Echocardiography Course Basic-Level-1

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Echocardiography learning guidelines

Level	Months	No. Studies	Interpretation
1	3	75	150
2	6	150	300
3	12	300	750

Ultra sound Wave

- 1 cycle per second =1 Hz
- 1000 cycles per second = 1 KHz
- I million cycles per second -1 MHz
- Human hear 20 Hz to 20 KHz
- Diagnostic Ultrasound uses 1- 20 MHz

Ultrasound wave Propagation in different organs

- Bone Velocity- 3000 m/s
- Lungs tissues- 700 m/s
- Soft tissues- 1540 m/s

Meaning of Frequency, Velocity, Wave Length

- Frequency - number of cycles per second in a ultrasound wave.
- Velocity – Speed that ultrasound travels through tissue.
- Wave length – Distance between ultrasound waves.

Note: Wave length is shorter in higher frequency transducer and wave length is higher in low frequency transducer.

Doppler's Effects

- An increase (or decrease) in the frequency of sound, light, or other waves as the source and observer move towards (or away from) each other. The effect causes the sudden change in pitch noticeable in a passing siren, as well as the red shift seen by astronomers.

TABLE 1. **Published ACC/AHA guidelines for the application of echocardiography18**

I	Heart murmurs and valvular heart disease
II	Chest pain
III	Ischemic heart disease
IV	Cardiomyopathy and left ventricular function evaluation
V	Pericardial diseases
VI	Mass and tumor of the heart
VII	Diseases of large vessels
VIII	Pulmonary disease
IX	Systemic hypertension
X	Neurological disorders and other cardioembolic conditions
XI	Arrhythmia and palpitations
XII	Echocardiography of the critically ill patient
XIII	Echocardiography in the adult patient with congenital heart disease
XIV	Echocardiography of the pediatric patient

ACC/AHA indicates American College of Cardiology/American Heart Association.

Preparing Patient for Echocardiography

Calm the patient and ensure relaxed breathing

Better not to perform after heavy meal and not mandatory in emergency.

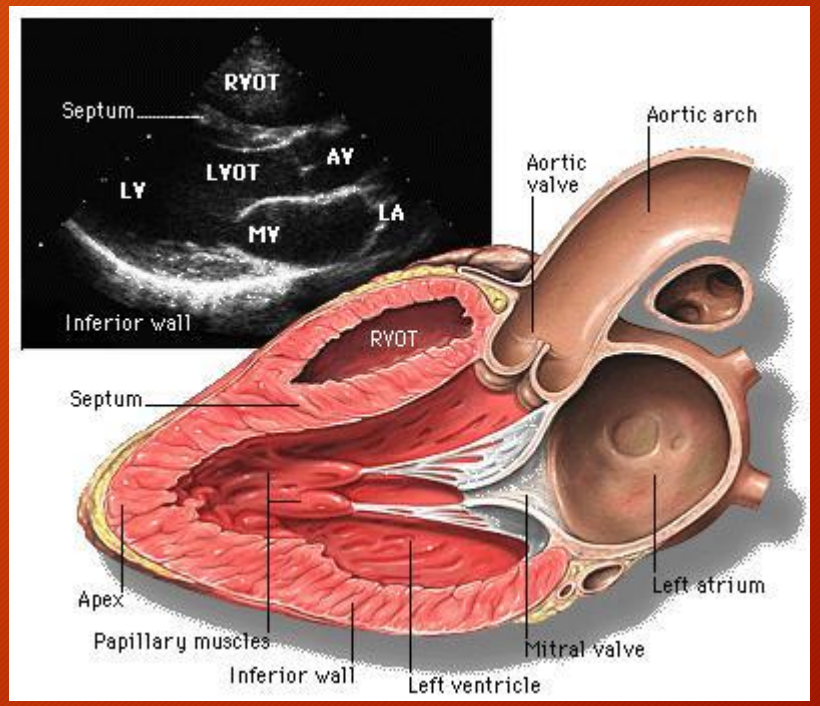
Position of a Patient –Left Lateral Decubitus

Basic Positions in Echocardiography

- 1- Para Sternal Long Axis.
- 2- Para Sternal Short Axis.
- 3- Apical 2Cs, 3Cs, 4Cs and 5Cs
- 4- Subcostal View
- 5- Supra sternal notch

