

Cardiac Ultrasound

Point of Care Indications and Scanning Techniques

Vicki Noble MD
Director, Division of Emergency Ultrasound
Massachusetts General Hospital



Why ultrasound?

- Chest pain?
- Shortness of breath?
- Hypotension?
- You know nothing is wrong?

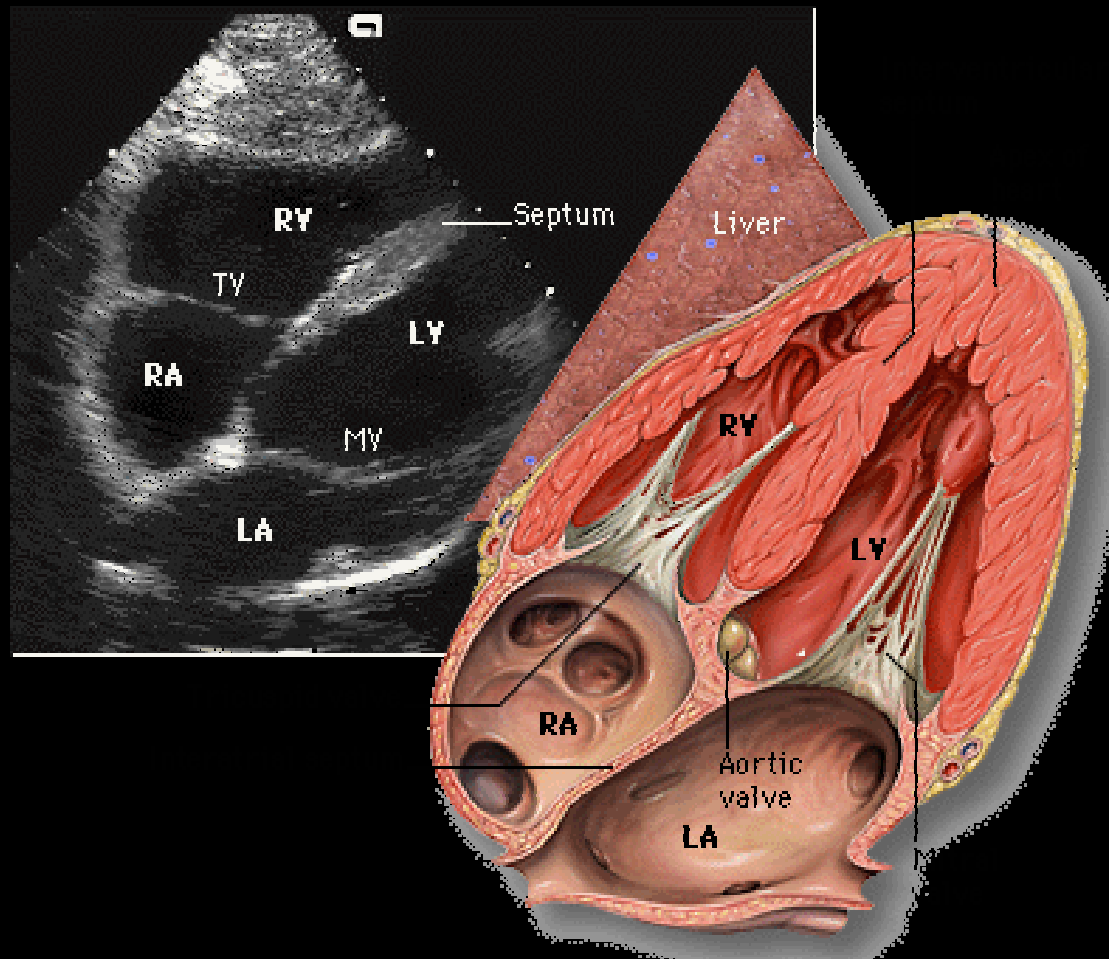
The transducer....



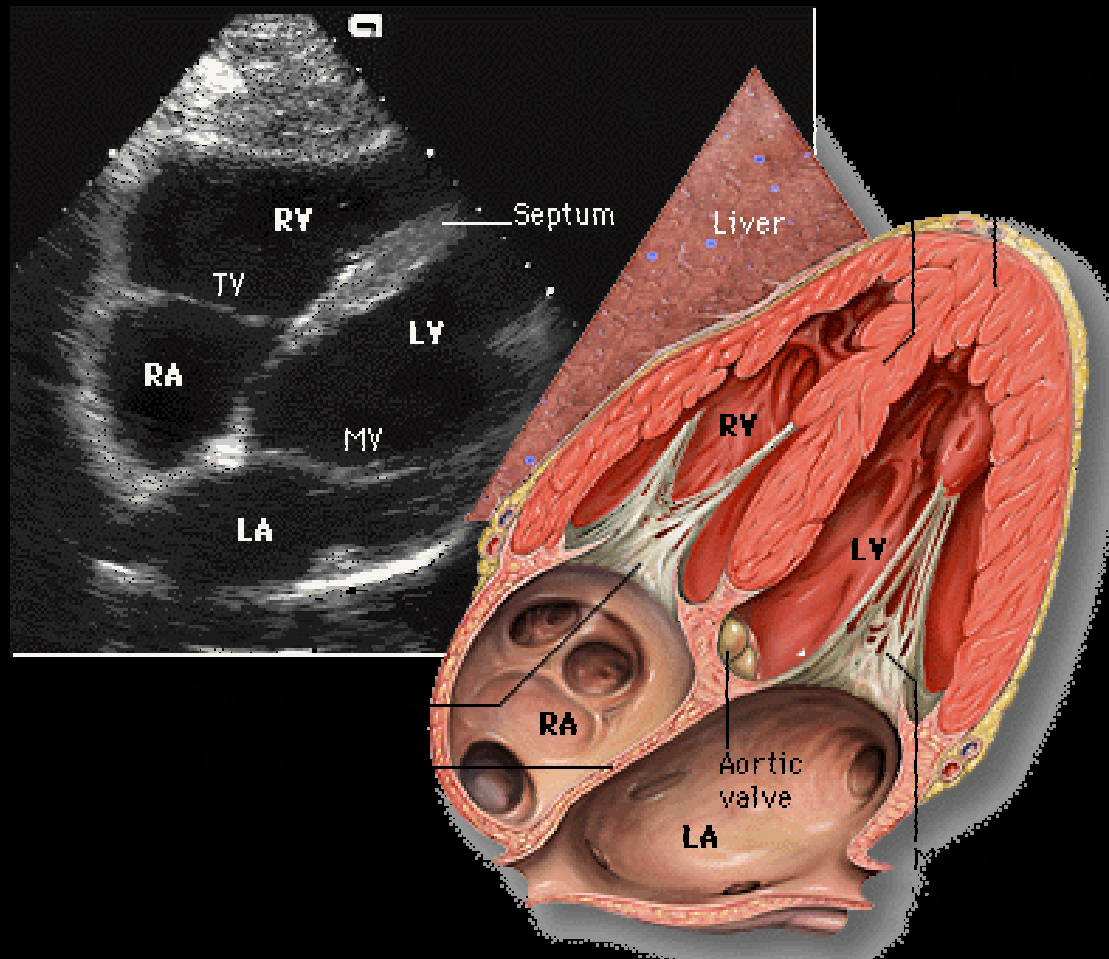
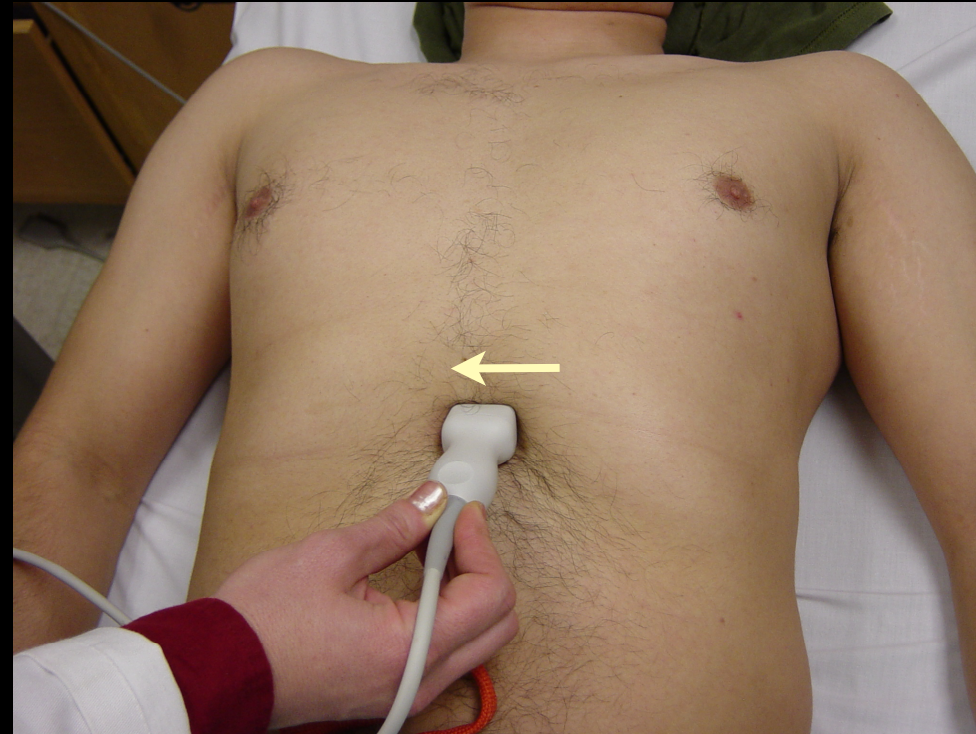
Views we will learn

- Subxiphoid
- Parasternal long
- Parasternal short
- Apical four

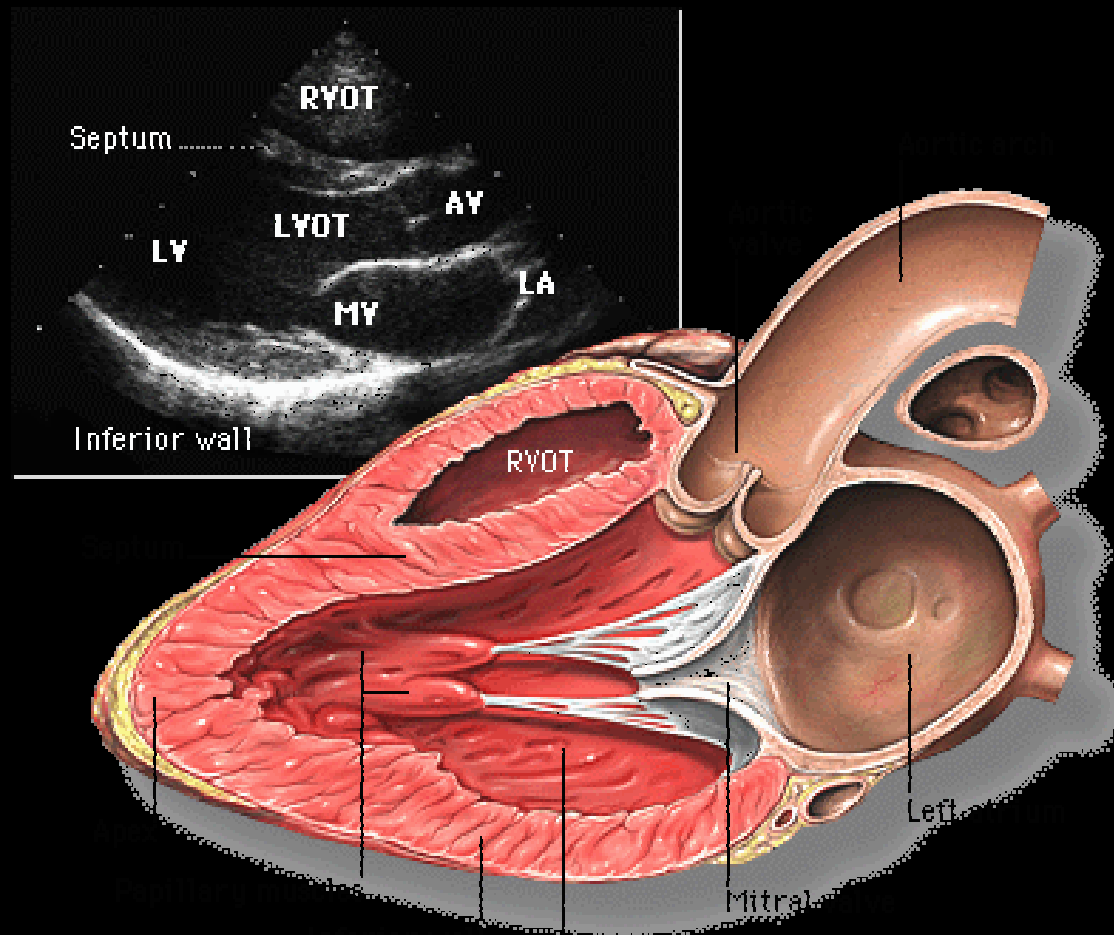
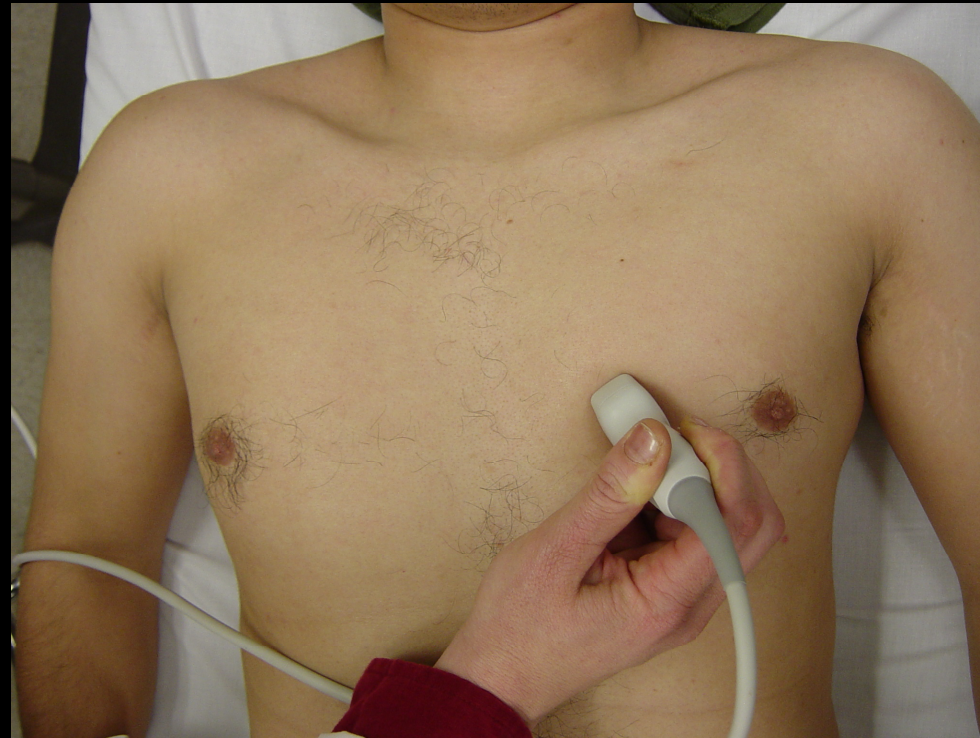
Subxiphoid View



