

Foundations Curriculum

Oral Board Review Cases

Case 60: Chest Pain

❖ Chief complaint

- 42-year-old male presents with chest pain

❖ Vital signs

- HR: 101 BP: 136/82 RR: 14 T: 37.9°C Sat: 100% Wt: 80 kg

❖ What does the patient look like?

- Patient appears alert, sitting up on stretcher, in no acute distress.

❖ Primary survey

- Airway: speaking full sentences
- Breathing: no respiratory distress, clear lungs
- Circulation: warm and dry skin, 2+ distal pulses

❖ Action

- Place patient on the monitor
- Two large bore peripheral IV lines (draw rainbow top)
- POC glucose (84, if requested)
- Stat EKG

❖ History

- Source: Patient, arrives by private vehicle
- HPI: a 42-year-old male presents with chest pain for the past 4 hours. He describes the pain as slow in onset, gradually worsening throughout the day. The pain is localized to the mid chest, and is sharp, non-radiating, worse with inspiration. There is associated mild shortness of breath. If asked, he reports it is made worse with lying down, and made better by sitting forward. If asked about recent illnesses, he states that he had “a cold” about a week ago that resolved on its own. He took a 5-hour flight within the U.S. 1 week ago. ROS is otherwise negative.
- PMHx: none
- PSHx: lives with wife and young child, social drinking, no smoking or drugs
- Allergies: none
- Meds: none
- FHx: sister with +DVT during pregnancy, otherwise negative
- PMD: Dr. Perry

❖ **Secondary survey**

- **General:** alert, sitting forward on stretcher, no acute distress
- HEENT: normal
- Chest: nontender
- Lungs: normal
- **Heart:** normal (friction rub heard over the left apex only if learner performs serial exams)
- Abdomen: normal
- Extremities: normal
- Back: normal
- Neuro: normal
- Skin: normal

❖ **Instructor Prompt:** discuss differential diagnosis (prompt learners to risk stratify for PE)

❖ **Nurse**

- EKG (**Figure 60.1**- sinus tachycardia, diffuse ST elevations with PR depressions except in aVR)

❖ **Action**

- Order labs
 - CBC, BMP, LFT, troponin, D-dimer
 - Consider coagulation studies, ESR, CRP, blood cultures x2
- Order Imaging
 - CXR
- POCUS: Echo to assess for pericardial effusion
 - **Figure 60.3**- (A) parasternal long and (B) parasternal short: small pericardial effusion, normal EF, no wall motion abnormality, no evidence of cardiac tamponade

❖ **Nurse**

- **Case 60 Lab Results** (normal)
- Other Results: troponin 0.03, D-dimer negative
- CXR (**Figure 60.2**- normal chest x-ray)

❖ **Action**

- PO analgesia (NSAIDs)

❖ **Nurse**

- Patient reports that pain well controlled after NSAIDs
 - Vitals after analgesia: HR: 81 BP: 120/80

❖ **Action**

- Discuss diagnosis and treatment plan with patient
- Discharge patient home with follow-up instructions and return precautions

❖ **Diagnosis**

- Acute Pericarditis

❖ **Critical actions**

- Stat EKG
- Thorough history and exam
- POCUS Echo to assess for associated pericardial effusion
- Analgesia with NSAIDs
- Ensure outpatient follow-up with strict return precautions

❖ **Instructor Guide**

- This is a case of pericarditis with classic presenting symptoms and a classic EKG. It will be important for the learner to gather an appropriately detailed history and exam to evaluate for alternate and life-threatening causes of chest pain. The patient is low risk by Wells Score but does not meet the PE Rule-out Criteria, so a D-dimer should be used to rule out a PE. A troponin (and blood cultures which can be drawn and held) should be sent to evaluate the potential for myocarditis and help determine need for admission. Important actions include obtaining a stat EKG, giving NSAIDs for pain and completing a POCUS echo to evaluate for an associated pericardial effusion. As this patient is otherwise stable, has symptomatic improvement with NSAIDs, and he has only a small pericardial effusion, discharge home with close PCP follow-up and strict return precautions is appropriate.

