# Chest Pain

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# Objectives

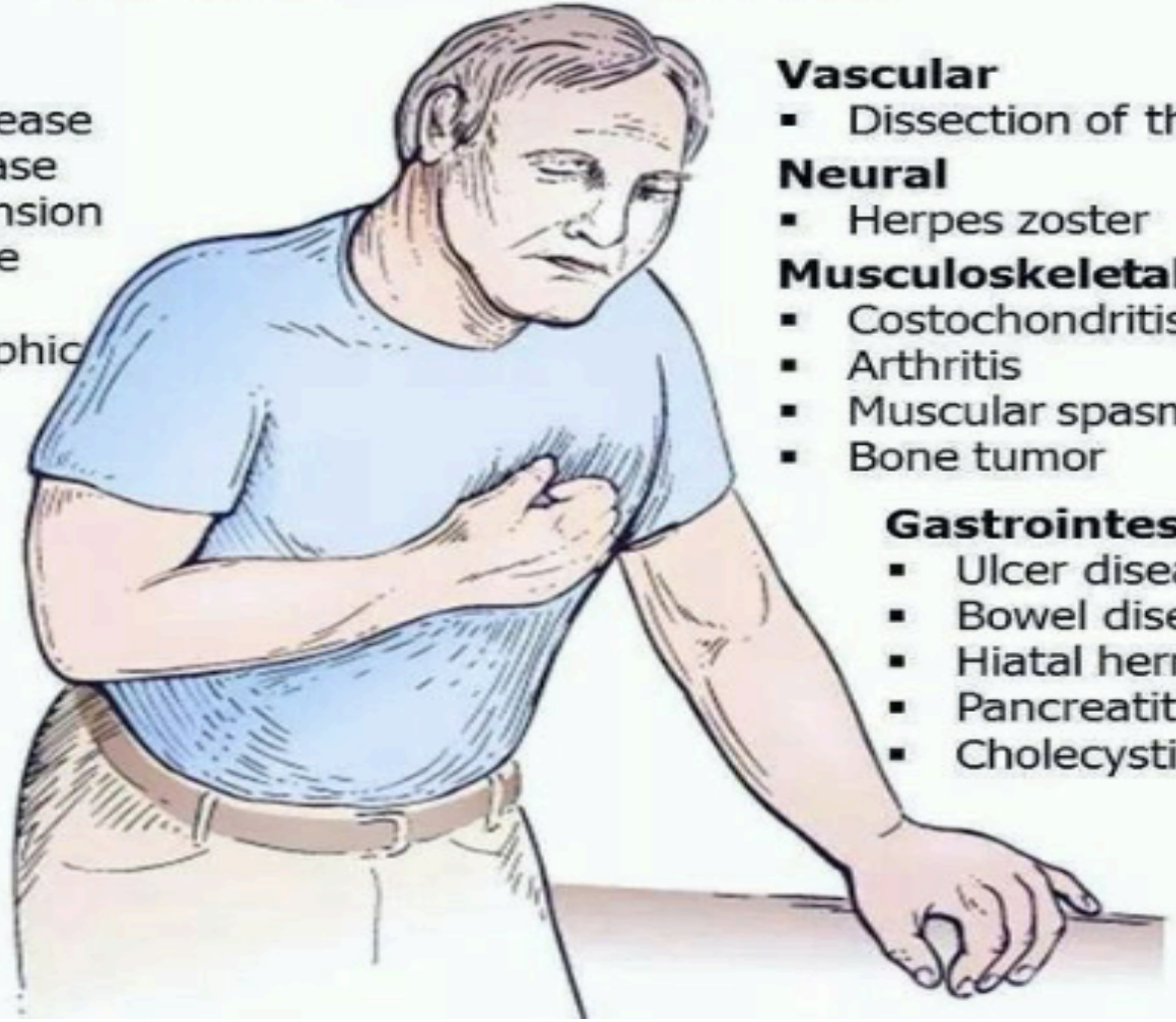
-Evaluation of Chest pain-the H and P
-Important Differential diagnoses
-What tests to order-**reason** for each!
-Management: what to prioritize.
-Disposition-admit (to where), observe (for how long), discharge (with what follow up)?

# Common Causes of Chest Pain

**Cardiac**
- Coronary artery disease
- Aortic valvular disease
- Pulmonary hypertension
- Mitral valve prolapse
- Pericarditis
- Idiopathic hypertrophic subaortic stenosis

**Pulmonary**
- Pulmonary embolism
- Pneumonia
- Pleuritis
- Pneumothorax

**Emotional**
- Anxiety
- Depression



**Vascular**
- Dissection of the aorta

**Neural**
- Herpes zoster

**Musculoskeletal**
- Costochondritis
- Arthritis
- Muscular spasm
- Bone tumor

**Gastrointestinal**
- Ulcer disease
- Bowel disease
- Hiatal hernia
- Pancreatitis
- Cholecystitis

# History-what is pertinent?

-Provocation/Palliation
-Quality
-Region/radiation
-Severity
-Timing/frequency/acuity
-Associated symptoms
-Review of Symptoms

# The physical exam

What are you going to look for in the exam?

Think in terms of **pertinent positives/ negatives!**
Vitals?
Neuro, Cardio, pulmonary, GI, extremities, etc

# Initial assessment

- Primary survey
  - ABC, IV, O2, Monitor (learn how to do each of these)
- Abnormal vitals-what are you going to look for?
- **General appearance!**
- ECG-what are you looking for? Imaging?
- Sometimes, primary survey supersedes getting a full H and P! **Resus first!**

## Other History-What is pertinent? Why?

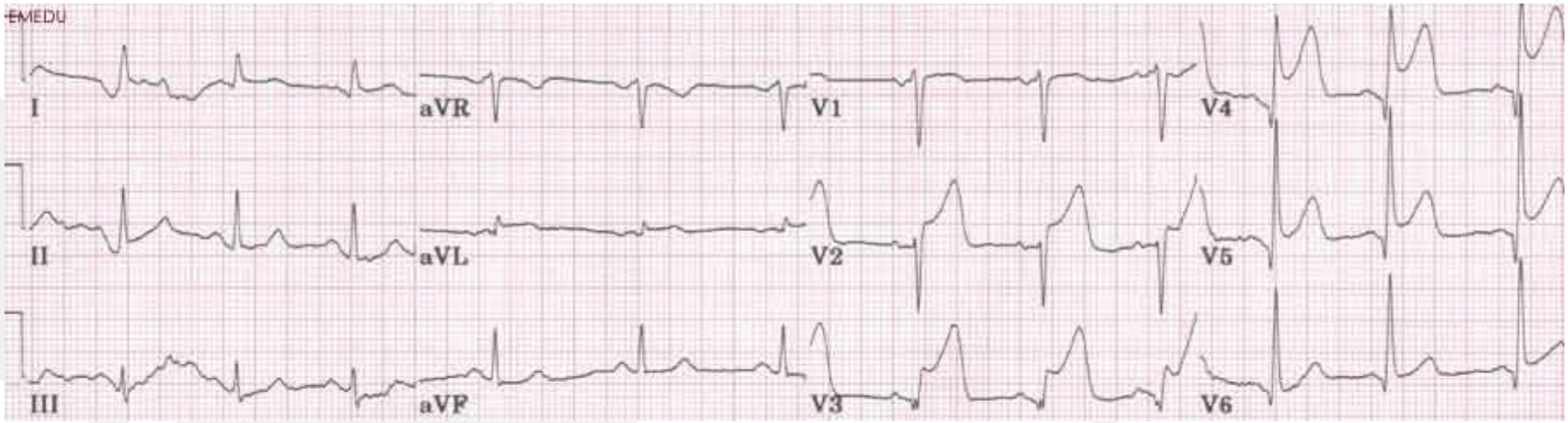
- PMH
- PSH
- Meds/All
- Fam Hx
- Soc Hx
- Surgical and procedural history
- RISK FACTORS!!!

