How to Scan Pulmonary Veins

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Here, it's different.™

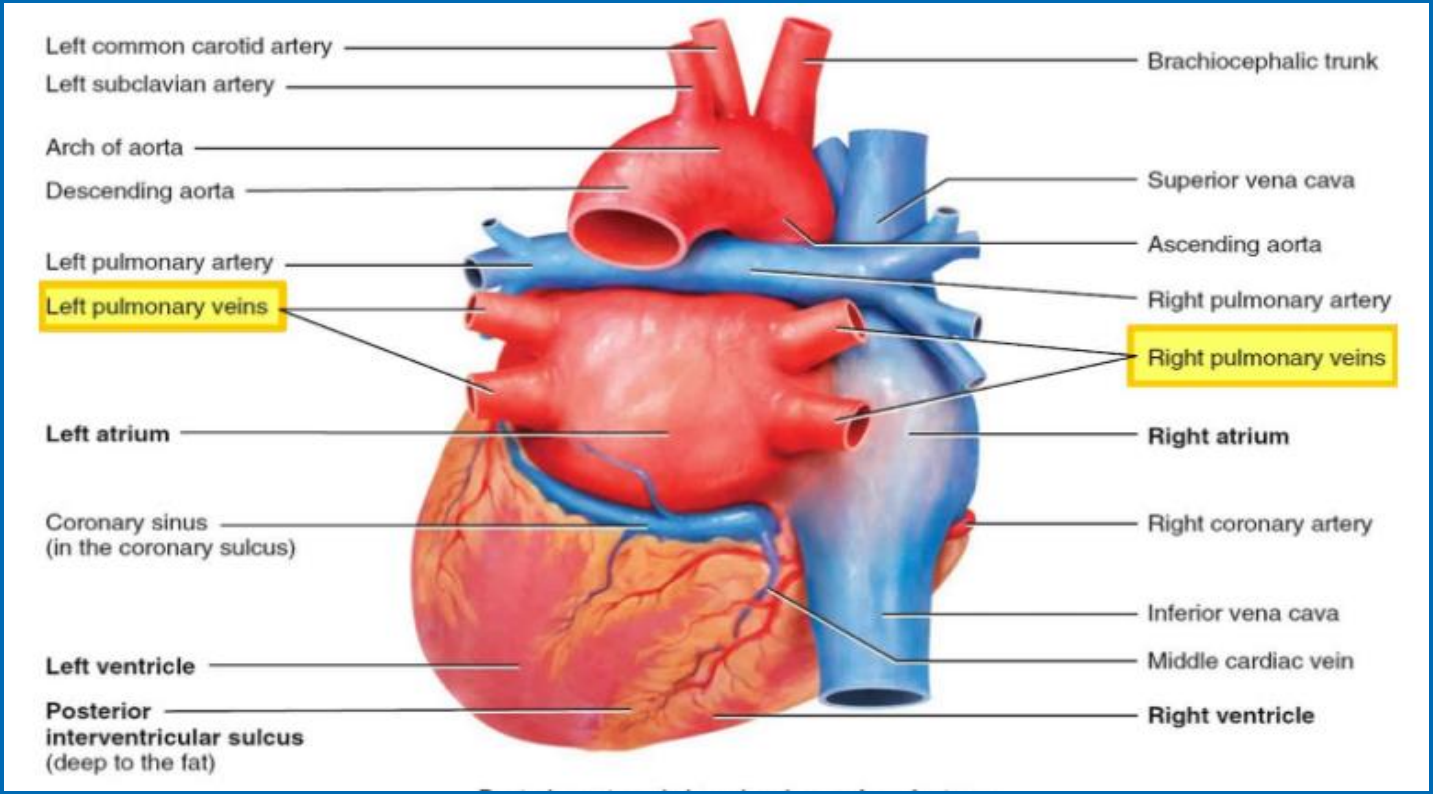
No Disclosures.

Agenda

1. What normal pulmonary veins look like
2. Where on the patient to obtain images
3. How to optimize your image and color Doppler
4. Red flags!

   Things to look for that could potentially be a pulmonary vein abnormality

Anatomic Pulmonary Veins

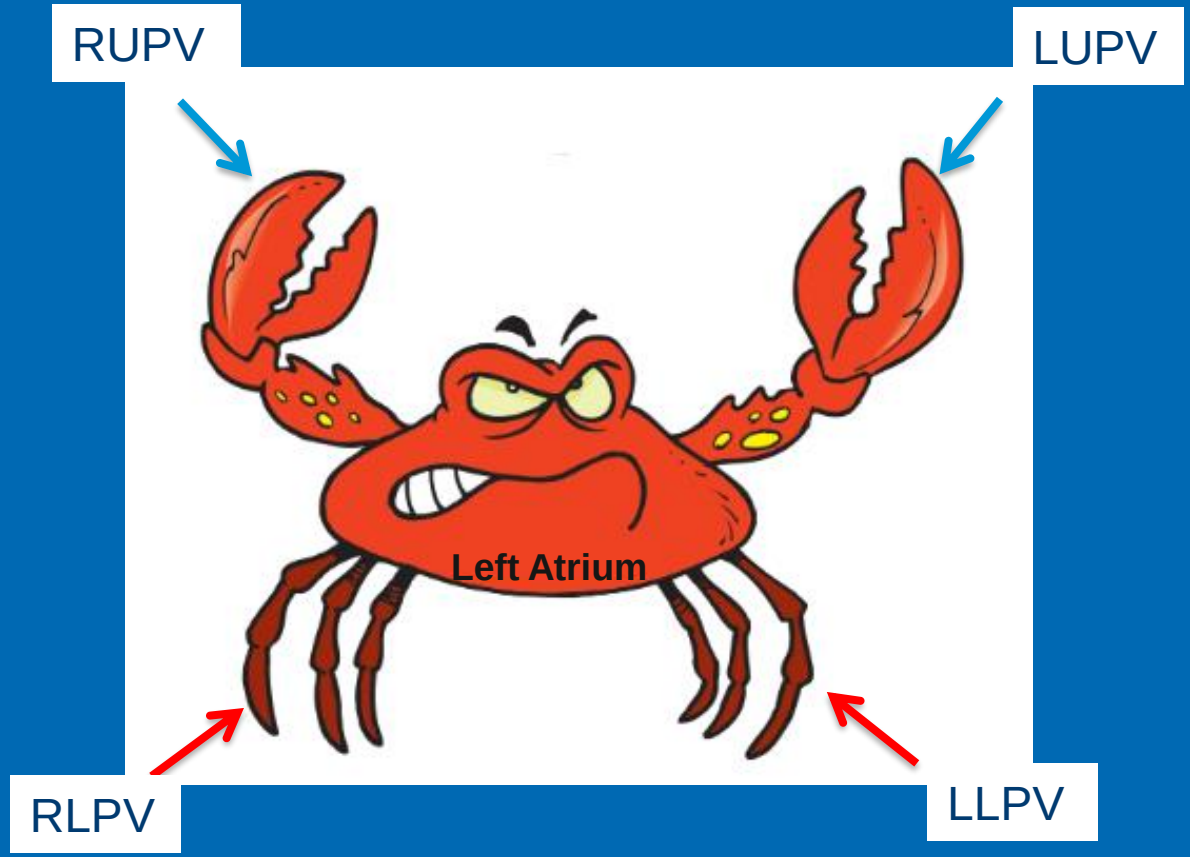


Where to image Pulmonary Veins

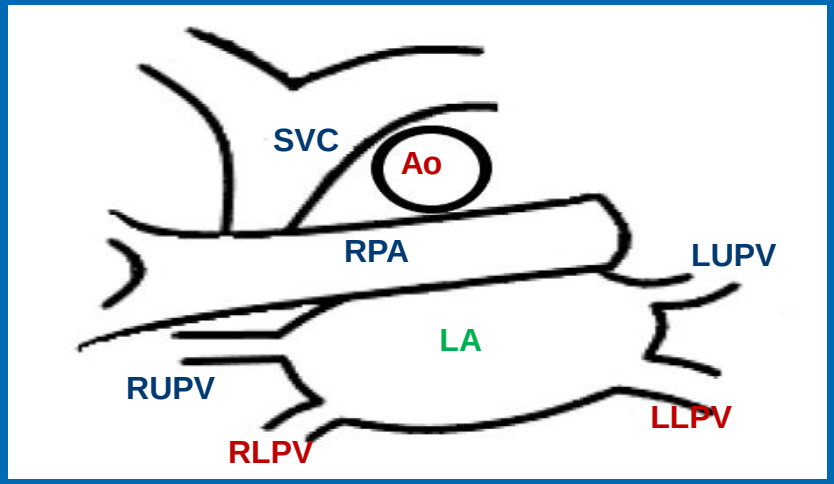
1) Suprasternal notch (crab view, notch at 3’o clock)
2) Sub clavicular (high parasternal short axis)
3) Parasternal short axis (usually lower veins)
4) Apical 4 chamber (left and right veins)
5) Subcostal sagittal bicaval view of SVC (RUPV)

