Ultrasound in the Dyspneic Patient

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Objectives

- Heart Failure
- COPD
- Pericardial Effusion/Tamponade
- Pulmonary Embolism
- Pneumonia
- Pneumothorax
- Pleural Effusion

Ultrasound Protocols

- RUSH
- RADiUS
- Triple Scan
- ACES
- FALLS

Case #1: SOB

- 58 ♂ with HTN, CHF, COPD now with 3 days of worsening SOB and DOE

85%RA

Gen: Dyspneic, Obese
Neck: ?JVD
CV: Tachy, Reg
Pulm: Wheezes & Bibasilar Rales
Extr: +1 Pedal edema

Goals of the Exam

- Evaluate Pump Function
- Assess for Pulmonary Edema
- Interrogate IVC
Protocol
1. Cardiac Ultrasound
2. Lung Ultrasound
3. IVC Ultrasound

Parasternal Long

Parasternal Long

Parasternal Long

Parasternal Short
Parasternal Short

Subxiphoid / Subcostal

Subxiphoid

Protocol
1. Cardiac Ultrasound
2. Lung Ultrasound
3. IVC Ultrasound
Pulmonary Edema

**B Lines**

- Arise from the pleural line
- Well-defined
- Move with lung sliding
- Reach the edges of the screen
B lines

- Highly sensitive
- Cardiogenic pulmonary edema
- ARDS
- Pulmonary contusion
- Pulmonary fibrosis
- Interstitial pneumonia

Normal Lung: Sliding Visceral Pleura

B lines = increased fluid in the interstitium
Hyperinflated Lungs

Protocol

1. Cardiac Ultrasound
2. Lung Ultrasound
3. IVC Ultrasound
COPD

- Presence of A line
- Lack of B lines
- Clinical signs of COPD
Pericardial Effusion

Cardiac Tamponade
- Right Heart Collapse during diastole
  - RV or RA
  - Can be subtle
- Diastole
  - Correlate with Mitral Valve Opening
- IVC Plethora

Cardiac Tamponade
- RV Dilatation (RV:LV > 1:1)
- RV Systolic Dysfunction
- Free-Floating Thrombus

Pulmonary Embolism
Pulmonary Embolism
- IVC Dilatation
- Presence of DVT in LE
- McConnell’s Sign

Pneumonia
- Air Bronchograms
  - static and dynamic
- B Lines adjacent to consolidation
- Associated pleural effusions

Pneumothorax
Pneumothorax

Abnormal Lung: Pneumothorax

Normal

Pneumothorax
References

- Aminian K, Xiao M, Valeanu C. Test Characteristics of Ultrasonography for the Detection of Pneumothorax. CHEST. 141(3) MARCH 2012
- Wu Ding W, Yuehong S, Yang J. Diagnosis of Pneumothorax by Radiography and Ultrasonography. CHEST. 140 (4) OCTOBER, 2011

Thank You

Apical 4 chamber

4 Chamber
4 Chamber