# Case 1

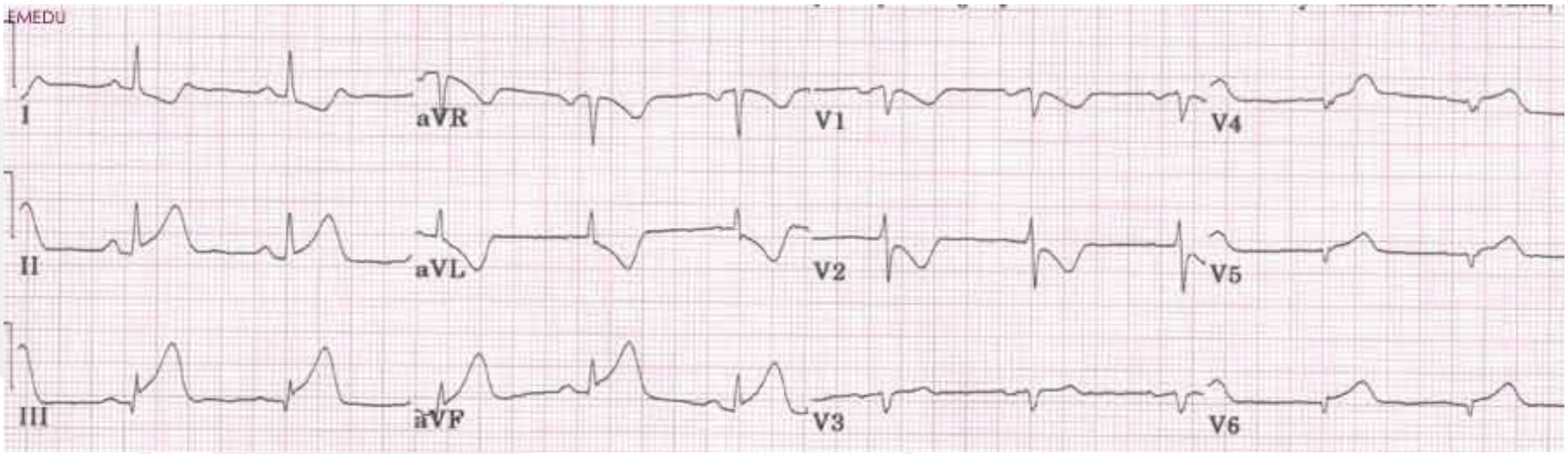
66 yo M h/o DM, HTN, CAD, MI c/o Chest pain
What do you want to do?
How risky is this patient?

# EXAM

BP: 160/100, HR: 102, RR: 18, SAT: 99%, T: 98
Moderate distress, anxious, diaphoretic
Nl s1s2, no mrg, no s3s4
CTA b/l, no WRR
Soft, NTND abd
EXT warm, dry and symmetric, pulses 2+ and symmetric throughout




ECG 1) What do you see? What do you want to do next?



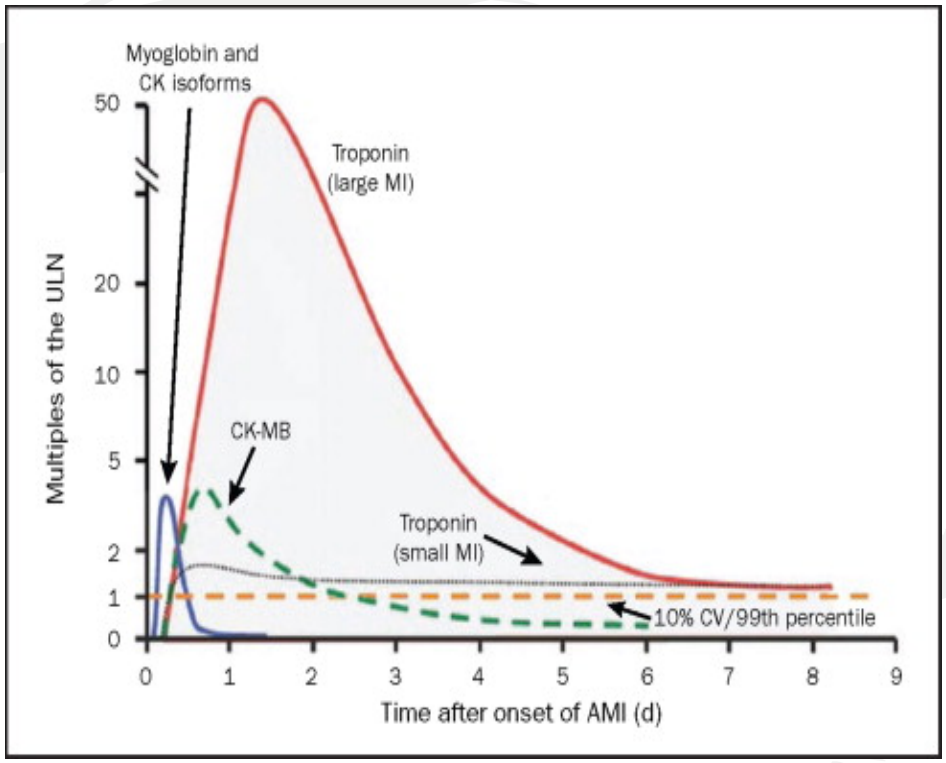

ECG 2) What do you see? What do you want to do next?

# Any labs?

What labs do you want and why? Need a **reason** for each test!

# Cardiac markers

## How will these help?



# Treatment

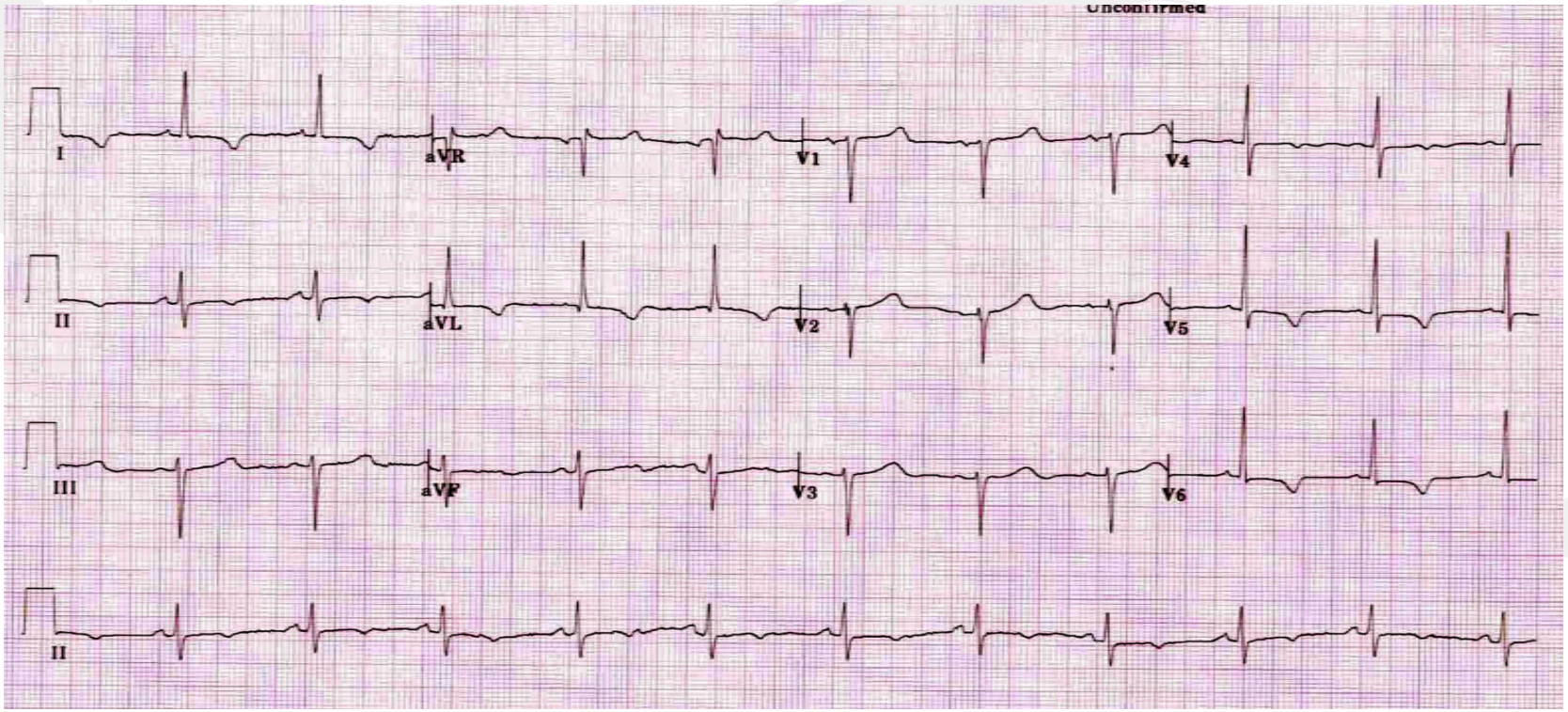
## What medicines are available to you?

Anti-ischemic: Oxygen, NTG, Morphine, Beta-blocker versus CCBs, ACEi

Anti-thrombotic: Aspirin, clopidorel/ticlopidine, heparin/LMWH, GPIIbIIIa antagonists, IV thrombolytics

Any important consults you would like?...

