Emergency Cardiac Ultrasound

Alistair Billington
Consultant in Critical Care & Emergency Medicine
University Hospital Birmingham
Objectives

- Indications for focused emergency cardiac ultrasound
- Technique and standard windows
- Recognising normal and abnormal
Clinical utility

- 15 mins after arrival to ED:
  - 50% correct diagnosis in clinical assessment group
  - 80% correct diagnosis in ultrasound assessment group

- Scan time - 5.8 mins
  - Jones, A. CCM 2004;32(8):1703
Emergency Cardiac Ultrasound

- Unexplained hypotension
- Peri-arrest
- Pulseless electrical activity
- Trauma
Emergency Cardiac Ultrasound

- Pathology:
  - tamponade
  - massive PE
  - hypovolemia
  - ventricular failure
  - septic shock
Clinical Questions

- Pericardial effusion / tamponade

- Gross ventricular function
  - Normal
  - Hypokinetic
  - Hyperkinetic
  - Akinetic
  - Dyskinetic

- Atrial & ventricular size
Cardiac probe

- Small round footprint for scan between ribs
- 2.5 MHz: above average sized patient
- 3.5 MHz: average sized patient
- 5.0 MHz: below average sized patient or child
Echo views
Echo planes
Sub-costal view

- Don’t need an echo probe
  - Can use curved array
- Suited to supine patients
- Best all around imaging window
- Good for identification of:
  - Circumferential pericardial effusion
  - Overall wall motion
- Easy to obtain
  - Liver is the acoustic window
Subcostal Echo
Other echo views

- Parasternal Long axis
- Parasternal Short axis
- Apical views
Parasternal Views

- Next best imaging windows
- Good for imaging LV
- Comparing chamber sizes
Parasternal Views

Long Axis

Short Axis
Parasternal long axis
Parasternal long axis
Parasternal short Axis

RV
LV
Parasternal Short axis
Parasternal Short axis

Aortic valve level

Mitral valve level

Papillary muscle level

Echo made easy
S.Kaddoura
Parasternal Short axis
Echo planes
Apical four chamber
Apical Views

- 5 chamber
- 4 chamber
Apical Views

Echo made easy
S.Kaddoura
Echo views
Apical 4 chamber
Apical 2 chamber
Technical Problems

- Narrow intercostal spaces
- Obesity
- Muscular chest
- COPD
- Calcified rib cartilages
- Abdominal distension
Echo views
Echo views

Parasternal Long

Parasternal Short

Apical 4 chamber

Subcostal
Questions
Summary

Be aware of probe orientation / marker conventions

Recognition of normal anatomy in standard views

Often limited views in supine patients
Resources

www.hqmeded.com