E. 12-View Focused Perioperative Ultrasound Exam and FORESIGHT Exam Review Sheets

**12 View Focused Perioperative US Exam**

**LUNG:** (probe indicator perpendicular to ribs scanning along pleural line)

1. RUQ
2. RLQ
3. LUQ
4. LLQ

**CARDIAC:**

1. **L PARASTERNAL LONG AXIS:** (probe indicator 3 to 4th rib space directed to 10 o’clock position)
2. **L PARASTERNAL SHORT AXIS:** (probe indicator 3 to 4th rib space directed to 2 o’clock position)
3. **APICAL 4-CHAMBER VIEW:** (probe indicator at 6th rib space midclavicular line directed to 5 o’clock position)
   - *adjust image to a 5-chamber view by decreasing probe angle with the chest (to see more anterior structures)*
4. **SUBXPHOID 30 DEGREE A.V. VIEW:** (probe indicator at subxiphoid space with indicator directed to 12 o’clock position)

**Abdominal:**

1. **RUQ** (probe indicator perpendicular to 10th rib space and move caudal): looking for free fluid at the hepatorenal interface (Morrison pouch)
2. **SUBXPHOID PERICARDIAL VIEW:** (probe indicator directed to 3 o’clock position with sig reduced angle of insolation); looking for pericardial tamponade
3. **LUQ** (probe indicator perpendicular to 10th rib space and move caudal with probe pointing more inferiorly than RUQ)
4. **SUPRAPUBIC** (probe indicator directed to 3 o’clock position with sig steep angle of insolation)
   - Free fluid appears as poorly defined irregularly shaped hypoechoic (black) regions

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<th>IVC % Collapse</th>
<th>Estimated CVP</th>
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**Perioperative Ultrasound Examination**

**Cardiac Evaluation:**

- R/L ventricular function
- Pericardial Effusion
- Severe Valvular abnormalities

**Views:** Parasternal Long Axis/ Short Axis, Apical 4 Chamber, Subxiphoid Pericardial

- **Position:** Left side down with L arm stretched out

**Pulmonary Evaluation:**

- Pneumothorax
- Pleural Effusion
- Severe Alveolar Interstitial Disease
- **Position:** supine

**Abdominal Evaluation:**

- Evaluate free fluid in intraperitoneal space via 3 windows
- Views: RUQ, LUQ, Suprapubic
- **Position:** supine

**Hemodynamics:**

- IVC Collapsibility
- Left Ventricular End Diastolic Diameter
- VT across aortic valve
- VT across radial/brachial artery

**Views:** Subxiphoid IVC, Parasternal Short Axis. Pulse Wave Doppler across radial/brachial artery

**Data References:**

- Diaphragm – 9th rib space
- Lung Sliding: motion of parietal pleura against visceral pleura during respiration
- B lines: increased reflective bands from the pleura line throughout the lung parenchyma, suggests increased area of lung aeration. (> 2 B lines suggests significant disease)
- Pleural effusion-hypoechoic (black) areas above the lung hyperechoic diaphragm
- Velocity Time Integral is a measure using continuous wave or pulse wave Doppler to assess flow proximal to a cardiac valve (usually aortic) or across an artery and is related to stroke volume and can be used for fluid responsiveness (greater than 15% variability -fluid responsiveness)
- Velocity Time Integral traces also provide estimated pressures when the waveforms are traced (how one sees gradients across valves)
- PA systolic pressure estimated by using continuous wave Doppler across tricuspid valve in the apical view to get peak regurgitate pressure and this value is added to the estimated CVP
- Normal LVIDd: > 3.5cm
- RVMDA: assessed in parasternal SAX
- Fractional Area Change quantifies LV and RV contractility (similar to EF) and is quantified by measuring the following in the parasternal SAX views (Area of Chamber / RV or LV) in Diastole – Area of Chamber (RV or LV) in Systole / Area of Chamber (RV or LV) in Diastole) x 100
- Valve function: assessed in apical view using color Doppler
- Severe Regurgitation is estimated by tracing the regurgitate jet area in the apical view, area (> 20cm) is severe or measuring the vena contracta (the point in a regurgitate jet that originates from the fluid stream where the diameter of the stream is the least, > 7mm severe)
- Tamponade: assessed in parasternal IAX and subxiphoid pericardial views

- Abdominal Free Fluid appears as “black” non-echogenic spaces between organs and will accumulate in RUQ if there is a upper abdominal injury and in suprapubic if lower abdominal injury
- Combined FAST exam can reliably detect > 200ml
- 0.7 x (supero-inferior diameter) x 15 (maximum transverse diameter) x AP (maximum anteroposterior diameter)
- IVC diameter measured on end expiration (spont breathing patient) and 1cm distal to the IVC-hepatic
**FORESIGHT EXAMINATION:**

**CARDIAC**
Overview:
Views:
1. Left Parasternal Long Axis  
2. Left Parasternal Short Axis  
3. Apical 4 Chamber View  
4. Apical Two Chamber View  
5. Apical 5 Chamber View  
6. Subxiphoid View

**Left Parasternal Long Axis View**

**Left Parasternal Short Axis View**

**Apical Views**

**Subxiphoid**
FORESIGHT EXAMINATION:

Abdominal Assessment Categories
1. FAST (Focused Assessment with Sonography for Trauma) exam:

FAST (Focused Assessment with Sonography for Trauma) exam:
Sub-xiphoid

Right Upper Quadrant View

Left Upper Quadrant View

Suprapubic View
FORESIGHT EXAMINATION:

**Pulmonary**

Assessment Categories
1. Pneumothorax
2. Pleural Effusions
3. Air Space Disease

**Pneumothorax Evaluation via Pleural Lung Sliding**

**Pleural Effusion Evaluation**

**Air Space Evaluation**