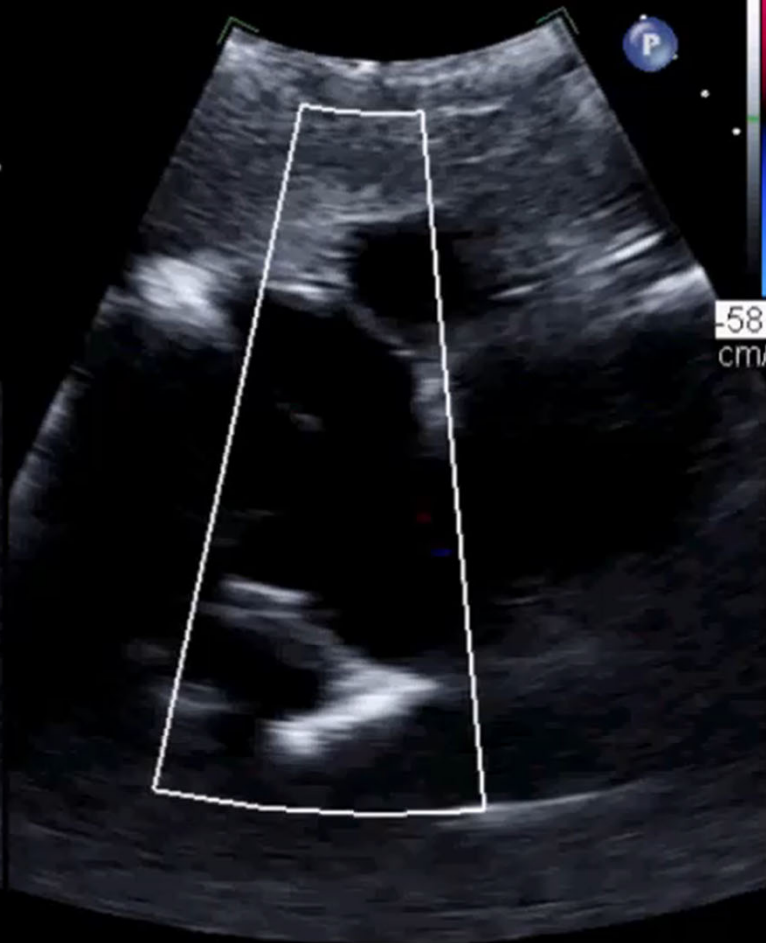




X5-1  
22Hz  
25cm

2D  
64%  
C 53  
P Low  
HPen

CF  
50%  
3051Hz  
WF 305Hz  
2.0MHz



M3  
+58.7  
-58.7  
cm/s

68 bpm



# Repair

- Due to the large size of the defect, the patient was referred to surgery for ASD patch closure.
- Of note: the patients father had an ASD patch closure as a young adult.

## Case #2

- 63 year old female
- Referred from Pulmonary Clinic. Reports chest pain, shortness of air with exertion, fatigue and muscle cramps
- Normal heart sounds
- Vitals: HR- 72 BPM, BP- 136/84, 5'4", 172 lbs, O2 saturation 94% on room air