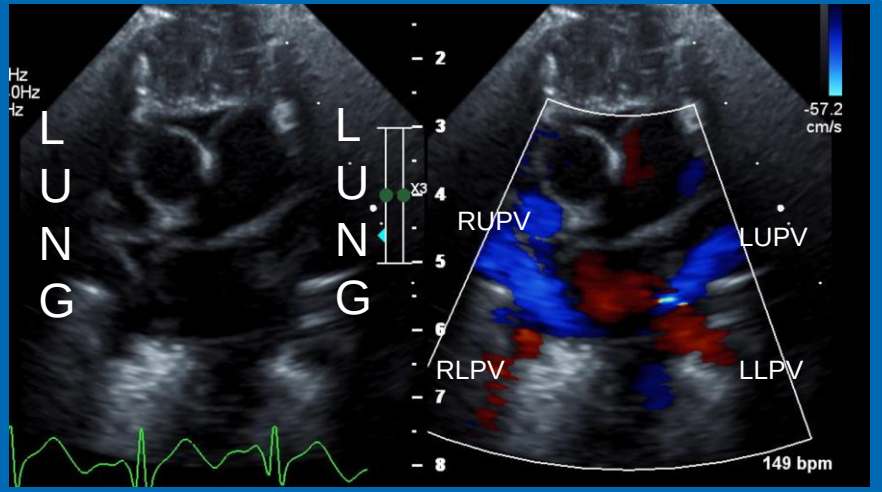
Crab View

(Suprasternal notch with indicator at 3 O'Clock)

