

Answer sheet

A 54yo man comes into the ED with chest pain

What is your first step...

VITALS, is this person stable, ACLS

Next step: You need to immediately rule out the worst case scenarios which are:

ACS (also aortic dissection, PE, pericarditis)

History, physical

What are typical ACS chest pain symptoms?

Pressure-type chest pain that typically occurs at rest or with minimal exertion lasting greater than or equal to 10 minutes

Frequently starts retrosternal and can radiate to either or both arms, neck, or jaw

Can also present with diaphoresis, dyspnea, nausea, abdominal pain, or syncope

He reports pain that is substernal, crushing, that radiates to his arm with associated sweating. He has had this pain before when walking and that goes away when he rests, but this time it is lasting for >10 minutes.

Follow-up question: What if he reports sharp pain over left chest, worse with movement lasting 3 hours and when you touch his chest he says "ouch, that's the pain"?

This is more consistent with costochondritis; however, may still consider ACS based on risk factors

Follow-up question: What if he reports burning pain that moves up into his throat?

This is more consistent with heartburn; however, may still consider ACS based on risk factors

What are some risk factors in a patient's PMH that would increase your index of suspicion?

Factors that increase risk are older age, male sex, positive family history of CAD, and presence of PAD, DM, renal insufficiency, prior MI, and prior coronary revascularization

He reports he takes insulin for diabetes, takes Lisinopril for HTN, and smokes 1 pack of cigarettes per day. Also his father died of a heart attack when he was 50yo

What are typical exam findings of someone with ACS

Physical exam can be normal, can have S4, paradoxical splitting of S2, or new murmur of MR

He has a normal exam

What are the 3 types of ACS?

Unstable angina, Non ST-elevation MI, ST-elevation MI

After H&P, what is your initial testing?

EKG and troponins

EKG will come back with 1 of 3 scenarios:

What is EKG comes back as Figure 1

This is ST elevation indicating STEMI
Give ASA, call cards, straight to cath lab

What if EKG comes back as Figure 2

T wave inversion-> NSTEMI/UA, give ASA, follow-up troponin

What if EKG comes back as Figure 3

ST depression -> NSTEMI/UA, give ASA, follow-up troponin

What if EKG comes back as Figure 4

Normal EKG-> Reassured, but not out of the woods NSTEMI vs UA vs noncardiac chest pain
Always follow-up troponin.
Depending on story, consider serial EKGs q15-30min and giving ASA

What if troponin comes back elevated

NSTEMI regardless of EKG

What if troponin comes back normal

Reassured but not out of the woods
Repeat troponin in 3-6 hours

	STEMI	NSTEMI	UA
EKG	ST elevation	ST depression, Twave inversion, or normal	Normal or with ST/Twave changes
Troponin	High and rising	Elevated and rising	Normal

Treatment:

STEMI -> They have already gone to cath lab

When can you differentiate NSTEMI and UA?

You can't at first because you need serial troponins. Initially they are treated the same

What are the medication treatments for NSTEMI and UA?

Aspirin 325mg should be chewed and swallowed if not done already (this is first line treatment and largely benign. Have a low threshold to give aspirin.

P2Y12 inhibitor (Clopidogrel or Ticagrelor)

Follow-up question: Which one should I give? Choosing P2Y12 inhibitor Ticagrelor is a better antiplatelet agent but more expensive. Your choice will depend on patient's insurance and bleeding risk. This is often chosen in discussion with your pharmacist.

Follow-up question: If patient is getting invasive intervention (ie cath and possible PCI) should we still give P2Y12 inhibitor?

Yes, P2Y12 can be given at time of diagnosis regardless of treatment strategy. Can consider holding for high bleeding risk, high likelihood of bypass, or low likelihood of new event in short term – going quickly to intervention or low risk. This can be discussed with cardiology consult.

IV heparin for anticoagulation-> you can find this in the powerchart orderset Adult Heparin IV Low Intensity

Beta blocker within 24 hours

Follow-up question: What are contraindications to a beta blocker?

Signs of acute heart failure, high risk for acute heart failure, signs of hemodynamic compromise, bradycardia, or severe reactive airway disease

Statin -> high intensity

Nitroglycerin -> for chest pain discomfort 0.4mg q5min x3

Follow-up question: What are contraindications to NG? Right ventricular infarction (suspect in all patients with an inferior MI) or use of phosphodiesterase inhibitors.

Oxygen – This is only given for SpO2 <90, respiratory distress, or someone at risk for hypoxemia. Not shown to have any benefit

Morphine – Only if unacceptable level for discomfort. Associated with poor outcomes. Possibly patients who received morphine already at higher risk at baseline. Also possibly decreases antiplatelet effect of P2Y12 inhibitors

What labs do I need to monitor?

