

# Transthoracic Echo

*Thomas M Burch, M.D.*

*Beth Israel Deaconess Medical Center*

*Children's Hospital Boston*



*Children's Hospital Boston*



*BIDMC*



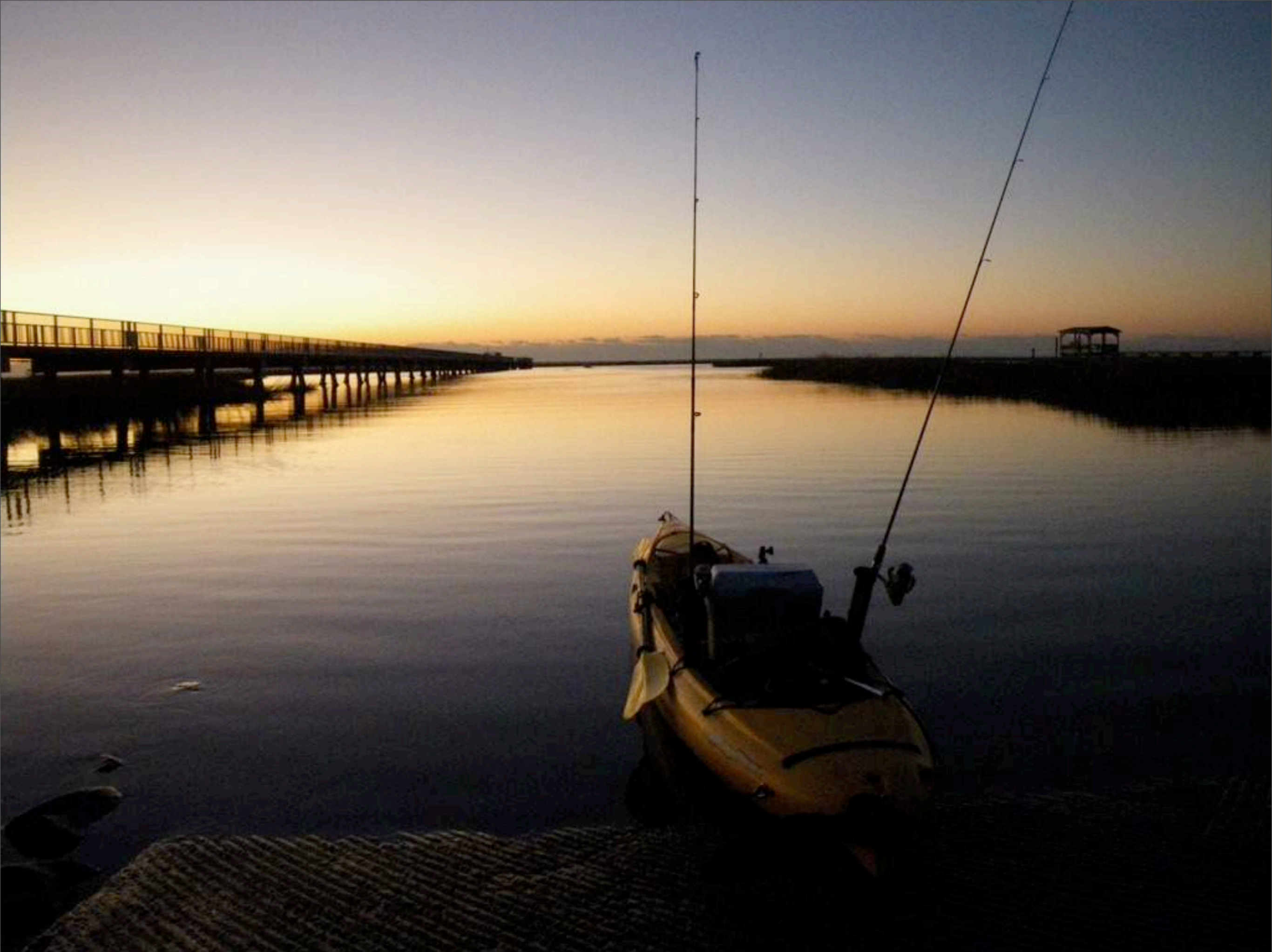
*Harvard Medical School*

# ***CONFLICTS OF INTEREST?***

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***PTEmasters.com***





Sunday, January 26, 2014

# Lecture Goals

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➤ *Review BASIC TTE views.*



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➤ *Describe common structures seen w TTE*

# Lecture Goals

- *Review BASIC TTE views.*
- *Describe common structures seen w TTE*
- *Describe how to do it? (simulation)*

# Resources:

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Google: Toronto, PIE, and TTE

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Google: Toronto, PIE, and TTE

Outstanding, Highly recommended

# Resources:

## Echocardiography

in Pediatric and  
Congenital Heart Disease

From Fetus to Adult

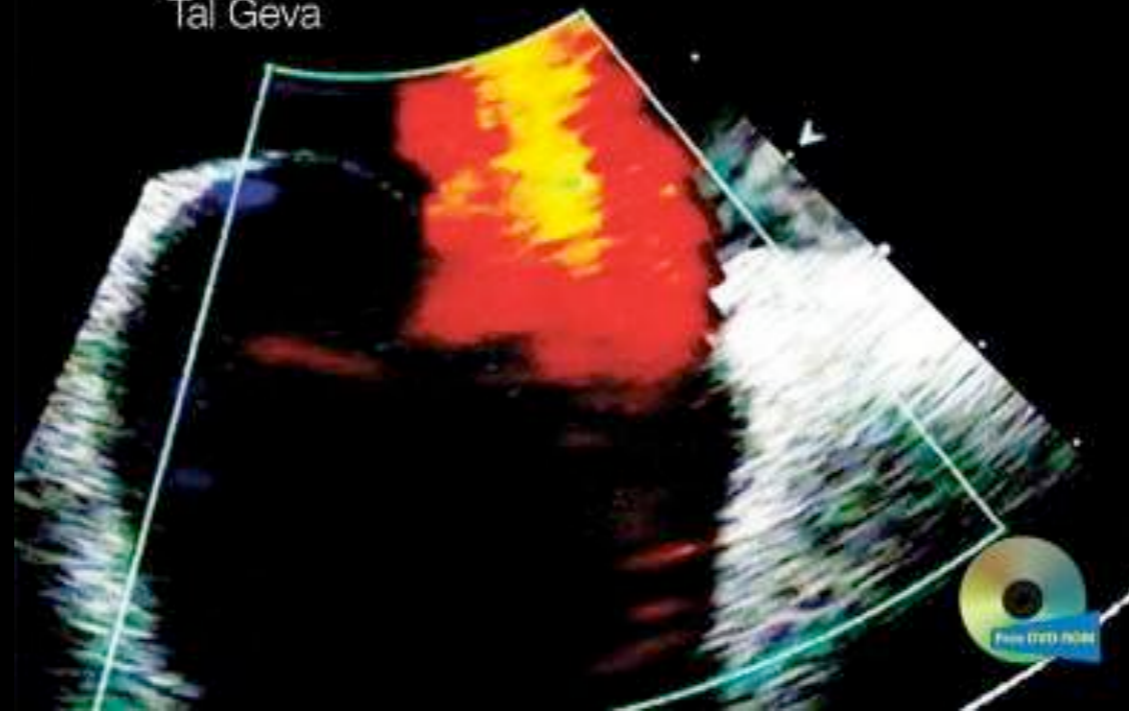
Edited by

Wyman W. Lai

Luc Mertens

Meryl S. Cohen

Tal Geva





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## Echocardiography

in Pediatric and  
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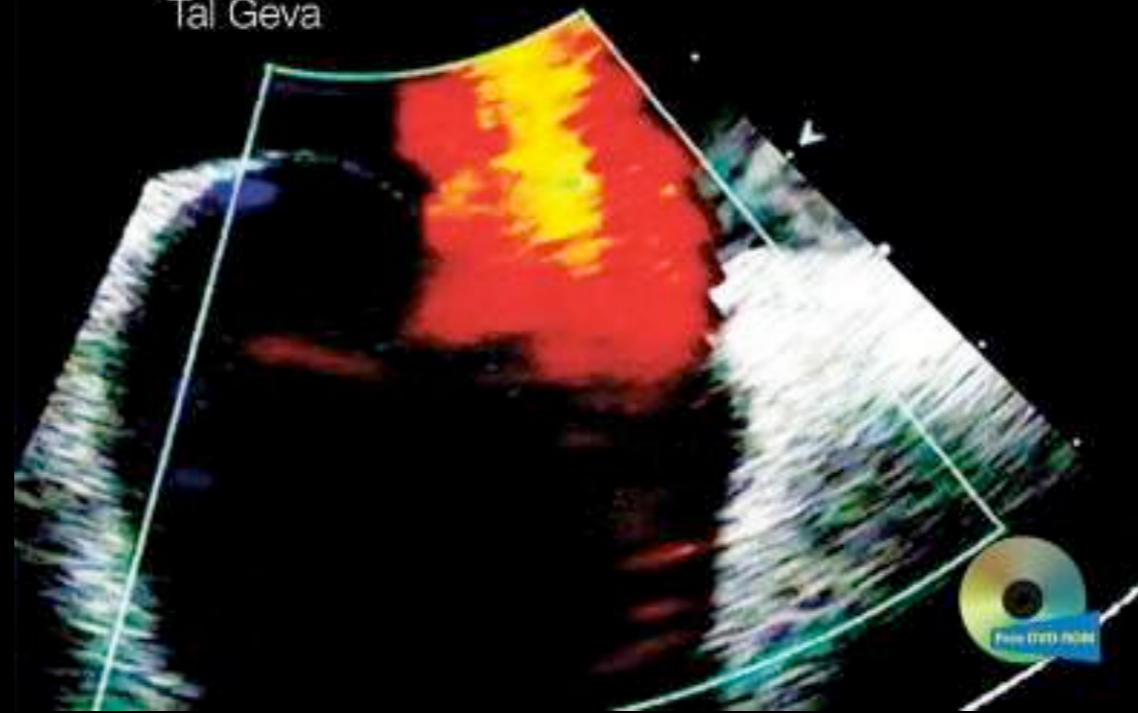
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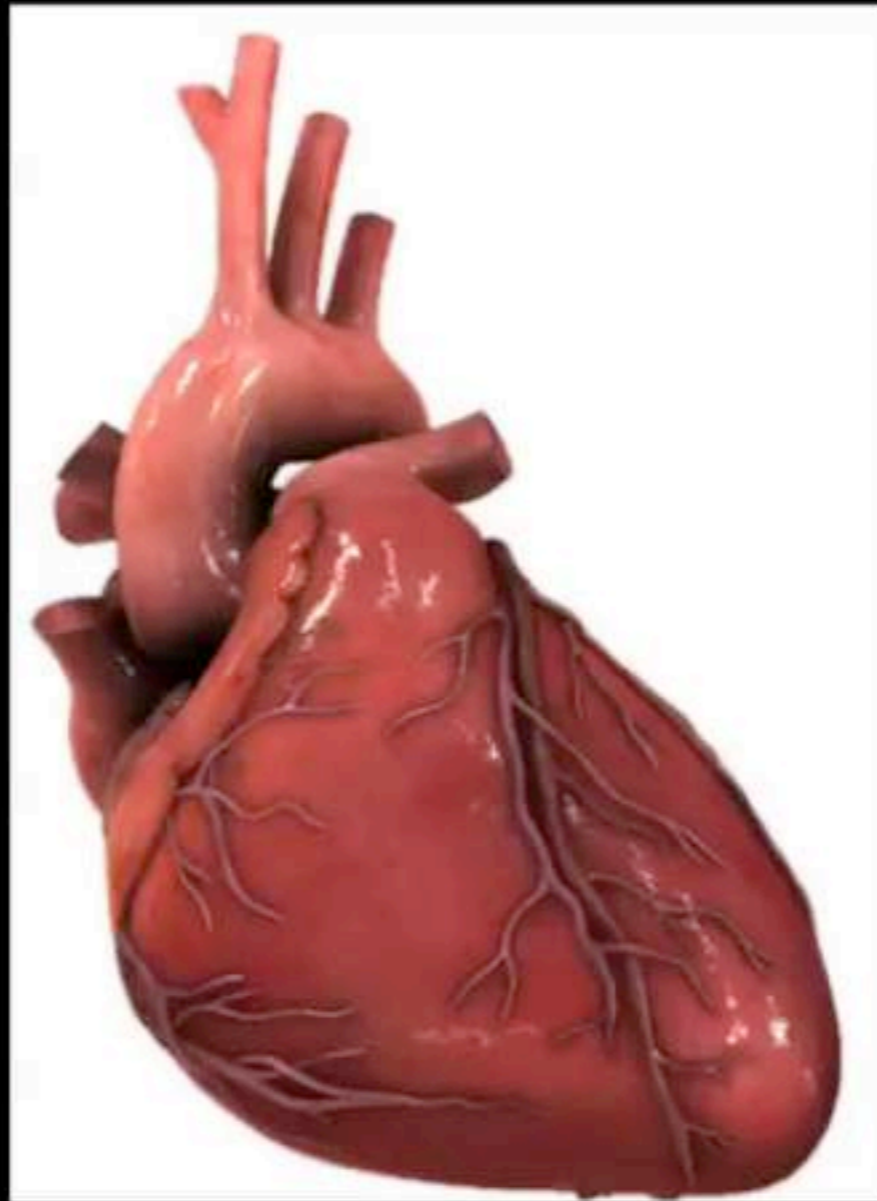
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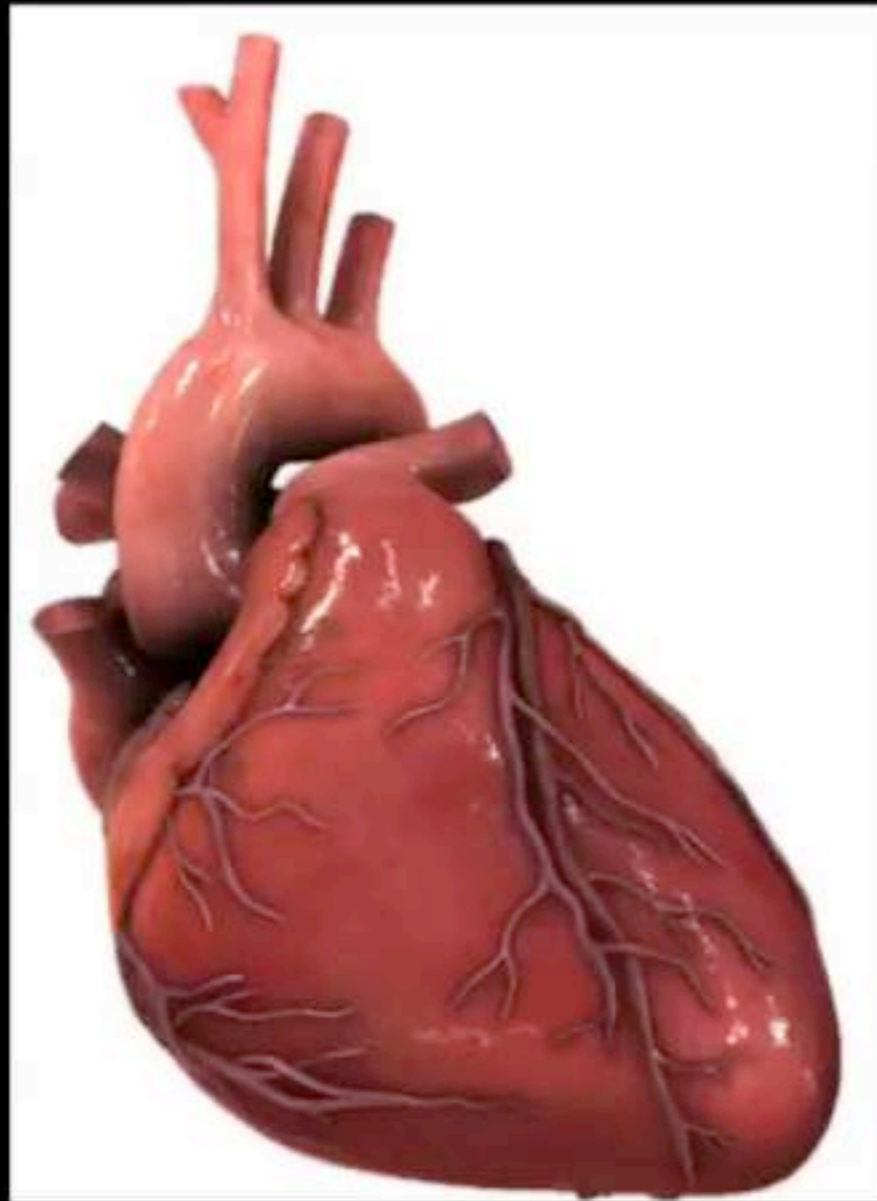


***Echocardiography in Pediatric and Congenital Heart Disease From Fetus to Adult***  
***EDITED BY: Wyman W. Lai, MD, MPH, Luc L. Mertens, MD, PhD, Meryl S. Cohen, MD, Tal Geva, MD***

# Resources: Heart Works



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***VERY VERY special Thanks to Heart Works! Without which this would NOT happen!***



# Resources: Heart Works



## HEARTWORKS

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updated

### **NEW: Introducing HeartWorks eLearn - ASE CME Accredited online learning program for TEE**

We are delighted to announce the launch of HeartWorks eLearn, a comprehensive online transesophageal echocardiography course, developed by Inventive Medical and leading clinicians in the United States and Europe.

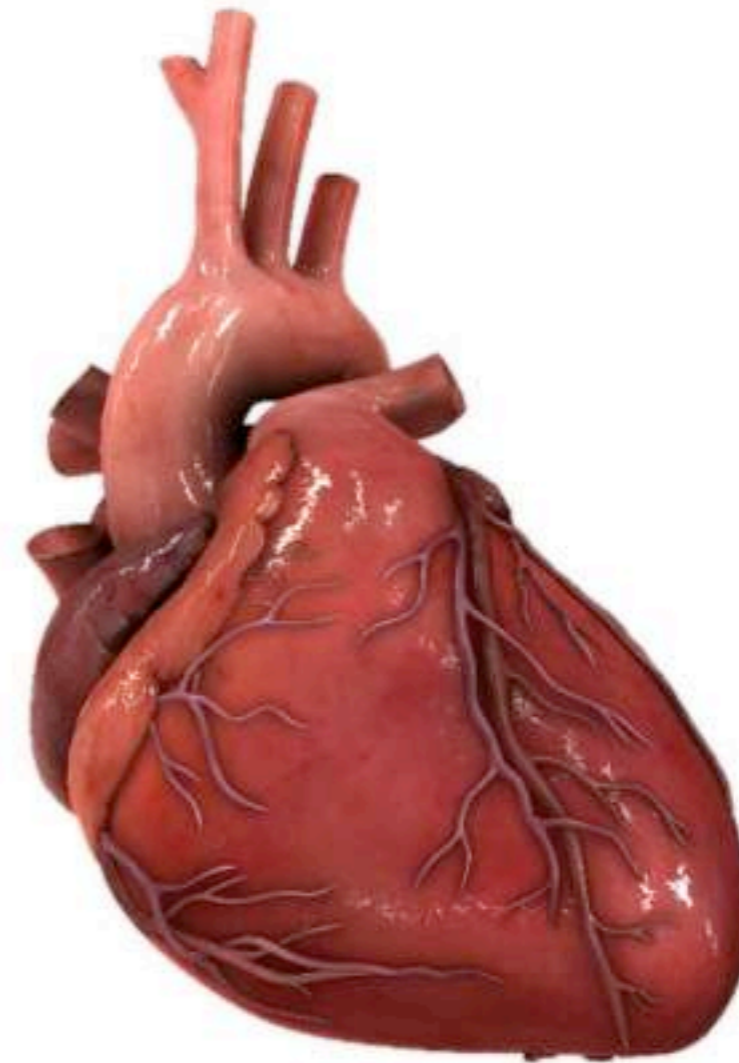
This course is suitable for individuals or institutions wishing to learn, teach or consolidate their understanding of TEE.

Learners will receive **11 AMA PRA Category 1 Credits™** upon passing the end-of-course assessment.

[Find out more >](#)

### **NEW: Introducing the second suite of pathology models for HeartWorks simulators.**

[Find out more >](#)





# Resources: Heart Works



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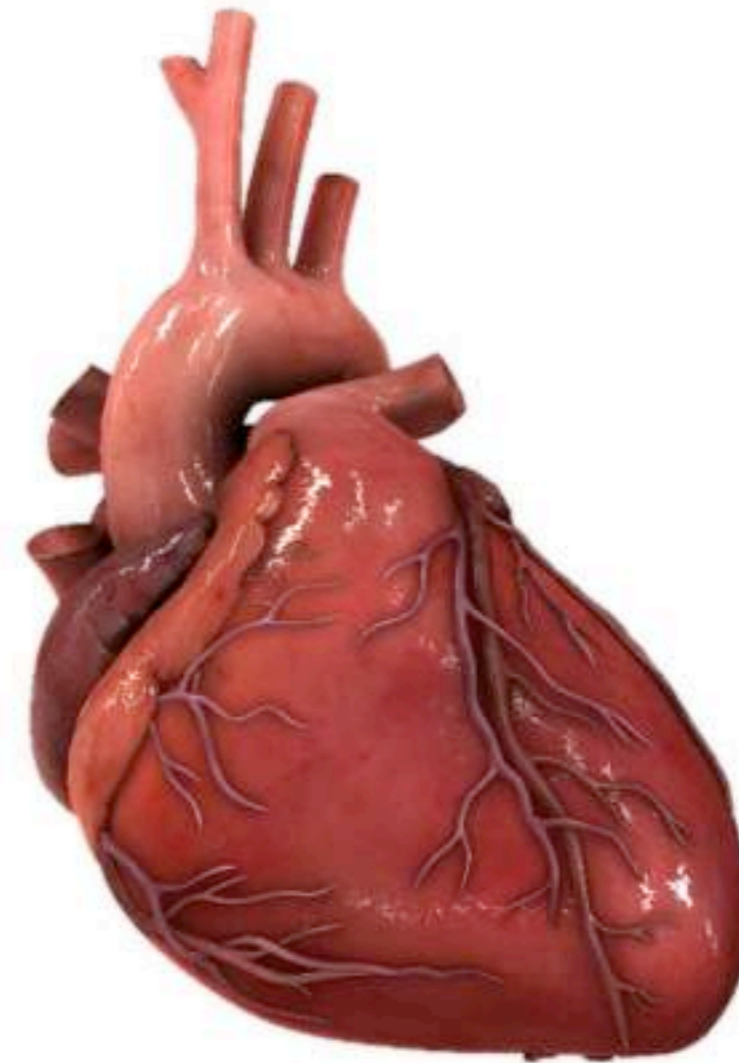
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# TTE Views = Windows

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 *Parasternal*



# TTE Views = Windows

➤ *Parasternal*

➤ *Apical*

# TTE Views = Windows

➤ *Parasternal*

➤ *Apical*

➤ *Subcostal*

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➤ *Suprasternal*

# TTE Windows

# TTE Windows

# TTE Windows

➤ *Parasternal Long Axis*

# TTE Windows

➤ *Parasternal Long Axis*

➤ *Parasternal Long-Axis View*

# TTE Windows

- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*



# TTE Windows

- *Parasternal Long Axis*
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# TTE Windows

- *Parasternal Long Axis*
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  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*

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  - *Aortic Valve Short Axis View*

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## ➤ Parasternal Short Axis

➤ *Aortic Valve Short Axis View*

➤ *Mitral Valve Short Axis View*

➤ *Mid-Papillary Short Axis View*

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- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*



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## ➤ Parasternal Short Axis

➤ *Aortic Valve Short Axis View*

➤ *Mitral Valve Short Axis View*

➤ *Mid-Papillary Short Axis View*

## ➤ Apical

➤ *Four Chamber View*

➤ *Five Chamber View*

➤ *Two Chamber View*

# TTE Windows

- *Parasternal Long Axis*
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- *Two Chamber View*
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- *Short Axis View*

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- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

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- *Two Chamber View*
- *Apical Long Axis View*

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- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

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- *Apical Long Axis View*

## ➤ Subcostal

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- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal



# TTE Windows

## ➤ Parasternal Long Axis

### ➤ Parasternal Long-Axis View

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➤ *RV Outflow View*

## ➤ Parasternal Short Axis

➤ *Aortic Valve Short Axis View*

➤ *Mitral Valve Short Axis View*

➤ *Mid-Papillary Short Axis View*

## ➤ Apical

➤ *Four Chamber View*

➤ *Five Chamber View*

➤ *Two Chamber View*

➤ *Apical Long Axis View*

## ➤ Subcostal

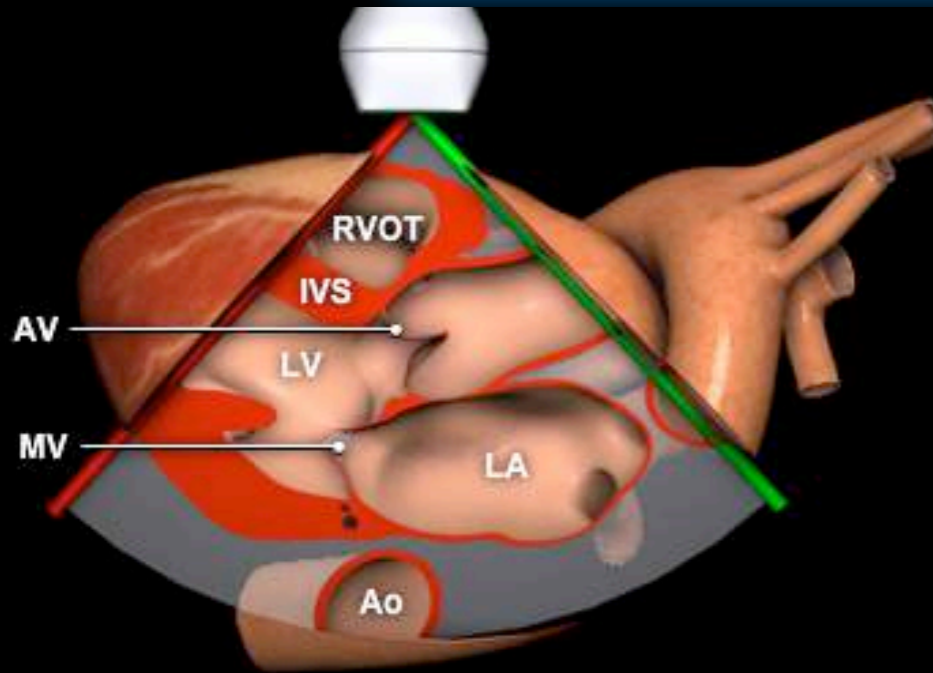
➤ *Four Chamber View*

➤ *Short Axis View*

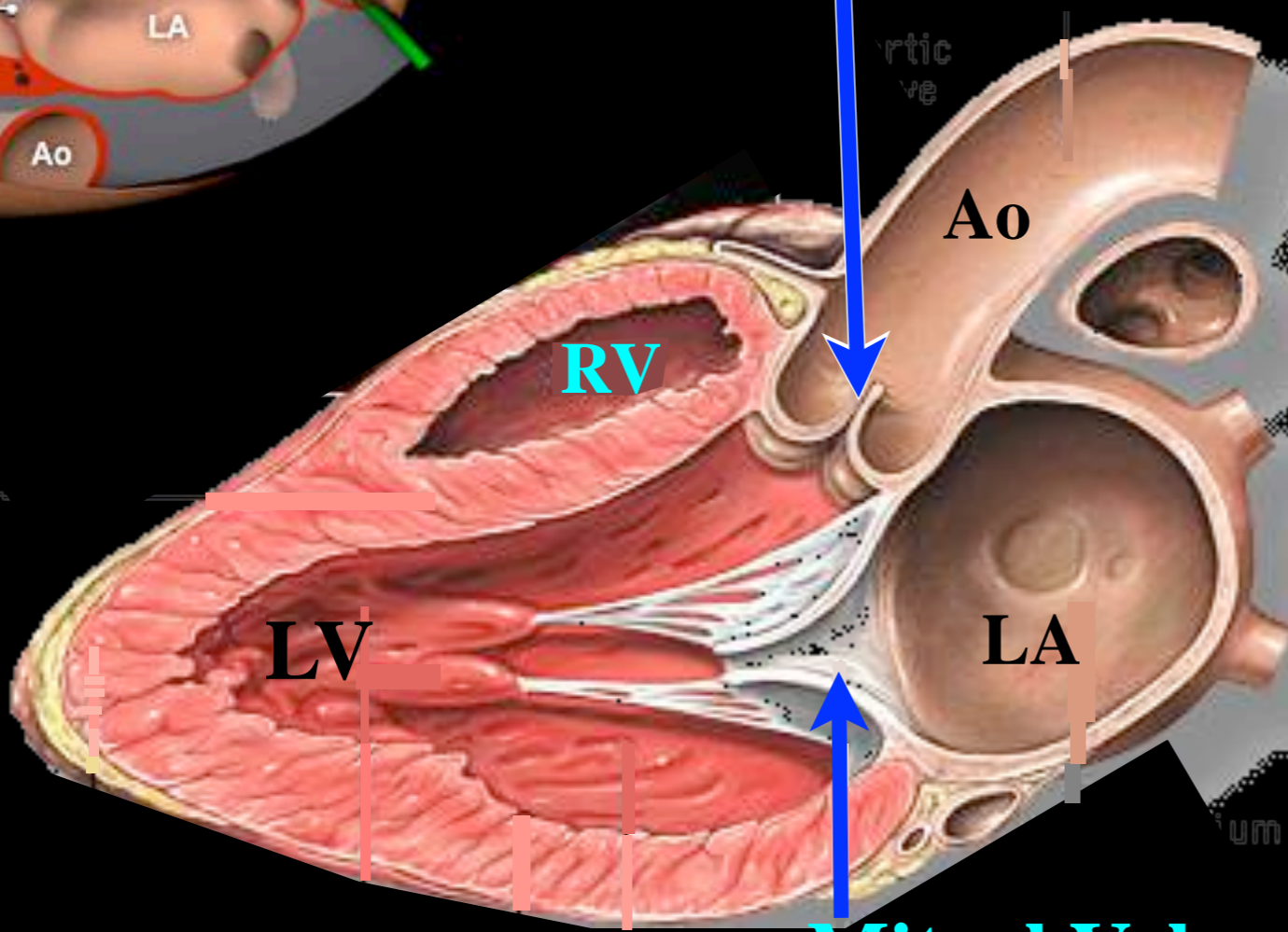
➤ *IVC Long Axis View*

## ➤ Suprasternal

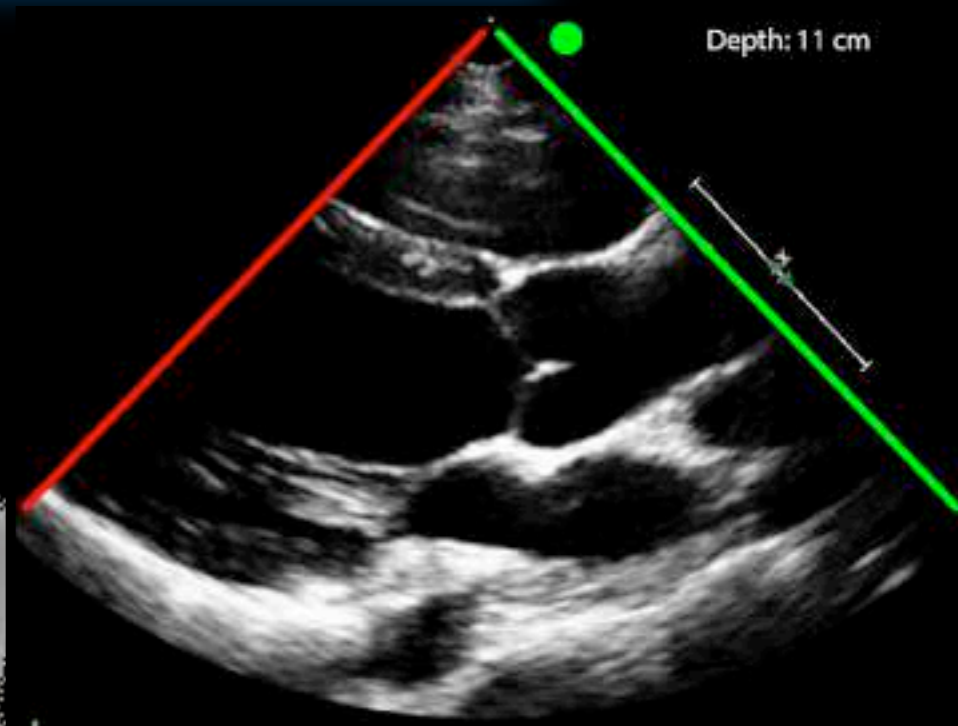
# *PLAX: Parasternal Long Axis View*



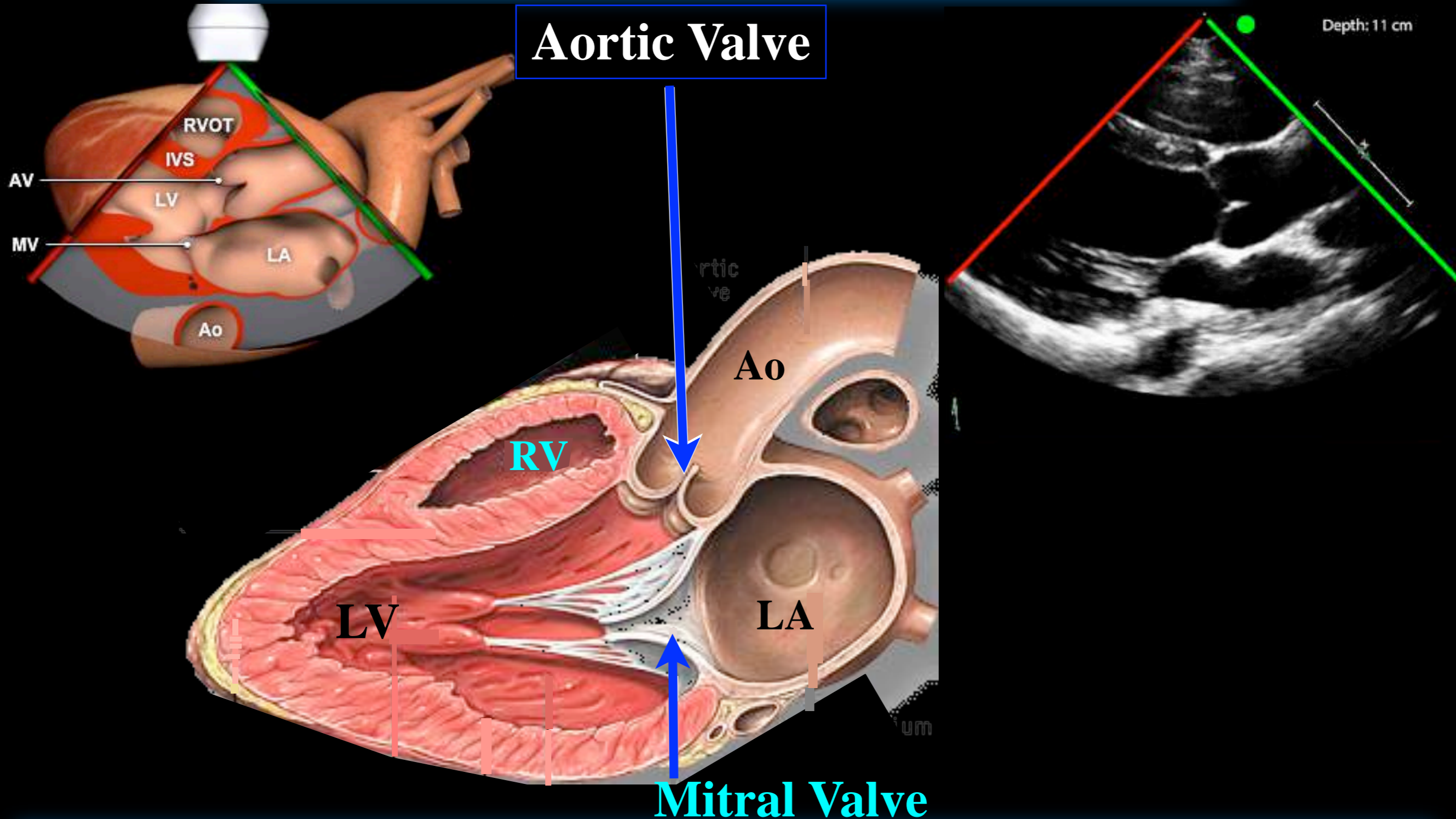
**Aortic Valve**



**Mitral Valve**



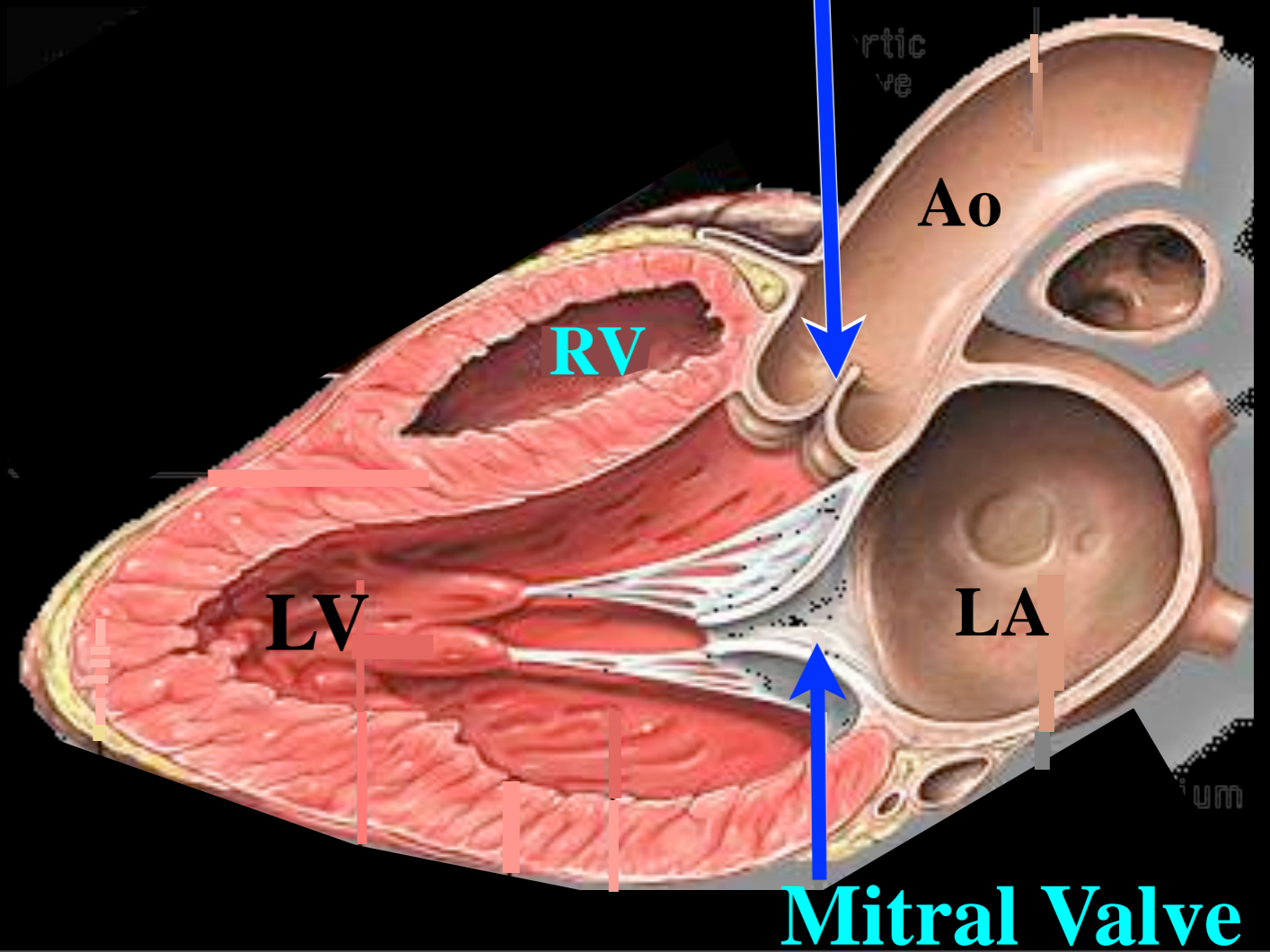
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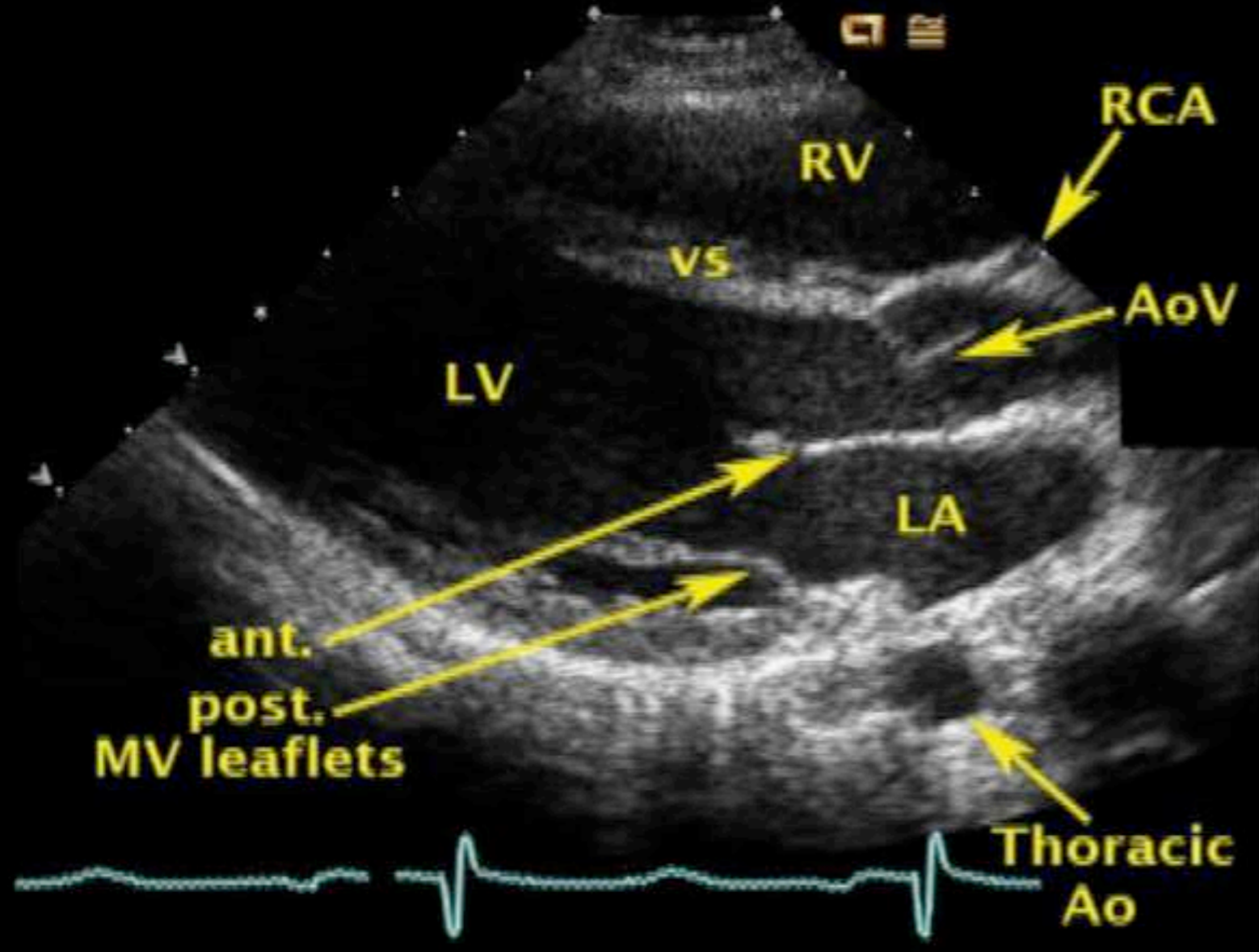