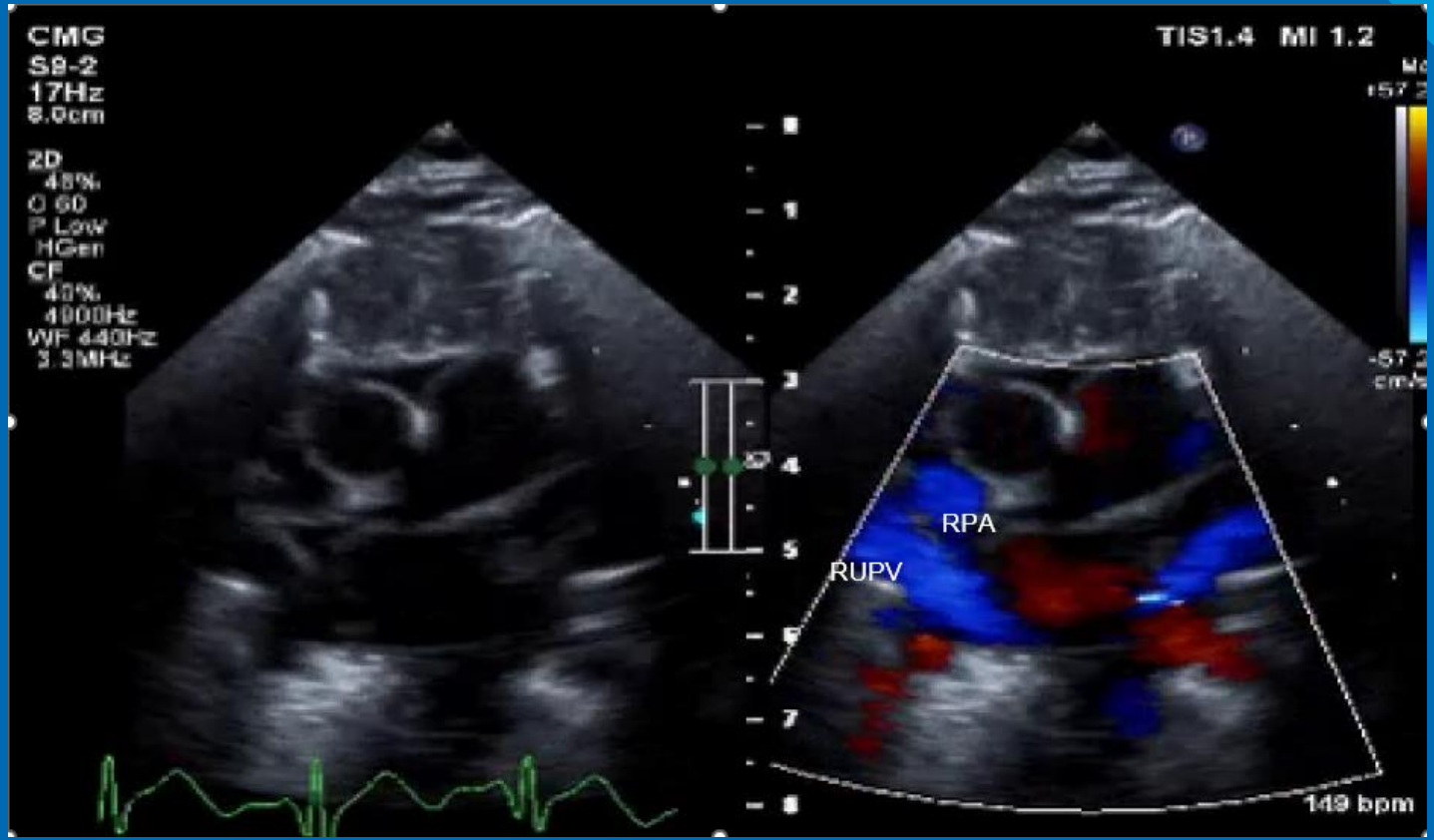


Crab View

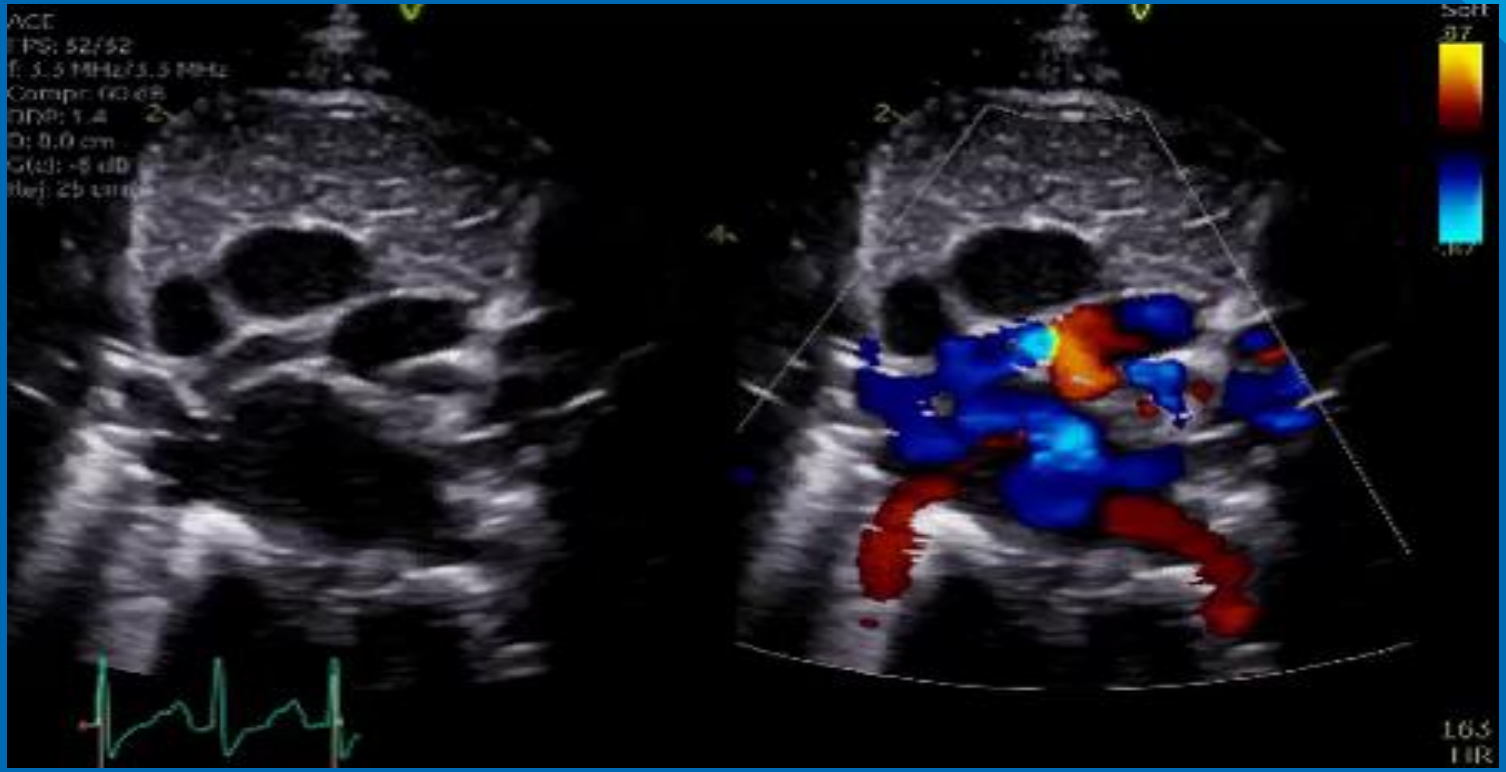

SVC
Ao
RPA
LUPV
LA
RUPV
RLPV
LLPV


LUNG
LUNG
RUPV
LUPV
RLPV
LLPV
-57.2 cm/s
149 bpm

Patient 1

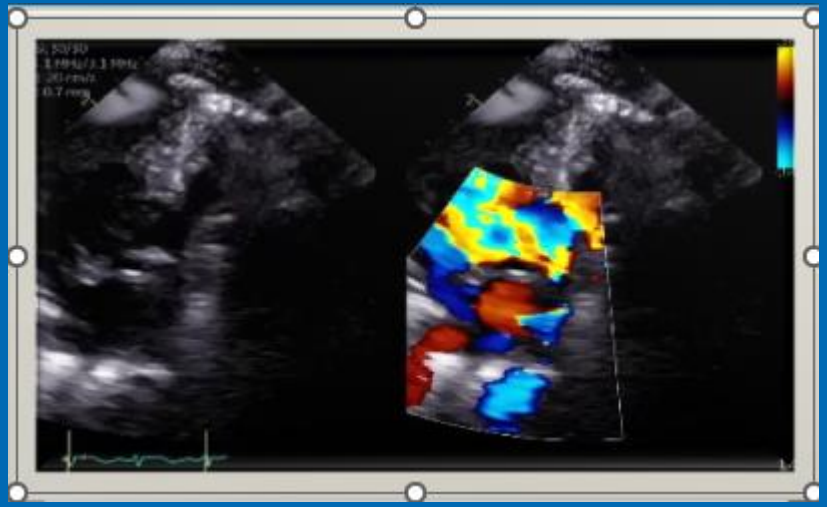

CMG
S9-2
17Hz
8.0cm
2D
48%
G 60
P Low
HGen
CF
40%
4000Hz
WF 440Hz
3.3MHz
TIS1.4 MI 1.2
RPA
RUPV
149 bpm

Patient 2

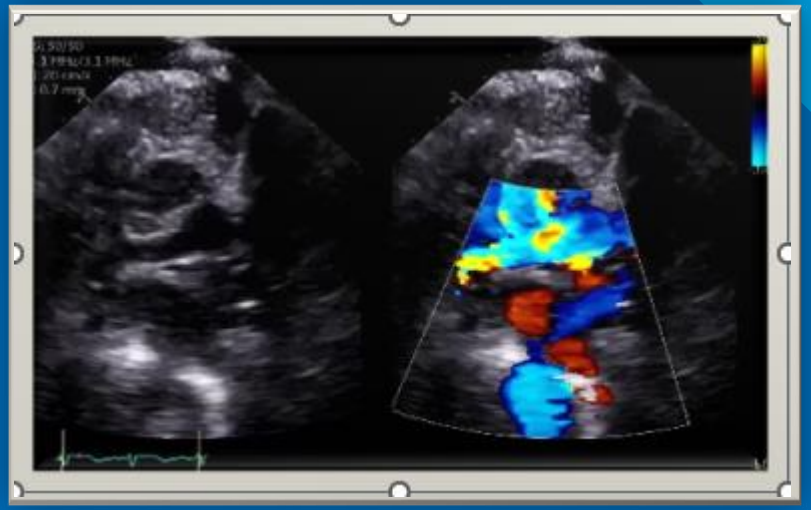


Patient 3

Patient 3

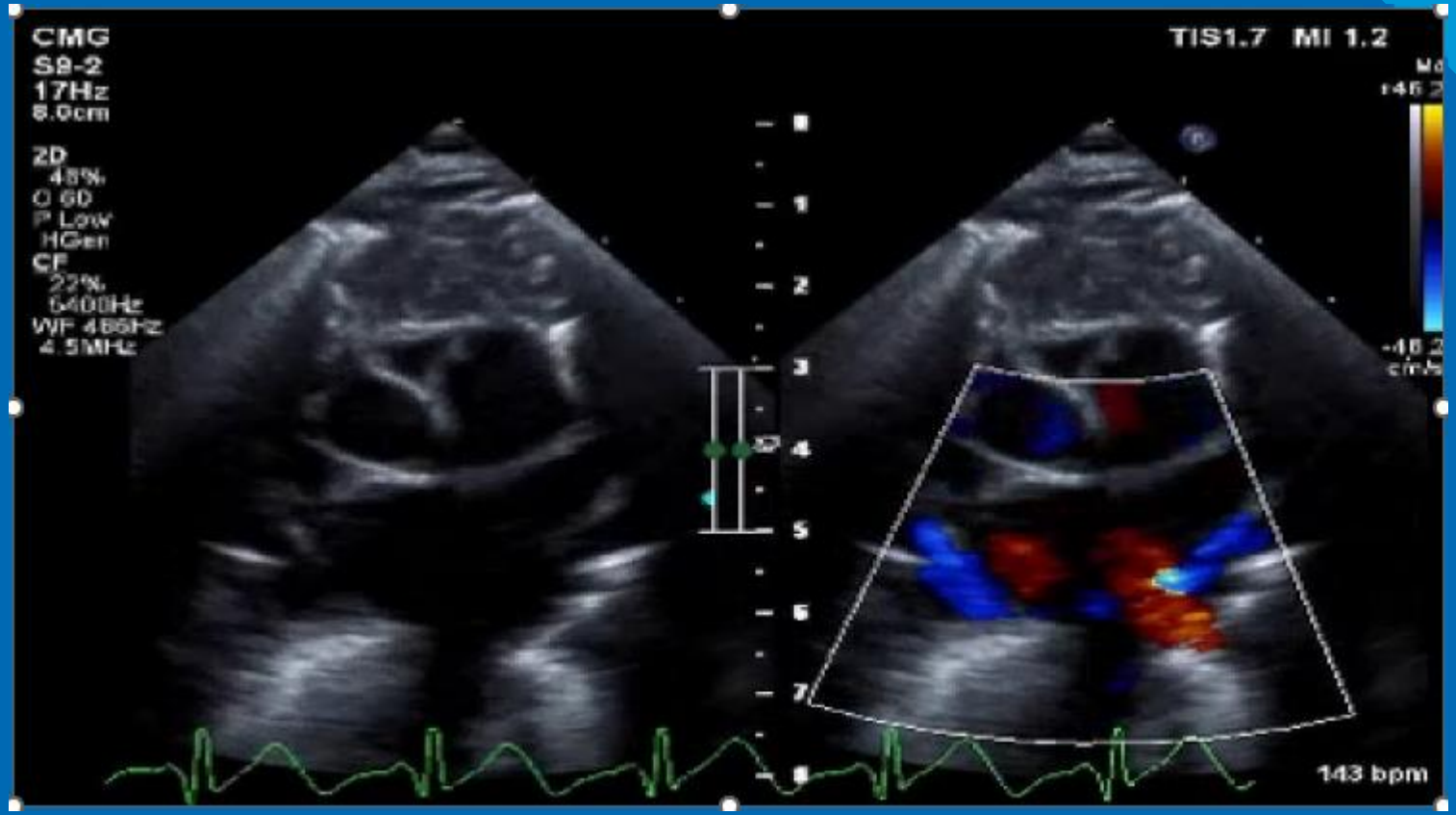


Move closer to the sternum even right sternal border to focus on the right upper and right lower pulmonary veins

