# American College of Physicians - Internal Medicine Meeting 2026
# San Francisco, CA

POCUS for LV Function

## Faculty Information


***Director:***

**Woo J. Moon, DO, FACP**

**Shane Robert Kinard, MD, FACP**

**Damien Ricklis, MD, FACP**

**Ian R. Ross, MD, FACP**

**Hillary Kieran Deveaux, MBBS, Resident/Fellow Member**



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# POCUS for Left Ventricular Systolic Function

Shane R Kinard, MD, FACP. *Penn State College of Medicine*

Woo J Moon, DO, FACP. *Saint Louis University School of Medicine*

Damien L Ricklis, MD, FACP. *University of Kansas School of Medicine*

Ian R Ross, MD, FACP. *Washington University School of Medicine in St. Louis*

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## Disclosures

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# Learning Objectives

- Describe standard cardiac ultrasound image orientation
- Acquire parasternal long axis, parasternal short axis, apical four chamber and subcostal four chamber views
- Estimate left ventricular systolic function using visual estimation and E-point septal separation (EPSS)
- Recognize reduced left ventricular systolic function on POCUS imaging

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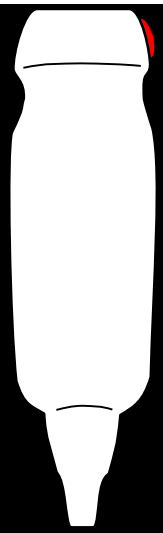
# Probe Selection

- Phased-array probe (1-5 MHz)
  - Low frequency for adequate depth
- Small footprint for intercostal imaging
- High frame rate to evaluate cardiac motion



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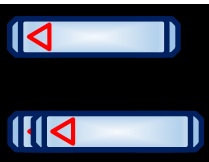
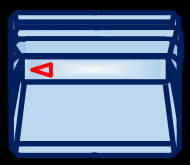
# Probe Manipulation



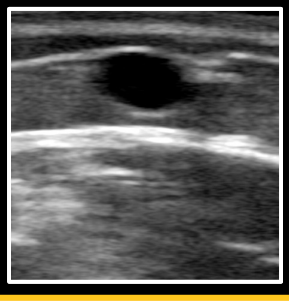
Slide

Rotate



Fan/Tilt

Rock



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# Cardiac Image Orientation

- Longitudinal views (i.e. PLAX): Probe marker cephalad
- Transverse views (i.e. PSAX): Probe marker leftward
- Screen indicator: Upper right corner
- Superficial structures appear at the top of the image

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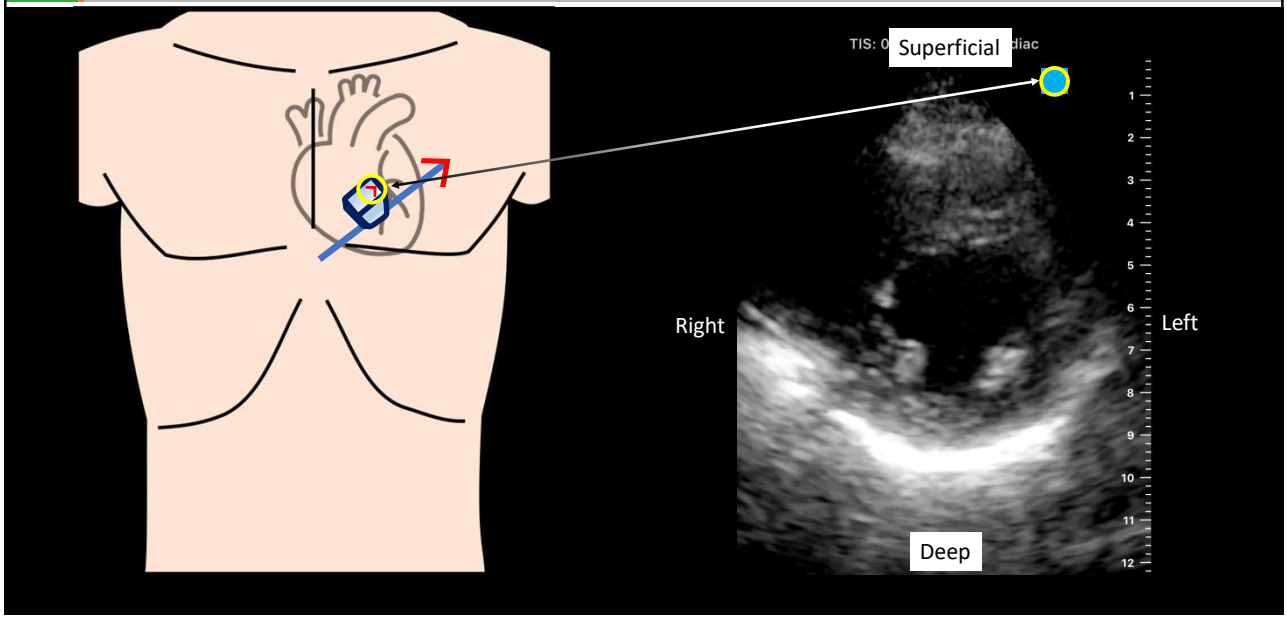
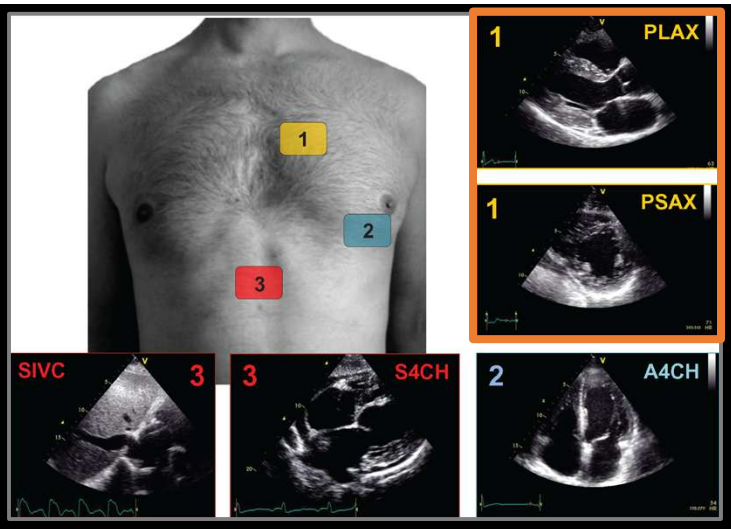
# Cardiac Image Orientation




7

# Cardiac POCUS Exam Views

- Parasternal long axis
- Parasternal short axis
- Apical four chamber
- Subcostal four chamber
- Inferior vena cava

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European Heart Journal – Cardiovascular Imaging 2018;19 475-481

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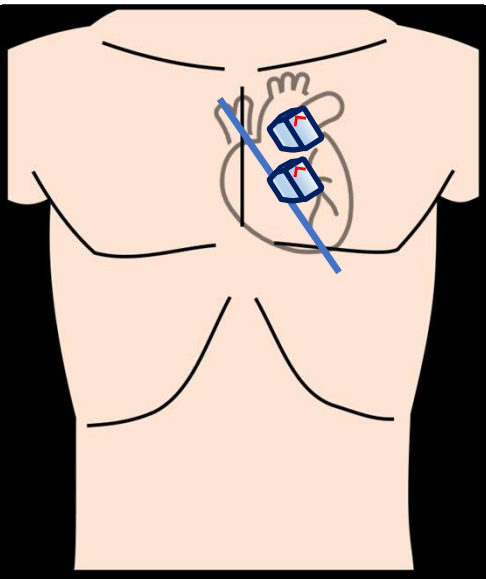
# Parasternal Long Axis Image Acquisition



- Probe position: Left parasternal border
- Marker: Toward the right shoulder
- Slide caudad until the heart is visualized
- Rock and fan to optimize the image
- Adjust depth to include the descending thoracic aorta

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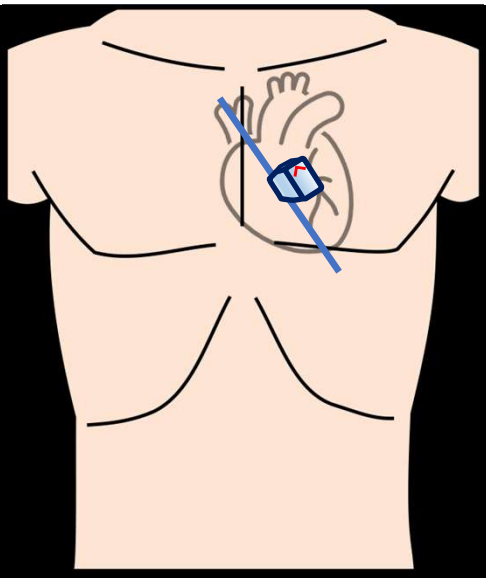
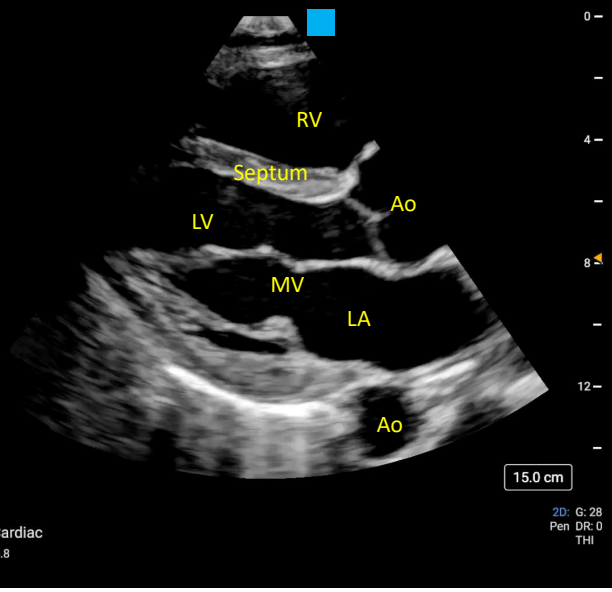
# Parasternal Long Axis Image Acquisition



