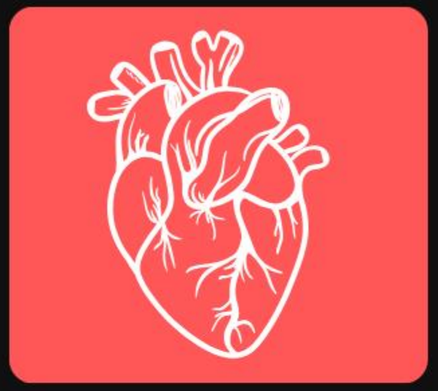
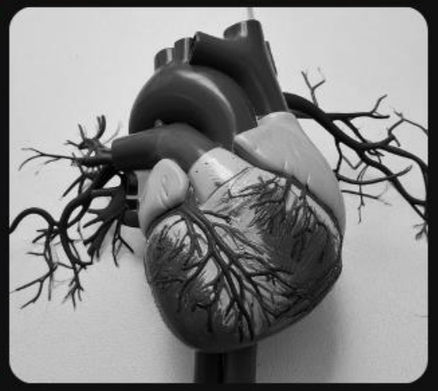








Critical Cardiology Cases

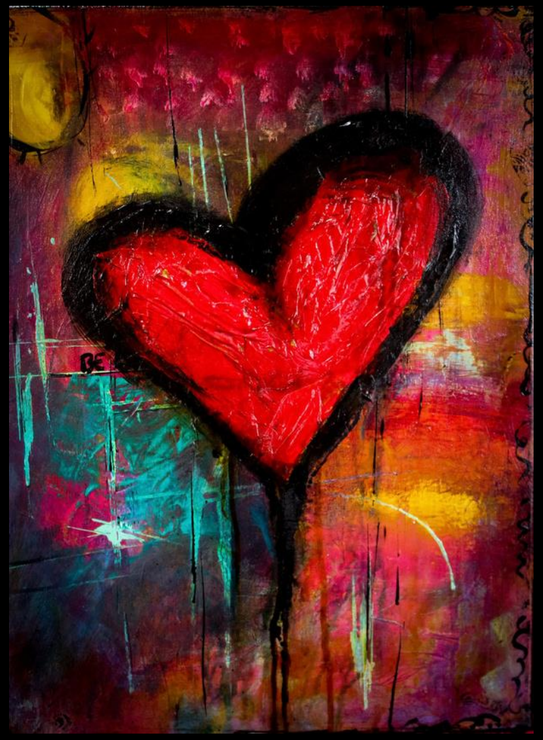
Presented By:
Jennifer Carlquist
PA-C, ER-CAQ

Disclosures: None



Objectives:

1. Identify dynamic ekg changes and why they matter
2. Review subtle signs of ischemia
3. Review EKG findings that can kill young people





The Case

Not a real patients face

39-year-old female

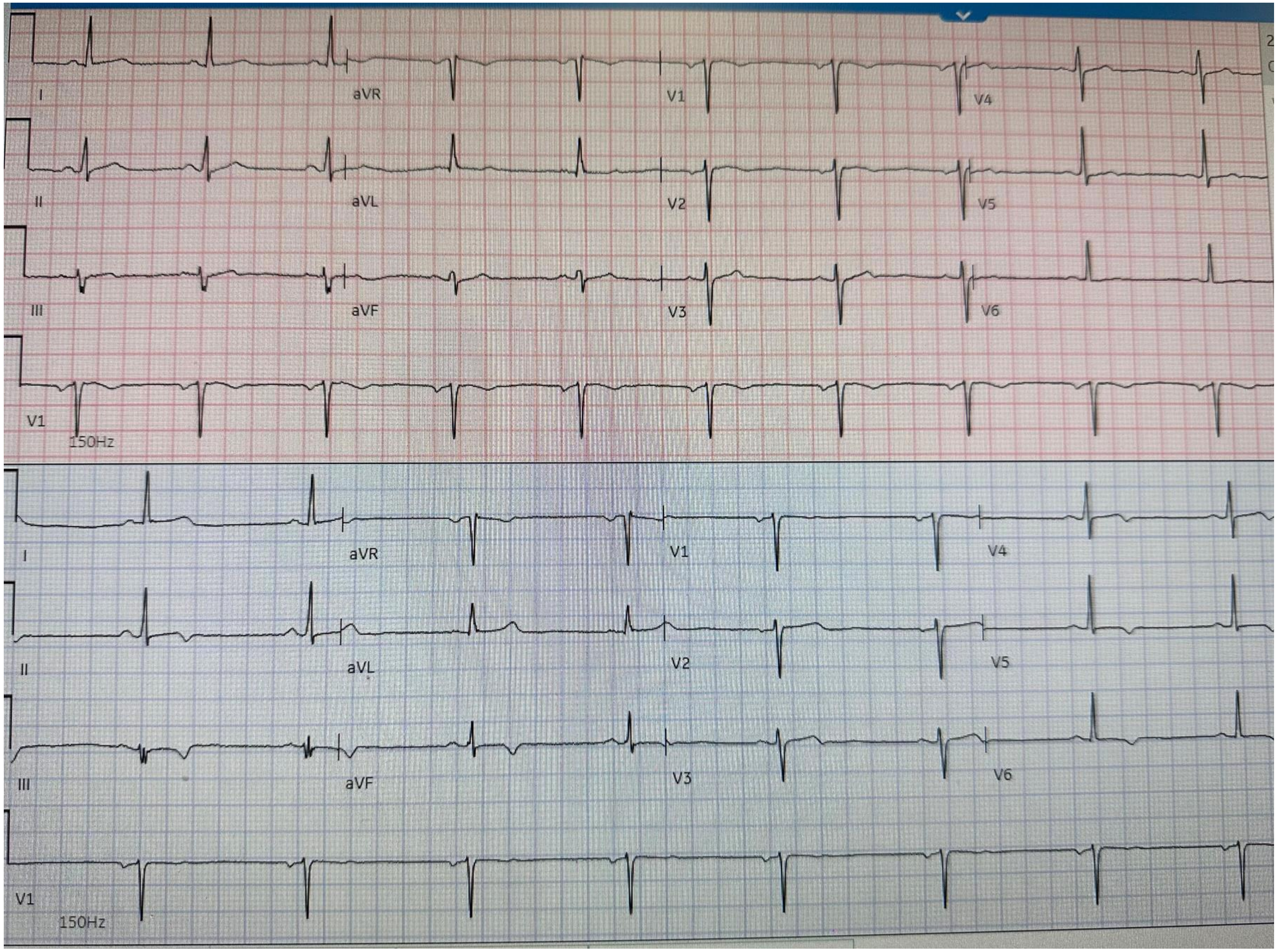
Chief Complaint: Chest pain, 8/10 severity

History: NSTEMI one year ago, no interventions

Medications: Discontinued clopidogrel and ASA 3 months ago for hysterectomy

EKG #1

EKG #2


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
150Hz
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
150Hz

LABS

- **Troponin Levels:**
  - Initial: 12
  - 6-hour: 48
  - 12-hour: 118 (Δ = 36)
- **Additional Labs:**
  - Creatinine: 0.84
  - Glucose: 90

Interventions in ED:

- Nitroglycerin: 100 mcg
- Morphine: Pain reduced to 2/10

CATH LAB

Cath Lab Findings (Day 2):
SCAD (Spontaneous Coronary Artery Dissection) in RPDA

Ejection Fraction (EF): 55%

Management:

- Heparin for 48 hours
- Initiation of ASA, statin, and clopidogrel
- Conservative (Medical) Management

Follow-Up:

- Screening: Fibromuscular Dysplasia

29-year-old Male



The Case

Not a real patients face

“I feel dizzy and lightheaded”

- Presented to ED after feeling unwell while out drinking with friends
- No chest pain, syncope, or seizure
- Reports feeling anxious, thought it was a panic attack

HISTORY

- **Social History:** Occasional alcohol use – had several drinks tonight
- **Medications:** None
- **Family History:** Sudden cardiac death in a cousin, age 30s
- No known drug use (urine tox pending)

VITALS & PHYSICAL EXAM

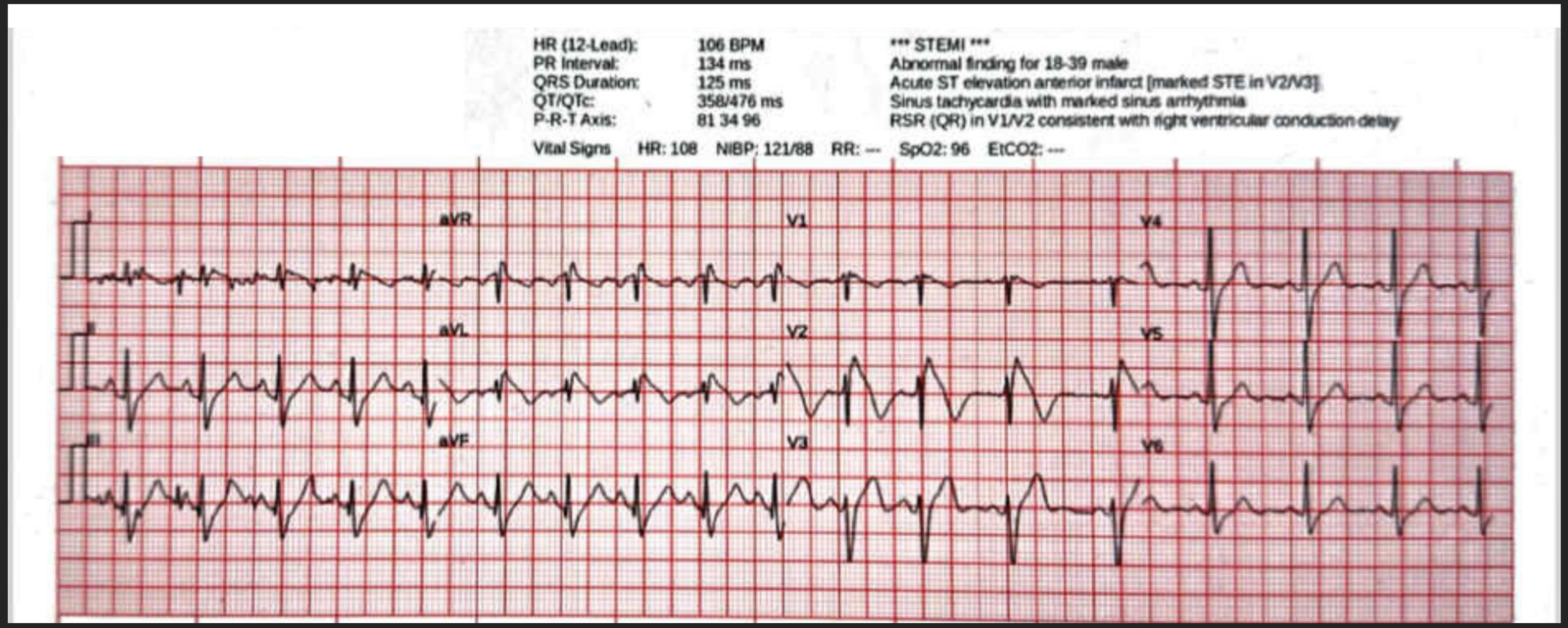
Initial Vitals:

- HR: 98 bpm
- BP: 110/72 mmHg
- RR: 18
- SpO_2: 98% RA
- Temp: 36.8°C

Physical Exam:

- Alert, mildly anxious
- No murmurs, rubs, or gallops
- No focal neuro deficits

EKG


HR (12-Lead): 106 BPM
PR Interval: 134 ms
QRS Duration: 125 ms
QT/QTc: 358/476 ms
P-R-T Axis: 81 34 96
*** STEMI ***
Abnormal finding for 18-39 male
Acute ST elevation anterior infarct [marked STE in V2/V3].
Sinus tachycardia with marked sinus arrhythmia
RSR (QR) in V1/V2 consistent with right ventricular conduction delay
Vital Signs HR: 108 NIBP: 121/88 RR: --- SpO2: 96 EtCO2: ---
aVR
V1
V4
aVL
V2
V5
aVF
V3
V6



The Case

Not a real patients face

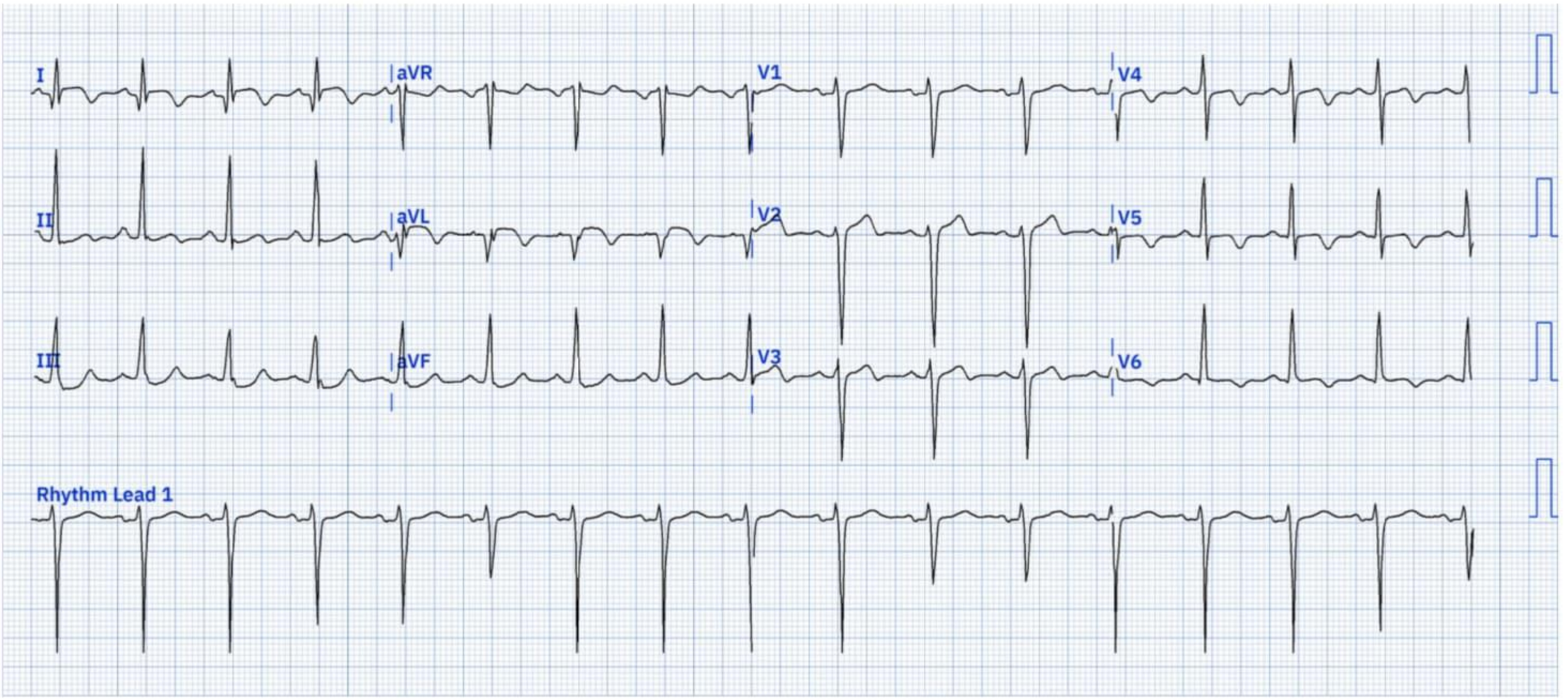
40 yo male w/ chest pain

- Doing manual labor when he developed substernal left chest pain
- Radiated down his left arm
- His arm felt “tingly and heavy”
- Vomited x 3 secondary to pain

FAMILY HISTORY

- 3 males in family died under age 50 of MI

THE EKG





The Case

Not a real patients face

98-year-old female

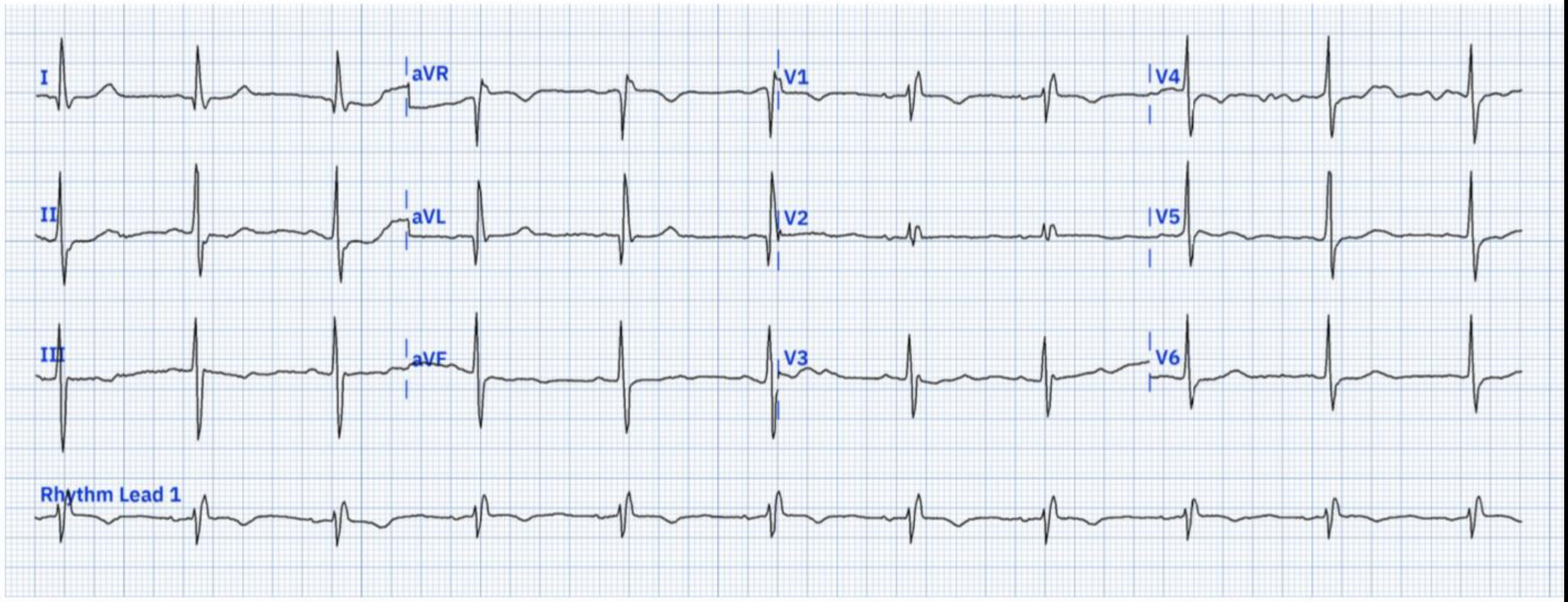
Chief Complaint: Lightheaded, nauseated
Fatigued

Associated Symptoms:

- No Dyspnea
- No cough

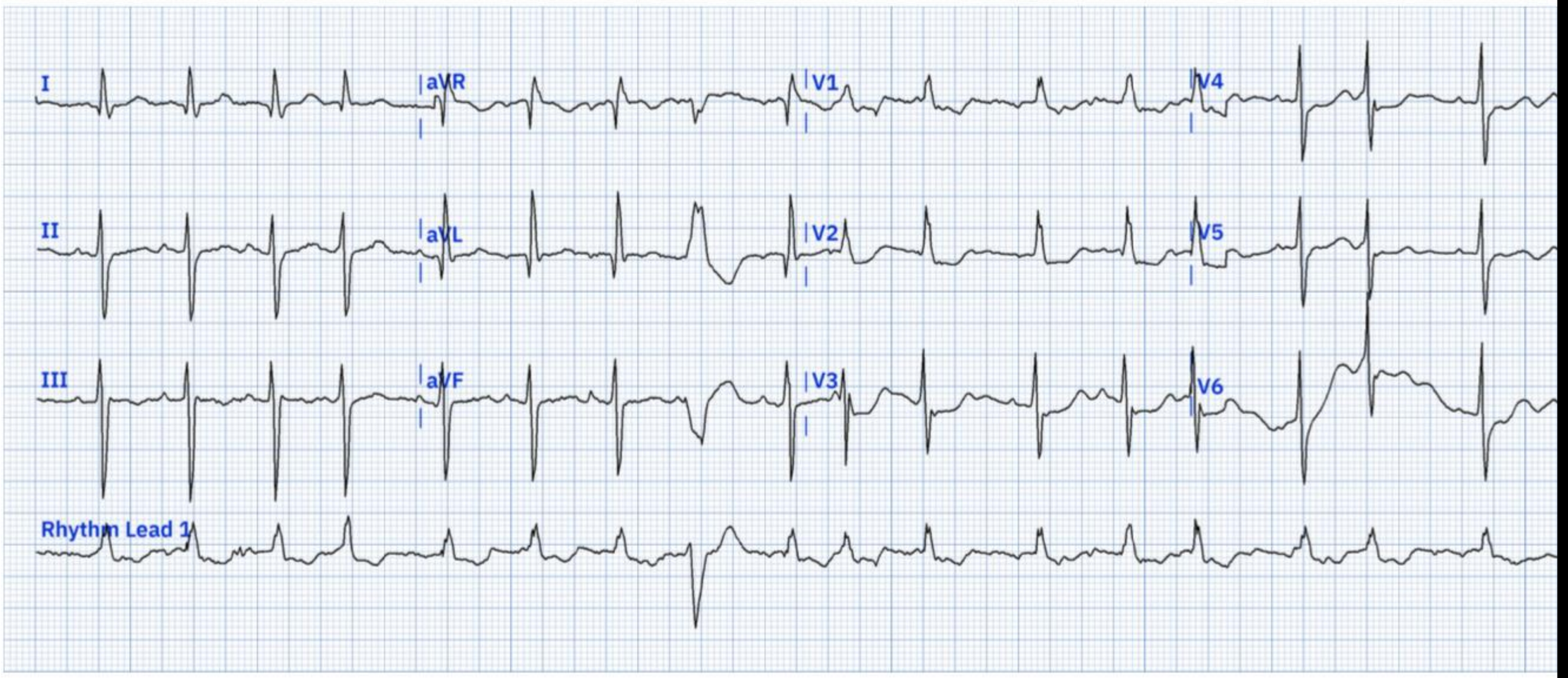
Was diagnosed with a UTI.....
Became confused.....

THE EKG #1

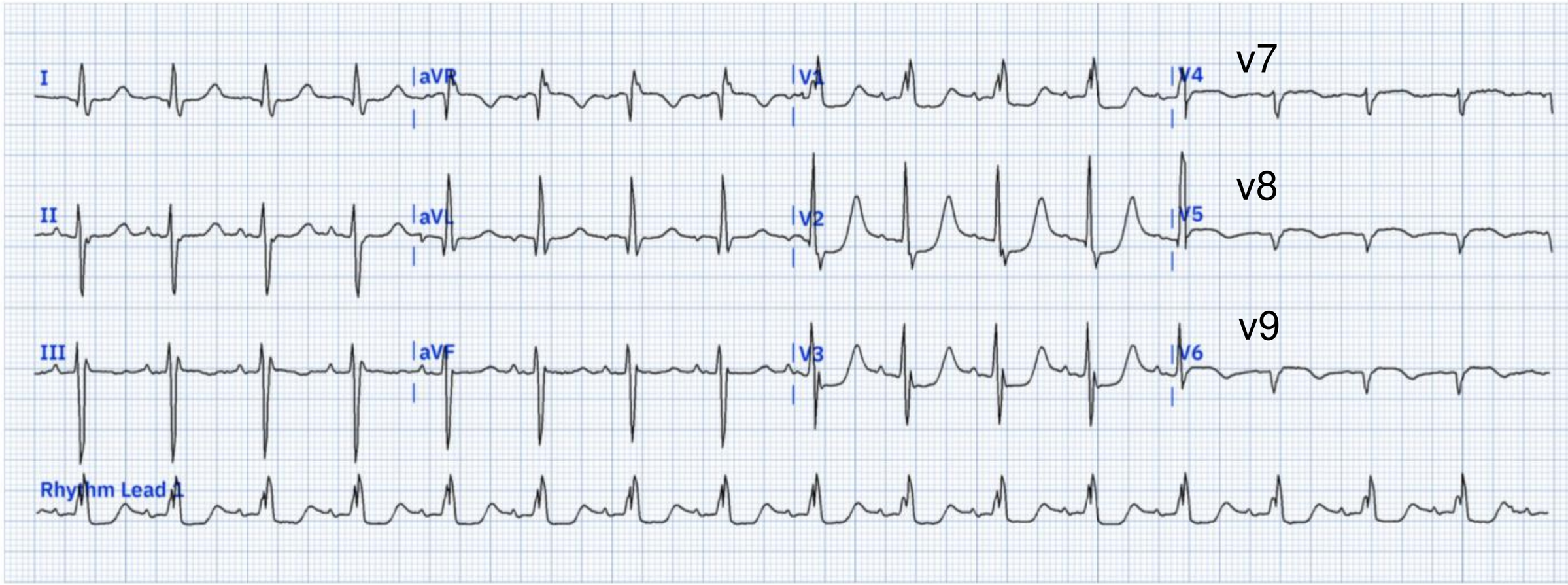


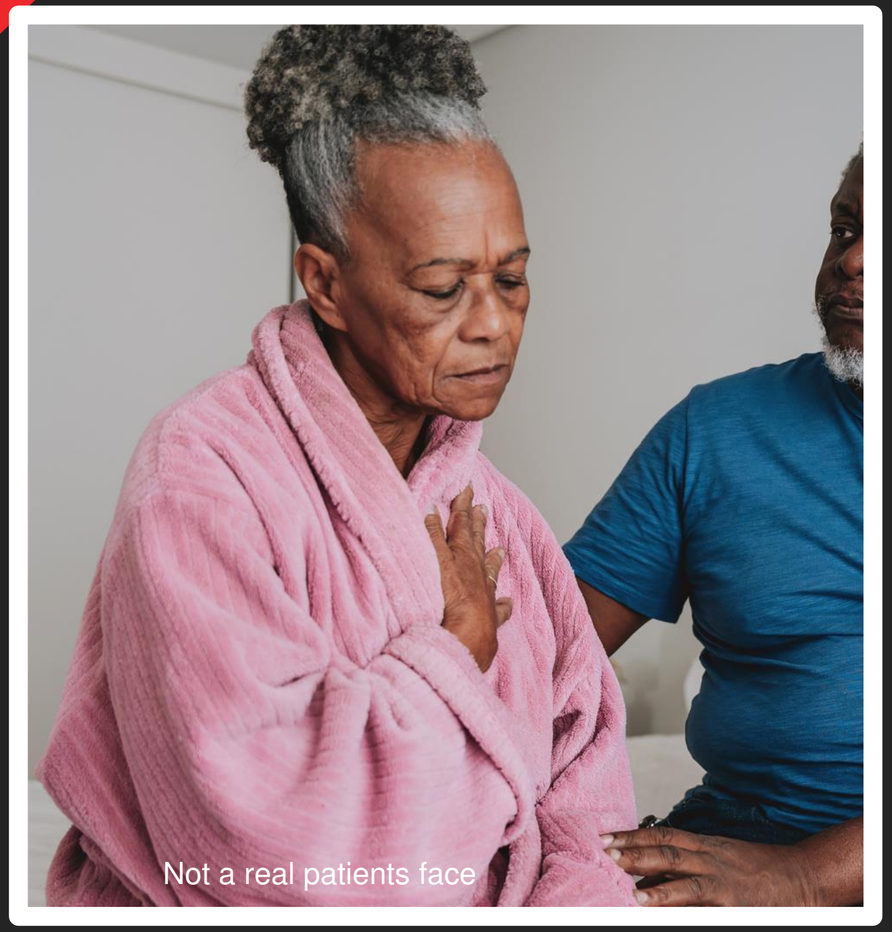
THE EKG #2

HS trop 54--->661



THE EKG #3




Not a real patients face

THE CASE

55-YEAR-OLD FEMALE

Presents with sudden-onset palpitations, weakness, and dizziness.