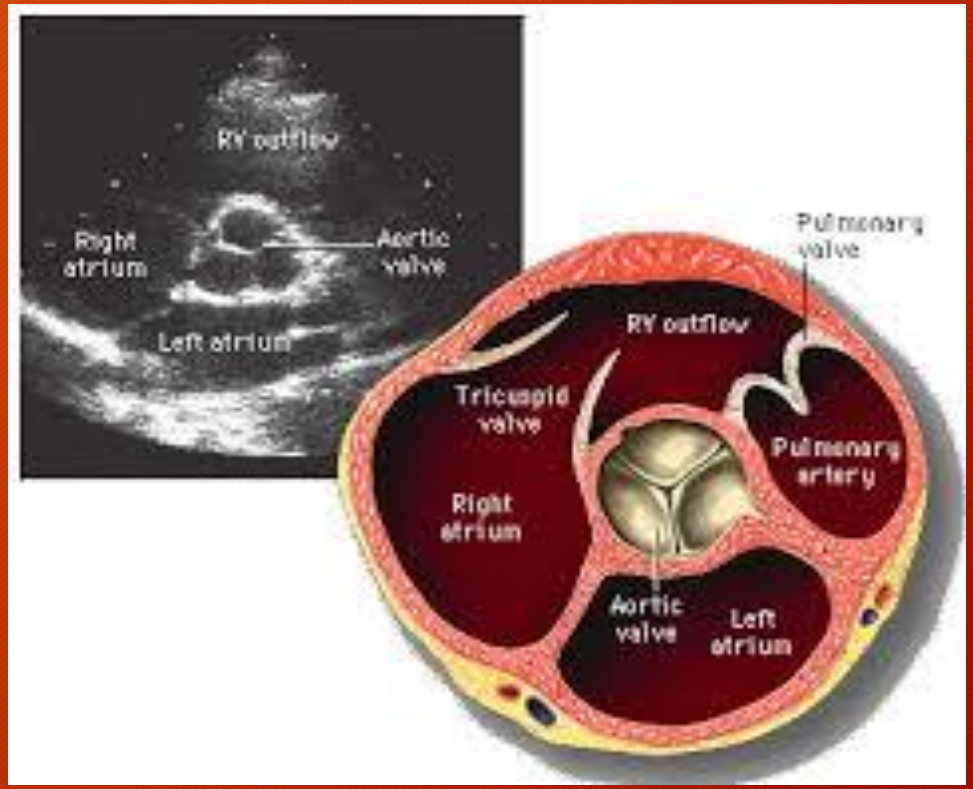
Para sternal Long Axis View

- Right ventricle
- Inter ventricular septum
- Aortic Valve, Aortic Root
- LV cavity
- Mitral Valve, Left Atrium



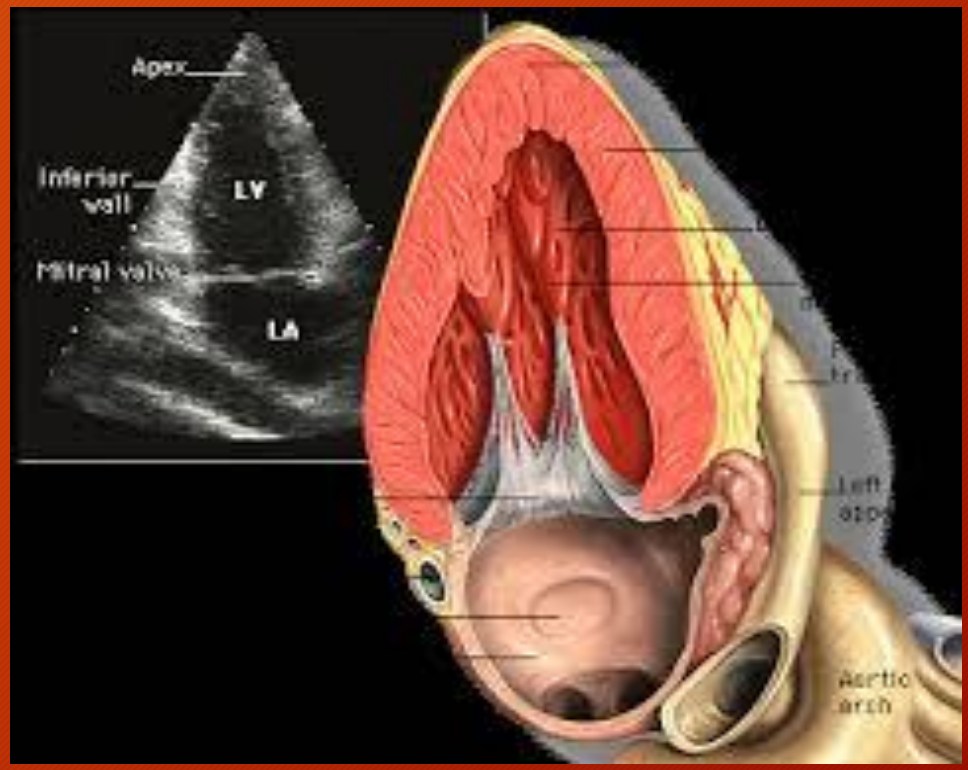
Para Sternal short Axis- Queen of all views