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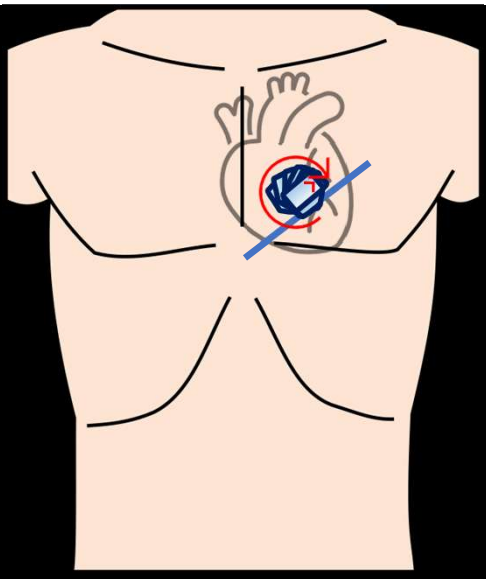
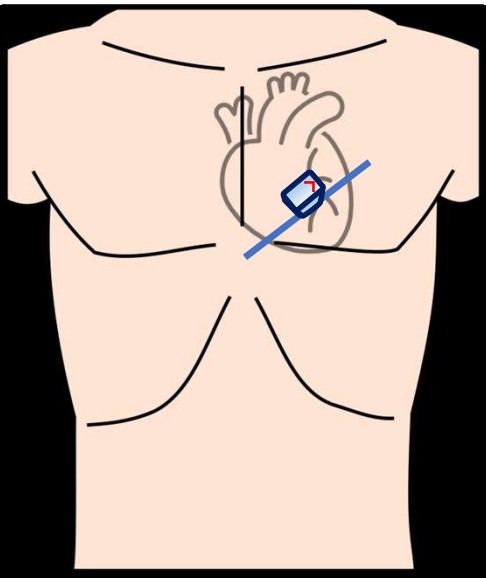
# Parasternal Short Axis Image Acquisition

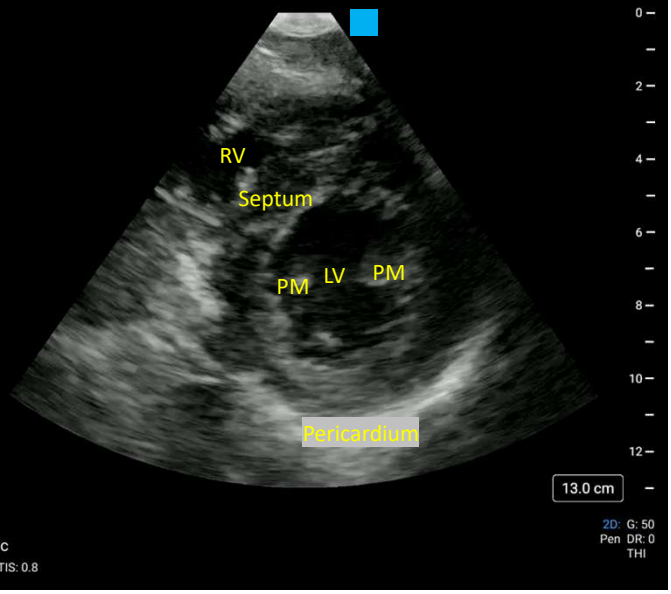


- Probe: Rotate 90° clockwise from parasternal long axis
- Marker: Toward the left shoulder
- Fan or slide to obtain the mid-ventricular papillary muscle level

11

# Parasternal Short Axis Image Acquisition



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# Left Ventricular Systolic Function Assessment

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# Left Ventricular Systolic Function

- Assessed qualitatively: Hyperdynamic → Severely reduced
- Based on three criteria:
  1) Endocardial excursion
  2) Myocardial thickening
  3) Anterior mitral valve leaflet motion

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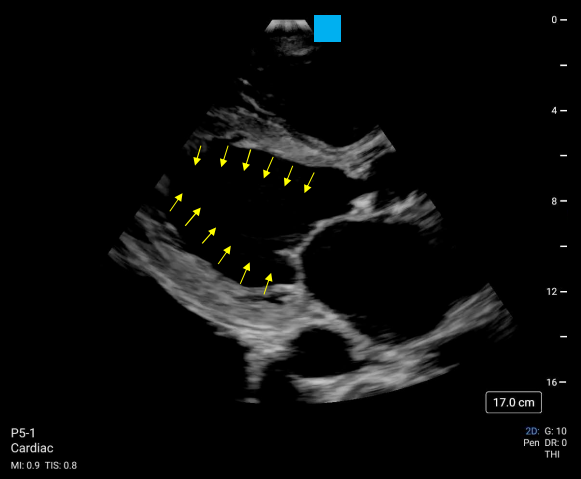
# Left Ventricular Systolic Function

1. **Endocardial excursion**:

   *Symmetric endocardial motion towards the LV chamber*

   - **Parasternal Long Axis**
   - Parasternal Short Axis

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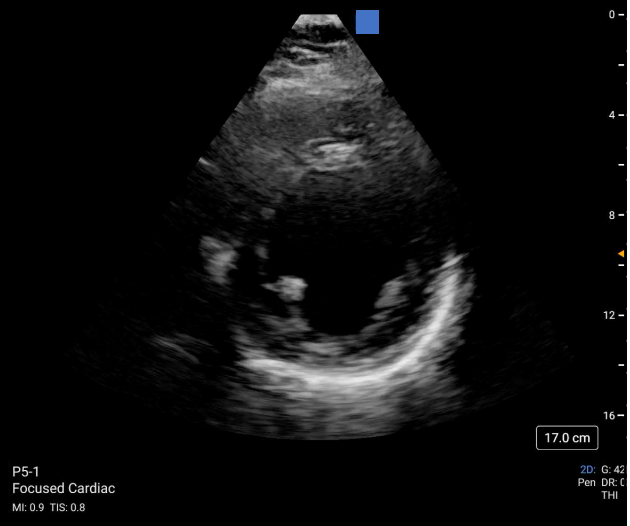
# Left Ventricular Systolic Function

1. **Endocardial excursion**:

   *Symmetric endocardial motion towards the LV chamber*

   - Parasternal Long Axis
   - **Parasternal Short Axis**

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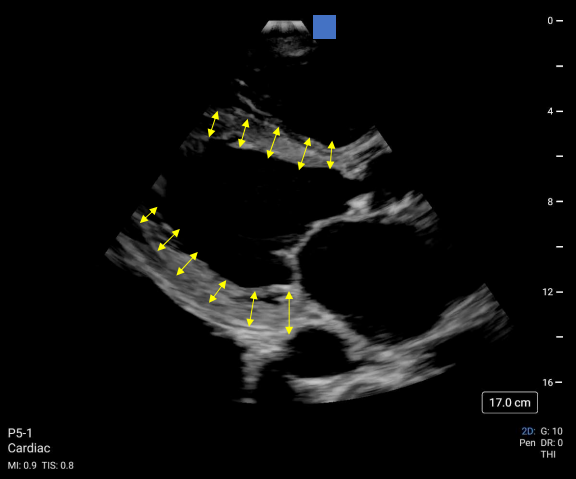
# Left Ventricular Systolic Function

2. **Myocardial thickening**:

*>40% increase in thickness during systole*

- **Parasternal Long Axis**
- Parasternal Short Axis

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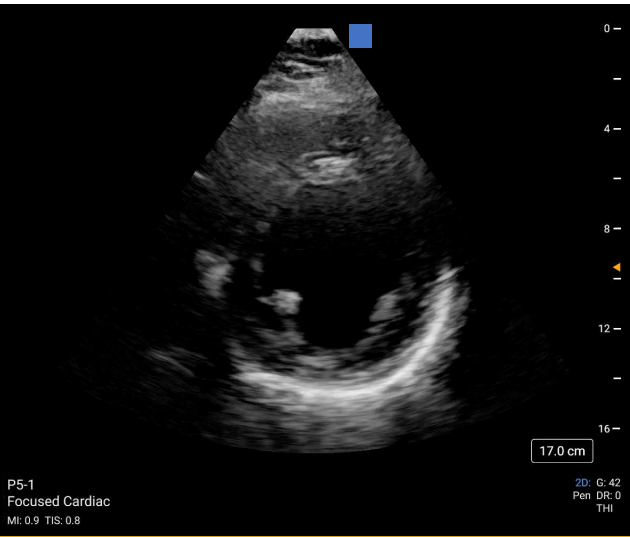
# Left Ventricular Systolic Function

2. **Myocardial thickening**:

*>40% increase in thickness during systole*

- Parasternal Long Axis
- **Parasternal Short Axis**

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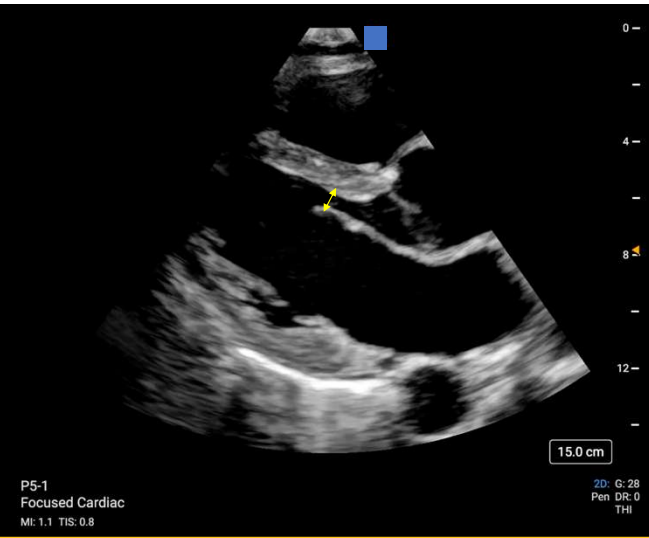
# Left Ventricular Systolic Function

3. **Anterior mitral valve leaflet motion**:

   *< 1cm separation between the mitral valve tip and septum (**E-point septal separation**)*

   - **Parasternal Long Axis**

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# M-Mode

- **What:** Evaluates motion of cardiac structures over time
- **How:** Obtain a B-mode image, then place the M-mode cursor along the structure of interest
- **Why:** High temporal resolution, ideal for rapidly moving structures
- Y-axis = depth, X-axis = time, visually depicts motion as depth vs. time

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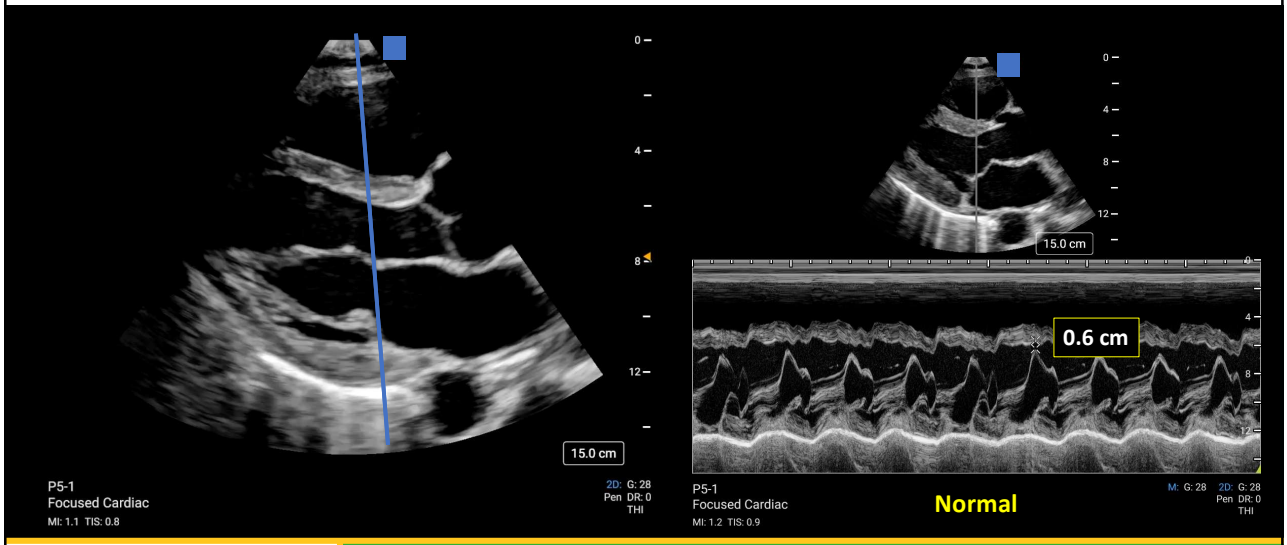
# E-Point Septal Separation: M-Mode