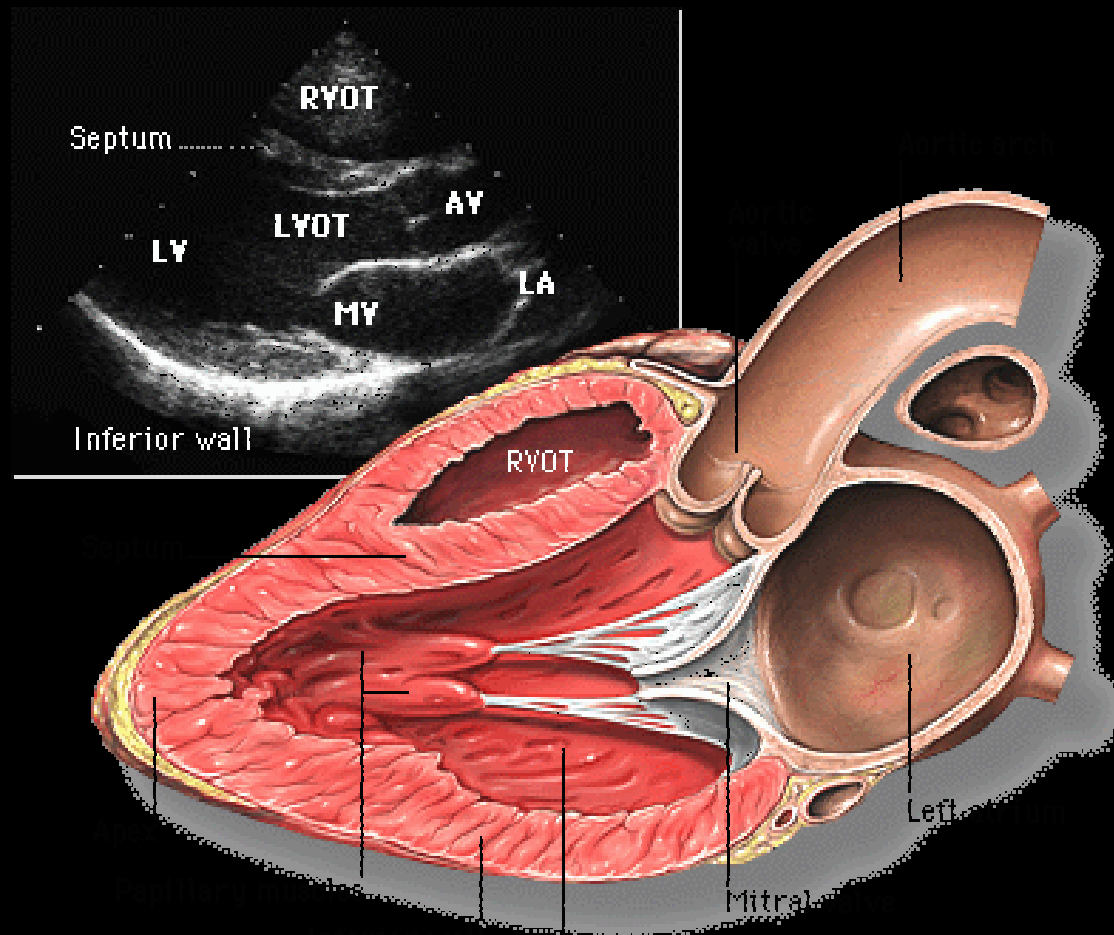
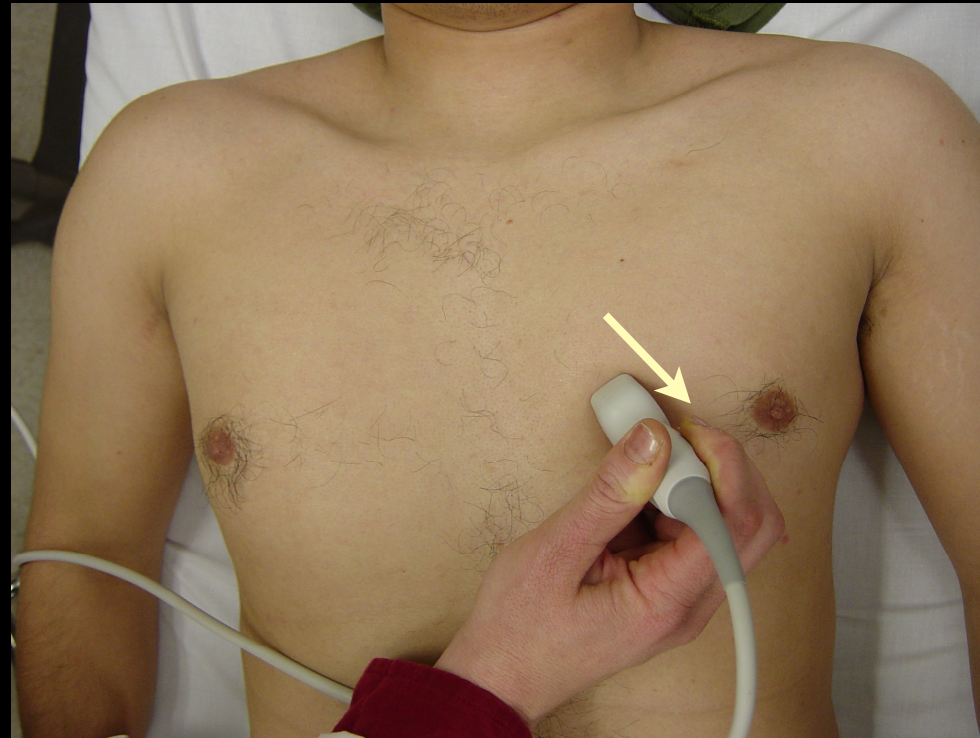
Subxiphoid View



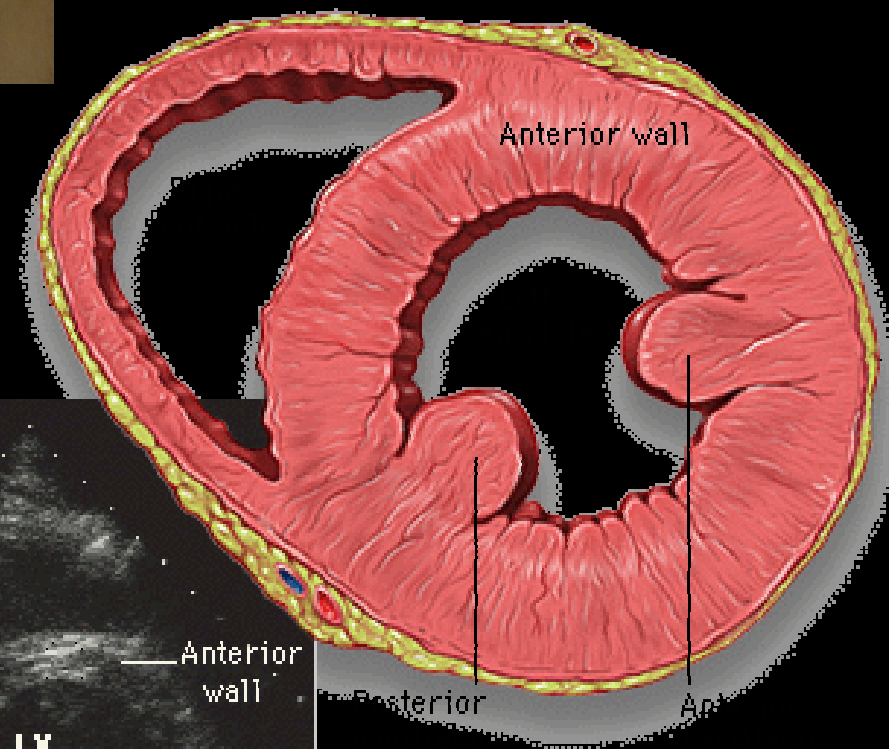
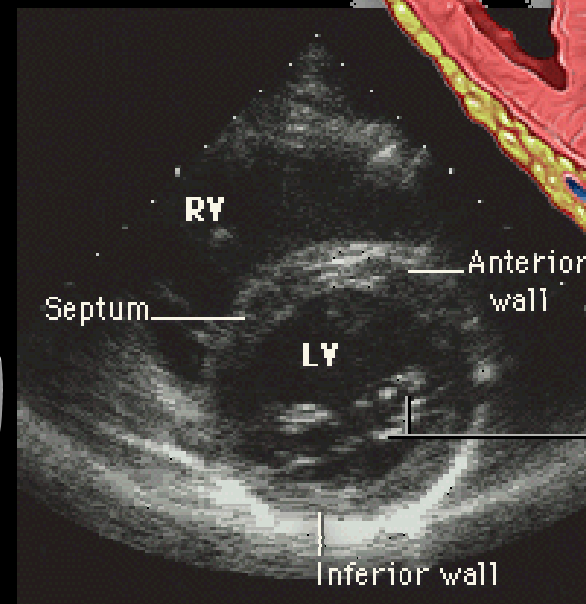
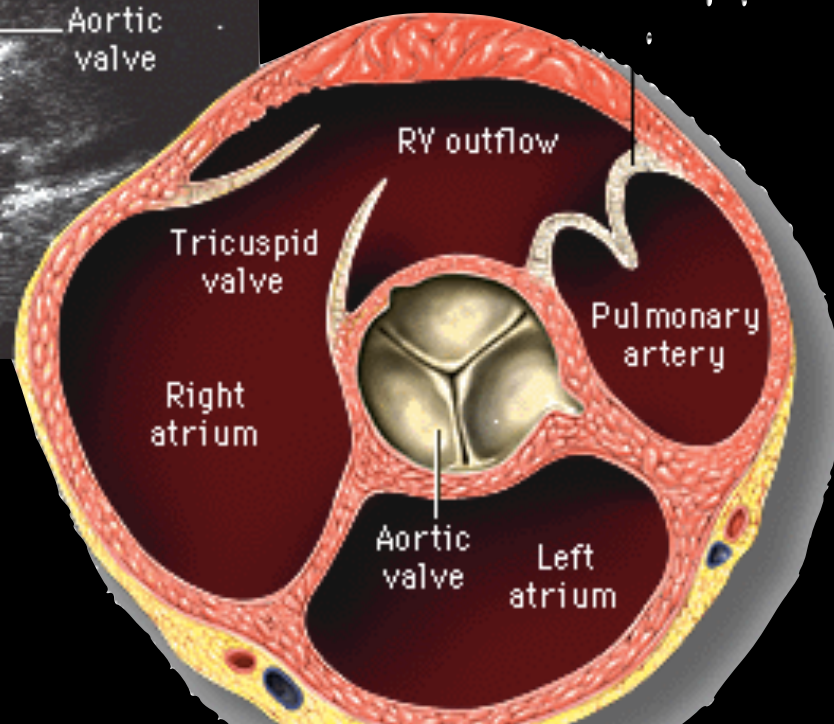
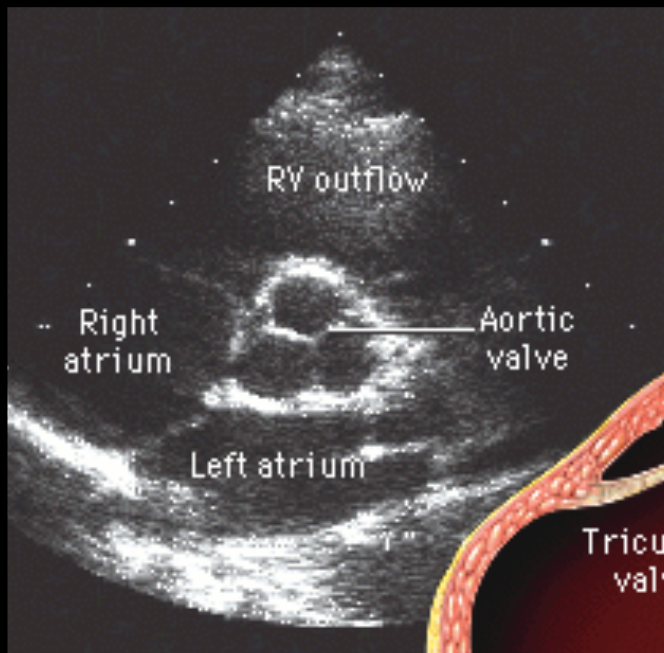
Parasternal Long Axis



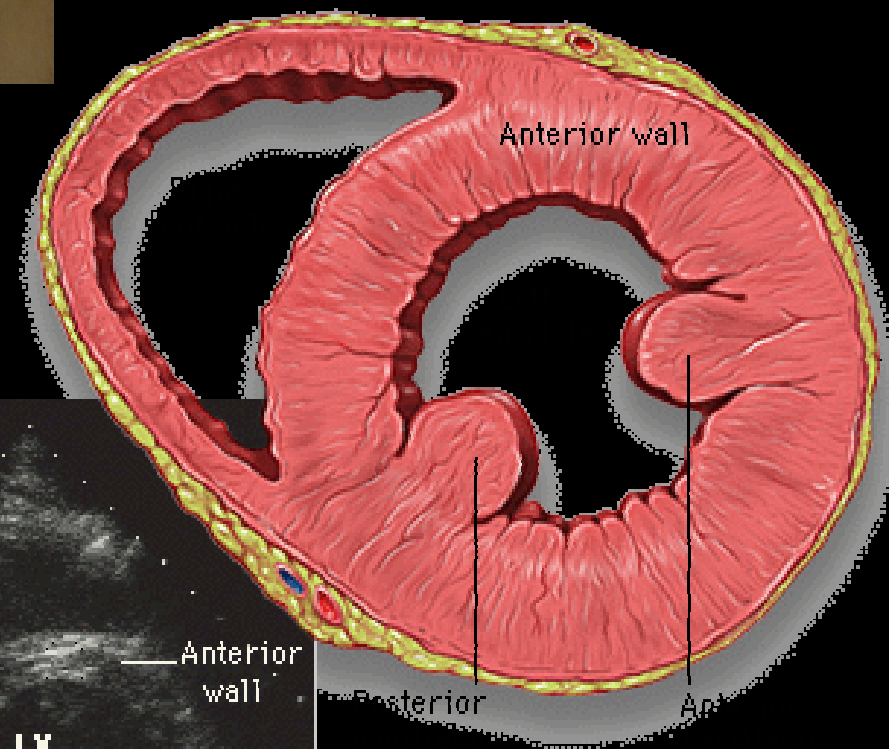
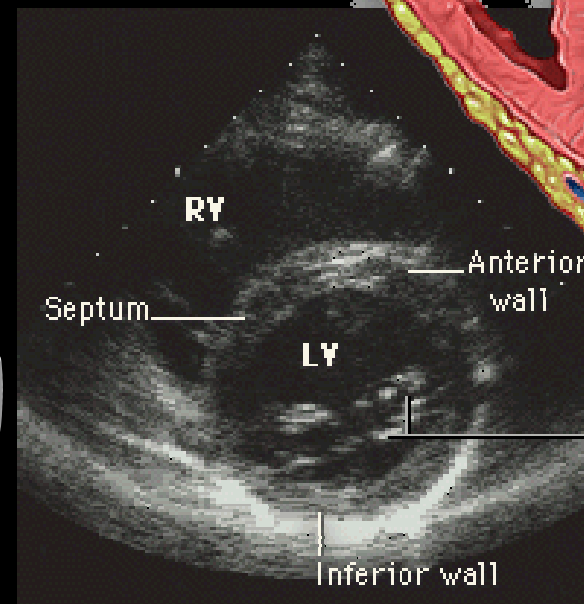
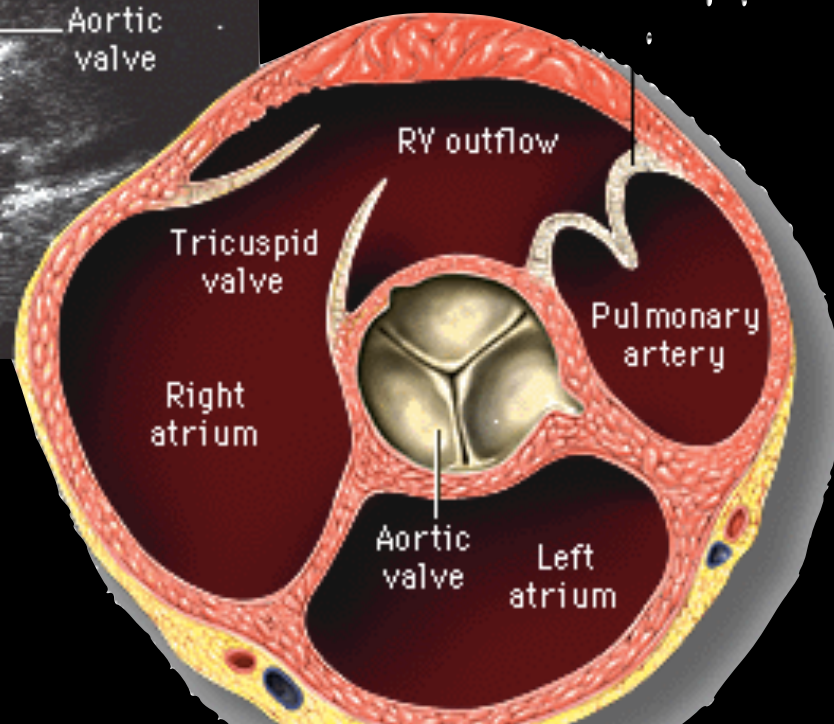
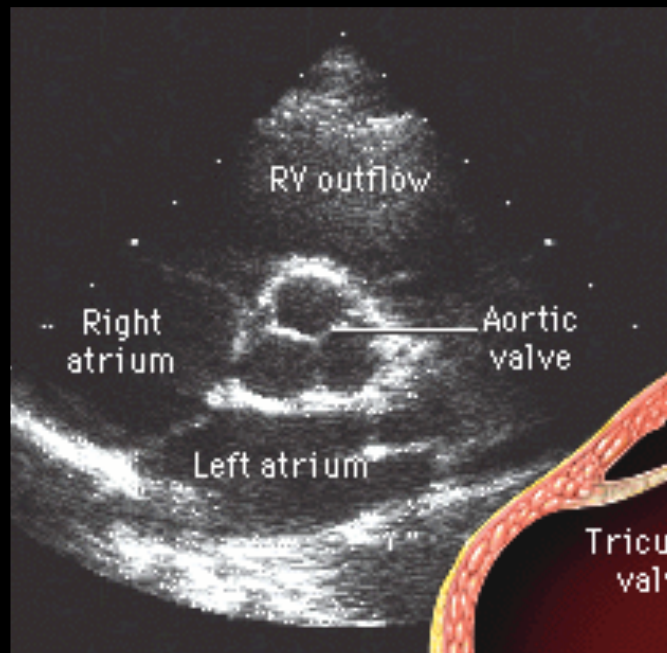
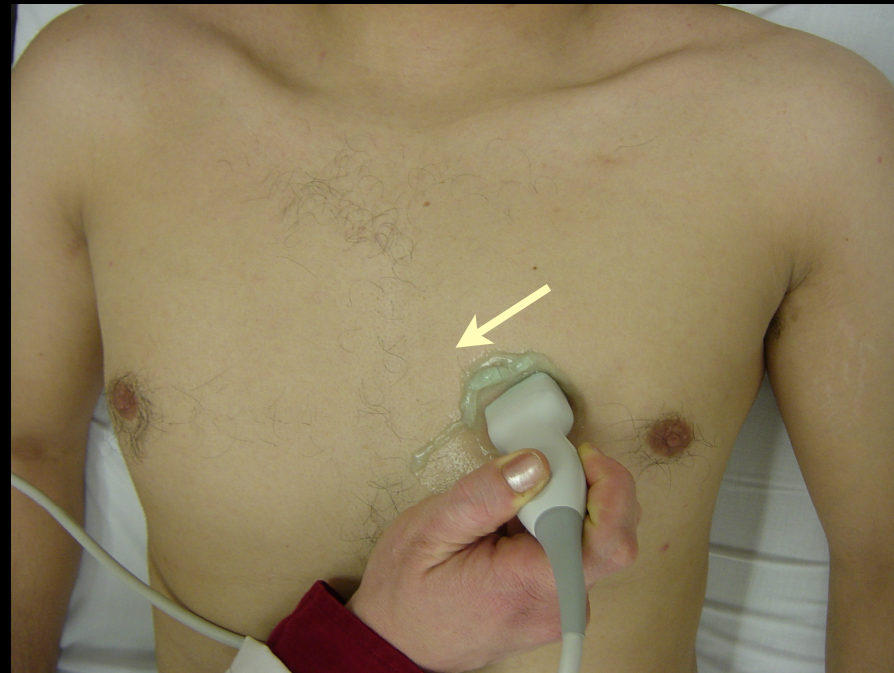
Parasternal Long Axis