Continue to trend troponin until it peaks

Also want CBC for anemia, coags for anticoagulation, and chem10 to optimize electrolytes

When EKG is normal and serial troponins are normal ->non cardiac chest pain

Calculate HEART score: Based on chest pain story, age, risk factors, troponin, EKG. This will aid to risk stratify patients into low risk and high risk which will determine if they get no further cardiac testing, outpatient stress test or immediate stress test.

ED cardiology obs: Some patients may qualify to stay in the emergency department overnight to get a stress test in the morning without admission. These patients generally have HEART score \geq 4, negative troponins and no history of CAD

Treat other causes of chest pain

What is on the differential for chest pain?

DANGER: STEMI, NSTEMI, UA, aortic dissection, expanding AAA, pericarditis, PE

Noncardiac causes:

- Pulmonary: pneumonia, pleuritis, pneumothorax
- GI: GERD, esophageal spasm, PUD, pancreatitis, biliary disease
- MSK: costochondritis, cervical radiculopathy
- Psychiatric disorders: anxiety
- Other etiologies: sickle cell crisis, herpes zoster

Who is at risk of presenting with atypical symptoms when they do have ACS?

Women and people with diabetes

You are on nights and paged that one of your floor patient's is having chest pain.

- History physical and risk stratification
- When in doubt, order an EKG

What is a type II MI?

Increased O₂ demand or decreased O₂ supply

Defined more by what it isn't -> Cardiac damage not caused by coronary artery thrombosis

Elevated troponin without ACS: global hypoxia/hypoperfusion, hypertension, spasm, cocaine/methamphetamine, procedure related, heart failure, cardiac infection or inflammation, pulmonary embolism, renal failure, sepsis, stroke