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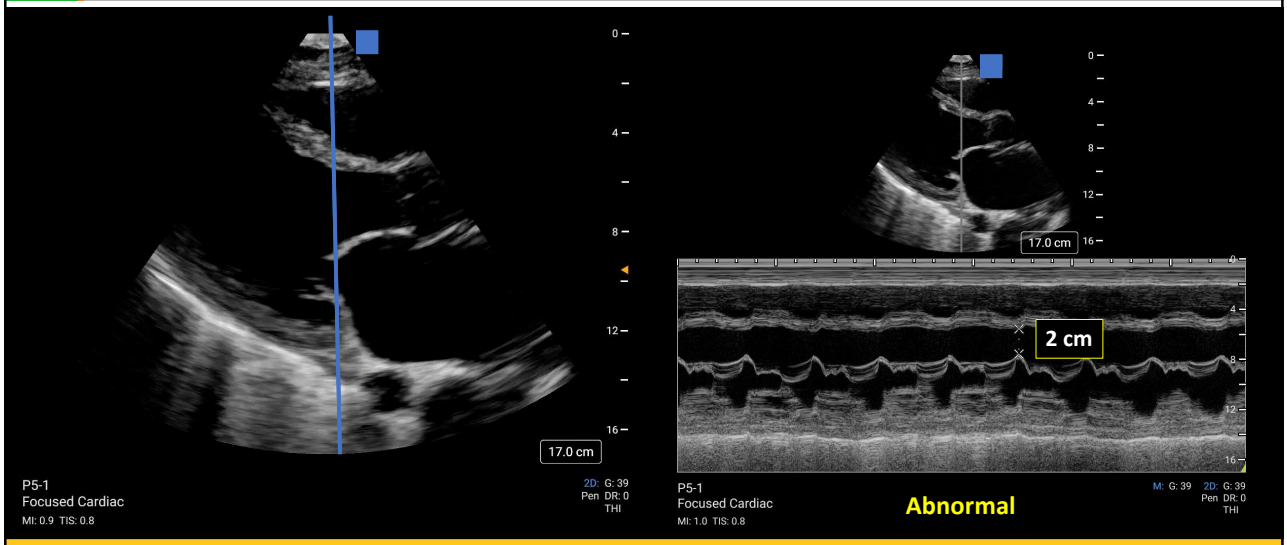
# E-Point Septal Separation: M-Mode

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# Take Home Points

- Use standard cardiac convention with indicator in the upper right of the screen
- Visually estimate function based on endocardial excursion and myocardial wall thickening
- E-point septal separation ≥10 mm suggests reduced systolic function
  - +LR 9.8, -LR 0.2 (Núñez-Ramos JA et al, POCUS J. 2022;7(1): 160-165)
- Learn more: ACP POCUS Module #3

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# References


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7. Núñez-Ramos JA, Pana-Toloza MC, Palacio-Held SC. E-Point Septal Separation Accuracy for the Diagnosis of Mild and Severe Reduced Ejection Fraction in Emergency Department Patients. POCUS. 2022;7(1):160-165. doi:10.24908/pocus.v7i1.15220


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# Interactive Image Review

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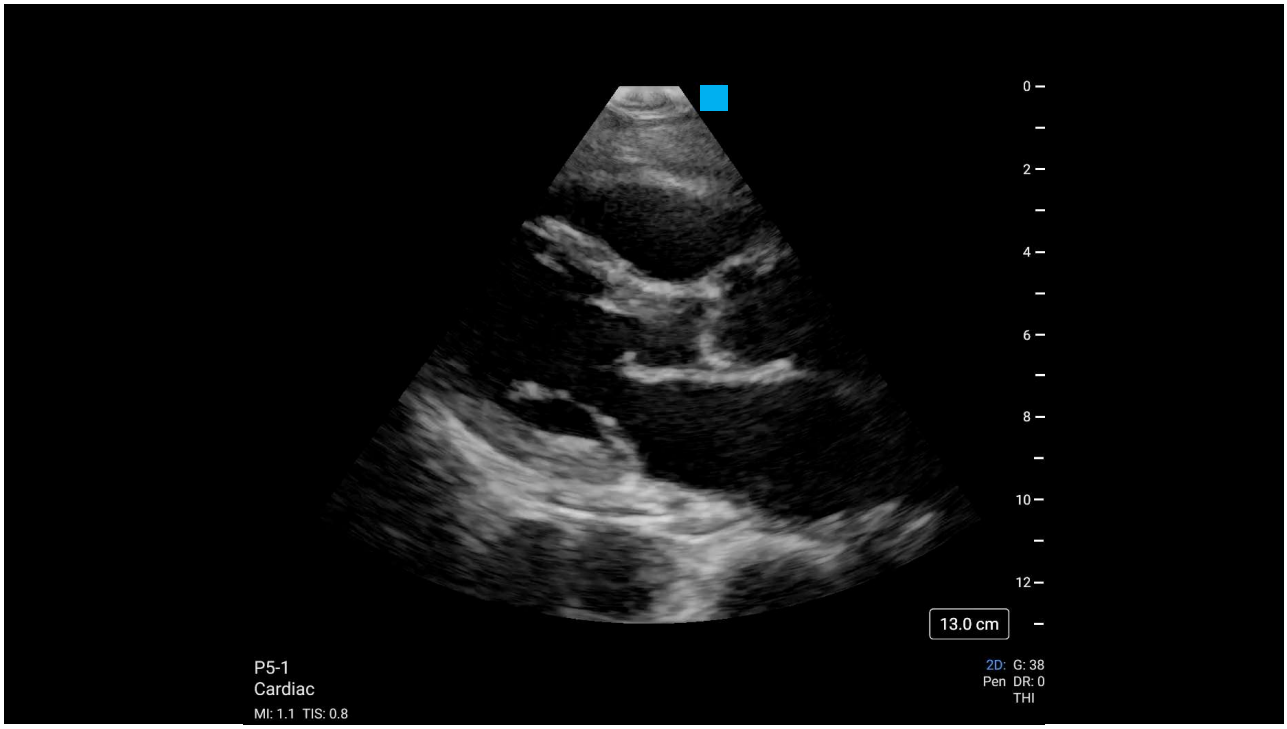


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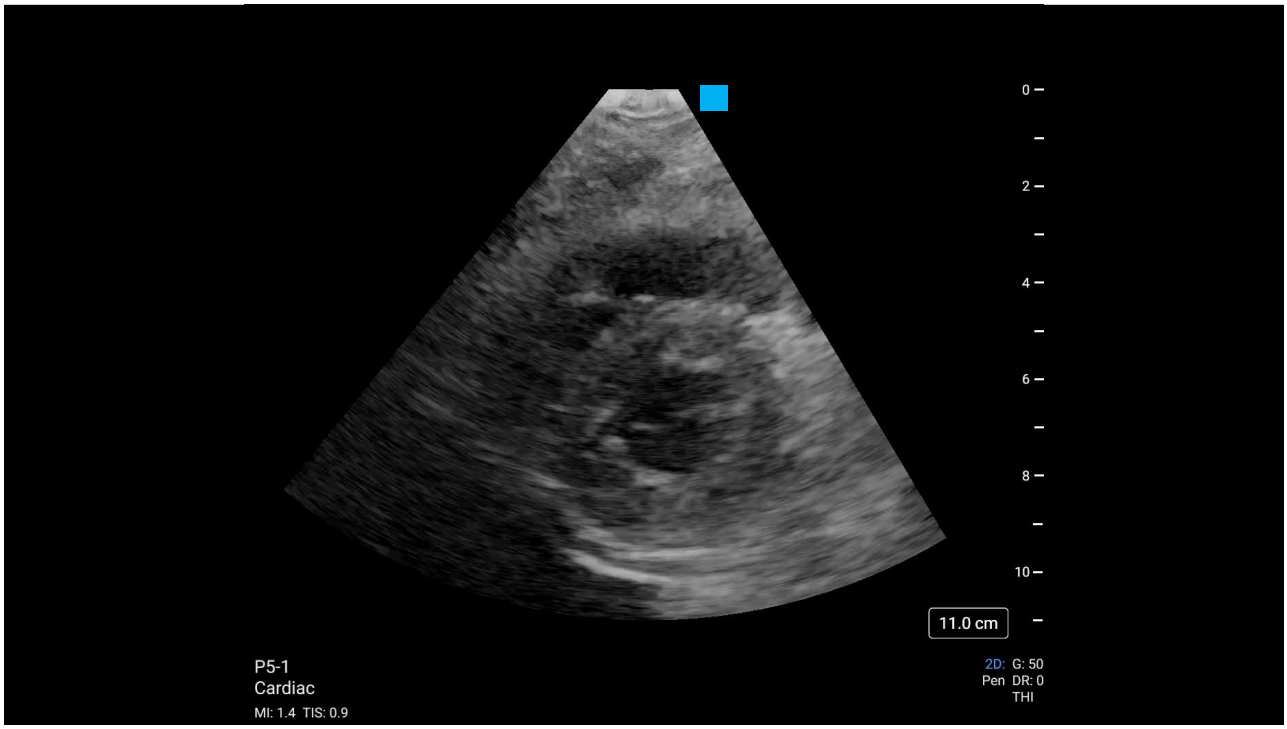
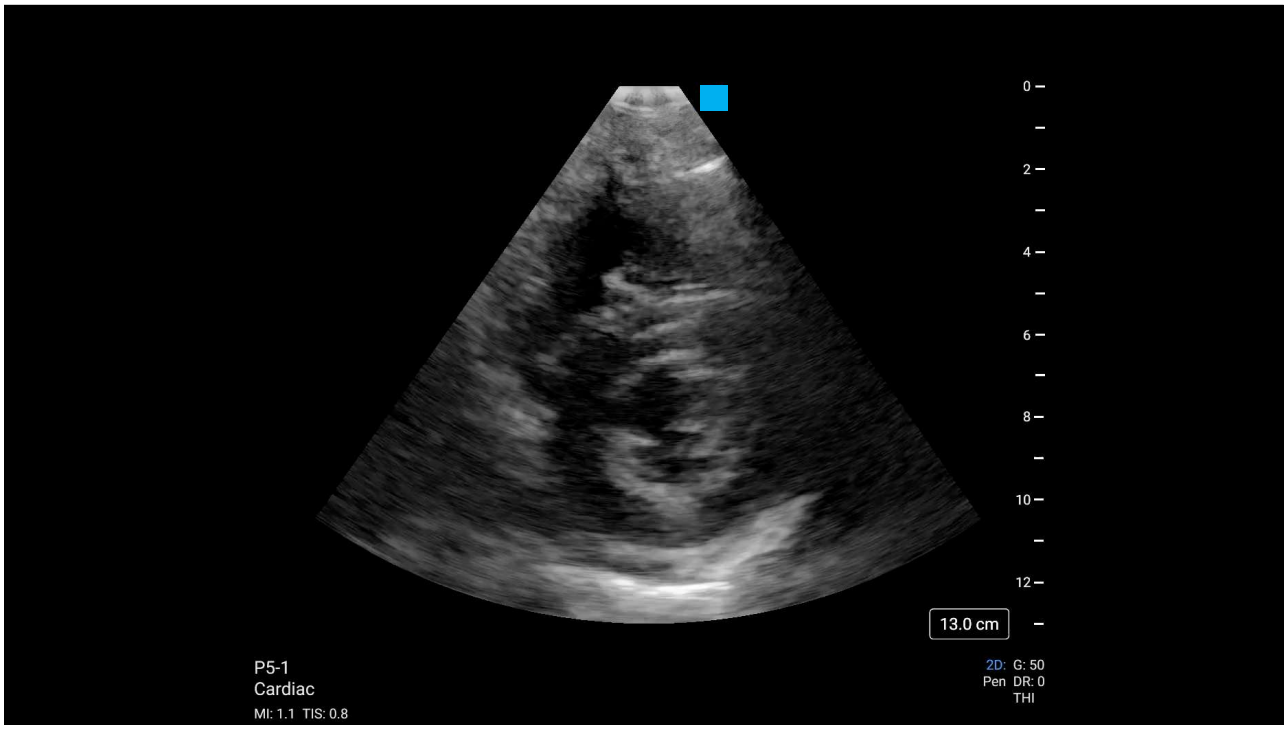