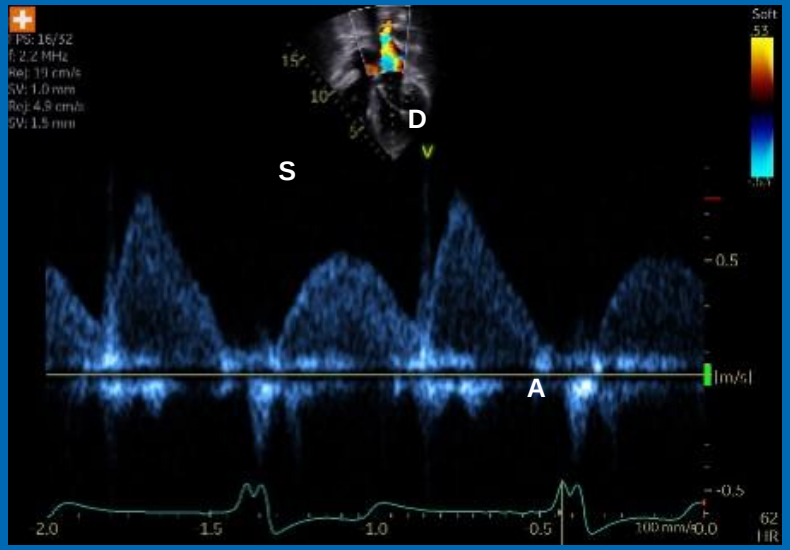


Move to the left to view left upper and left lower pulmonary veins

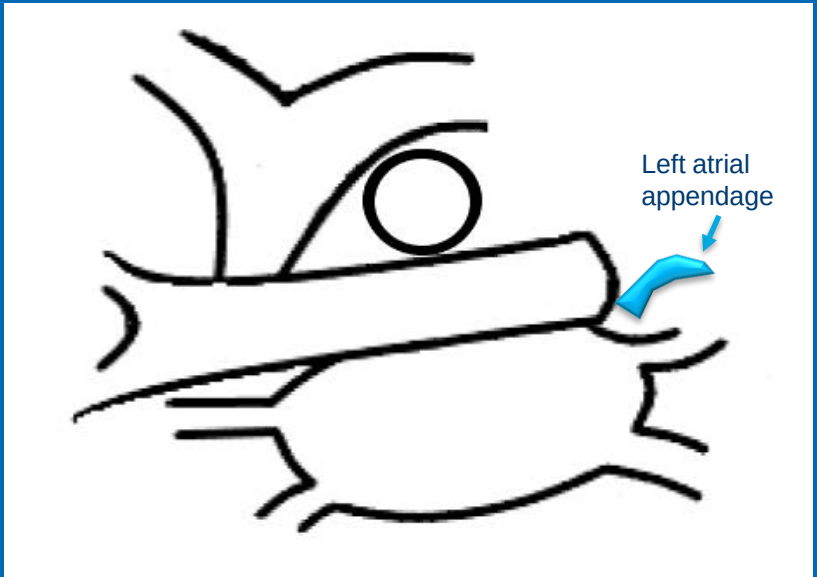
Small Sweep


CMG
S9-2
17Hz
8.0cm
2D
48%
G 60
P Low
HGen
CF
22%
6400Hz
WF 486Hz
4.5MHz
TIS1.7 MI 1.2
143 bpm

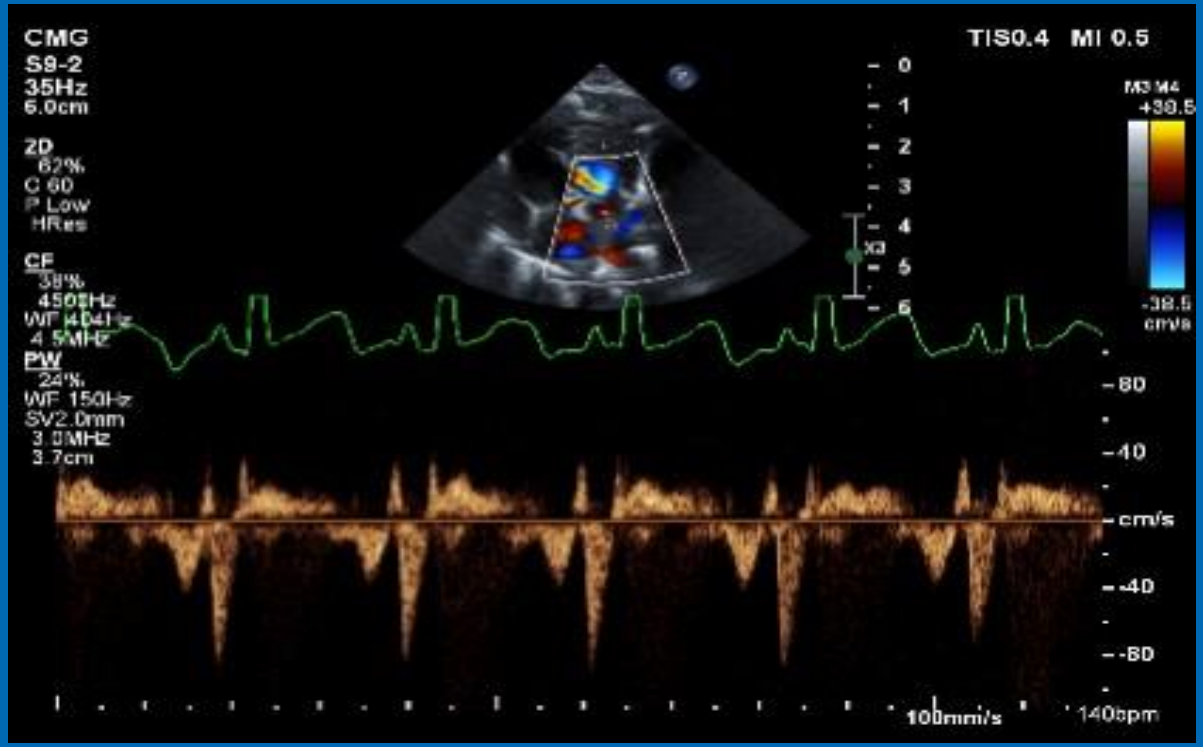
Pulmonary Venous Spectral Doppler



Don’t Be Fooled by the Left Atrial Appendage



Left Atrial Appendage Doppler

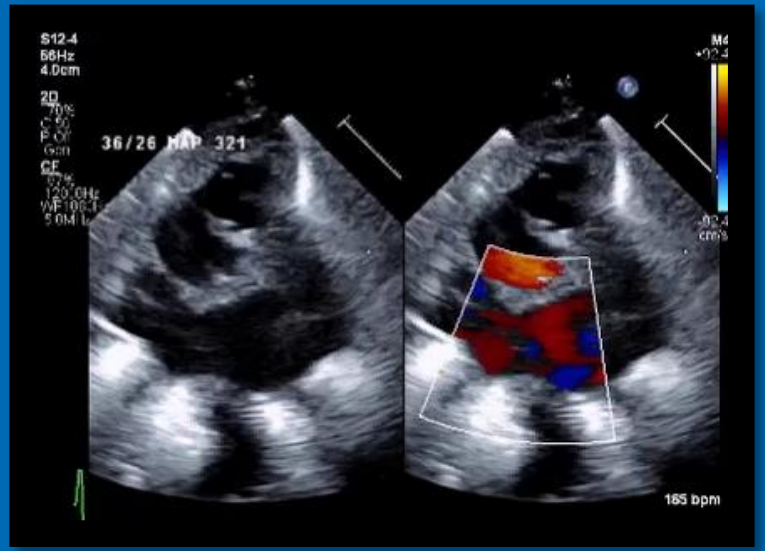


How to Optimize Color Doppler

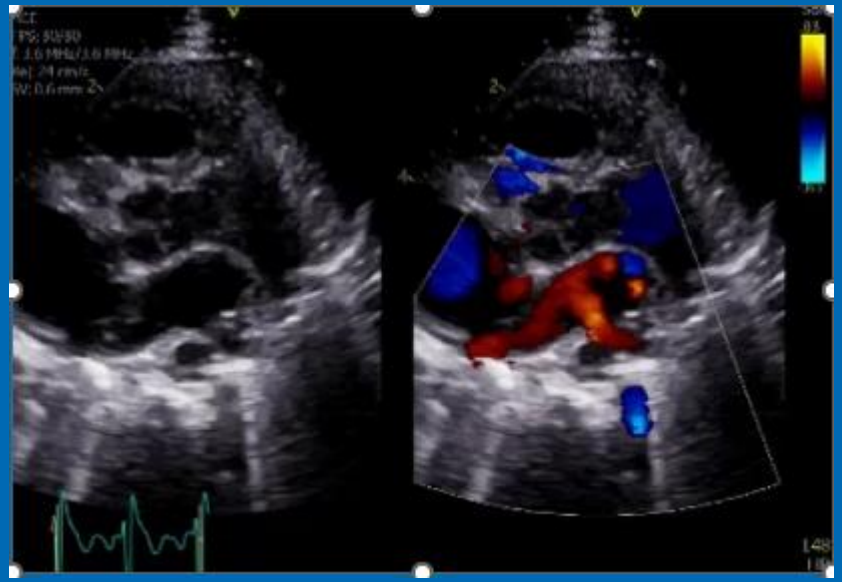
1. Decrease the Nyquist limit (color scale) to about 50 m/s
2. Increase color gain
3. Decrease wall filter/low velocity reject
4. Increase line density
5. Switch to a lower frequency transducer