- Left atrium, IAS, TV
- Right atrium, RV, RVOT
- PV, MPA, LPA, RPA
- Aortic Valve- to conform bicuspid or tricuspid



Apical 2 chambers View

- LV Apex
- Inferior wall
- Mitral valve
- LV cavity
- IVS
- Left Atrium

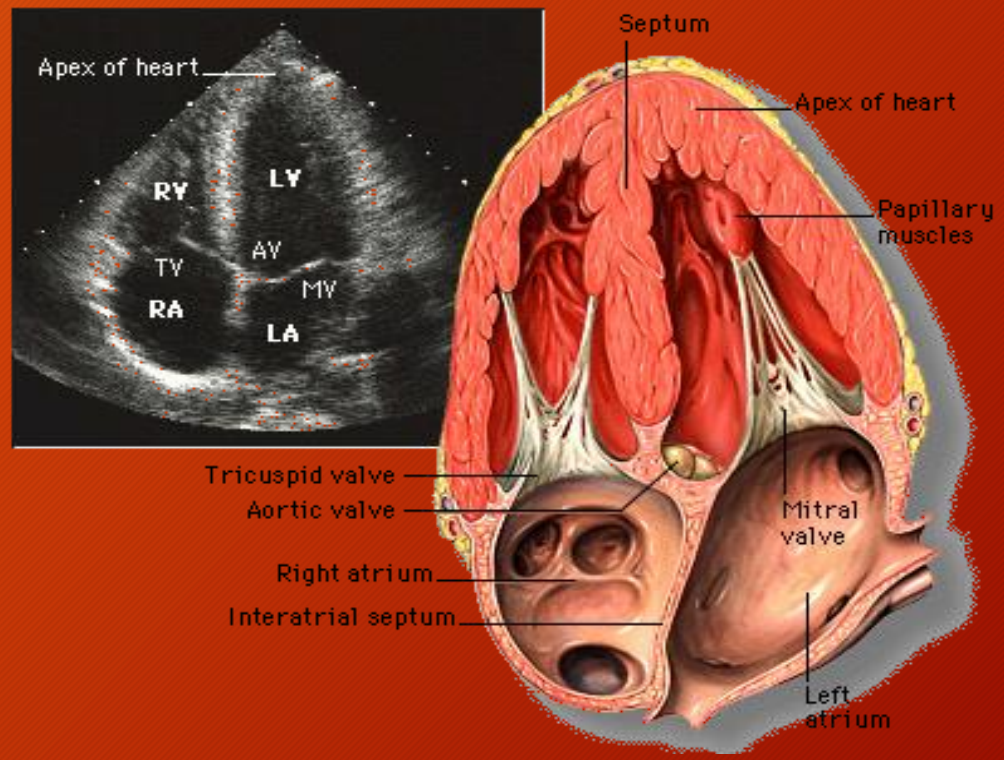


Apical 3Cs View

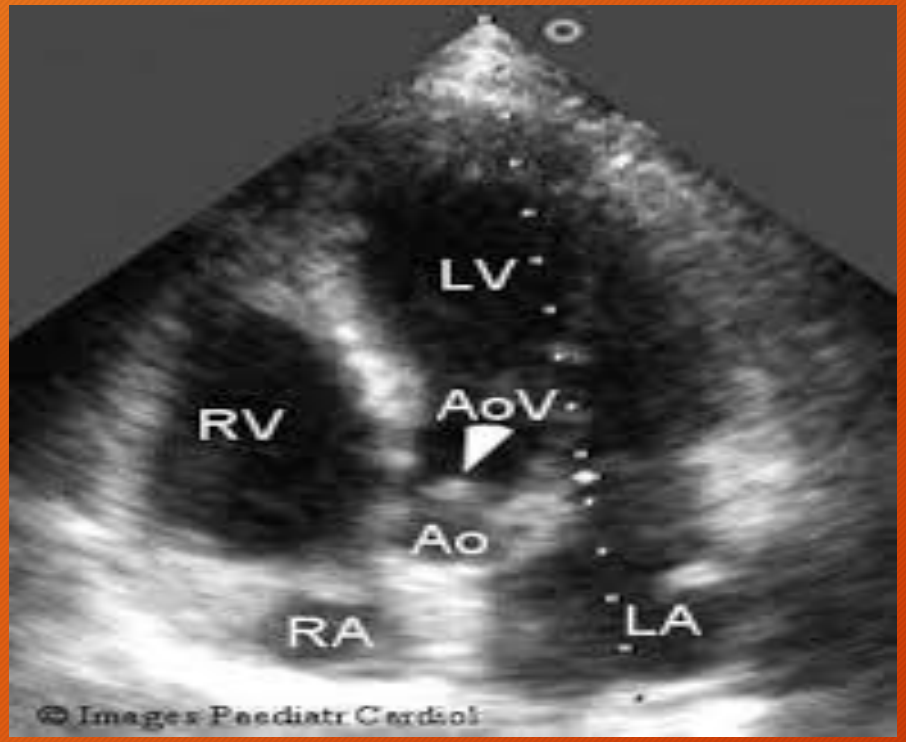
