Cardiac Ultrasound

Topic: Evaluating Ventricular Failure

1. Definition
   a. Ventricular failure can be organized into systolic and diastolic dysfunction (https://www.ncbi.nlm.nih.gov/pubmed/7713107). Echocardiography can diagnose ventricular failure and the severity of each type of dysfunction.

2. Purpose
   a. Determine type of dysfunction
   b. Determine severity of dysfunction
   c. Define parameters of the dysfunction

3. Types of dysfunction
   a. Systolic
      i. Wall motion abnormalities
         1. Hypokinesis
         2. Akinesis
         3. Aneurysmal
         4. Normal
      ii. Ejection Fraction
         1. Simpsons method of discs
         2. 3D assessment
   b. Diastolic
      i. Early filling
         1. E wave
      ii. Atrial filling
         1. A wave
      iii. Tissue Doppler
         1. e’
      iv. Left Ventricle End Diastolic Pressure
      v. Pulmonary vein flow

4. Transducer Placement and Doppler
   a. Systolic
      i. Apical Four Chamber
         1. 4th-5th intercostal space
         2. Probe marker toward the floor
         3. Septal and Lateral Walls
         4. Coronary Perfusion
      ii. Apical Two Chamber
         1. 90 degree counterclockwise rotation from Apical Four
         2. Inferior and Anterior Walls
   b. Diastolic
      i. Apical Four Chamber
         1. 4th-5th intercostal space
2. Probe marker toward the floor
   ii. Pulsed Wave Doppler
      1. Ventricular side of Mitral Valve
         a. E wave
         b. A wave
      2. Pulmonary vein
         a. S and D waves
   iii. Tissue Doppler
      1. Pulsed Wave
      2. Lateral Mitral Valve Annulus

5. Coronary Perfusion
   a. Right Coronary Artery
      i. Basilar Septal Wall
      ii. Basilar and Mid Inferior Wall
      iii. Right Ventricle
   b. Left Anterior Descending
      i. Distal Septal Wall
      ii. Distal Inferior Wall
      iii. Anterior Wall
   c. Circumflex
      i. Infero-lateral Wall
      ii. Mid Septal Wall
      iii. Lateral Wall