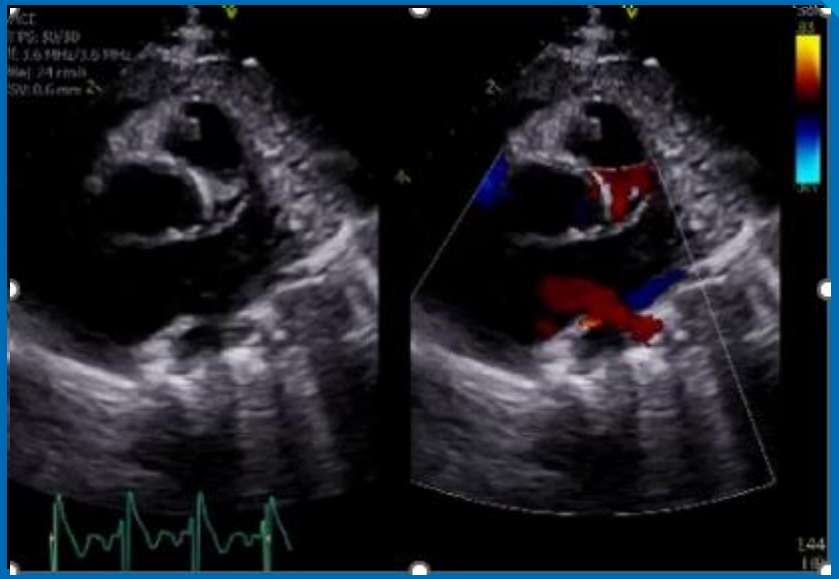
How to Improve This Image

- Slide the color box over to the left to cover the pulmonary veins and the entrance to the left atrium
- Decrease the color scale
- Increase color gain
- Increase line density
- Lower wall filter