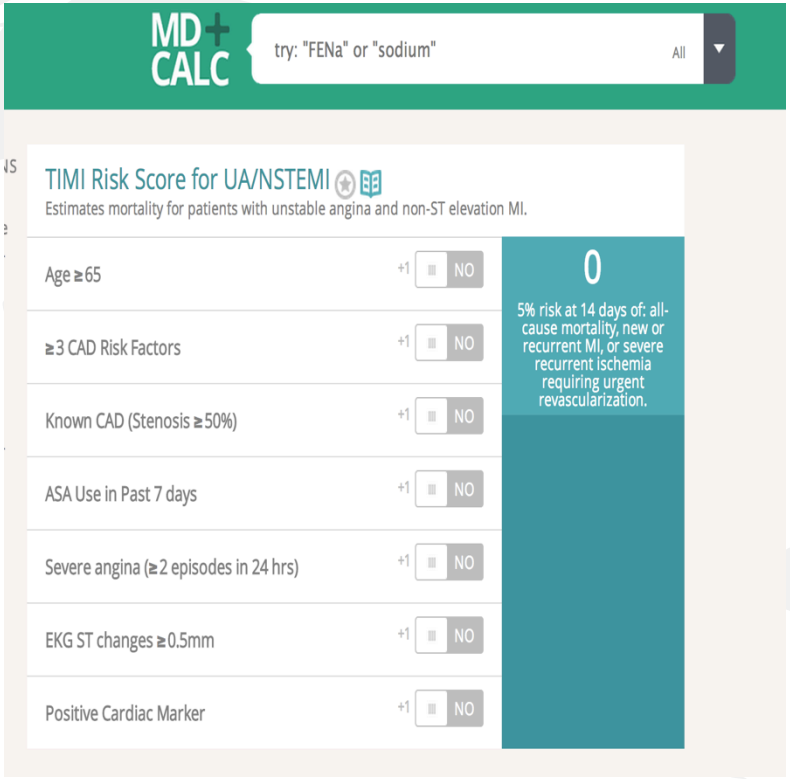
# Suppose this was the ECG…



# Risk stratification…

What are you going to do… Admit, observe, send home?

How does risk stratification factor into your ED patient management?



# Another risk stratification tool…

| HEART score for chest pain patients | | | |
|---|---|---|---|
| History | Highly suspicious | 2 | |
| | Moderately suspicious | 1 | |
| | Slightly suspicious | 0 | |
| ECG | Significant ST-deviation | 2 | |
| | Non specific repolarisation disturbance / LBTB / PM | 1 | |
| | Normal | 0 | |
| Age | ≥ 65 years | 2 | |
| | > 45 and < 65 years | 1 | |
| | ≤ 45 years | 0 | |
| Risk factors | ≥ 3 risk factors or history of atherosclerotic disease* | 2 | |
| | 1 or 2 risk factors | 1 | |
| | No risk factors known | 0 | |
| Troponin | ≥ 3x normal limit | 2 | |
| | > 1 and < 3x normal limit | 1 | |
| | ≤ 1x normal limit | 0 | |
| | | Total | |

***Risk factors for atherosclerotic disease:**

| | |
|---|---|
| Hypercholesterolemia | Cigarette smoking |
| Hypertension | Positive family history |
| Diabetes Mellitus | Obesity |

# Case 2

30 yo F with acute onset chest pain and SOB. Returning from Haiti 4 days ago, smokes, and takes OCPs.

What do you want to do next? What are you worried about?

# EXAM

BP: 140/80, HR: 110, SAT: 93%, RR: 22, T: 100
CTA b/l, trach midline, no WRR
Lower ext symmetric, no edema, warm and dry

# Any risk stratification rules?

## Revised Geneva score

| Criteria | Points |
|---|---|
| Age >65 | 1 |
| Previous DVT/PE | 3 |
| Surgery/lower limb fracture (past month) | 2 |
| Active malignancy | 2 |
| Unilateral limb pain | 3 |
| Hemoptysis | 2 |
| HR 75-94 | 3 |
| HR >94 | 5 |

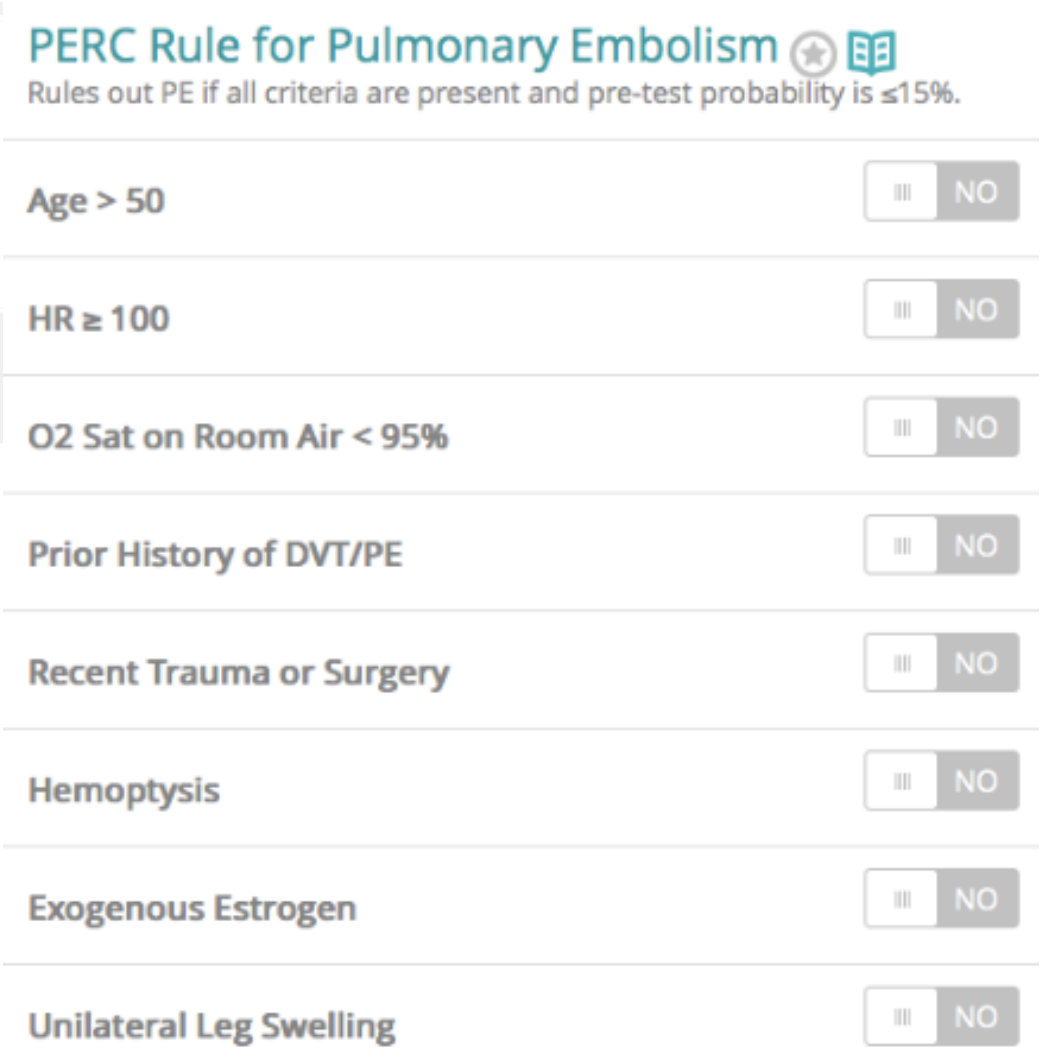

## Wells Score for PE

| Clinical Signs and Symptoms of DVT | 3 points |
|---|---|
| PE most likely diagnosis | 3 points |
| Surgery or immobilization for more than 3 days in the last 4 weeks | 1.5 points |
| Previous DVT or PE | 1.5 points |
| Heart Rate > 100 bpm | 1.5 points |
| Haemoptysis | 1 point |
| Active Cancer (treatment ongoing or within the last 6 months or palliative treatment) | 1 point |

