Point of Care Ultrasound Cases

• The following are building upon the normal ULTRASOUND anatomy of the heart, learned in the SHB course.
• The students will go through the cases with their ultrasound facilitators, Dr. Amy Kule in room 360, Dr. Brian Barbas in room 390, and Dr. Jason Palmatier in room 460 during the cardiac pathology US lab.
• Students should review the cases prior to the session and be prepared to answer questions regarding the history, PE, lab data, radiologic findings, clinical correlates, as well as the US scan during the lab session.
• Drs. Kule, Barbas and Palmatier will be requesting volunteers to assist with answering questions during the US lab.
• Drs. Kule, Barbas and Palmatier will also discuss the Point of Care Ultrasound findings with you during the session.

Cardiac Ultrasound Videos

• Pericardial Effusion (4:43)
  • http://5minsono.com/per_eff

• Introduction to Cardiogenic Shock (3:38)
  • https://www.youtube.com/watch?v=2Hkq6mQ488s&sns=em
Case 1 - History

- A 53 year old Female arrives to the Emergency Department, having been transferred from an outside hospital for “possible sepsis.” She is somnolent in bed and not able to provide any meaningful history.

- EMS states that she has a history for hypertension (HTN) and metastatic breast cancer

- Vitals:
  - Temp 37.1  BP 101/64  HR 62  RR 24  O2 sat 87% on RA

Case 1 – Physical Exam

- Being an astute medical student on the EM rotation, you recognize the benefit of point of care ultrasound and perform a bedside echo to supplement your evaluation of this patient.

- Which transducer would be most ideal to perform this exam and why?

Case 1 – Point of Care Cardiac US

- As the subxiphoid view is most sensitive view for identifying a pericardial effusion, you perform this first.

- Describe and demonstrate (on the mannequin) how to perform and obtain the subxiphoid view.
Case 1 – Subxiphoid View

• Describe the findings that you see on this scan.

Case 1 – Subxiphoid View

• Point out the key structures (organs, chambers, valves) seen on the subxiphoid view.

Case 1 - CXR

• A chest x-ray is obtained. Describe the findings seen in this patient.
Case 1 - EKG
• What significant findings are seen on this EKG.

Case 1 - Reassessment
• On the cardiac monitor, you notice a change in her vitals.
  • BP 68/37 HR 142
• What do you suspect is the cause for this acute change?
• You quickly remember to perform a physical exam. What do you expect to find during your exam to support your diagnosis?

Case 1 – Repeat US
• Describe the findings seen on this repeat cardiac subxiphoid view.
• What is your diagnosis?
Case 1 – Repeat US

• How would you manage this patient?

![Image](https://via.placeholder.com/150)

Case 2 - History

• A 64 year old Male arrives to the ED with a chief complaint of chest pain. He states 1 hour prior to arrival he acutely developed onset of crushing precordial chest pain that radiates to his left jaw and arm.
• His PMH includes HTN and HLD.
• SurgHx: cholecystectomy, rotator cuff repair
• Allergies: NKDA
• Medications: Lisinopril, Simvastatin
• SocHx: 1 ppd smoker, drinks 4 beers on weekends, no illicit drugs

Case 2 – Physical Exam

• Vitals
  • T 37.2 BP 84/30 HR 114 RR 35 O2 sat 89% on RA

• Physical Exam
  • Constitutional: Moderate distress
  • Skin: Diaphoretic
  • Cardiac: Tachycardic, regular rhythm, S1, S1, S3 auscultated
  • Pulmonary: Diffuse rales, tachypneic, 2-3 word conversational dyspnea
  • Extremities: No lower extremity pitting edema
Case 2 – Workup

• What is your differential diagnosis (suspected cause of this patient’s presentation)?

• What radiologic studies would you order or perform on this patient?

Case 2 - CXR

• Describe the CXR findings in this upright patient.

Case 2 - EKG

• Describe the findings seen on this patient’s EKG.
Case 2 – Parasternal Long Axis View

• In order to better assess the patient’s condition, you perform a bedside echo. Describe and demonstrate how to perform and obtain the parasternal long axis view of the heart.

Case 2 – Parasternal Long Axis View

• Identify the key structures seen on the parasternal long axis view.

Case 2 – Parasternal Long Axis View

• Compared to a normal US (left), what abnormal findings do you see on the right?
Case 2 - IVC

- When a long axis view of the IVC is obtained, the following is seen. Describe and explain the findings.

![IVC Image]

Case 2 - Management

- What is your suspected diagnosis?

- What is the next step in definitive management?

![Management Image]

Case 3 - History

- 30 yo Female arrives following a witnessed arrest, while walking into the hospital from the parking garage. A family member informs you that she recently returned home from a cross-country car ride and was arriving for a post-op check-up since she noticed increased leg swelling and pain.

- Bystander CPR performed for 2 mins prior to EMS arrival.
- PEA initially with ROSC – several rounds of CPR and 2 doses of Epi

- PMH: None
- SurgHx: Left meniscal repair 3 weeks prior

- Vitals:
  - BP 74/46
  - HR 138
  - Temp 36.2
  - O2 100% intubated
Case 3 – Limited Cardiac US
• A bedside limited echo is performed to evaluate for the cause of PEA arrest. What cardiac views are seen below?

Case 3 – Parasternal Short Axis View
• Describe and demonstrate how to perform and obtain a parasternal short axis view of the heart.

Case 3 – Cardiac US
• Describe the findings noted these views.
Case 3 – Cardiac US

• What is the most likely diagnosis in this patient?

Case 3 – Cardiac US

• Describe the mechanism behind this patient’s cardiac arrest?

Case 3

• What risk factors increase the likelihood of developing this condition?

• What is the definitive management for this patient?
Summary

• Summarize the utility of point of care cardiac ultrasound in the evaluation of a critical patient.