History

- Anemia
- Colitis

VITAL SIGNS ON ARRIVAL

- **BP:** 131/96
- **HR:** 191
- **RR:** 20
- **Temp:** 97.9°F

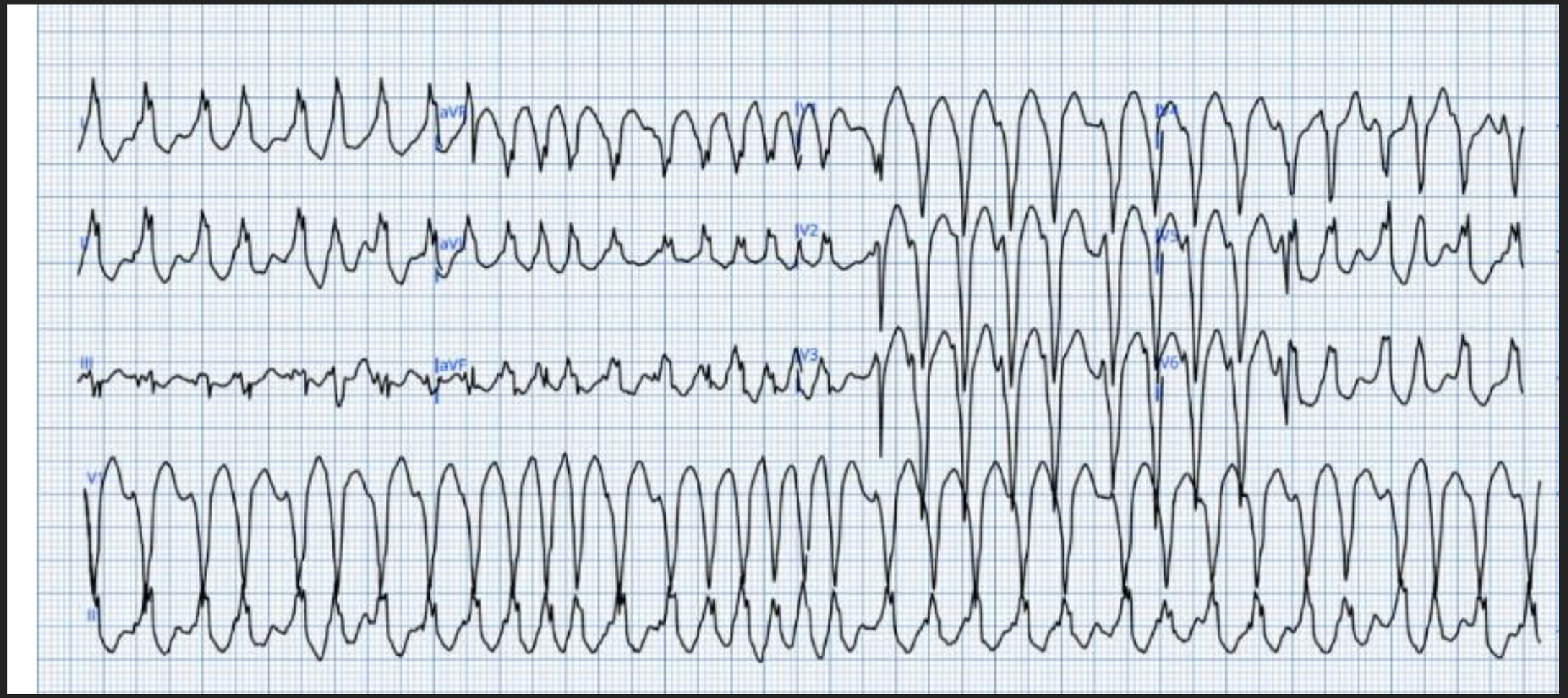


LABS

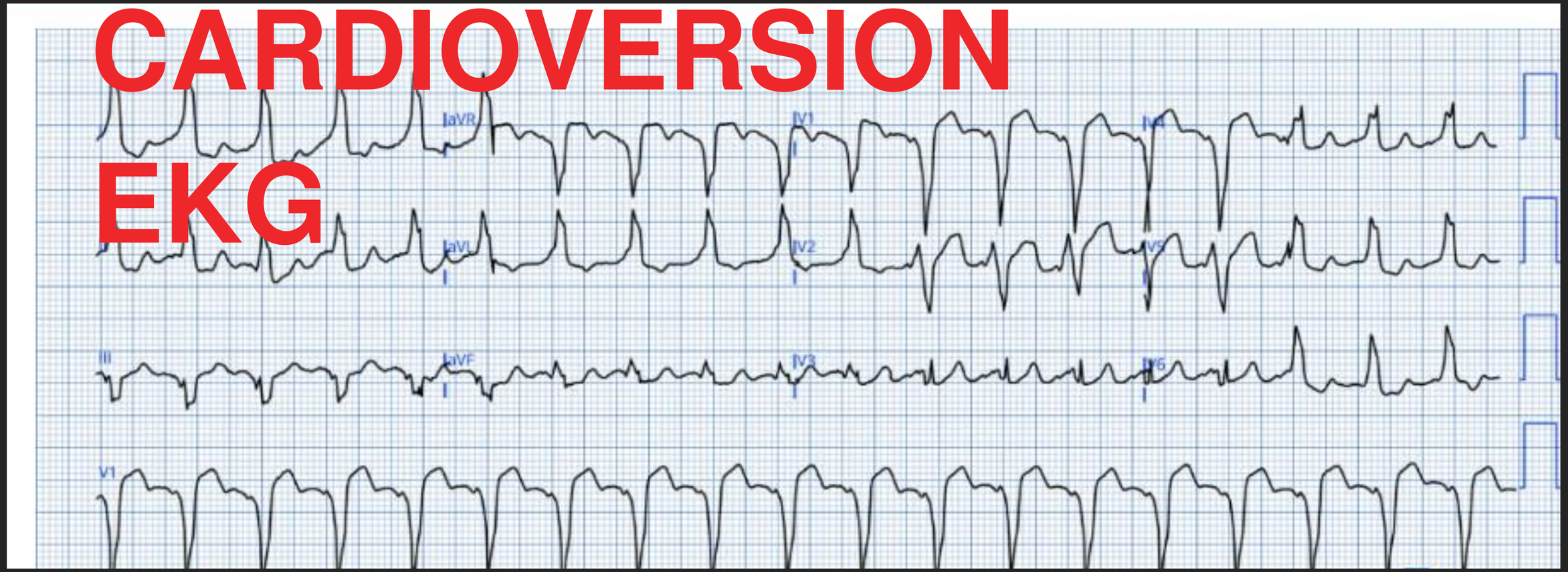
- **Mag:** 2.1
- **Creatinine:** 0.61
- **Potassium:** 4.5
- **LDL:** 64
- **High-sensitivity Troponin:** 14 → 13
- **TSH:** 0.01



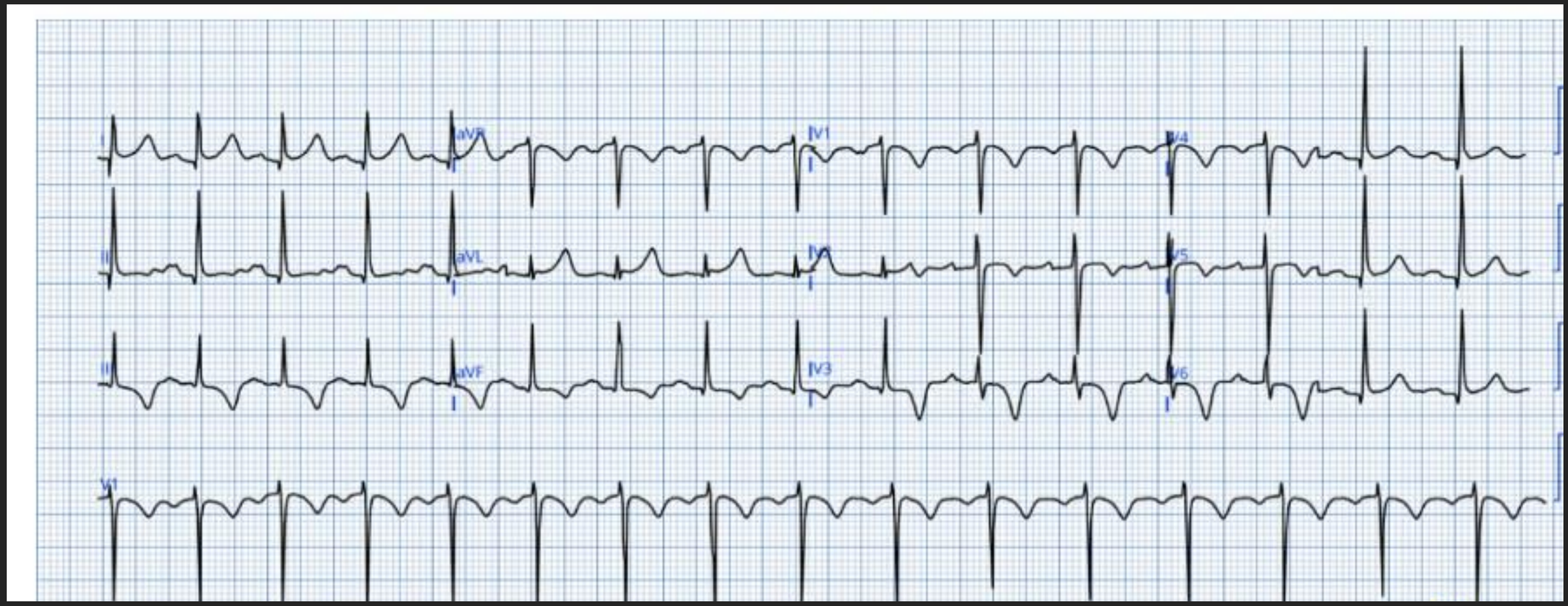
EKG #1



POST CARDIOVERSION EKG



POST ABLATION EKG



TREATMENT IN ED

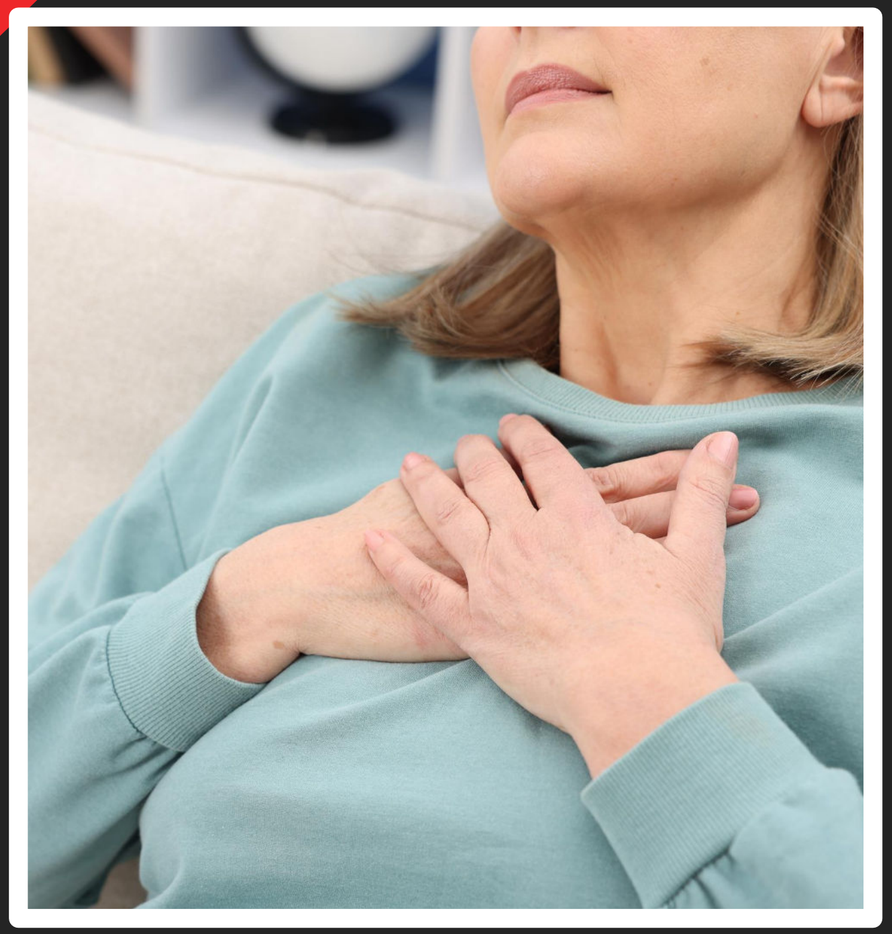
- **Synchronized cardioversion with sedation**
- **Rhythm restored**

DIAGNOSIS

- **Wolff-Parkinson-White (WPW) syndrome**
- **Ebstein anomaly**

HOSPITAL COURSE

- **Underwent WPW ablation**
- No complications
- **Discharged on metoprolol XL 25 mg once daily**



THE CASE

43-YEAR-OLD FEMALE

Chief Complaint: Acute chest pain

Timeline: 1.5 weeks postpartum

Chest Pain Description: 10/10 tight, radiating down left arm; improved to 6/10 after NTG + ASA in ambulance

