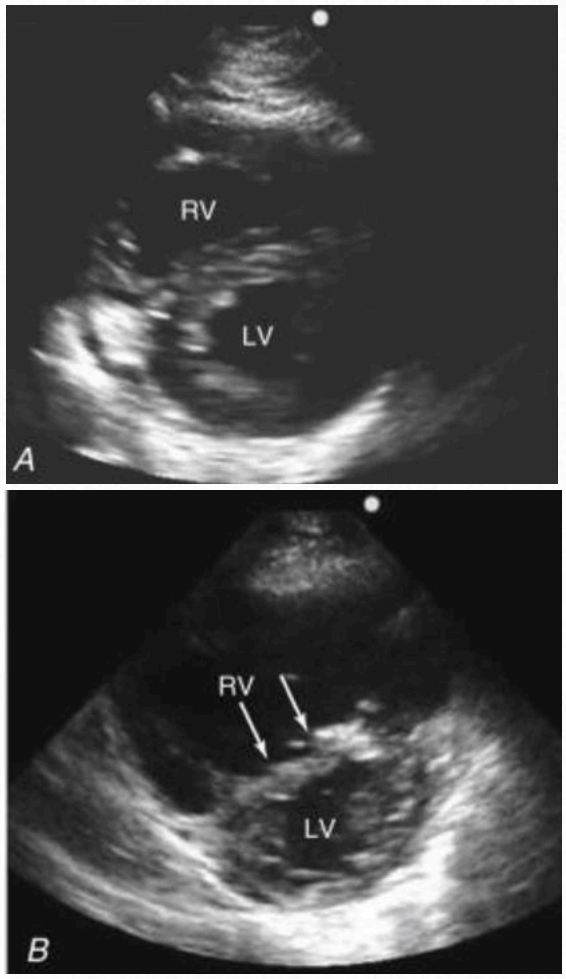
F. ASSESSMENT OF RIGHT HEART FUNCTION

Right Ventricular Dimensions

Comparing right ventricular dimensions to left ventricle dimensions is an important technique to assess function. The ideal views for this technique are apical 4-chamber and subcostal 4-chamber views.

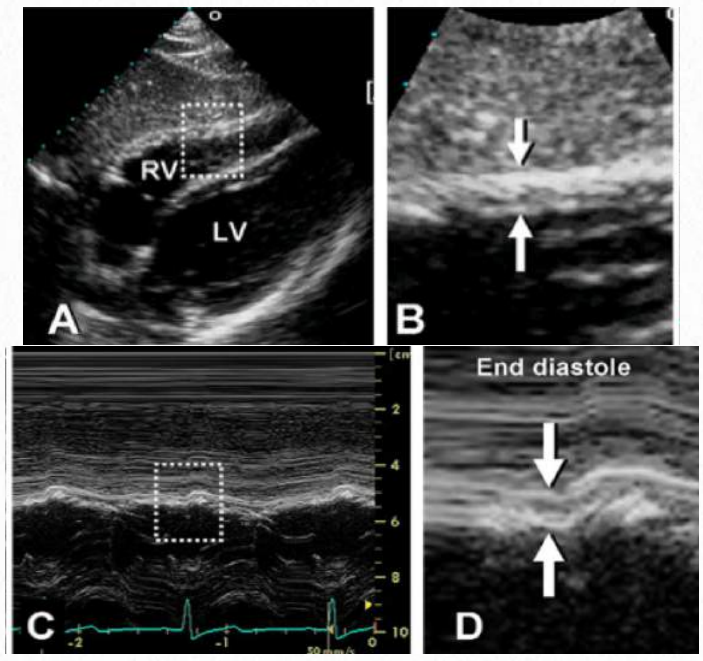
The RV internal diameter should not be more than 2/3 the size of the LV, and it should not extend more than 2/3 to the apex of the LV.

If the interventricular septum forms a flattened or “D shaped” left ventricle, one should be concerned for right ventricular heart failure.