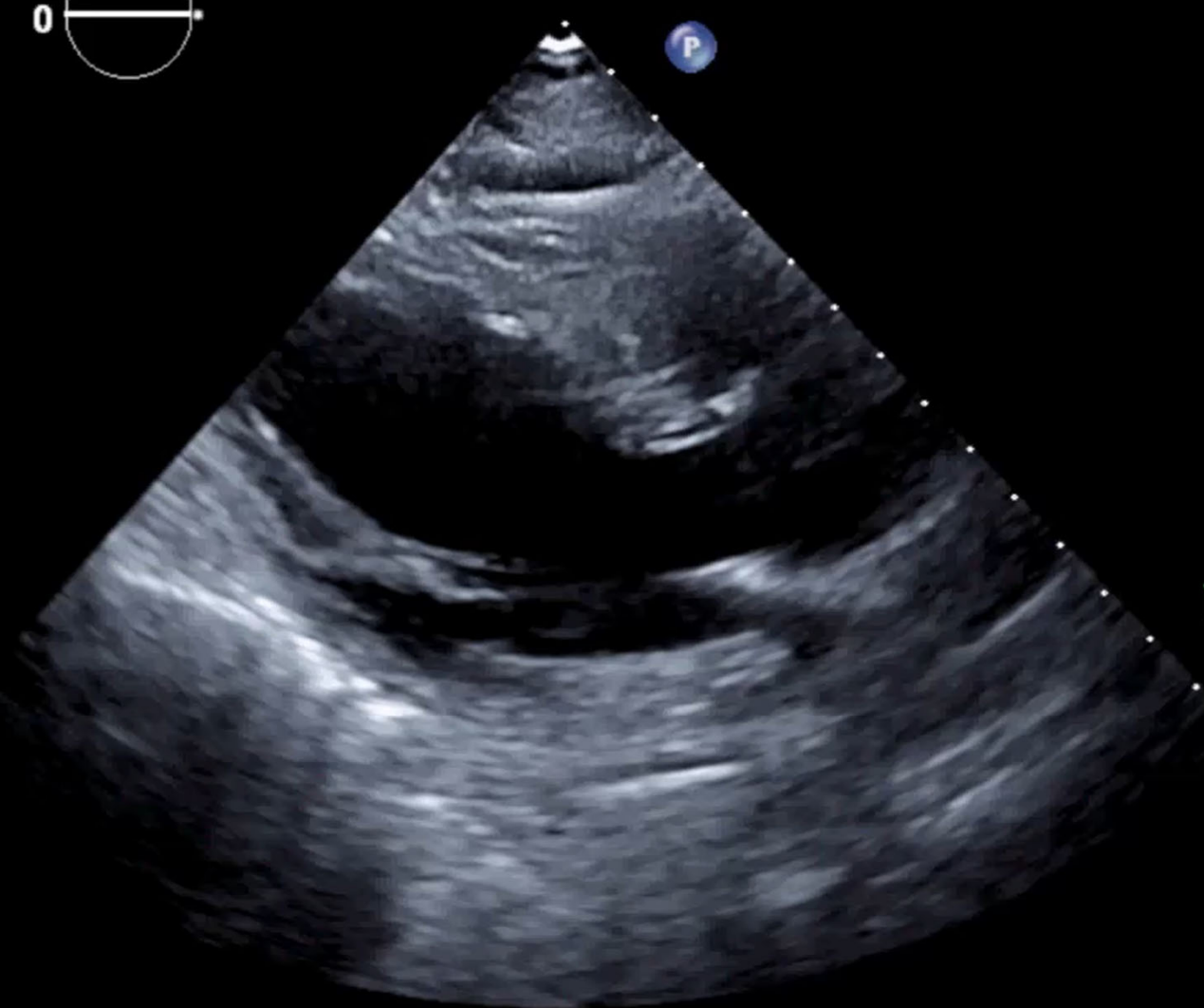
# Pulmonary CT

- Persistent left superior vena cava which drains to the coronary sinus but may demonstrate a significant penetration with the left atrium resulting in a left to right shunt. This is incompletely characterized on the available imaging to date. Consider correlation with echocardiography as well as multiphase chest CTA and MRI.

X5-1  
50Hz  
15cm



2D  
65%  
C 56  
P Low  
HPen



P

M4



65 bpm



X5-1  
50Hz  
16cm



P

M3

2D  
63%  
C 53  
P Low  
HPen



66 bpm

X5-1  
50Hz  
15cm



2D  
63%  
C 53  
P Low  
HPen

BUBBLE REST

P

M3



66 bpm

# Cardiac CTA

- Left-sided superior vena cava enters posterior superior aspect of the left atrium immediately anterior to the superior left pulmonary vein.
- The great cardiac vein enters the left atrium directly. The coronary sinus is unroofed.



# Repair

- The patient was taken to the cath lab where a vascular plug was placed in the distal left superior vena cava occluding the anomalous venous return to the left atrium.

## Case #3: Bubble Study

- Bubbles are noted in the right heart and in the left heart
- Bubble are noted only in the right heart, look closely

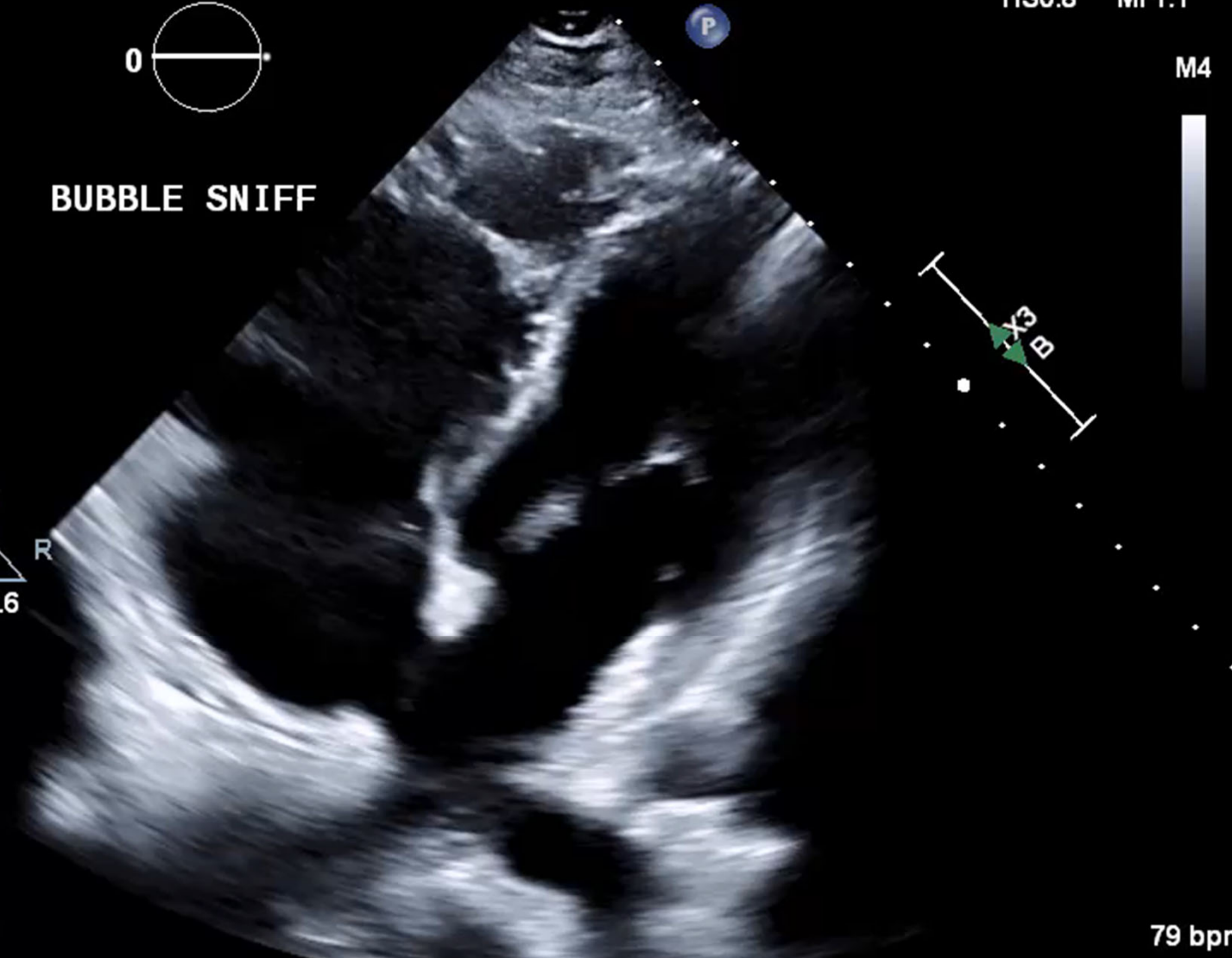
UKY1  
X5-1c  
55Hz  
18cm  
Z 1.2  
2D  
53%  
C 48  
P Low  
HGen



TIS 0.8 MI 1.1

M4

**BUBBLE SNIFF**



79 bpm

## Case #4

- 53 year old female
- Reports open heart surgery at age 5, exertional dyspnea which has been slowly getting worse, dyspnea with climbing stairs, dizziness with activity, and brief episodes of palpitations.
- Vitals: HR- 75 BPM, BP-120/79, 5'2", 138 lbs, O2 saturation 99% on room air