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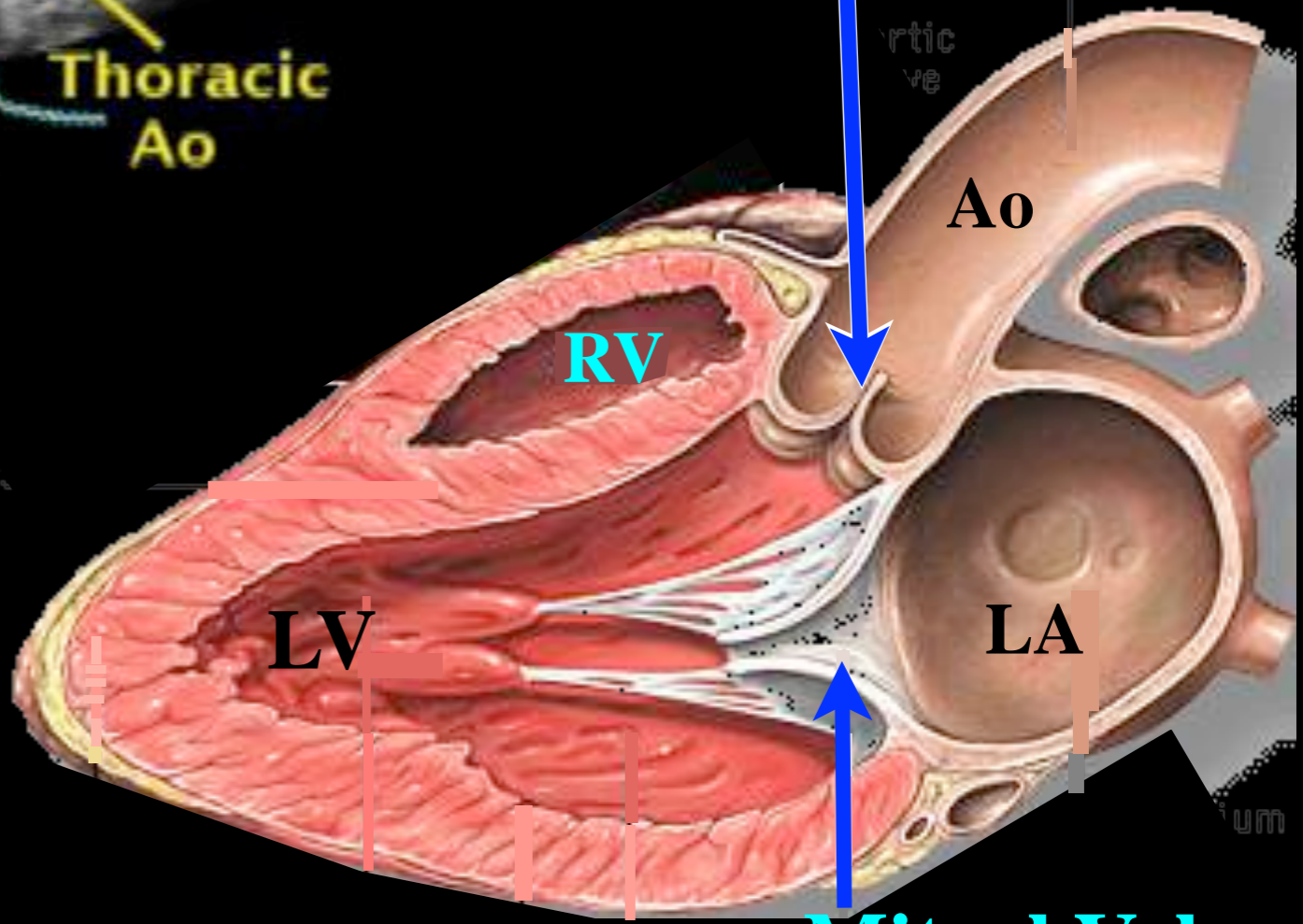
2. *Echocardiography in Pediatric and Congenital Heart Disease From Fetus to Adult*  
EDITED BY: Wyman W. Lai, MD, MPH, Luc L. Mertens, MD, PhD, Meryl S. Cohen, MD, Tal Geva, MD

**Aortic Valve**

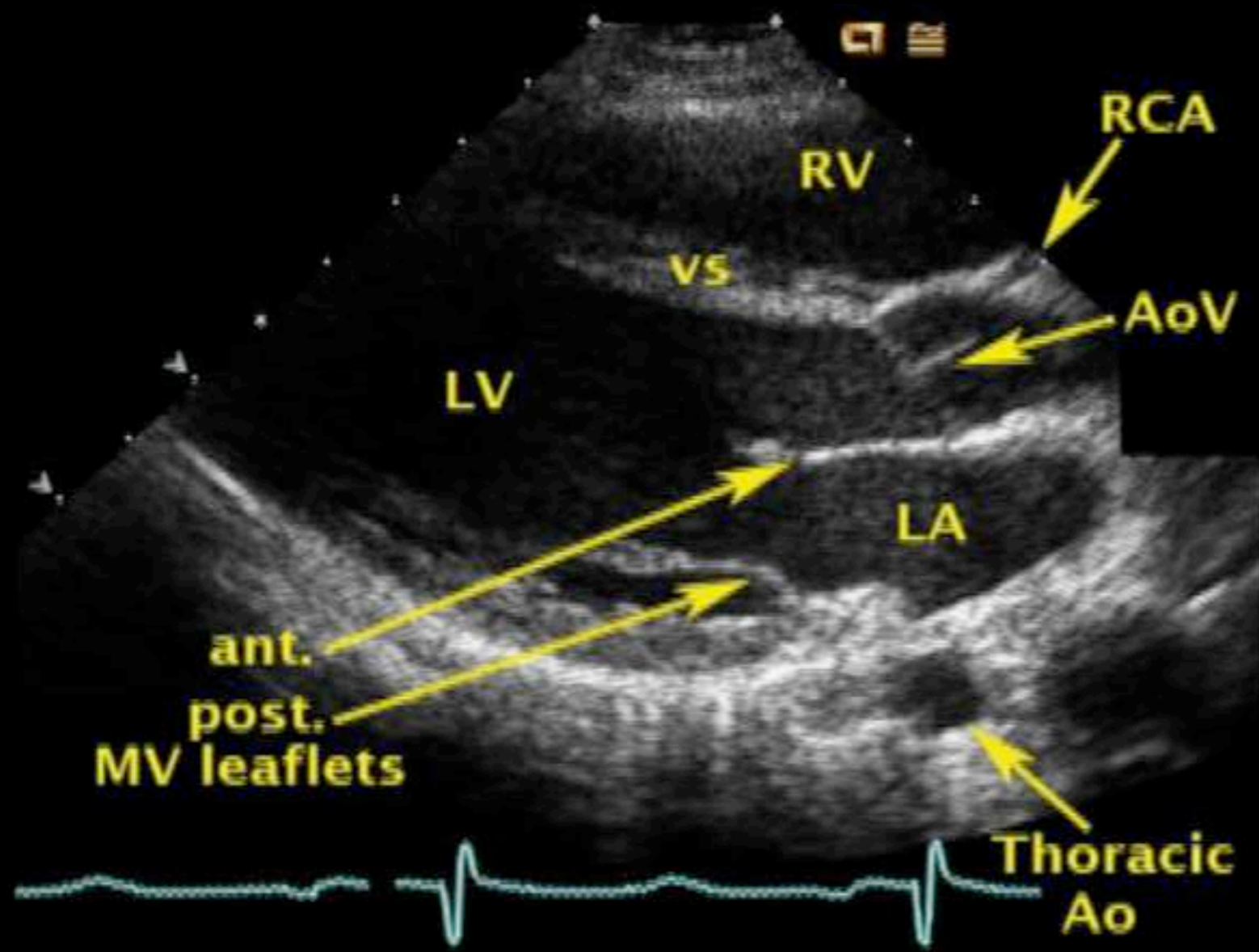




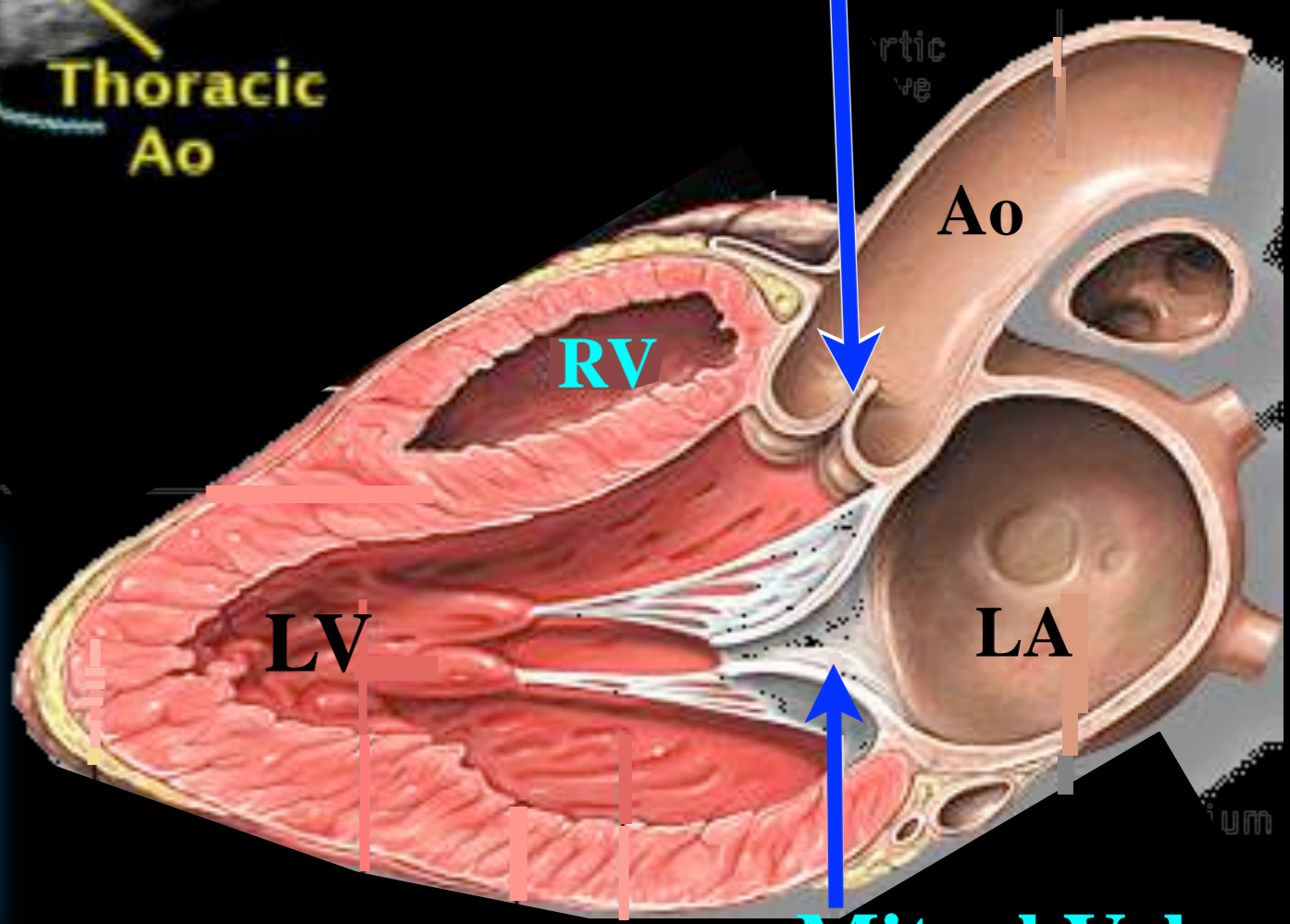
**Aortic Valve**



**Mitral Valve**



**Aortic Valve**



**Mitral Valve**

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# TTE Windows

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- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

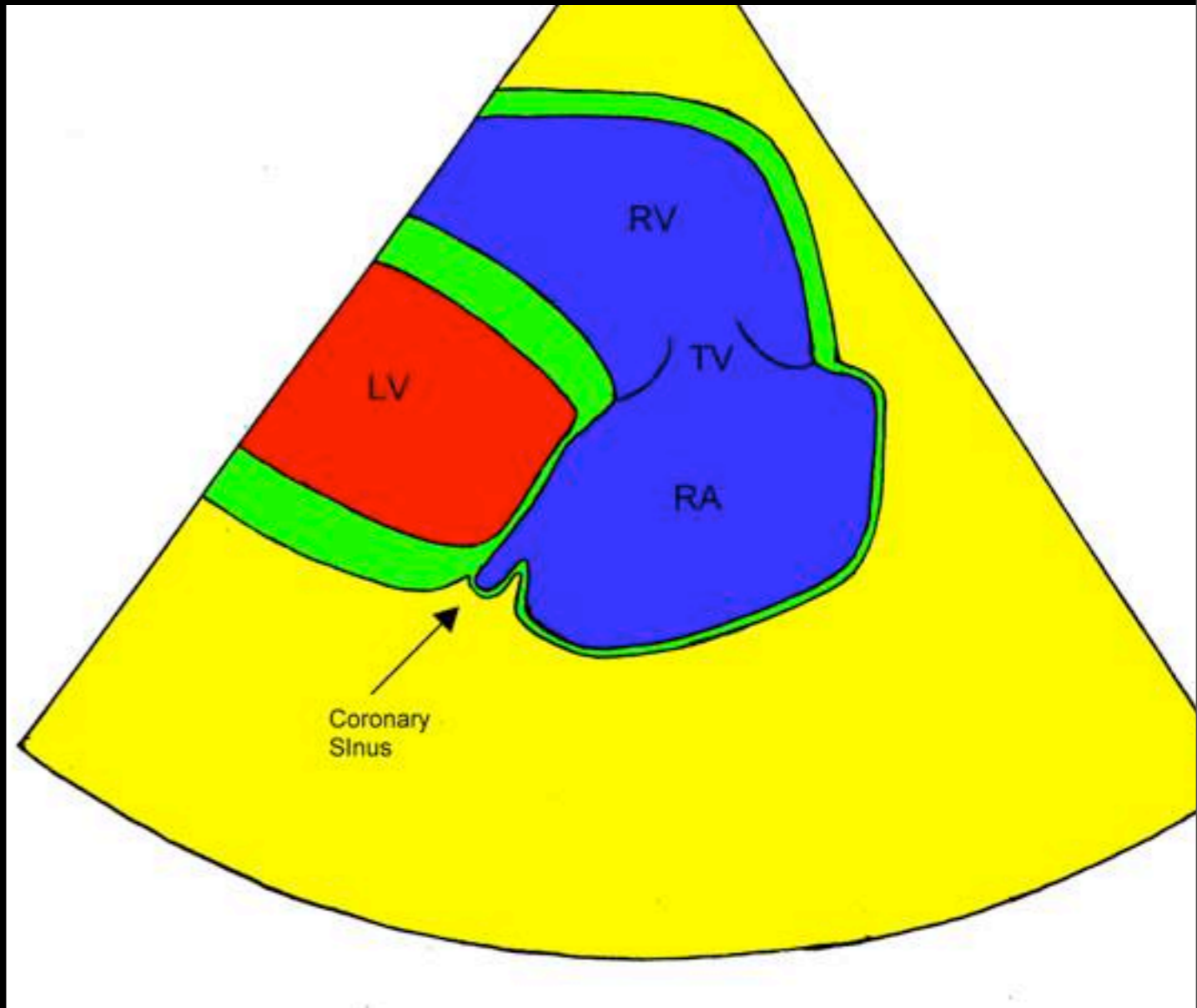
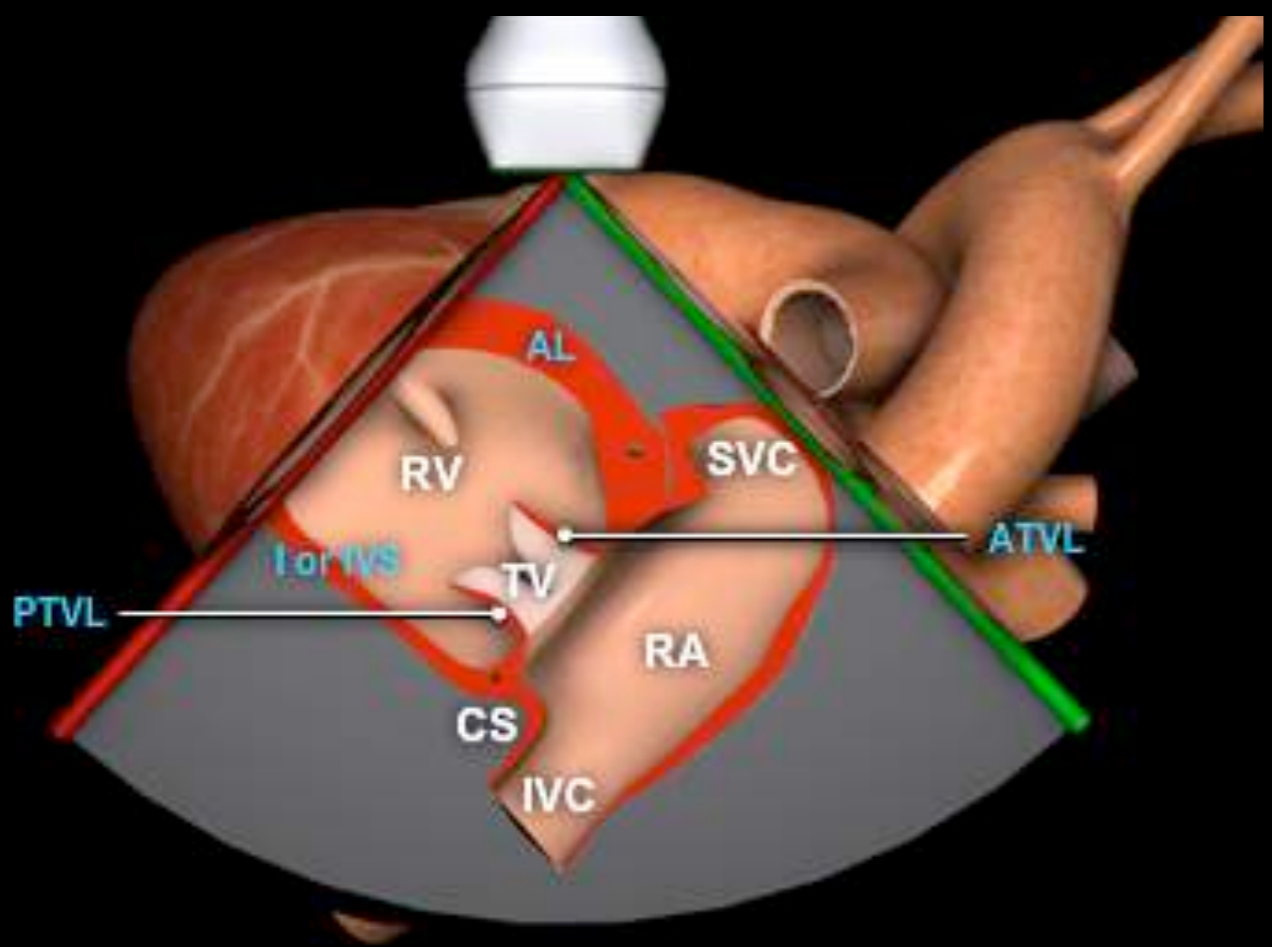
## ➤ Suprasternal

# TTE Windows

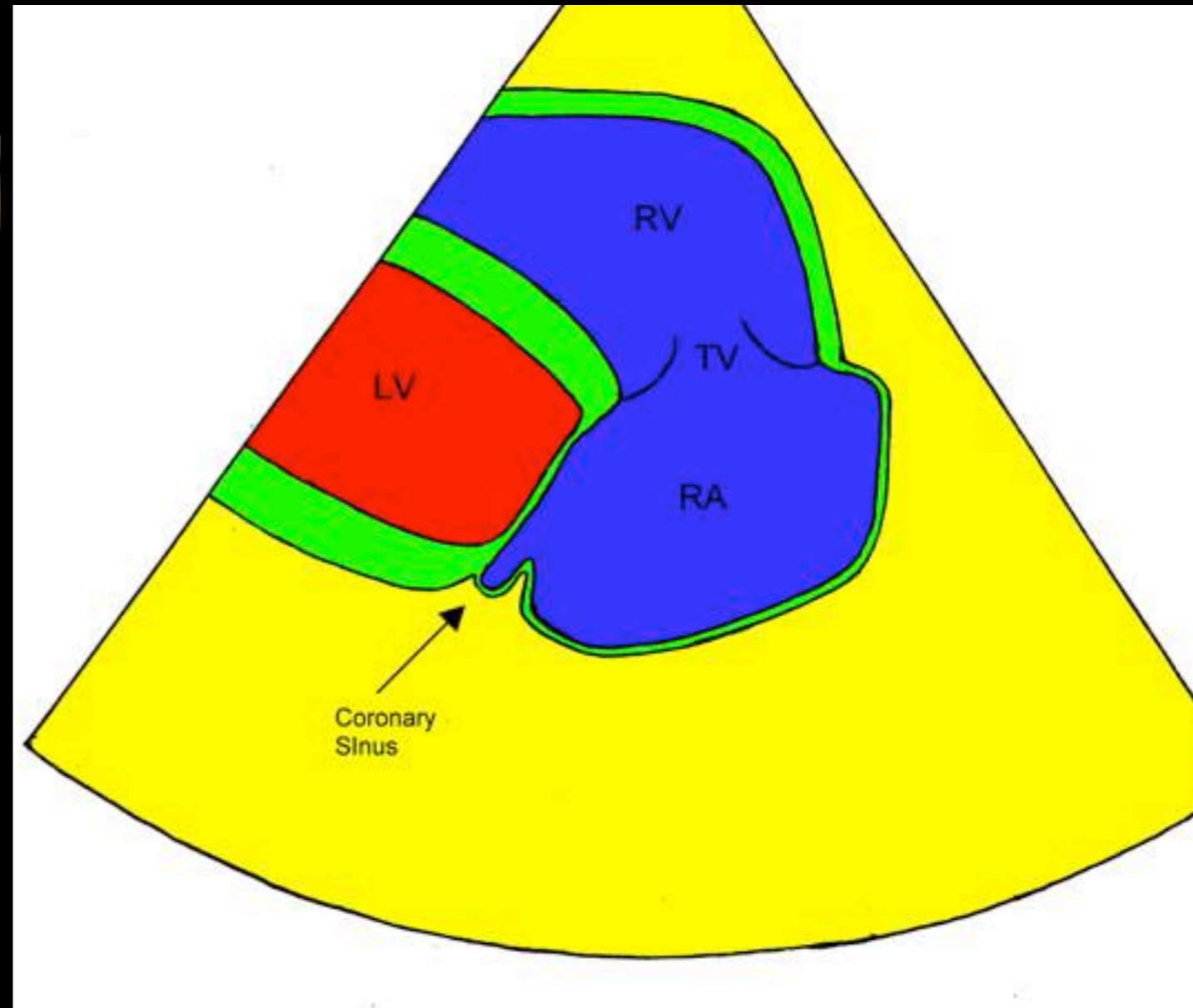
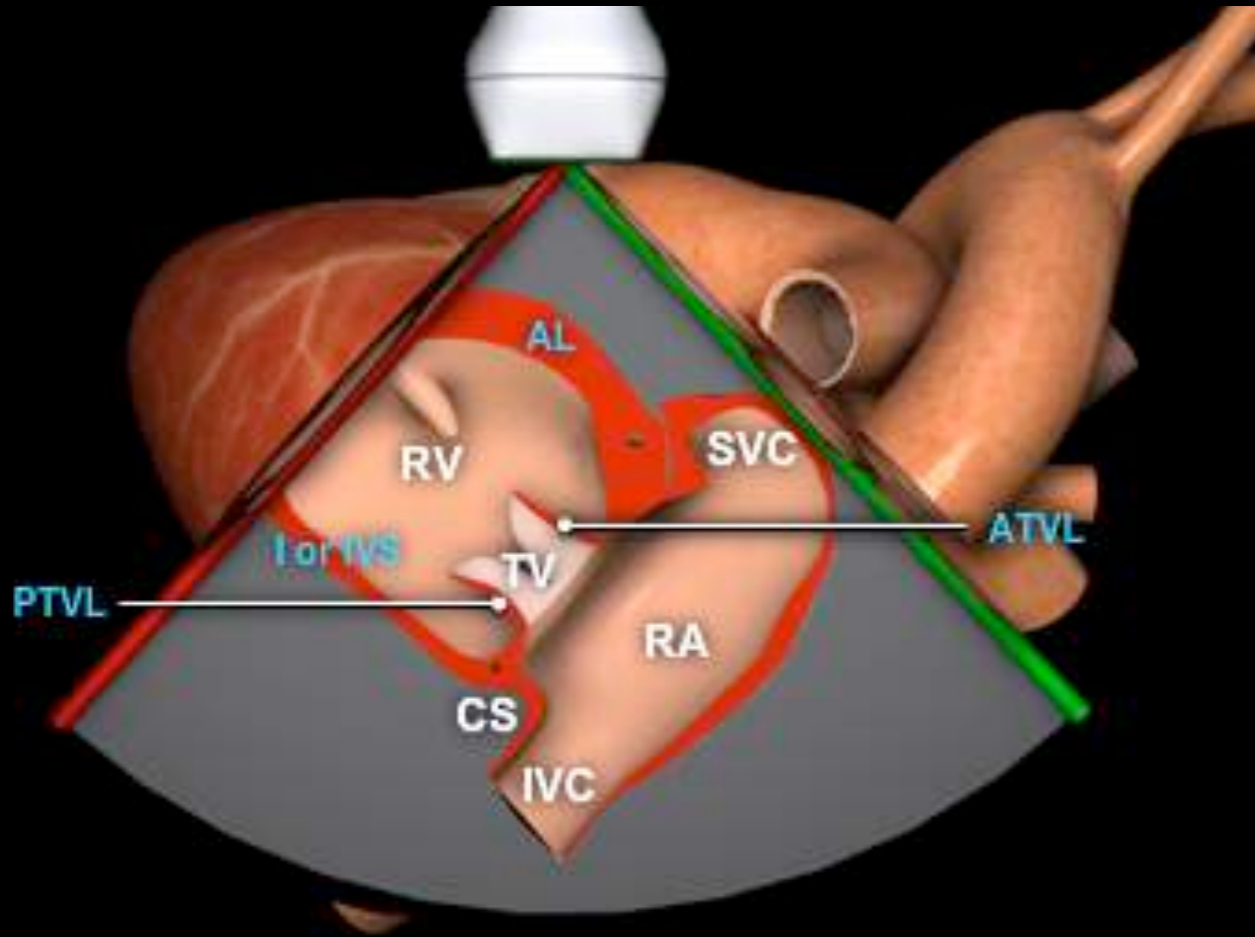
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# PLAX: RV Inflow View