VITAL SIGNS ON ARRIVAL

- BP: 124/100
- **HR: 88 bpm**
- **RR: 20**
- **SpO_2: 96% on room air**

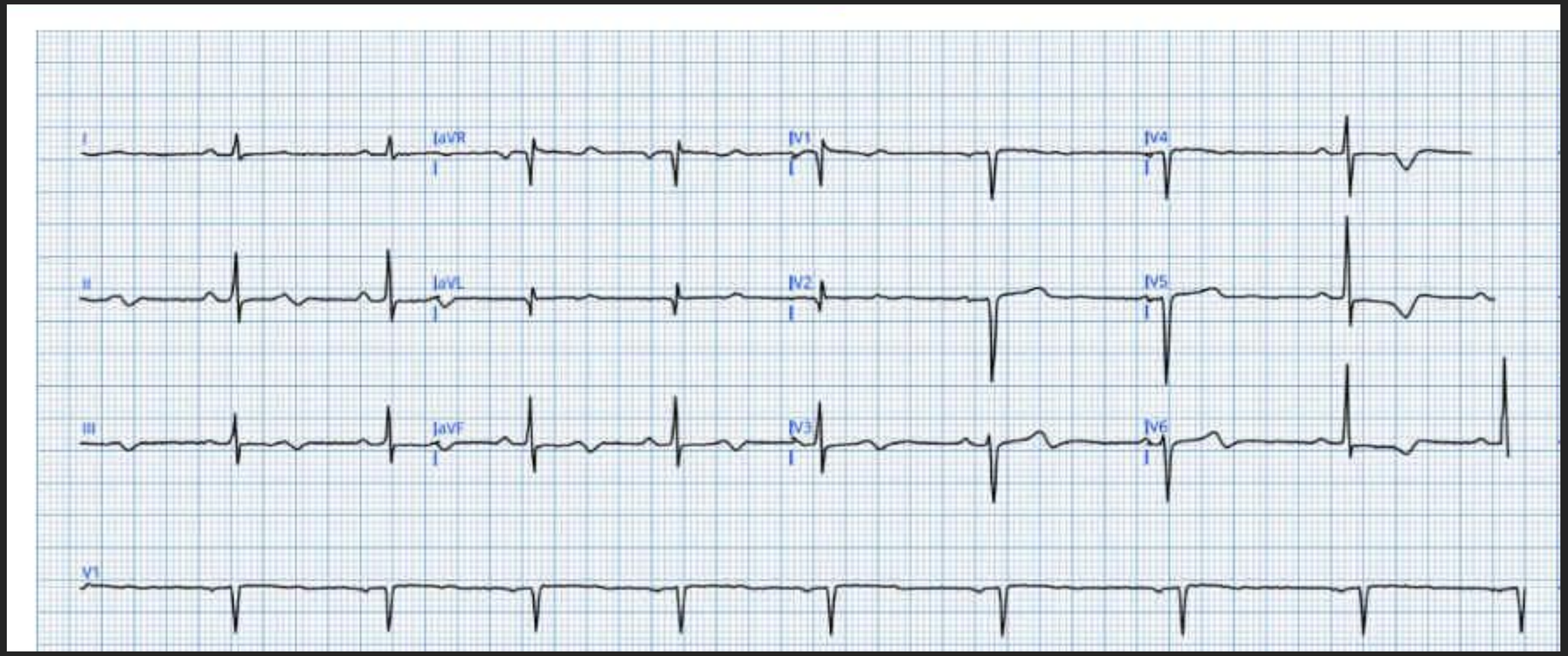


No complications in prior pregnancies or this recent delivery.

TROPONIN PANEL

TRPT5	569 ⏫	301 ⏫	81 ▲

EKG



CARDIAC CATH FINDINGS

2-Vessel SCAD:

- Mid LAD: 80% dissection
- Right PDA: 80% dissection

No evidence of atherosclerotic plaque ruptu

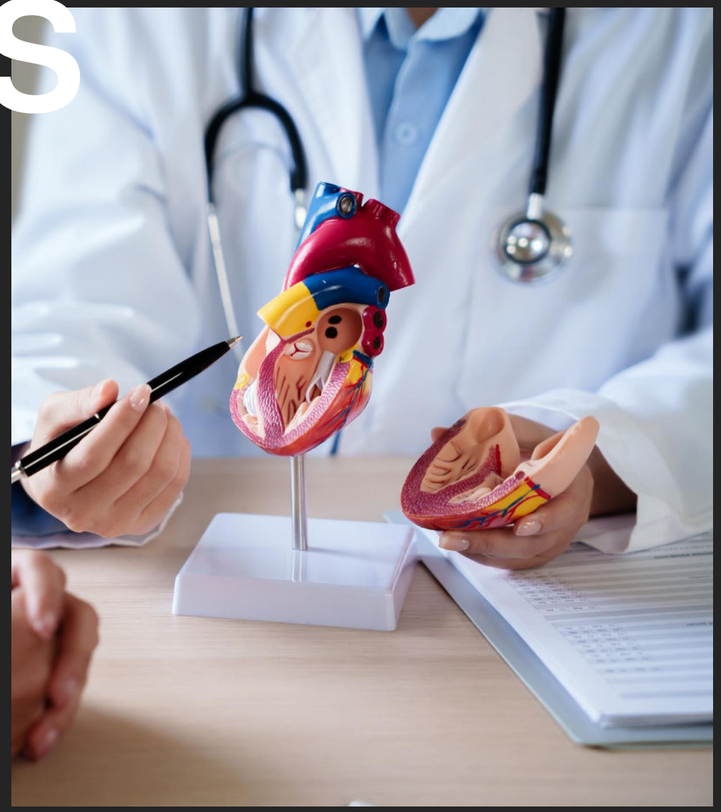


ECHOCARDIOGRAM FINDINGS

- LVEF 51–55% (normal systolic function)
- Diastolic function unable to assess (limited tissue Doppler / atrial rhythm)
- LV cavity size normal (indexed to BSA & gender)
- RV systolic function normal
- RV cavity size normal
- Estimated PA systolic pressure: 31 mmHg (mean 21 mmHg)
- IVC: normal CVP ~3 mmHg (<2.1 cm, >50% collapse)
- Apex hypokinetic; basal segments appear hyperkinetic
- No significant valvular disease

CARDIOLOGY RECOMMENDATIONS

- Conservative management (no stent)
- Limit physical activity
- Cardiac rehab referral
- Repeat CCTA to confirm healing/resolution
- CTA head to pelvis to evaluate for fibromuscular dysplasia (FMD)