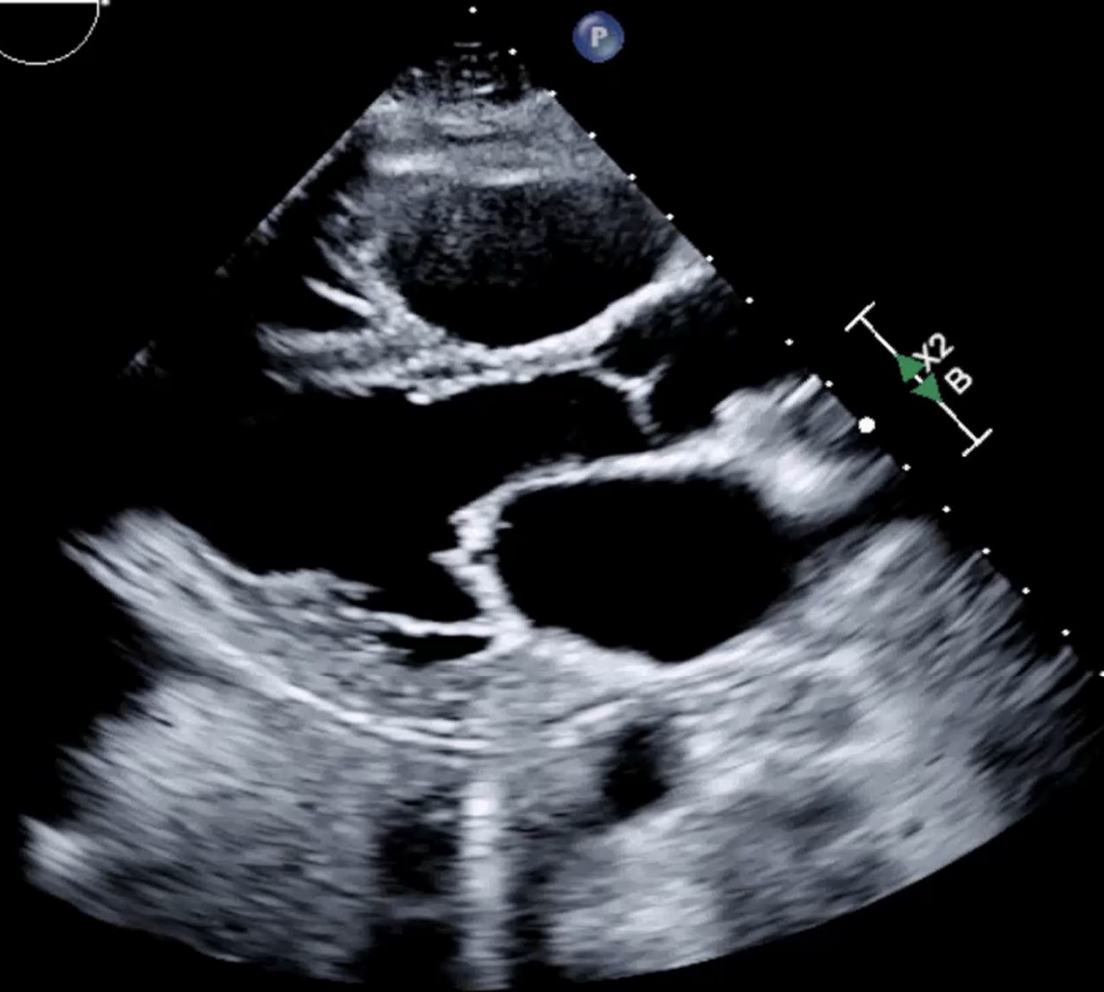
UKY5  
X5-1c  
50Hz  
17cm

2D  
55%  
C 53  
P Low  
HPen



TIS0.6 MI 1.2

M2



65 bpm

UKY5

X5-1c

22Hz

13cm

**2D**

54%

C 55

P Low

HPGen

**CF**

42%

4150Hz

WF 373Hz

2.5MHz

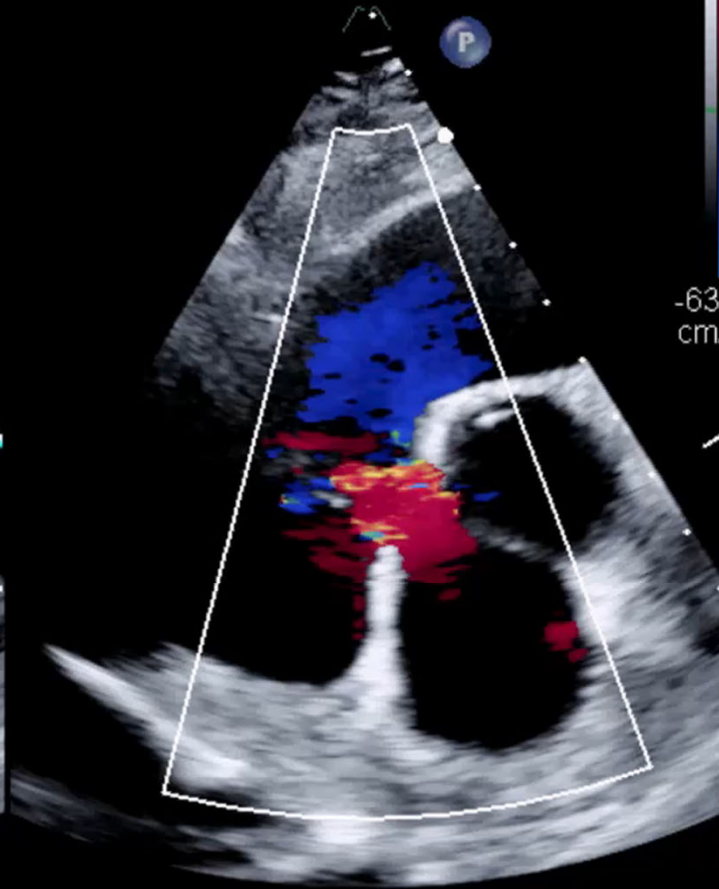
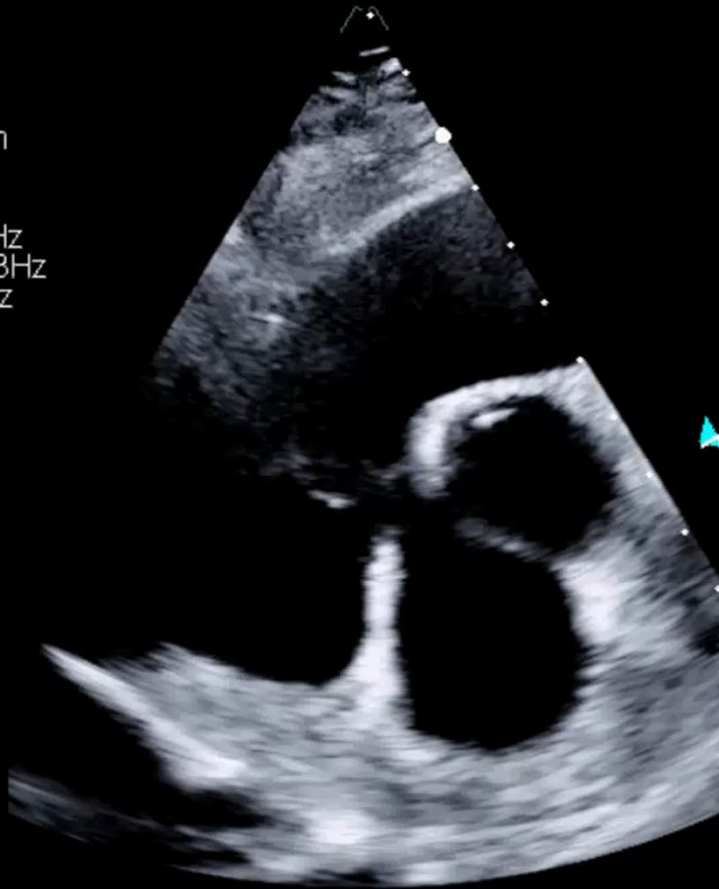
TIS1.0 MI 1.2