- LV apex
- LV cavity
- Lateral and Inferior wall
- IVS
- Mitral valve and Aortic valve
- Left Atrium

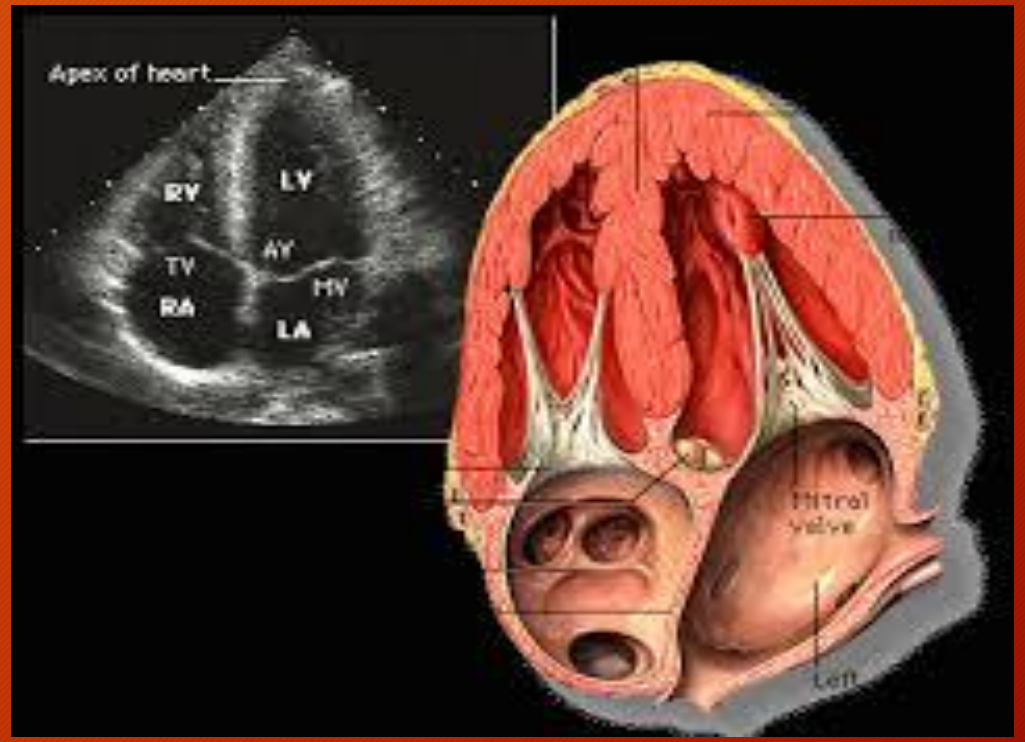
Apical 4Cs View- king of all views

- LV Apex, LV cavity
- Mitral valve, LA,
- Pulmonary veins
- Right ventricle
- Tricuspid valve
- RA, Eustachian valve