70 y.o F with chest pain



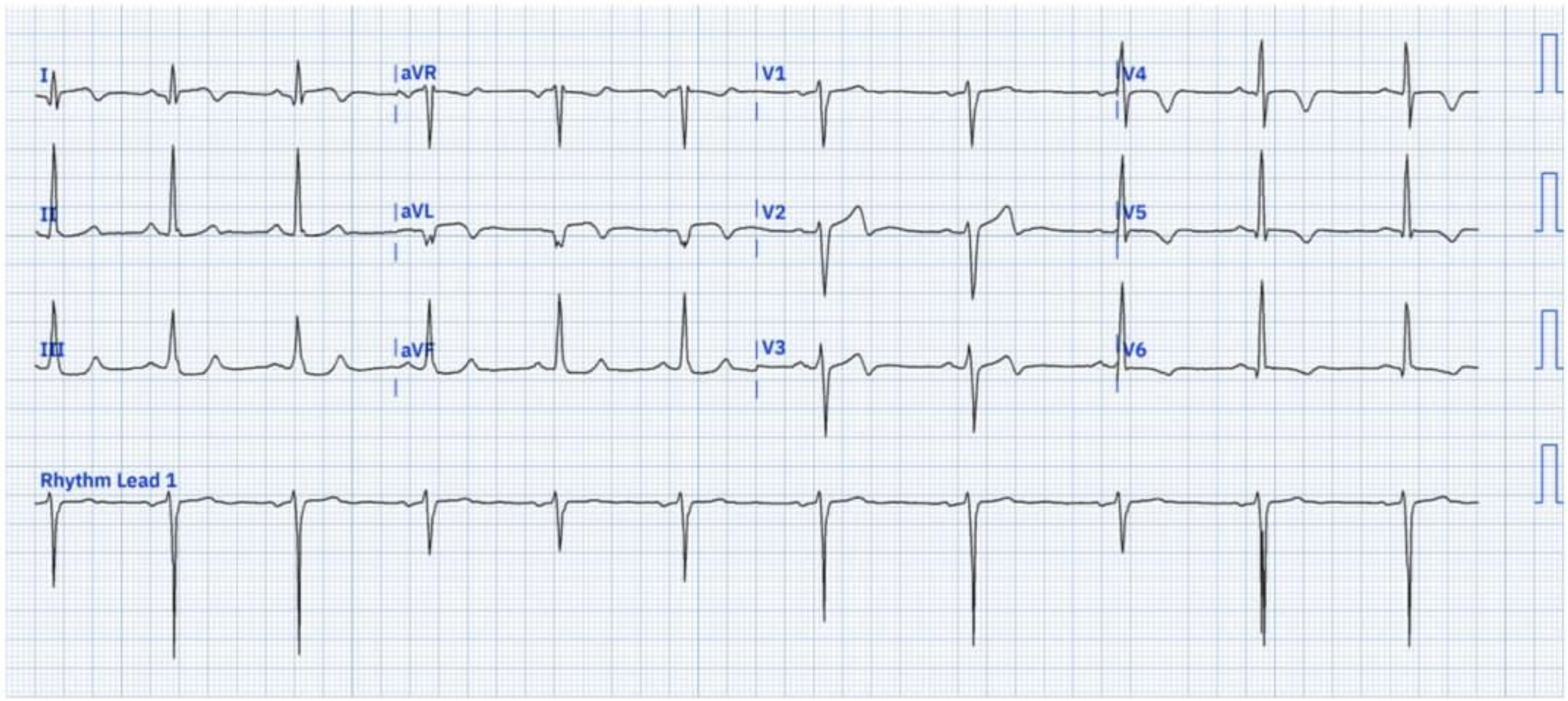
Not a real patients face

The Case

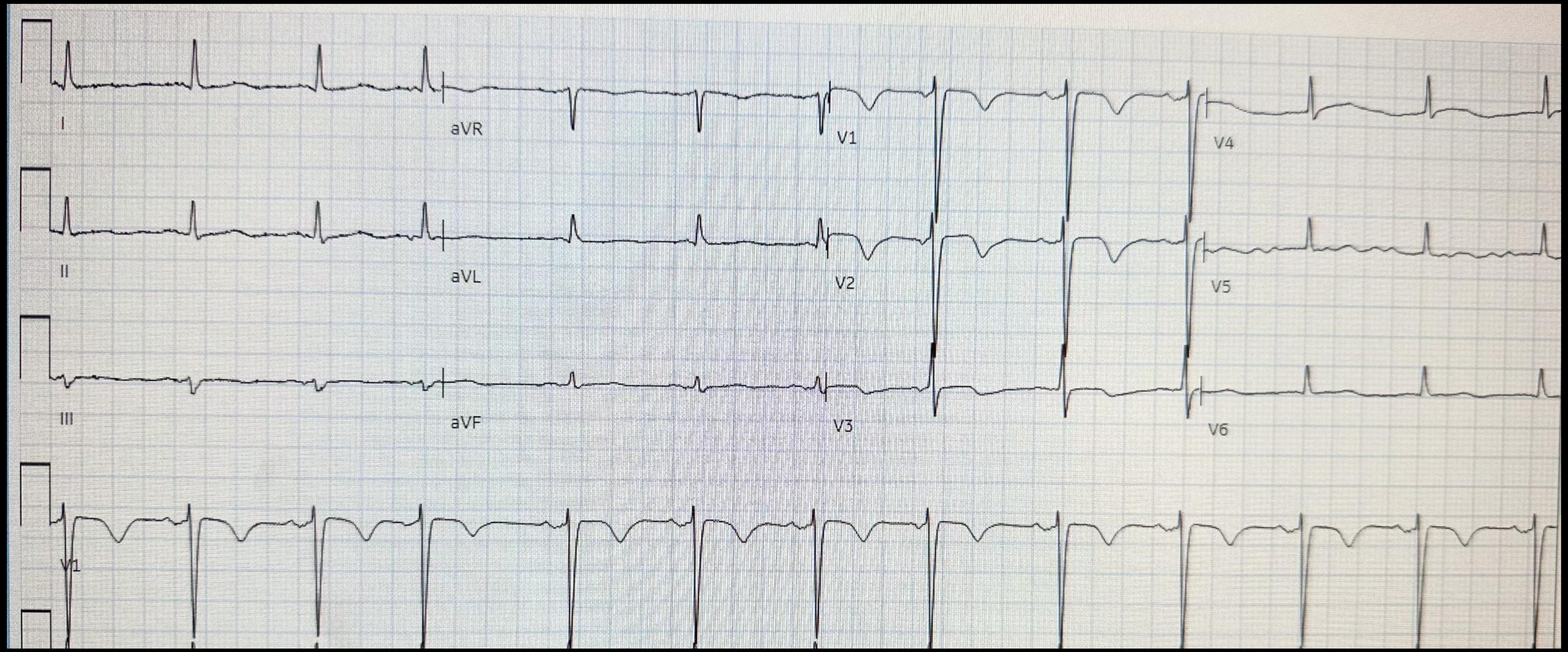
- P - Nothing
- Q - heavy
- R - To my back
- S - 8/10
- T - 45 minutes pta

Pmhx: HTN, HLD, DM, CAD

THE FIRST EKG



EKG 1

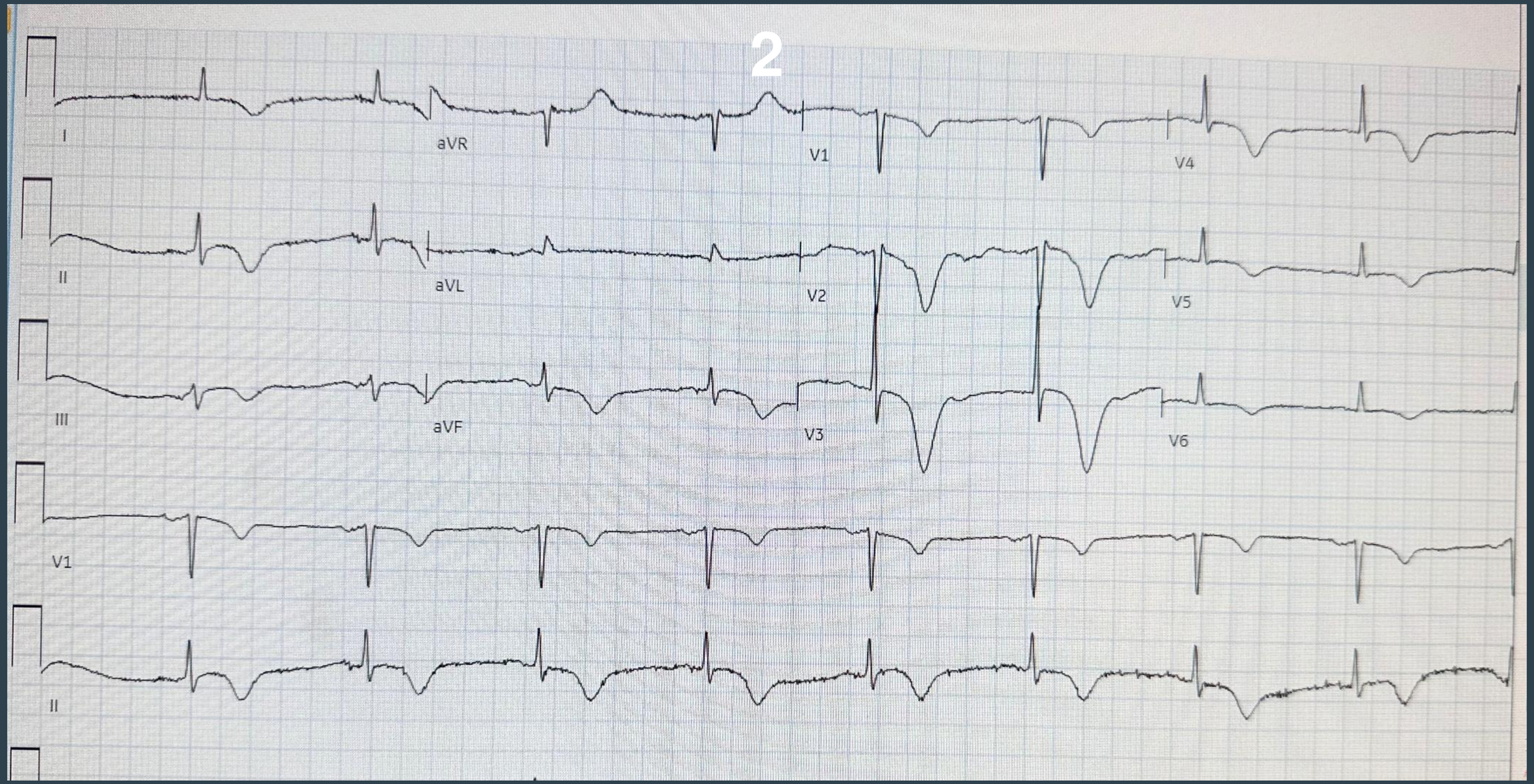


What is this called?

What should be done here?

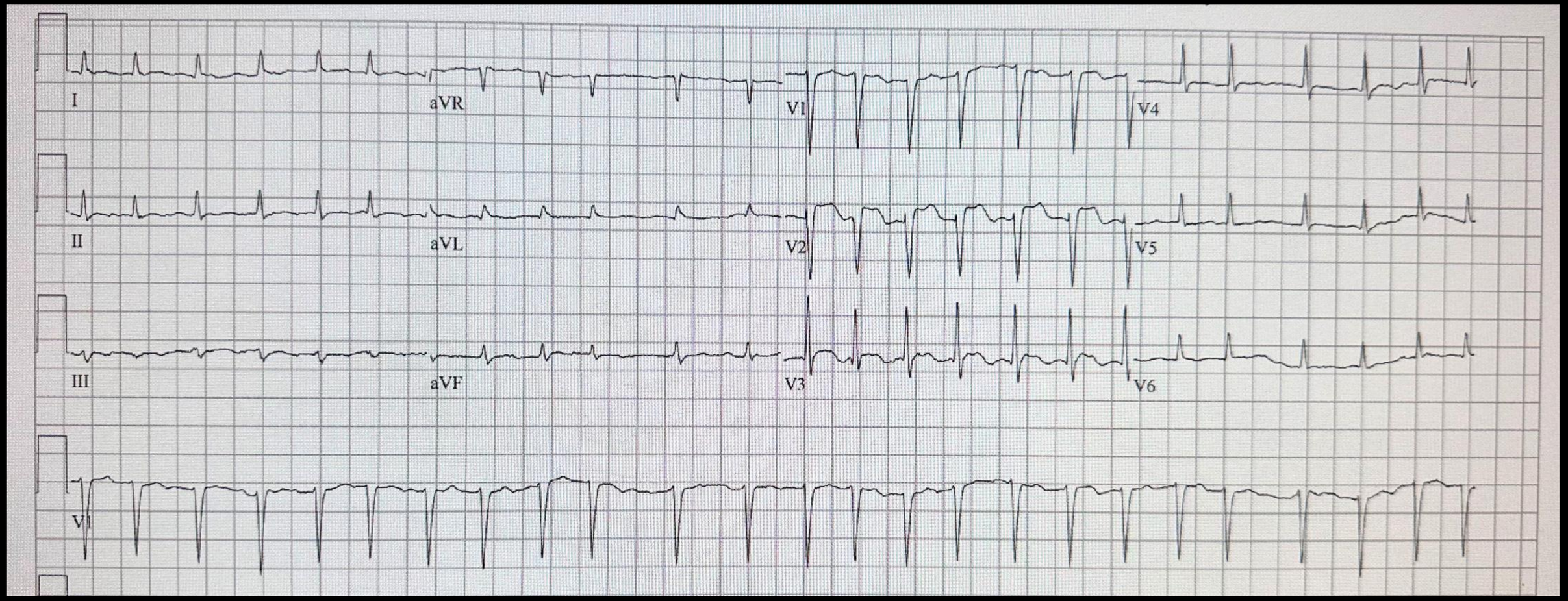
EKG

2



What do we call THIS?