M3

+63.9

-63.9

cm/s



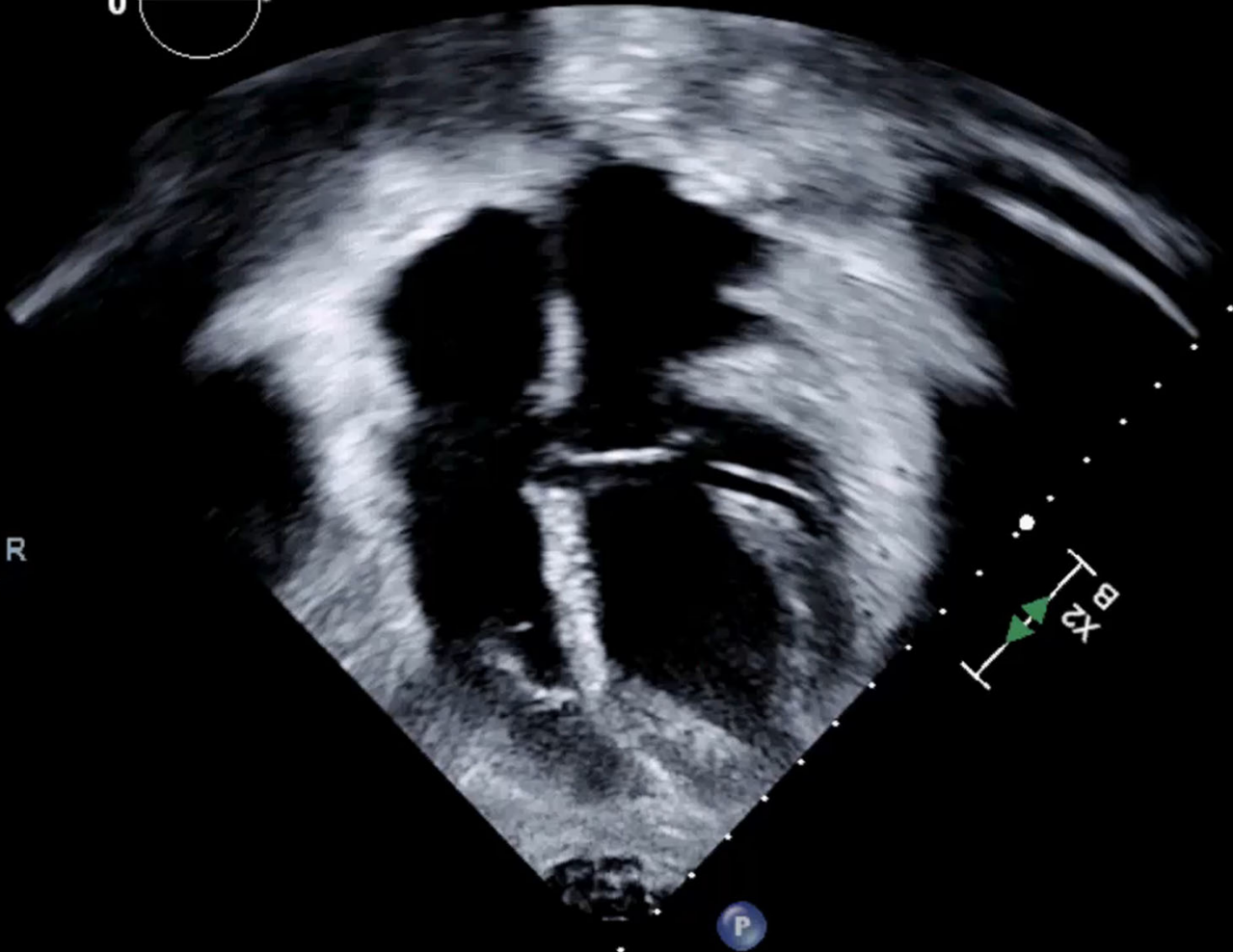
62 bpm

UKY5  
X5-1c  
50Hz  
18cm

2D  
51%  
C 60  
P Low  
HPen

TISO.6 MI 1.2

M2



B  
X2

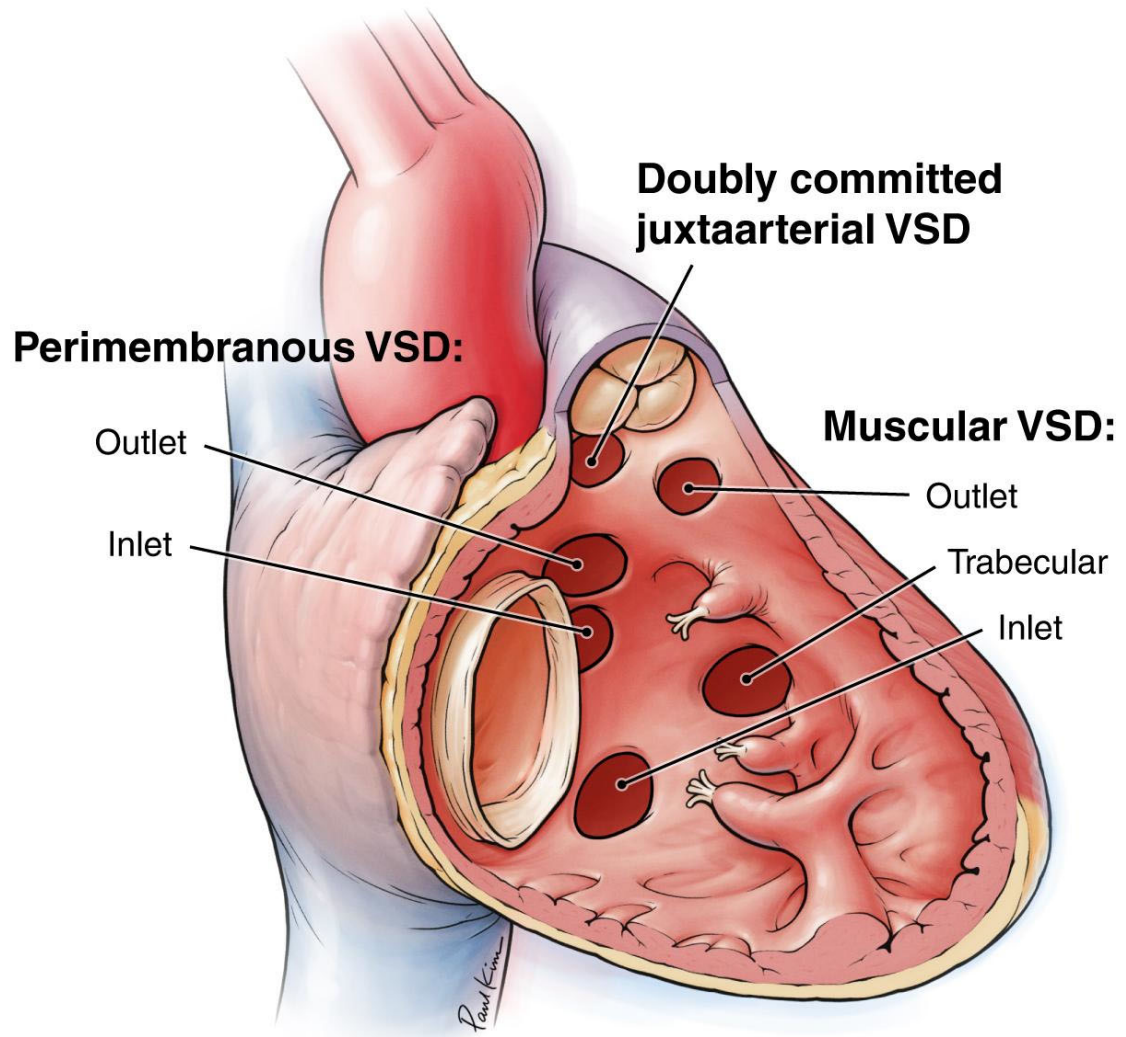
P

58 bpm

## Plan:

- Obtain a congenital cardiac MRI to better assess the shunt and cardiac volumetrics.
- Obtain a Cardiopulmonary Exercise Test to assess exercise capacity.
- Discuss at congenital surgery conference.





# Ventricular Septal Defects

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## Case #5

- 34 year old male
- History of peri-membranous VSD with spontaneous closure and hyper-trabeculated LV consistent with LV non-compaction.
- Reports no symptoms.
- Vitals: HR 82 BPM, BP- 116/72, 5'7", 171 lbs, O2 saturation 97% on room air