0
2
4
6
8
10
11.0 cm
P5-1
Cardiac
MI: 1.4 TIS: 0.9
2D: G: 50
Pen DR: 0
THI

27


0
4
8
12
16
17.0 cm
P5-1
Focused Cardiac
MI: 0.9 TIS: 0.8
2D: G: 39
Pen DR: 0
THI

28


0
2
4
6
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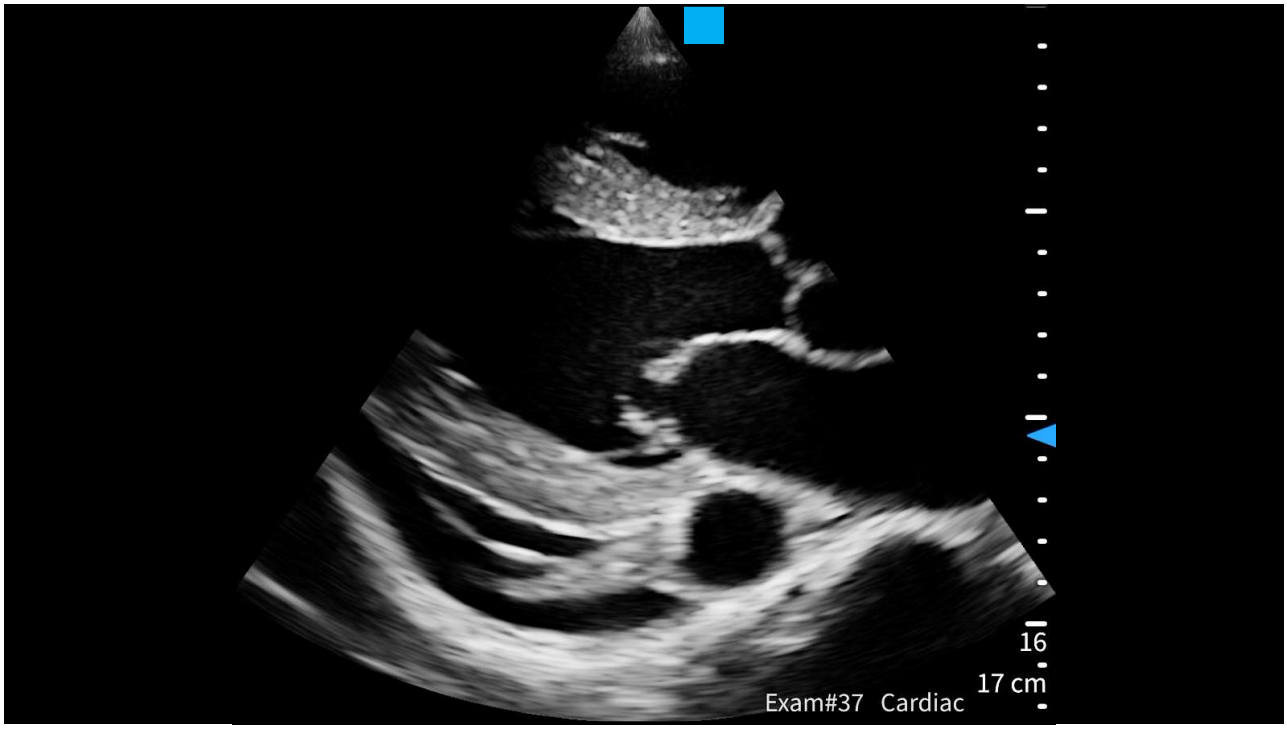
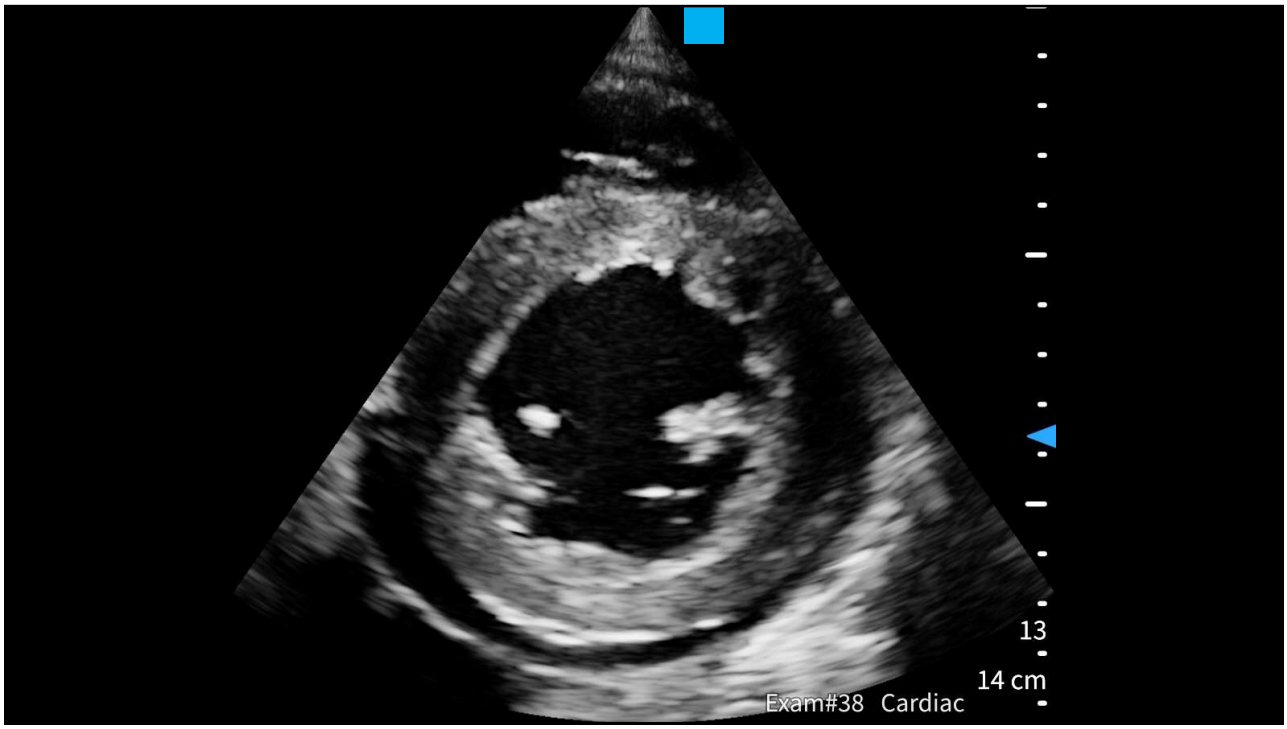
10
12
13.0 cm
P5-1
Cardiac
MI: 1.1 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