❖ **Case Teaching Points**

Pericarditis

- Inflammation or infection of the pericardial sac
- Majority of cases are idiopathic (up to 80%) or viral (1-10%)
 - Other causes include bacterial, TB, post-MI, malignancy, radiation, uremia, rheum/connective tissue disease, and medications
- Symptoms include sharp chest pain, classically positional and worse with laying flat, +/- fever, +/- friction rub; may report a preceding viral illness
- A pericardial friction rub is usually a high-pitched, scratchy or squeaky sound heard best at the left sternal border
 - "Classic" friction rub consists of 3 phases that correspond to the movement of the heart during 3 phases of the cardiac cycle: atrial systole, ventricular systole, and rapid ventricular filling during early diastole
- EKG findings for acute pericarditis include:
 - Diffuse concave ST-segment elevations in all leads except for aVR +/- V1 which will show ST-segment depressions
 - STE are not in a localized anatomical distribution
 - Absence of any reciprocal changes except for aVR +/- V1
 - PR depressions in all leads with STE and PR elevations in leads with STD (aVR +/- V1)
 - PR depressions are specific but not sensitive for pericarditis

- A detailed history and exam, in addition to screening labs will help to exclude other causes of chest pain
- Bedside or formal echo is important to rule out a significant pericardial effusion or pericardial tamponade
- Patients with uncomplicated idiopathic or viral pericarditis can usually be managed as outpatients with 1-3 weeks of NSAID (ibuprofen or high dose aspirin > indomethacin) therapy unless there is evidence of myocarditis or significant pericardial fluid
- In some patients, colchicine or steroids may be considered as adjunctive therapy

Myocarditis

- Inflammation or infection of the myocardium
- Called myopericarditis when there is concomitant pericarditis
- Causes are similar to pericarditis
 - Chagas Disease is the most common cause worldwide
- Clinical presentation is highly variable
 - Can present with symptoms similar to pericarditis
 - May also report palpitations, syncope, or show persistent tachycardia
- EKG may be similar to pericarditis but most commonly shows non-specific ST-T wave changes, may show dysrhythmias, blocks, low voltage QRS
- Findings that suggest myocarditis/myopericarditis (and not just pericarditis):
 - Reduced LV function and EF on echo
 - Significantly elevated troponin
- Complications include CHF and arrhythmias
- Treatment should be supportive, avoid early NSAIDs or steroids
- Most patients require admission for monitoring and treatment of underlying cause

❖ POCUS Pearls

- POCUS to assess for pericardial effusion and tamponade is a fundamental skill for EM.
- Echocardiography: gold standard for diagnosing pericardial effusion and should be performed if the patient's condition allows it.
- Findings consistent with tamponade include the following:
 - Anechoic stripe of fluid c/w pericardial effusion
 - Diastolic collapse of right ventricle and right atrium, when severe all chambers can collapse
 - Paradoxical septal motion
 - Dilated/plethoric IVC (a normal IVC essentially rules out tamponade physiology)
- Pericardial fluid appears as an anechoic stripe posterior to the heart but anterior to the aorta on parasternal long view. Fluid accumulates posteriorly, then anteriorly.
 - Subxiphoid view is most sensitive for pericardial effusion
- Don't be fooled by the anterior fat pad, which is often mistaken for a pericardial effusion. If there is no posterior pericardial fluid, it is likely just the fat pad.

❖ References

- **Original Case Source:** Emergency Medicine Oral Board Review Illustrated (1st Edition), Dr. Yasuharu Okuda, Dr. Bret Nelson, Case 60 (Author: Dr. Braden Hexom)
- Primary Editor: Dr. Kristen Grabow Moore
- Additional Editors: Dr. Jennifer Robertson, Dr. Jeremy Berberian
- Ultrasound content by: Dr. Rachel Haney, Dr. Sierra Beck
- **References:**
 - Original Case References: Tintinalli: Chapter 55, Rosen's: Chapter 81
 - Ma & Mateer's Emergency Ultrasound (3rd Ed): Chapter 6
 - Northwestern Emergency Medicine POCUS Image Bank
 - Medscape emedicine "Pericarditis" (Dr. Sean Spangler)