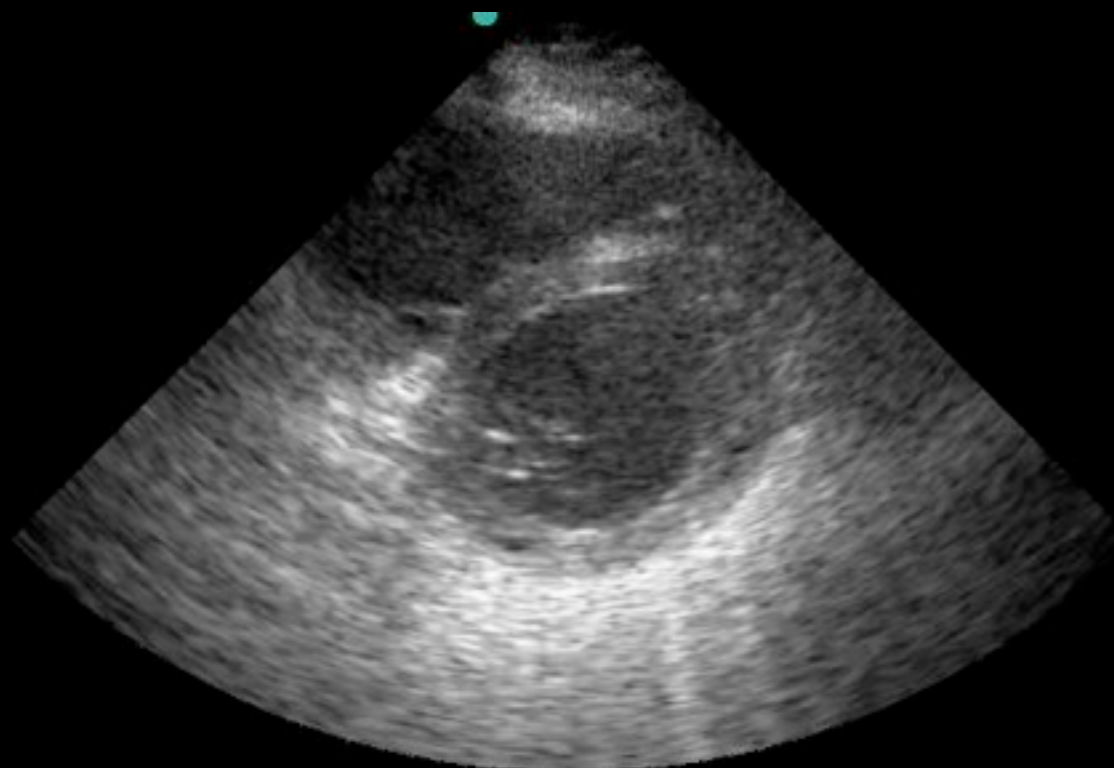


Parasternal Short Axis



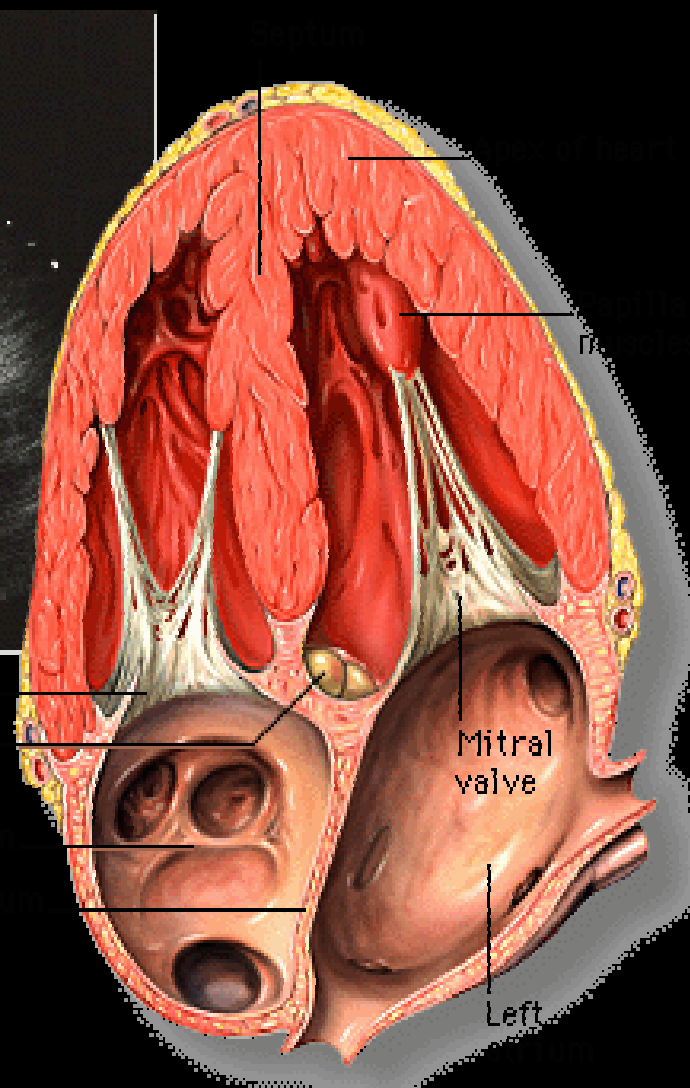
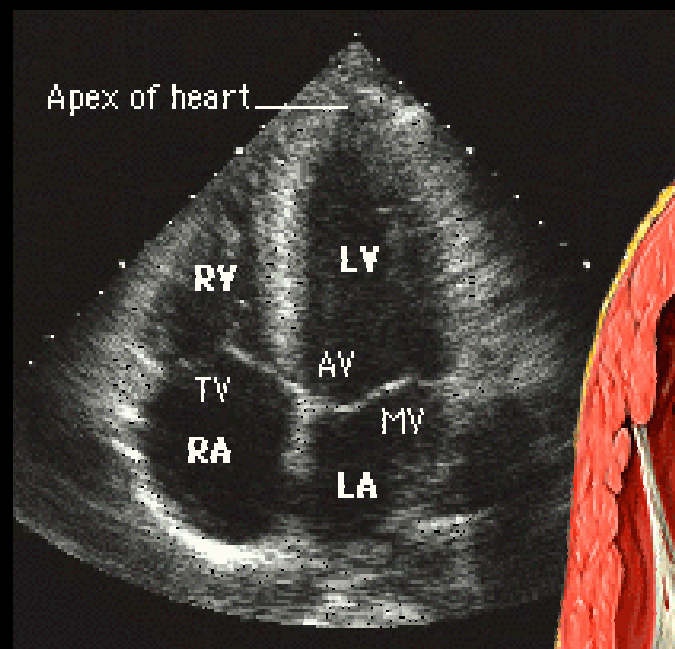
Parasternal Short Axis



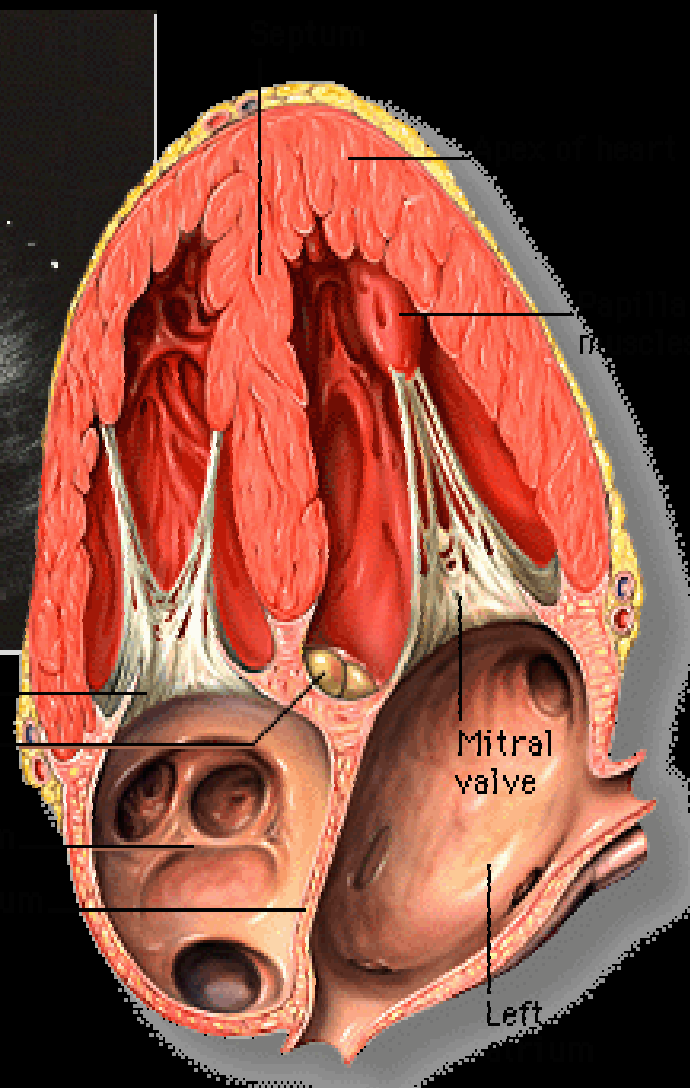
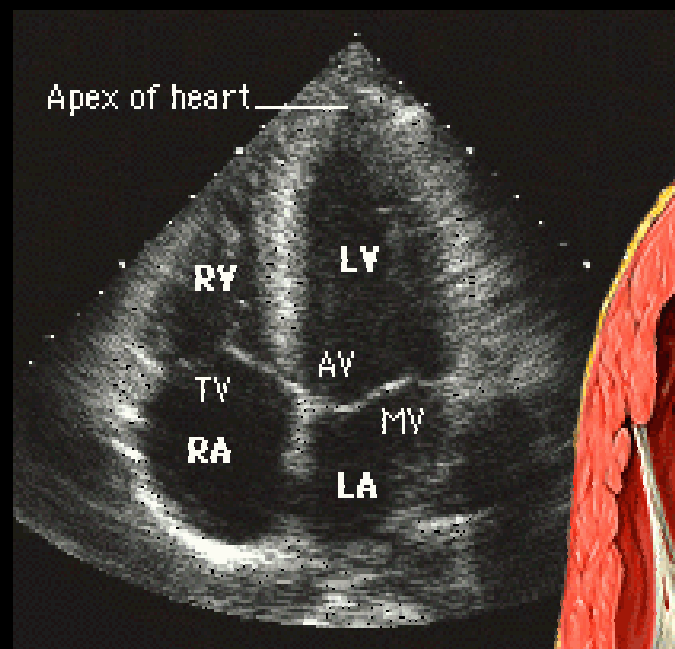


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Apical 4 Chamber View



Apical 4 Chamber View



Point of care yes/no questions

- Cardiac activity
- Pericardial effusion
- Global function
- RV size

Cardiac Activity

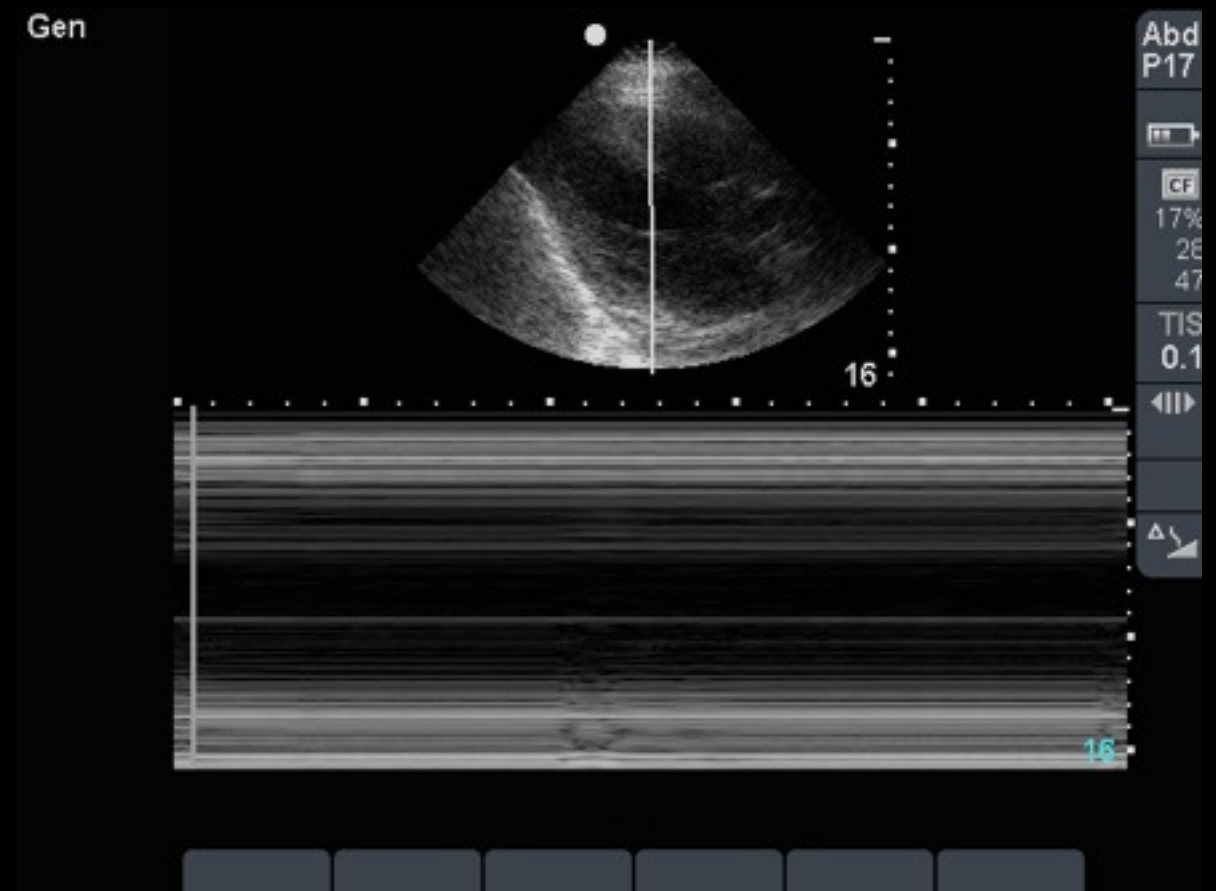
Underlying Cardiac Rhythm

– Asystole?

- Prospective, 102 patients
- Cardiac activity associated with survival to hospital admission, 11/41 or 27%
- “Cardiac standstill survival” 2/61 or 3% ($p < 0.001$)
 - Salen P. AEM 2001;8(6):610–615
- Prospective, 169 patients
 - All patients with cardiac standstill died: PPV 100% for death in the ED
 - Blaivas M. AEM 2001;8(6):616–621

Underlying Cardiac Rhythm

- Asystole?
- Outcomes
- Family presence



Underlying Cardiac Rhythm

- The trouble is....