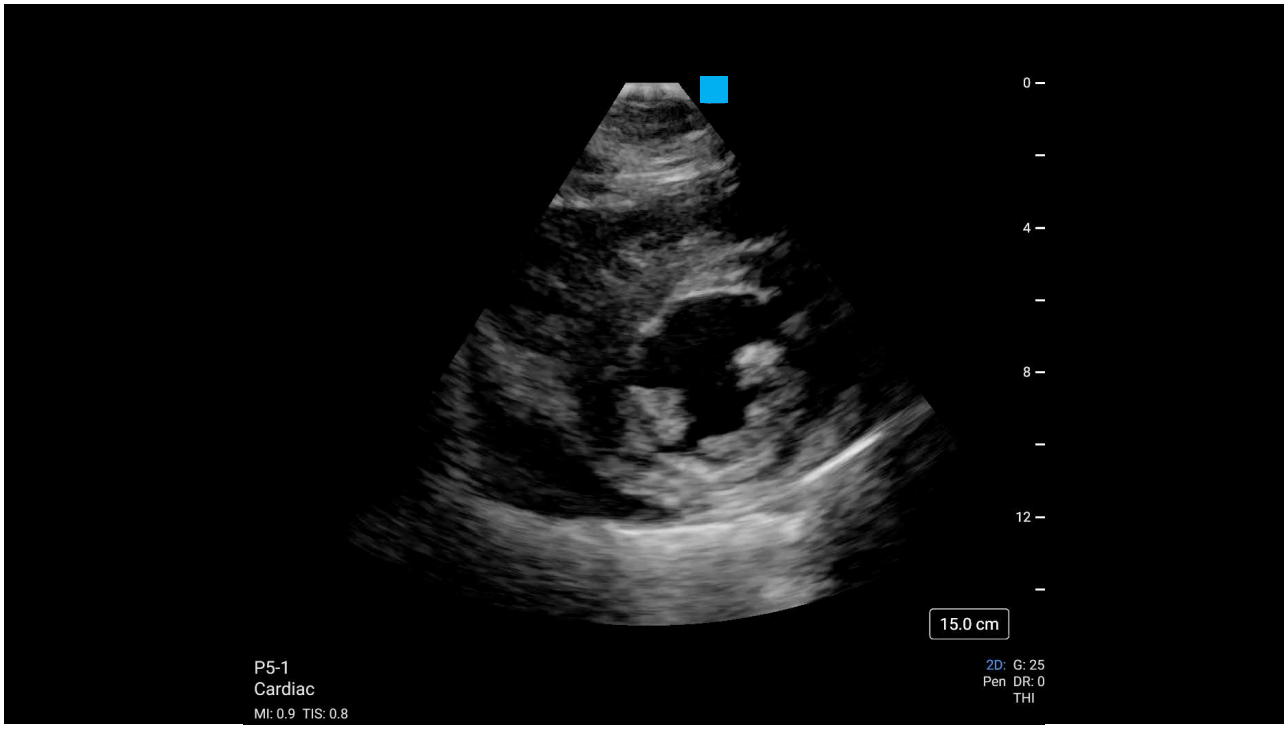
29


16
17 cm
Exam#37 Cardiac

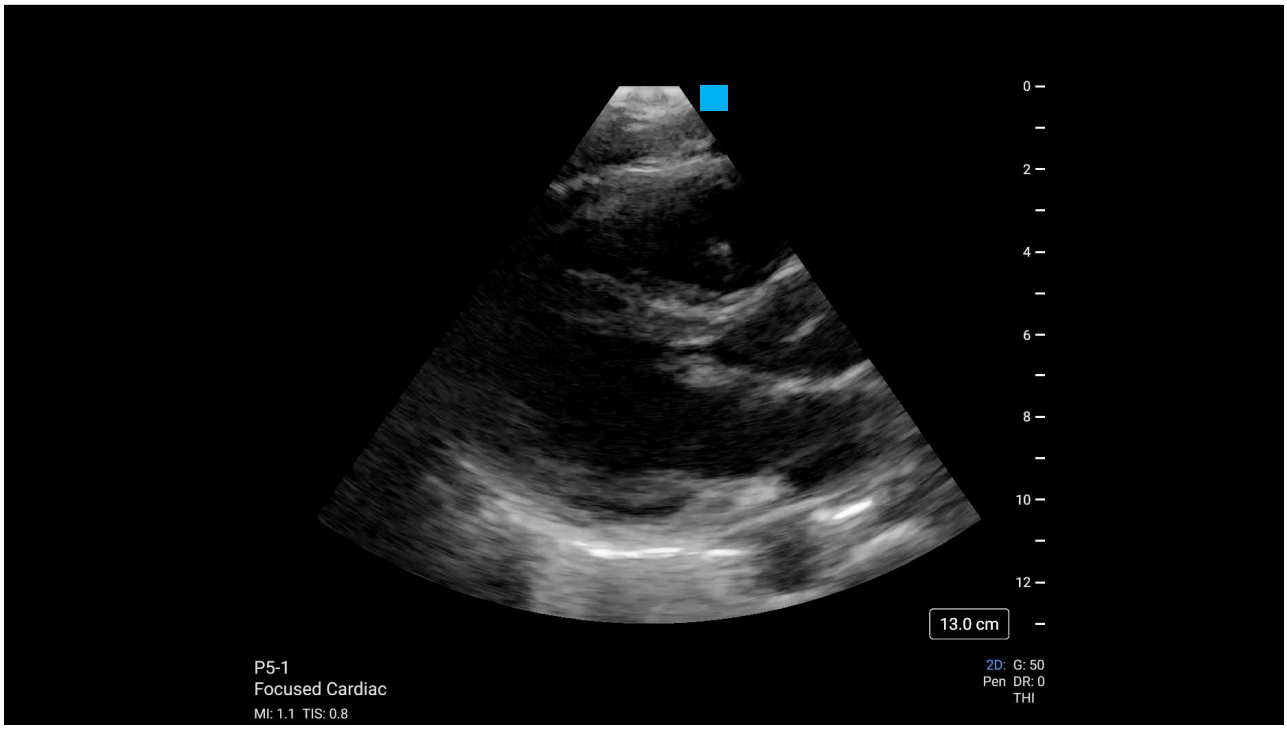
30


13
14 cm
Exam#38 Cardiac

31


0
4
8
12
15.0 cm
P5-1
Cardiac
MI: 0.9 TIS: 0.8
2D: G: 25
Pen DR: 0
THI

32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8
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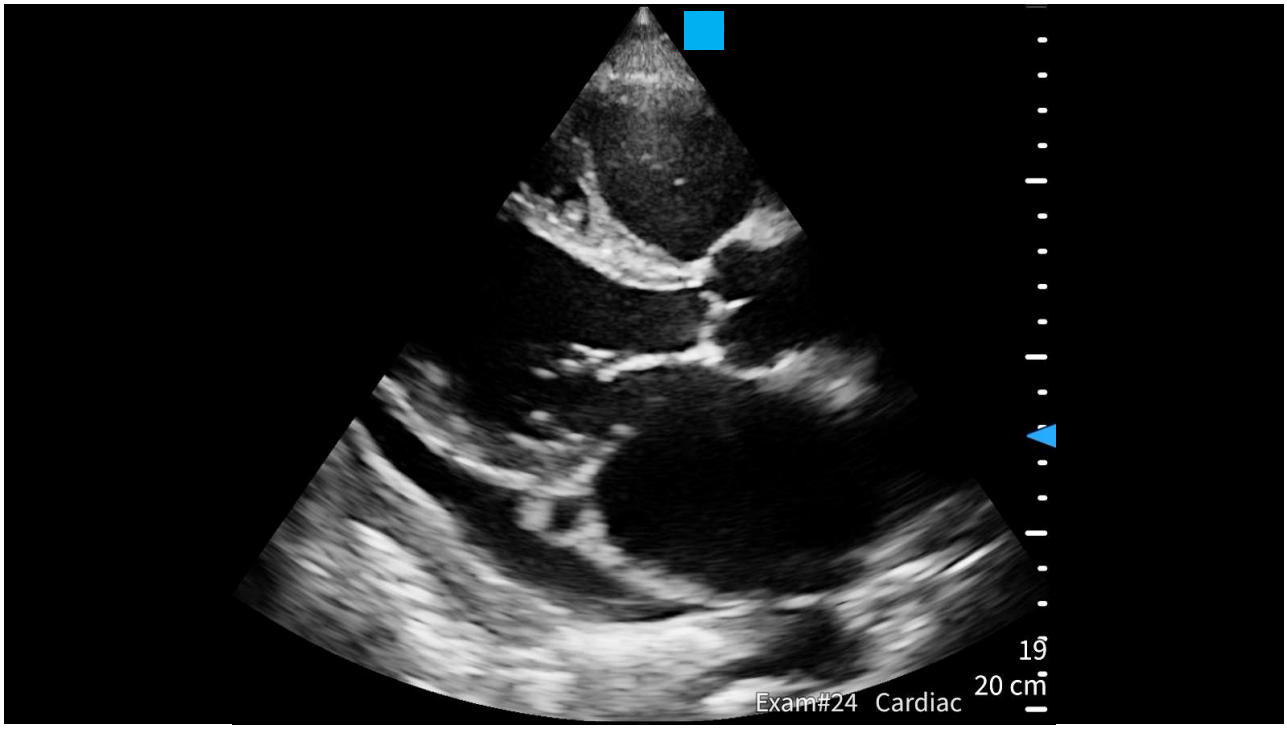
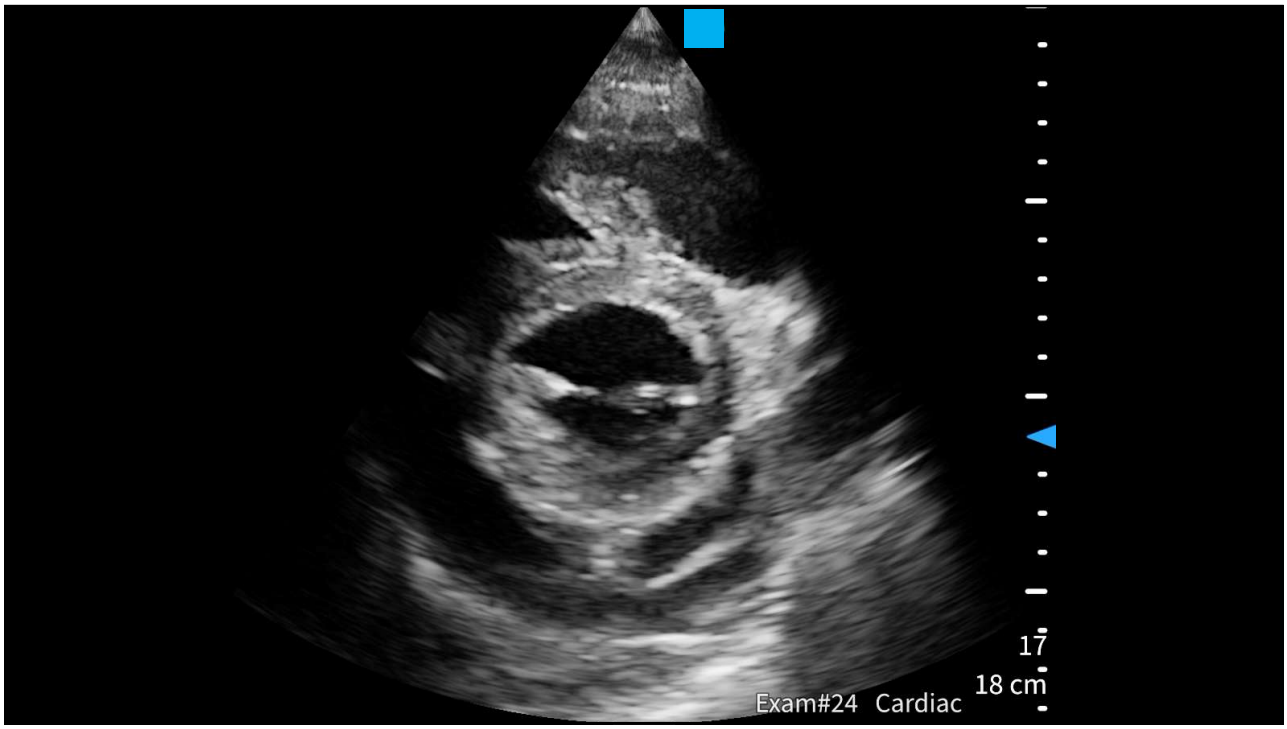
12
13.0 cm
P5-1
Focused Cardiac
MI: 1.1 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