RV Wall Thickness

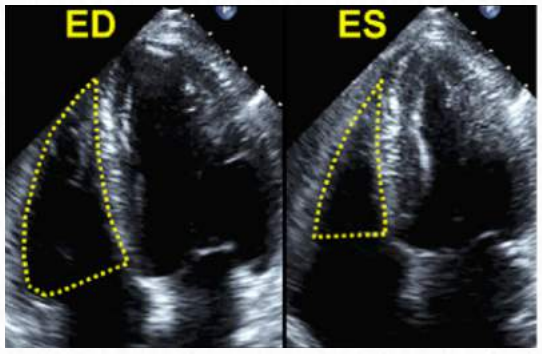
From the subcostal view, align the ultrasound beam perpendicular to the RV free wall and exclude RV trabeculations and papillary muscle from the endocardial border. M-Mode can be helpful to visualize the image. **The normal range for RV wall thickness is <0.5cm.**



Meaurements of RV Systolic Function

The RV is thin-walled and its systolic function is based on longitudinal shortening. The key assessment relies on seeing a significant change in the “length of the RV” from diastole to systole.

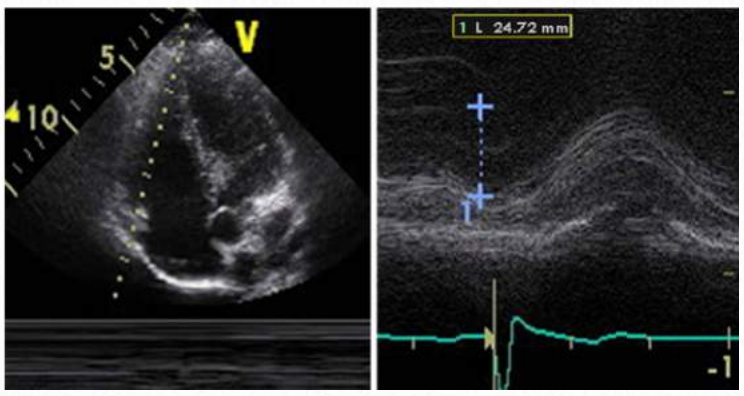
Right Ventricular Fractional Area Change (FAC): RV FAC is obtained by tracing RV endocardium both in systole and diastole from the annulus, along the free wall to the apex, and then back to the annulus, along the interventricular septum (see below). Avoid trabeculations. **Normal FAC is >30%.**



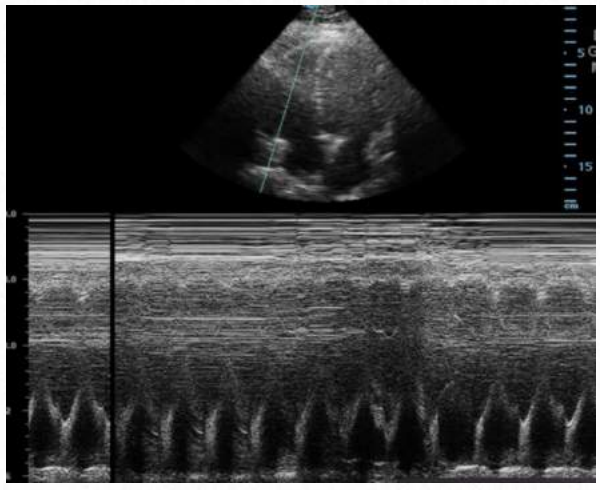
$$\frac{\text{End diastolic area} - \text{End systolic area}}{\text{End-diastolic area}} \times 100$$

RV FAC correlates well with RV ejection fraction by MRI. RV FAC is found to be an independent predictor of heart failure, sudden death, stroke, and/or mortality in studies of patients after pulmonary embolism.

Tricuspid Annular Plane Systolic Excursion (TAPSE): TAPSE is acquired by placing an M-Mode cursor through the tricuspid annulus and measuring the amount of longitudinal motion of the annulus at peak systole. *Normal TAPSE is >16mm.*



Advantages	Disadvantages
Simple	Assumes displacement of a single segment represents the function of a complex 3D structure
Less dependent on optimal image quality	Angle dependent
Reproducible	No large scale validation studies
Does not require sophisticated equipment or prolonged image analysis	May be load dependent



Right Atrial Assessment

Assess the right atrium in the apical 4-chamber view. Estimate the right atrial area by planimetry. The maximum long distance of the RA is from the center of the tricuspid annulus to the superior RA wall, parallel to the interatrial septum. A mid-RA minimum distance is defined from the mid-level of the RA free wall to the interatrial septum perpendicular to the long axis. RA area is traced at the end of ventricular systole, excluding the IVC, SVC, AND RAA. *Normal right atrial area is <18 cm².*