100 Patients with CPR				
Before US	PEA 51		Asystole 27	
After US	True PEA 13	"Pseudo PEA" 38	Wall Motion 13	No Wall Motion 24

Breitkreutz R, Price S, Steiger HV et al
Resuscitation 2010

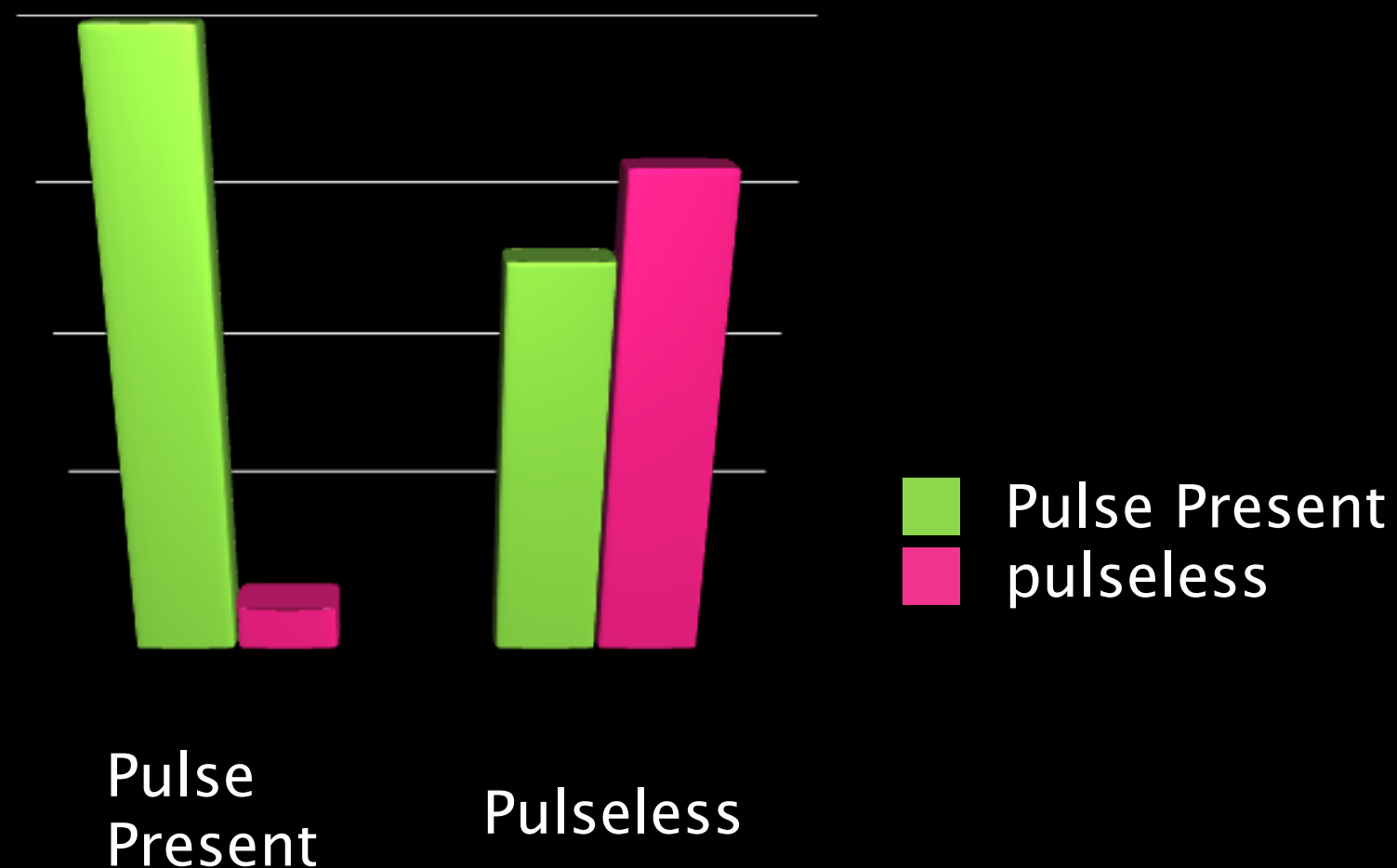
Underlying Cardiac Rhythm

The trouble is...

- Pulse Check

- Sens 90%

- Spec 55%

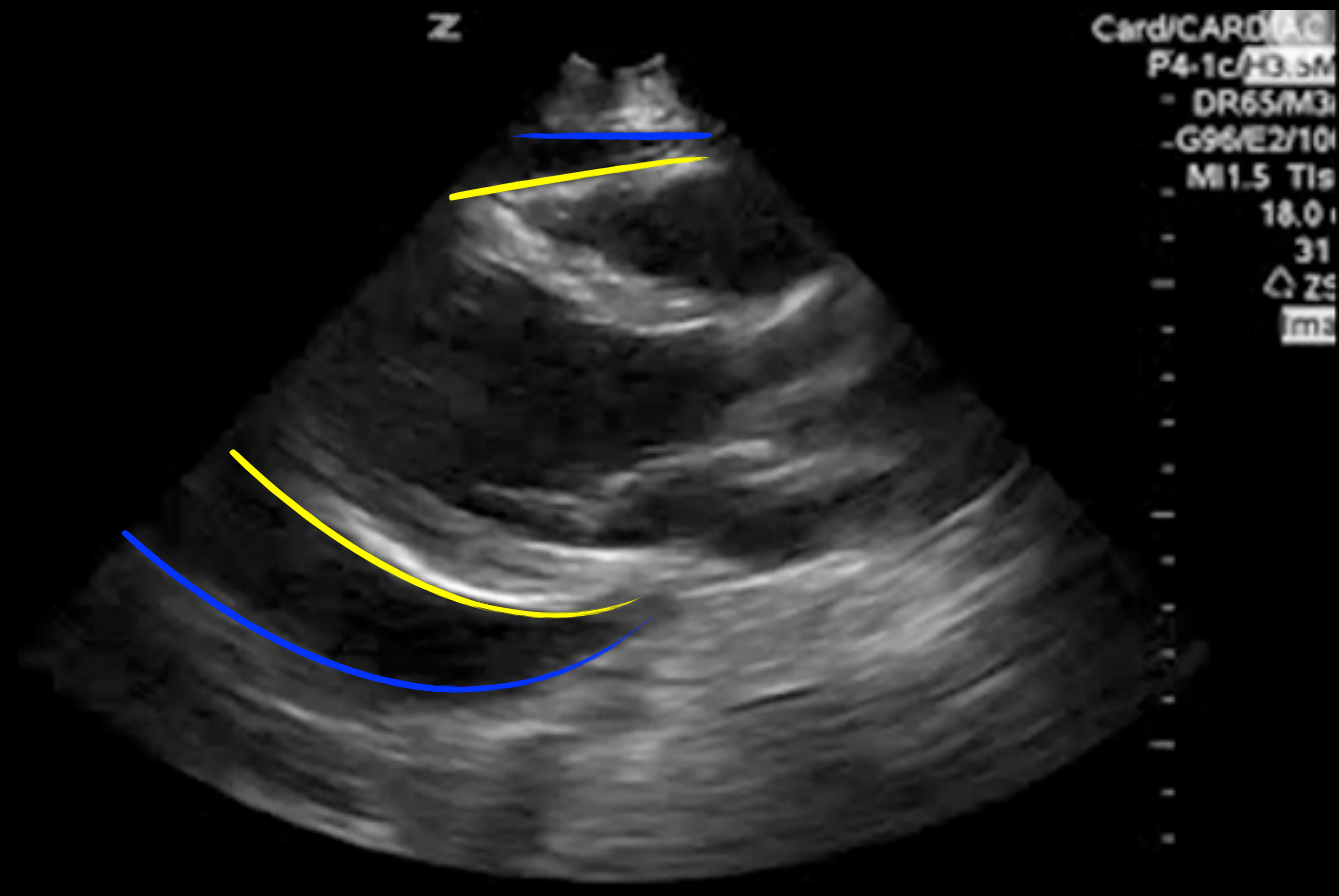


Eberle et al Diagnostic Accuracy of First Responders Resuscitation
1996

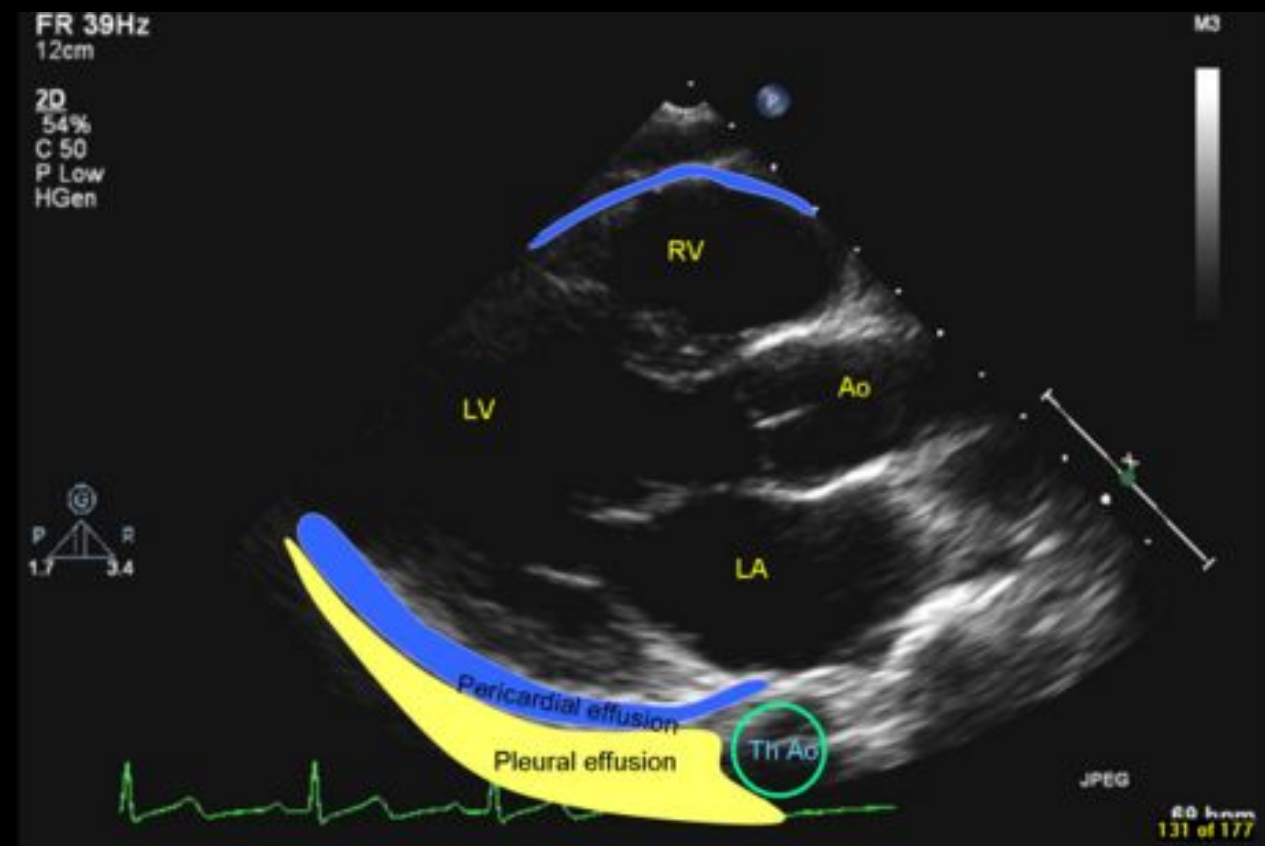
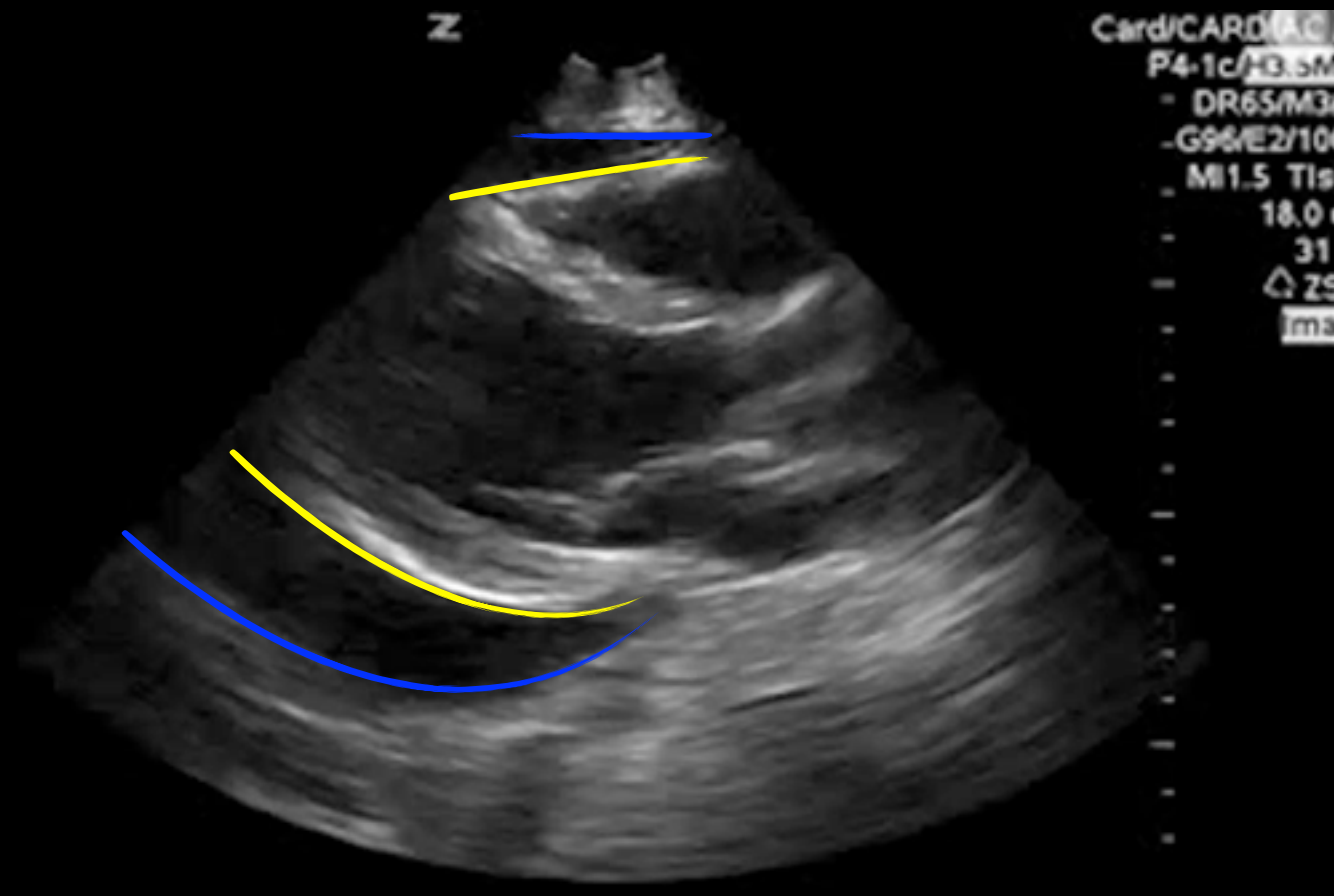