33


19
20 cm
Exam#24 Cardiac

34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18 cm
Exam#24 Cardiac

35


0
4
8
12
16
19.0 cm
P5-1
Focused Cardiac
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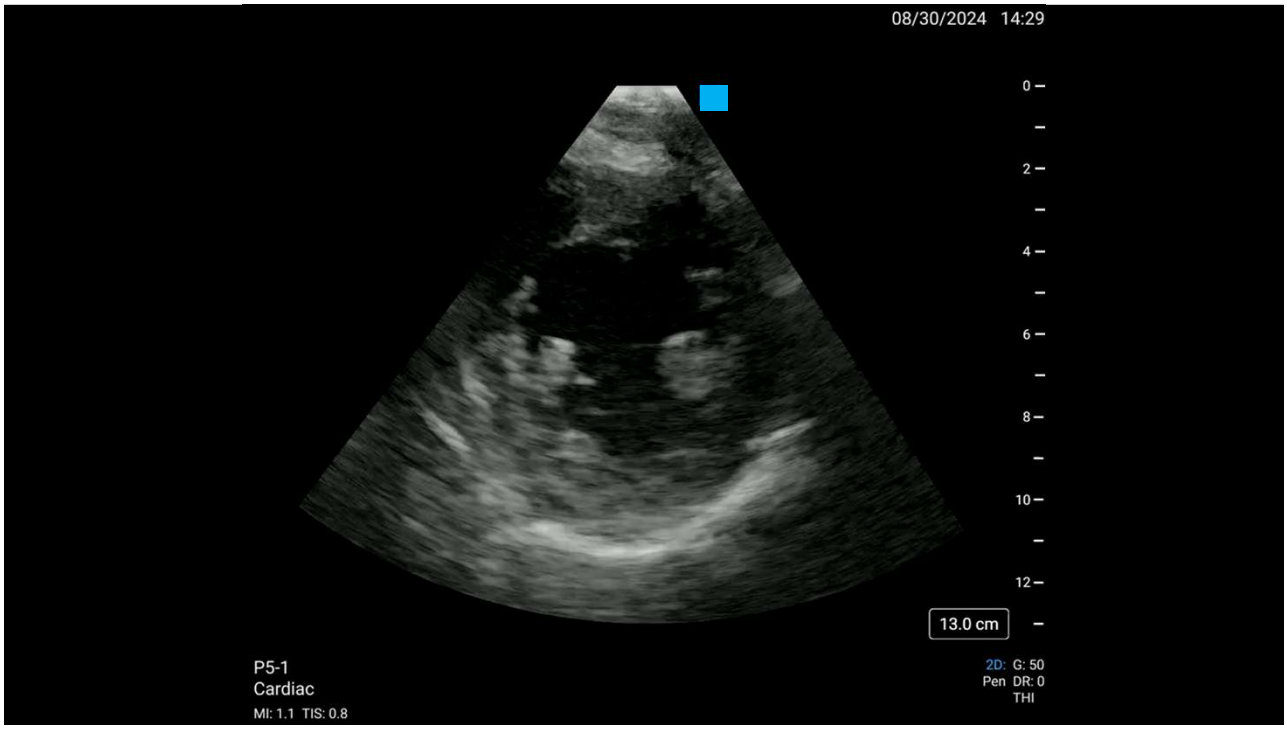
2D: G: 43
Pen DR: 0
THI

36


08/30/2024 14:29
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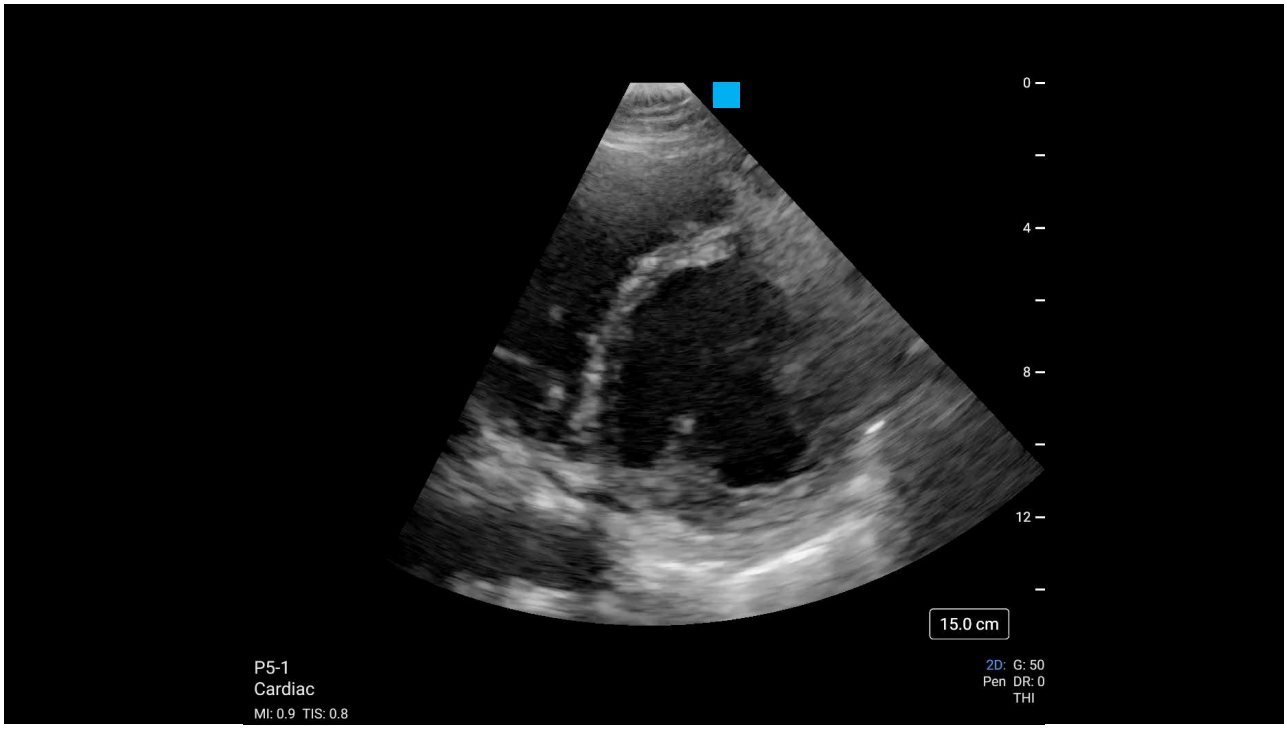
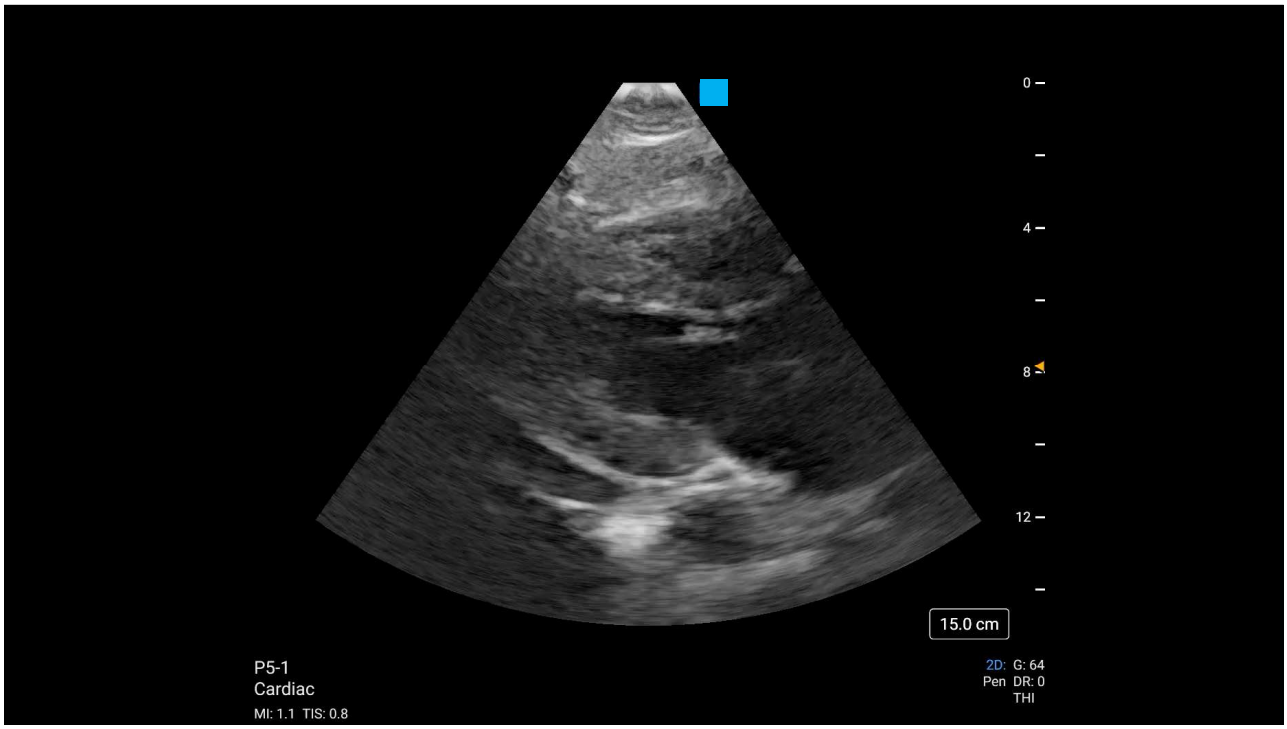
10
12
13.0 cm
P5-1
Cardiac
MI: 1.1 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

37


0
4
8
12
15.0 cm
P5-1
Cardiac
MI: 0.9 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