Case 60 Lab Results

Complete blood count:		Liver function panel:	
WBC	10.1 x 10 ³ /uL	AST	32 U/L
Hb	14.1 g/dL	ALT	14 U/L
Hct	43.5%	Alk Phos	90 U/L
Plt	290 x 10 ³ /uL	T bili	1.1 mg/dL
		D bili	0.3 mg/dL
Basic metabolic panel:		Amylase	30 U/L
Na	135 mEq/L	Lipase	40 U/L
K	4.5 mEq/L	Albumin	4.5 g/dL
Cl	101 mEq/L		
CO ₂	24 mEq/L	Urinalysis	
BUN	15 mg/dL	SG	1.018
Cr	0.9 mg/dL	pH	6.8
Gluc	80 mg/dL	Prot	Neg
		Gluc	Neg
Coagulation panel:		Ketones	Neg
PT	13.1 sec	Bili	Neg
PTT	26 sec	Blood	Neg
INR	1.0	LE	Neg
		Nitrite	Neg
		Color	Yellow

Figure 60.1- EKG

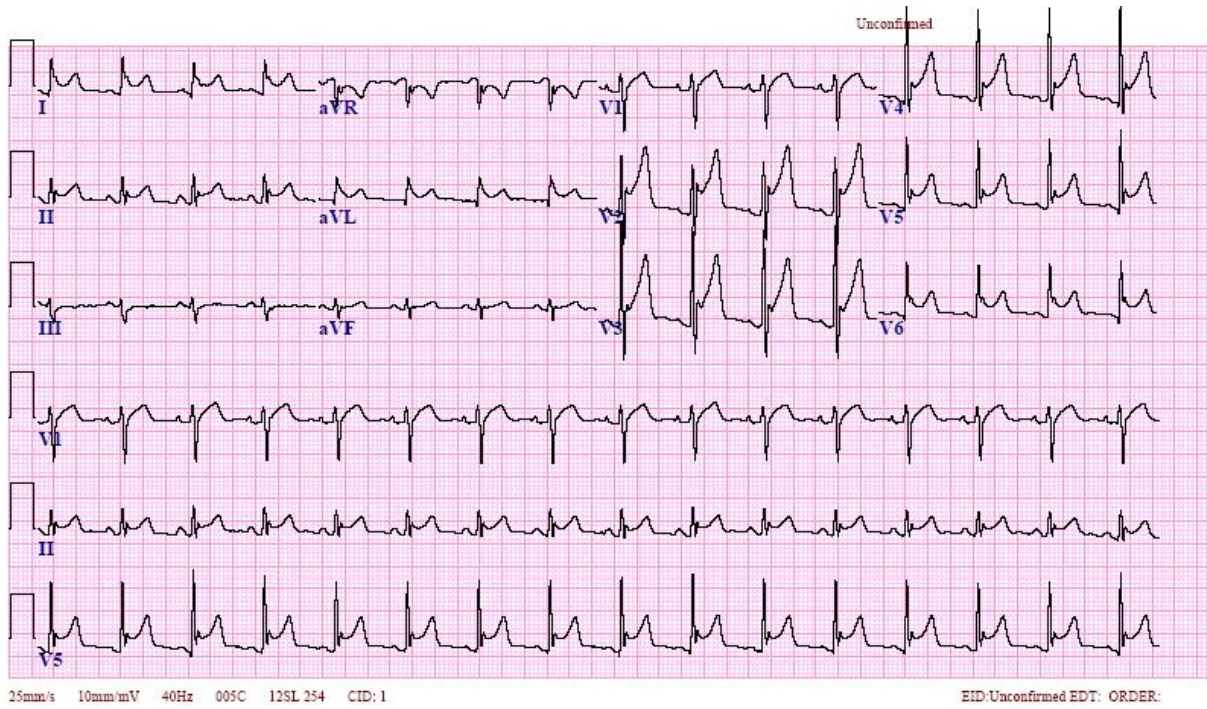


Figure 60.2- CXR



Figure 60.3 A&B- POCUS Echo

A. Parasternal Long



B. Parasternal Short