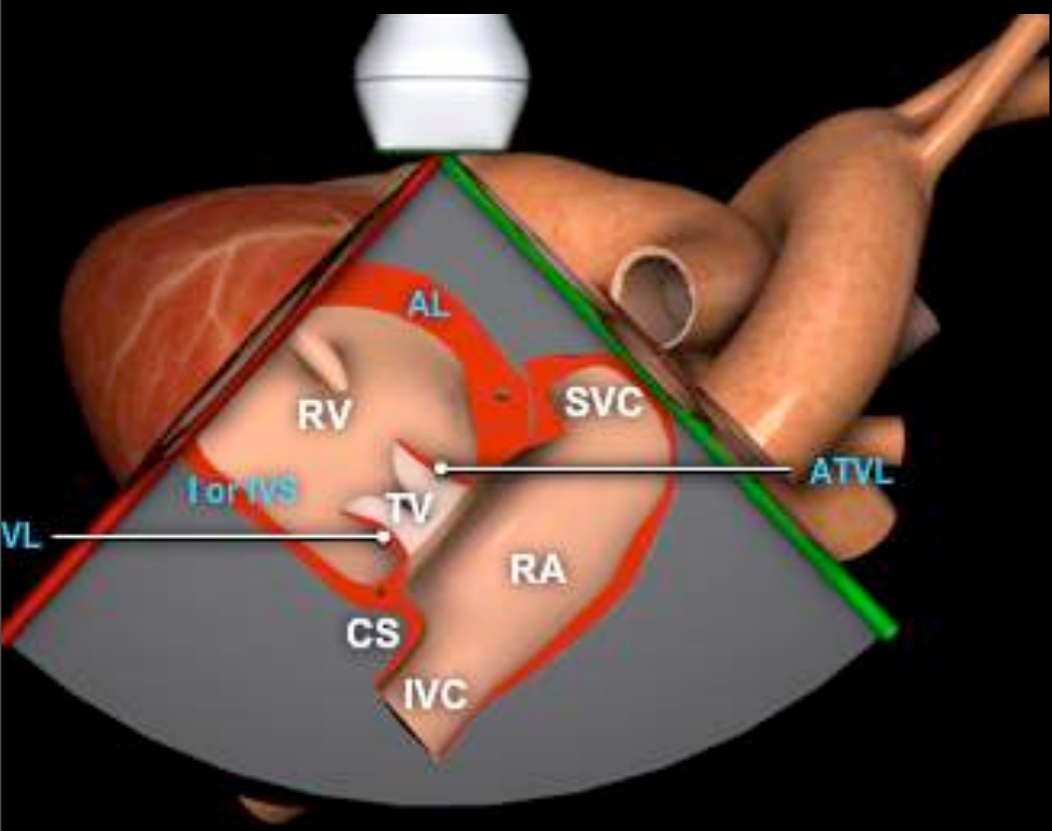
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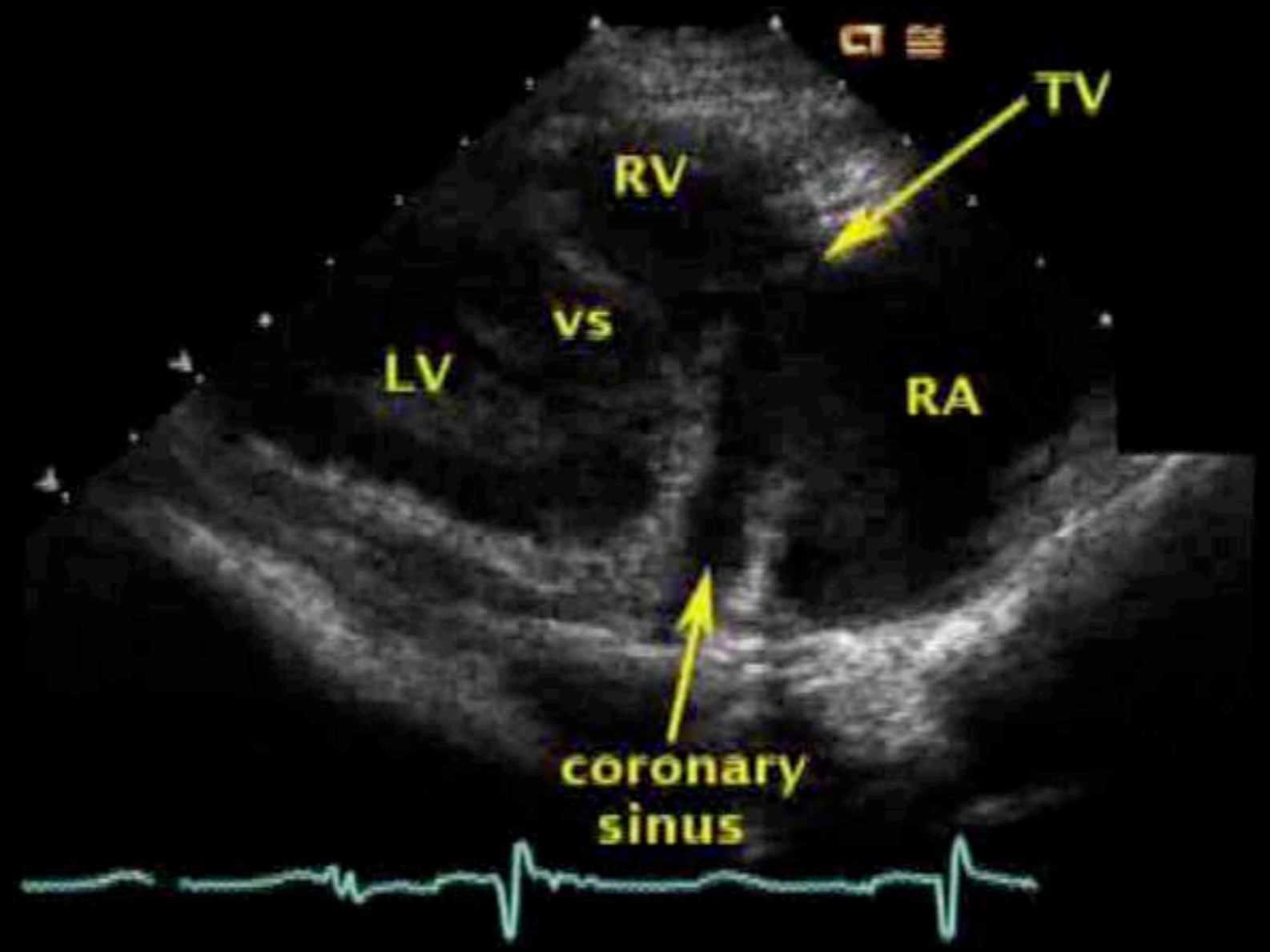
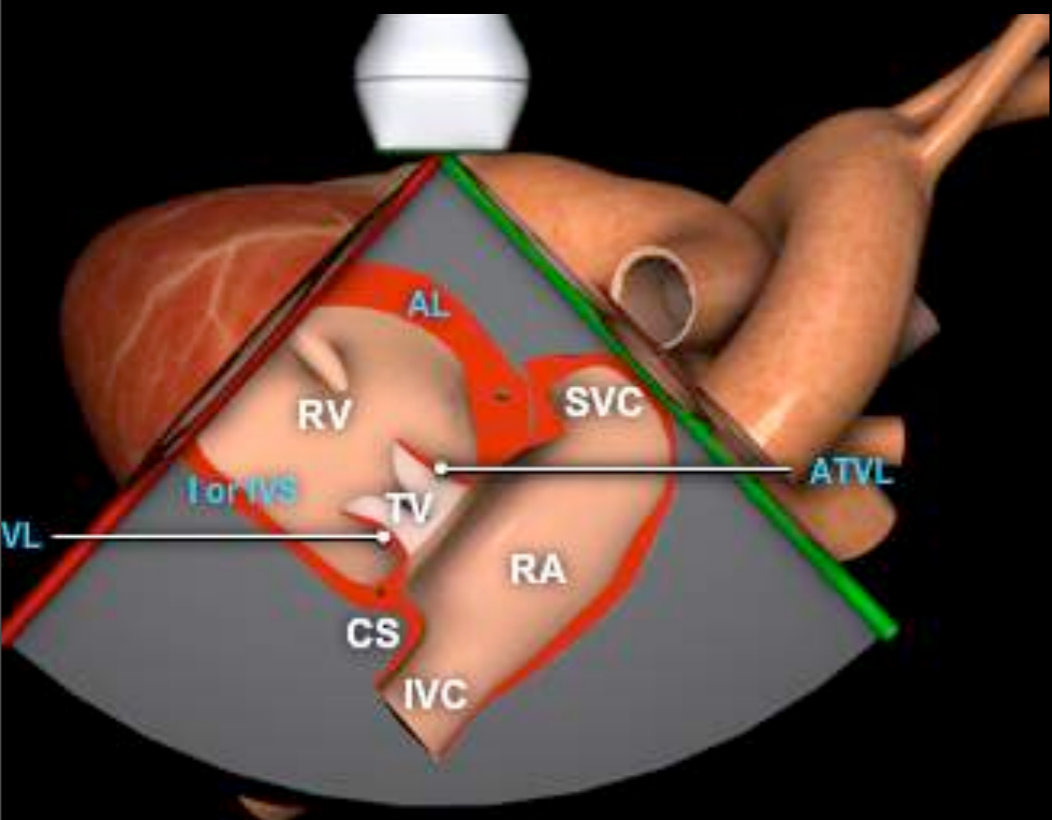
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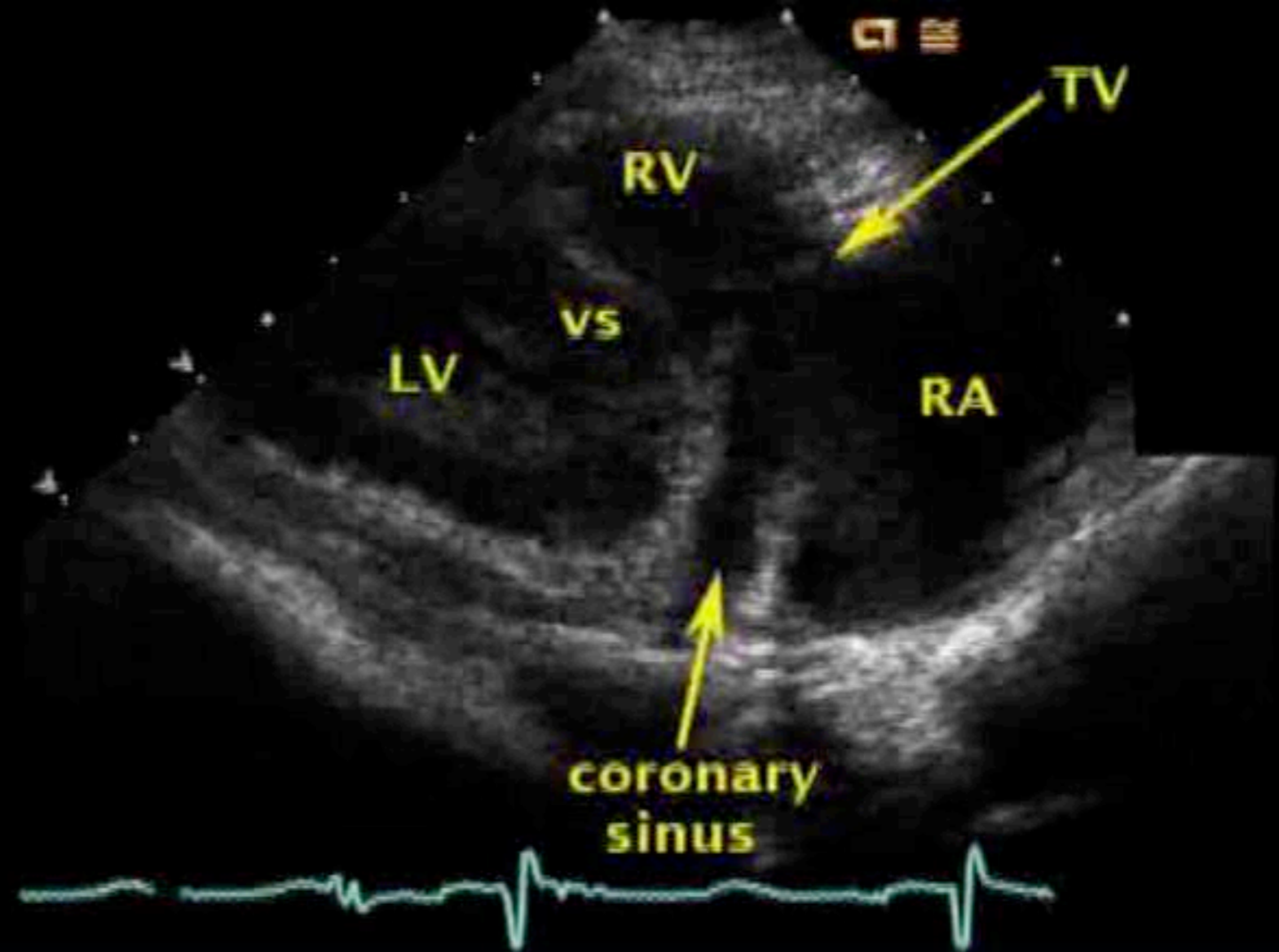
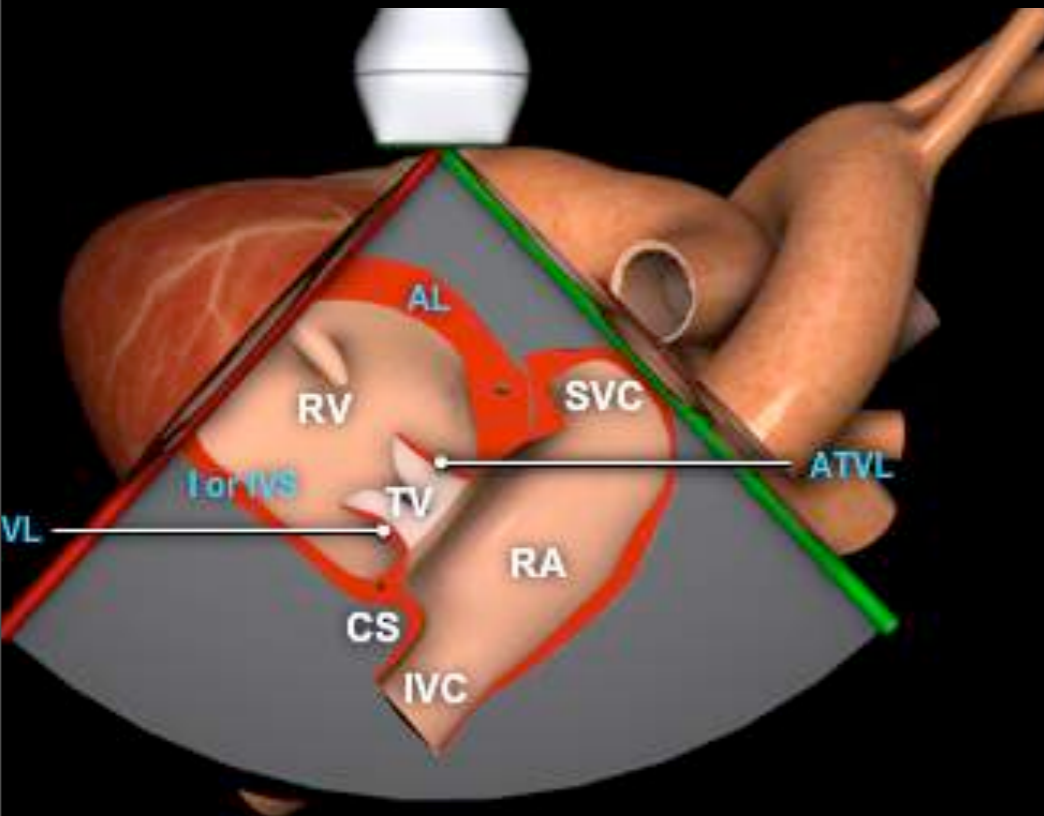
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## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
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- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
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## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# TTE Windows

## ➤ Parasternal Long Axis

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## ➤ Parasternal Short Axis

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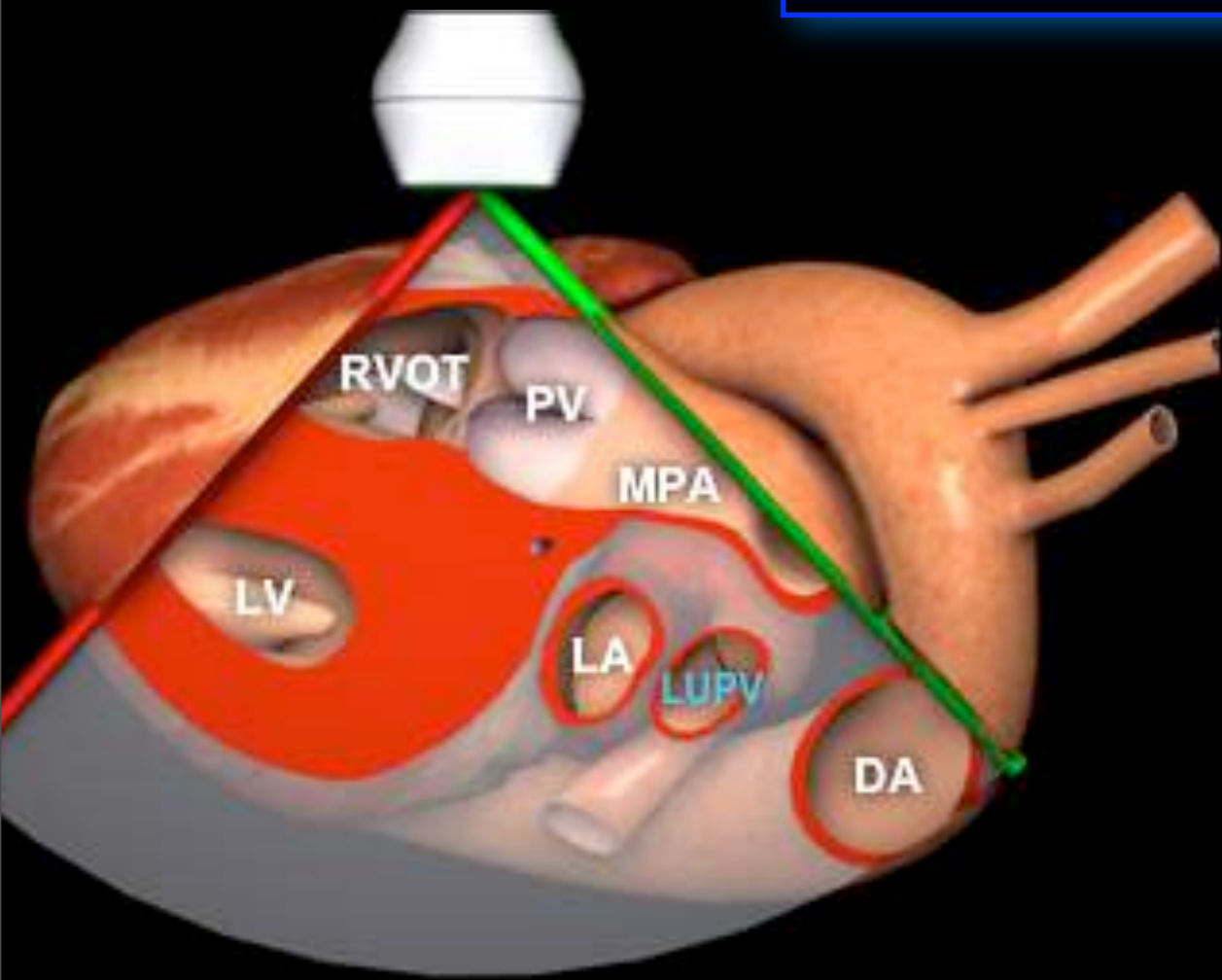
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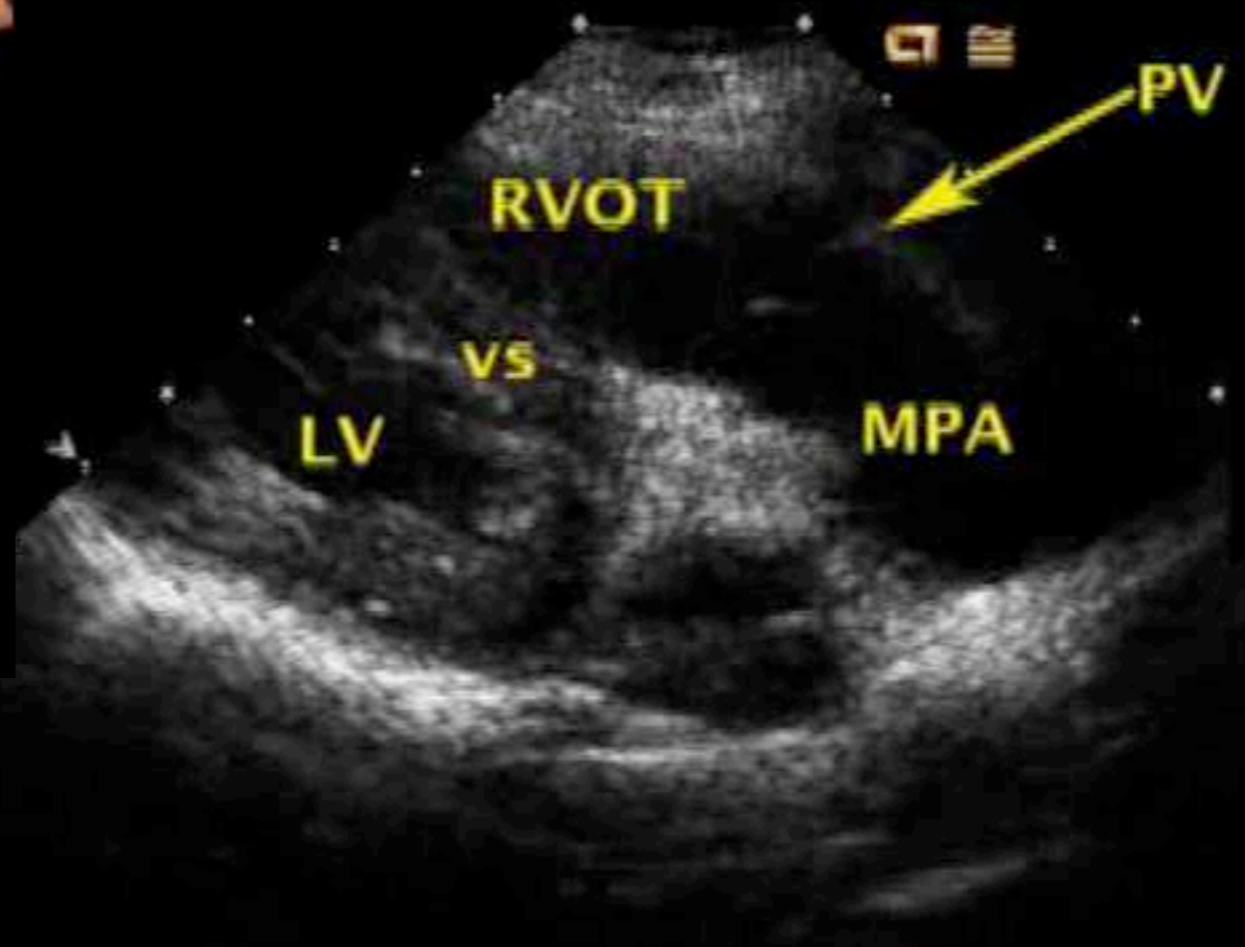
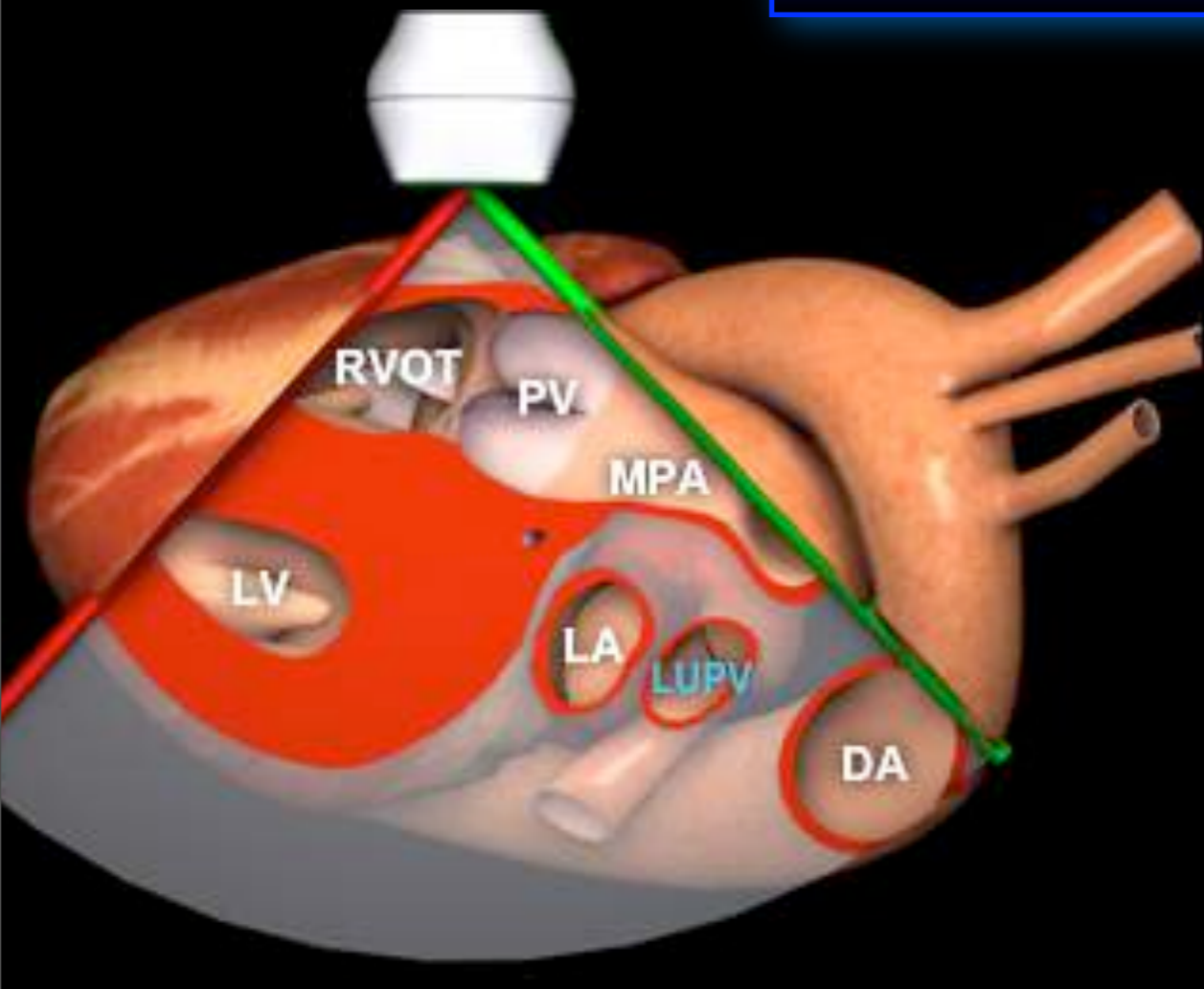
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# *PLAX: RV Outflow*

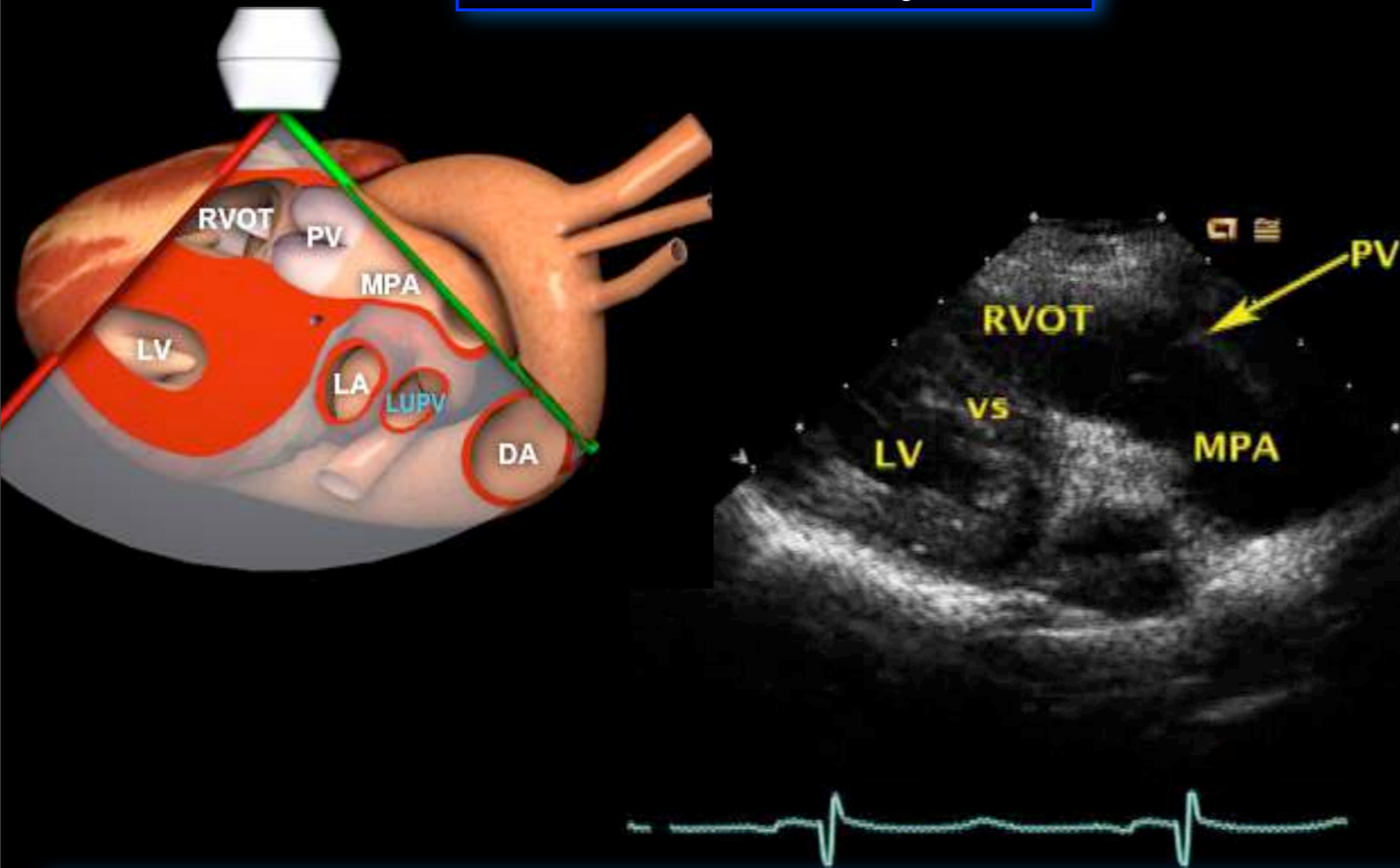




# *PLAX: RV Outflow*



# *PLAX: RV Outflow*



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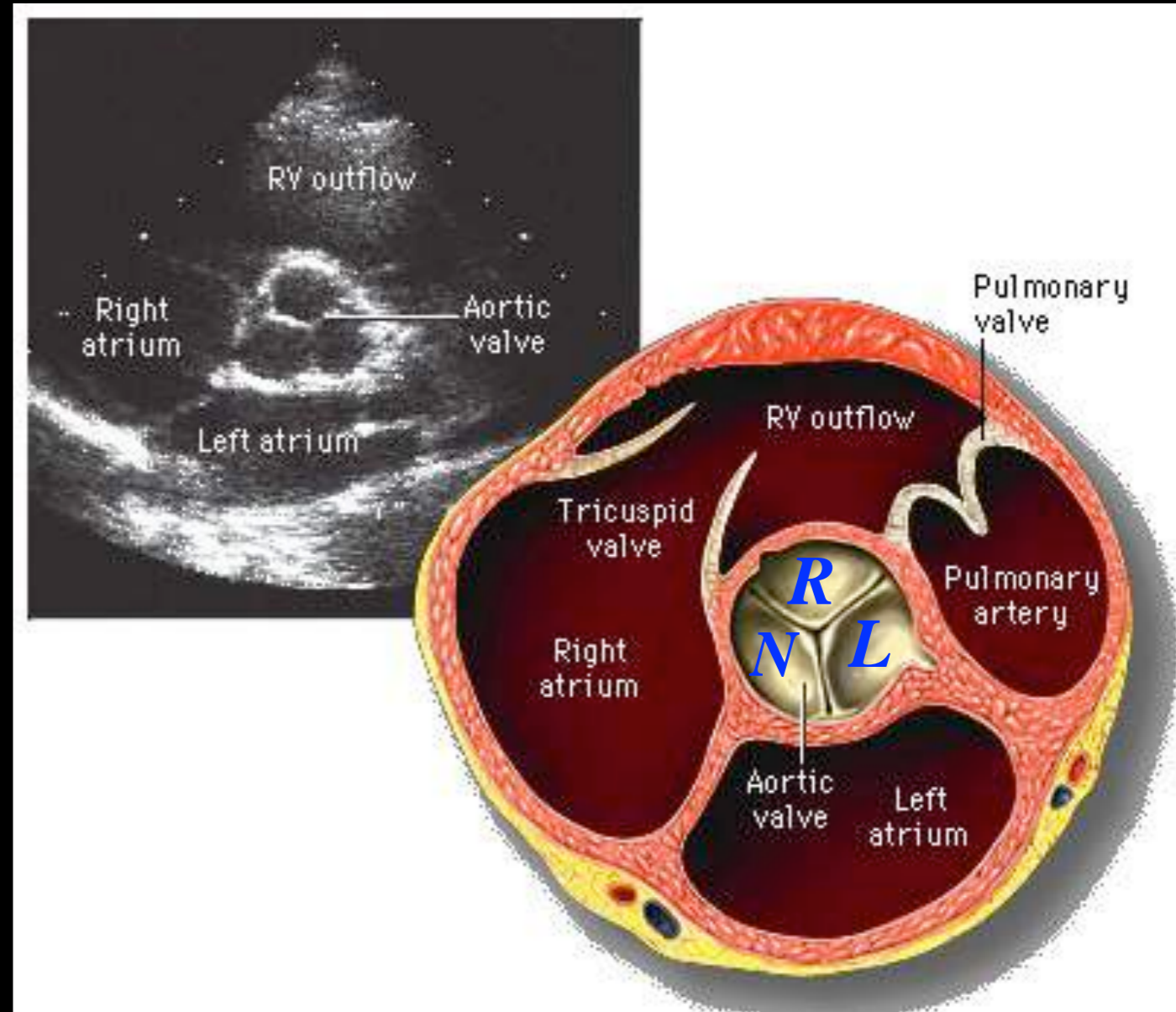
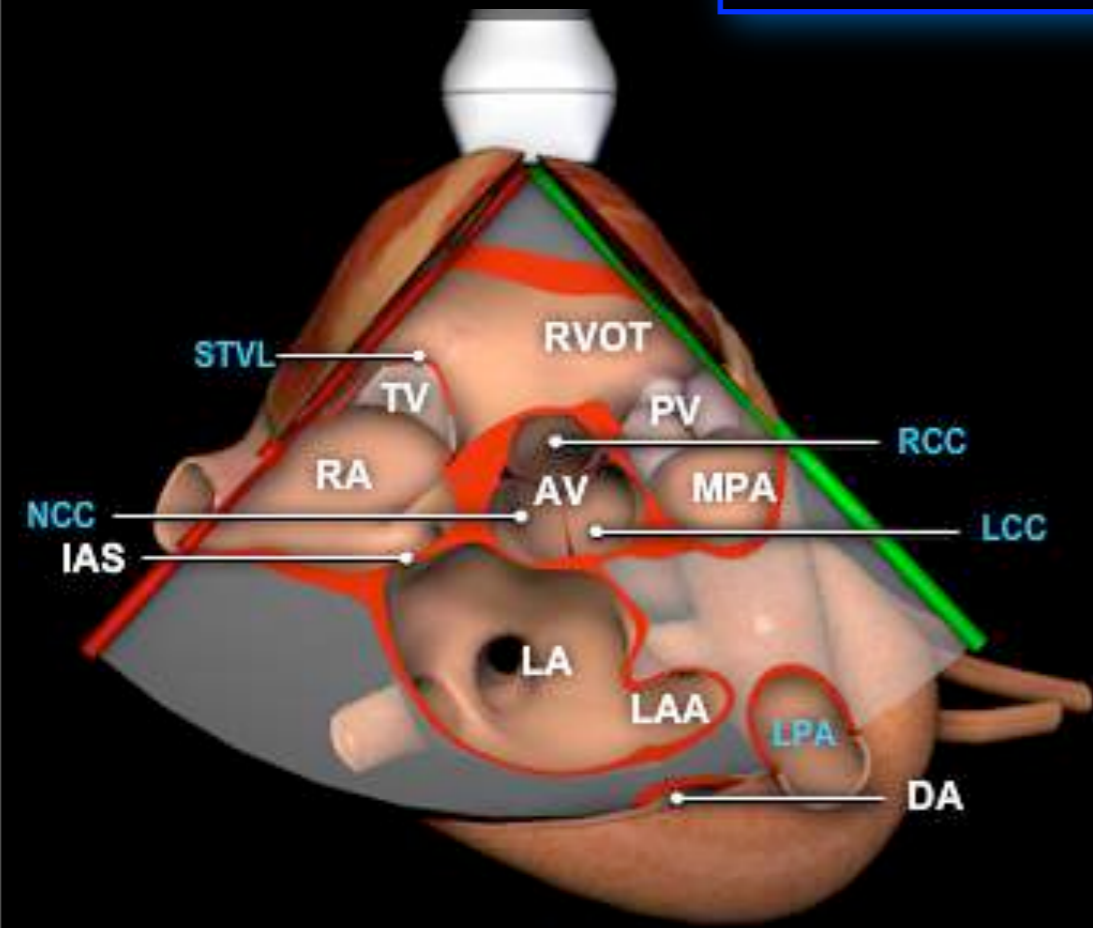
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- *IVC Long Axis View*

## ➤ Suprasternal

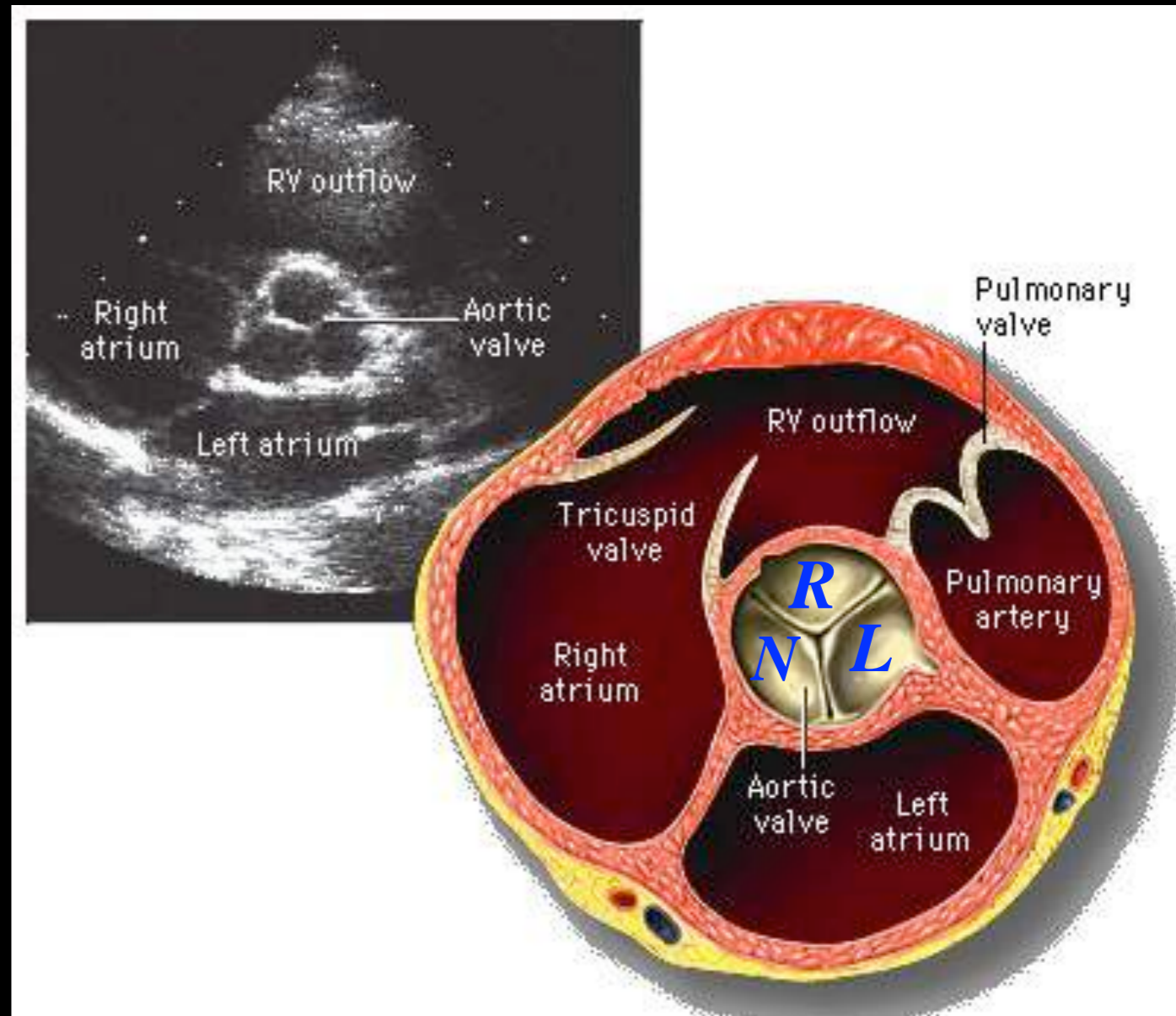
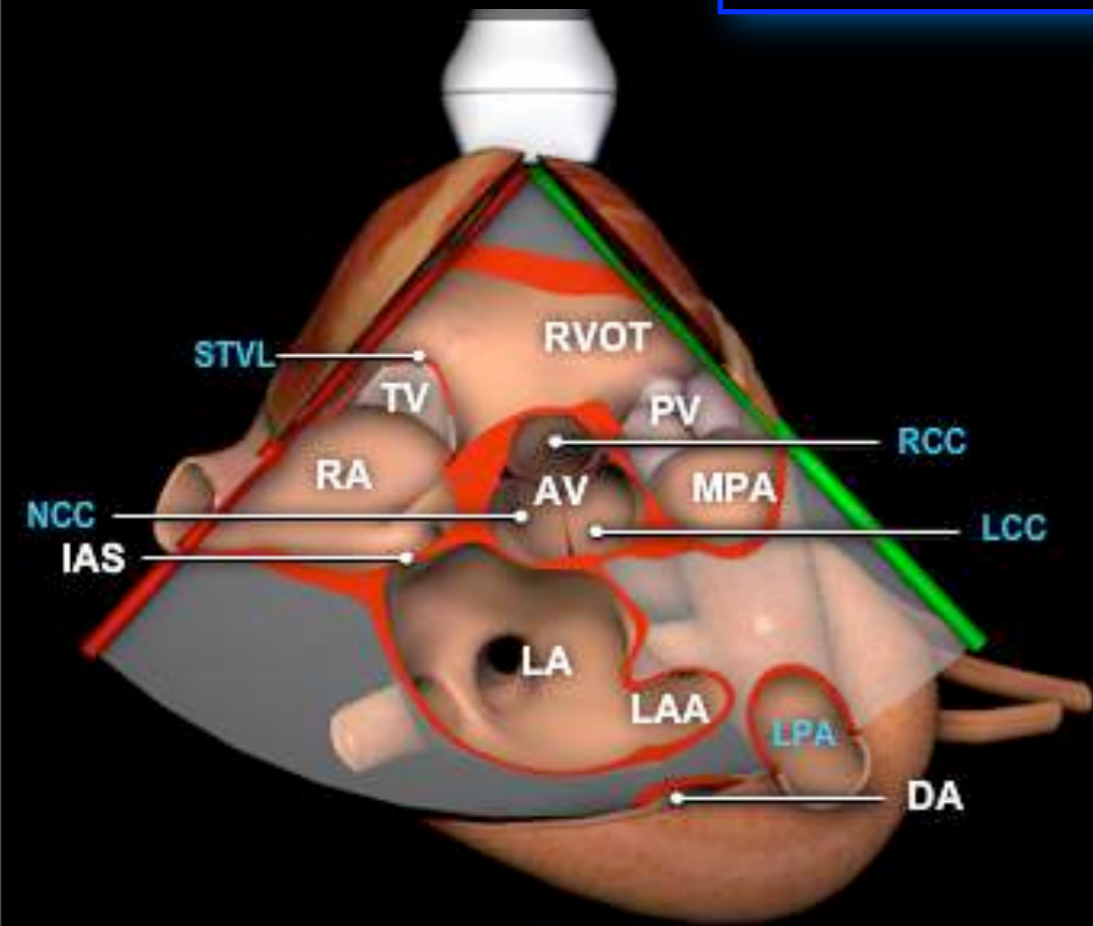
# TTE Windows

- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*
  - *Aortic Valve Short Axis View*
  - *Mitral Valve Short Axis View*
  - *Mid-Papillary Short Axis View*
- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*
  - *Two Chamber View*
  - *Apical Long Axis View*
- *Subcostal*
  - *Four Chamber View*
  - *Short Axis View*
  - *IVC Long Axis View*
- *Suprasternal*