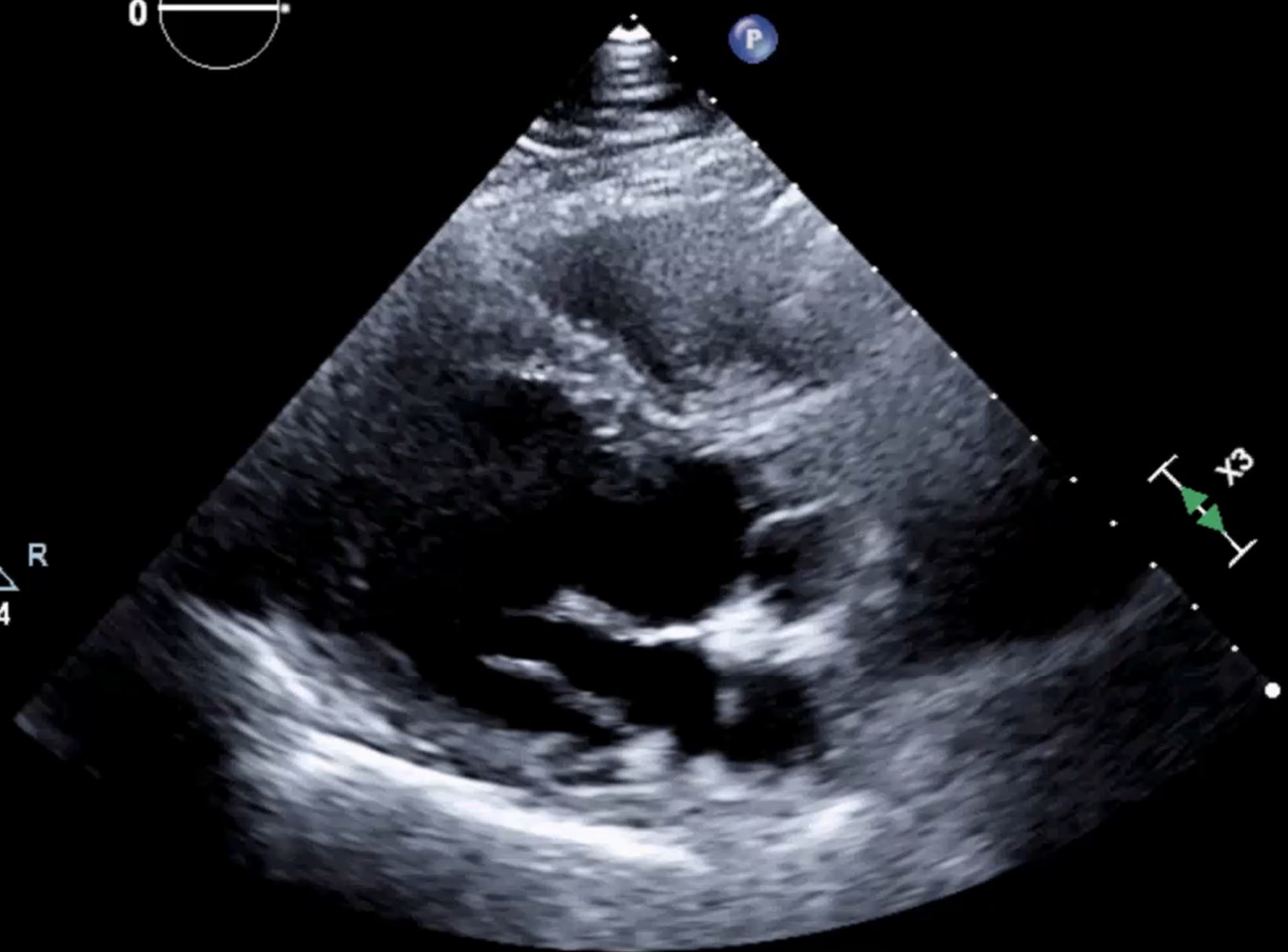
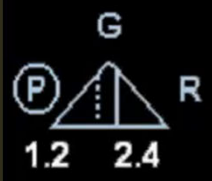
X5-1  
50Hz  
16cm