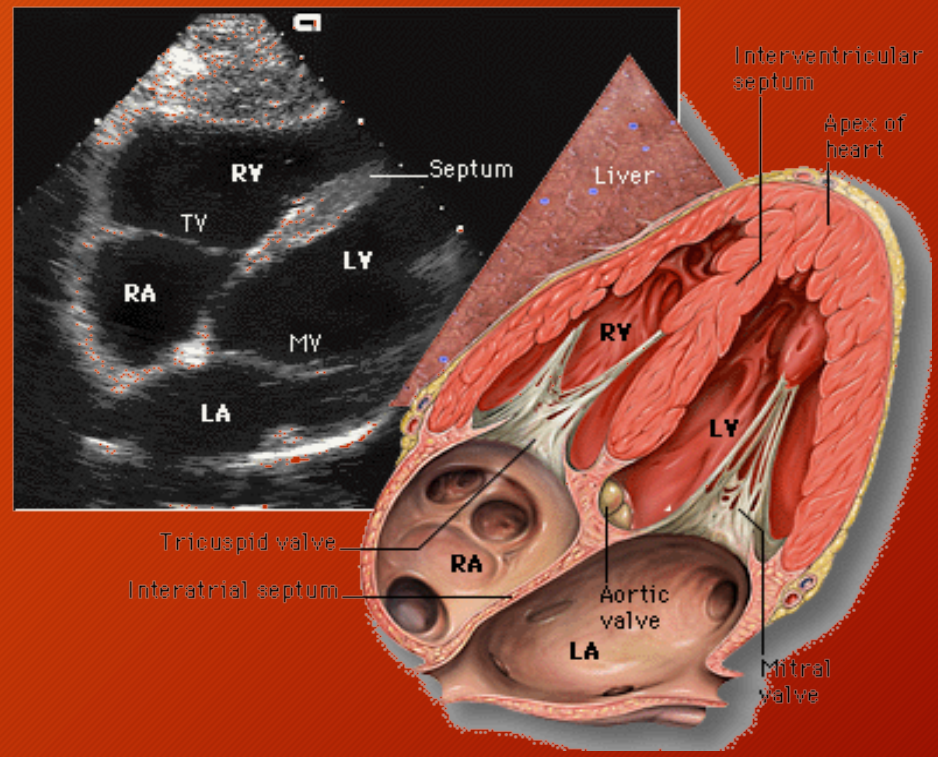
Apical 5Cs view



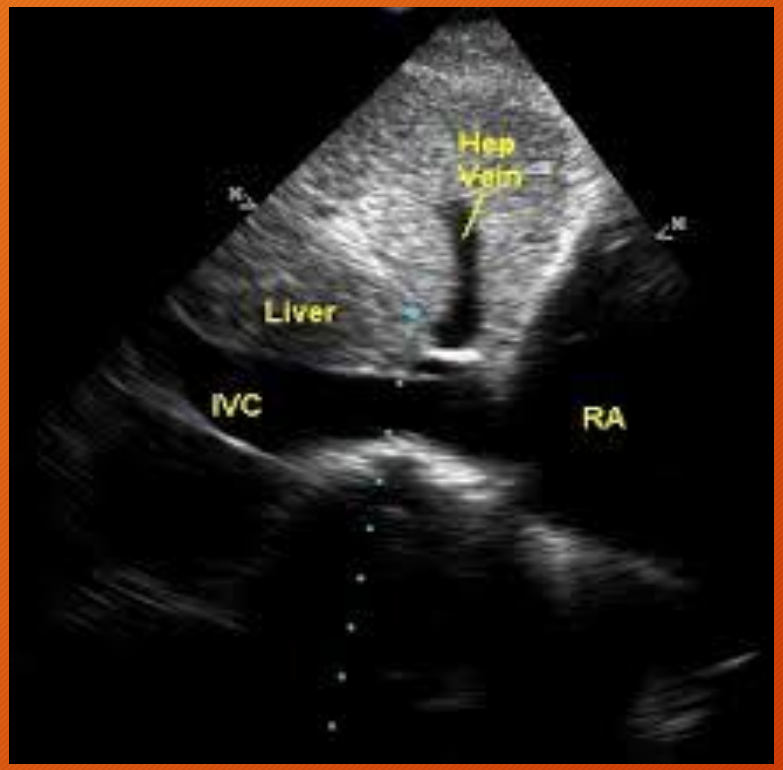


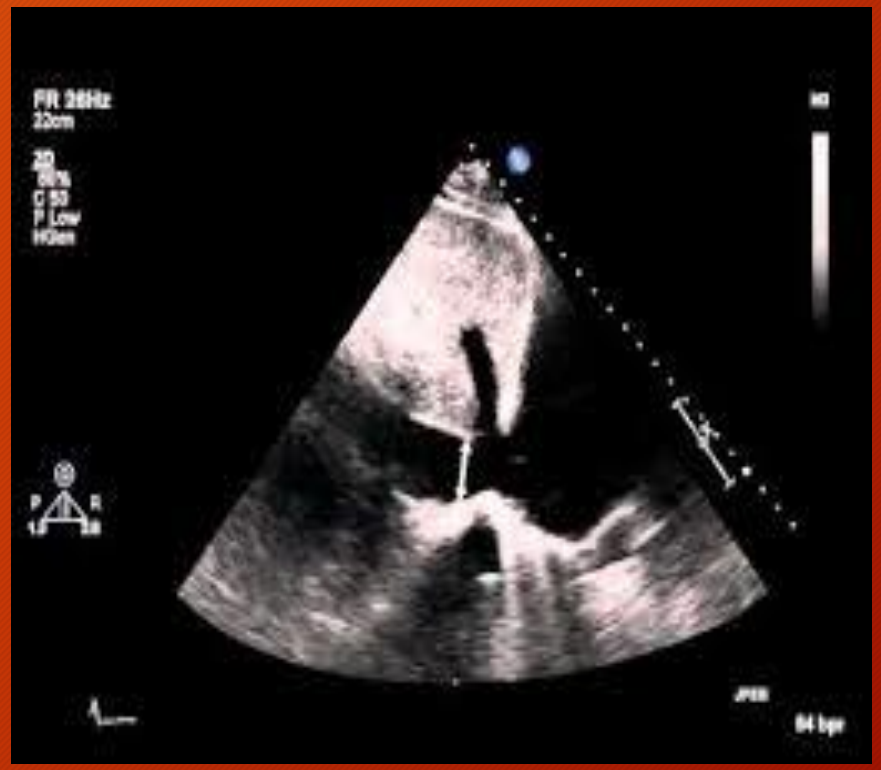
Subcostal view long Axis

- Mainly for IAS
- Pulmonary Veins
- Clots in atria
- Regurgitations
- Mass in the cavity