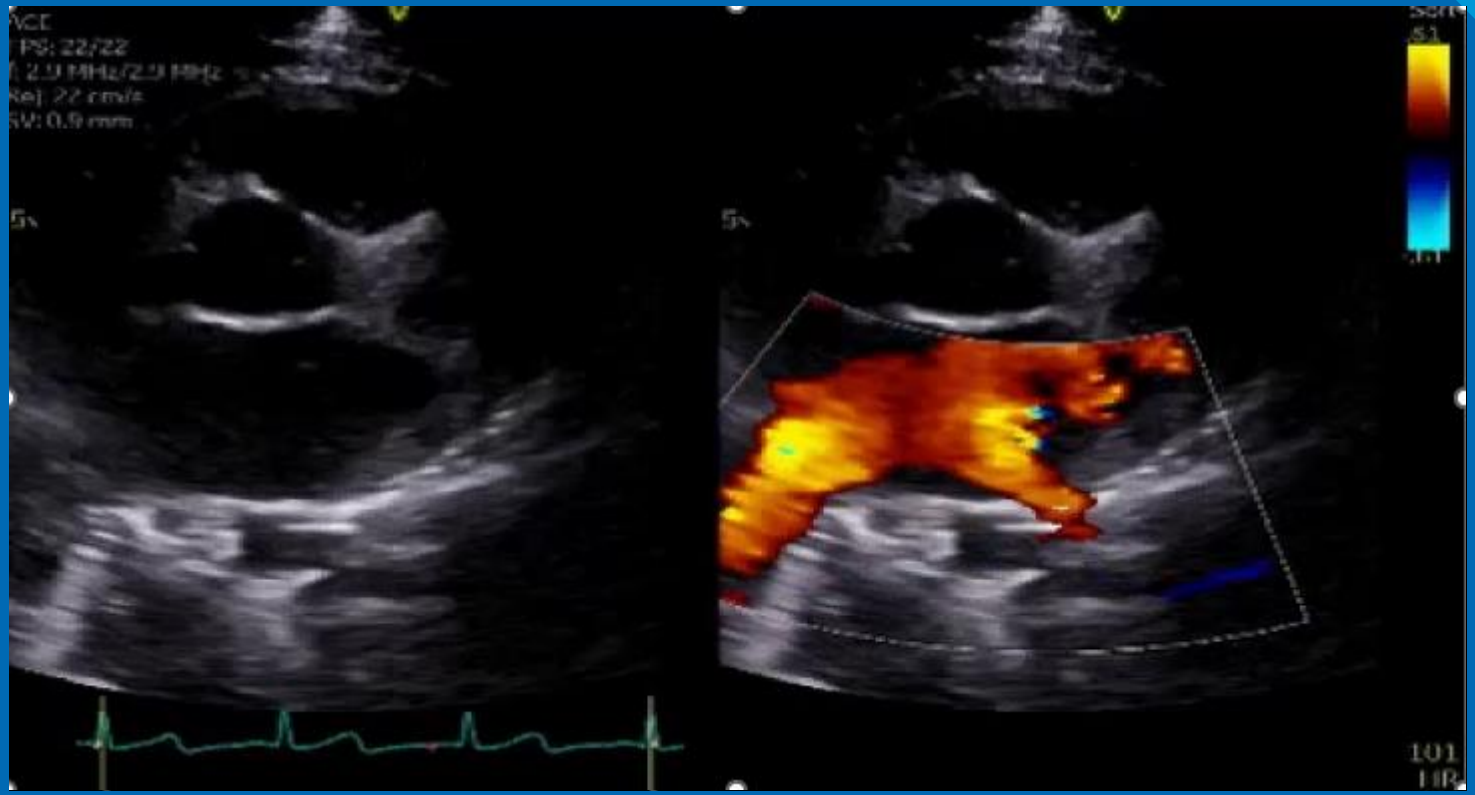


High Parasternal Short Axis

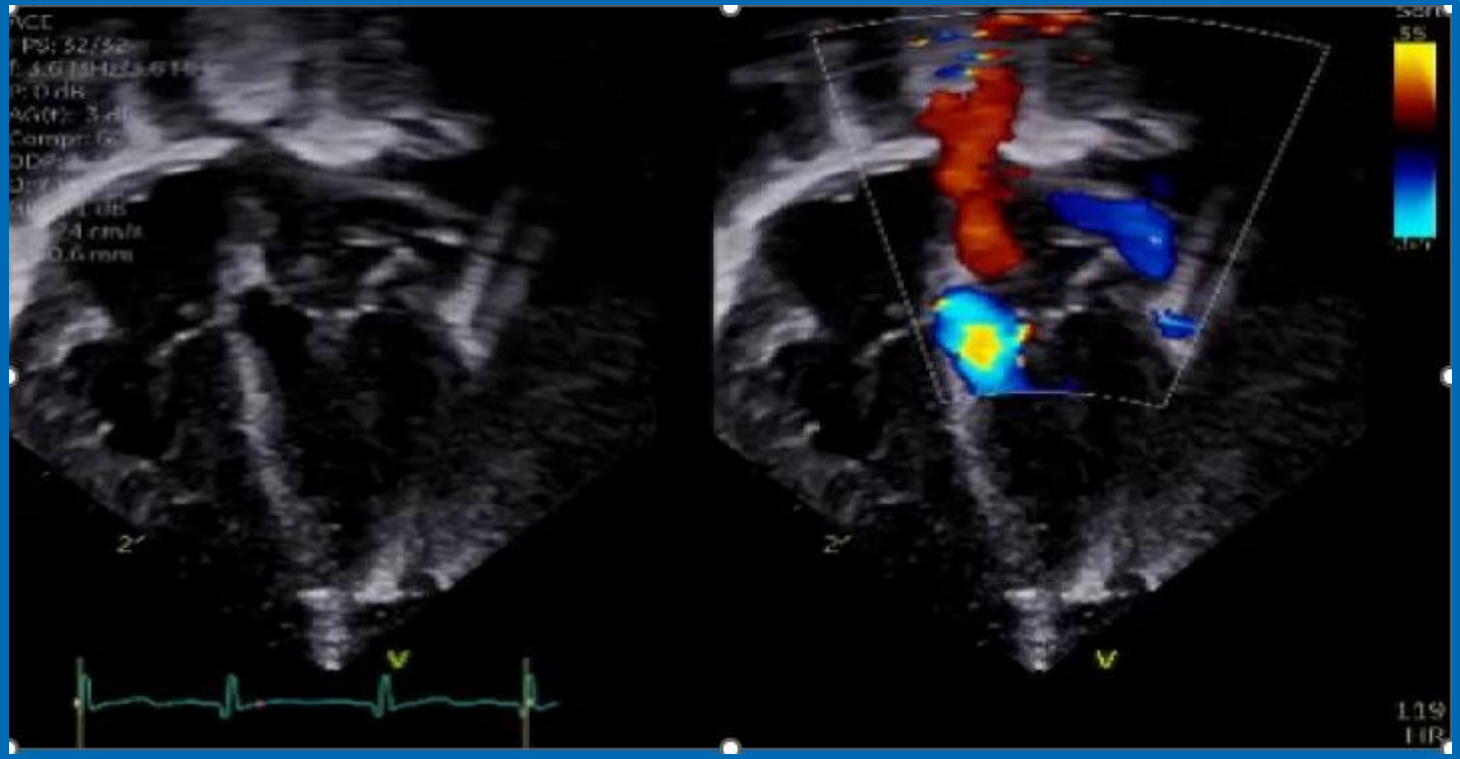




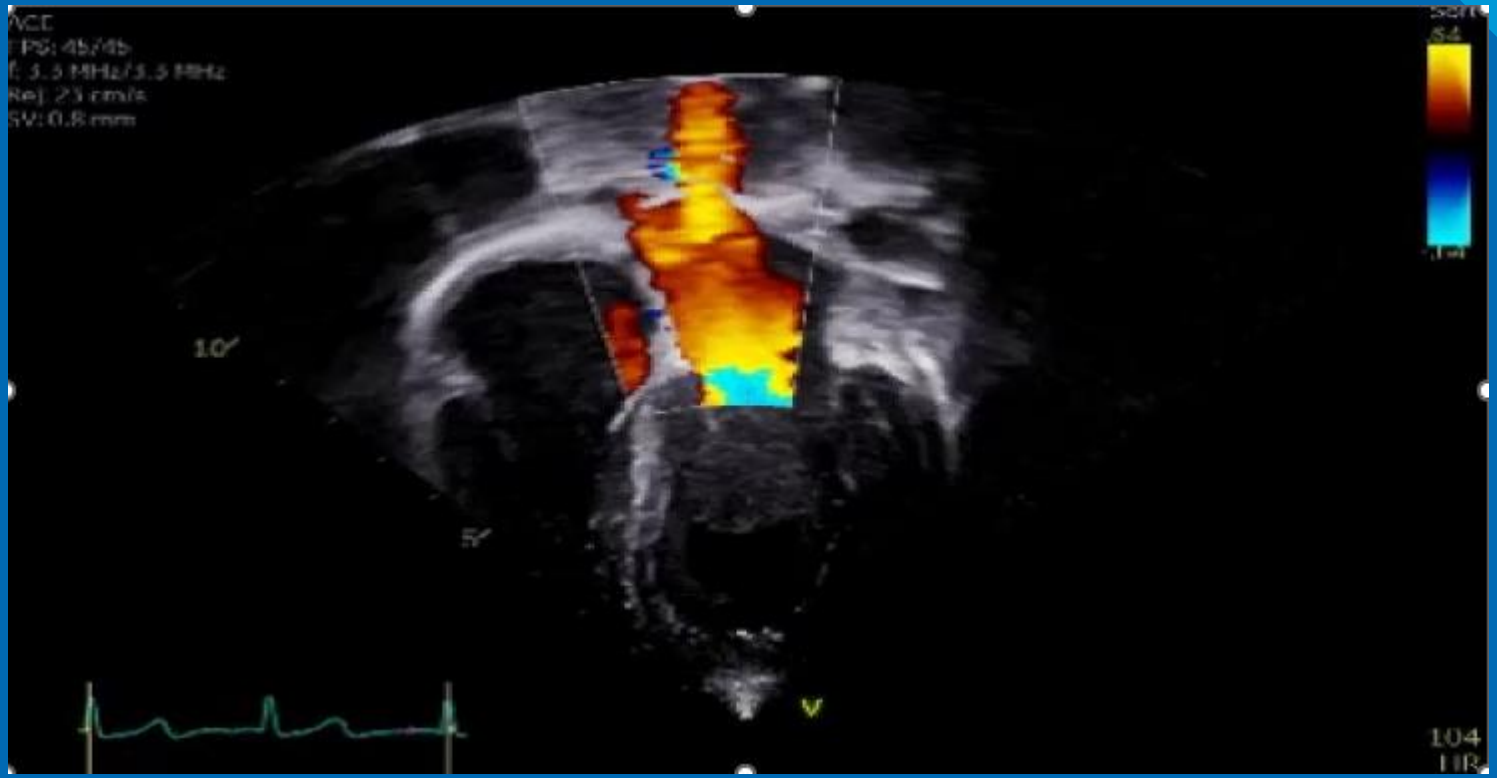
Parasternal Short Axis



Apical View of one Pulmonary Vein on Each Side

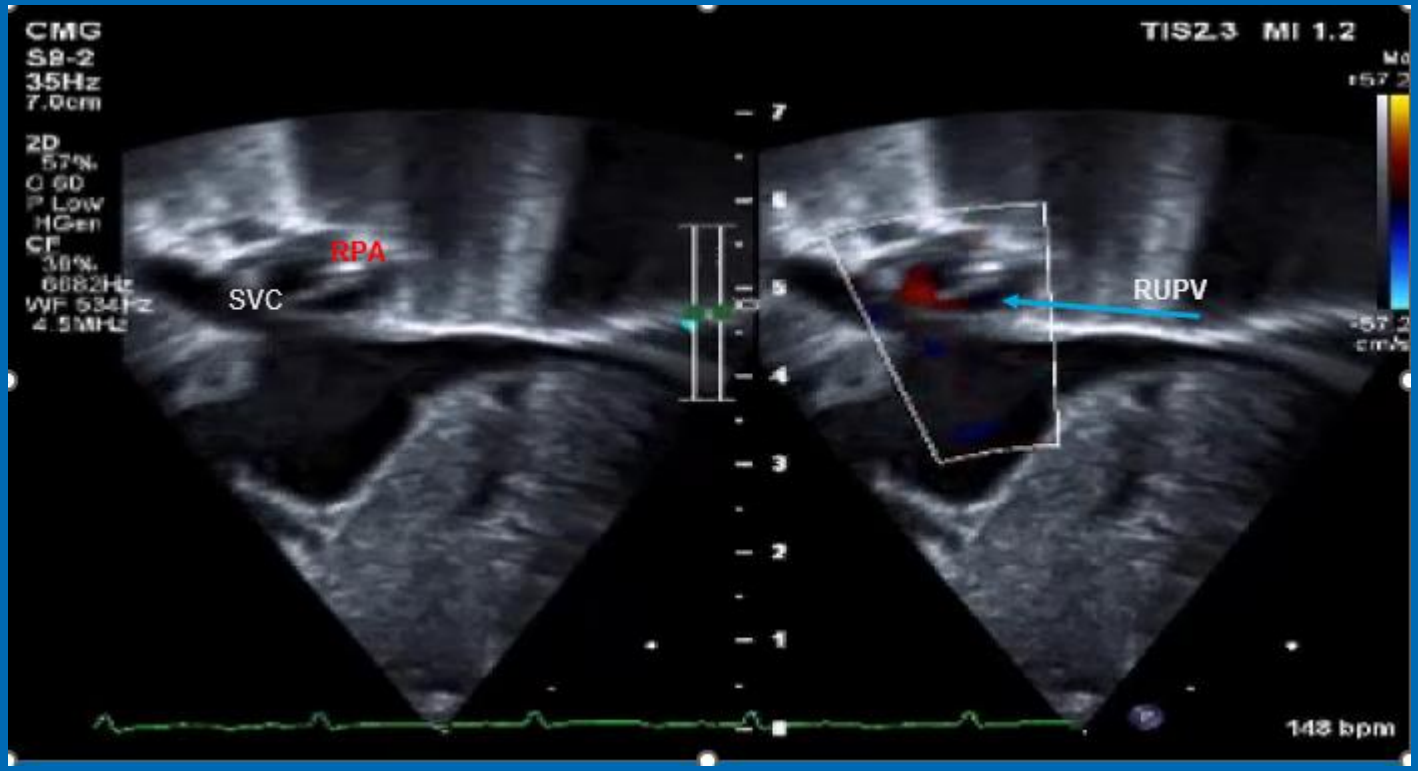


Apical View of One Right Pulmonary Vein

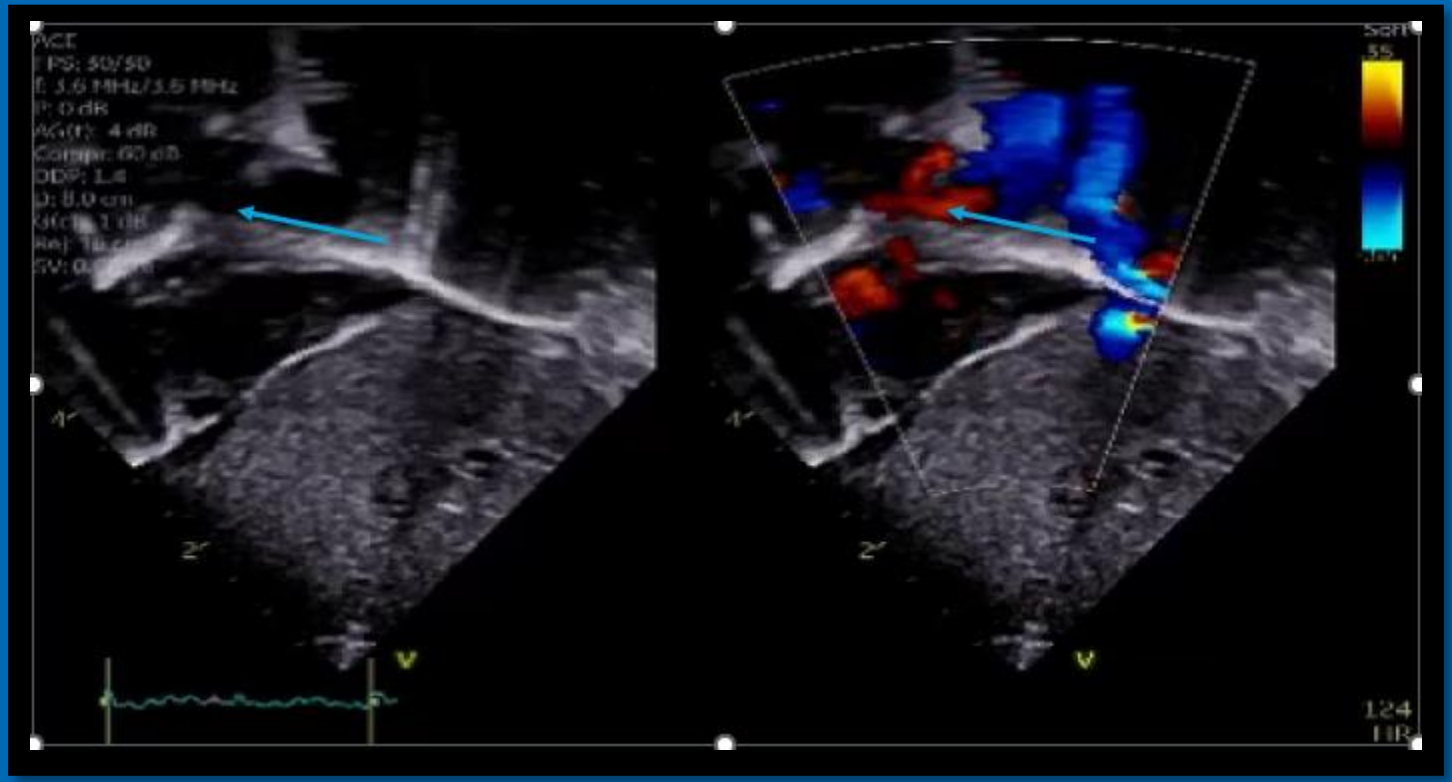


Apical View of One Left Pulmonary Vein