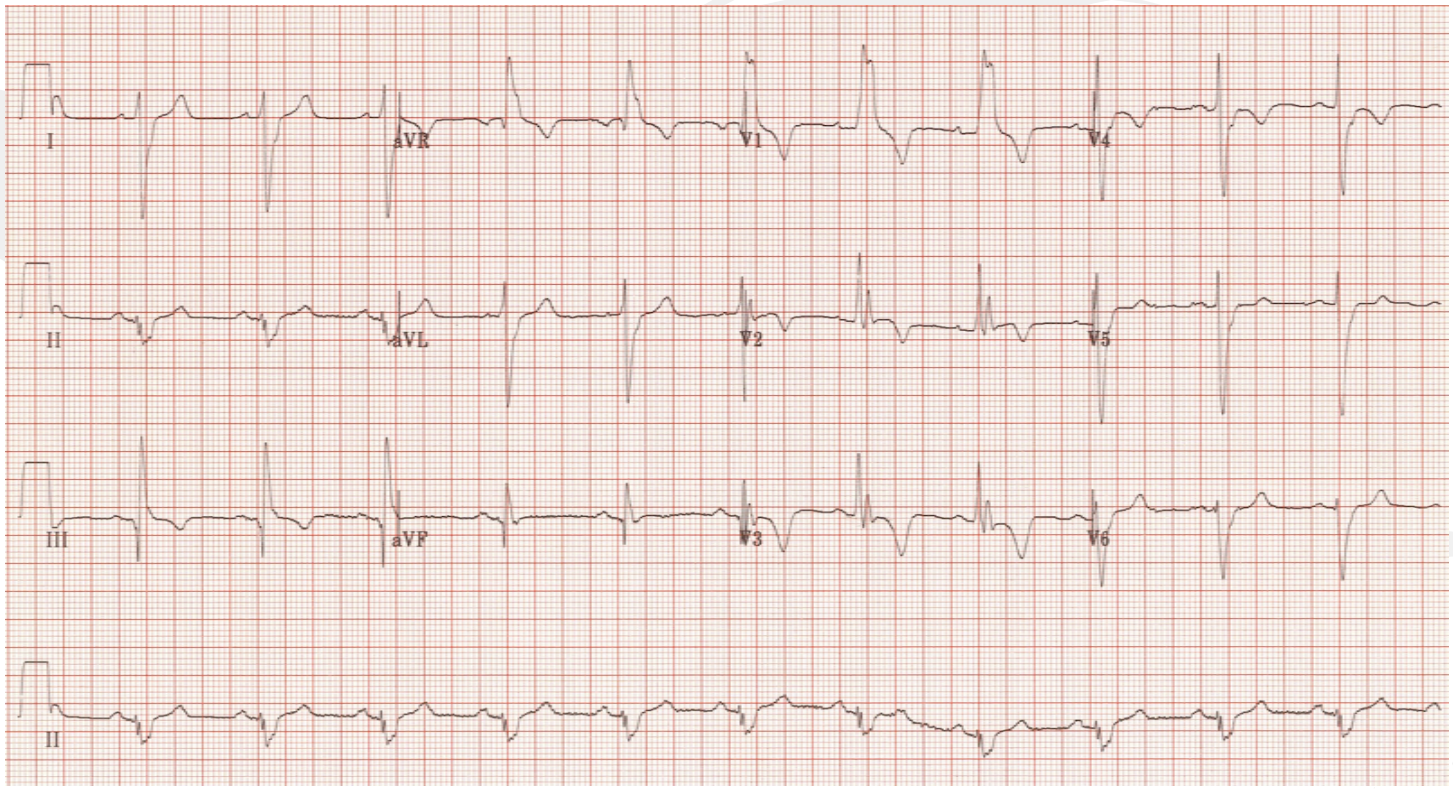
# PERC?

How risky is your patient?

Do you think they are having a PE?

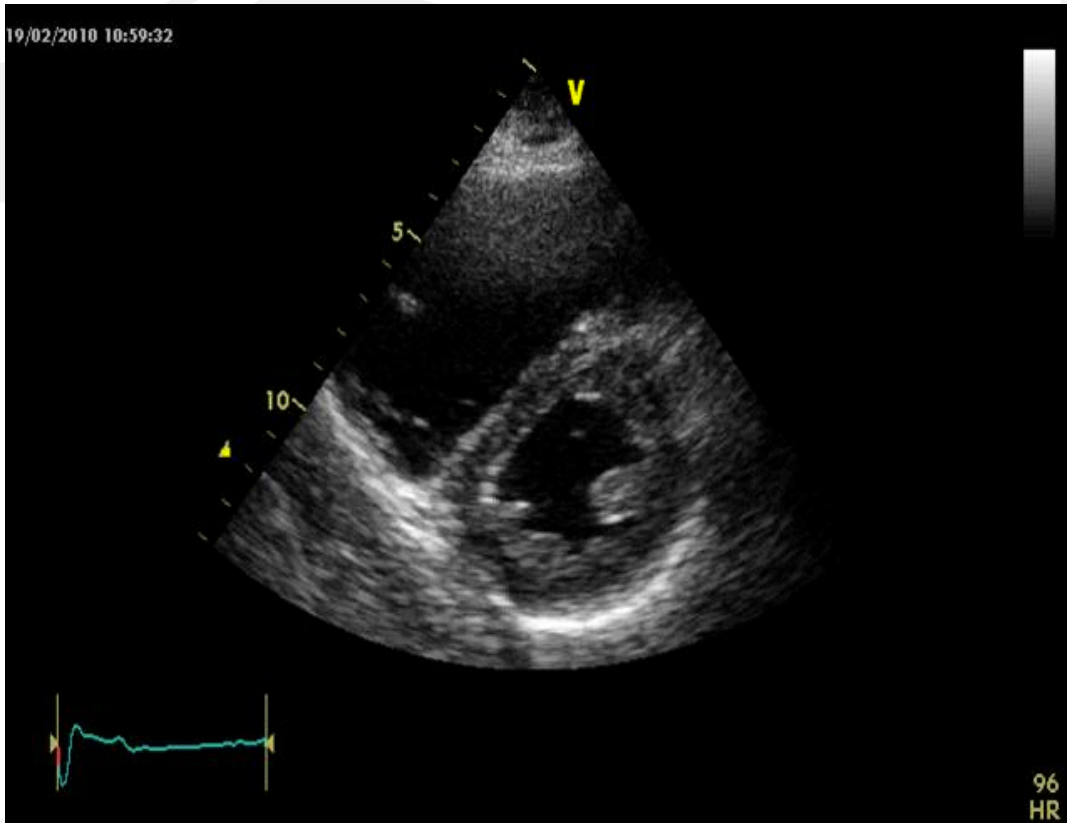


# ECG: What do you see and why is this important?

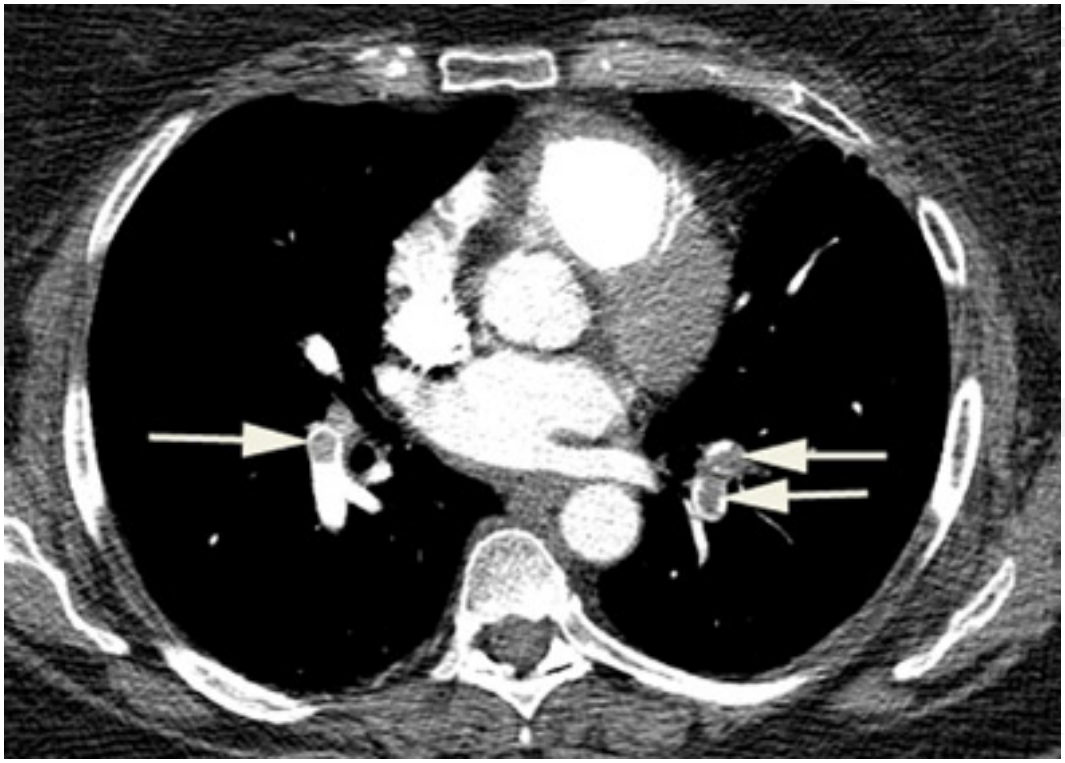


# This is what you see on bedside ECHO

What do you see and why is this important?