Subcostal Short Axis



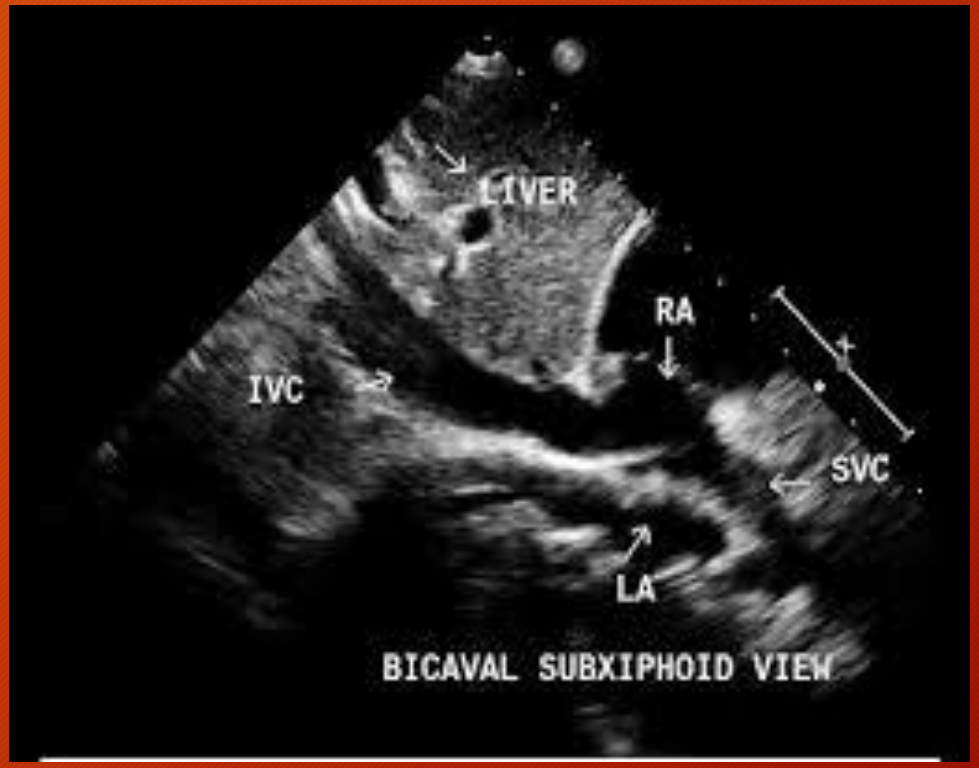


Bicaval Subxiphoid view

Liver vessels

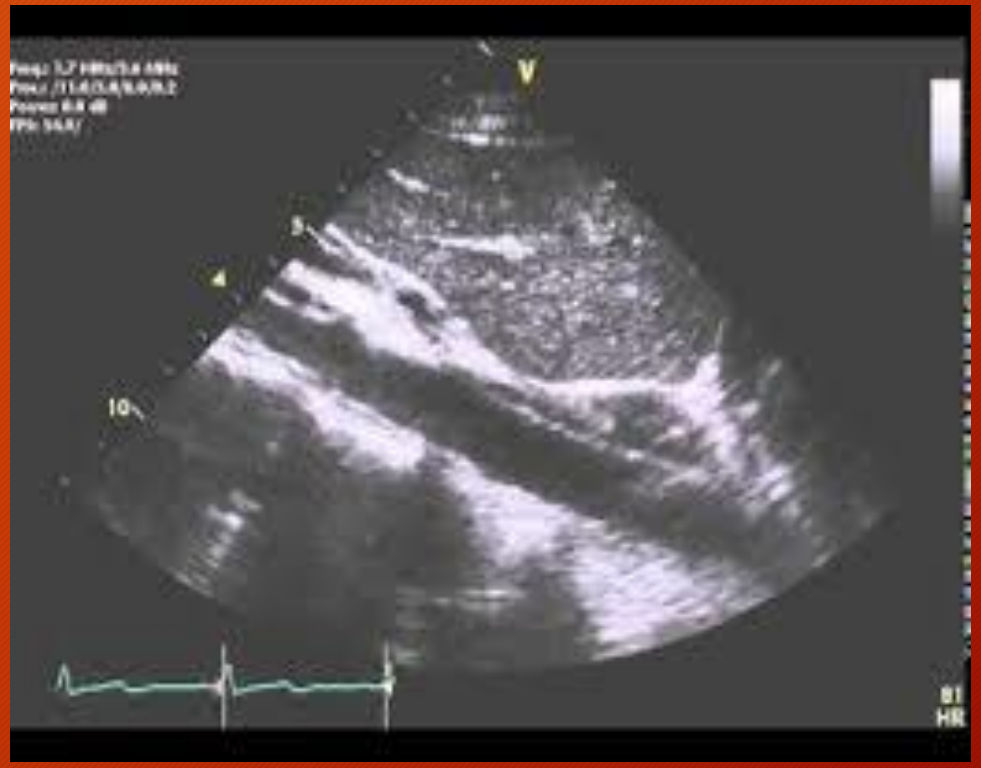
RA, LA

IVC, SVC



Subcostal view modified

- Abdominal Aorta to detect aneurysm and stenosis



Suprasternal Notch view