38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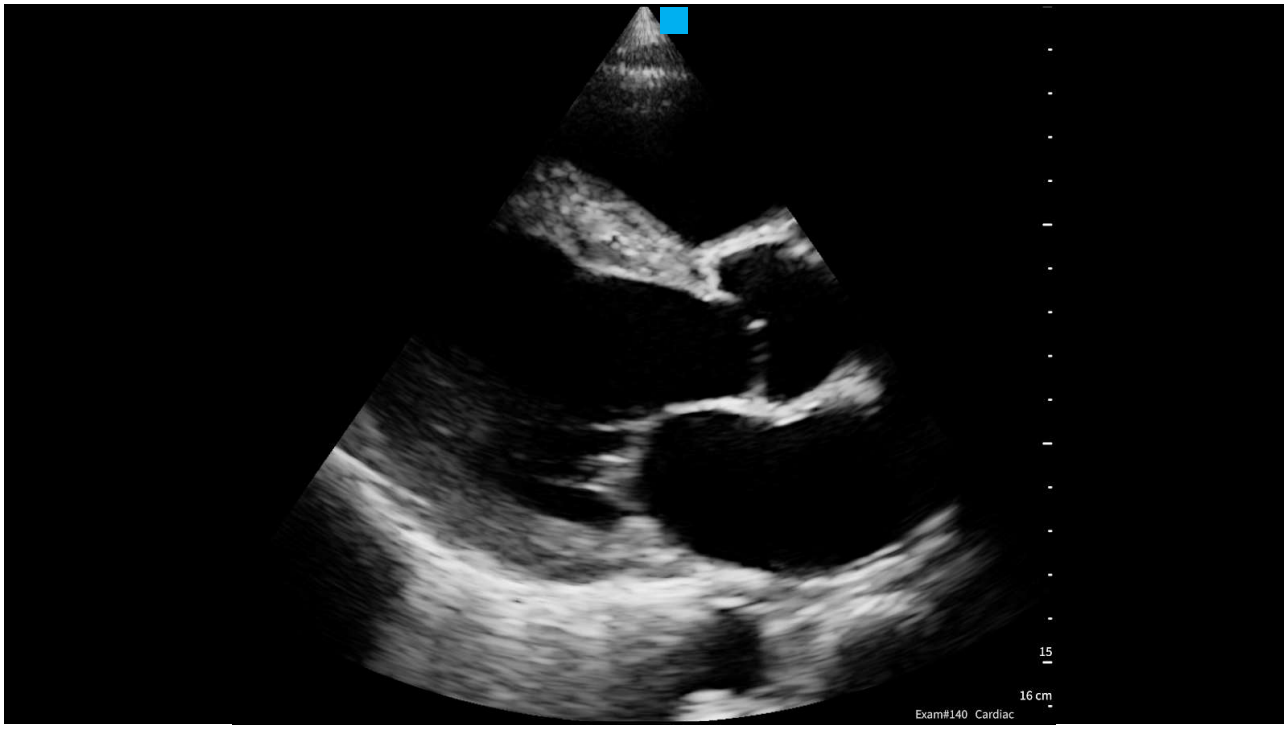
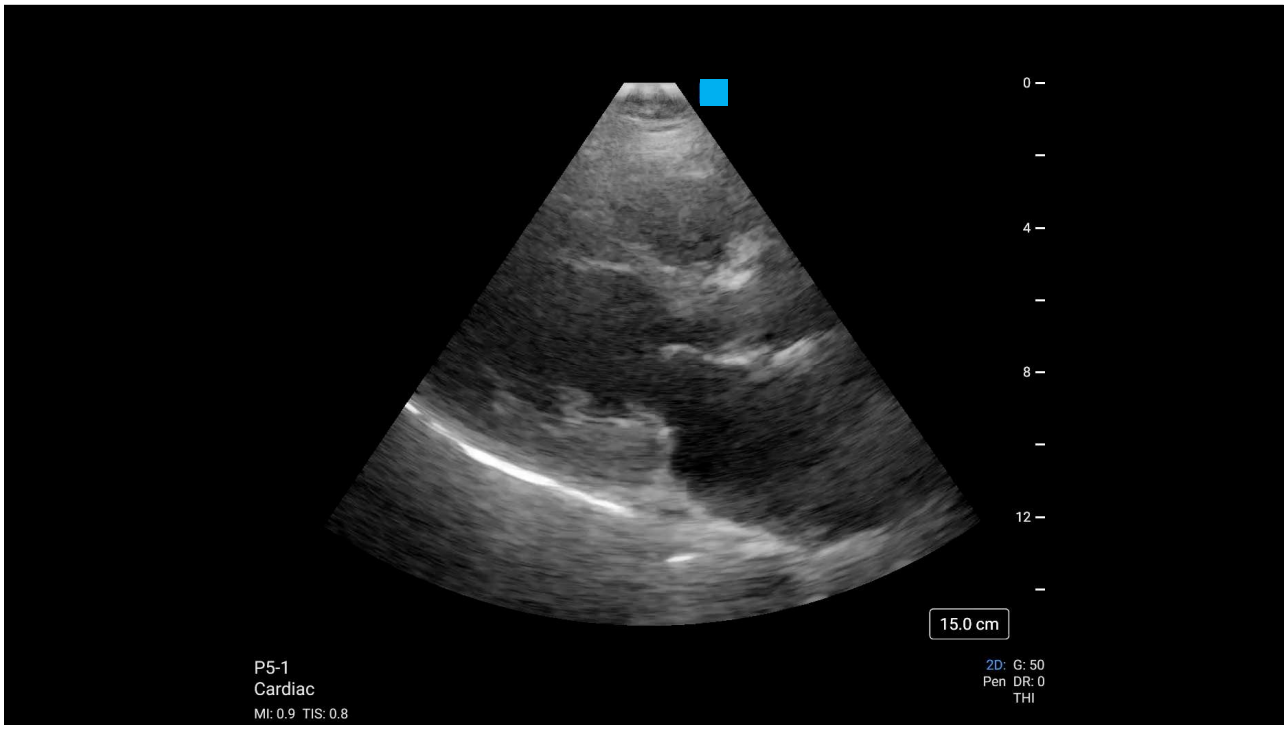
8
12
15.0 cm
P5-1
Cardiac
MI: 1.1 TIS: 0.8
2D: G: 64
Pen DR: 0
THI

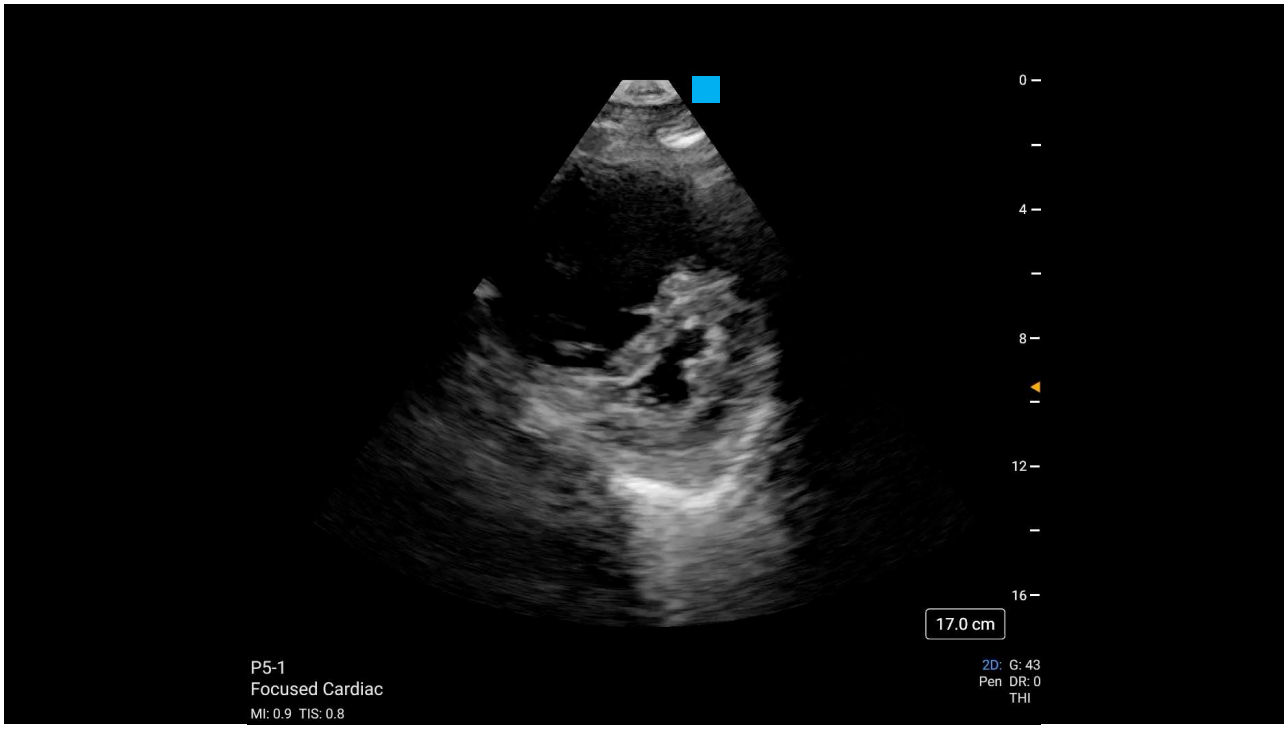
39


15
16 cm
Exam#140 Cardiac

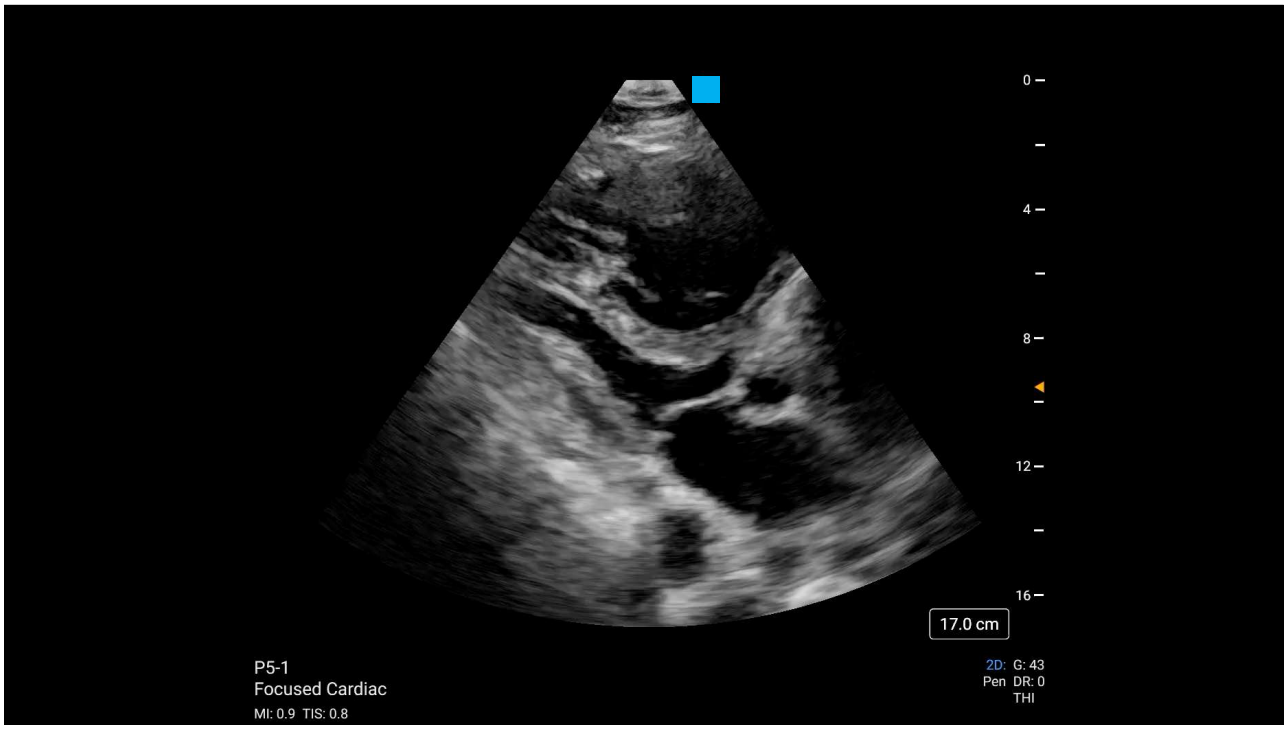
40


0
4
8
12
15.0 cm
P5-1
Cardiac
MI: 0.9 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