Pericardial Effusion

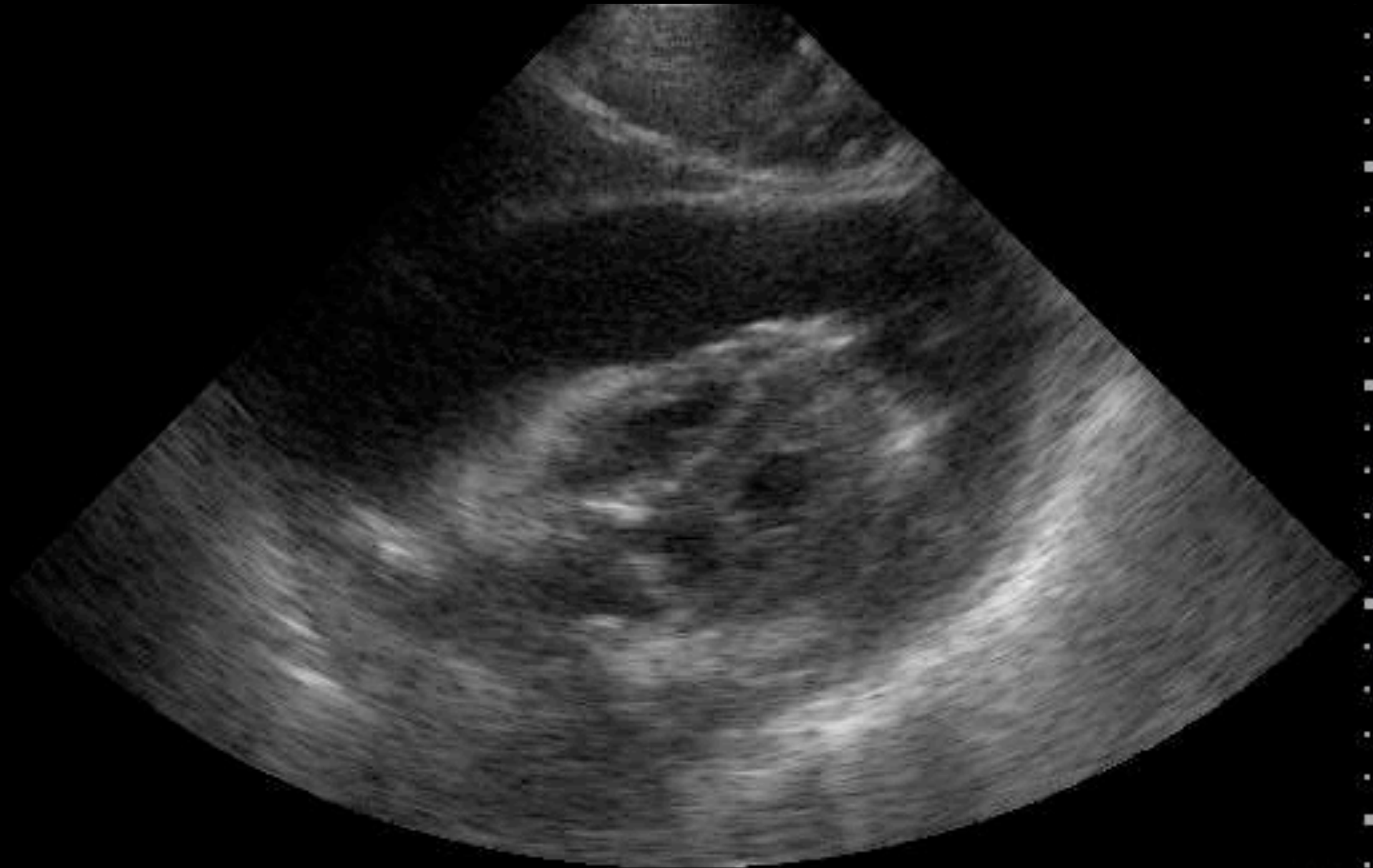
Pericardial Effusion



Pericardial Effusion

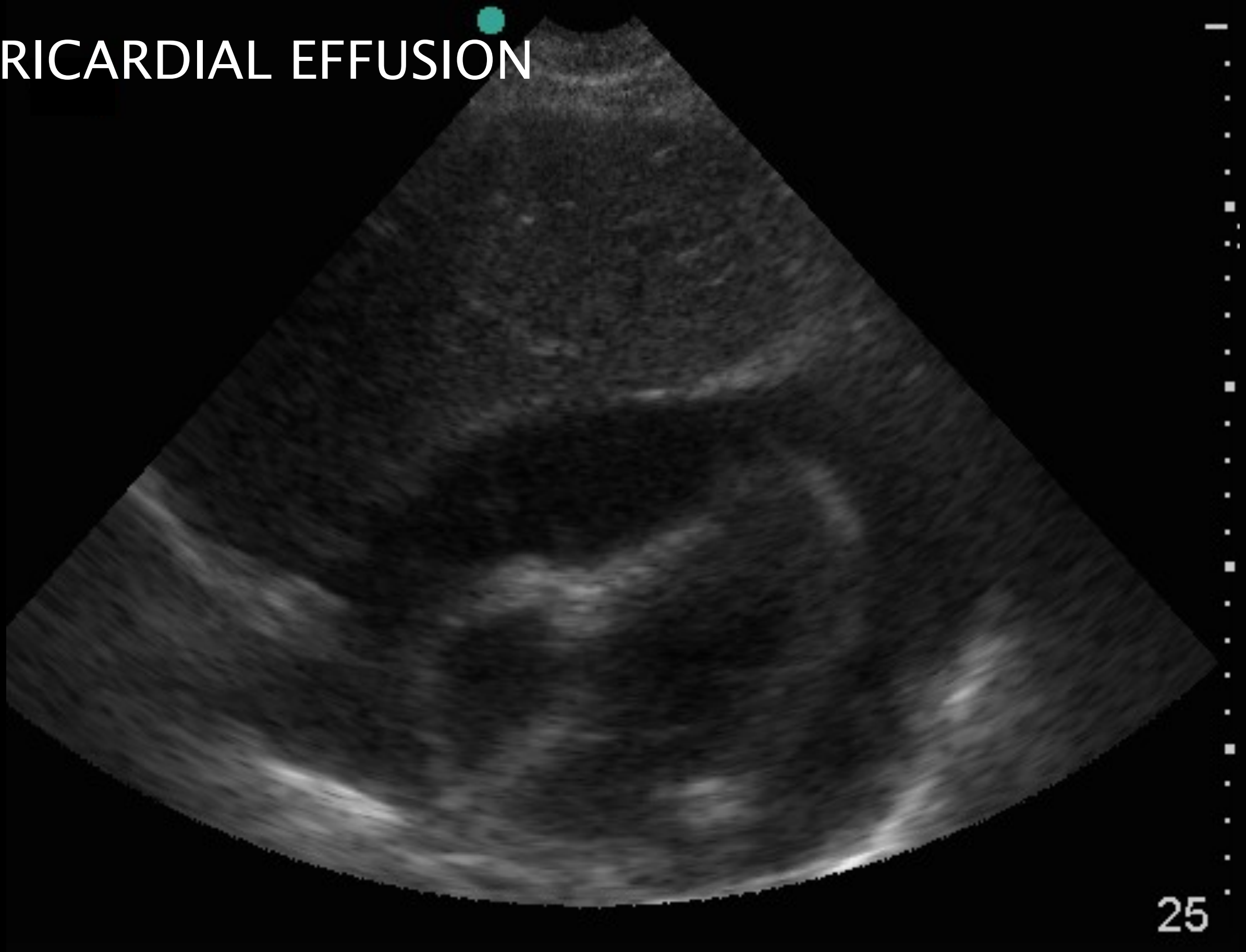


PERICARDIAL EFFUSION



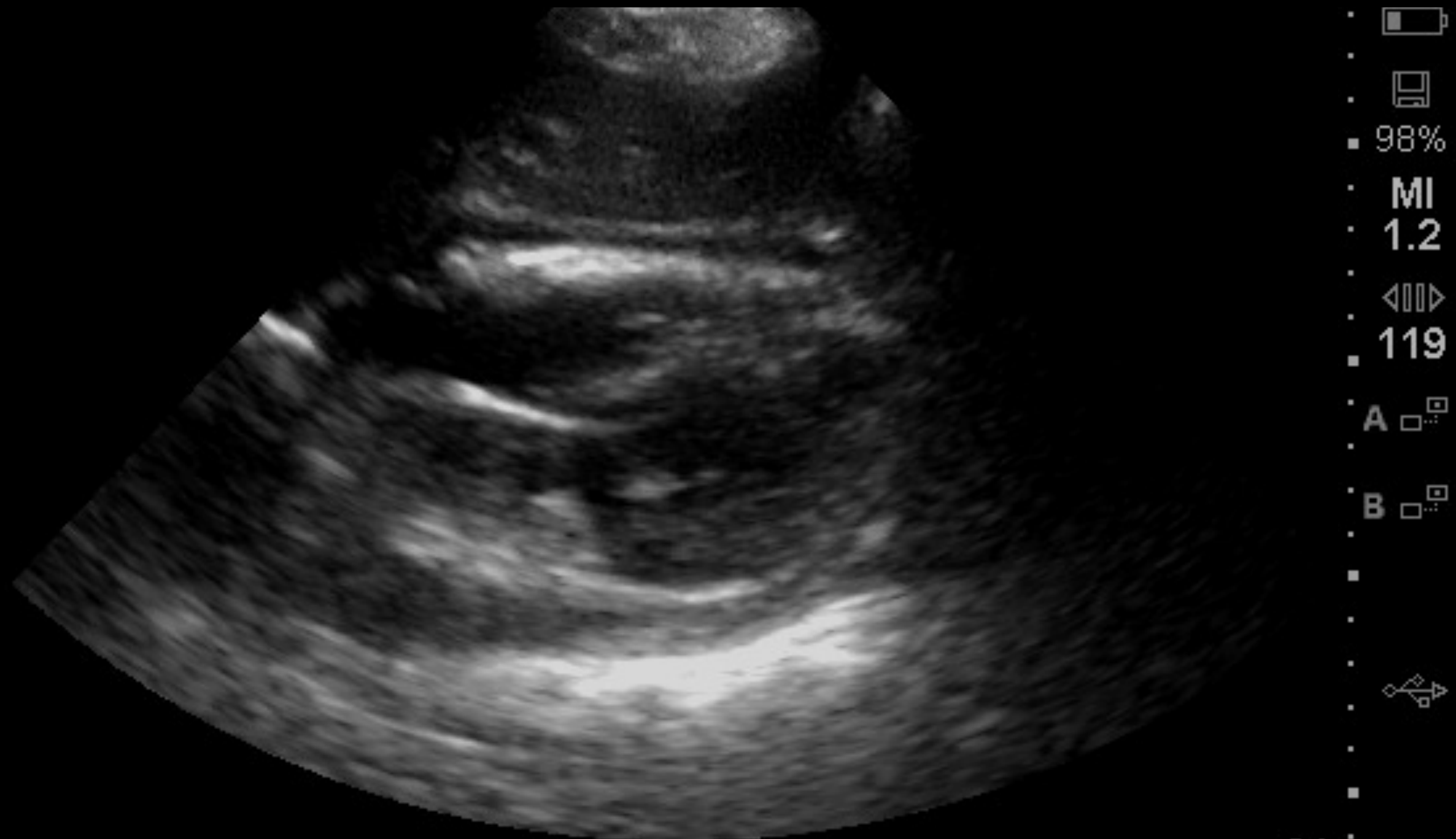
CF
82%
27
109
MI
0.7

PERICARDIAL EFFUSION

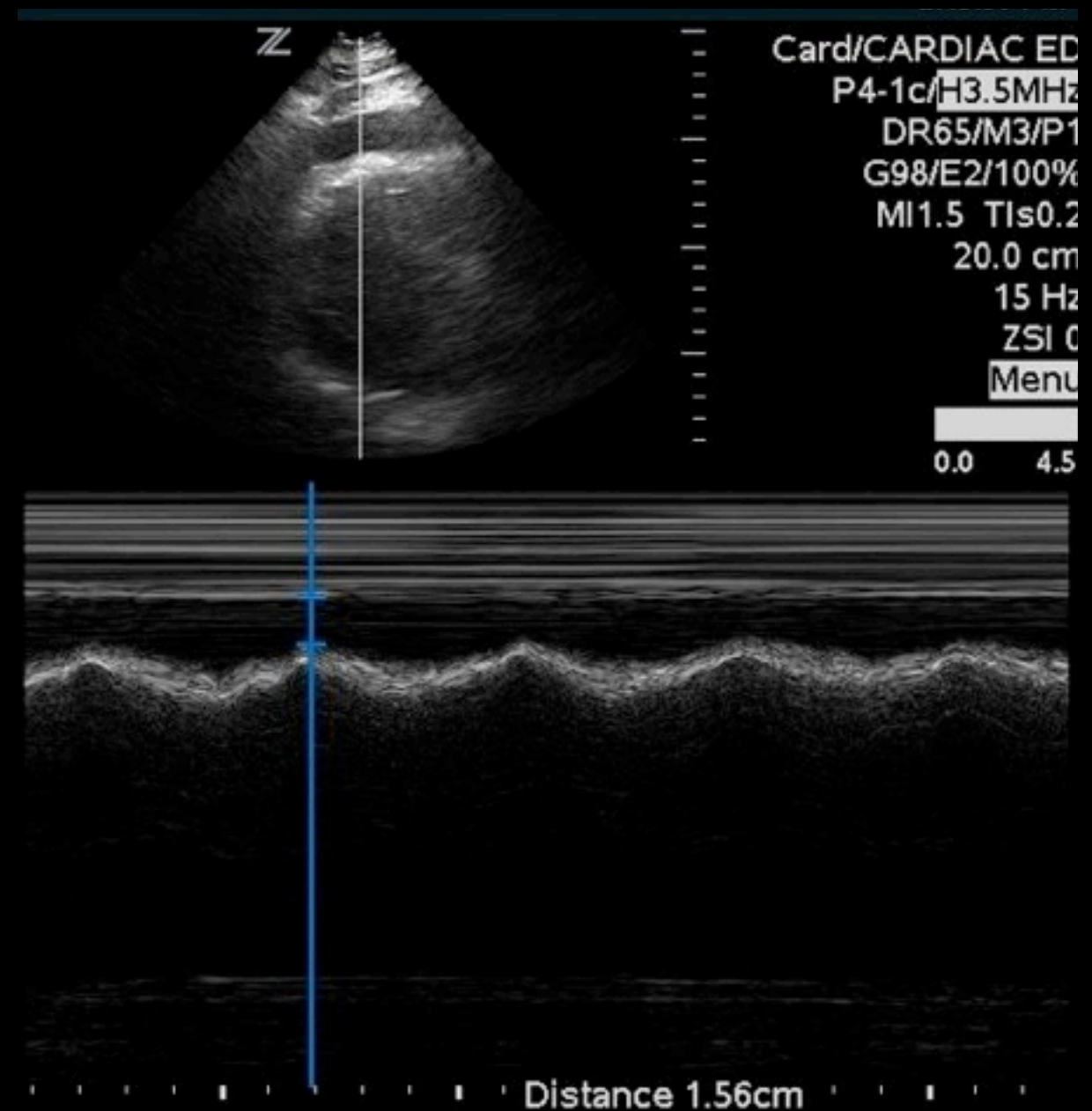
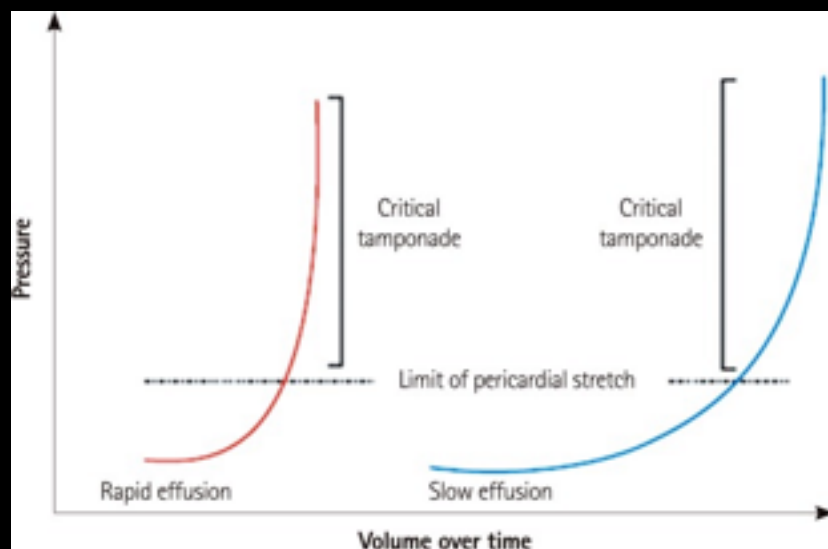