Subcostal Sagittal View of the RUPV



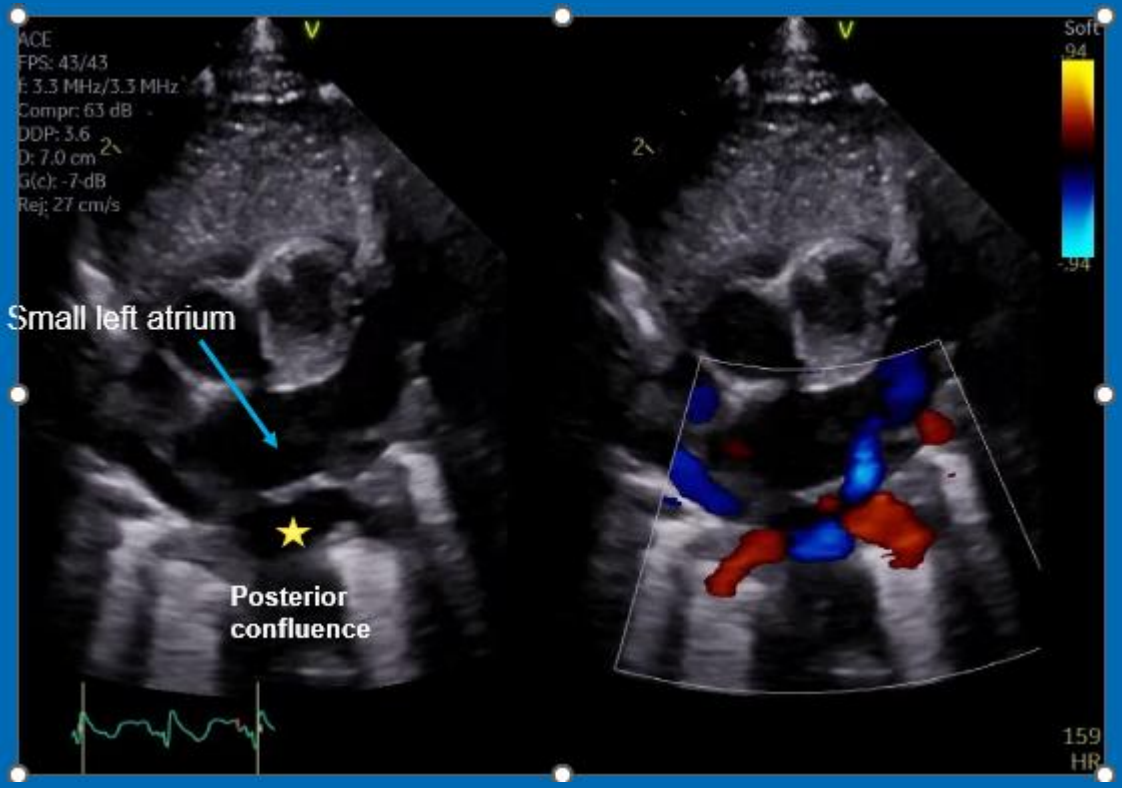
Subcostal Sagittal View of the RUPV



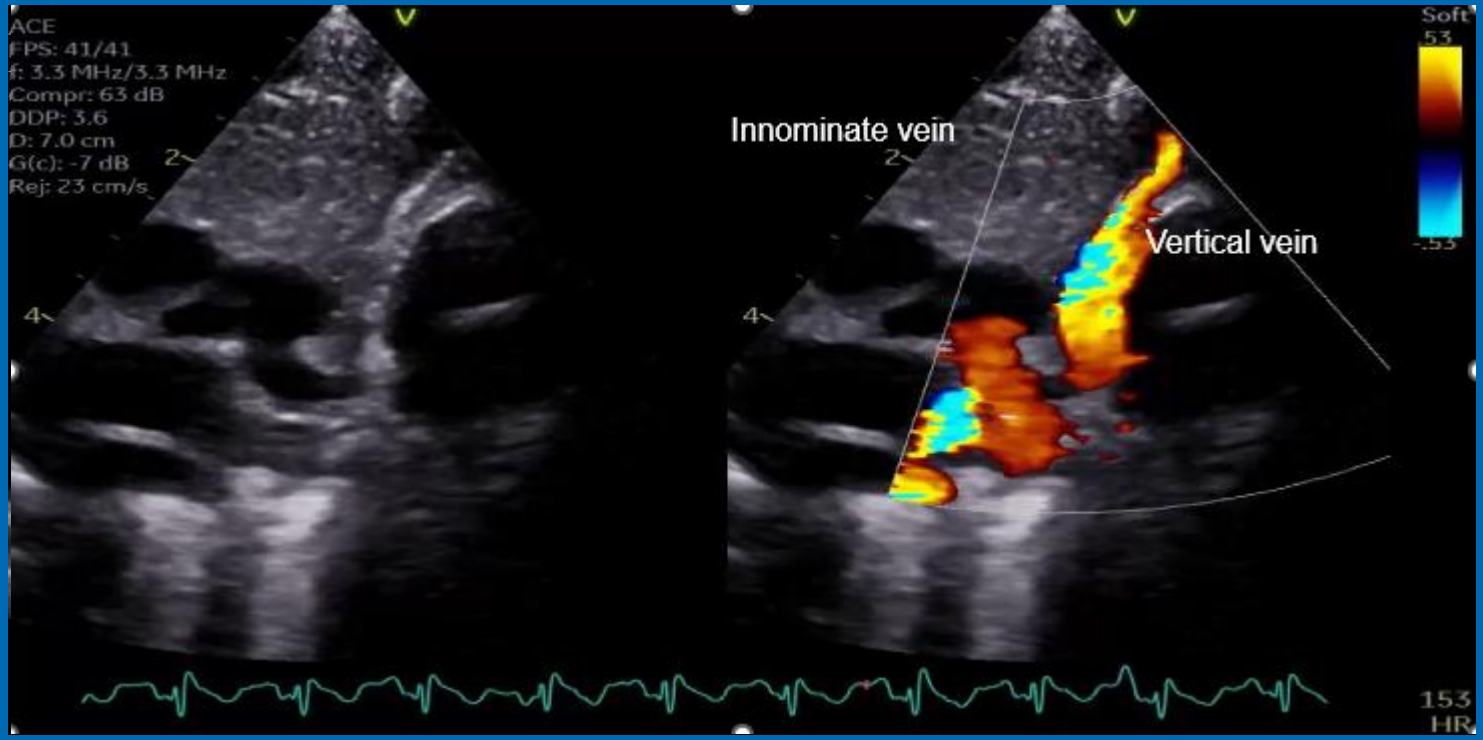
Abnormal findings

1. Prominent color flow that doesn’t appear to go into the left atrium
2. A left atrium that seems small
3. Dilated right side (RA, RV, CS)
4. Right to left flow at the atrial shunt (blue flow through the PFO/ASD)