# *PSAX: Aortic Valve Short Axis View*



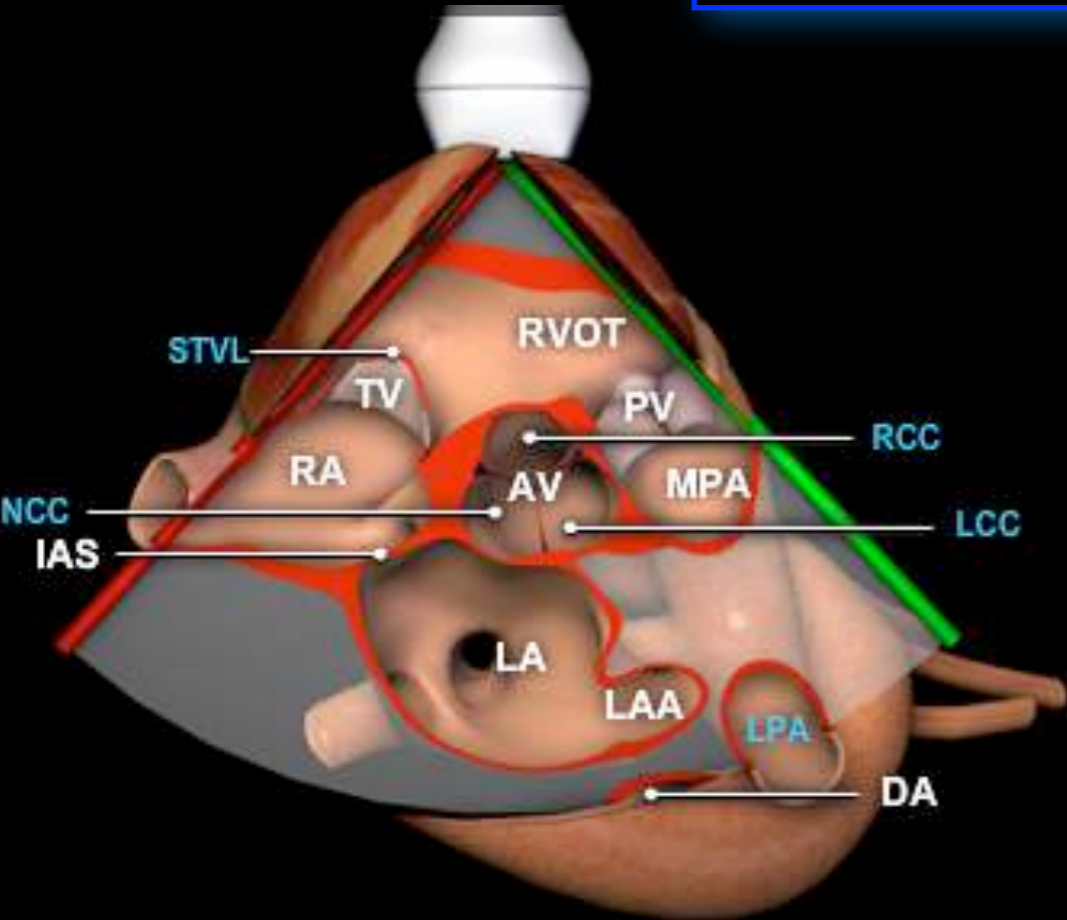
# *PSAX: Aortic Valve Short Axis View*



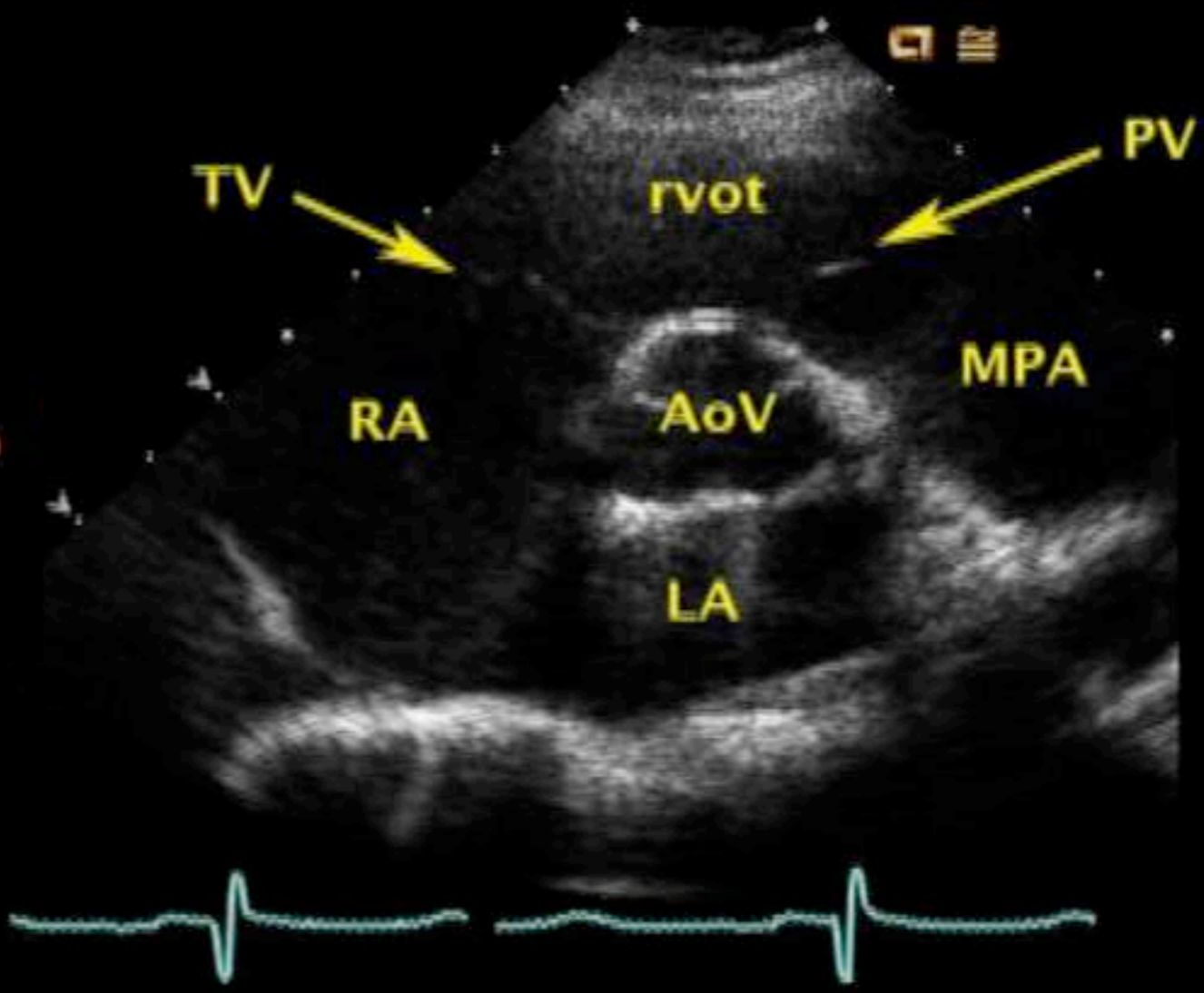
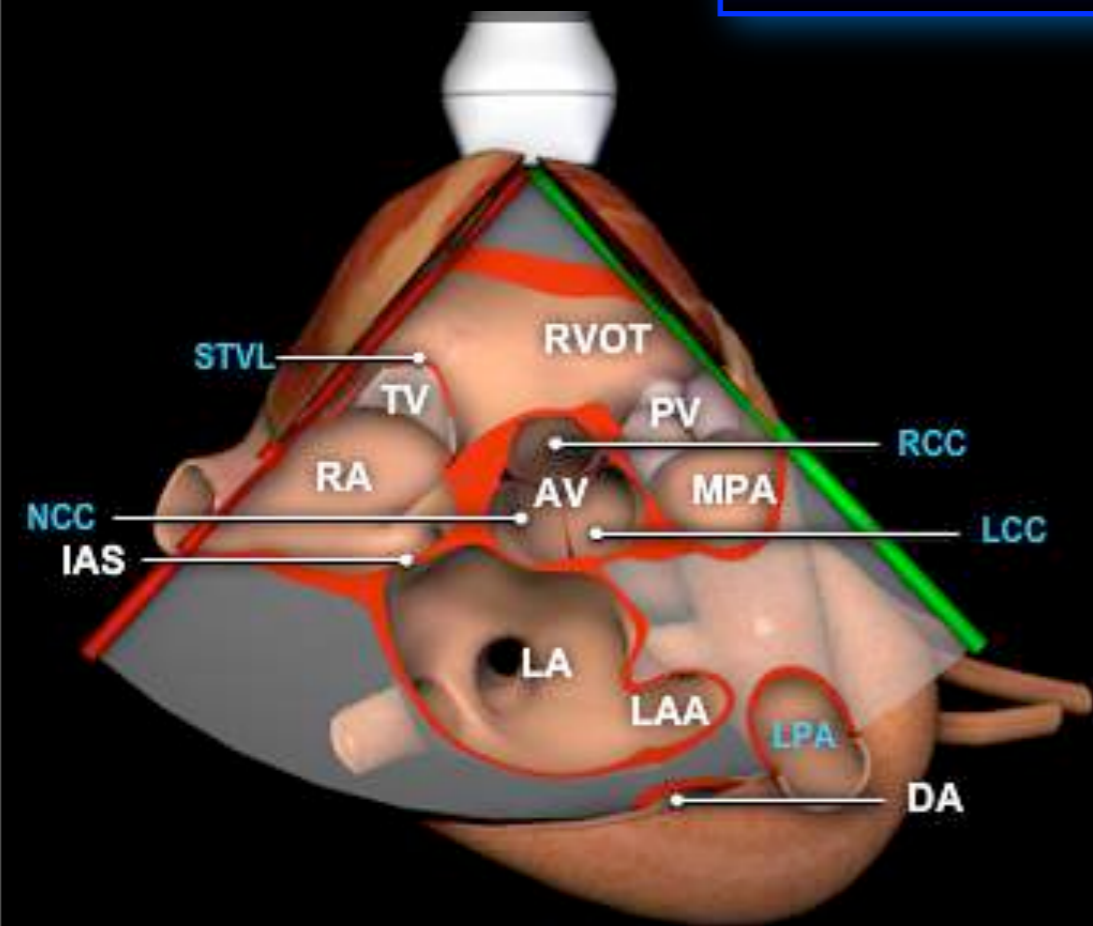
1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# *PSAX: Aortic Valve Short Axis View*

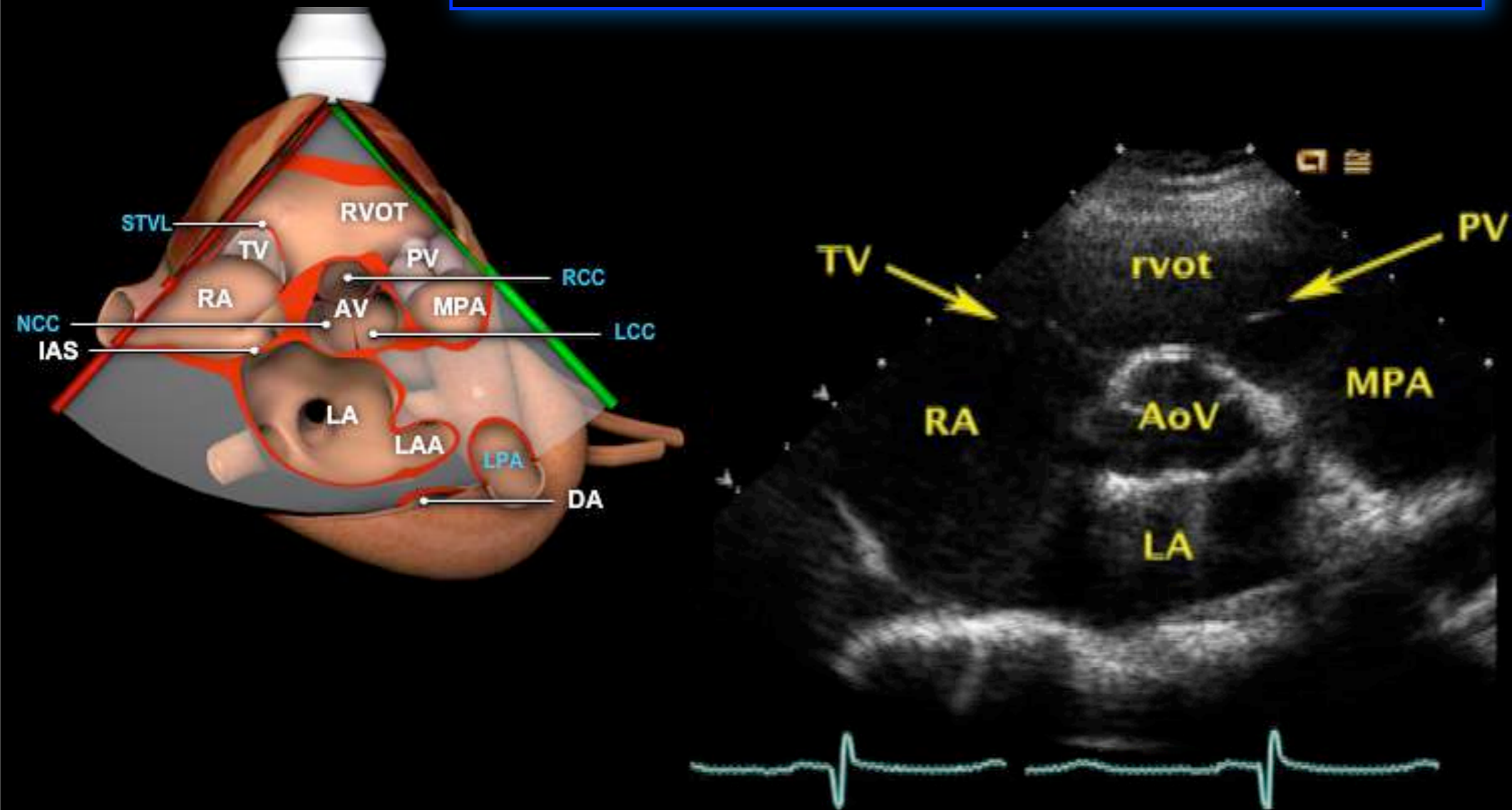


# *PSAX: Aortic Valve Short Axis View*





# *PSAX: Aortic Valve Short Axis View*



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

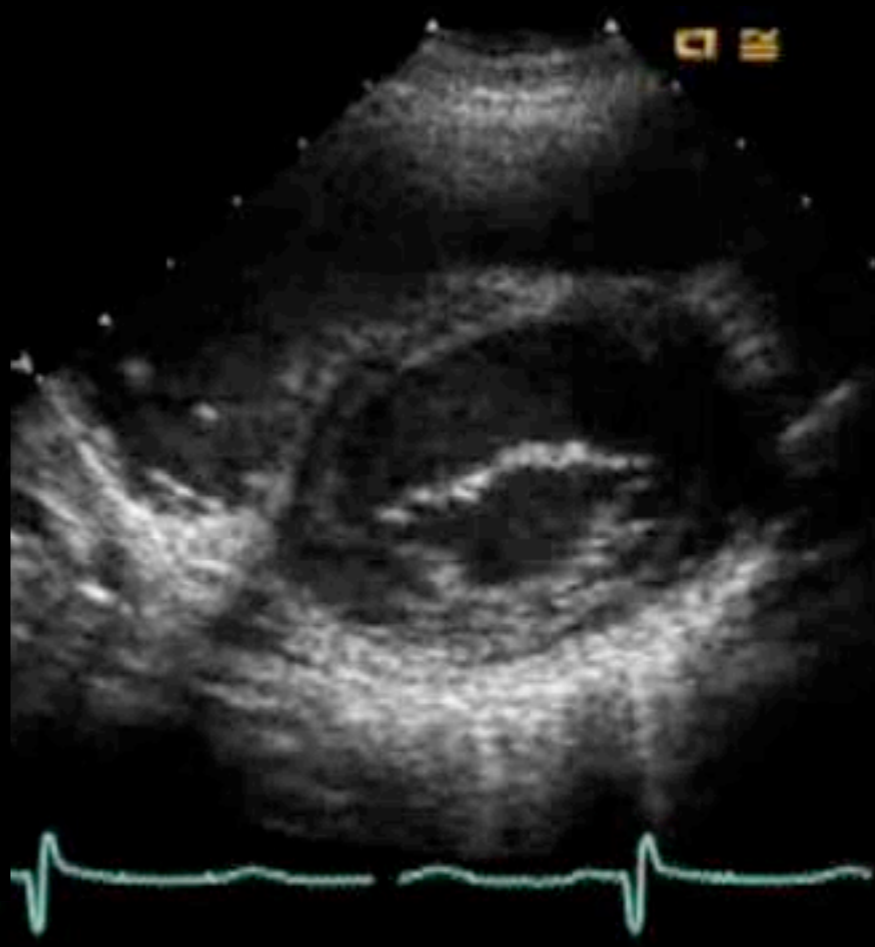
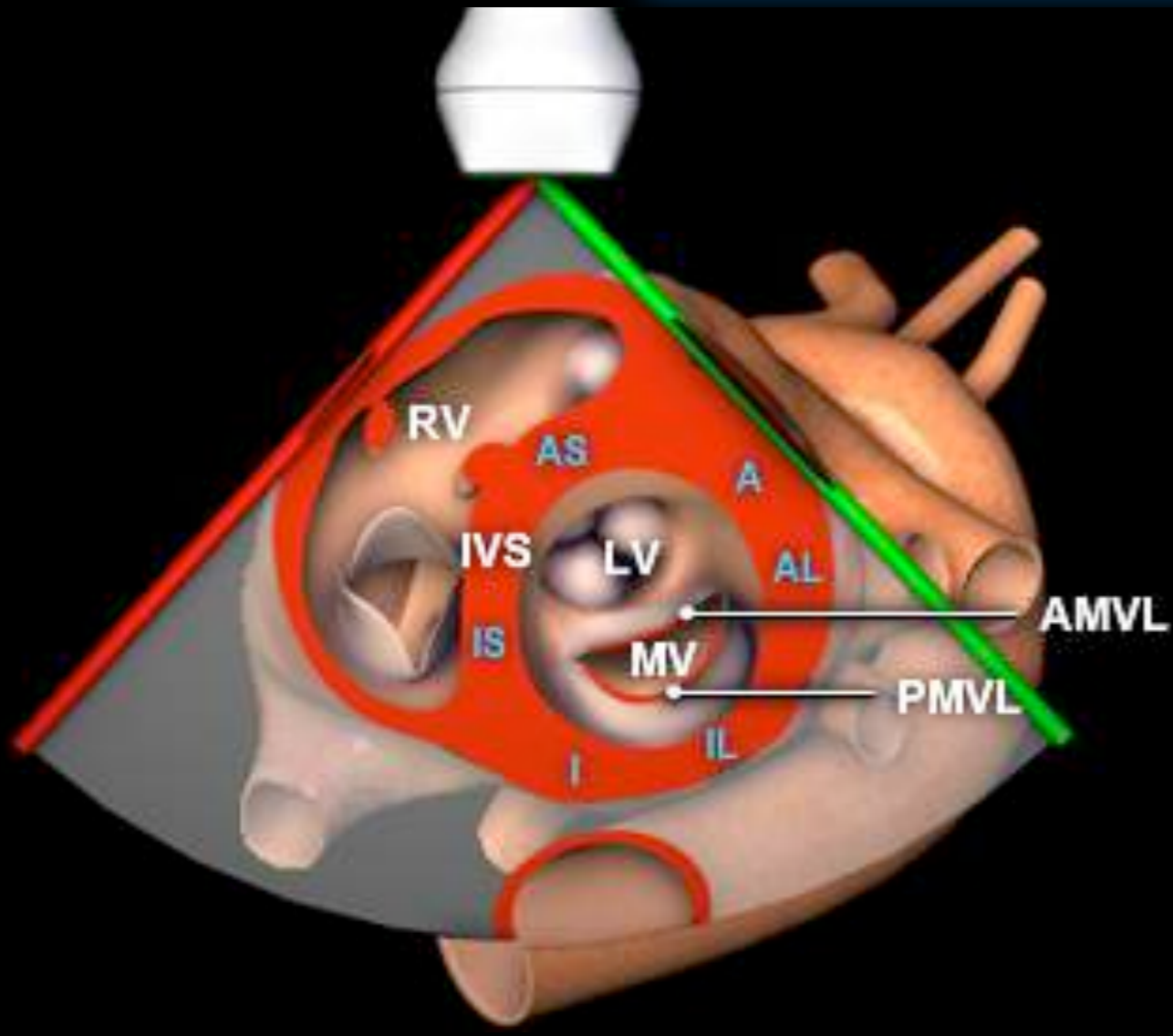
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

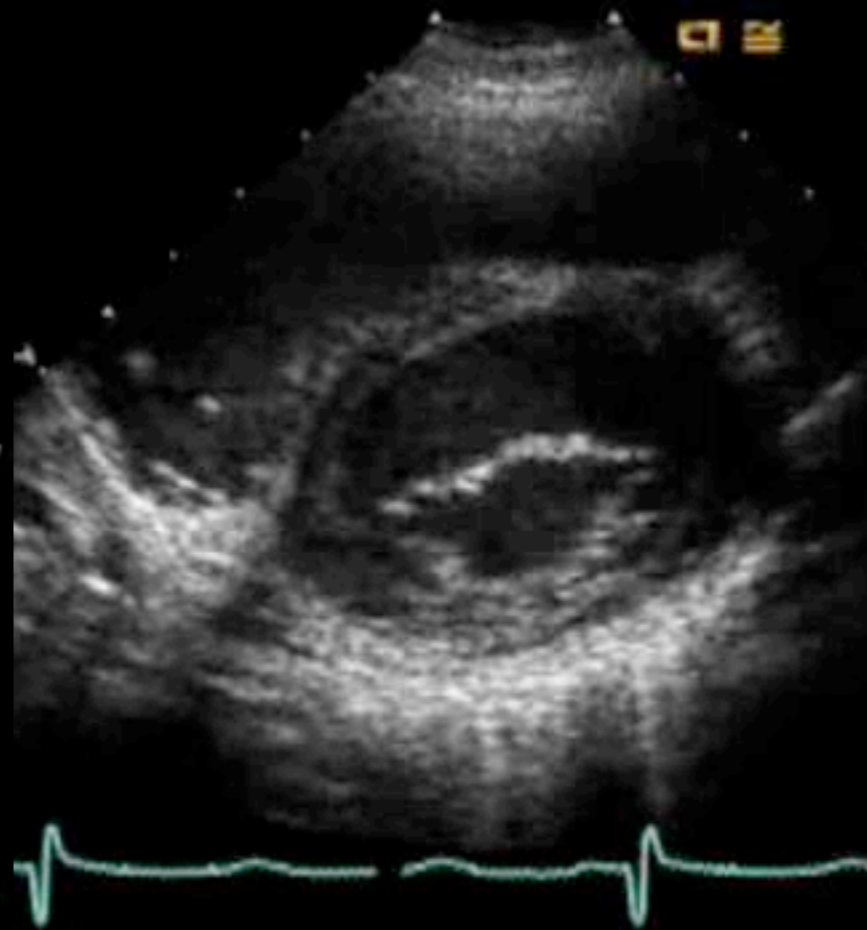
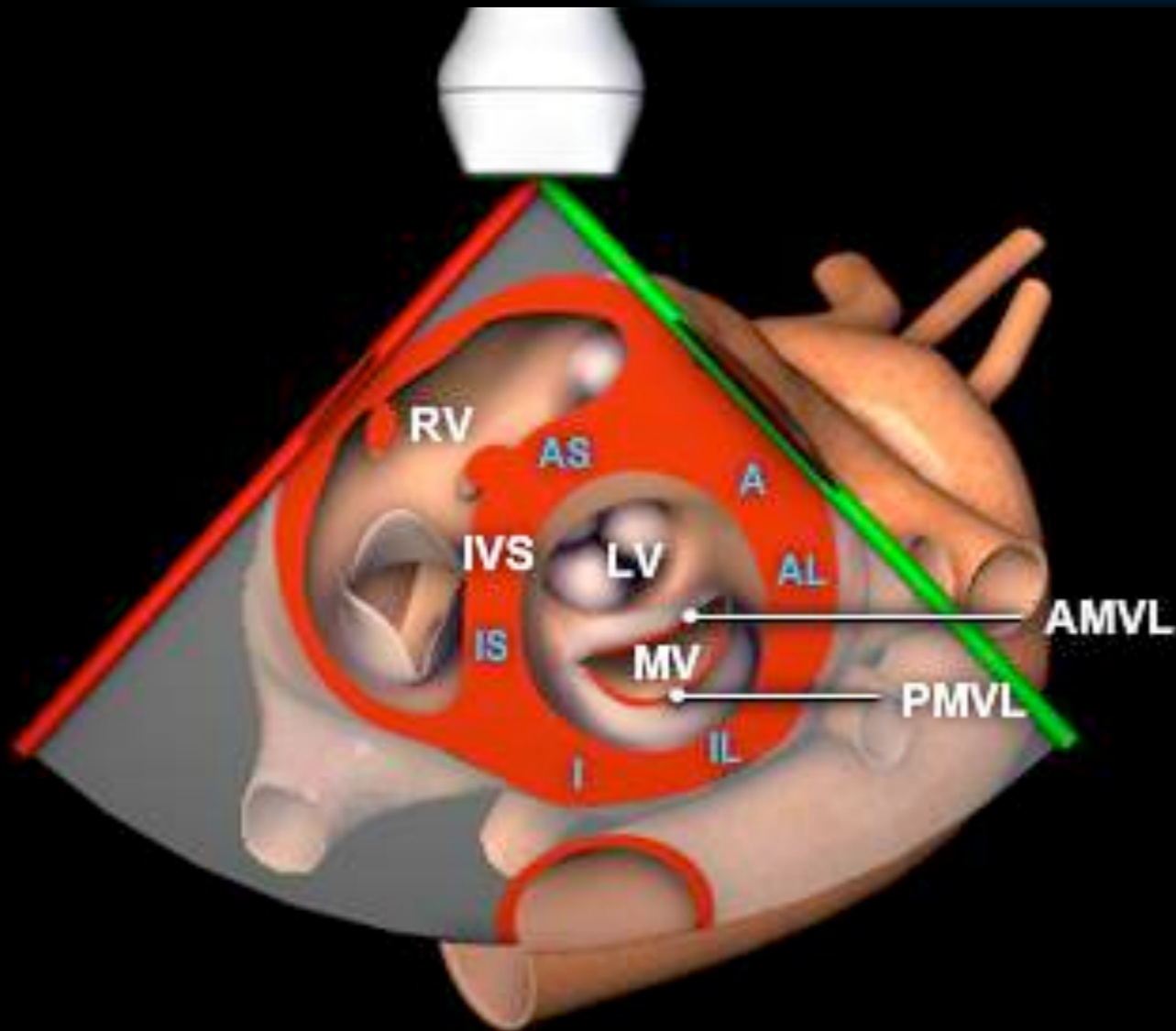
# TTE Windows

- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*
  - *Aortic Valve Short Axis View*
  - *Mitral Valve Short Axis View*
  - *Mid-Papillary Short Axis View*
- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*
  - *Two Chamber View*
  - *Apical Long Axis View*
- *Subcostal*
  - *Four Chamber View*
  - *Short Axis View*
  - *IVC Long Axis View*
- *Suprasternal*

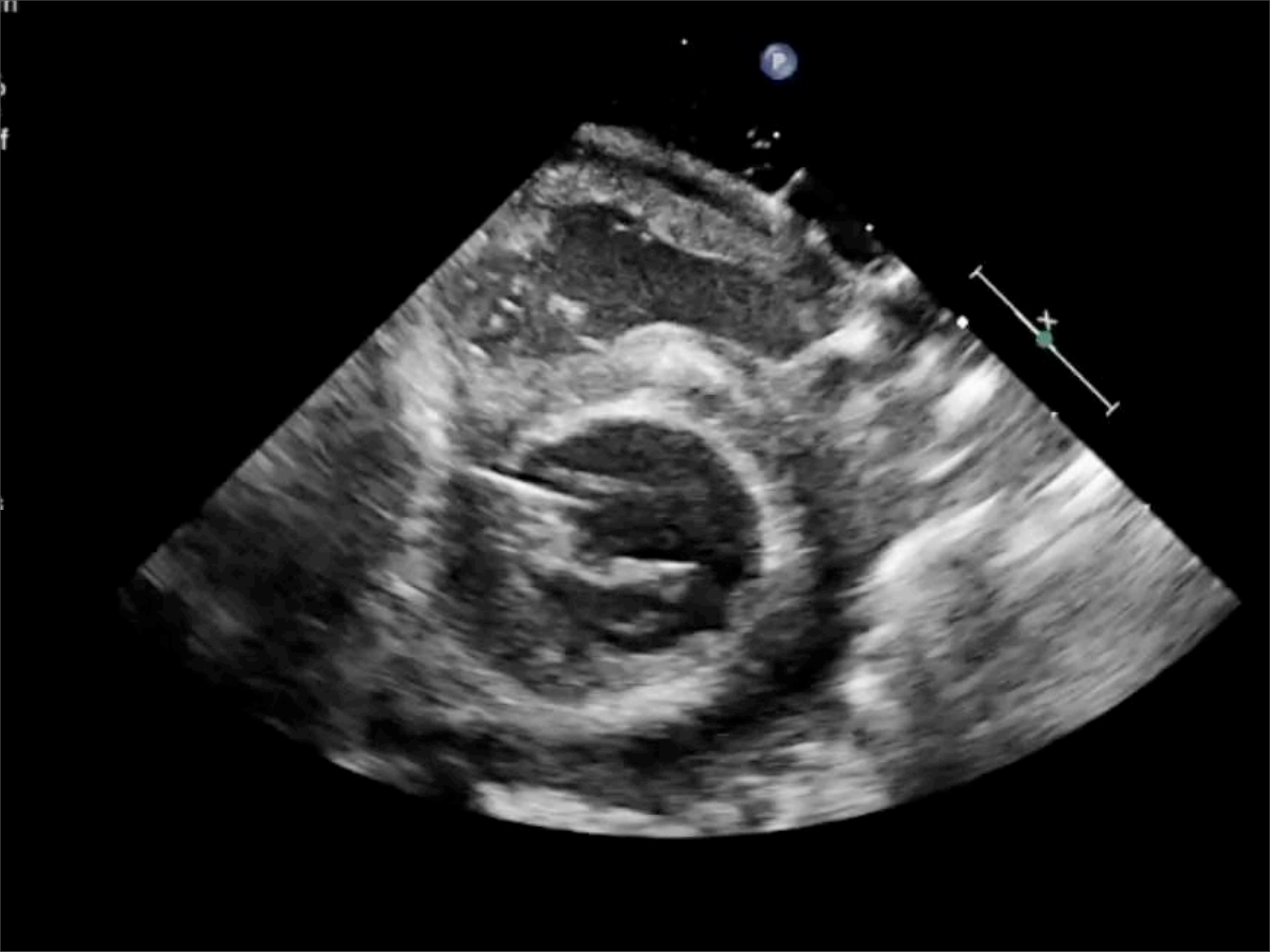
# *PSAX: Mitral Valve Short Axis View*



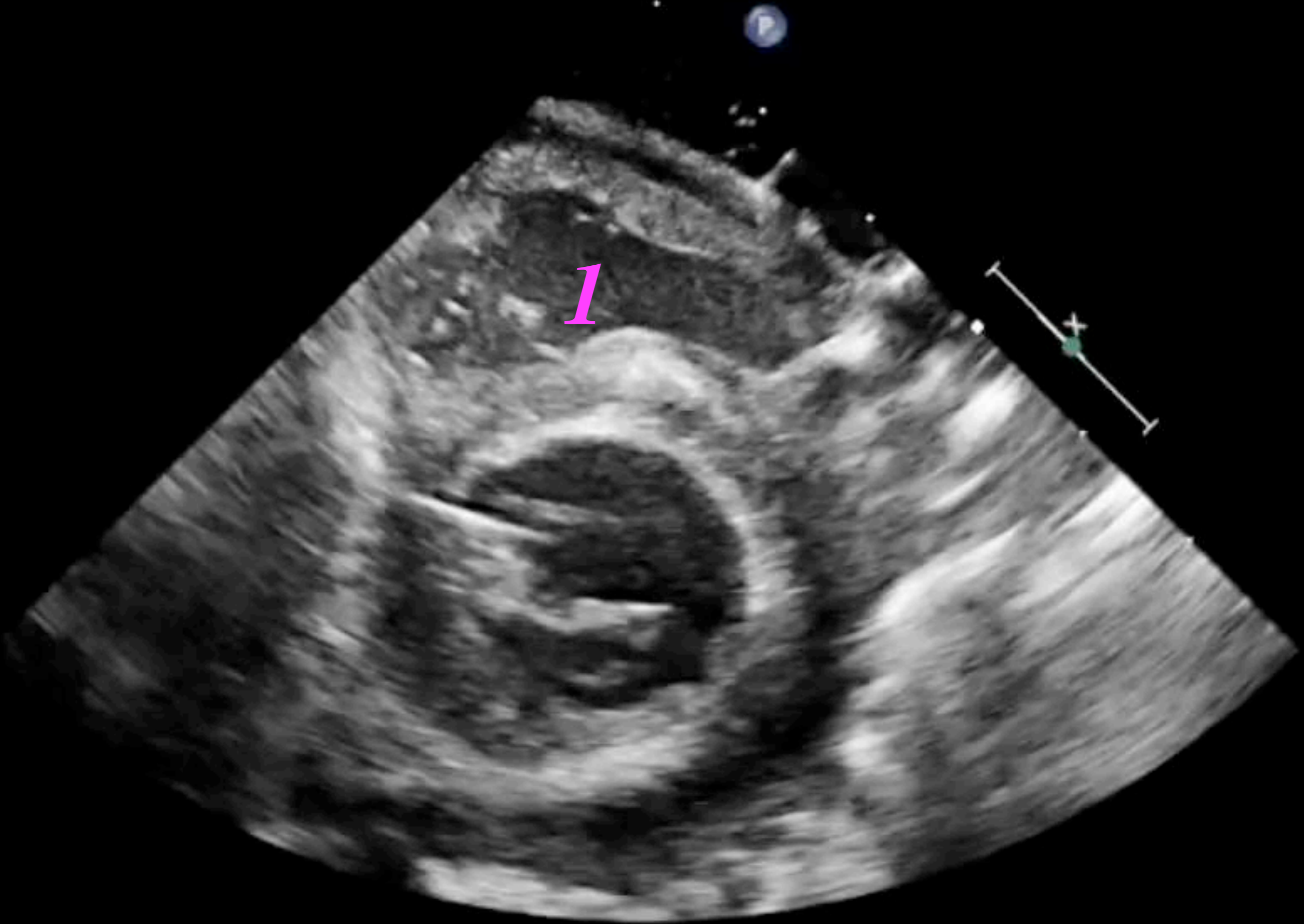
# *PSAX: Mitral Valve Short Axis View*



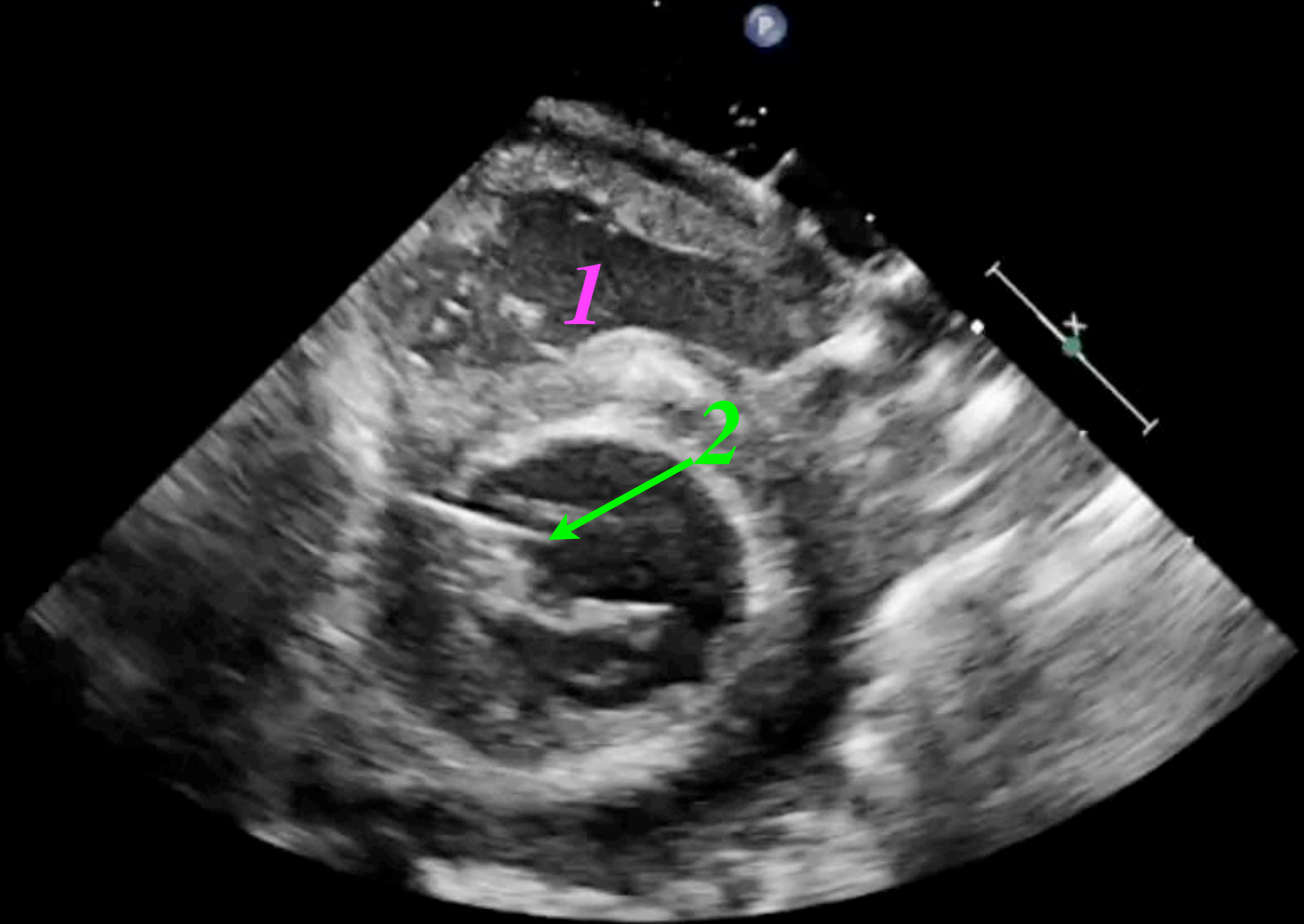
- 1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)*
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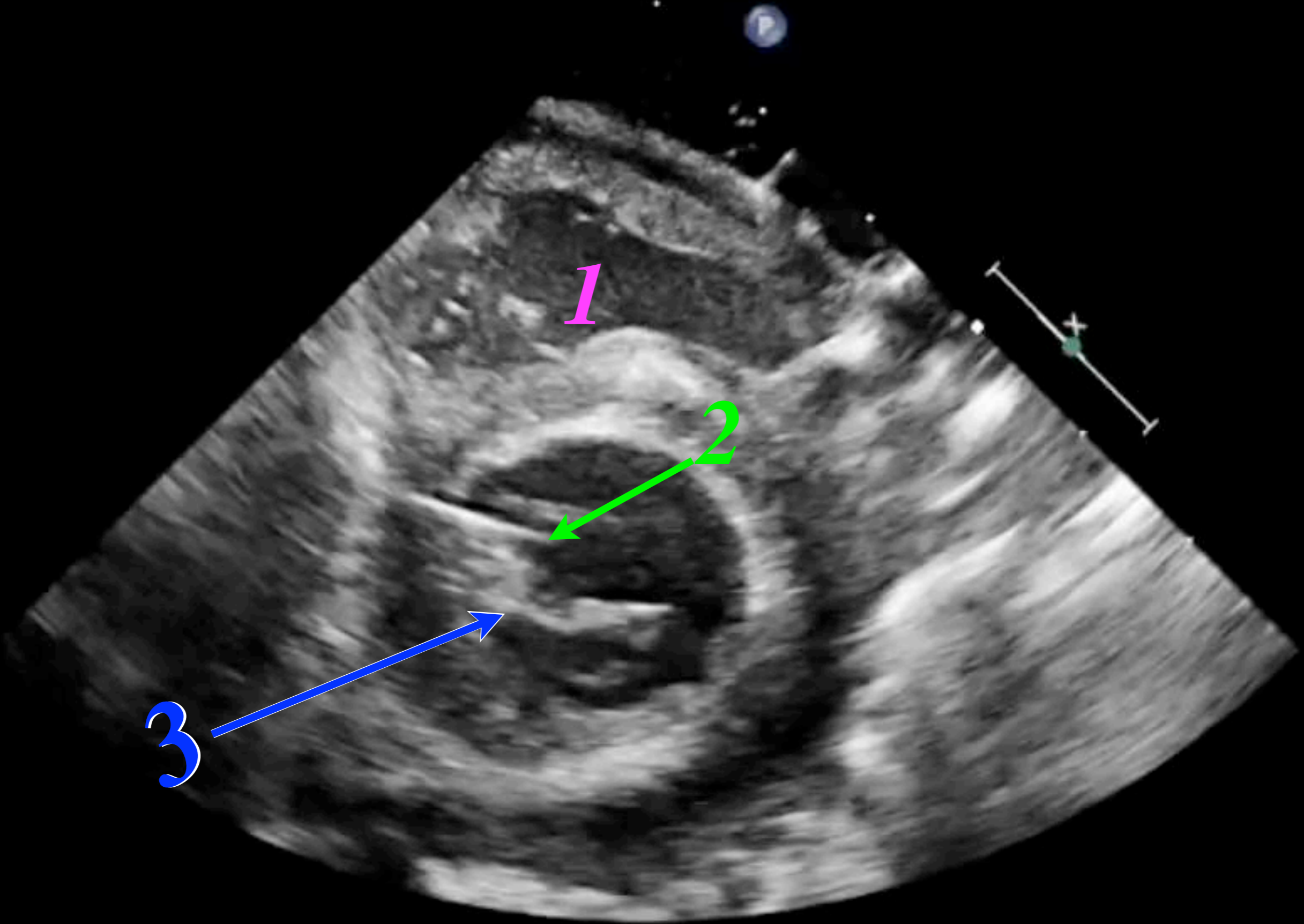