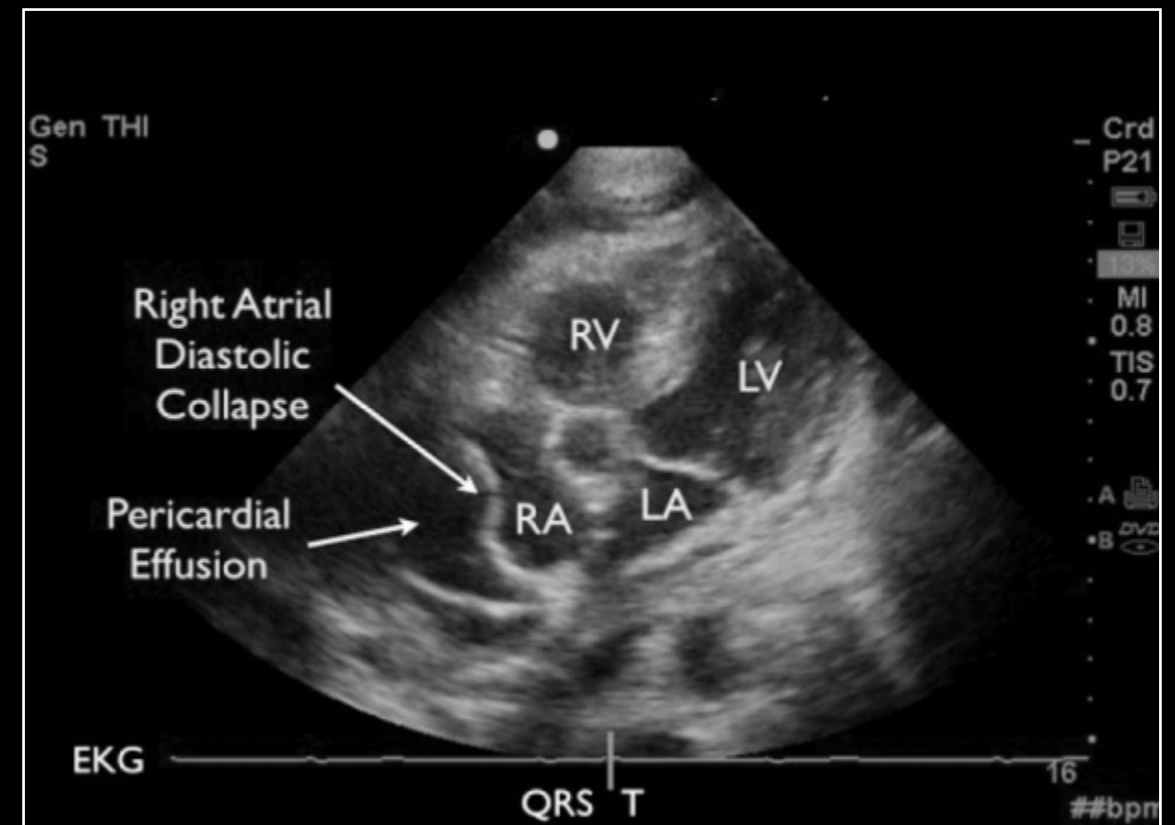
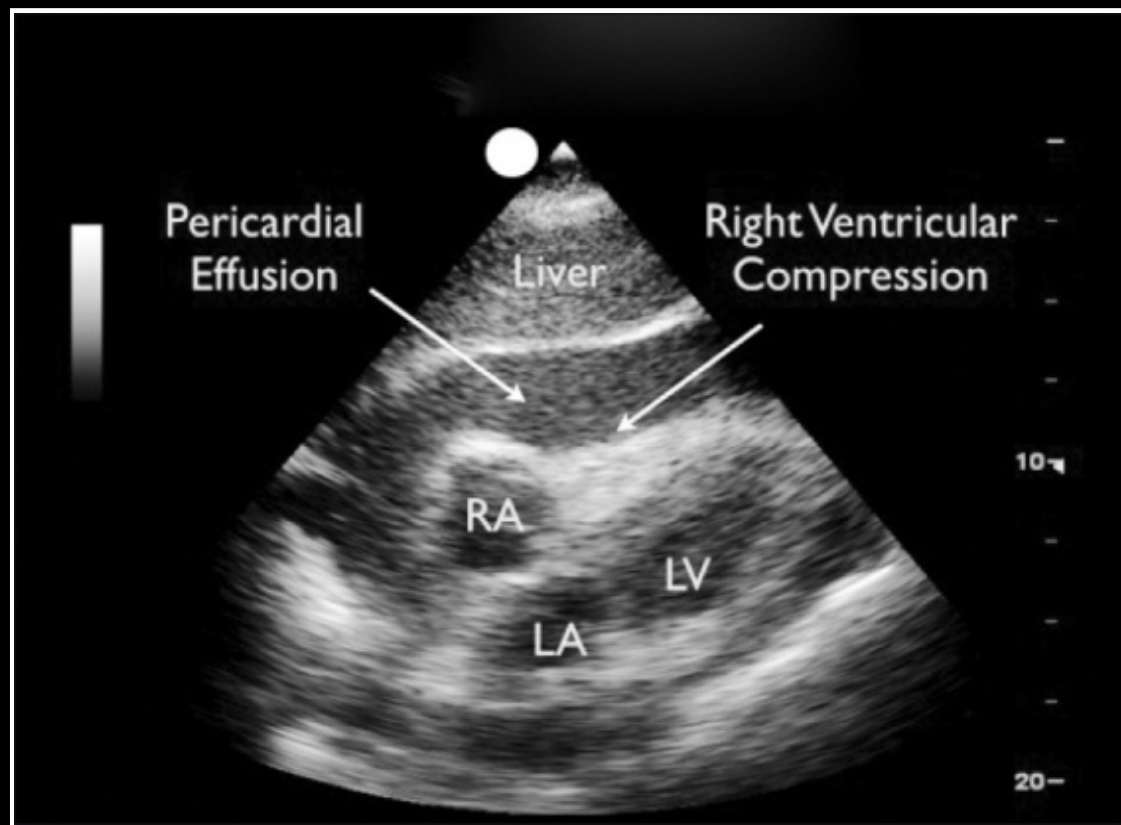
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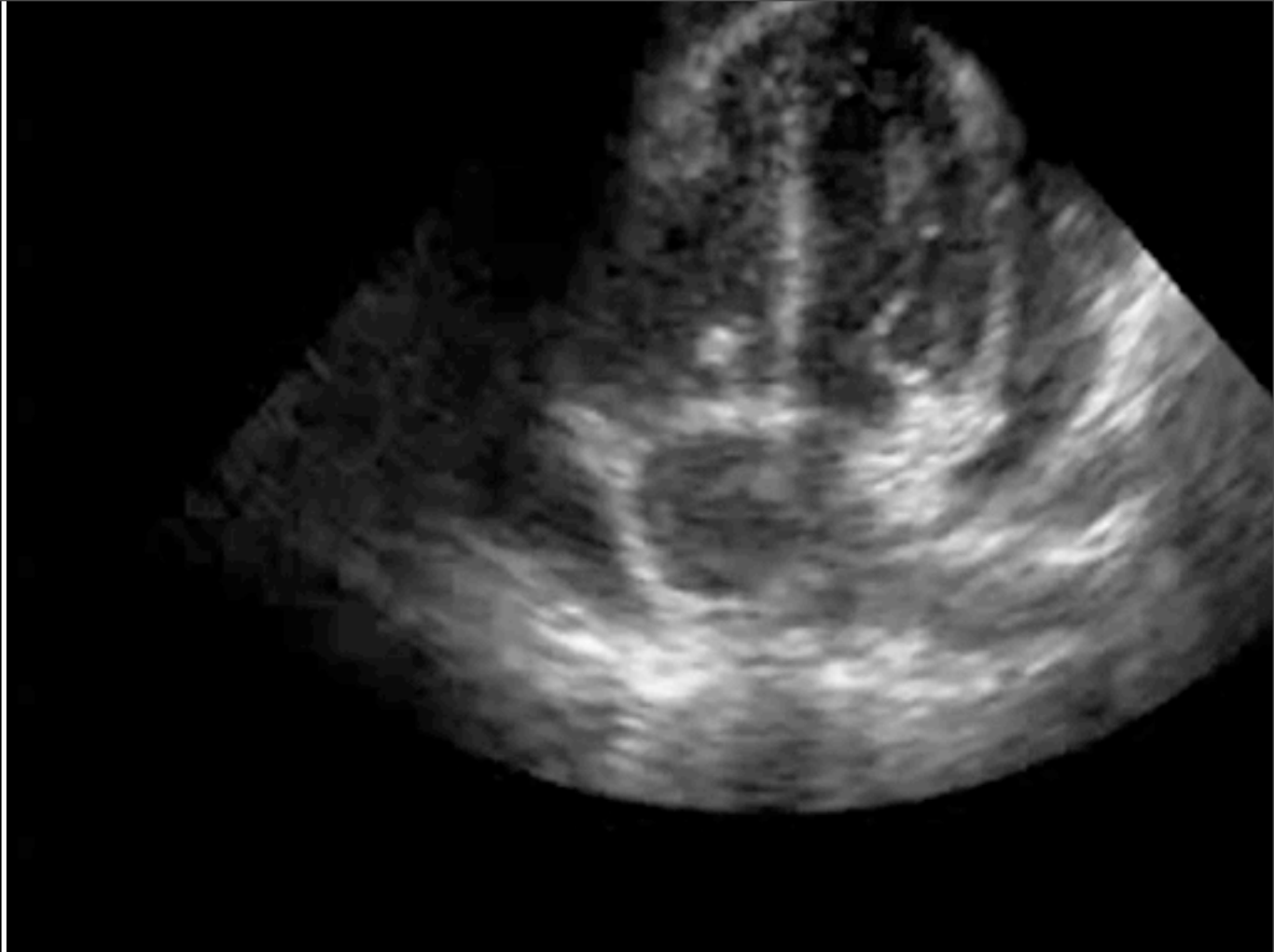
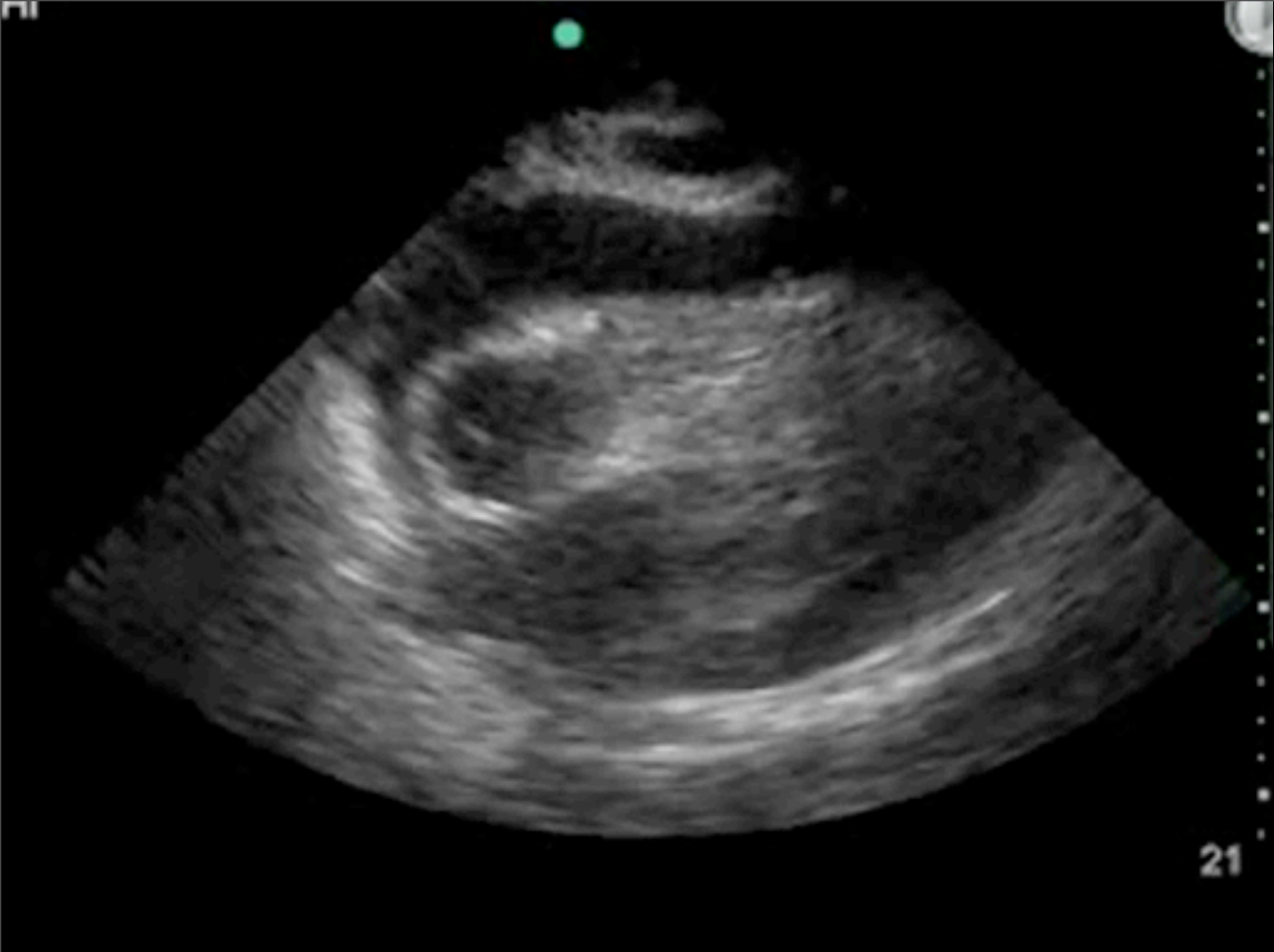
PERICARDIAL EFFUSION



- Small= < 10 mm
- Medium = 10-20 mm
- Large= > 20 mm









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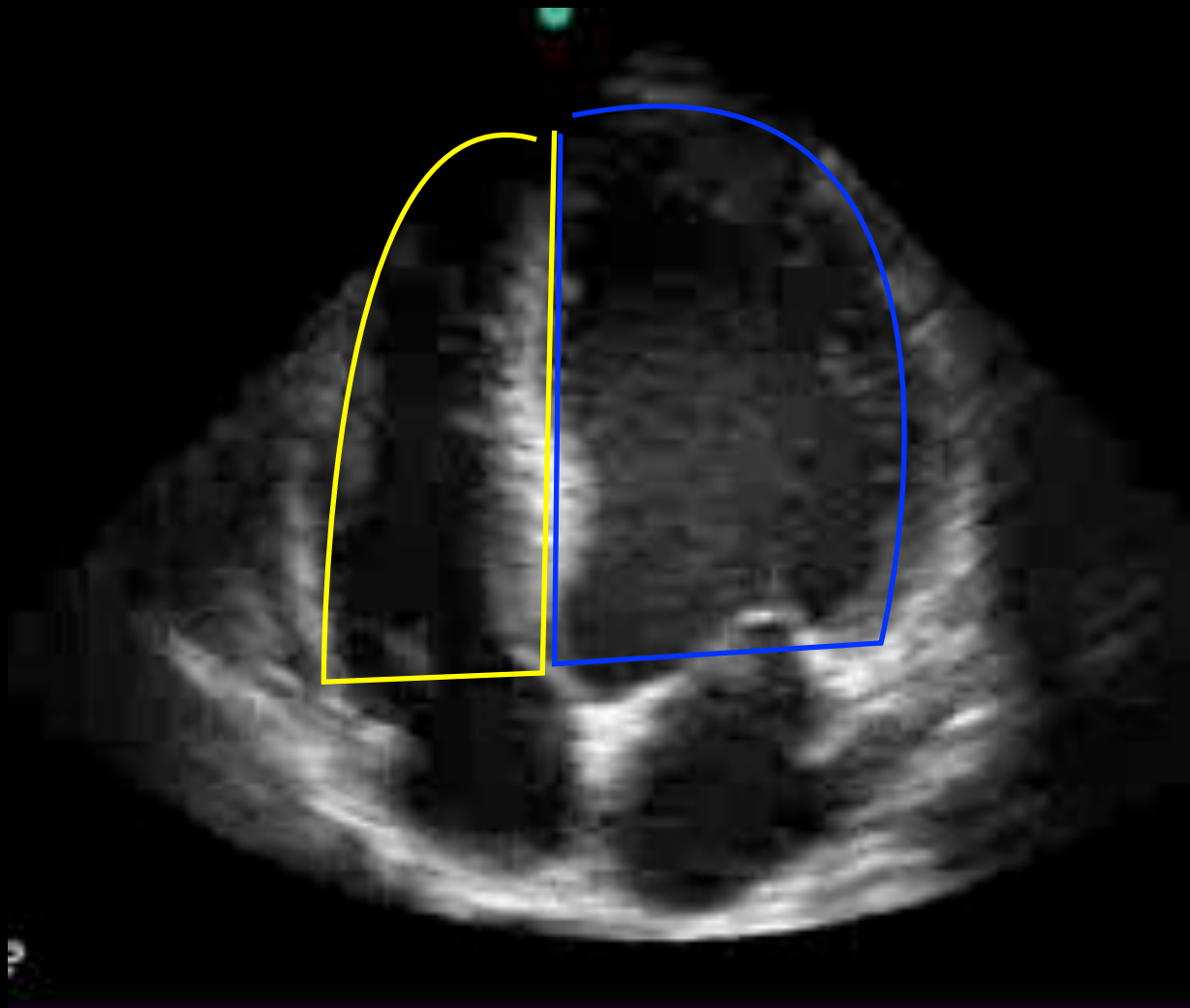