EKG 3



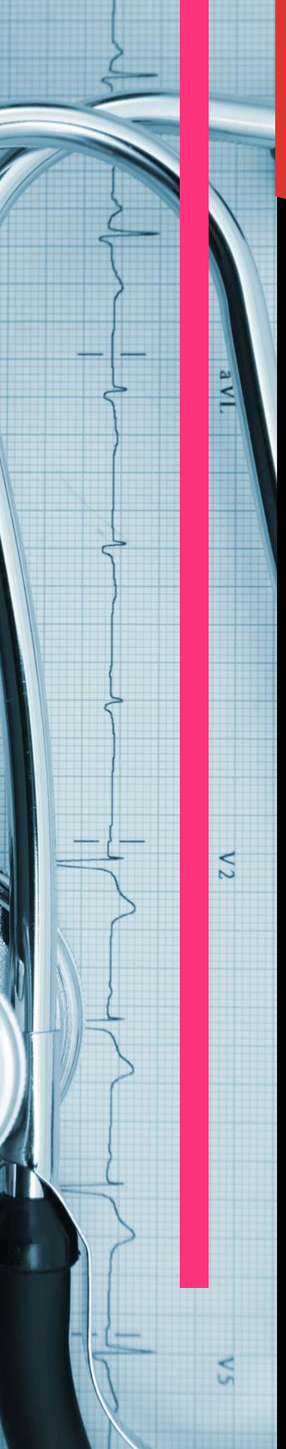
What is the rhythm?

Is this a STEMI?

HER LABS

- Hs trop - 1020-1140 delta 225
- LDL 112
- Glucose 100





CATH REPORT

- The prox to distal LAD dissected!
- RCA with mid-moderate disease
- LCX with minimal plaque
- LVEF is preserved with apical hypokinesis



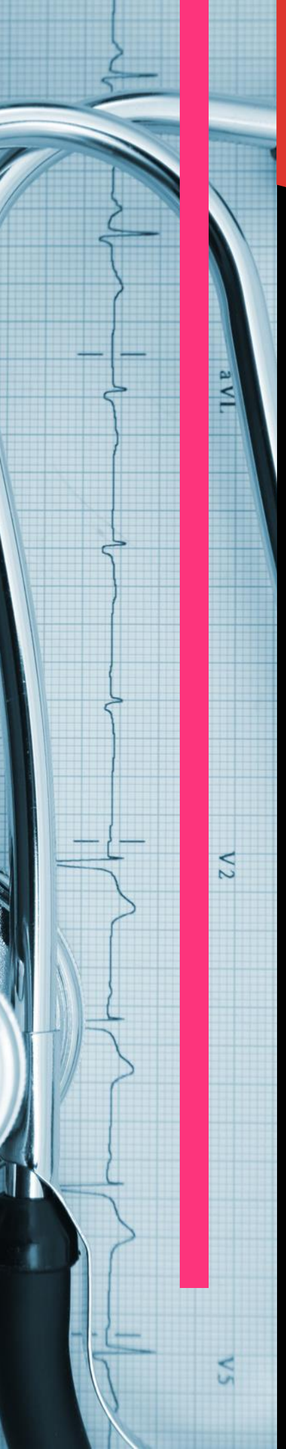
The Case

Not a real patients face

80 yo male w/ chest pain

- “Burning” did also have indigestion
- Pain got better with gabapentin
- +Diaphoresis and mild dyspnea

- **Pmhx:** Former smoker, DM, HLD sent from urgent care for “STEMI”



MORE INFO

- **Bp 171/90 hr 116 98%**

Labs

- LDL 102
- Tri 211
- Gfr 53
- Glucose 340
- Hga1c 10.4

Meds:

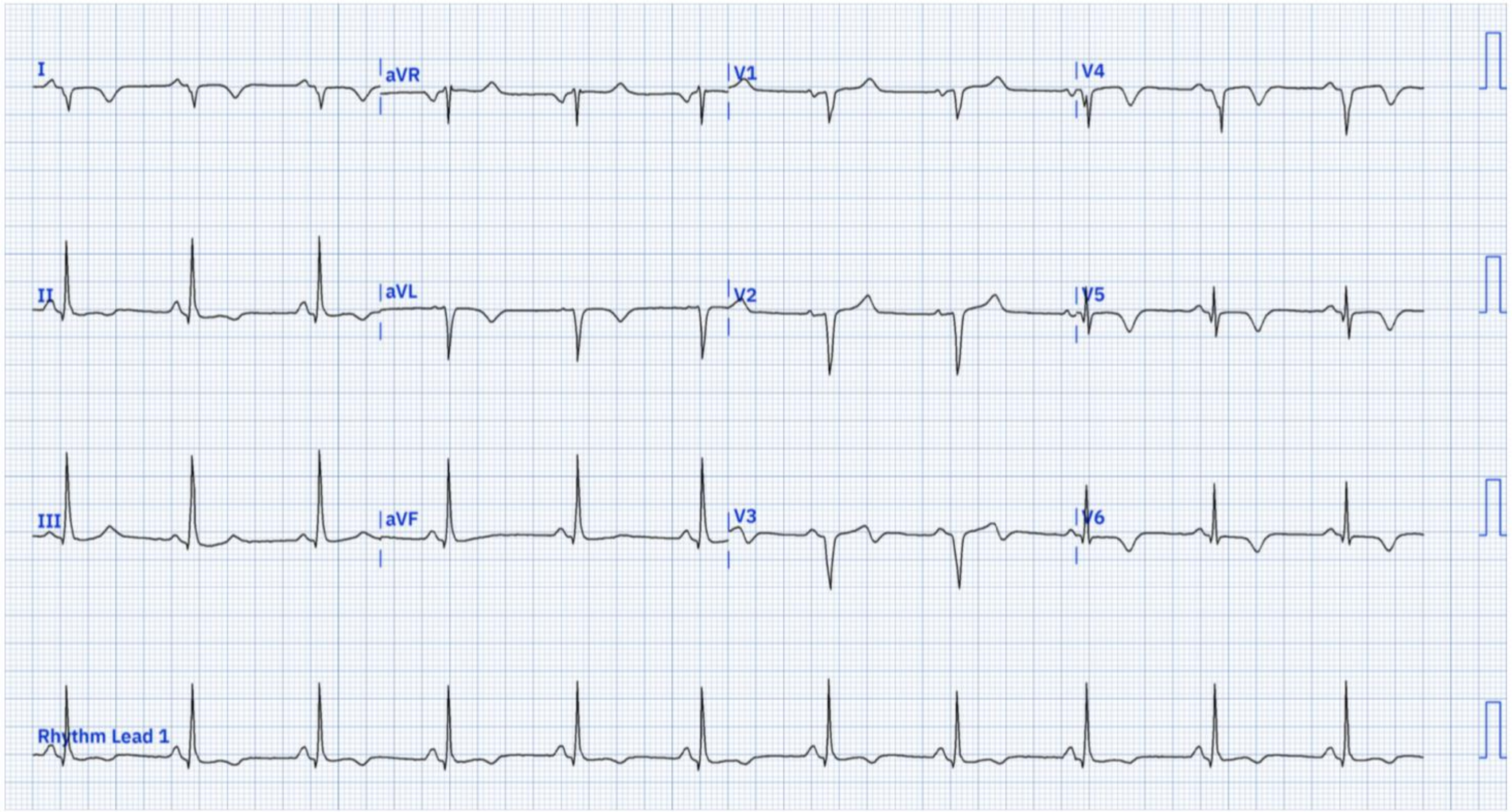
- Takes losartan 50 mg qd
- Rouvastatin 20 mg qd

HS TROP 1828

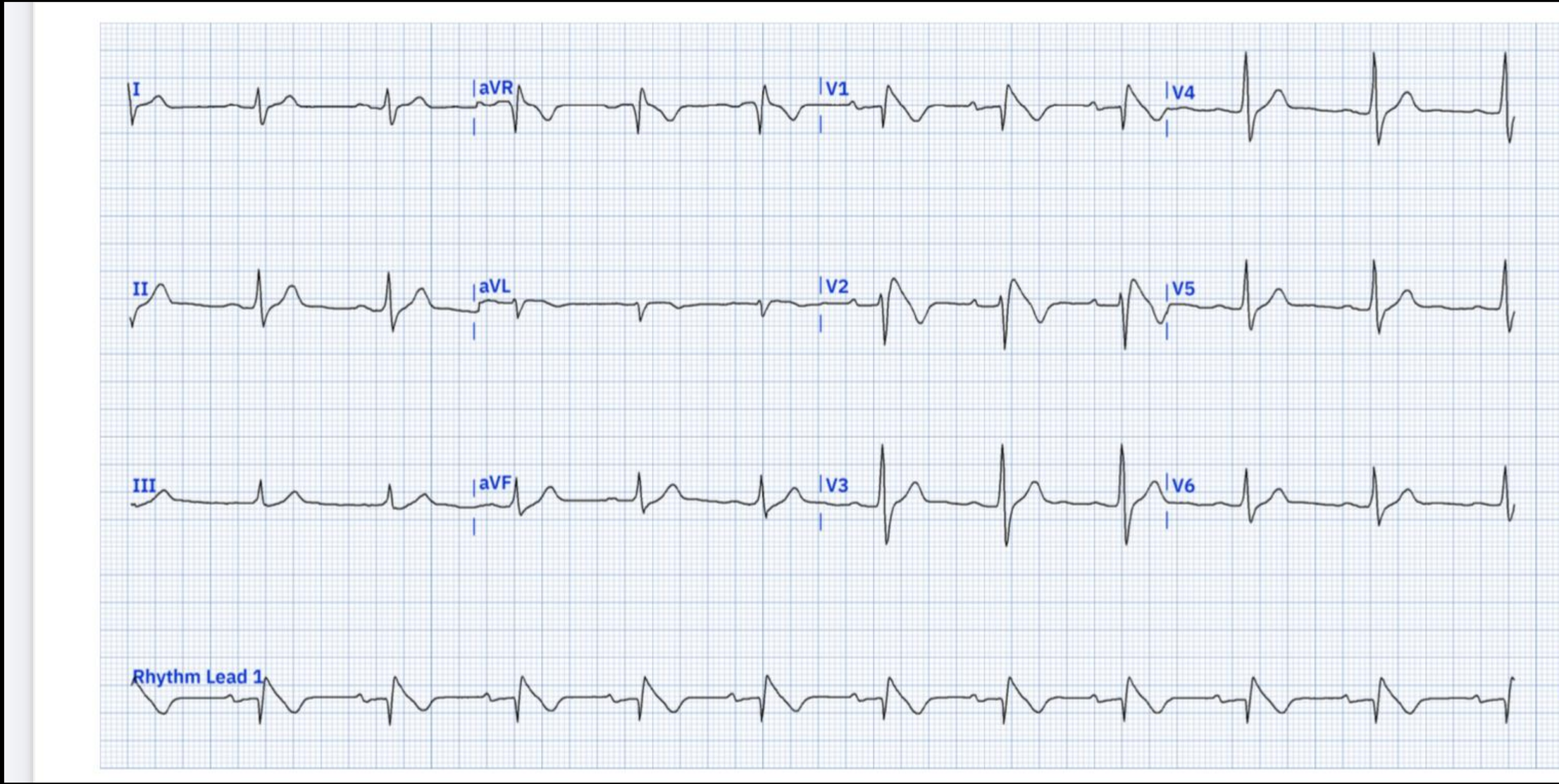
EKG



61 y/o m cardiac arrest



18 year old with chest pain after playing basketball





The Case

Not a real patients face

65-year-old female

Past medical history:
Hypertension (HTN), gastroesophageal reflux disease (GERD), depression