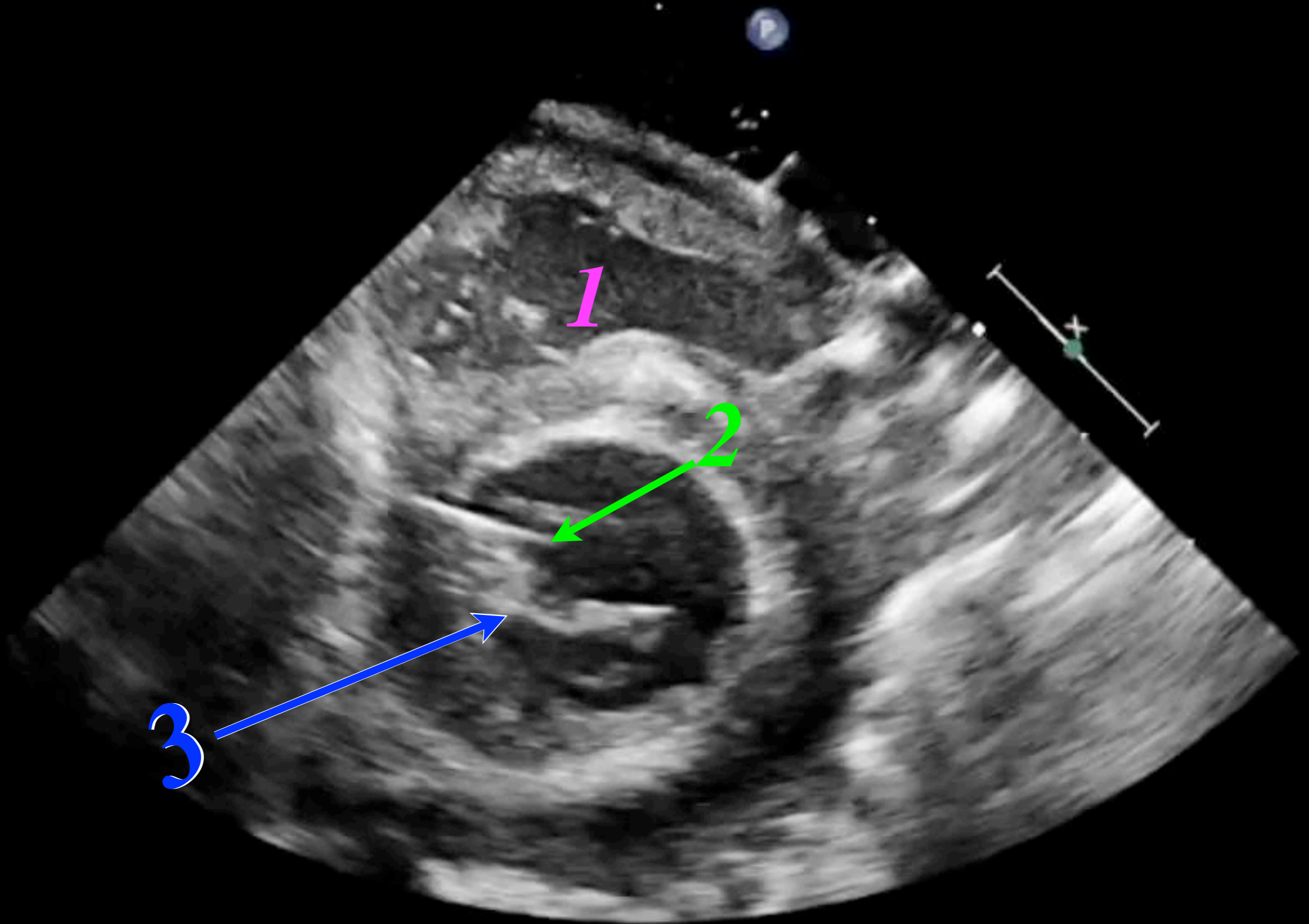












1= RV, 2 = Anterior MV leaflet, 3 = Post MV leaflet

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

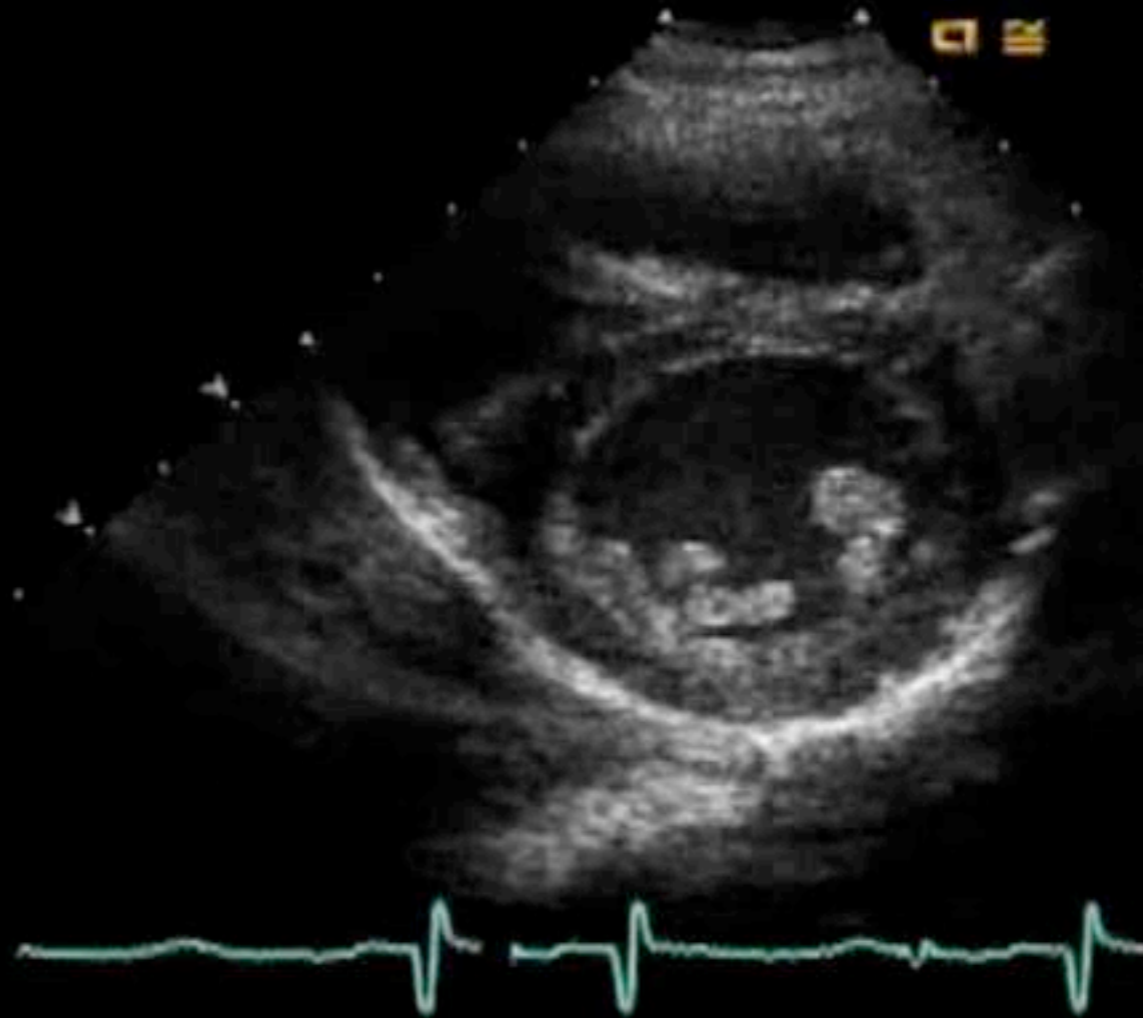
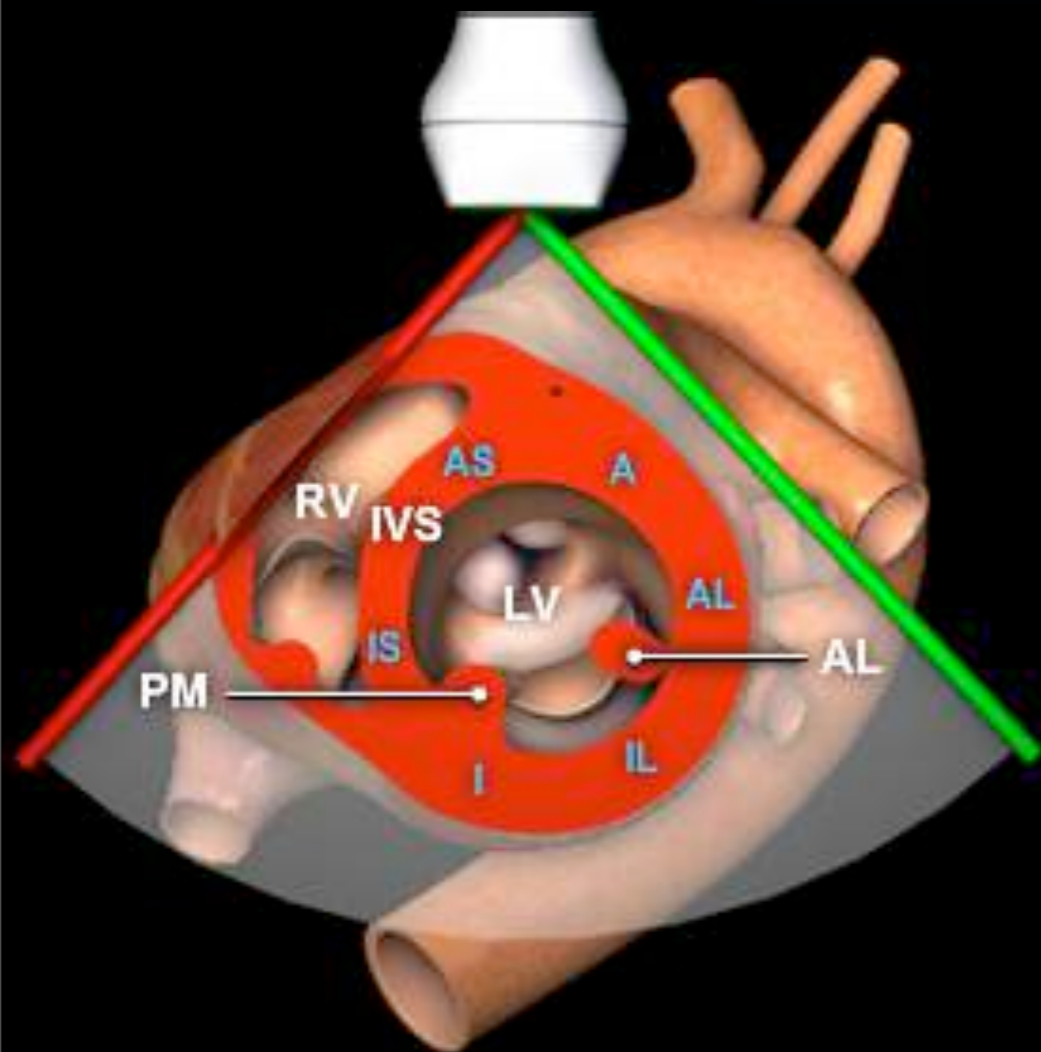
- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

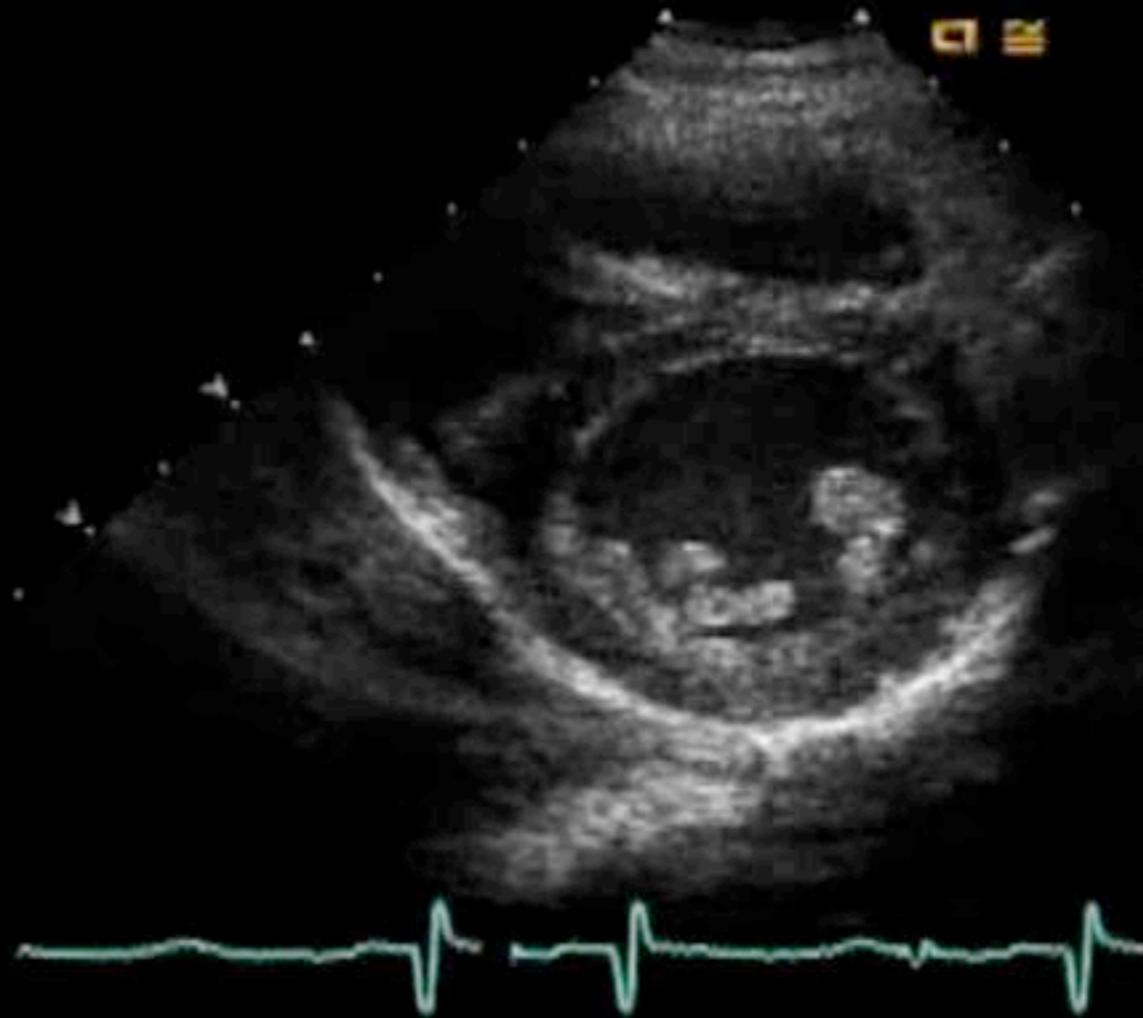
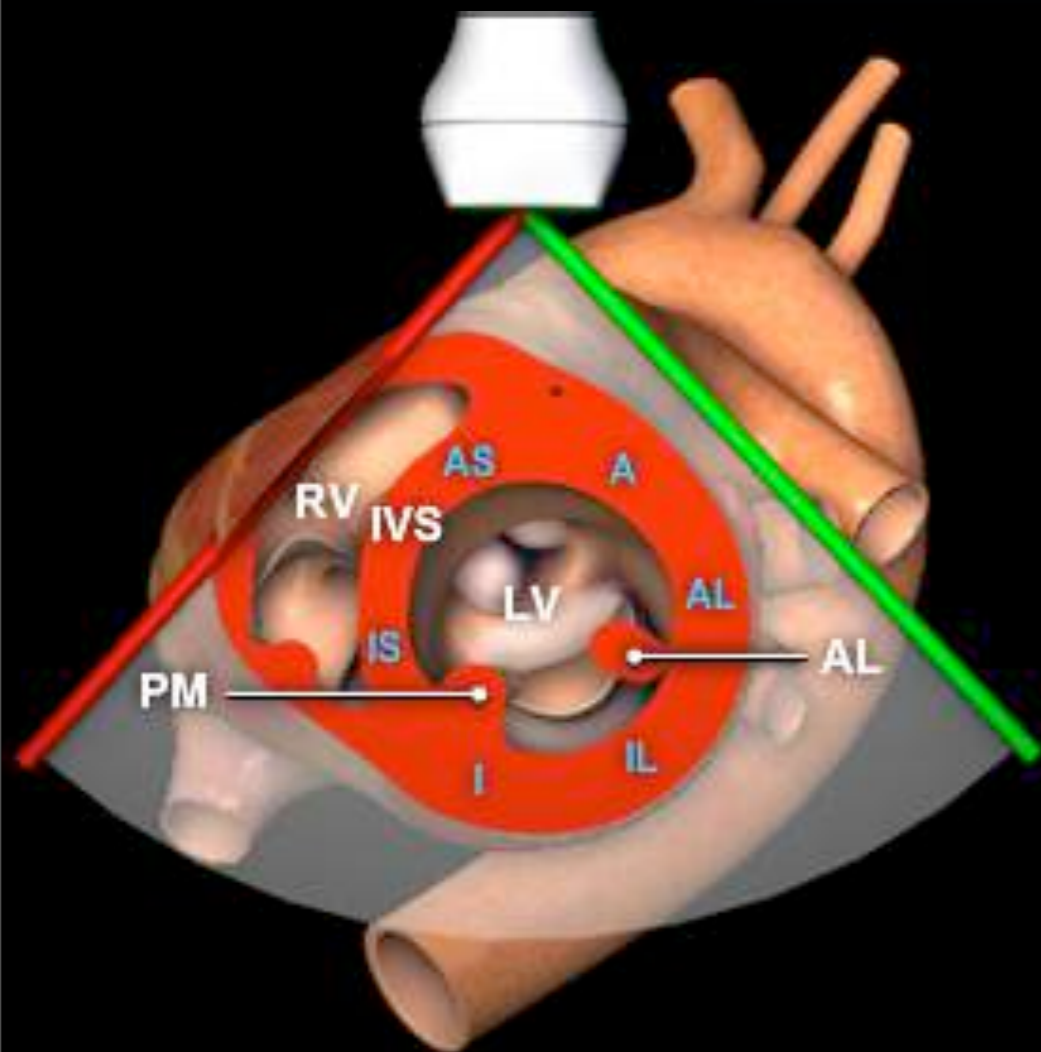
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# *PSAX: Mid Papillary Level*

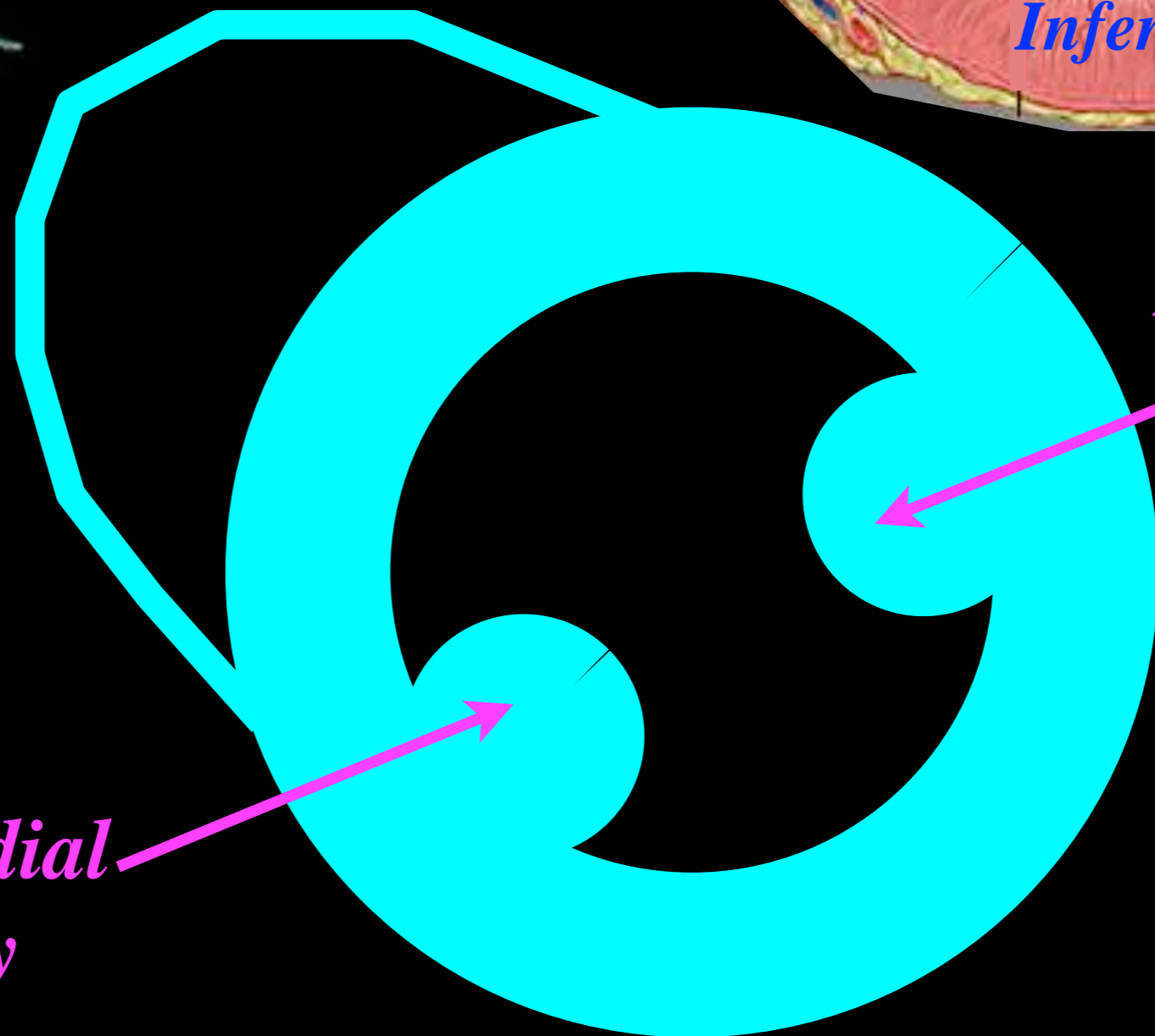
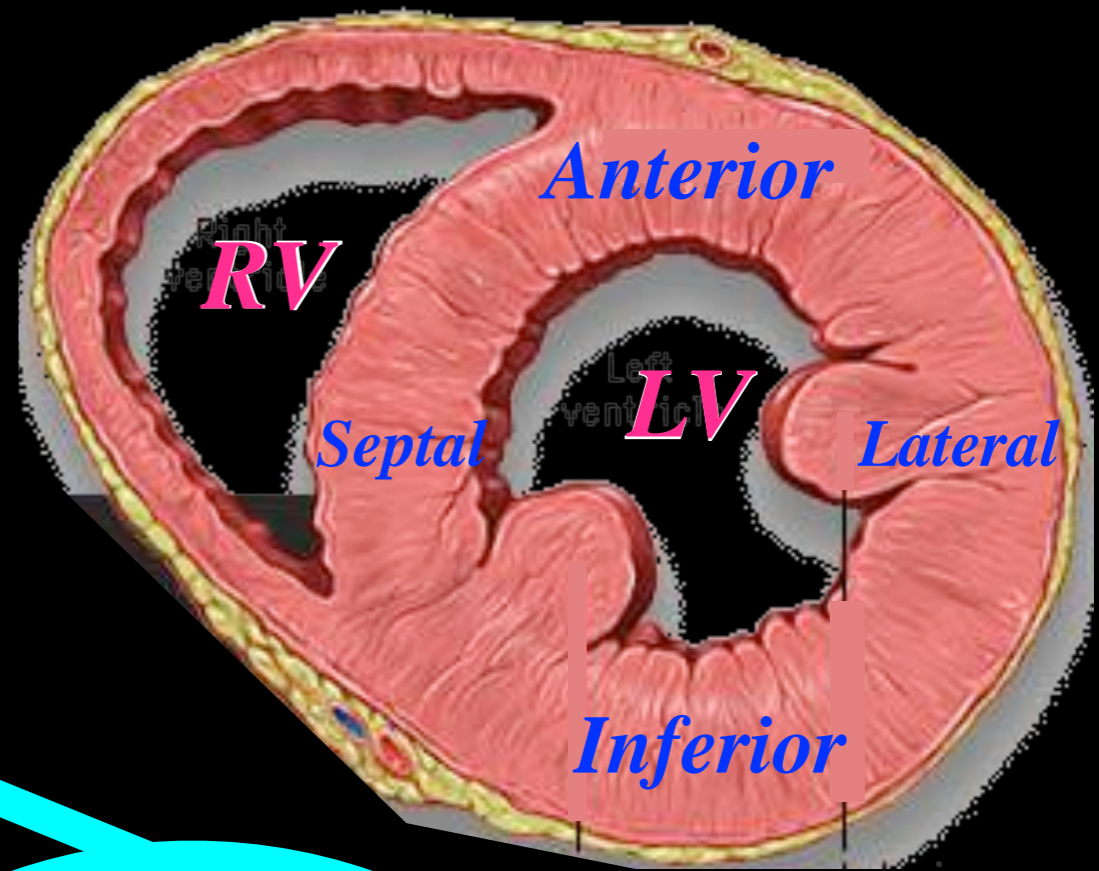


# *PSAX: Mid Papillary Level*



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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*Anterolateral  
Papillary  
muscle*

*Posteromedial  
Papillary  
muscle*



# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

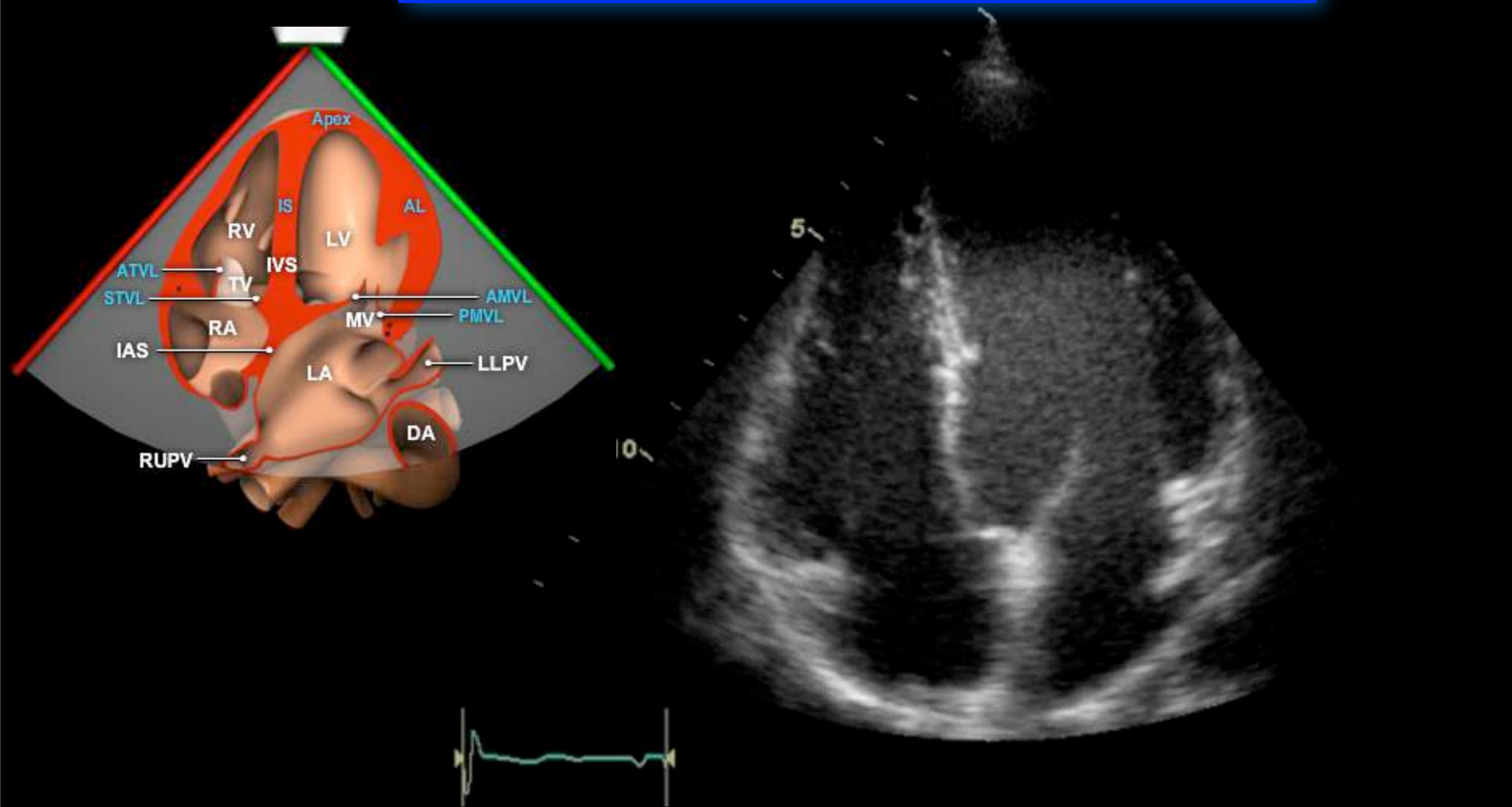
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

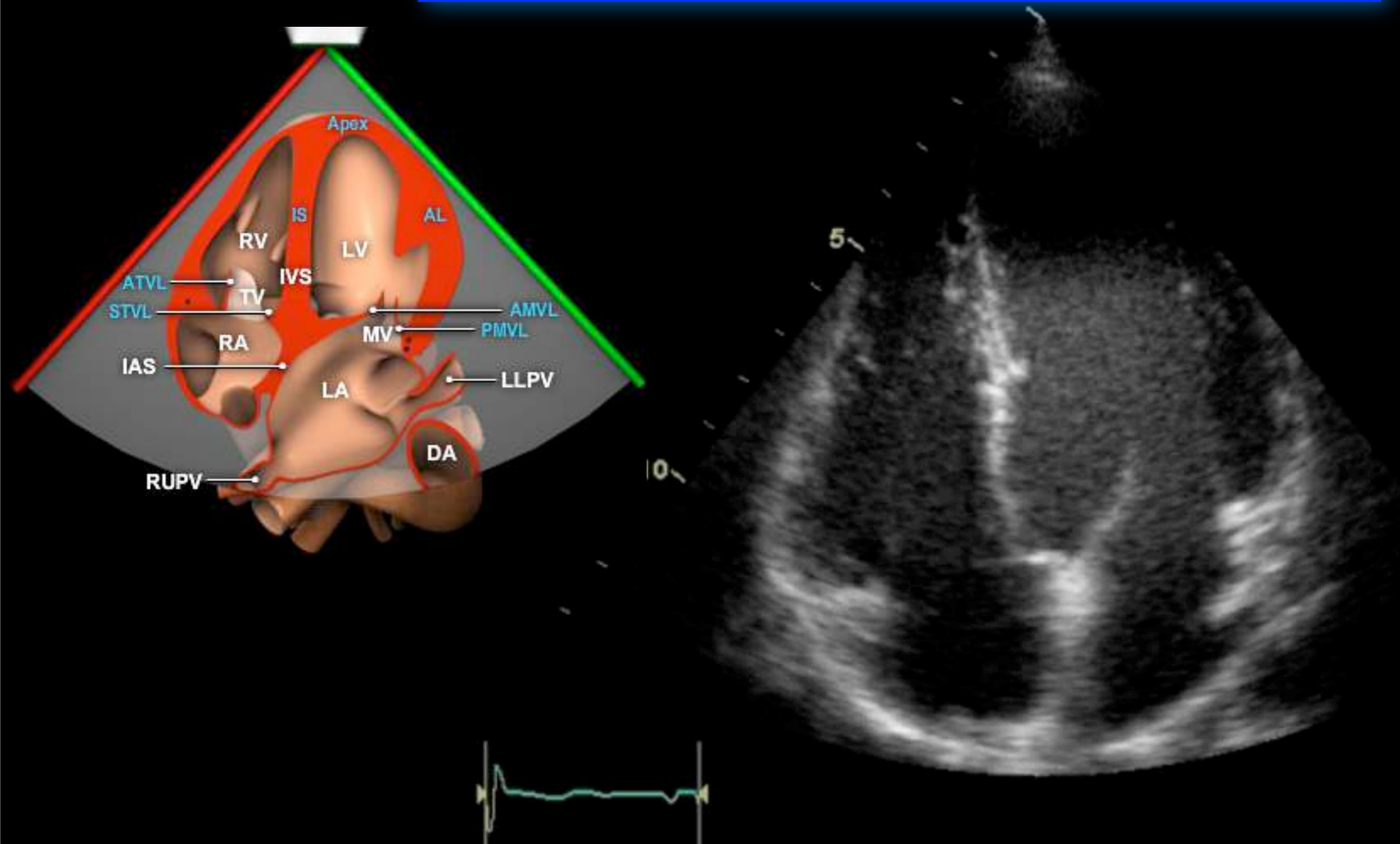
# TTE Windows

- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*
  - *Aortic Valve Short Axis View*
  - *Mitral Valve Short Axis View*
  - *Mid-Papillary Short Axis View*
- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*
  - *Two Chamber View*
  - *Apical Long Axis View*
- *Subcostal*
  - *Four Chamber View*
  - *Short Axis View*
  - *IVC Long Axis View*
- *Suprasternal*

# Apical: 4 Chamber



# Apical: 4 Chamber



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

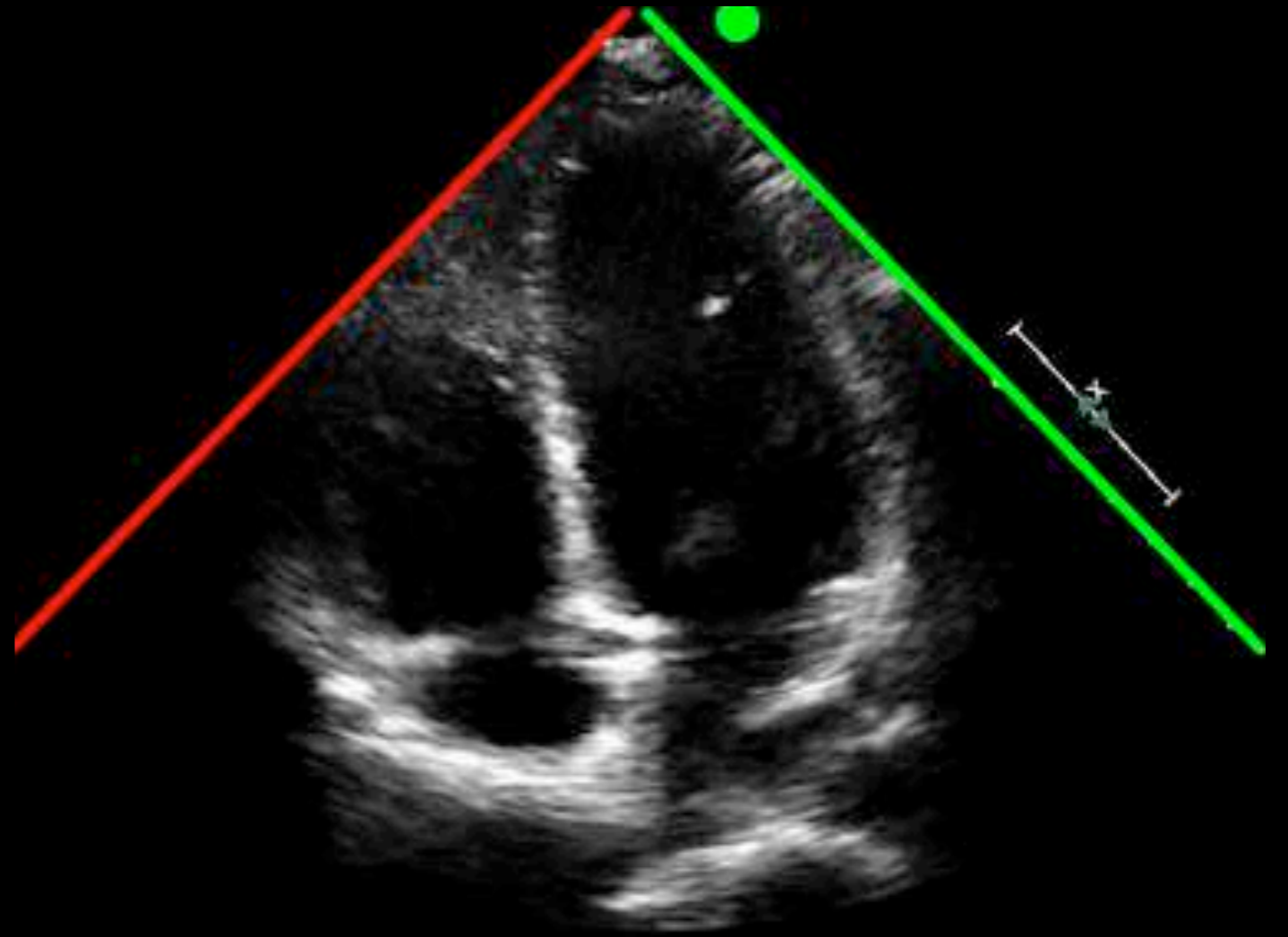
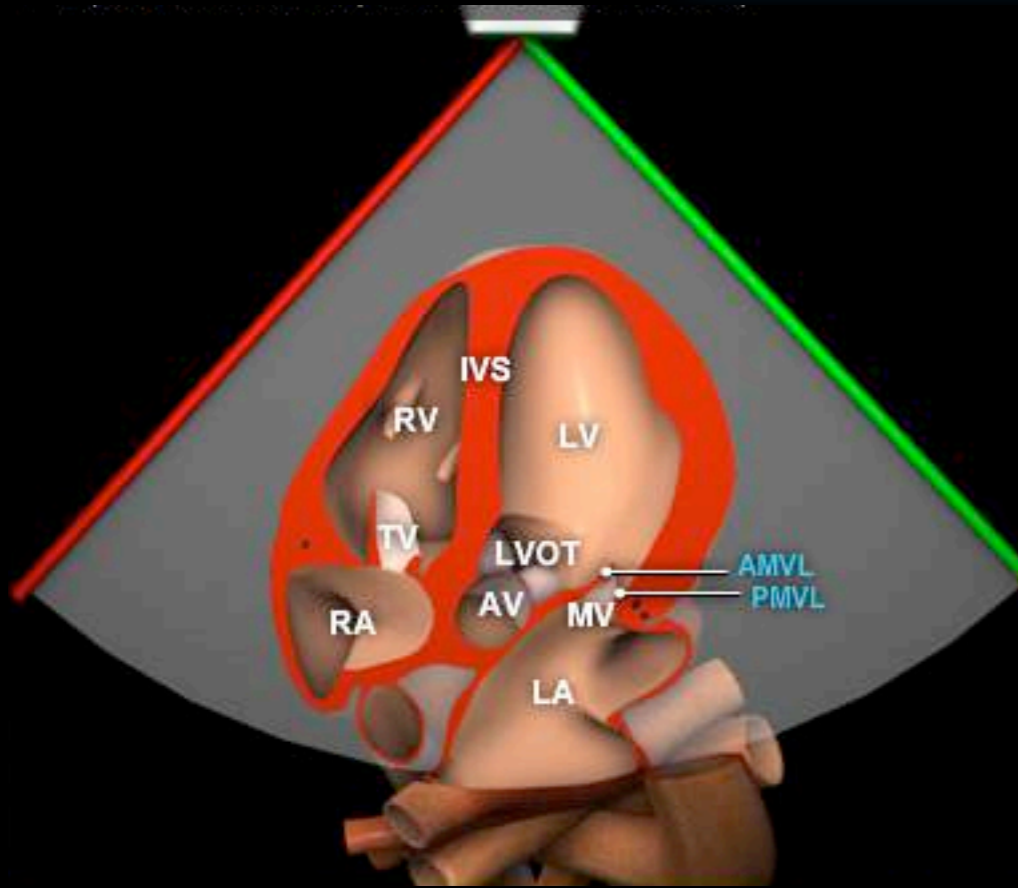
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

