POCUS Cardiac Examination Author: George Pantely
Edited: Bob Gobbo 5.24.23

I. **Purpose and Objectives**: To determine if specific symptoms or physical exam findings can be explained by information gained during a brief POCUS examination of the heart by the assessment of:
1. Cardiac chamber and ascending aortic sizes.
2. Presence of pericardial effusion.
3. Volume status by size and collapsibility of the IVC.

II. **Key Questions** to answer: 5 E's plus 1
1) Is there a pericardial **Effusion** present?
2) What is the **Ejection** Fraction? Eye Balling, Look at MV making a High 5, Myocardial Thickening, End Point Septal Separation % EF = 75 – (2.5 x EPSS) (Normal/Depressed/Severely depressed)
3) What is the **Equality**: Is the RV > LV
4) What is the **Entrance** (IVC) Normal Intravascular Volume Assessment or Plethoric
5) What is the **Exit** (Aorta) Normal or Dilated?
6) Is the Left Atrium **Enlarged**

III. Technique:
a. Use cardiac setting with problem marker on the right side of the screen.
b. Two positions of patient: supine (PLAX, PSAX, and subcostal) and left side for A4C view.
c. Image from 3 different places on the chest (parasternal, apical, and subcostal) to obtain 5 views.

IV. Positions on the chest wall and views

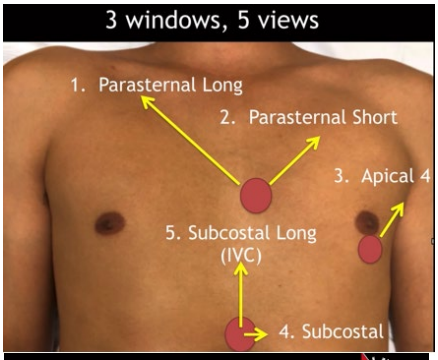
1. **Parasternal long axis (PLAX) from parasternal position**.
   a. Patient supine with probe perpendicular to chest wall and marker pointing toward right shoulder.
   b. Slide between the 3rd-5th IC space until a view of the heart is obtained. Then make small changes in probe position to improve image.

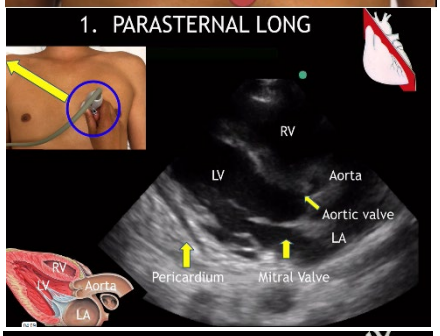
2. **Parasternal short axis (PSX) from parasternal position**.
   a. Rotate probe clockwise by 90 degrees so marker is pointing toward left shoulder to obtain PSAX
   b. Tilt probe to view LV at papillary muscle level.

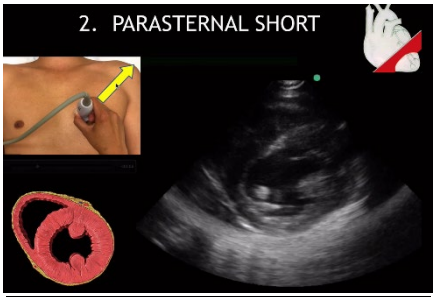
3. **Apical 4 chamber (A4C) from apical position**
   a. Left lateral position with probe at apex pointed toward the right shoulder with probe marker pointed toward the left shoulder.
   b. Patient hold breath in expiration may improve image by getting lung out of the way. Look for moderator band id the RV

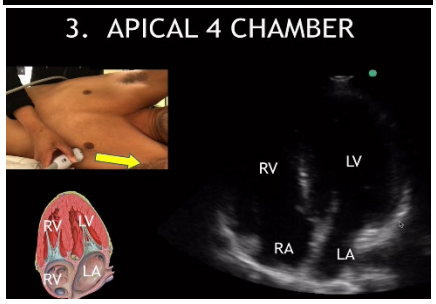
4. **Cardiac view through the liver from the Subcostal Position**.
   a. Patient supine with knees bent to relax abdominal muscles.
   b. Probe flat against (parallel) abdominal wall with probe aimed toward the head or left neck area with marker pointing to the patient's left.
   c. Hand above probe with fingers holding sides and try to scoop up under xyphoid sound waves pass through liver to heart
   d. Holding breath in full inspiration can improve image as heart is closer to probe.

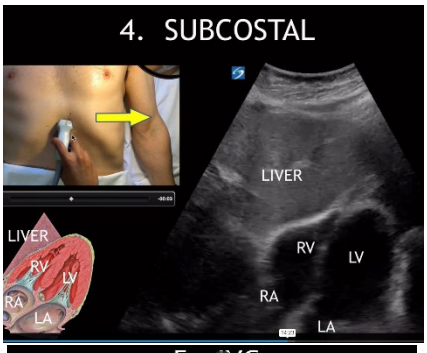
5. **IVC view from the subcostal position.**
   a. Probe mostly perpendicular to the abdomen directly slightly to the right of midline with probe marker pointing to the head or left neck.
   b. View IVC and hepatic vein as it enters the right atrium.

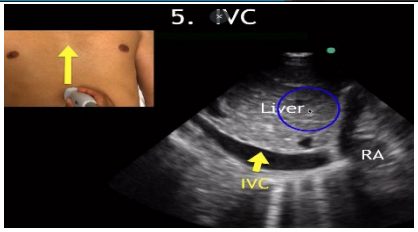












IV. Interpretation: Findings are described in general terms (normal or mild, moderately, or severely abnormal).
a. Normal LV diameter in PLAX <5.5 cm. RV diameter in A4C is 50-70% of normal LV size.

b. In the PLAX, normal aortic and LV diameters are <2.5 cm and should be about equal. In the A4C, the LA size is about half the size of the LV.
c. LV systolic function = normal if anterior leaflet of the mitral valve hits or comes close to touching the septum in diastole, .
d. Absence of pericardial fluid in normal. Presence is abnormal. Size of pericardial effusion is based on thickness: small <1 cm, moderate 1-2 cm, and severe if >2cm.
e. Normal IVC size is <2.5 cm with 50% collapse during inspiration, CVP is normal at <8 mmHg. If the IVC is dilated and doesn't collapse with inspiration, CVP is severely elevated (>18 mmHg).

V. Pitfalls

a. The anterior motion of the mitral leaflet during diastole is not a valid judge of LV systolic function if either significant aortic insufficiency or mitral valve stenosis are present.
b. There is a poor correlation between the size of a pericardial effusion and presence of tamponade. Need to look at other clinical or echo parameters.
c. In the PLAX, pleural effusion is behind aorta while pericardial effusion is anterior to aorta.
d. Don't mistake epicardial fat on the surface of the heart (moves with it) for pericardial fluid.
e. Distinguish true IVC collapse from "false" collapse due to probe motion during respiration.
f. Don't confuse the IVC with the aorta or gall bladder in the subcostal view.