# CTA



# PE classifications

-Massive versus sub-massive versus non-massive (Low risk)

-How do Vital signs, ECHO/ECG, trops/BNPs, imaging assist in determining which PE patient you are treating?

# Treatment

Anticoagulation: UFH, LMWH, Warfarin, Rivaroxaban, Apixaban, Dabigatran, etc

Thombolysis: tenecteplace, alteplase, etc.

Disposition-admit to ICU versus regular floor, ***discharge***? Need to risk stratify (PESI?)

## PE eval Steps

-Assess pre-test probability
-Appropriately use ancillary testing to increase or decrease probability
-Risk stratify your patient even further if diagnosed with PE
-Appropriately treat your patient
-Appropriately disposition your patient

# Case 3

-34 yo M with chest pain

-What hx do you want?

-What are you looking for on hx and exam?

VS: BP: 190/120, HR: 104, RR: 18, T: 98.7, SAT: 100% on RA

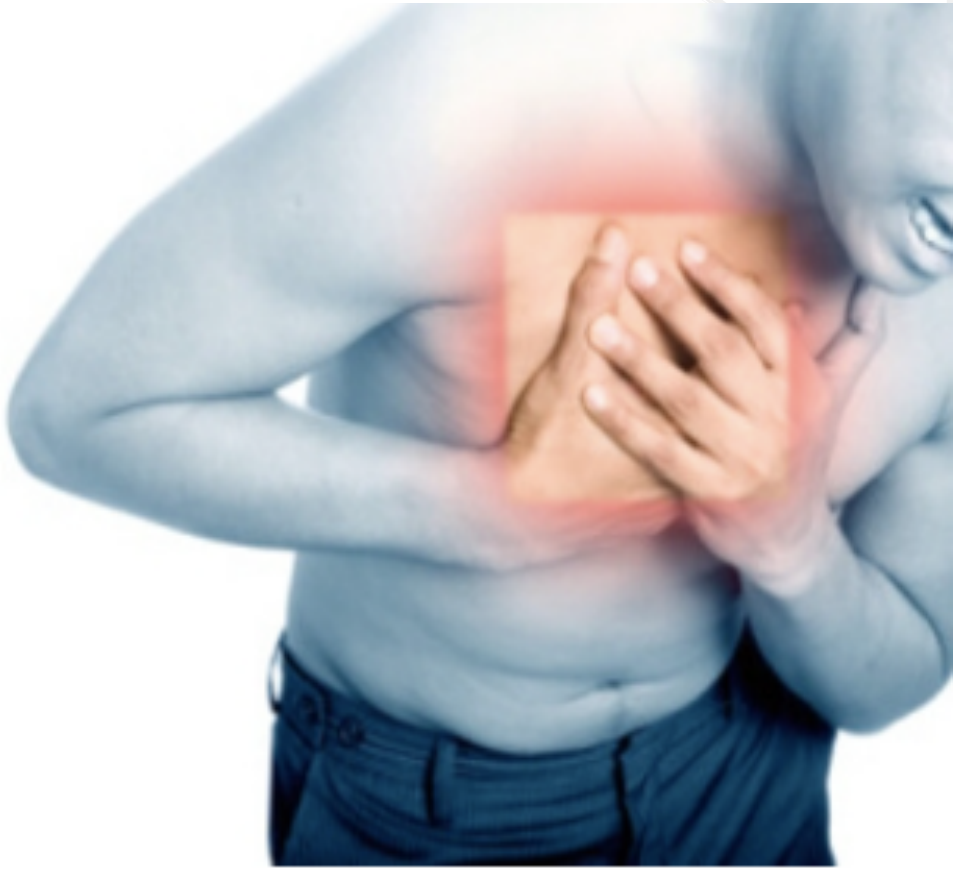
Mod to severe distress, diaphoretic, clenching chest, alert and oriented x3, non-focal
CTA b/l
Nl s1s2, Grade 2 diastolic murmur LLSB, no rubs or gallops
Symmetric pulses throughout

-What else do you want to examine?

RUE BP is 196/124 and his LUE BP is 170/100

This guy doesn't look so good.

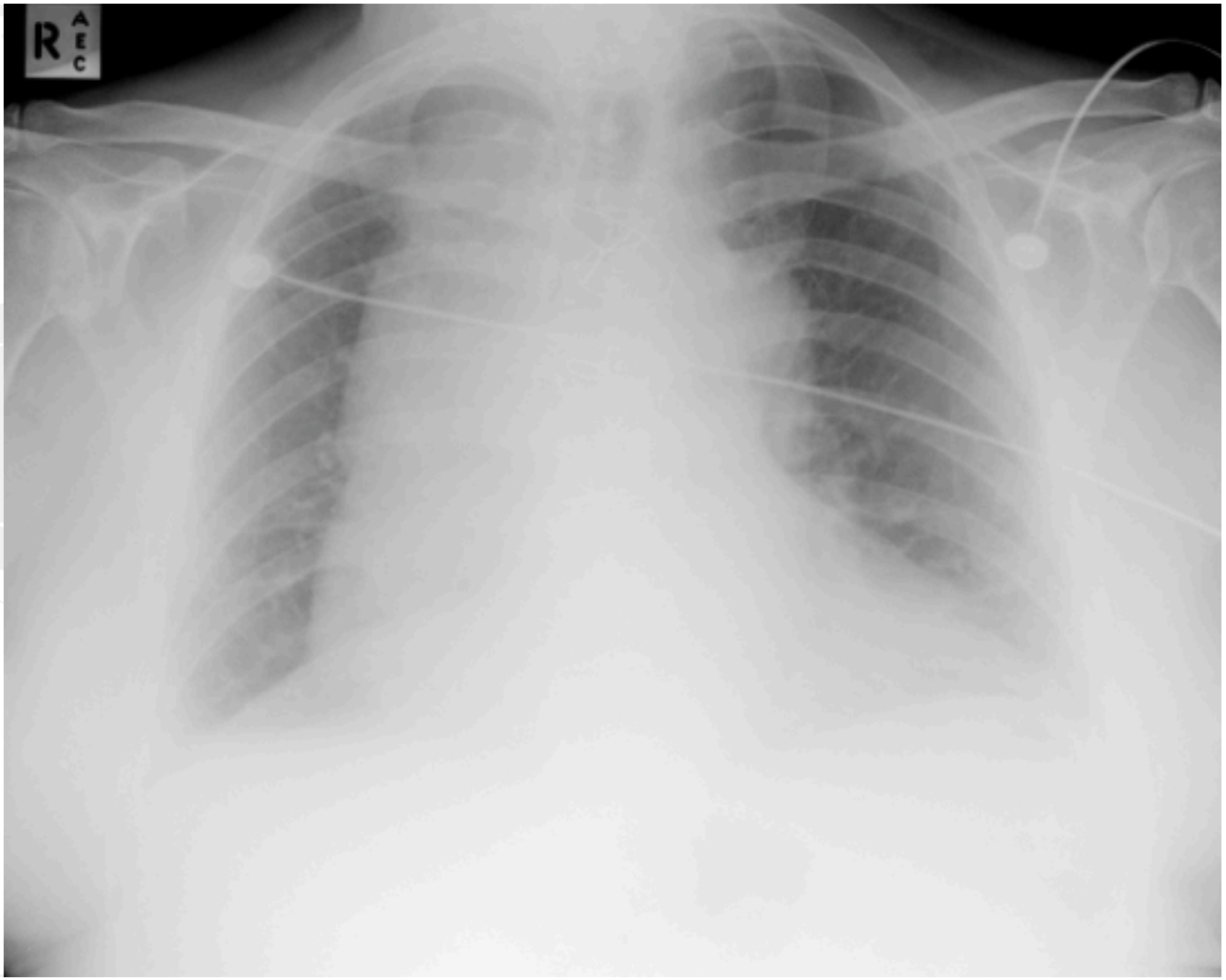
-What next?