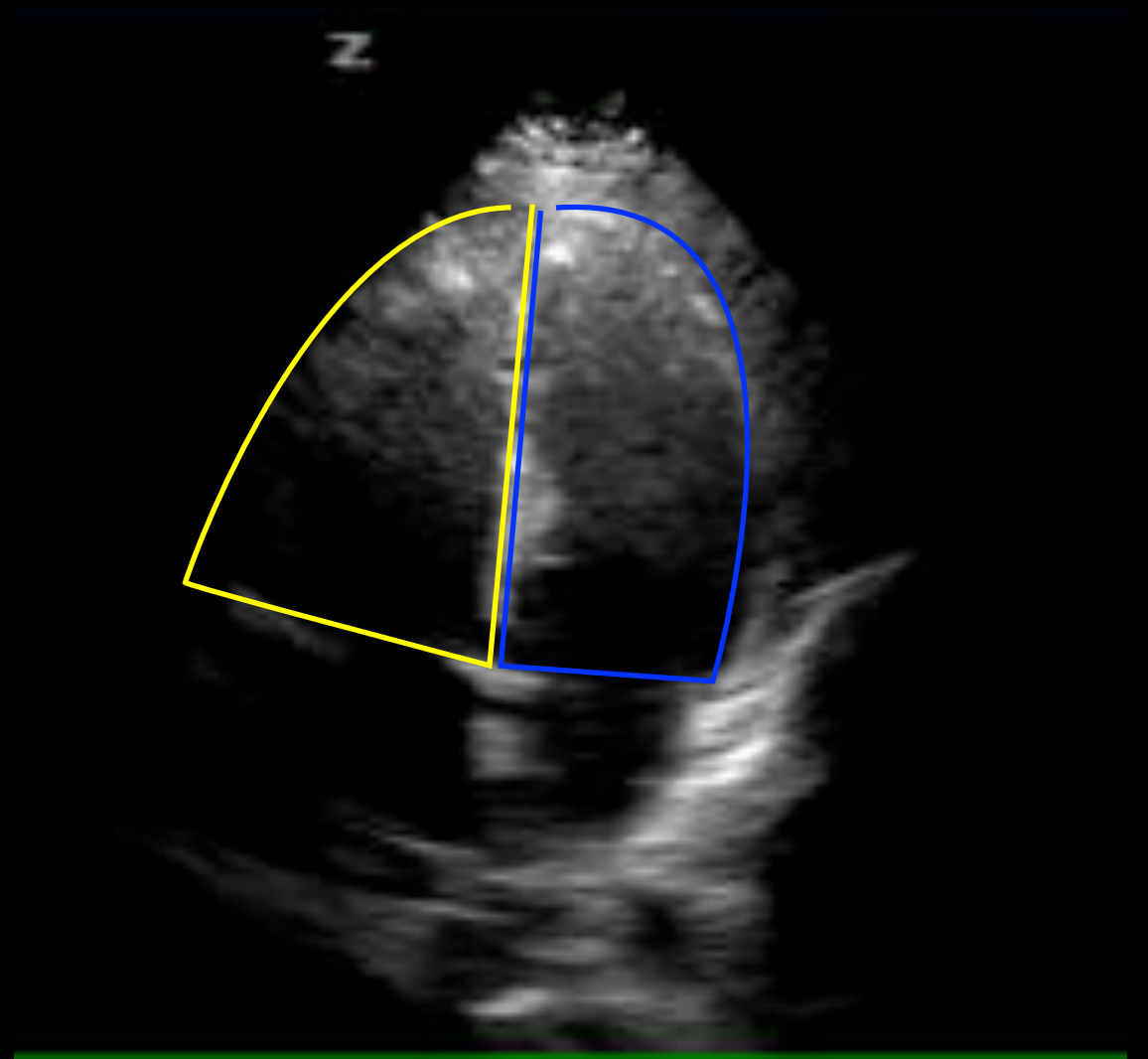
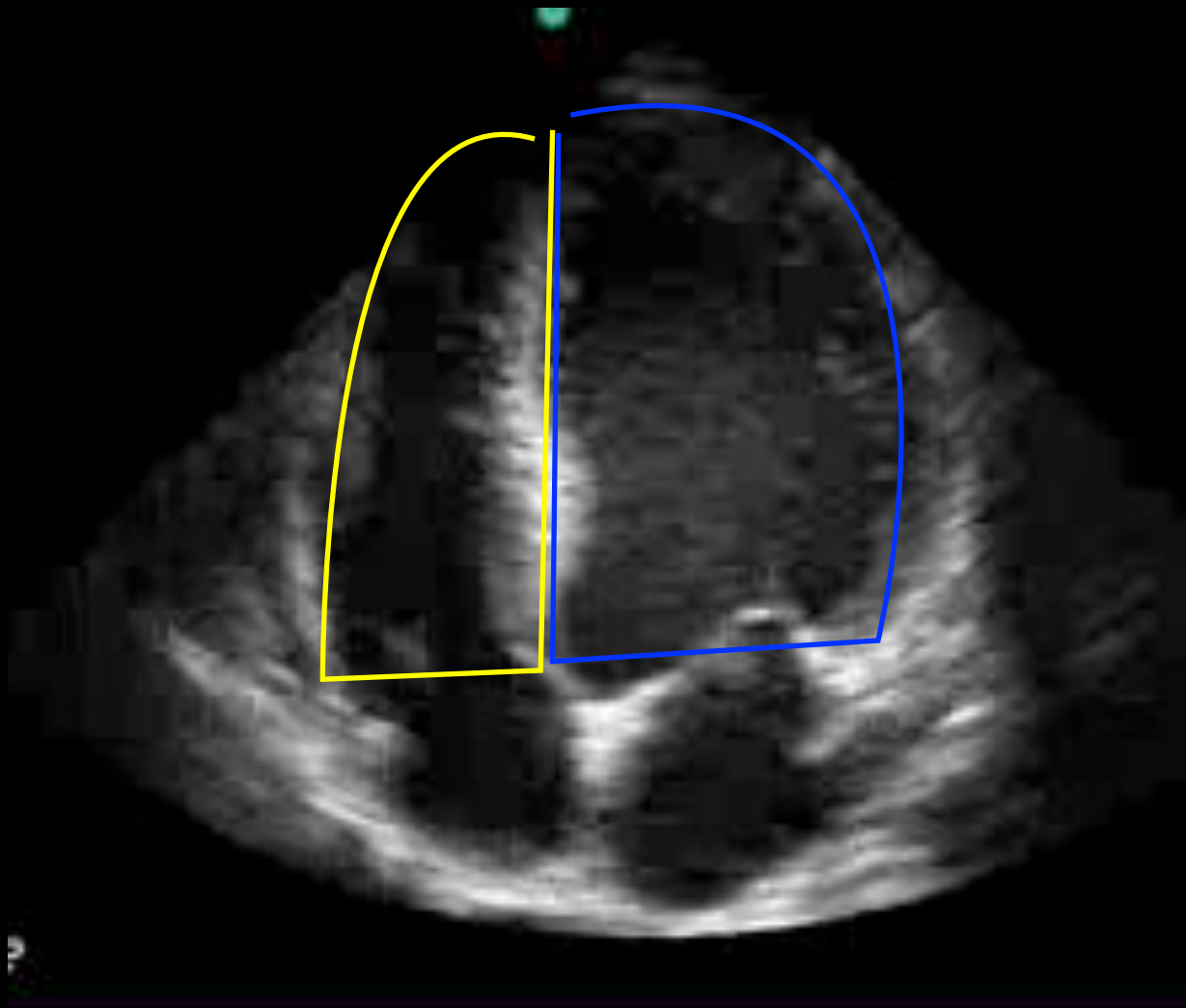
RV dilatation

Two views

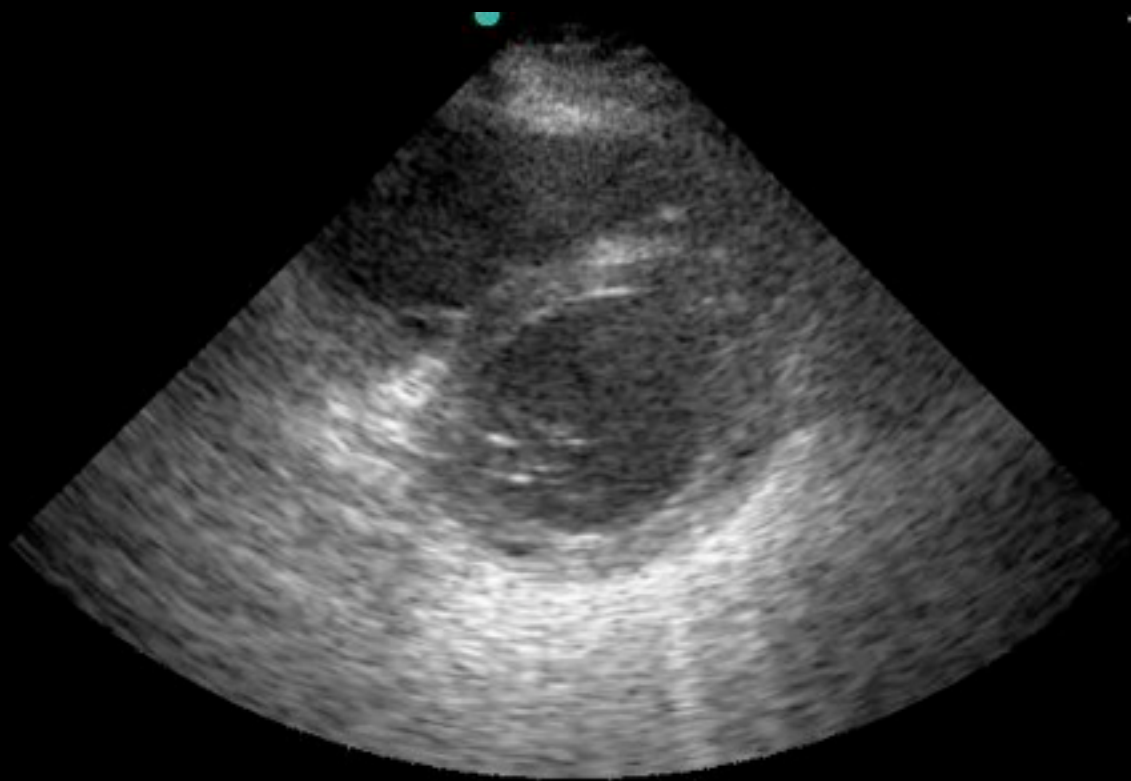
- Apical four - septum vertical, compare ventricles side by side
- Parasternal short - evaluate septal shift and RV pressures