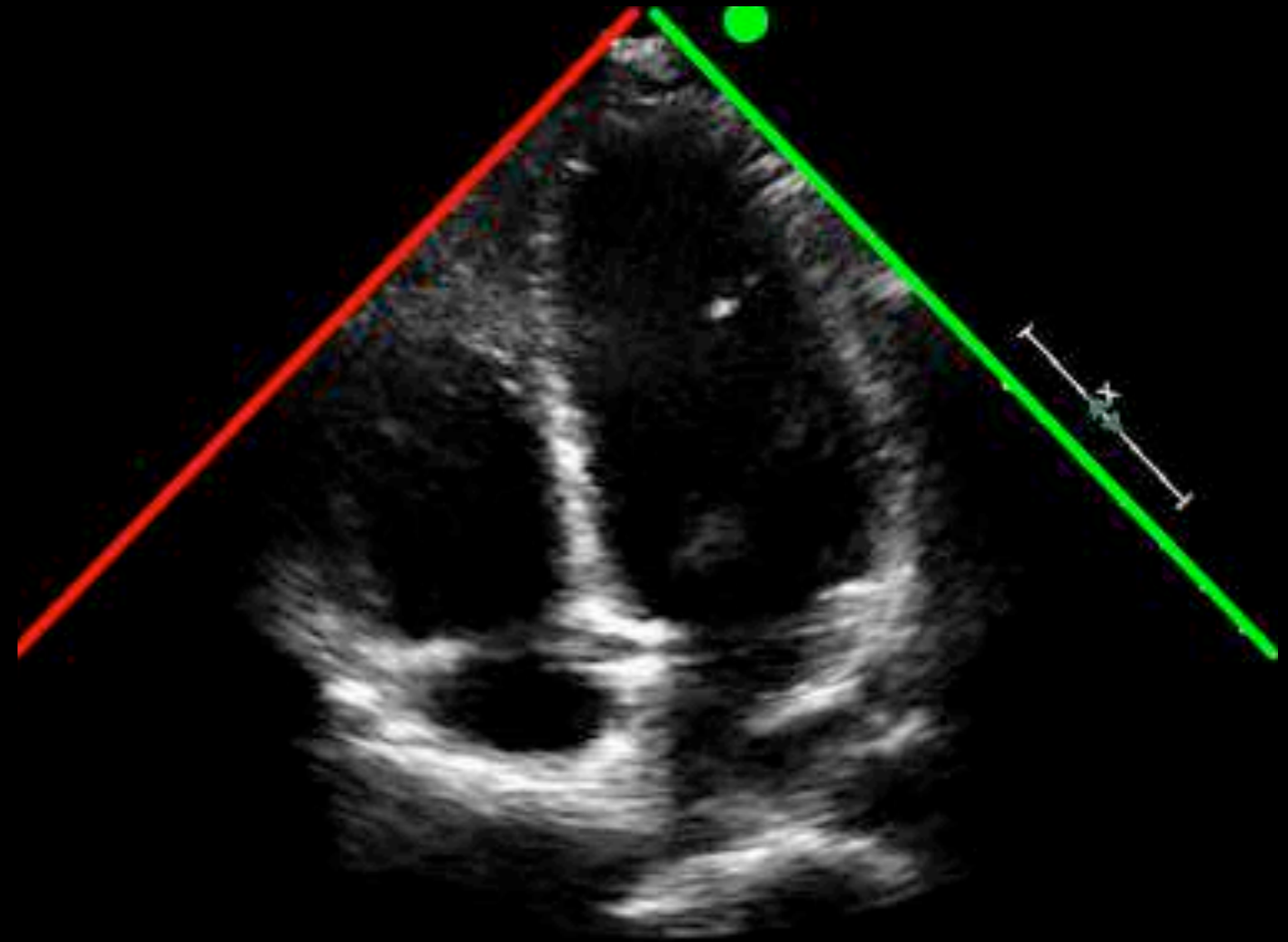
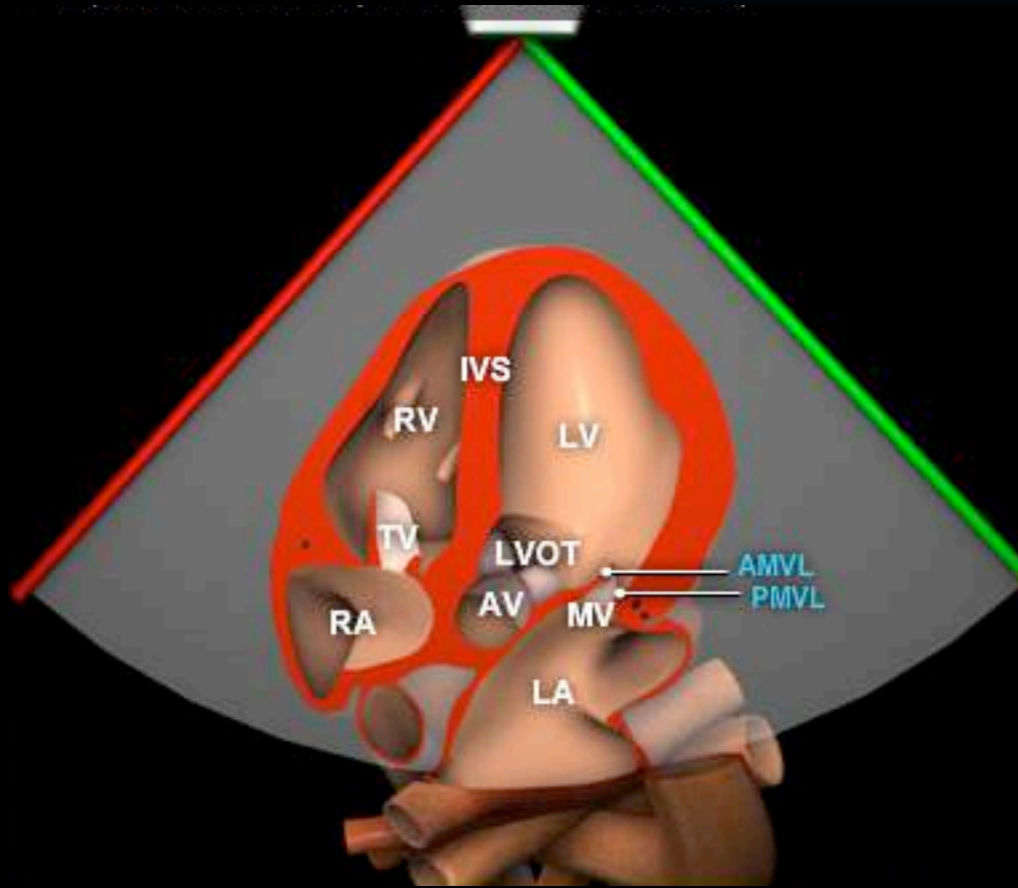
# TTE Windows

- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*
  - *Aortic Valve Short Axis View*
  - *Mitral Valve Short Axis View*
  - *Mid-Papillary Short Axis View*
- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*
  - *Two Chamber View*
  - *Apical Long Axis View*
- *Subcostal*
  - *Four Chamber View*
  - *Short Axis View*
  - *IVC Long Axis View*
- *Suprasternal*

# Apical: 5 Chamber



# Apical: 5 Chamber

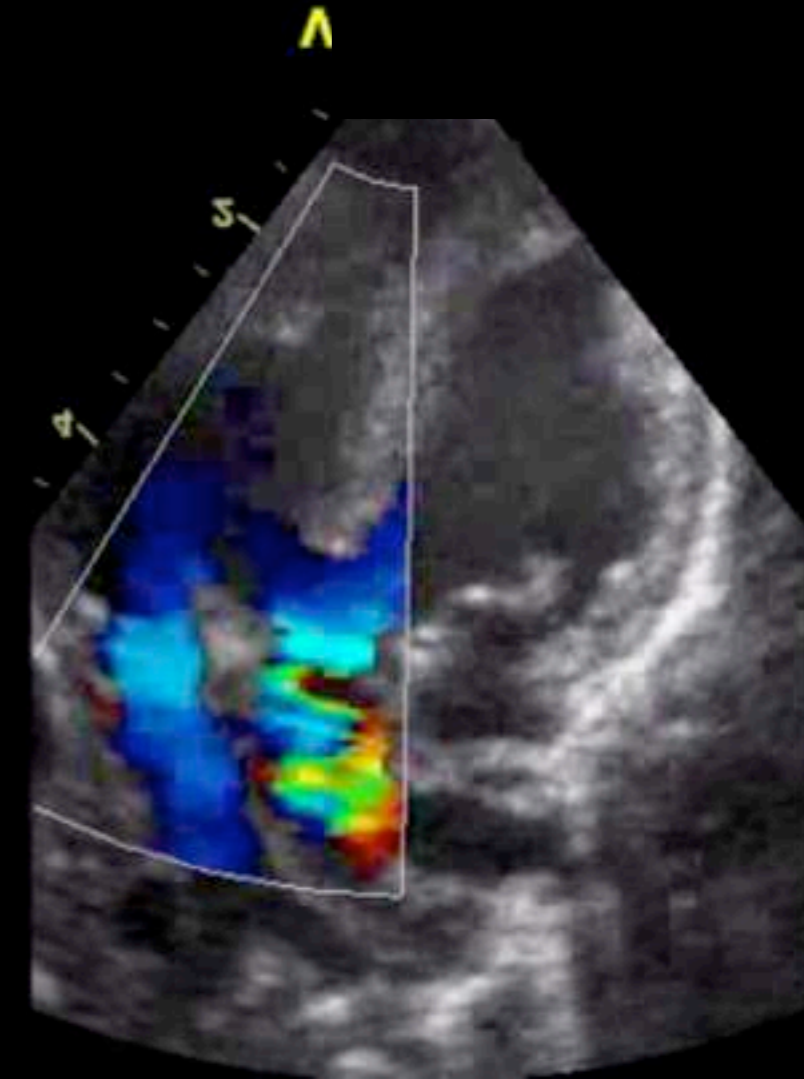
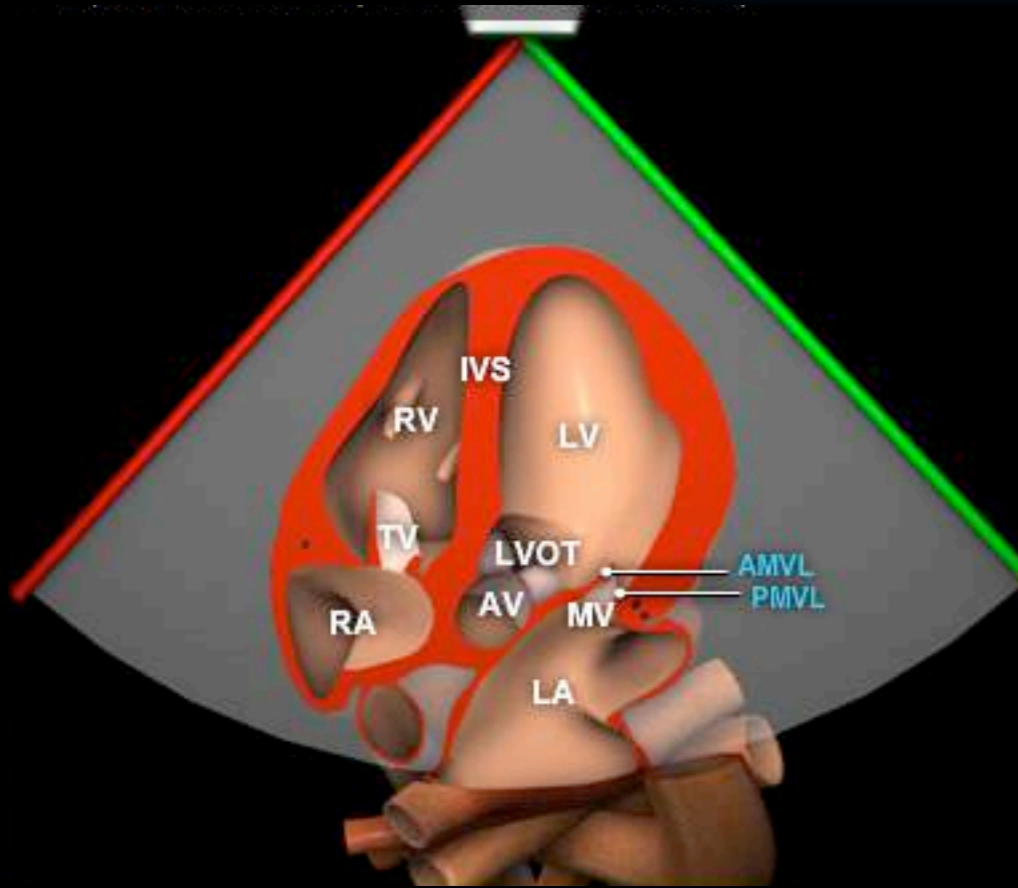


1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

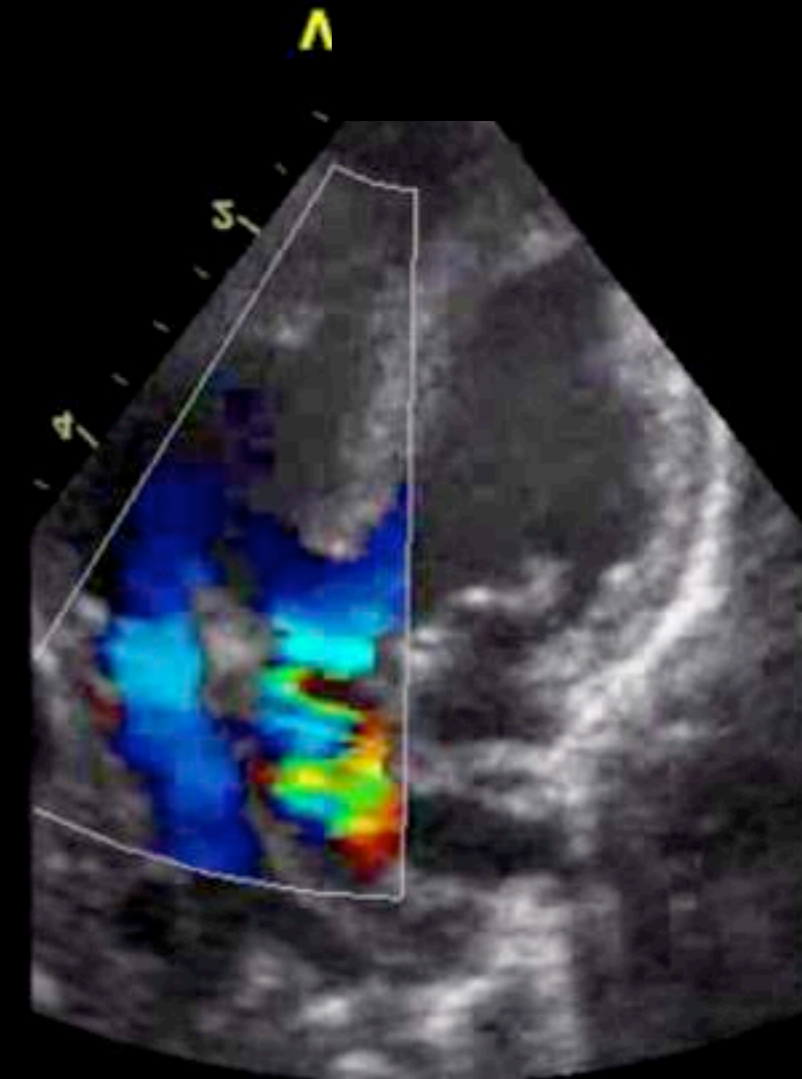
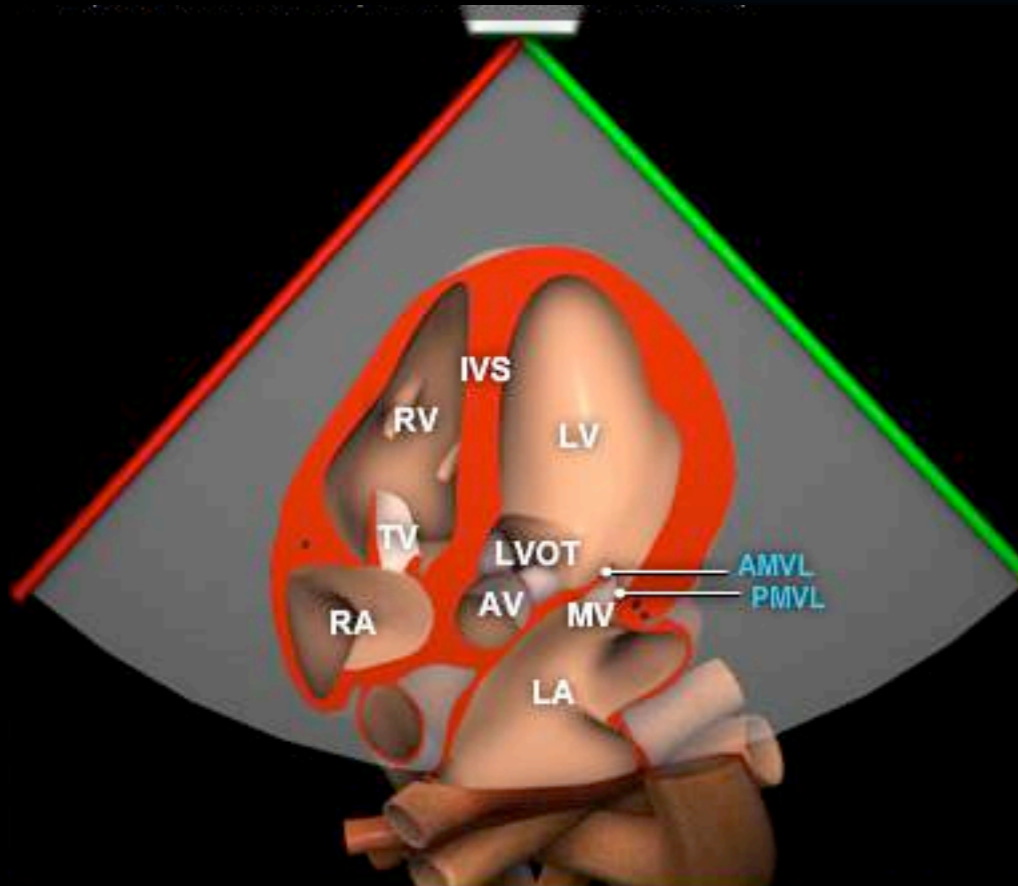
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# Apical: 5 Chamber



# Apical: 5 Chamber



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

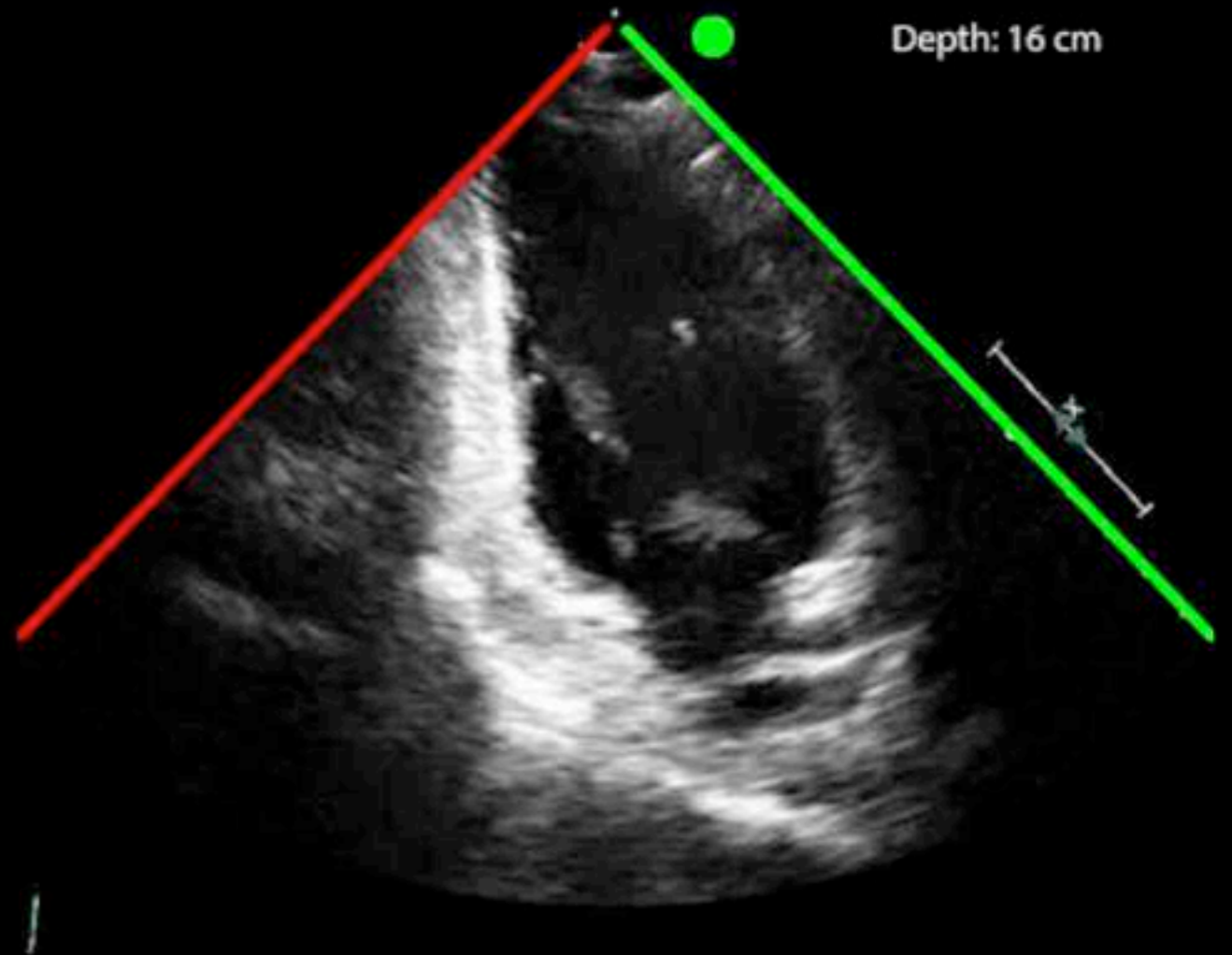
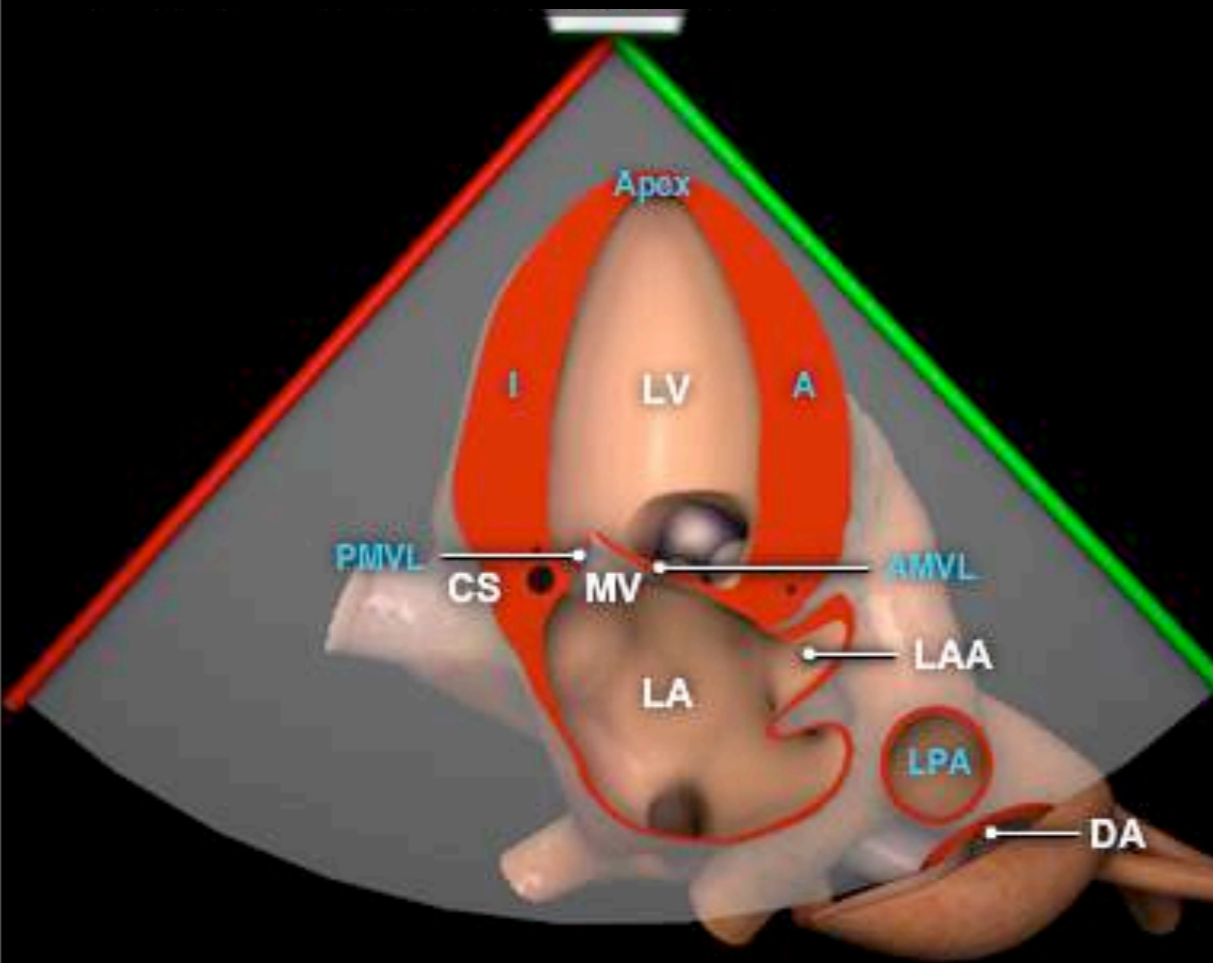
- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

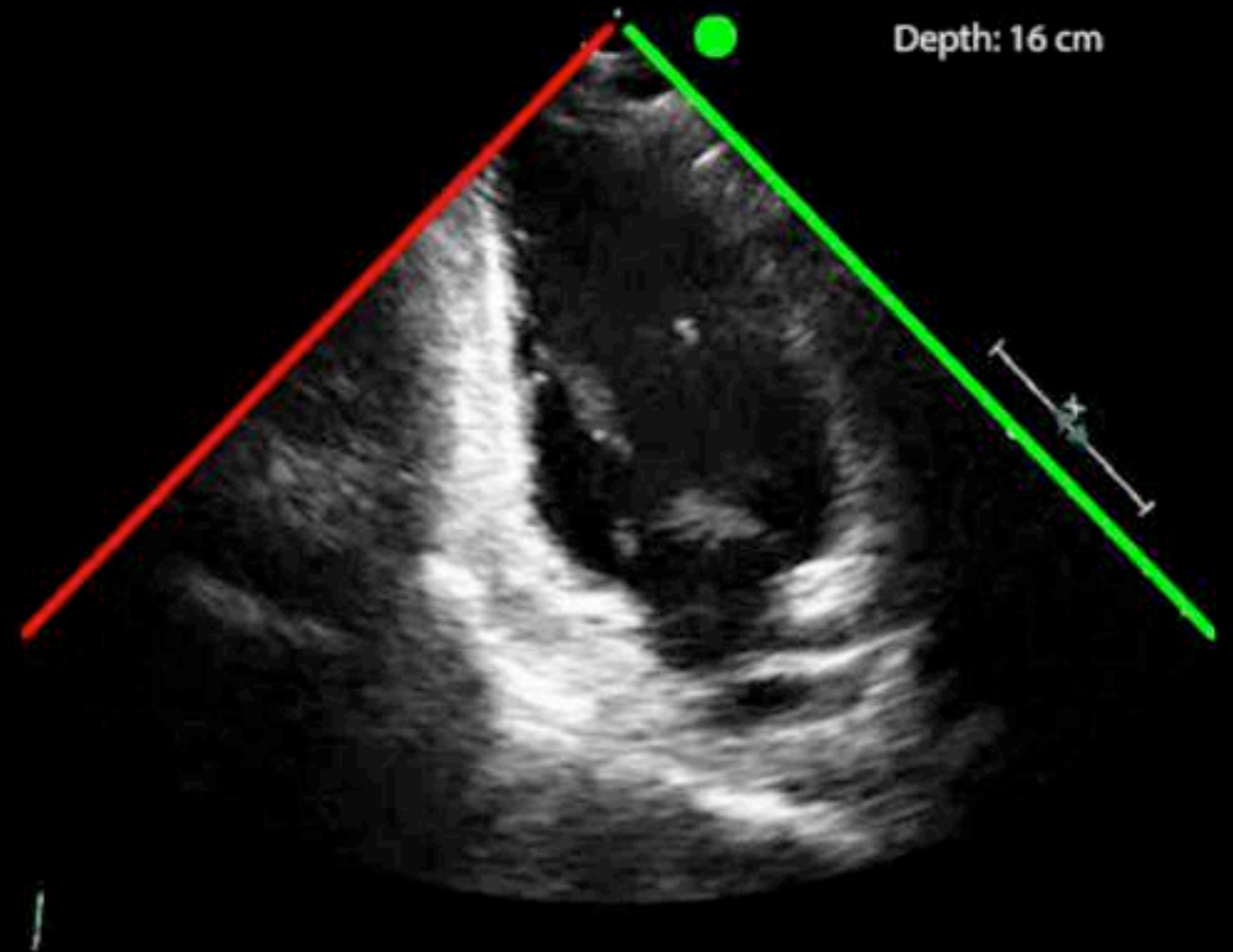
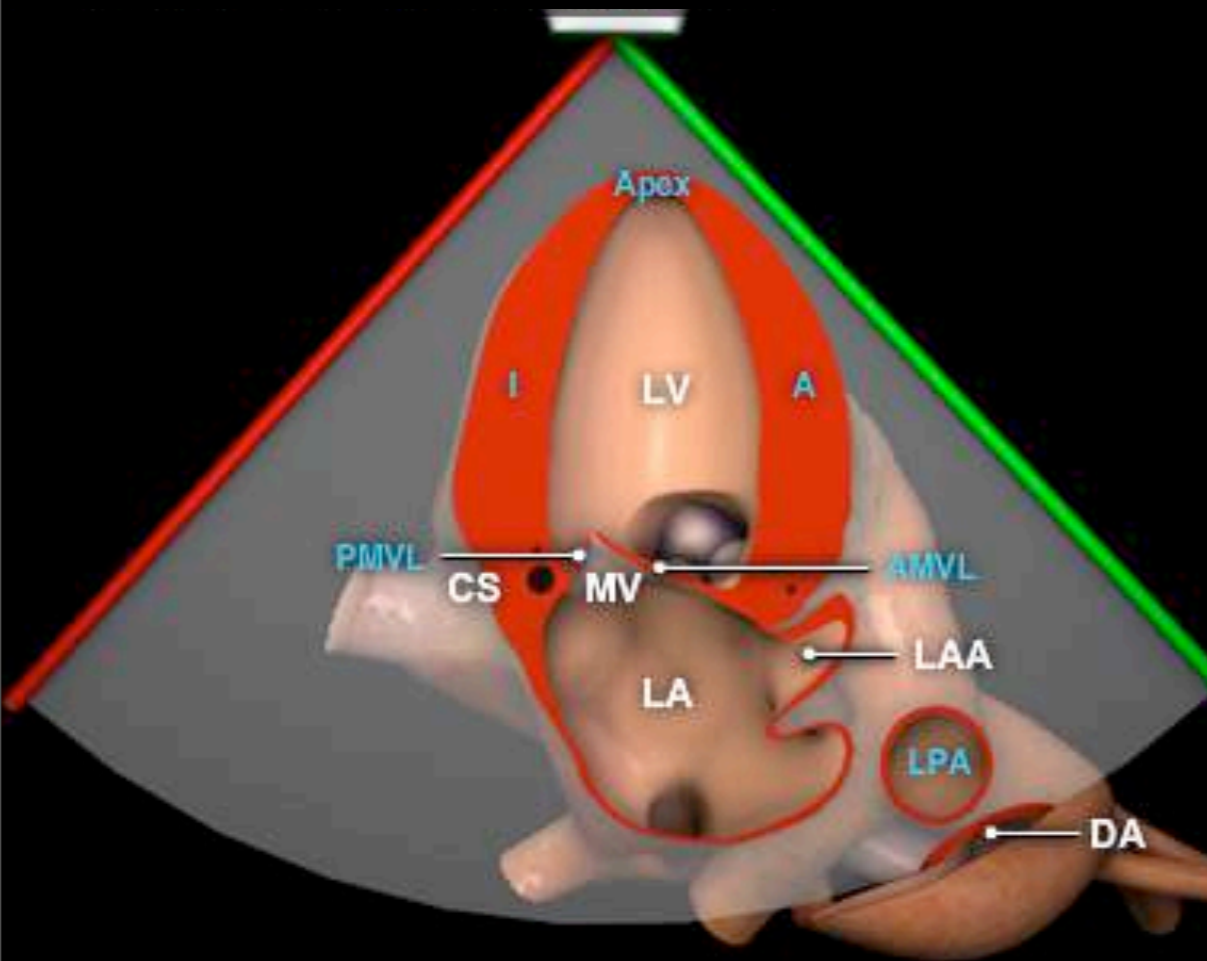
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# Apical: 2 Chamber