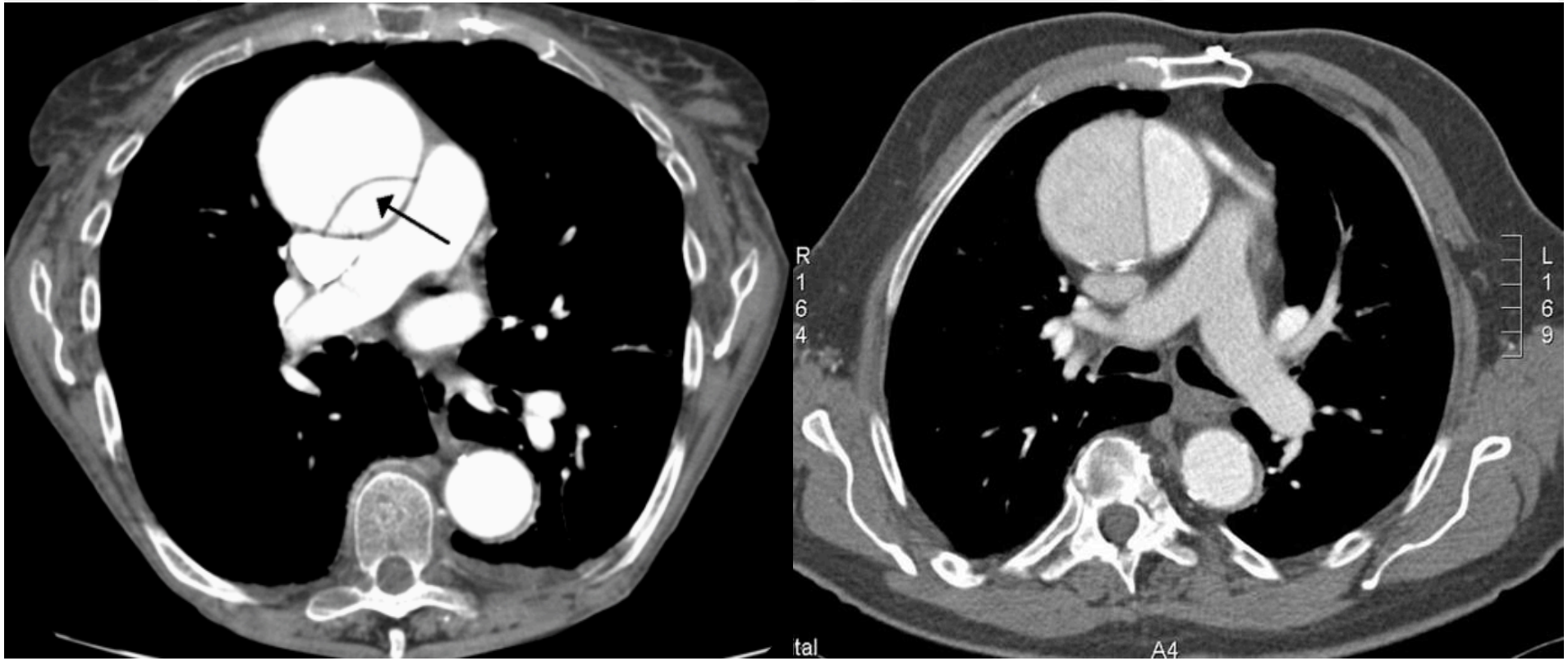
# CXR

-Thoughts?

-What now?



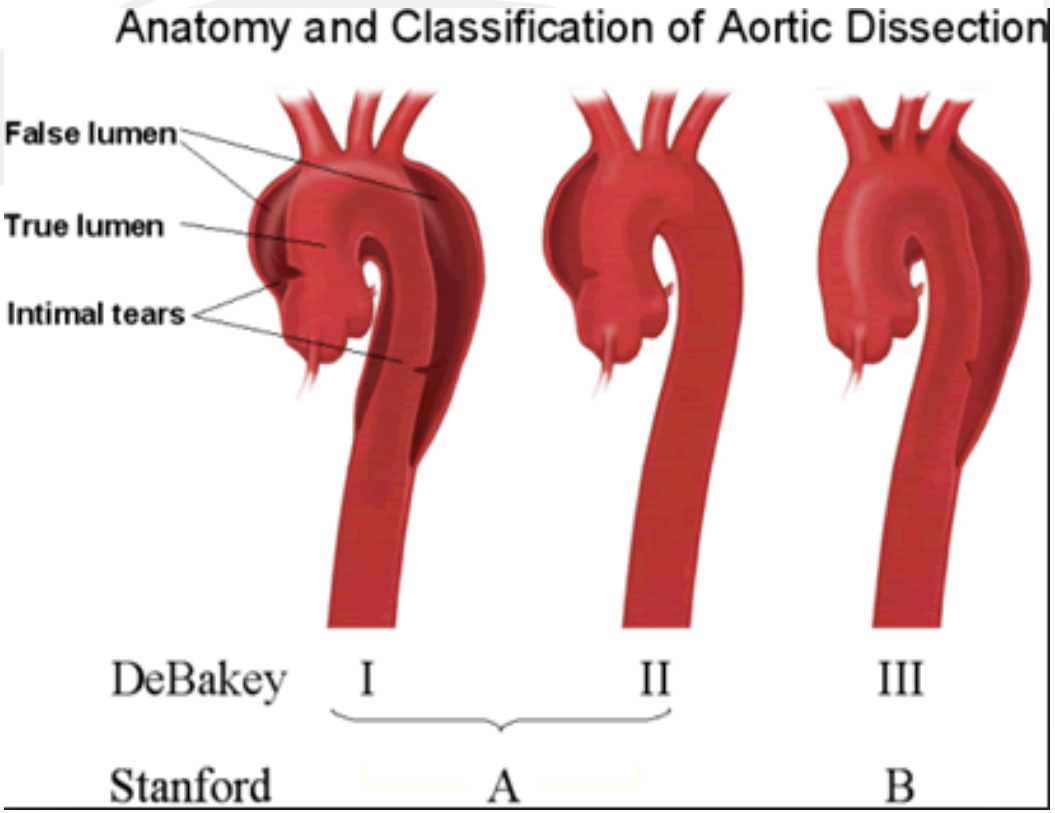
# CT-angiography-DX?



# Management

-Interventions?
Control HR, BP, pain, Monitor

-Consults?
CT surgery ASAP!



# Case 4

28 yo M with chest pain for 2 days.

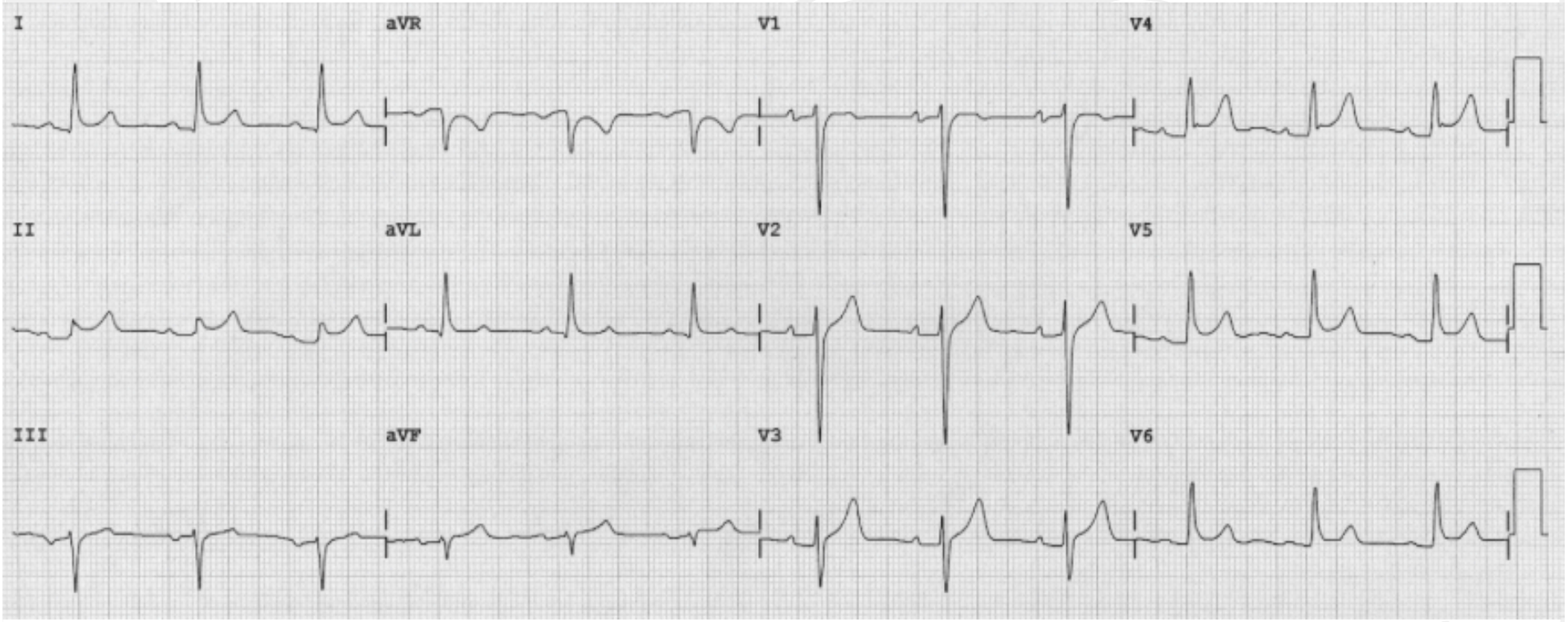
-What do you want to know?
-What is your next step?
-What are you going to look for?