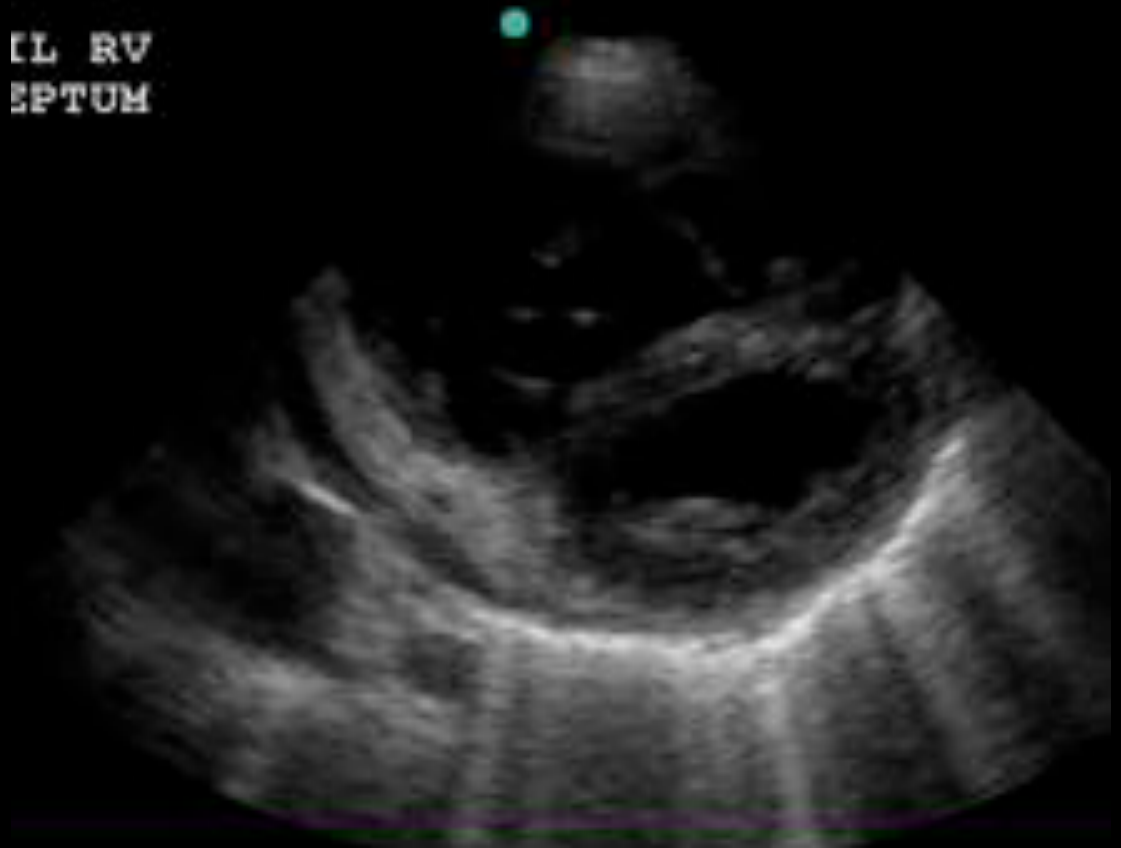


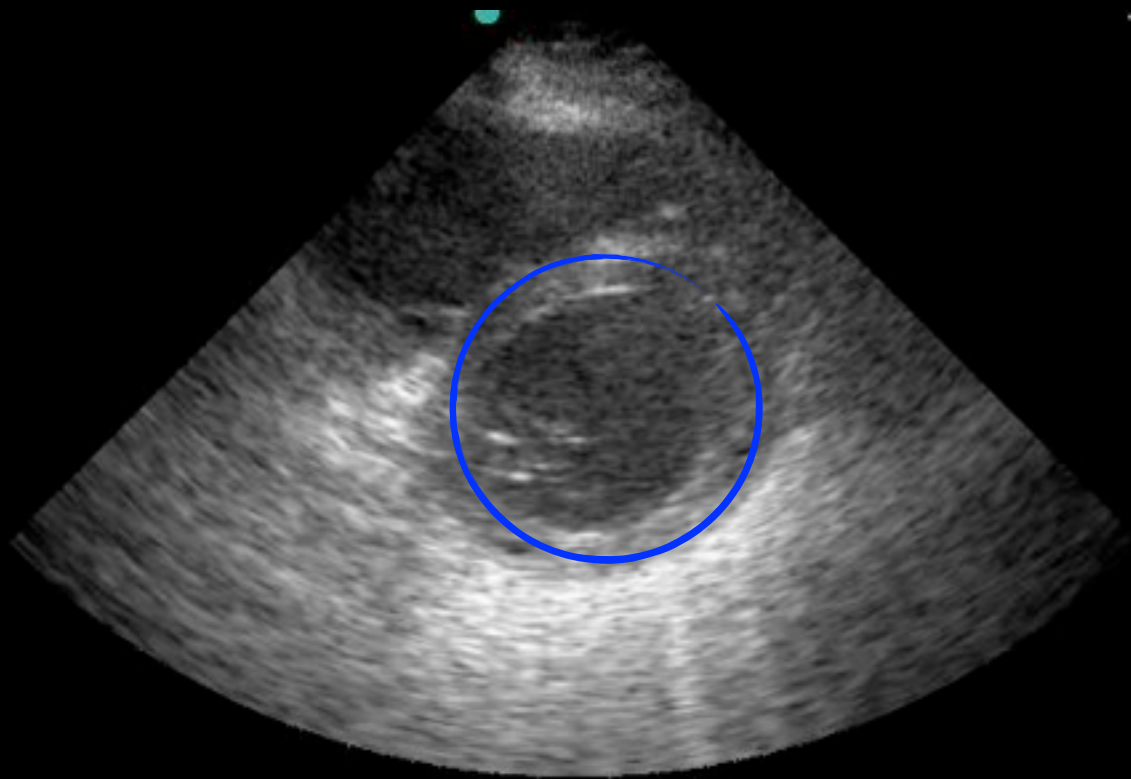




IL RV
EPTUM

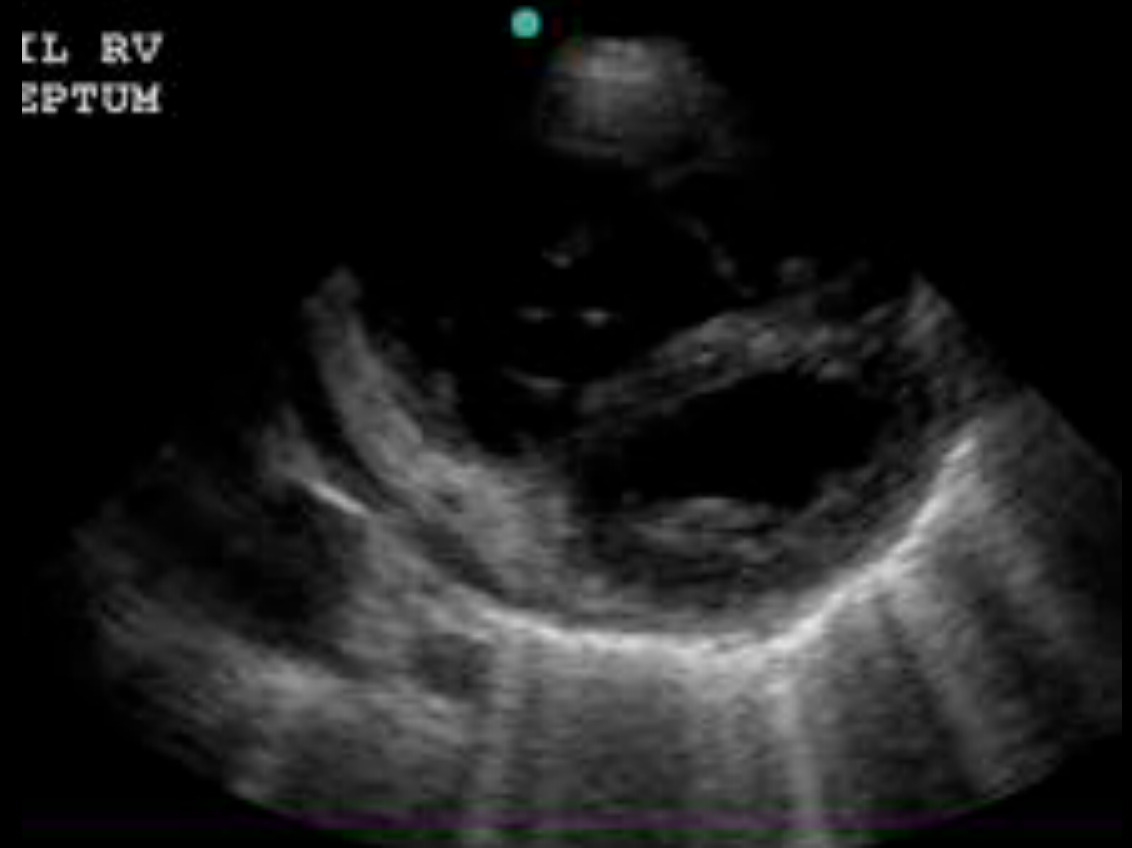
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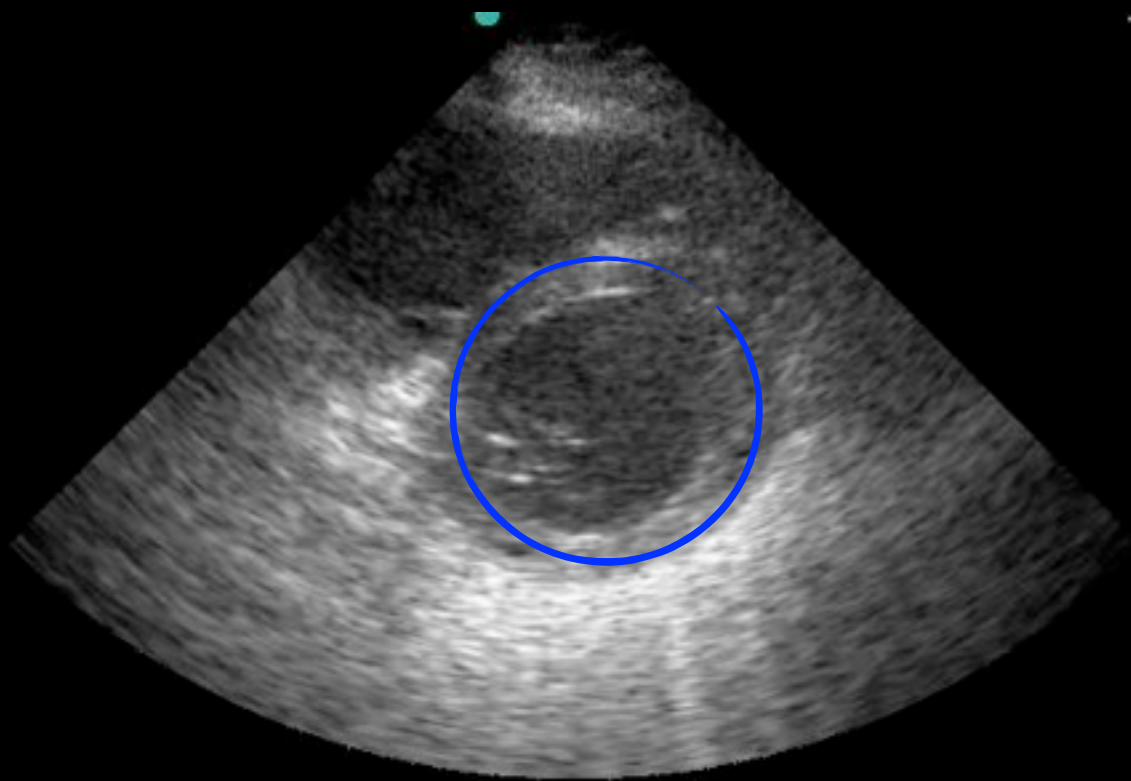




IL RV
EPTUM

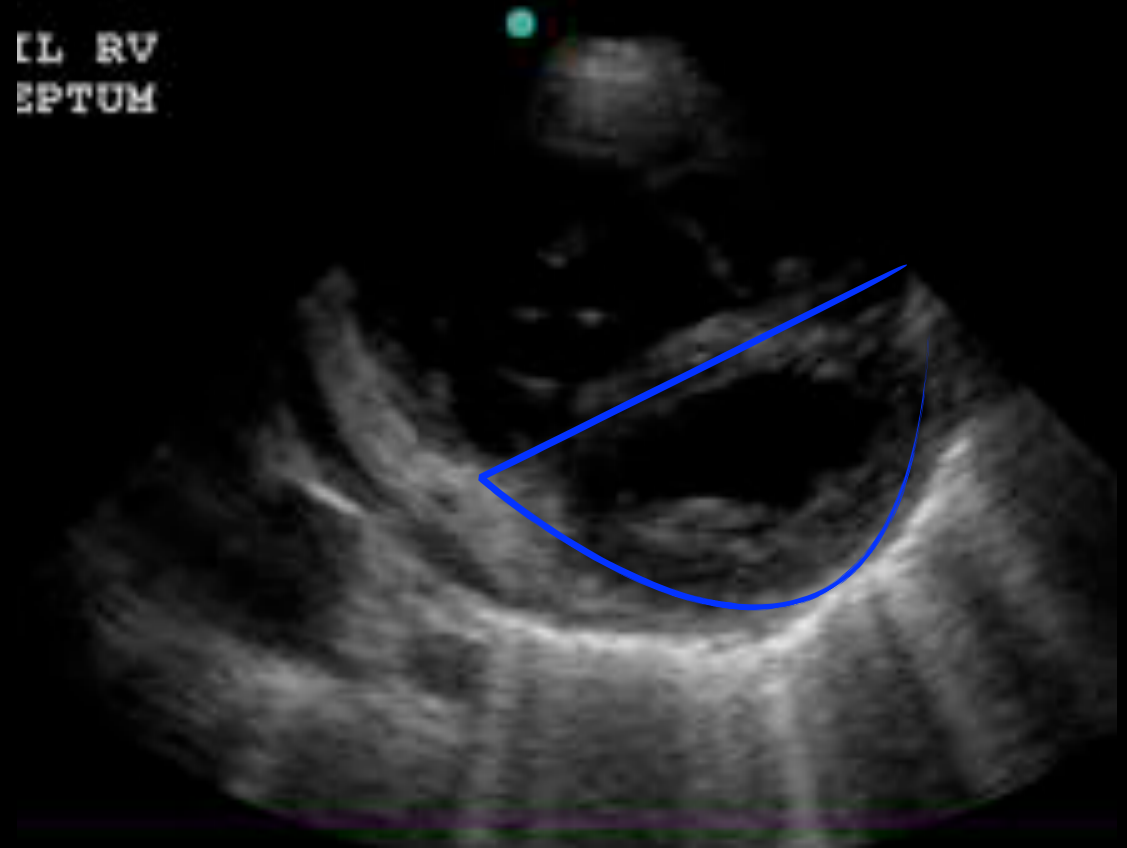
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IL RV
EPTUM

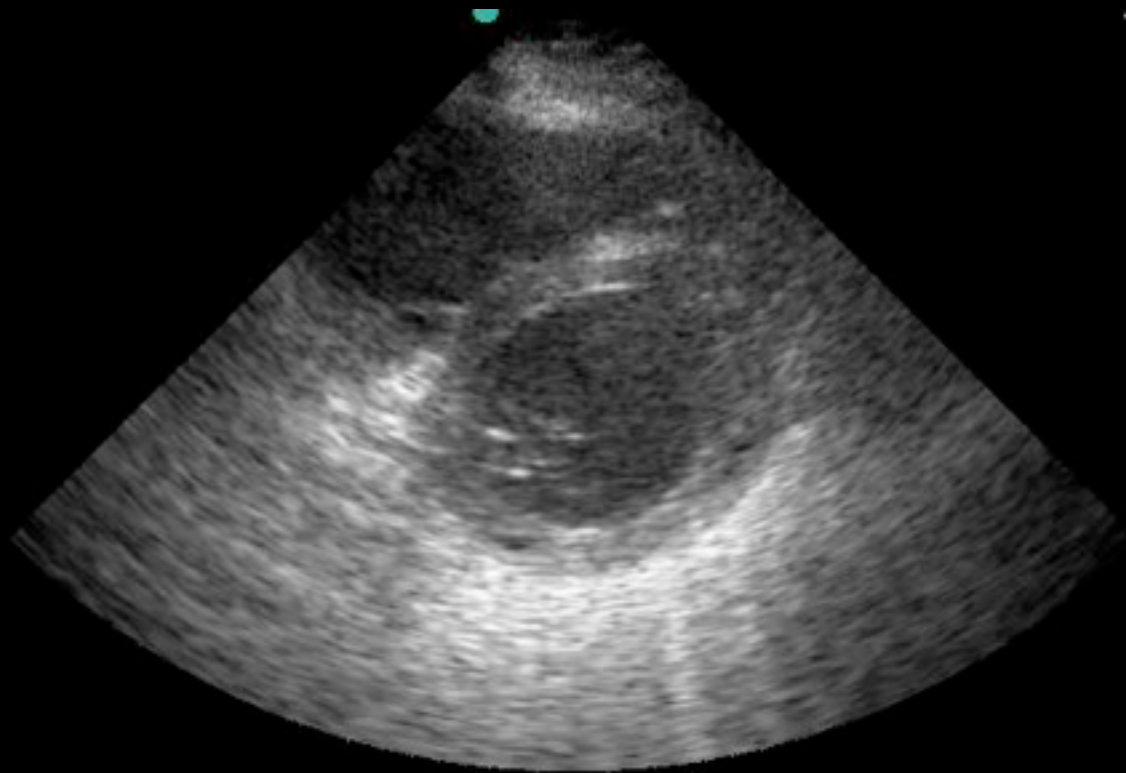
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Global function

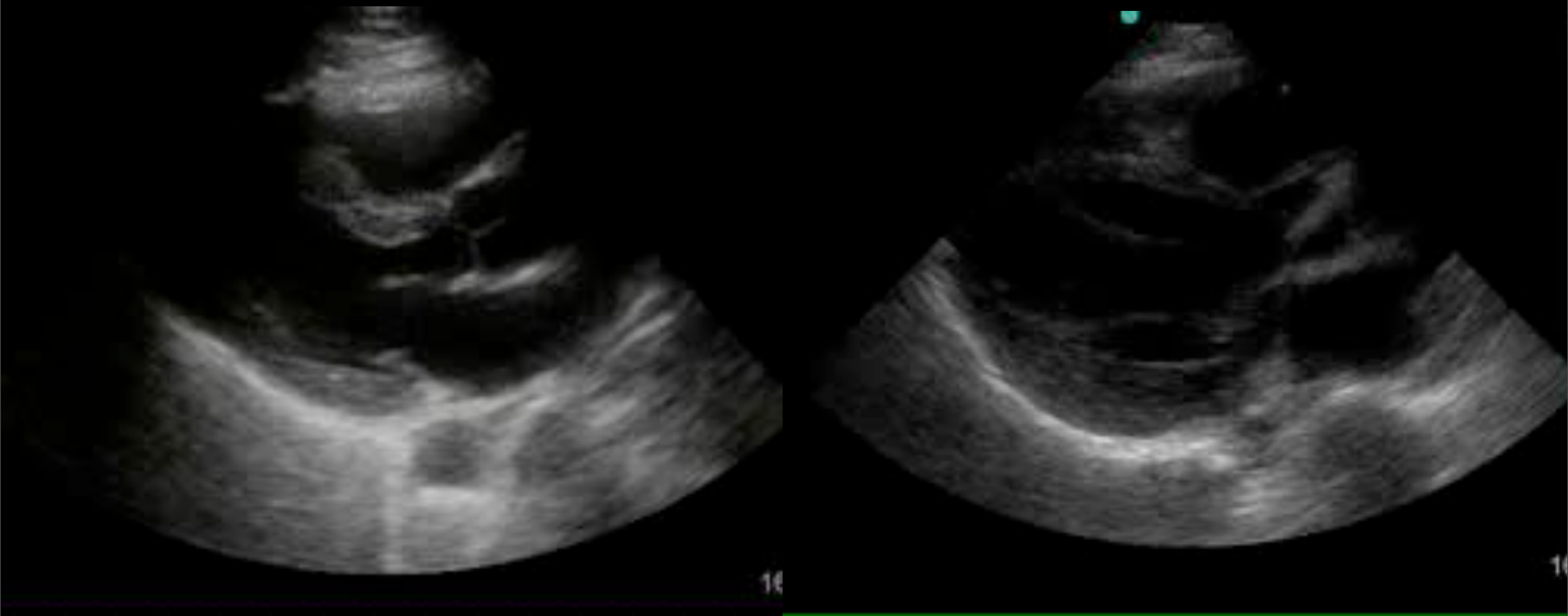
◎ Is the ventricle contracting symmetrically toward its center?



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◎ Is the myocardium thickening as it shortens?

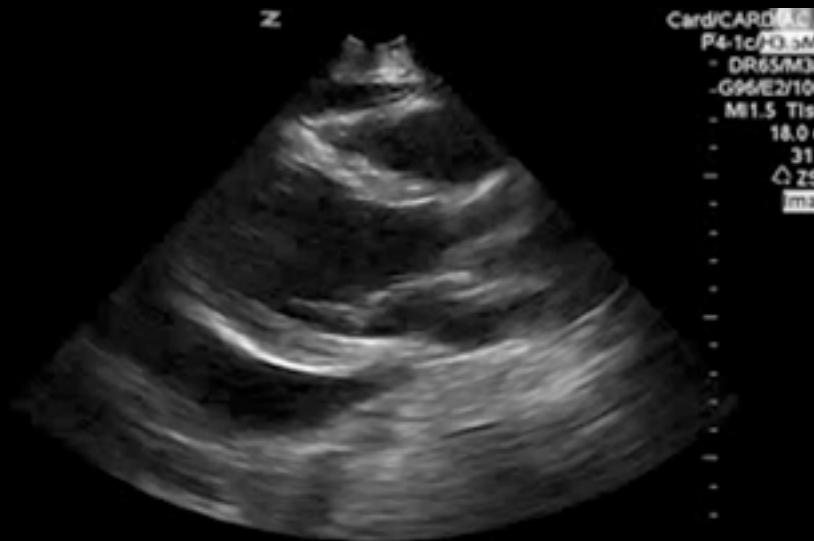


● Is the mitral valve opening normally during diastole?



Why cardiac ultrasound?

Is there pericardial effusion/
tamponade?



Is there evidence of right heart
strain?



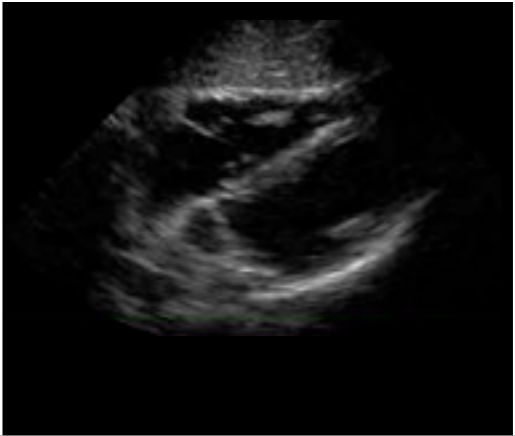

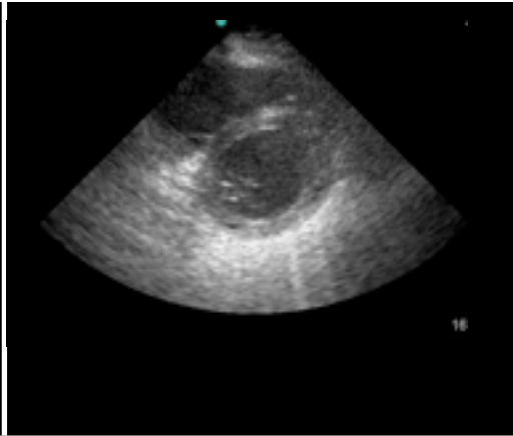
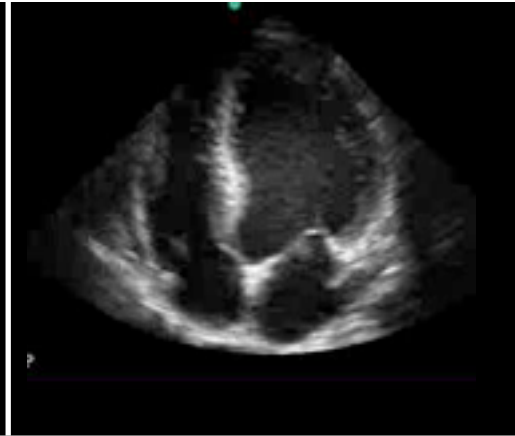
What is the global LV systolic
function?



Is cardiac motion present?



Courtesy of Rasha Buhumaid MD

				
Pericardial Effusion	✓	✓ ✓	✓	✓
Cardiac motion	✓	✓	✓	✓
Global LV EF	✓	✓ ✓	✓	✓
RVS			✓	✓ ✓

Courtesy of Rasha Buhumaid MD



Questions?