P

M1

2D  
73%  
C 50  
P Low  
HPen



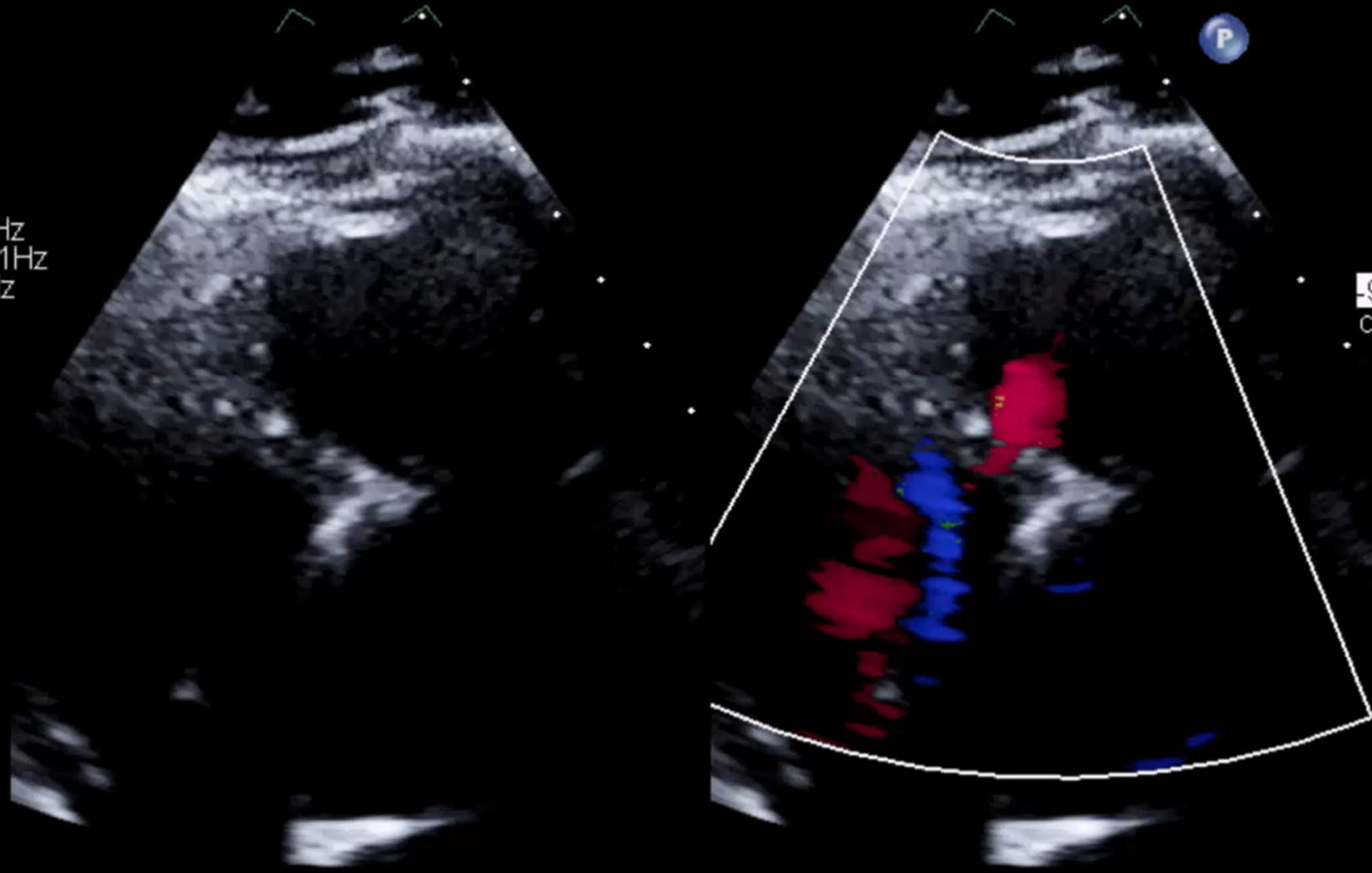
118 bpm



X5-1  
22Hz  
12cm

2D  
68%  
C 50  
P Low  
HPen

CF  
50%  
5918Hz  
WF 591Hz  
2.5MHz



M3  
+91.1  
-91.1  
cm/s

105 bpm

X5-1  
50Hz  
16cm



2D  
71%  
C 50  
P Low  
HPen

P

M1



101 bpm

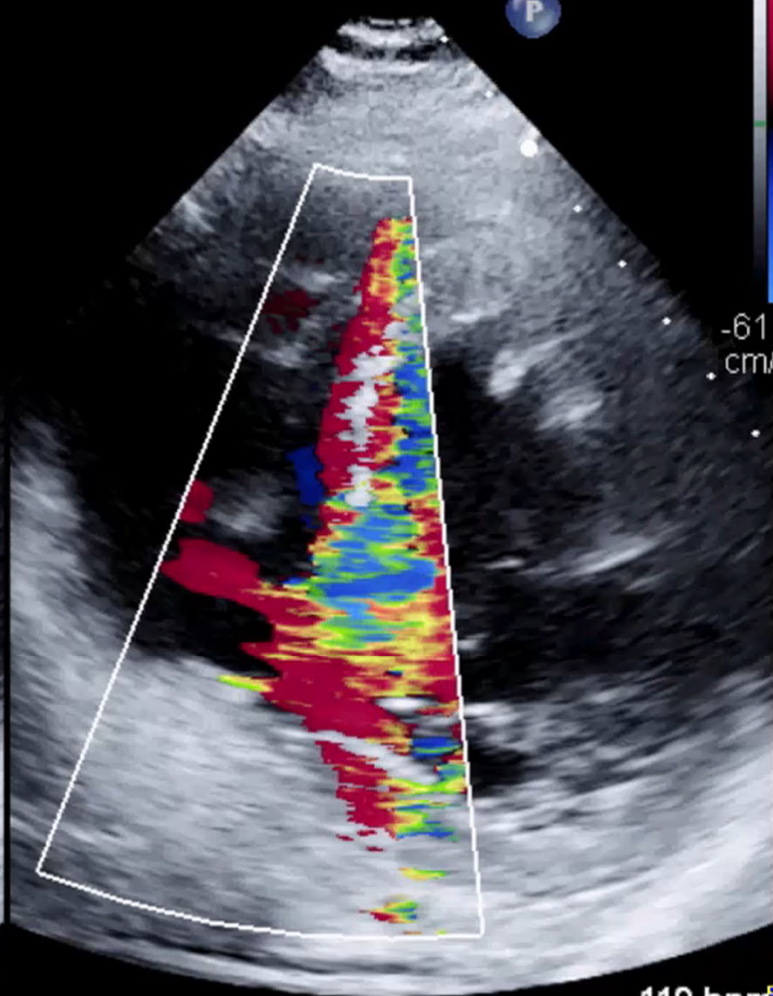