VS: BP: 140/80, HR: 90, RR: 12, SAT: 99%
RA, T: 98.7 rectal

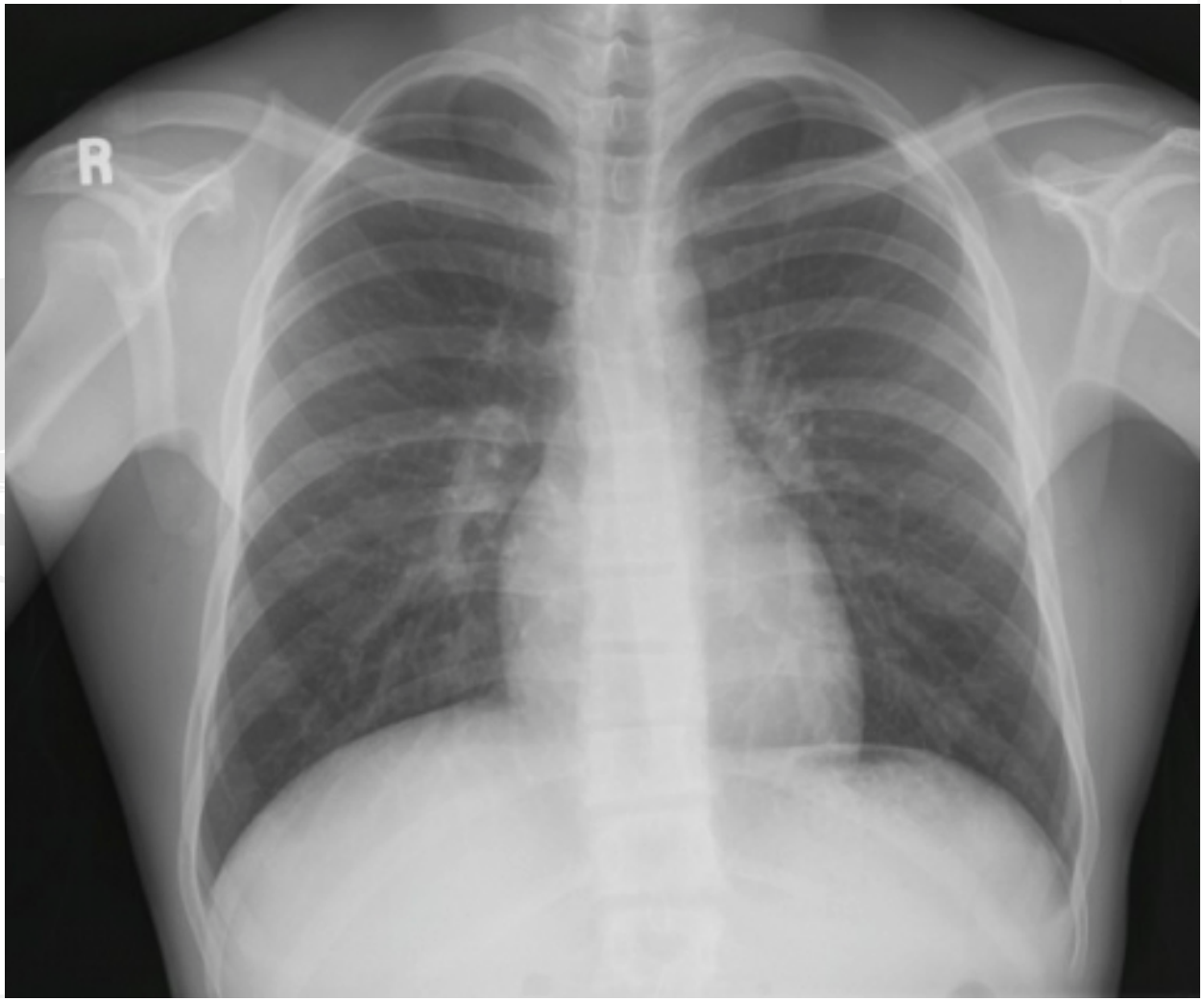
Mild distress, leaning forward
CTA b/l, no WRR
Nl s1s2, no MRG
Soft, NTND, normal bowel sounds
EXT warm and dry