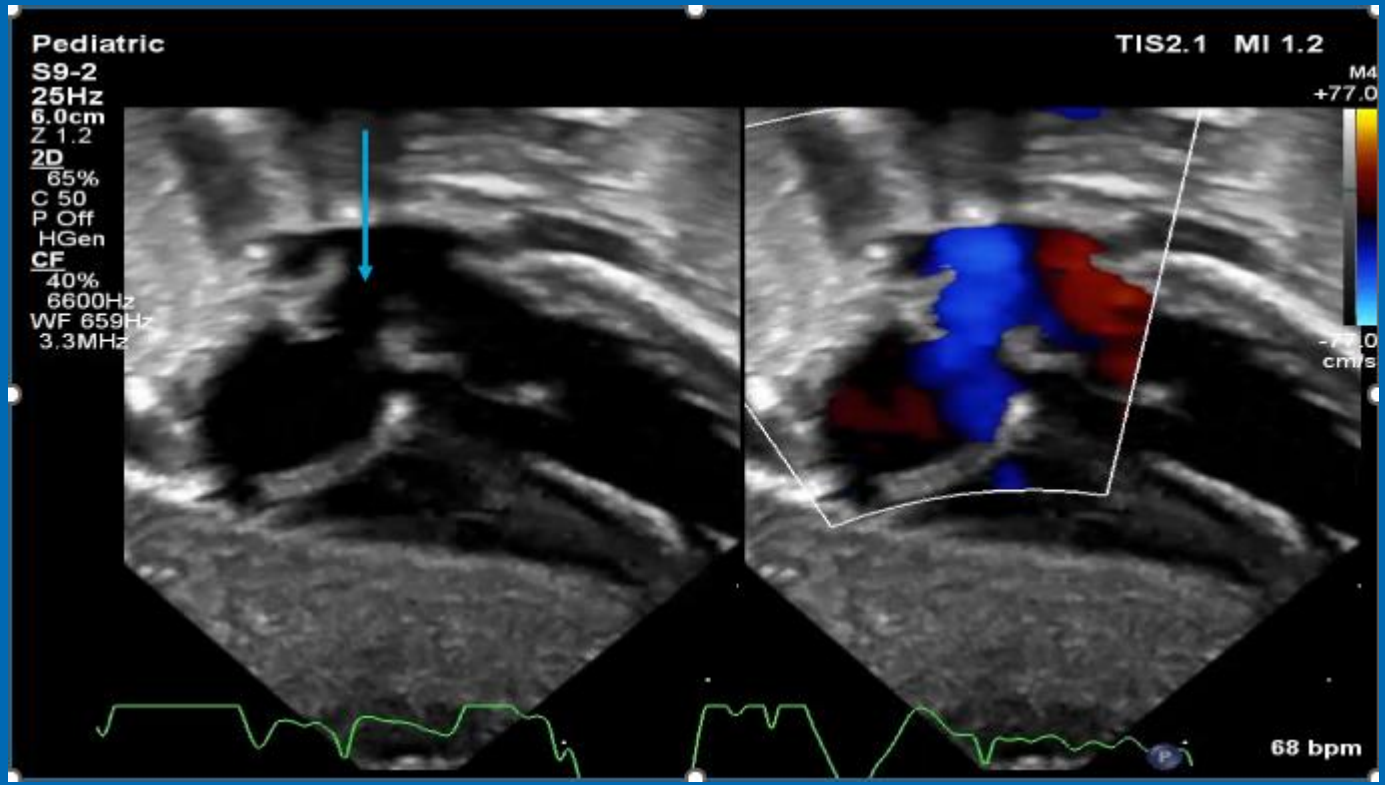
Posterior Confluence



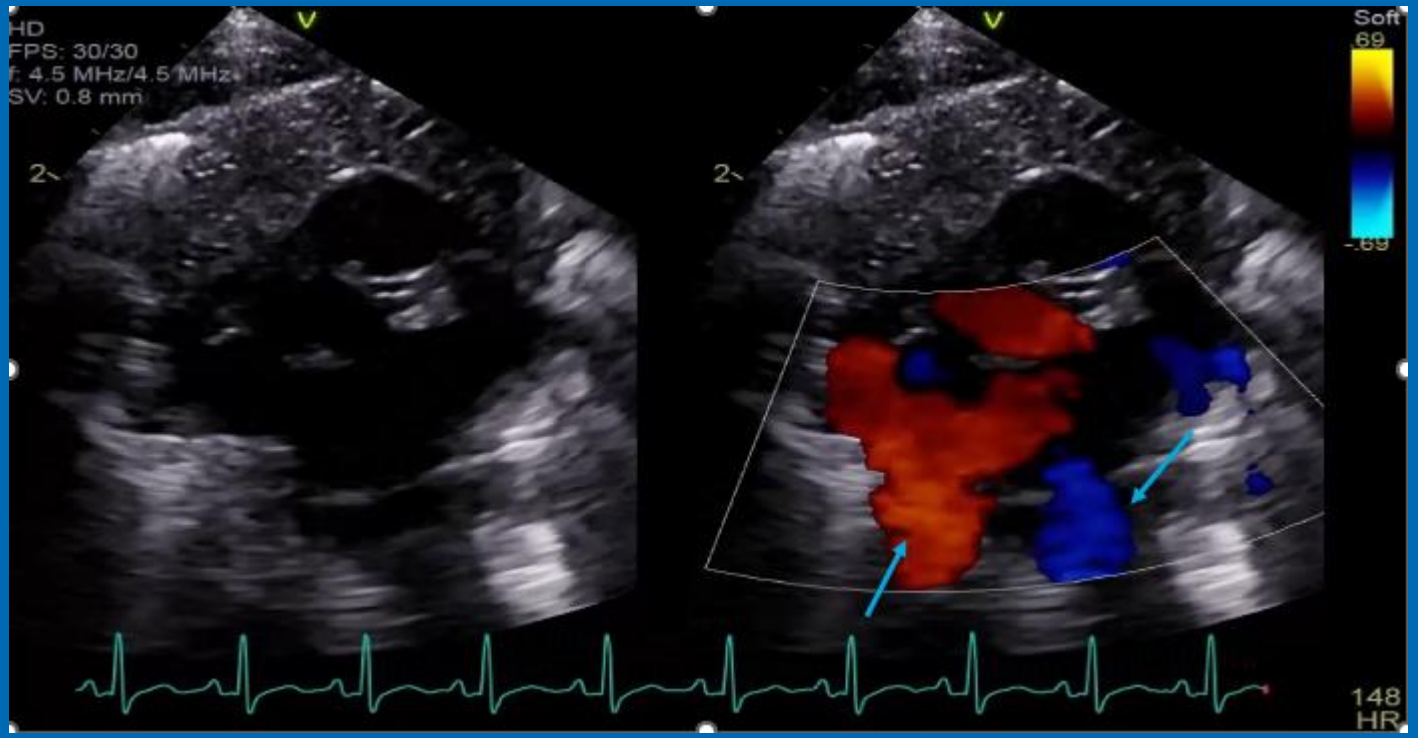
Vertical Vein



Right To Left Shunting



Prominent Flow Inferiorly



Recap

- Image from multiple windows SSN, high parasternal, apical, subcostal, even right parasternal
- Move to the patient's left or right and focus on one side at a time
- Use color compare when imaging pulmonary veins as color Doppler obscures anatomy
- Optimize the 2D image and color Doppler
- Make sure to show color going from the pulmonary veins into the left atrium
- Slow sweeps of flow that doesn’t look normal

Thank You!