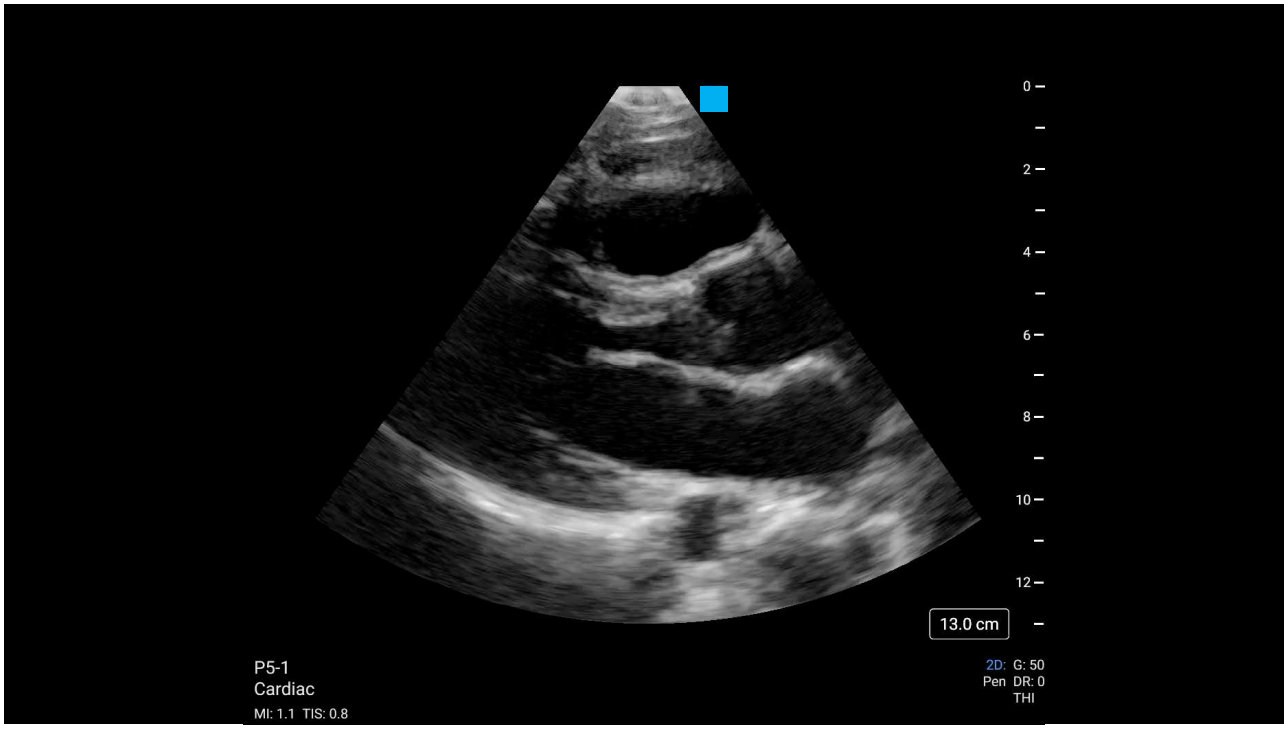
41


0
4
8
12
16
17.0 cm
P5-1
Focused Cardiac
MI: 0.9 TIS: 0.8
2D: G: 43
Pen DR: 0
THI

42


0
4
8
12
16
17.0 cm
P5-1
Focused Cardiac
MI: 0.9 TIS: 0.8
2D: G: 43
Pen DR: 0
THI

43


0
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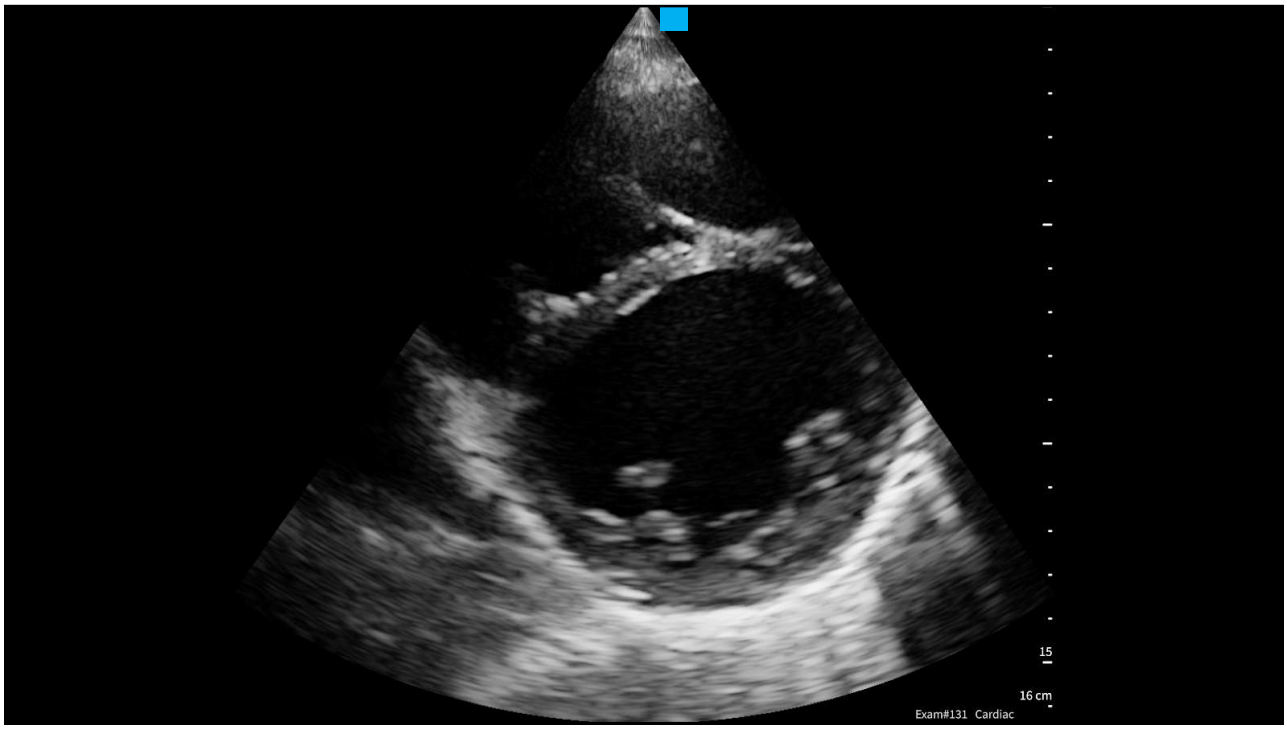
10
12
13.0 cm
P5-1
Cardiac
MI: 1.1 TIS: 0.8
2D: G: 50
Pen DR: 0
THI

44


15
16 cm
Exam#131 Cardiac

45


0
4
8
12
16
17.0 cm
P5-1
Cardiac
MI: 0.9 TIS: 0.8
2D: G: 10
Pen DR: 0
THI

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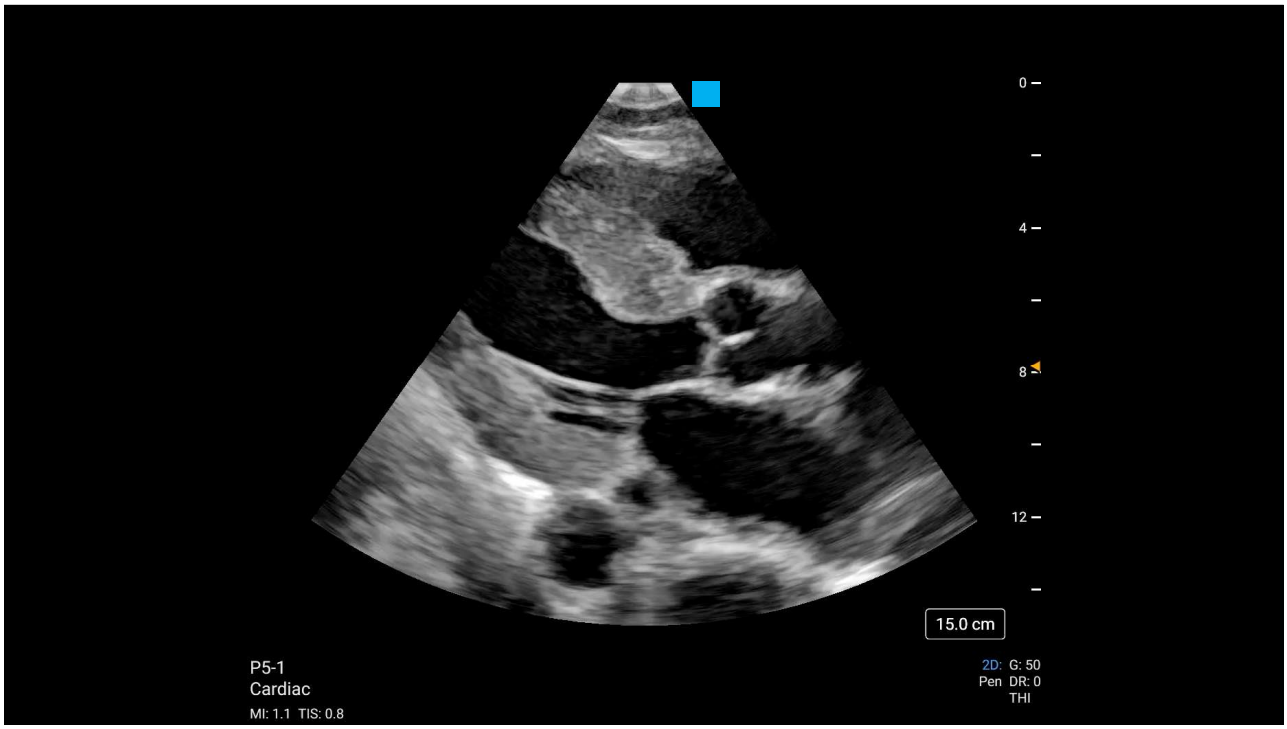


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Please break into groups of 3 for the practical session

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