**-What's your DDX? What next?**

# ECG: What do you see?

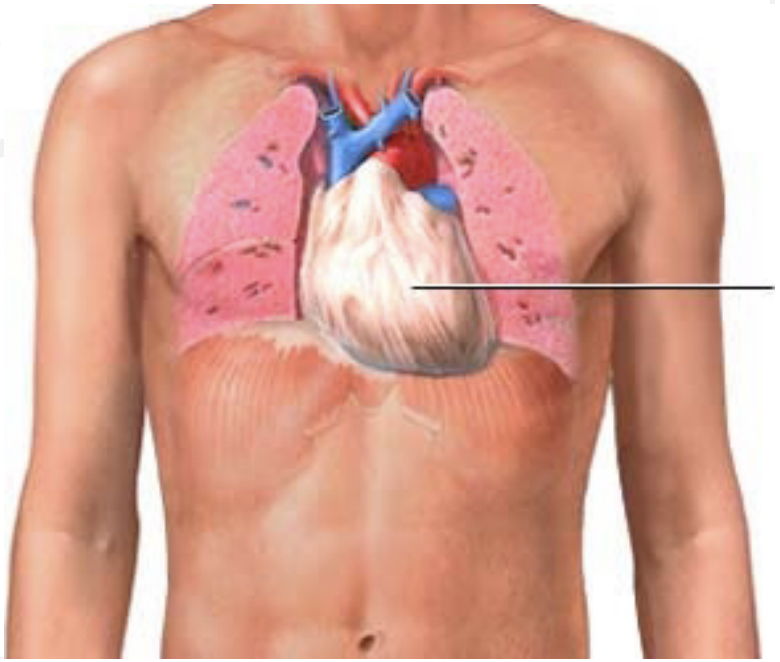


See anything? Normal or abnormal? **Why did you get a CXR?**

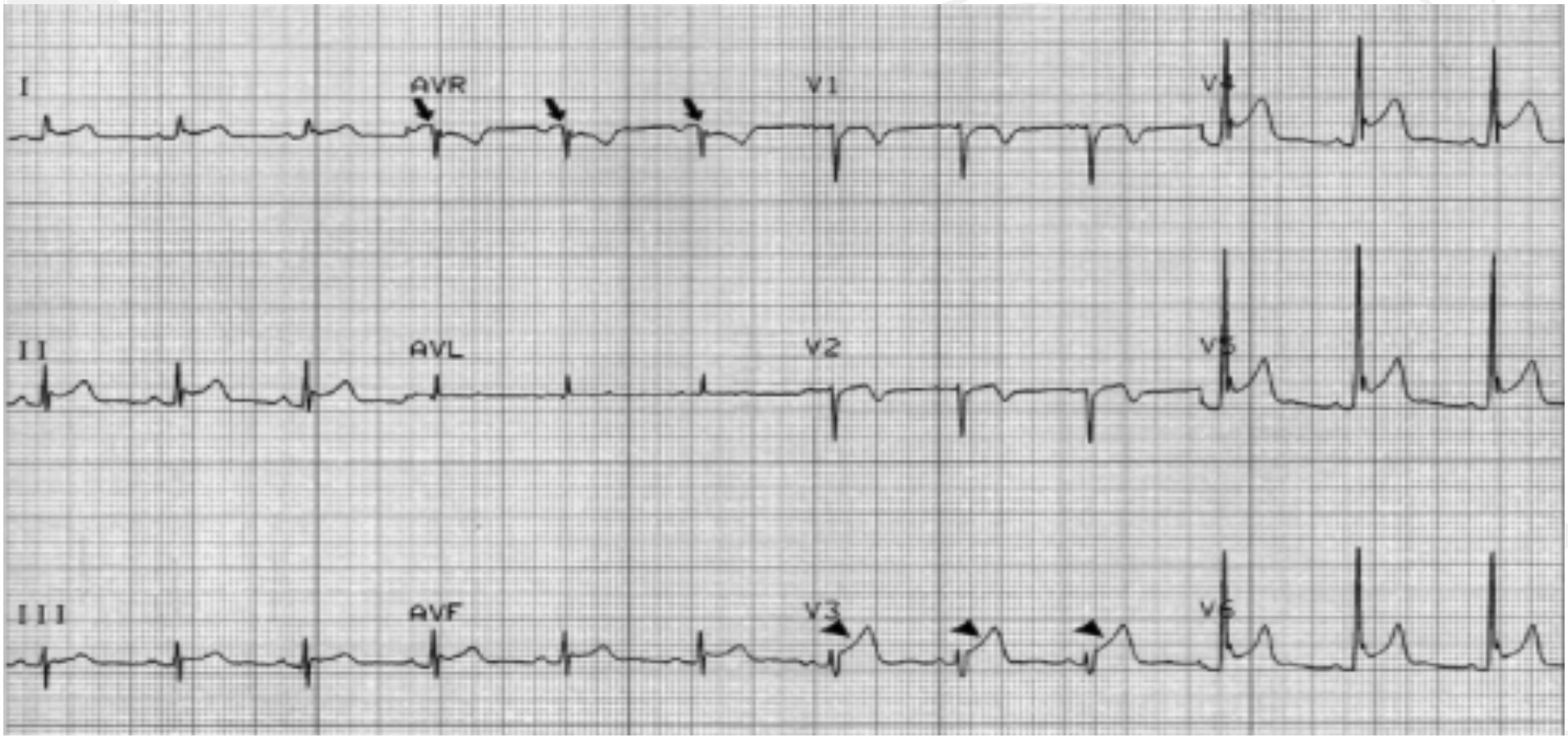


# Dx: Acute Pericarditis

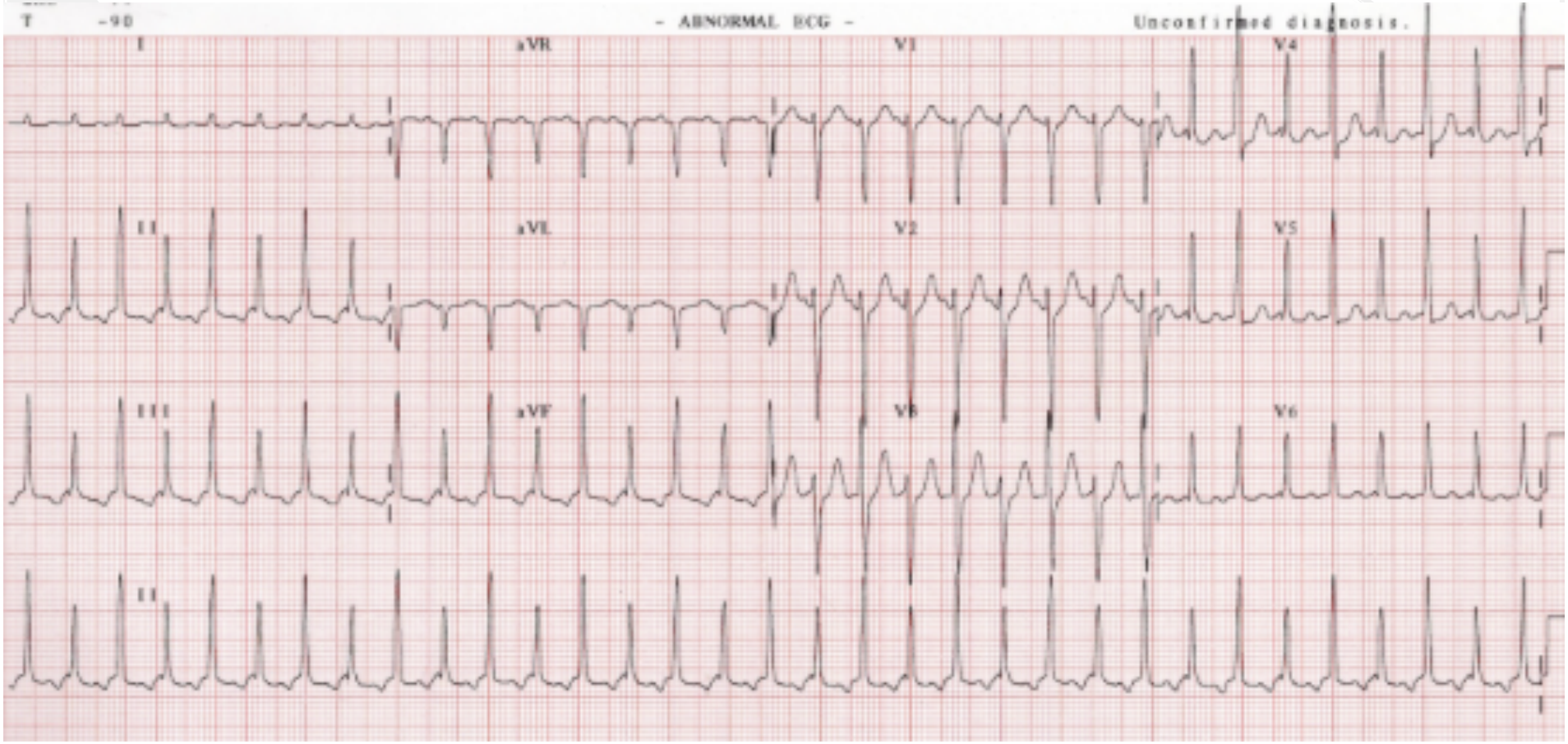
-What pain characteristics distinguish this from ACS, coronary ischemia/anginal pain?
-Any labs helpful?



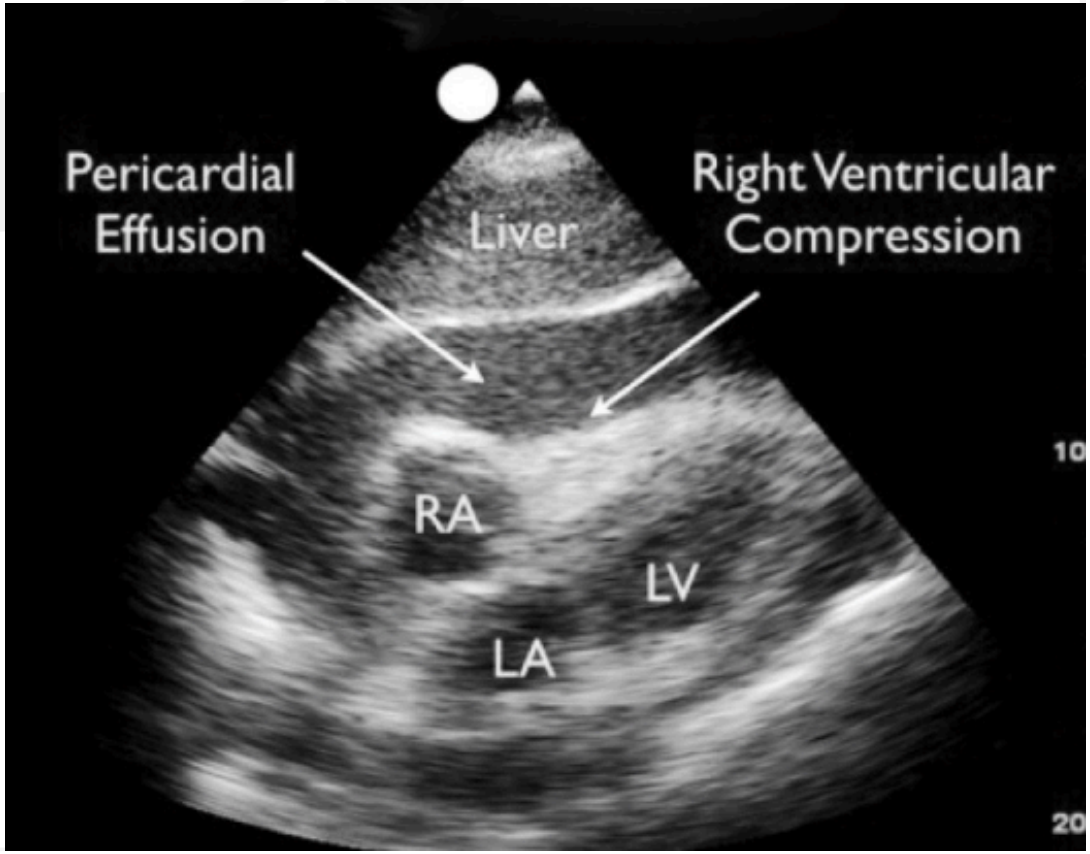
# Note findings on ECG



# Alternans…


- ABNORMAL ECG -
Unconfirmed diagnosis.
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II

# What we are worried about…



# Treatment:

-What are the goals of tx?

-What meds are options?
NSAIDs, Colchicine, Steroids

-Dispo?