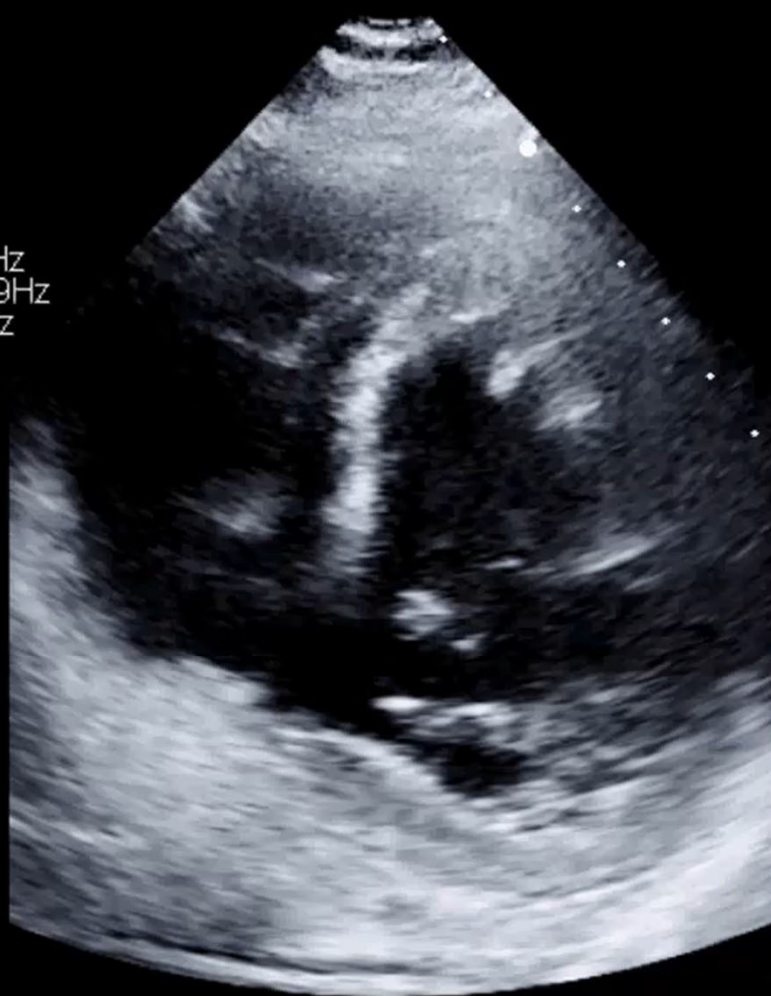
## Case #6

- 65 years old male
- History of hypertension and chronic kidney disease
- Presents in cardiogenic shock with late-presenting inferior STEMI with multivessel disease including mid-LAD, CTO, focal OM disease and 100% occlusion of proximal RCA.
- Vitals: HR 122 BPM, BP 93/52, 171 lbs, O2 saturation ventilated 100%.