Reading an EKG if there is time

Figure 1

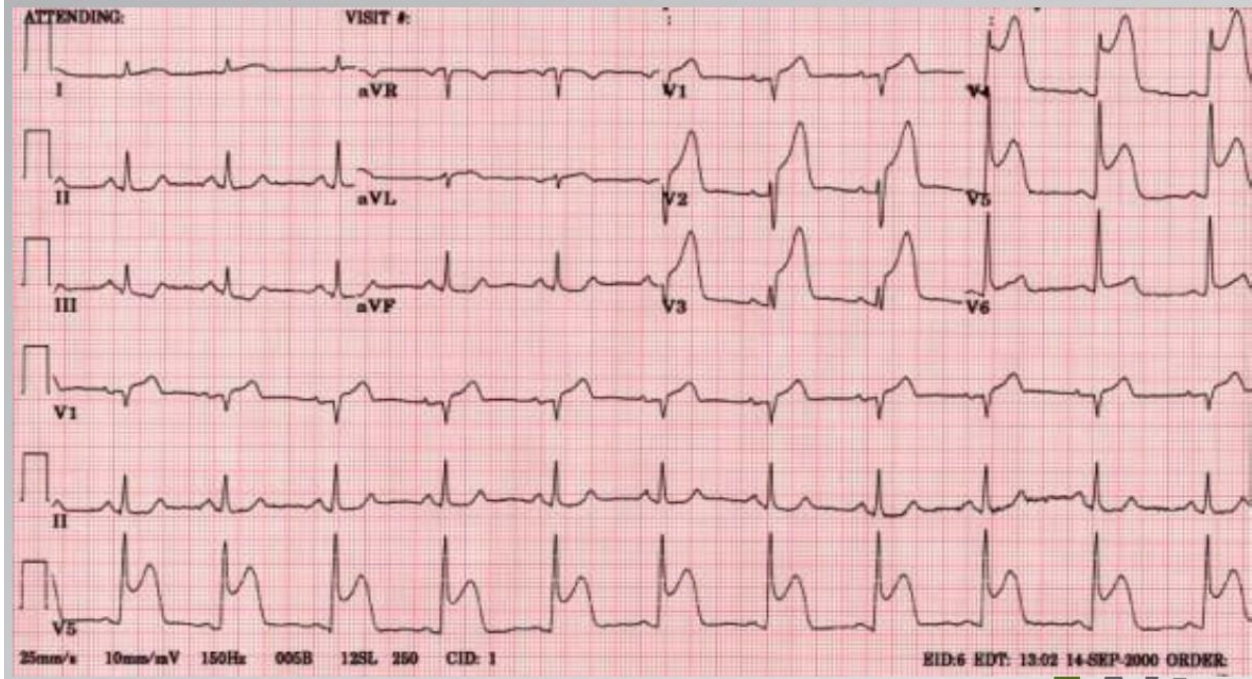


Figure 2

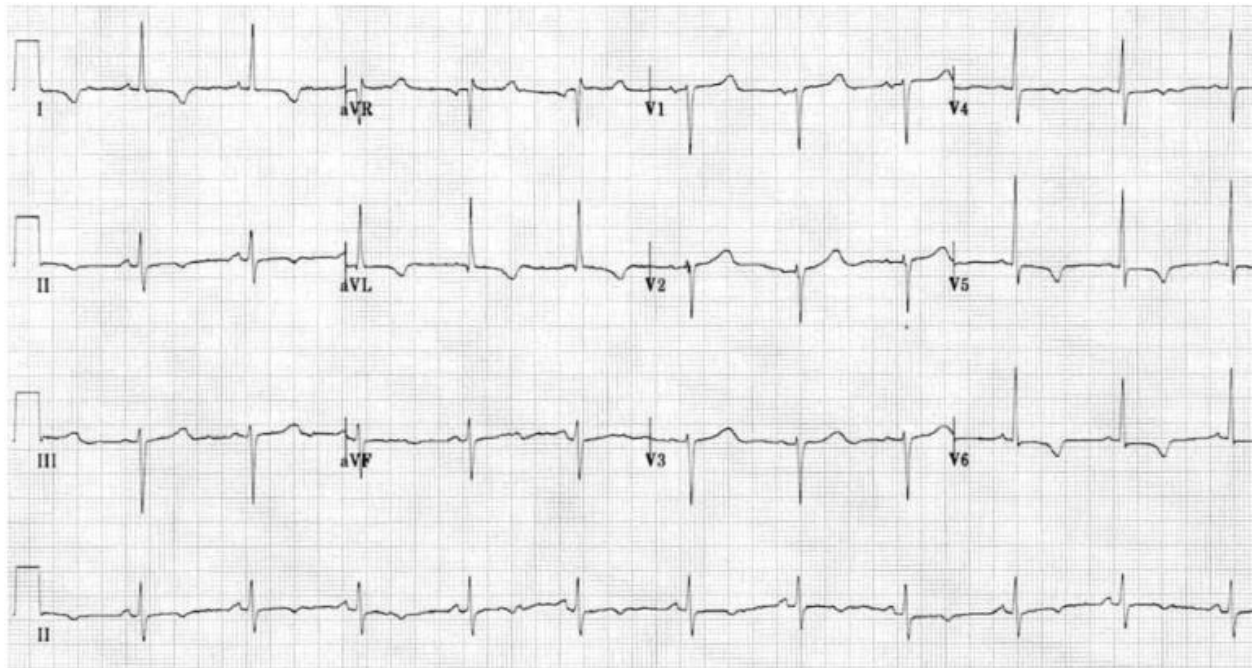


Figure 3

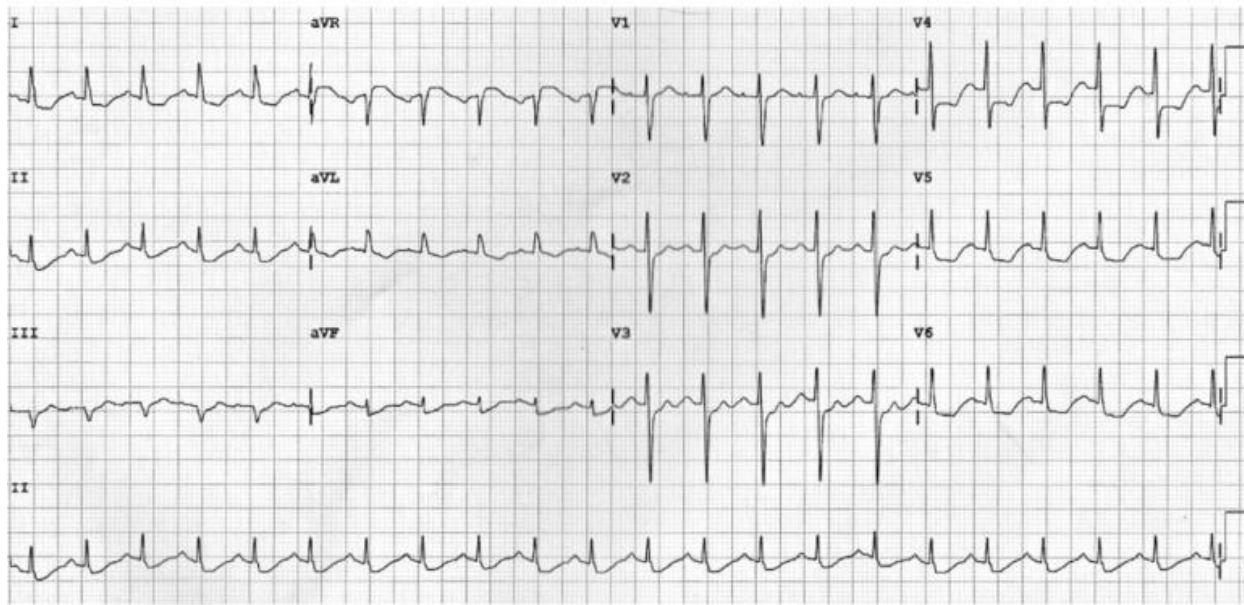


Figure 4

