Cardiac Ultrasound Cheat Sheet

**Basics**

**Clinical Indication**
- Evaluation of pts with hypotension, chest pain, & syncope of unknown origin
- Evaluation of pts with cardiac disease

**Anatomy**
- Apex of heart points towards left hip
- Base of heart points towards right shoulder

**Technique**

**Basics**
- Use phased array probe
- In cardiac mode probe indicator is on right side of screen
- If possible roll patient into left lateral decubitus
- There are 4 basic cardiac views

**Parasternal Long View**
- Probe marker towards right shoulder
- Place probe left of sternum at 2nd intercostal space
- Slide probe over 2nd to 5th intercostal space to find a good window
- Good for assessing: LV, LA, & aortic outflow tract

**Parasternal Short View**
- From parasternal long view turn probe 90°
- Point probe marker to left shoulder
- Good for assessing: global LV function

**Apical Four Chamber View**
- Probe marker towards patients left hip
- Place probe lateral & inferior to right nipple
- Angle transducer up towards base of the heart
- This is a more difficult view... be patient
- Good for assessing: all 4 chambers and their relative sizes

**Subxyphoid View**
- Probe marker towards patients left hip
- Place probe just inferior to xyphoid process
- Angle probe up into left chest until side of probe is flat against the abdomen

- Hold probe with your hand on top of the probe (like holding a pencil)
- Use liver as an acoustic window to better see the heart

**Assessing LV Function**
- Range of function: stand still to hyperdynamic ejection fraction
- Assess systolic function by endocardial border incursion and myocardial thickening
- Classification of systolic function:
  - Severe ly depressed (EF < 30%)
  - Mild-moderate depression (EF 30-55%)
  - Normal (EF 55-70%)
  - Hyperdynamic (EF > 70%)
- If hyperdynamic, ventricular cavity will be obliterated during systole
- Hyperdynamic LV = hypovolemia or vasodilation

**Mitral Valve E Point Septal Separation**
- EPSS: distance between anterior mitral valve leaflet & ventricular septum
- Measured with M mode in parasternal long view
- Place M mode spike at distal end of mitral valve leaflet (where it comes closest to septum)
- EPSS value ≤ 6 mm is normal
- EPSS ≥ 7 mm indicates poor LV function and poor ejection fraction
- Estimate ejection fraction with equation: LVEF = 75.5 – 2.5 x EPSS

**Fractional Shortening**
- Fractional change in LV diameter with contraction
- Measured with M mode in parasternal long view
- Place M mode line across LV just beyond mitral valve leaflets
- Equation: (LV end diastolic diameter – LV end systolic diameter)/ LV end diastolic diameter
- Normal: 30-45%
- Hyperdynamic: > 45%
- Hypodynamic: < 30%
**Pericardial Effusion**
- Looks like an anechoic stripe between heart and pericardial sac
- Epicardial fats pads are often mistaken for effusion
- Fat pads are anterior (not dependent areas) and mostly hypoechoic with some echoic features
- Pleural and pericardial effusions can looks similar
- Pleural effusions run posterior or lateral to thoracic aortic
- Pericardial effusions run medial and anterior to thoracic aorta
- Use ultrasound guidance to drain pericardial effusions

**Tamponade**
- Ultrasound signs of tamponade:
  - RV free wall inversion during diastole, *the classic finding*
  - RA inversion during ventricular, *the most common and early sign*
  - Dilated IVC with minimal size variation during breathing

**Right Heart Dilation**
- RV should smaller than LV
- Moderate dilation: RV = LV
- Severe dilation: RV > LV
- Use apical 4 to evaluate RV size
- Compare relative RV/LV sizes at tip of AV valves in diastole
- Causes of dilated RV: PE, RV infarct, pulmonary hypertension, and COPD