X5-1c  
23Hz  
14cm

**2D**  
58%  
C 48  
P Low  
HGen

**CF**  
36%  
4000Hz  
WF 399Hz  
2.5MHz

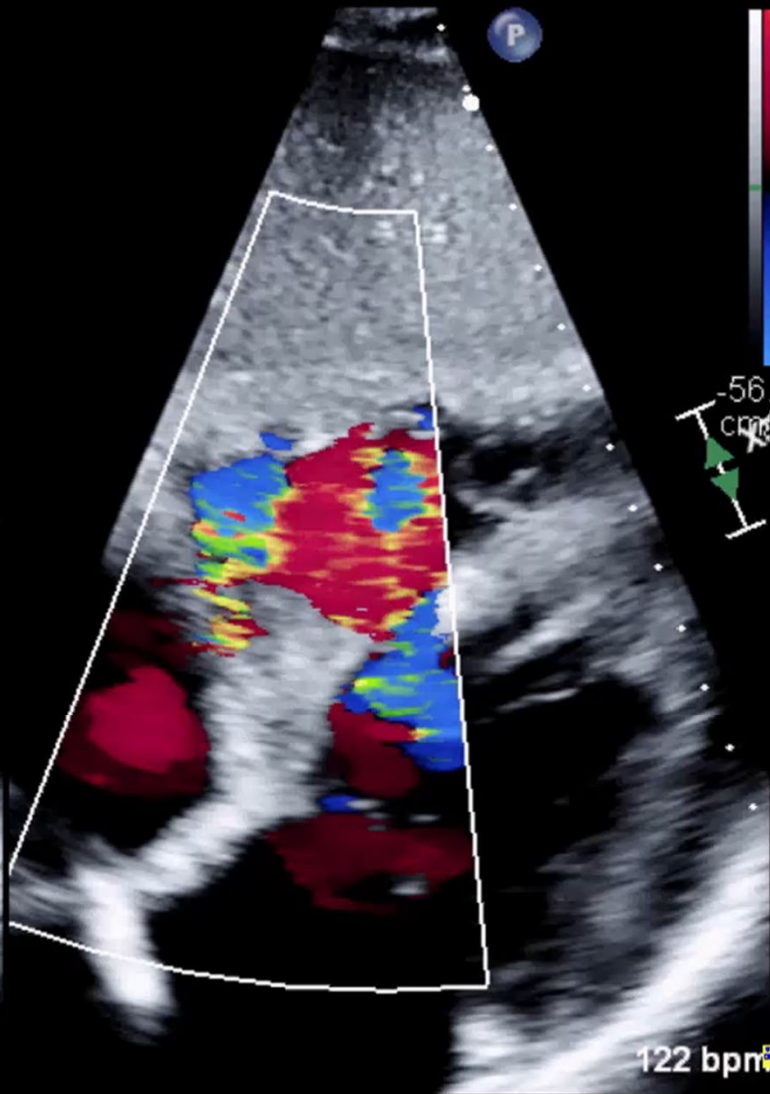
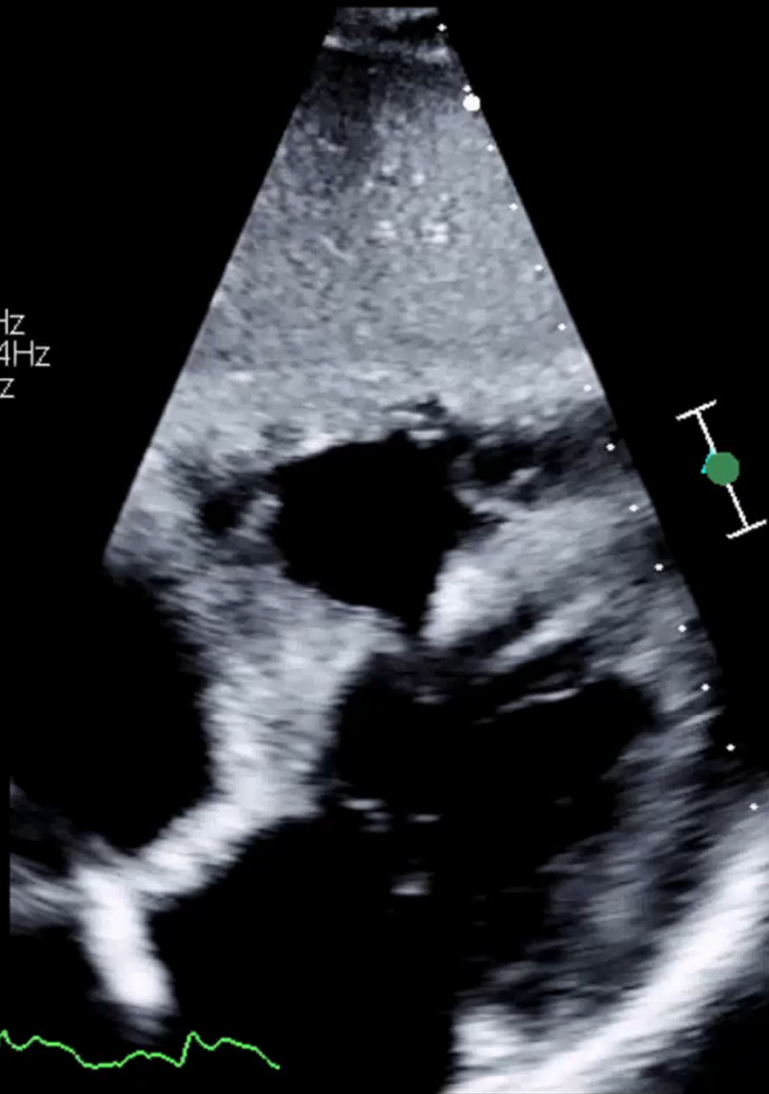


M3  
+61.6  
-61.6  
cm/s

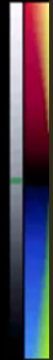
119 bpm



X5-1c  
23Hz  
20cm  
Z 1.4  
2D  
61%  
C 48  
P Low  
HGen  
CF  
40%  
3650Hz  
WF 364Hz  
2.5MHz



M3  
+56.2



-56.2  
cm/s

122 bpm

# The University of Kentucky Echo Lab



# HealthCare