# Apical: 2 Chamber



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

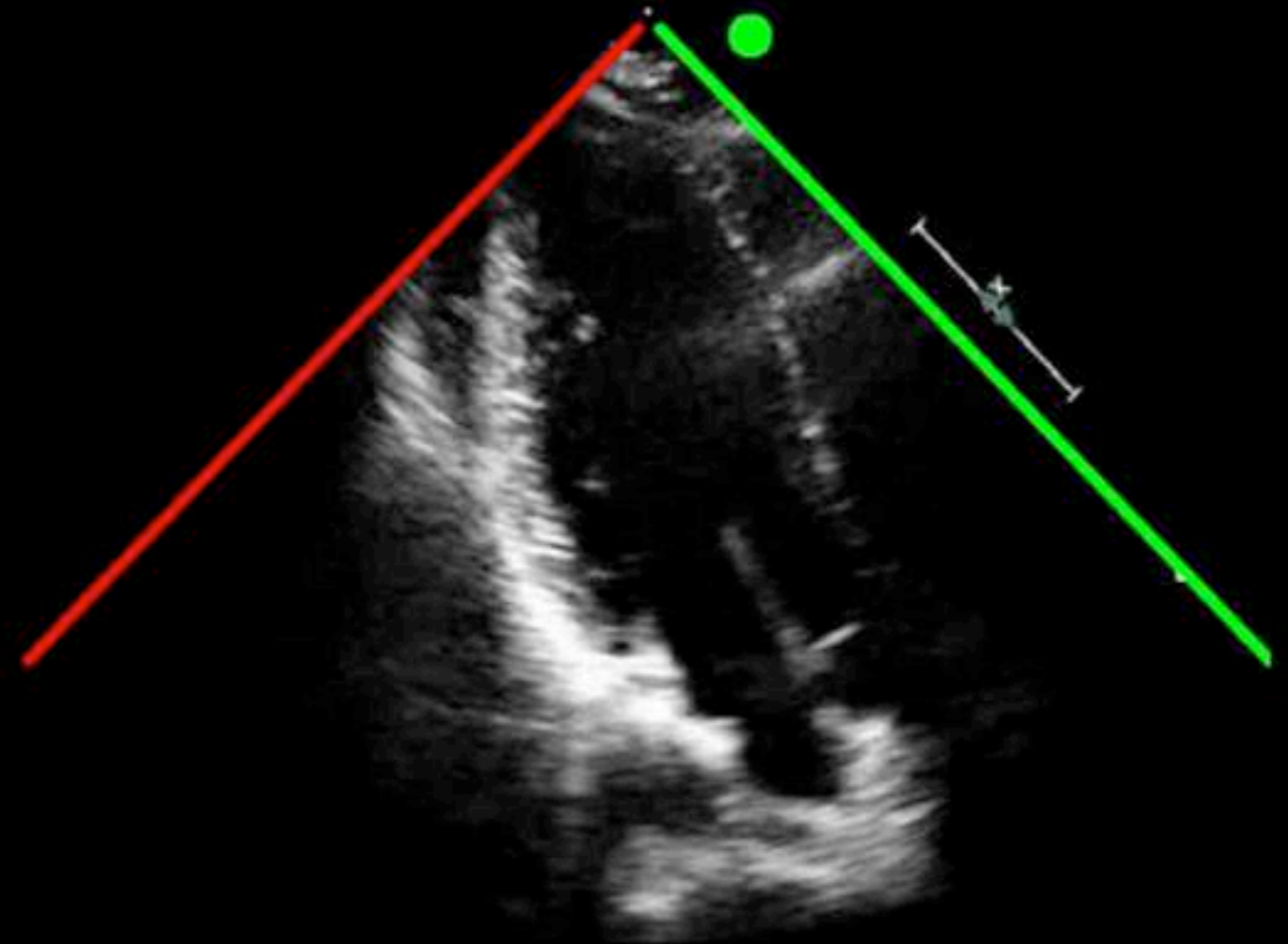
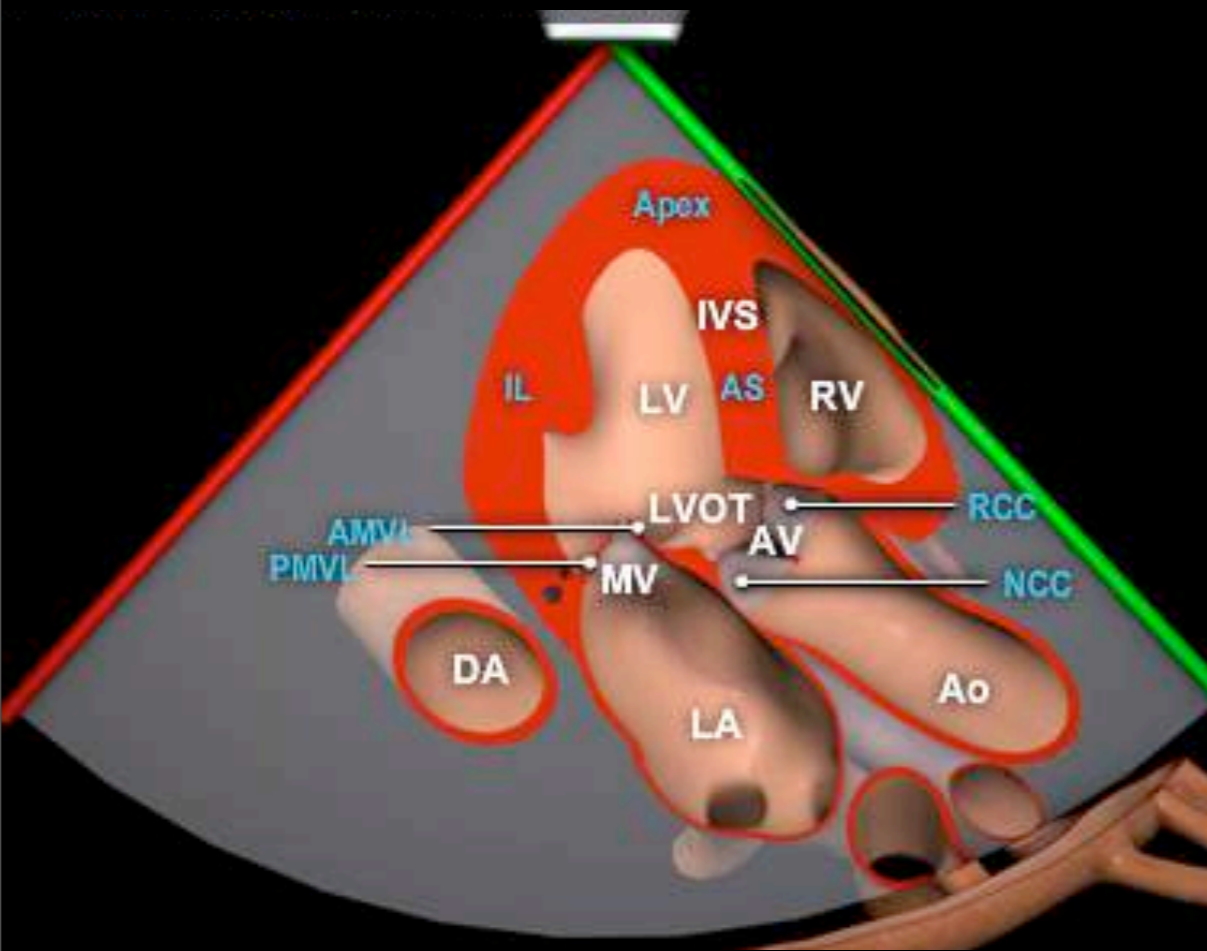
## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

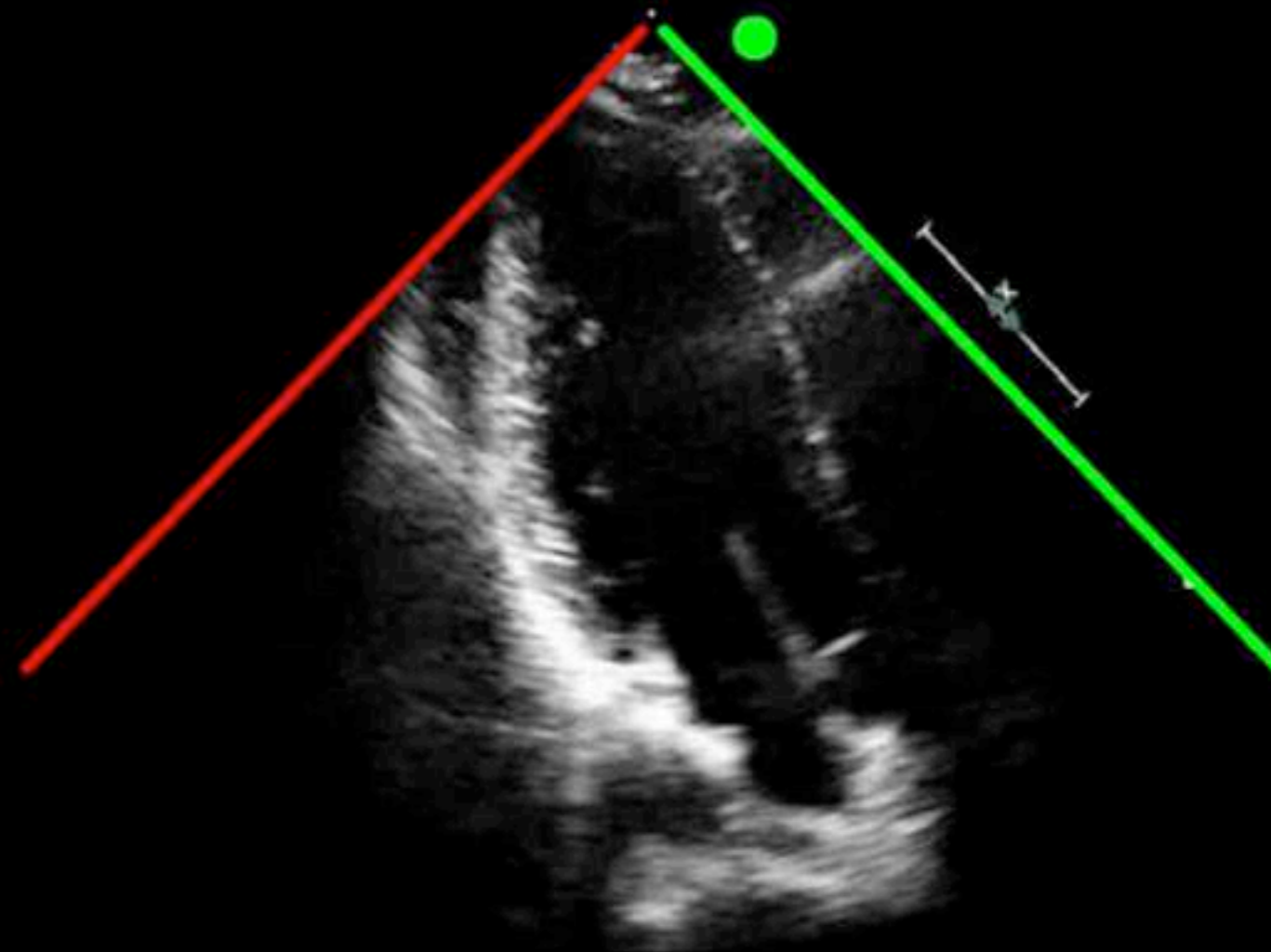
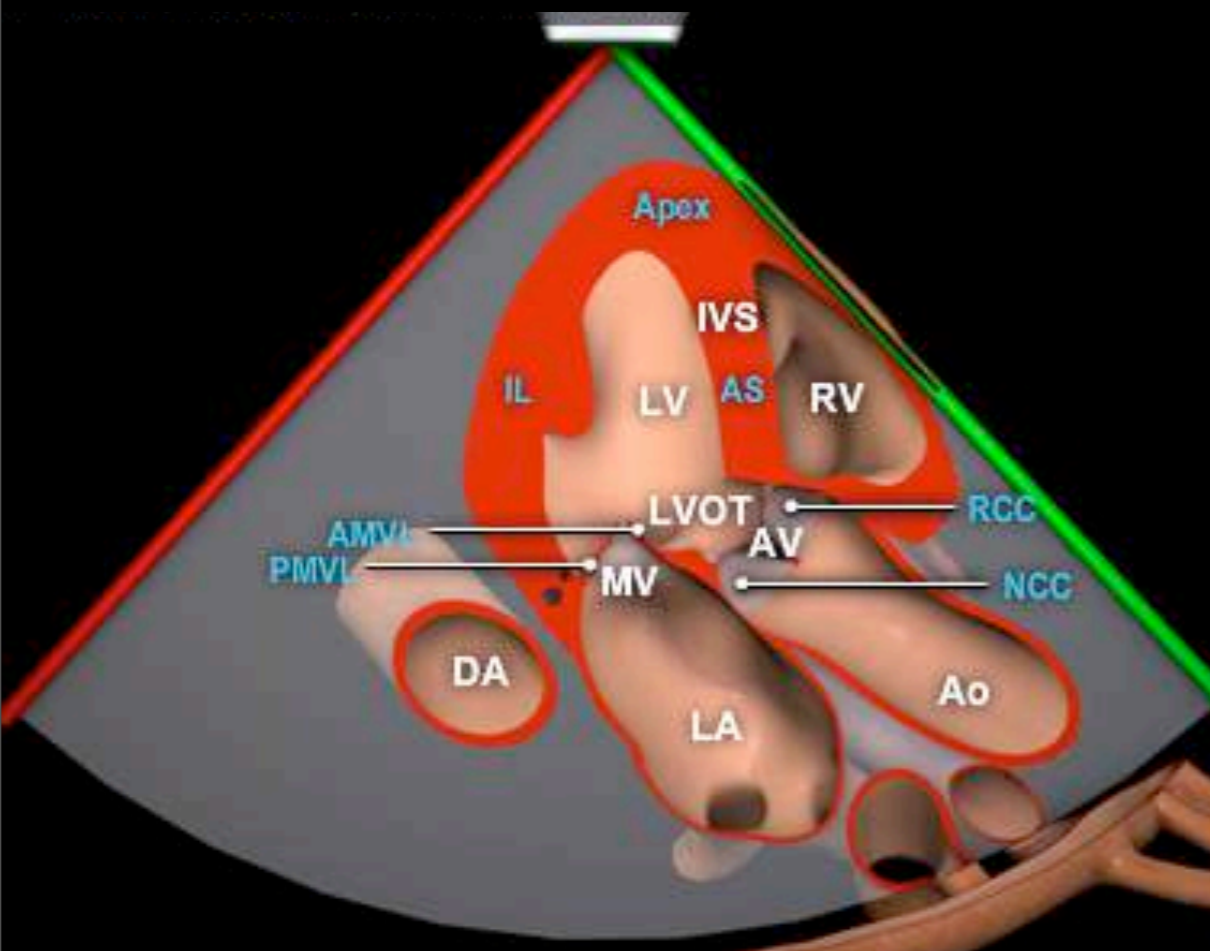
## ➤ Suprasternal



# Apical: Long Axis



# Apical: Long Axis



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

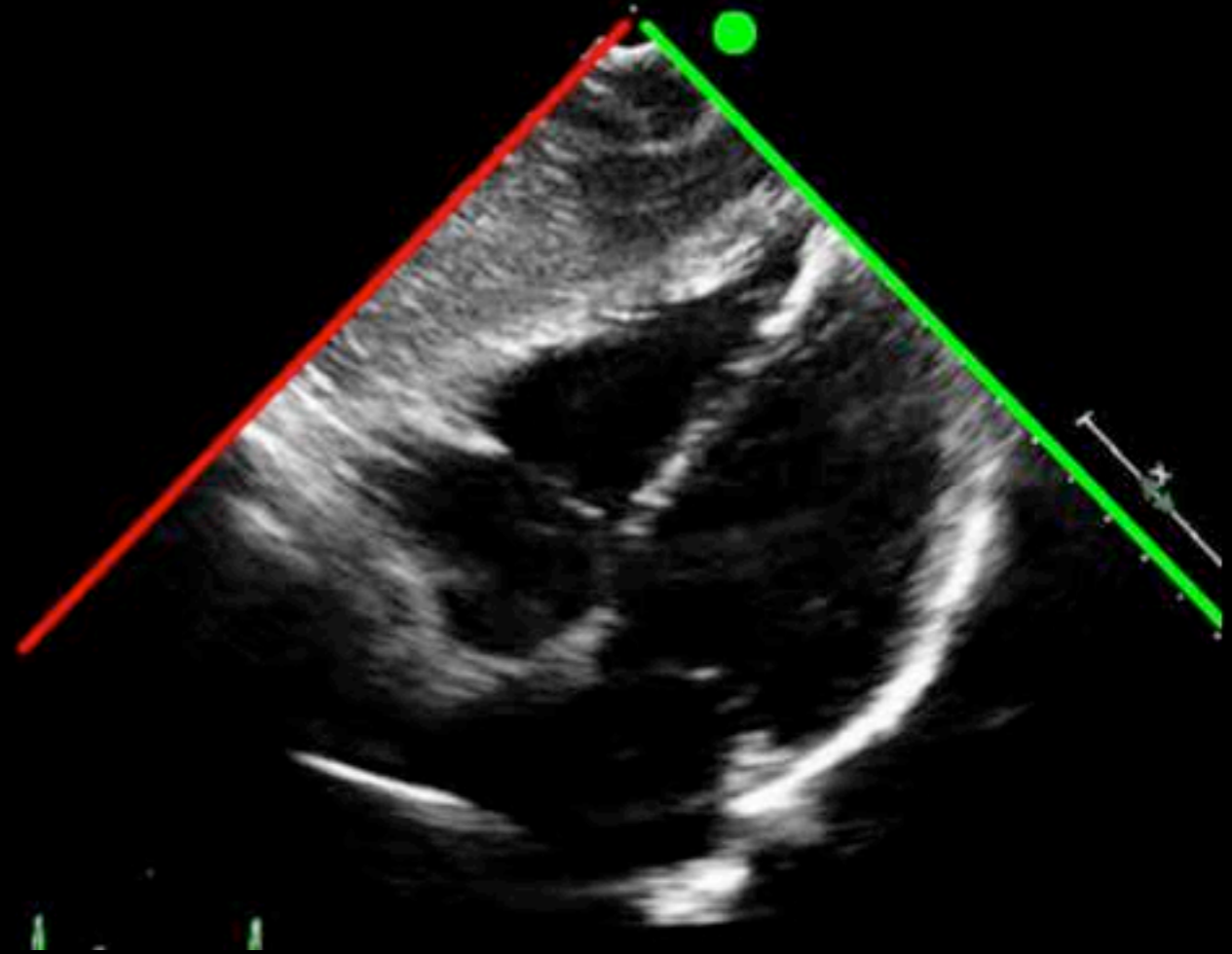
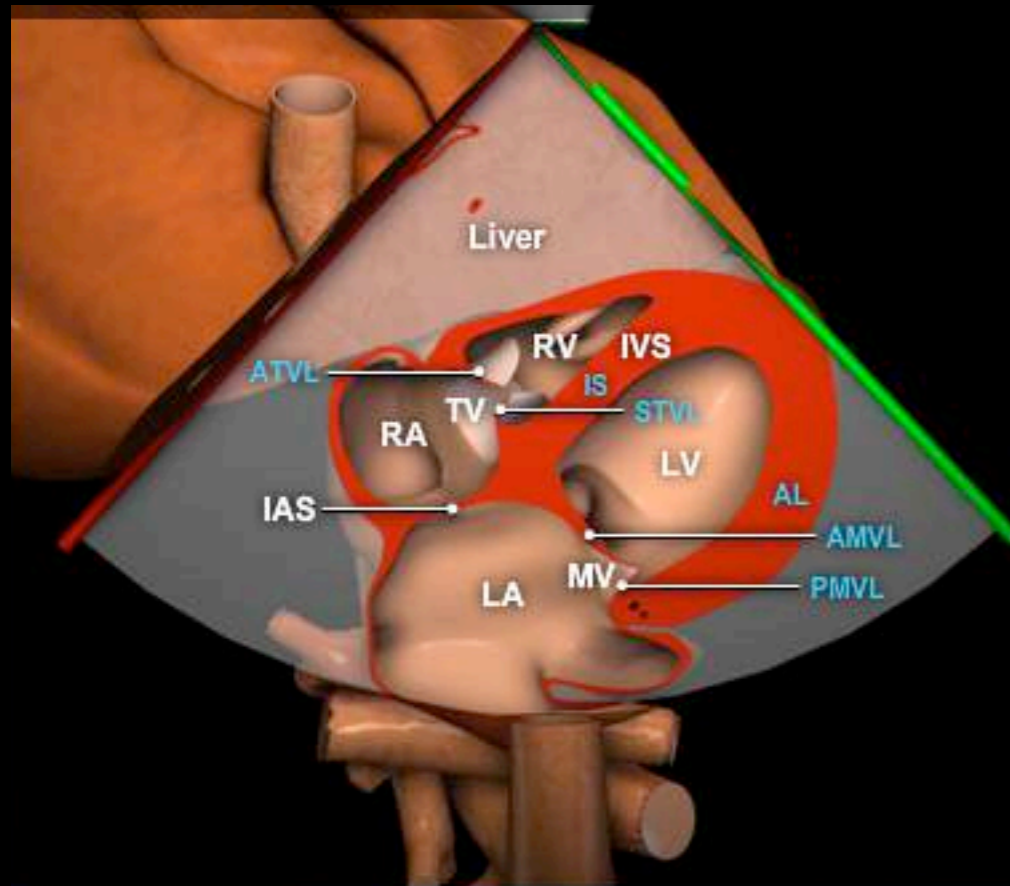
- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

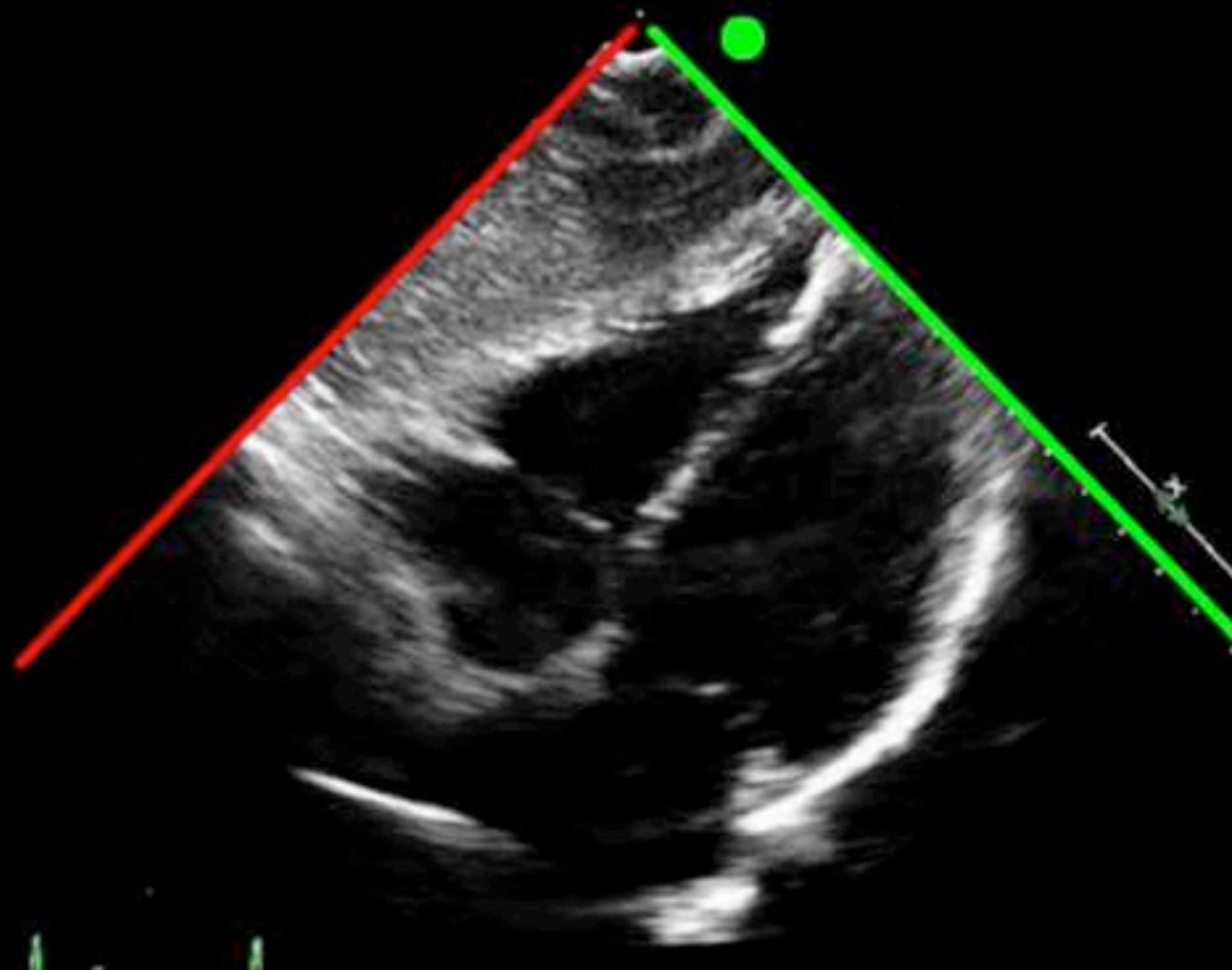
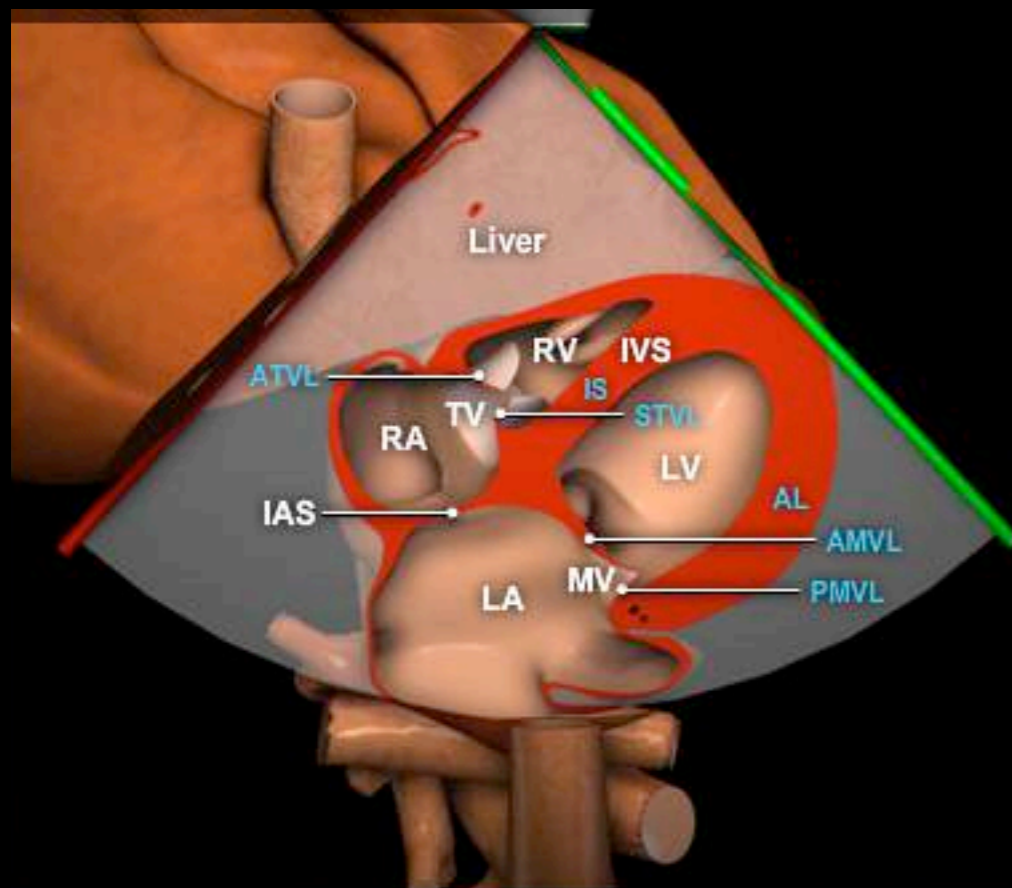
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

# *Subcostal: 4 Chamber*



# *Subcostal: 4 Chamber*



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

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# TTE Windows

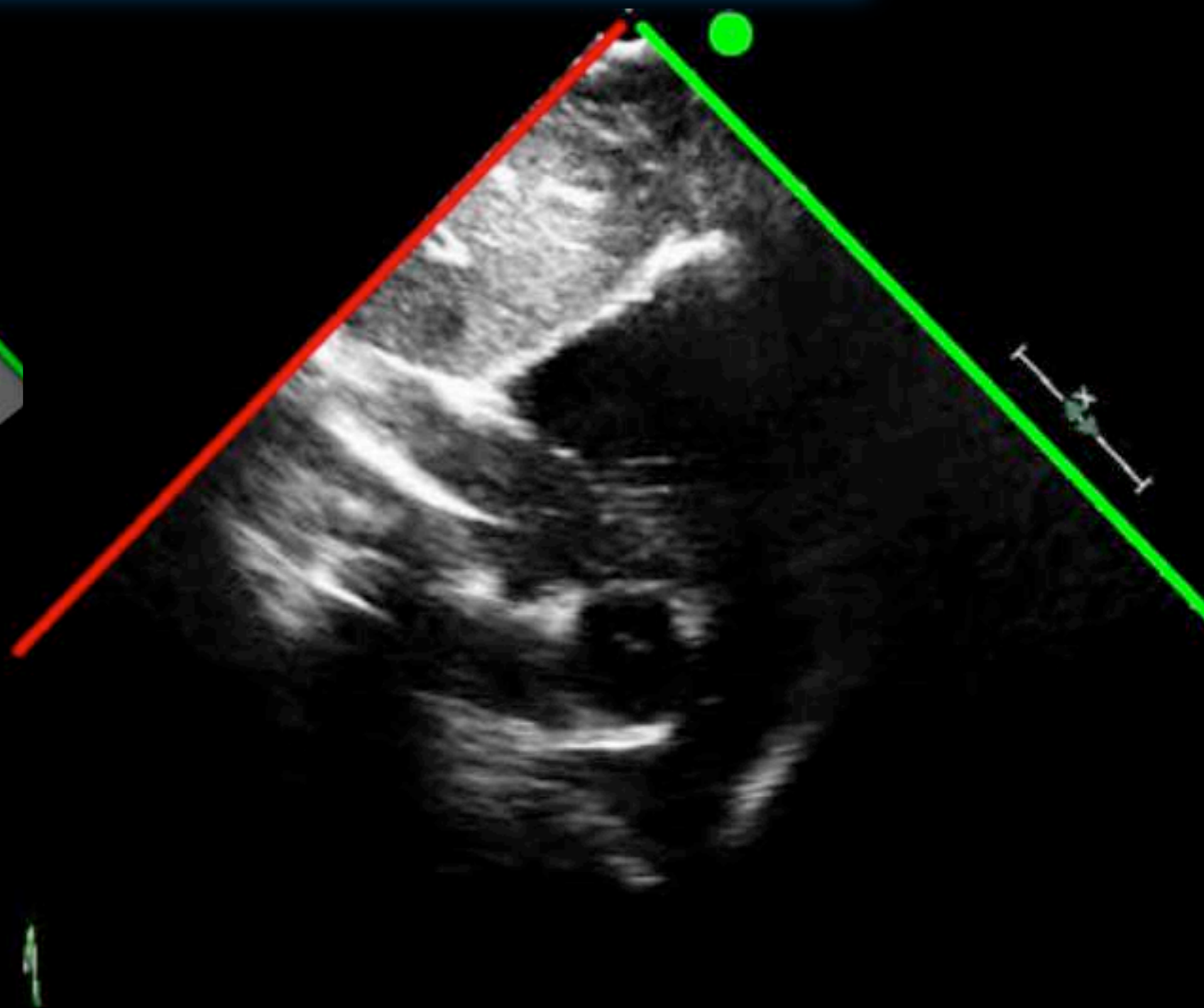
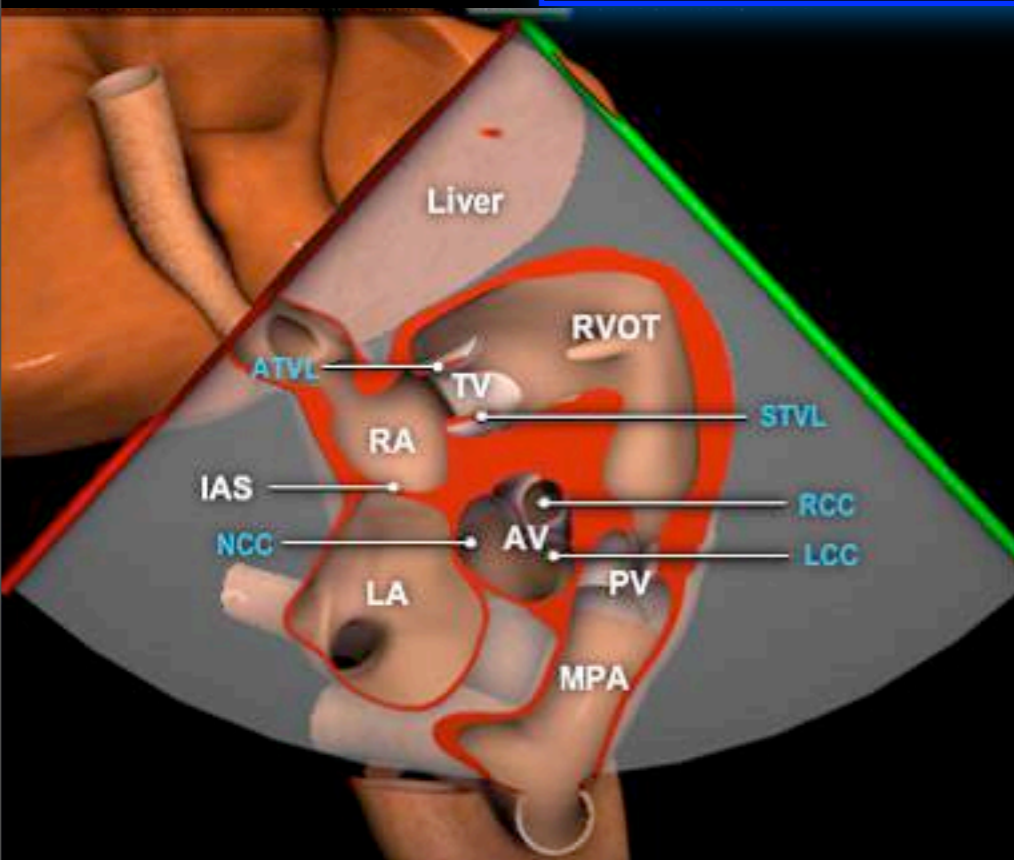
- *Parasternal Long Axis*
  - *Parasternal Long-Axis View*
  - *RV Inflow View*
  - *RV Outflow View*
- *Parasternal Short Axis*
  - *Aortic Valve Short Axis View*
  - *Mitral Valve Short Axis View*
  - *Mid-Papillary Short Axis View*
- *Apical*
  - *Four Chamber View*
  - *Five Chamber View*
  - *Two Chamber View*
  - *Apical Long Axis View*
- *Subcostal*
  - *Four Chamber View*
  - *Short Axis View*
  - *IVC Long Axis View*
- *Suprasternal*

# TTE Windows

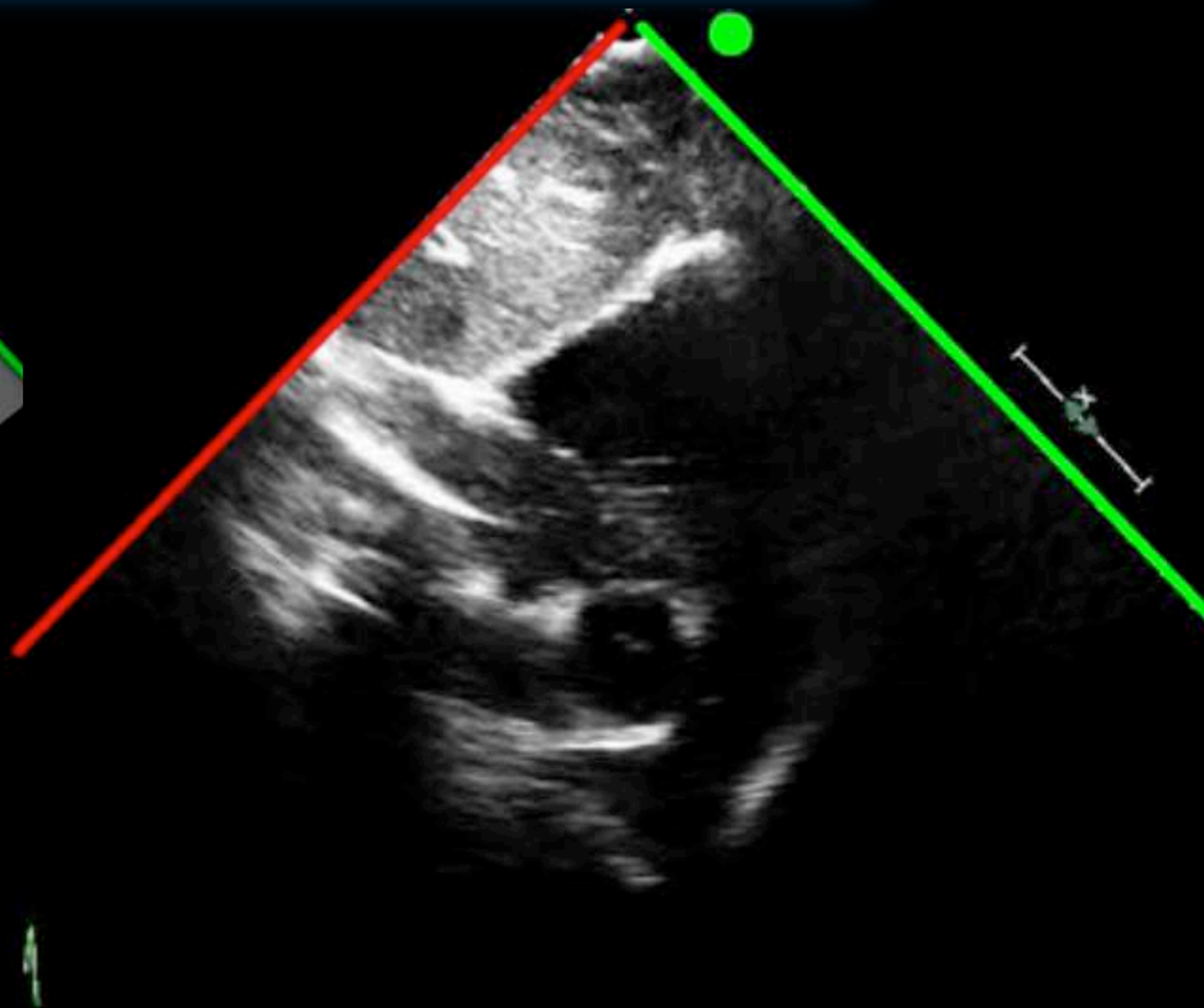
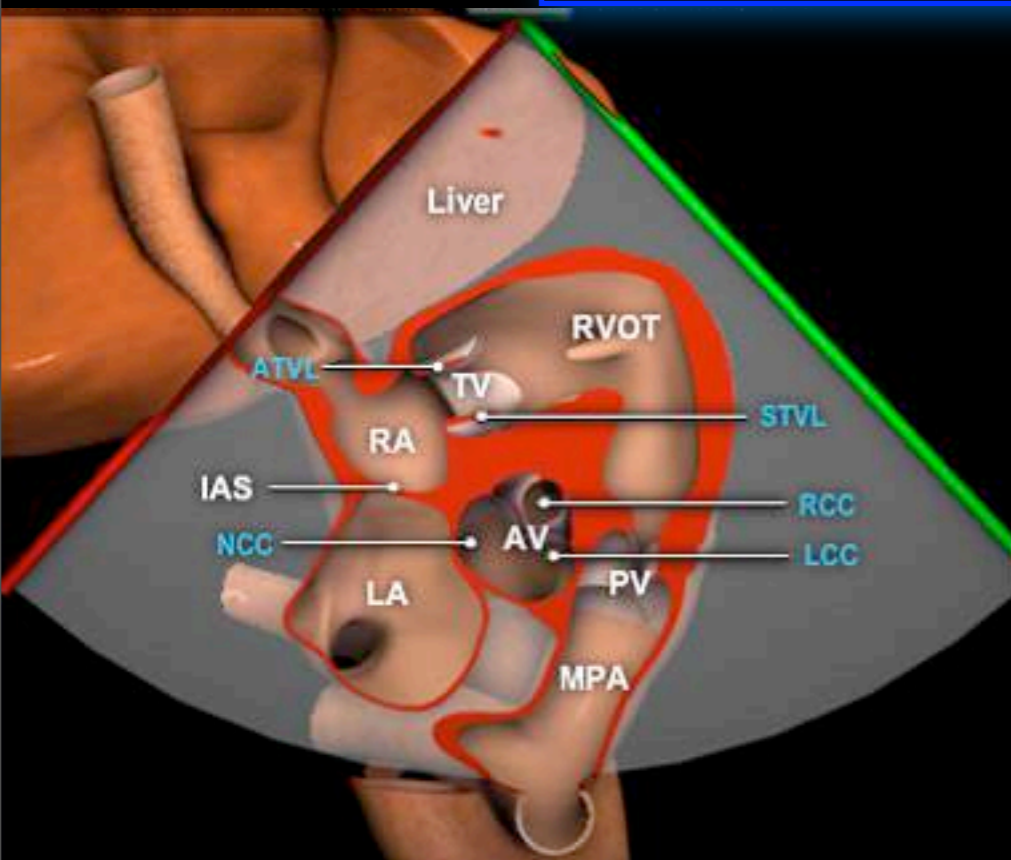
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# *Subcostal: Short Axis View*



# *Subcostal: Short Axis View*



1. [http://pie.med.utoronto.ca/TTE/TTE\\_content/standardViews.html#quickstart](http://pie.med.utoronto.ca/TTE/TTE_content/standardViews.html#quickstart)

