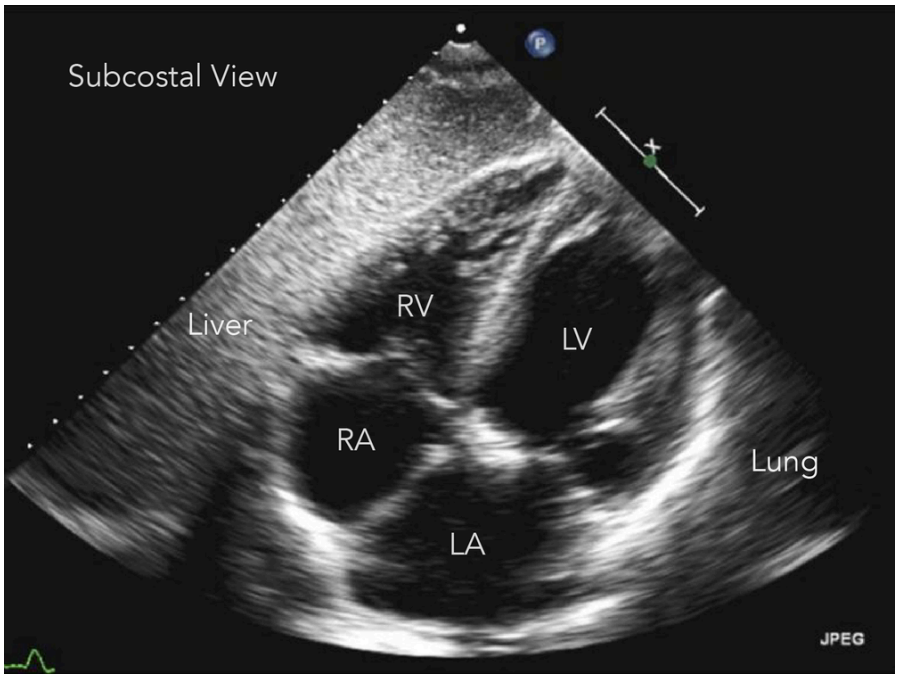
Station 5: Subcostal 4 Chamber View Transthoracic Echocardiography - Monica Lupei, MD, University of Minnesota

Learning objectives:

1. Obtain the optimal Subcostal 4 Chamber Transthoracic View.
2. Understand the anatomy of the Subcostal 4 Chamber View.
3. Clinical applications of the Subcostal 4 Chamber View.
4. Use the Subcostal 4 Chamber View to diagnose and recognize pathology.
5. The Subcostal View of the Inferior Vena Cava (IVC).

1. Obtain the optimal Subcostal 4 Chamber Transthoracic View tips and tricks:

- A phased array ultrasound (US) probe should be used, depth 16-24 cm, expand sector width if necessary.
- Position the patient supine, with relaxed abdomen and bent legs if possible; deep inspiration improves the view.
- Place the US probe flat 2-3 cm below the xiphoid, the probe marker oriented towards the patient left side at 3 o'clock (cardiac preset) and towards the patient right or 9 o'clock (abdominal preset).
- If the chambers are not open tilt the probe up and down and rotate slightly counterclockwise.
- If aortic valve is visible tilt the probe upwards.
- If there is lung-shadow move the probe to the patient right.



https://www.nuemblog.com/new-page

2. Anatomy of the Subcostal 4 Chamber View:

- All four chambers should be visible.
- Right ventricle (RV) is closer to the probe.
- Tricuspid valve (TV), mitral valve (MV) and interventricular septum should be visible.
- Aorta should not be visible.

3. Clinical applications of the Subcostal 4 Chamber View:

- Trauma, shock, chest pain, cardiac arrest.
- Ventilated patients or patients with COPD when the parasternal and apical views are suboptimal.
- Patients who cannot be placed on the left side or have dressing or other devices over the thorax.
- It might be the only view available during cardiac arrest while CPR is undergoing.

4. Use the Subcostal 4 Chamber View to diagnose and recognize pathology:

- Assess LV and RV function.
- Evaluate chamber dimension, wall thickness.
- Is there severe ventricular dysfunction and wall motion abnormality? Is there severe MV regurgitation? Diagnosis: cardiomyopathy, acute coronary syndrome.
- Is there pericardial fluid? Is there collapse of RV during diastole? Diagnosis: pericardial effusion, tamponade.
- LV and RV are under-filled or collapsed? Diagnosis: hypovolemia.
- Is there RV larger than LV? Is there RV dysfunction with preserved apical function (McConnell sign)? Is there left side bowing of the interventricular septum? Diagnosis: pulmonary embolism.
- Is there hyperdynamic LV? Septic shock.

5. The Subcostal View of the Inferior Vena Cava (IVC):

- Turn the US probe 90 degrees counterclockwise from the Subcostal 4 Chamber View marker oriented cephalad (cardiac preset) or 12 o'clock.
- The correct image visualizes the IVC connection to RA.
- The IVC diameter should be measured at 2 cm from the confluence of RA with IVC.
- If IVC < 2.1 cm and changes with respiration > 50%: RA pressure 0-5 mmHg.
- If IVC < 2.1 cm and changes with with respiration < 50%: RA pressure 5-10 mmHg.
- If IVC > 2.1 cm and changes with with respiration > 50%: RA pressure 10-15 mmHg.
- If IVC > 2.1 cm and changes with with respiration < 50%: RA pressure 15-20 mmHg.