2. *Echocardiography in Pediatric and Congenital Heart Disease From Fetus to Adult*  
EDITED BY: Wyman W. Lai, MD, MPH, Luc L. Mertens, MD, PhD, Meryl S. Cohen, MD, Tal Geva, MD

# TTE Windows

## ➤ Parasternal Long Axis

- *Parasternal Long-Axis View*
- *RV Inflow View*
- *RV Outflow View*

## ➤ Parasternal Short Axis

- *Aortic Valve Short Axis View*
- *Mitral Valve Short Axis View*
- *Mid-Papillary Short Axis View*

## ➤ Apical

- *Four Chamber View*
- *Five Chamber View*
- *Two Chamber View*
- *Apical Long Axis View*

## ➤ Subcostal

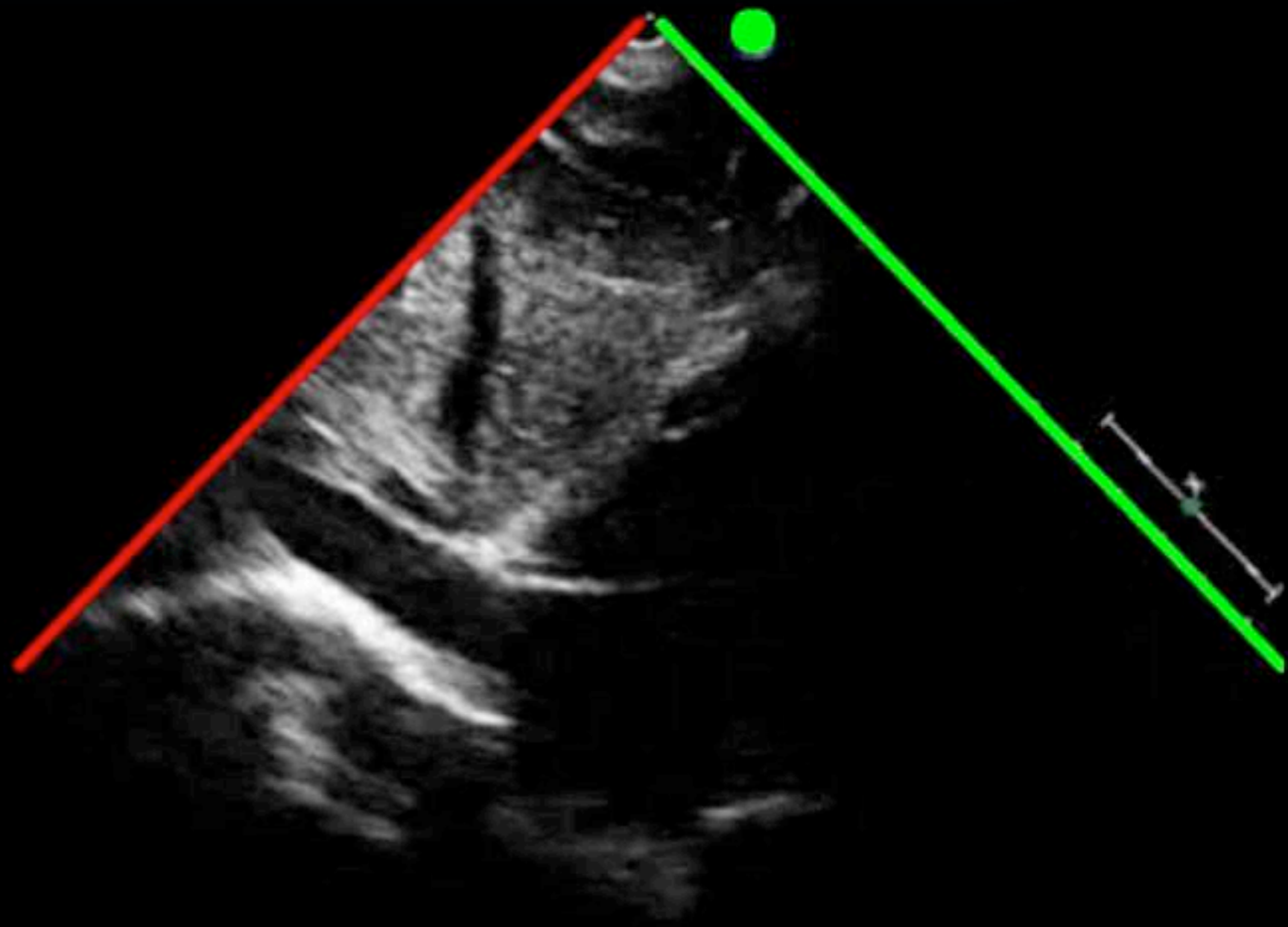
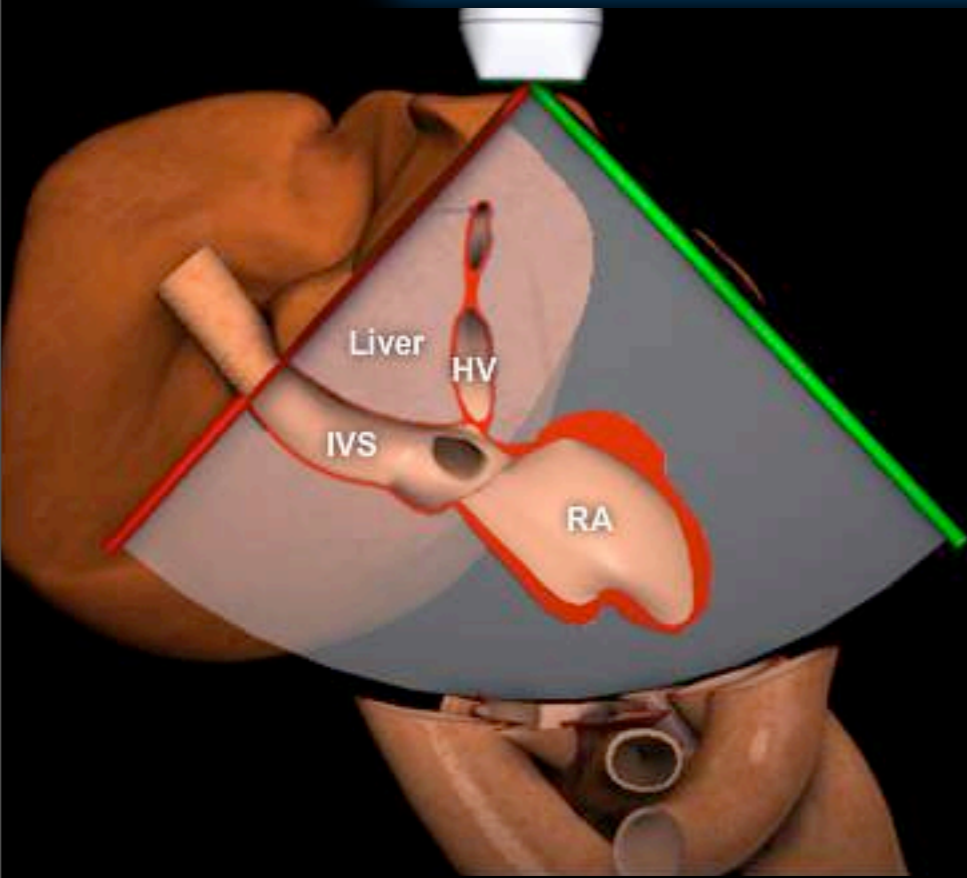
- *Four Chamber View*
- *Short Axis View*
- *IVC Long Axis View*

## ➤ Suprasternal

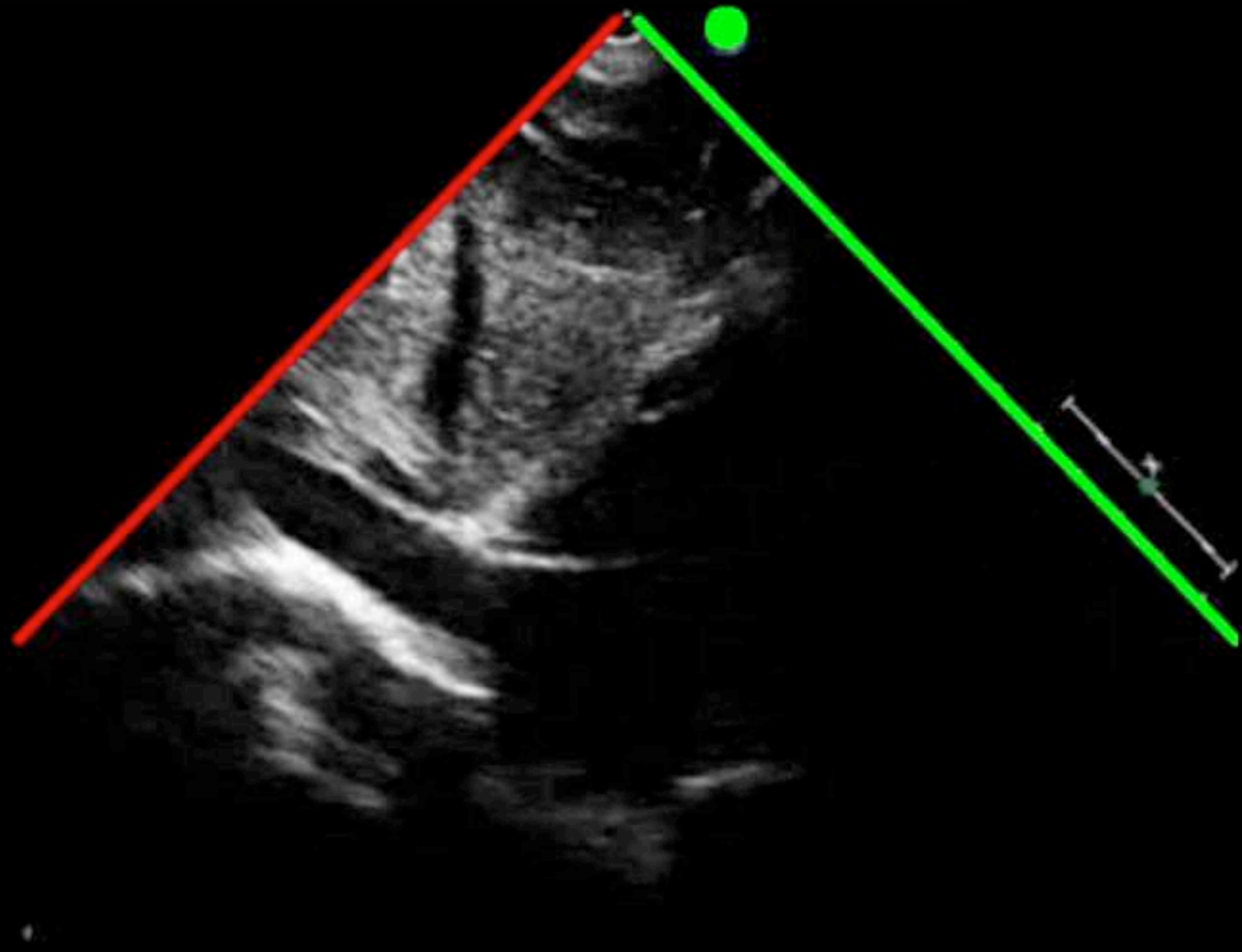
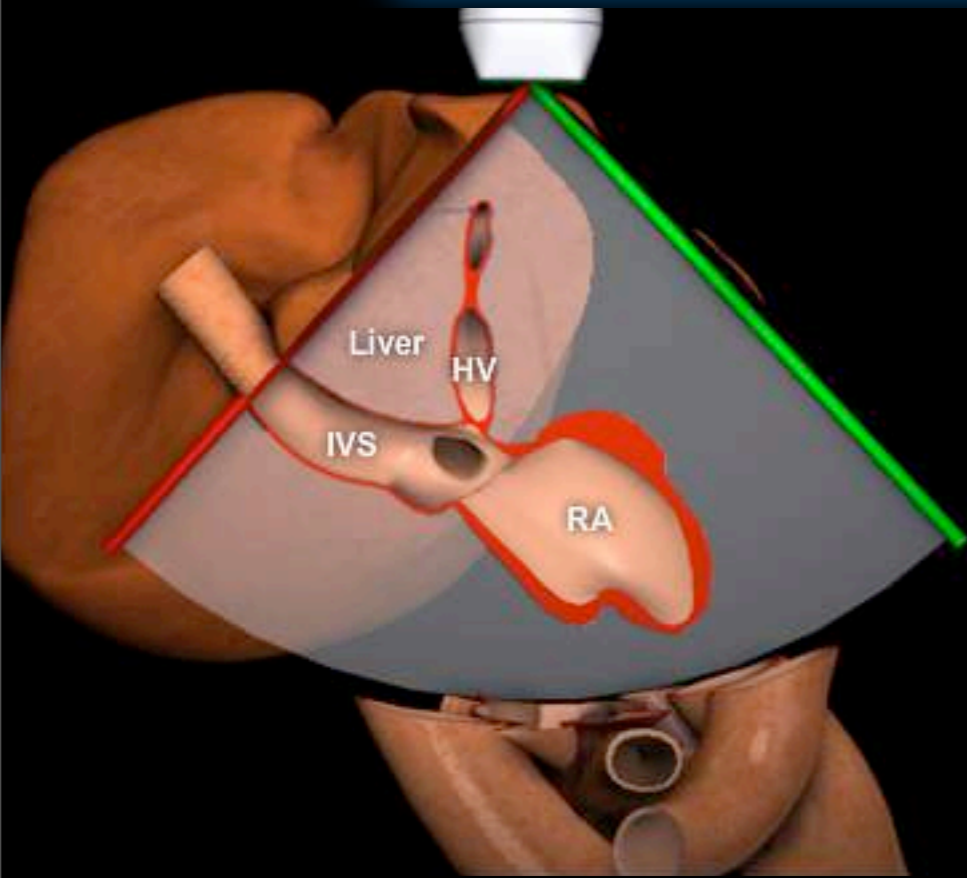
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# *Subcostal: IVC Long Axis View*



# *Subcostal: IVC Long Axis View*



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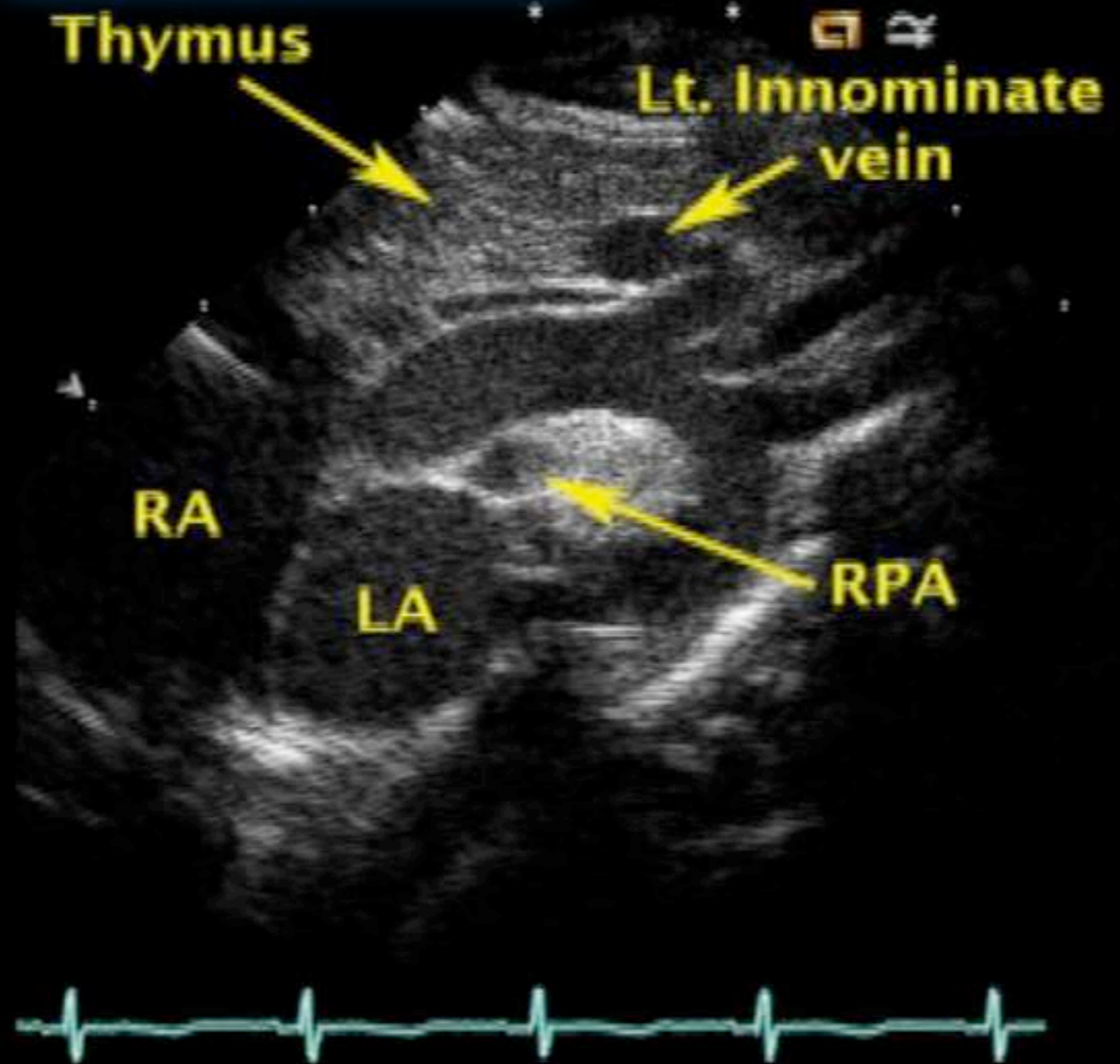
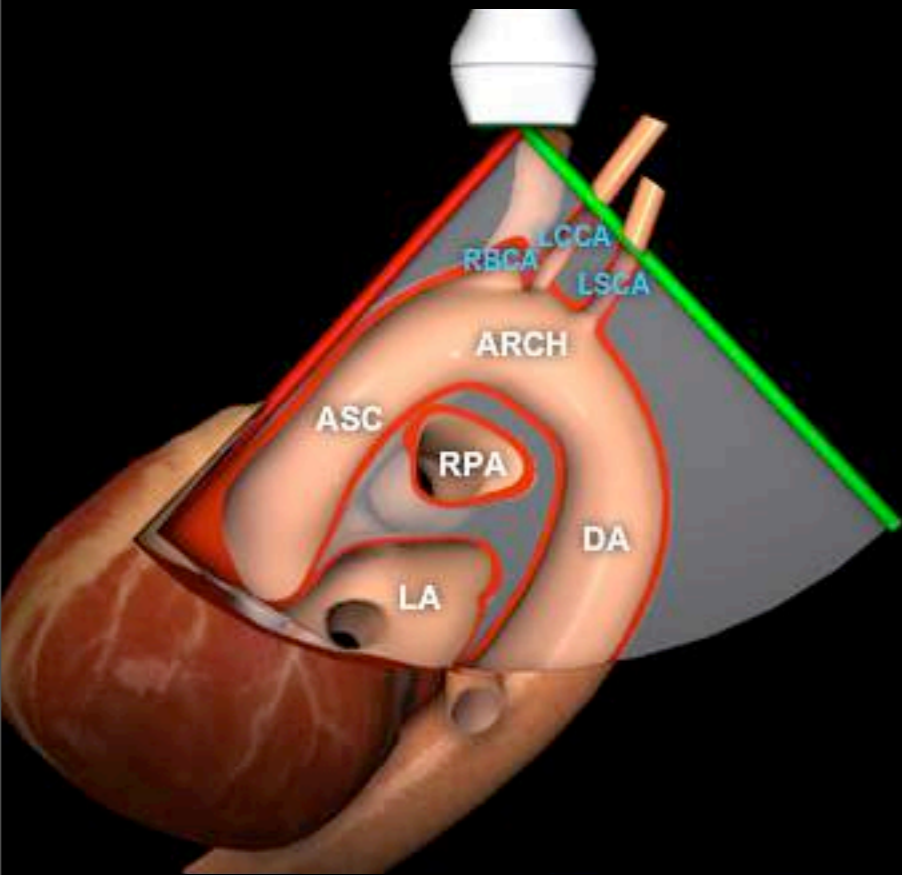
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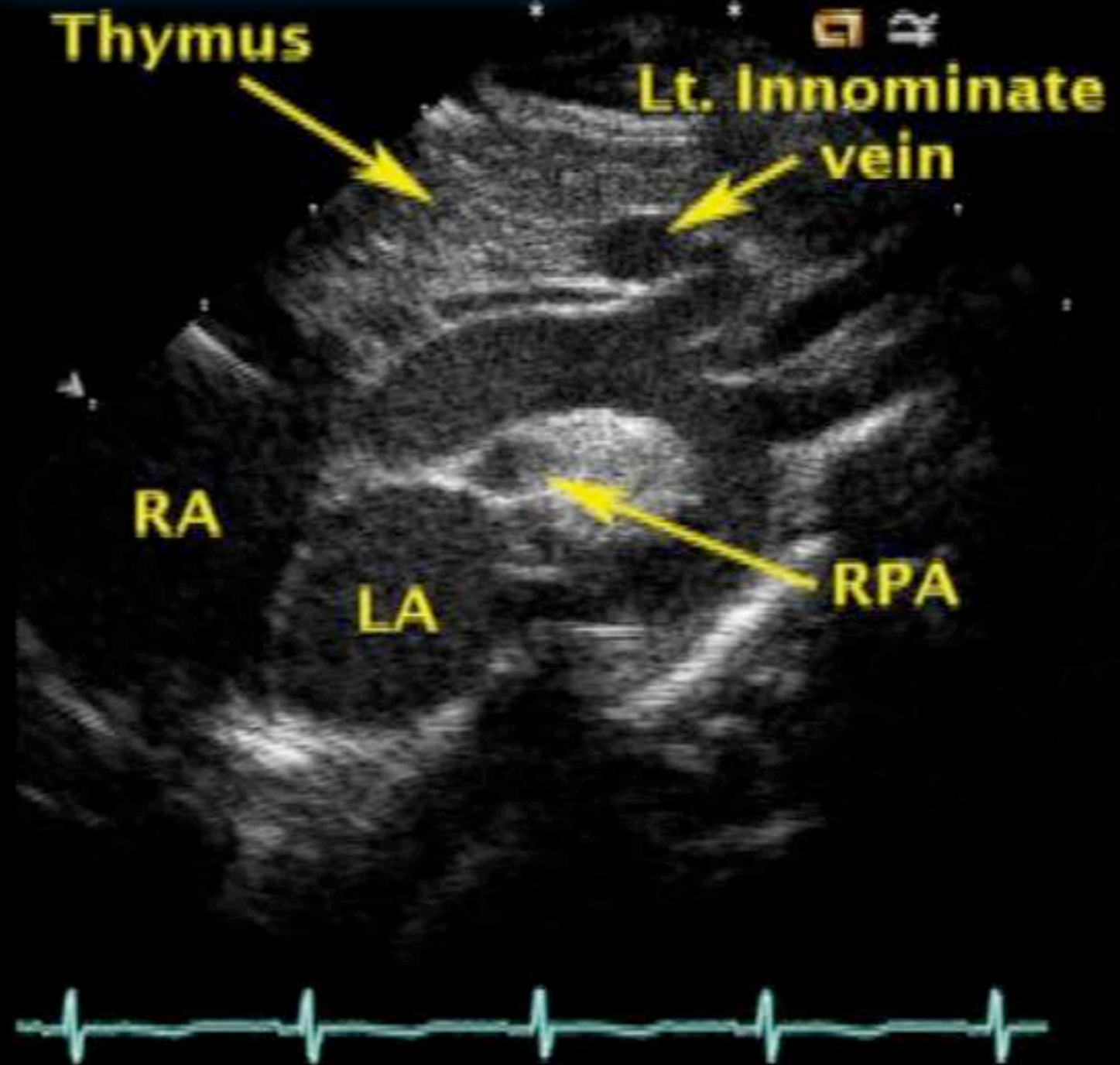
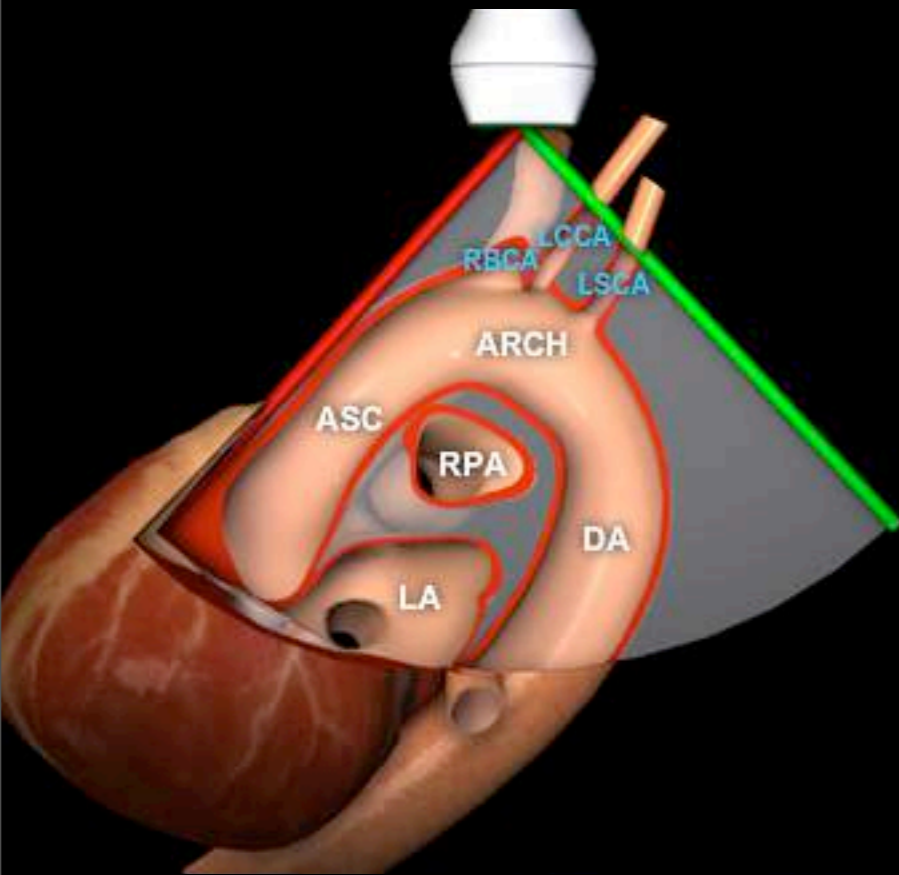
## ➤ Suprasternal



# Suprasternal



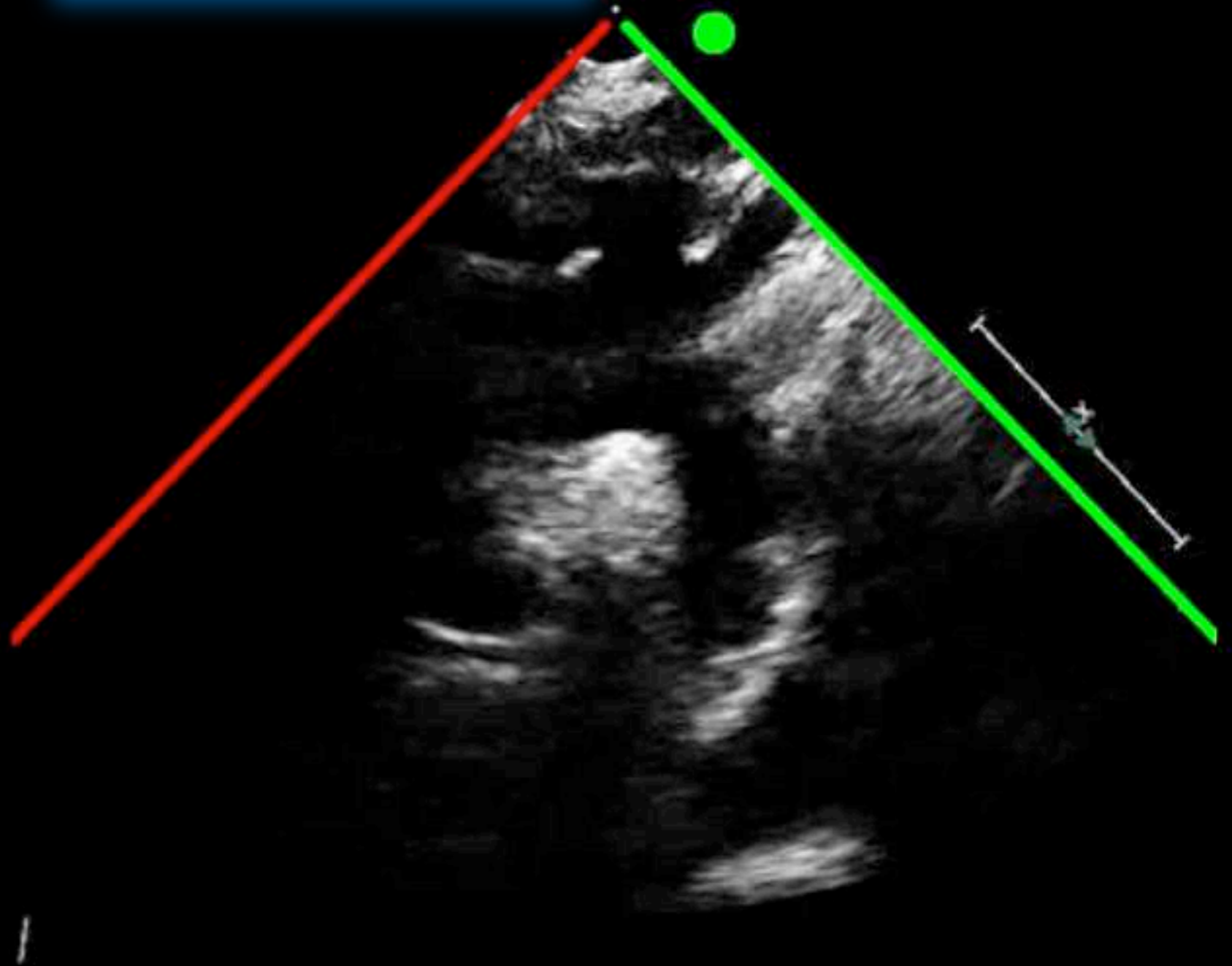
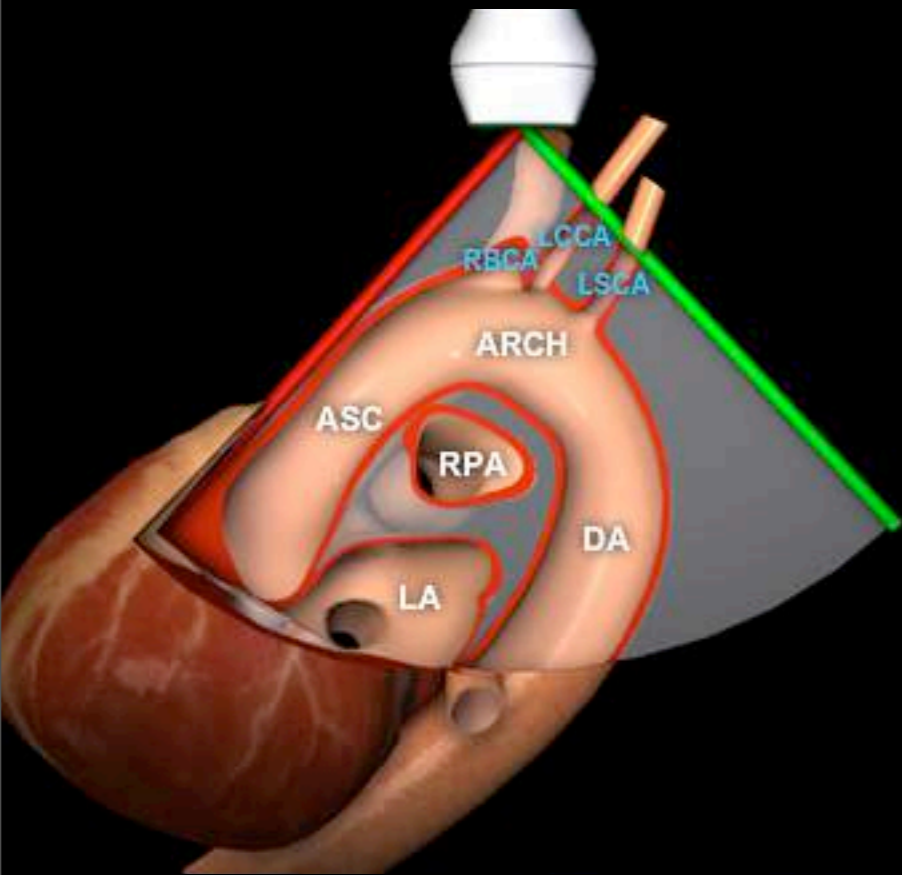
# Suprasternal



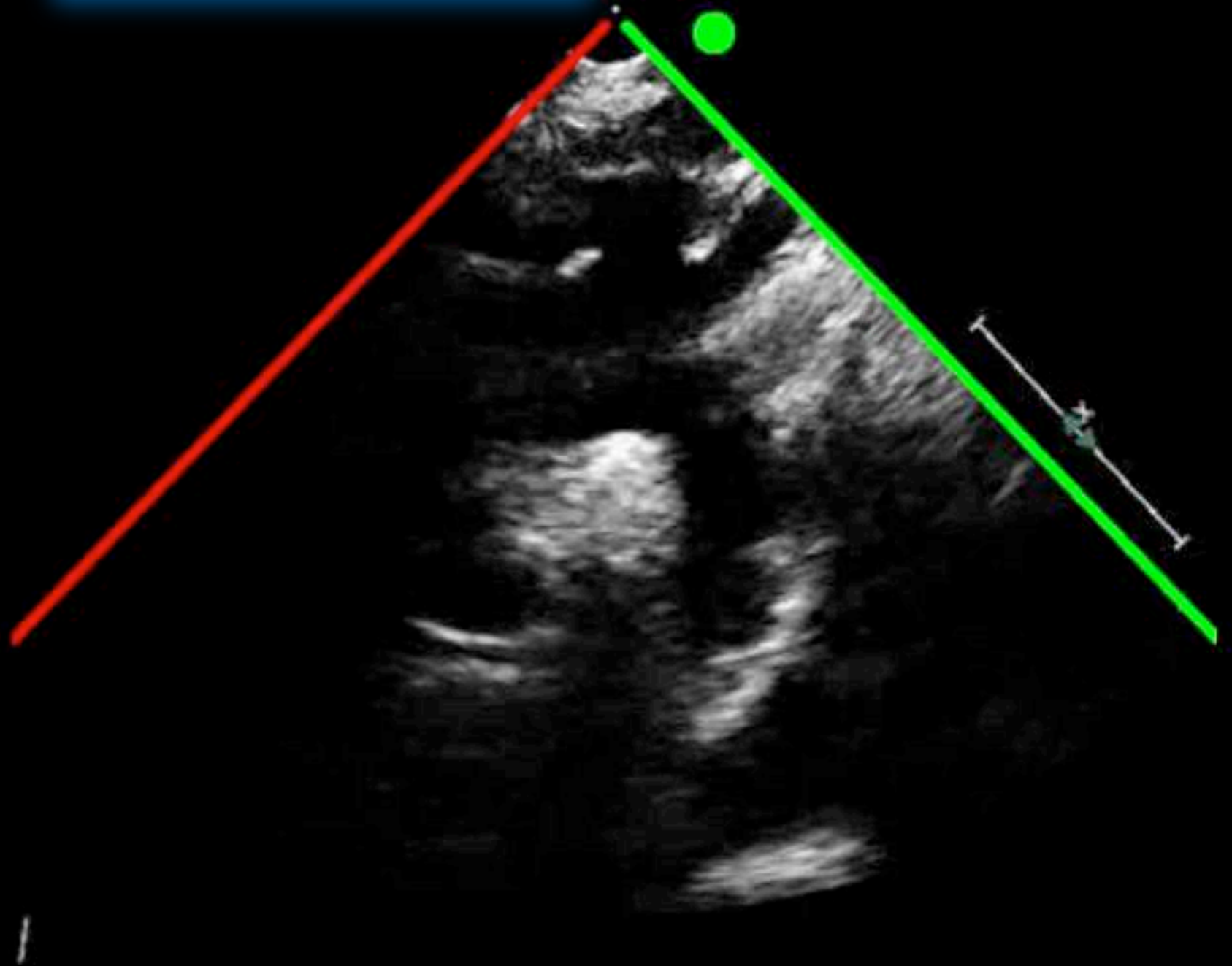
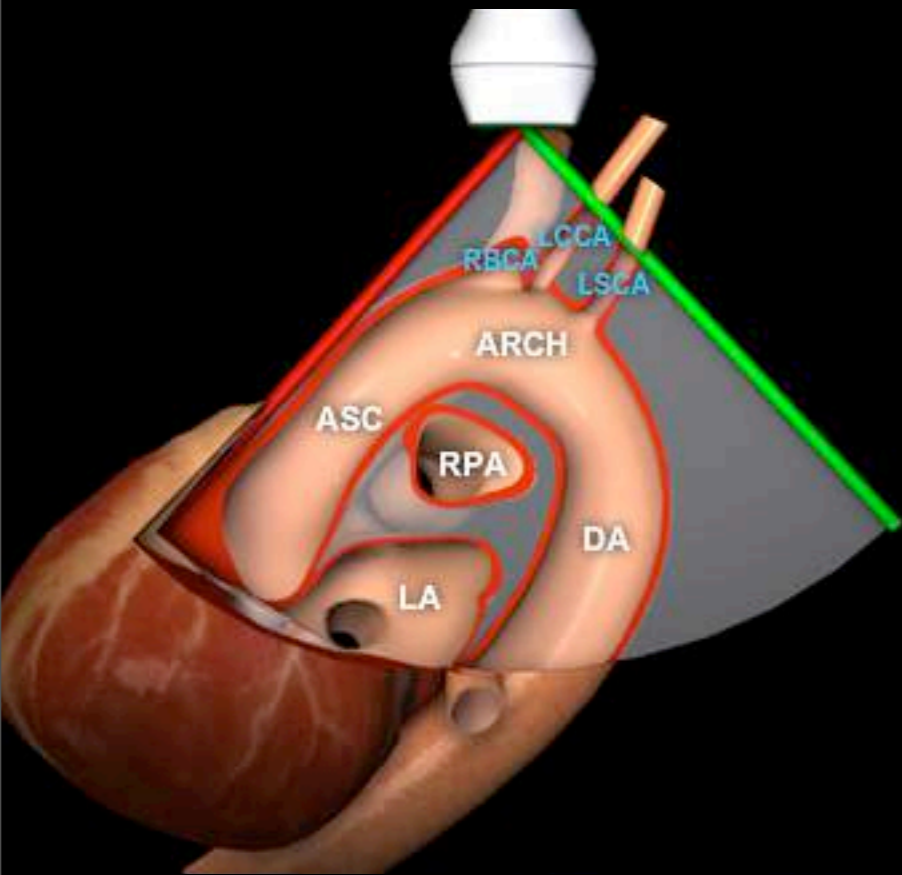
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# Suprasternal



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*Thanks & Good Luck!*

*Tburch333@yahoo.com*