Social history:

- Significant alcohol (ETOH) and tobacco use
- Recently lost her job

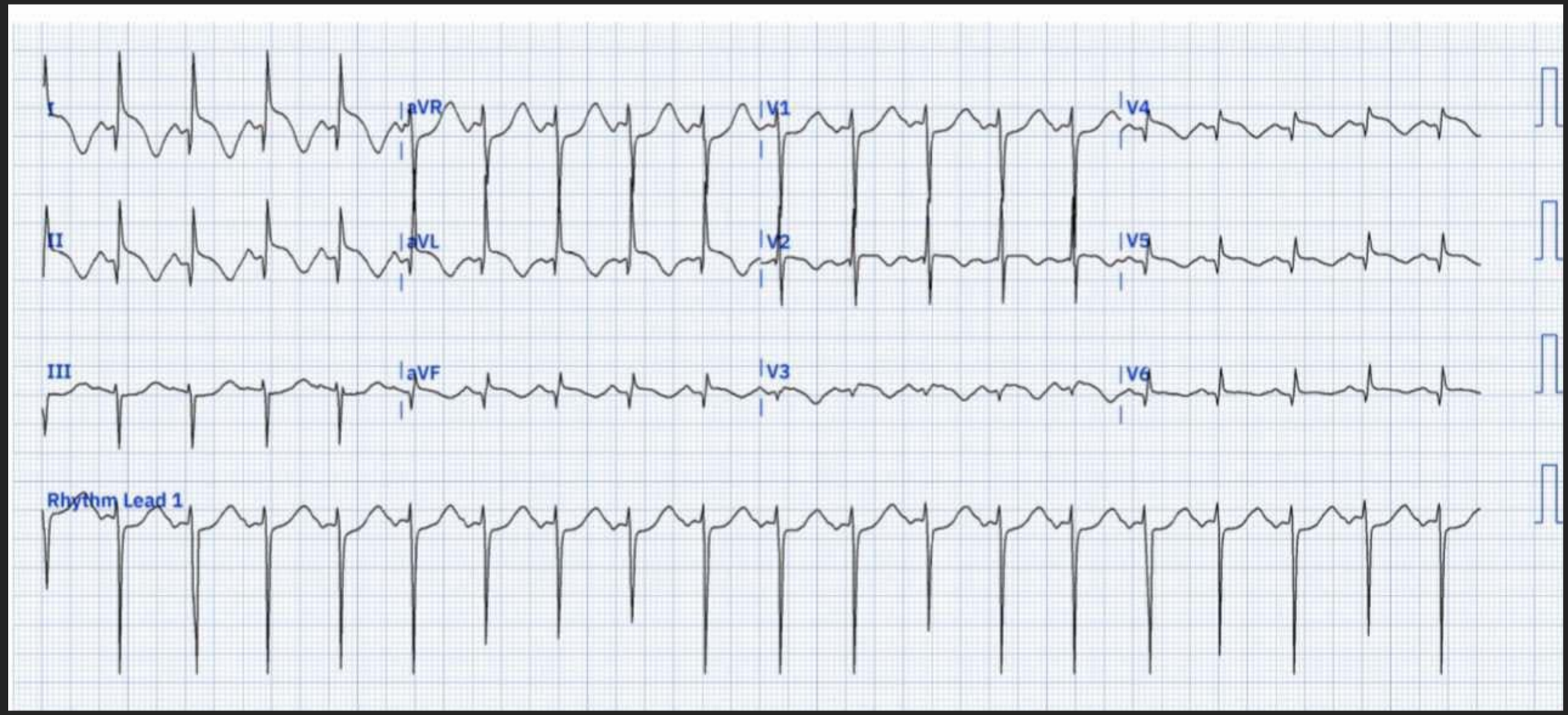
CHIEF COMPLAINT

Primary complaint:

- Chest pain described as "feeling like heartburn"
- Awoke with 20/10 chest pain, described as:
  - Sharp and pleuritic
  - Non-radiating



EKG



ASSESSMENT

Vital Signs

- Blood pressure: 148/104 mmHg
- Heart rate: 102 bpm
- Respiratory rate: 22 breaths/min

Cardiac cath: Revealed Takatsubos Cardiomyopathy

What does she need now?



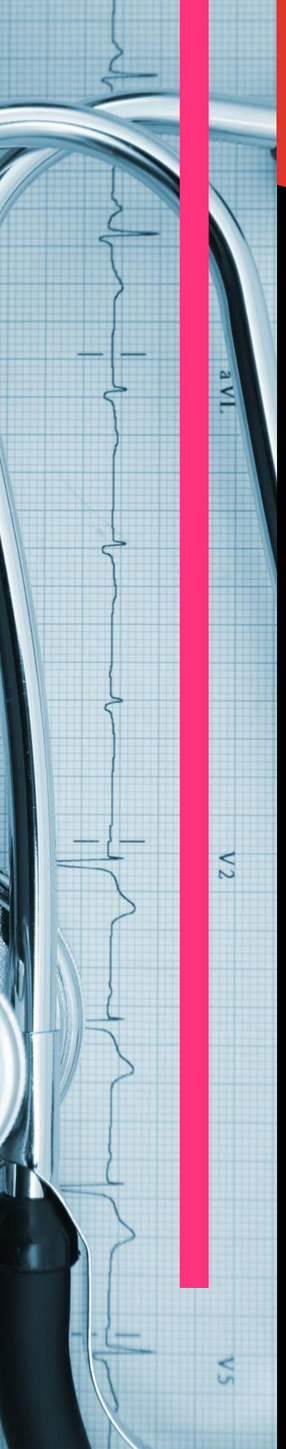
The Case

Not a real patients face



28 y/o with palpitations

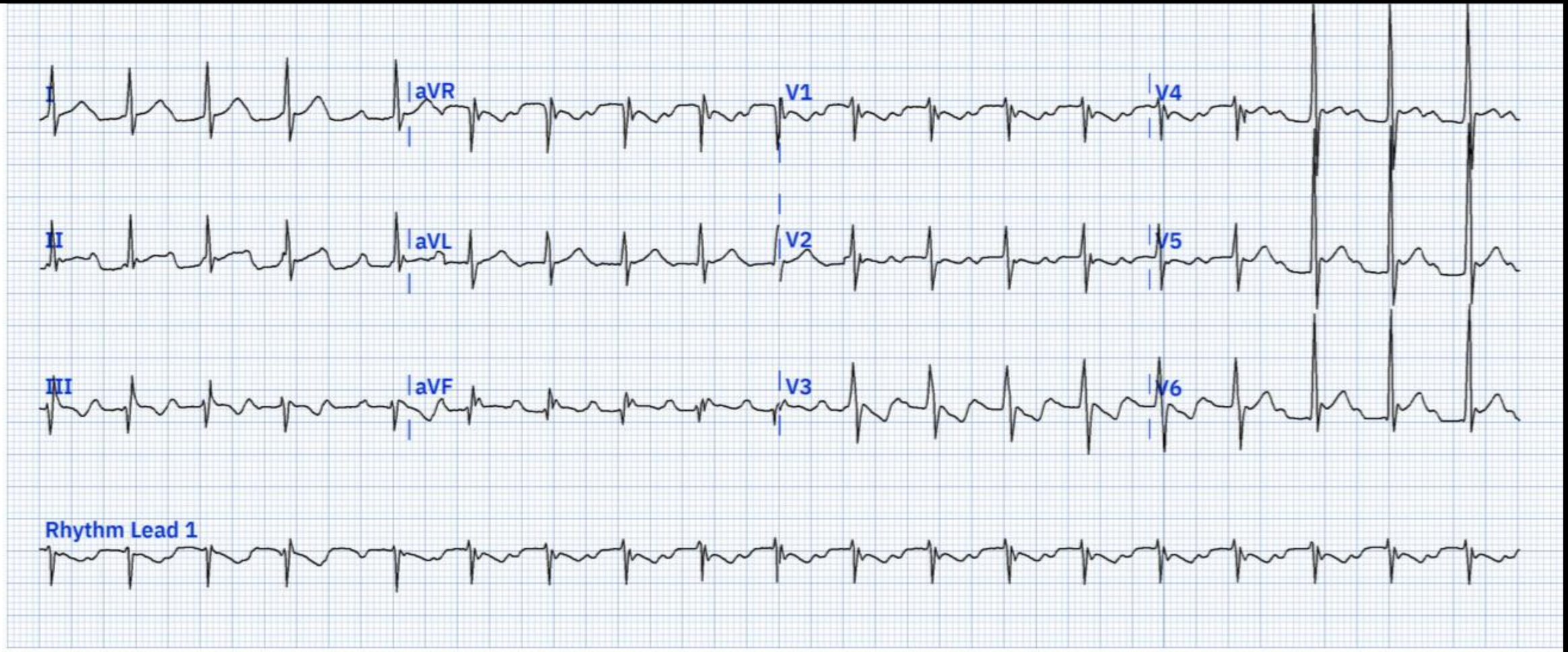
- Had a large caffeinated beverage at Starbucks that day
- Was playing baseball
- Heart started racing
- Felt like he was gonna pass out, went home
- Had a glass of wine that night
- Went back to play baseball in record heat and had to go home early
- No chest pain
- Mild dyspnea
- Feels light headed when he stands up now



LABS

- Drug screen negative
- HS Trop 23->22
- Cr 0.8 K 4.1
- Mag 2.0
- ProBNP 928
- Er gives furosemide 40 mg IV
- Admits for HF

EKG



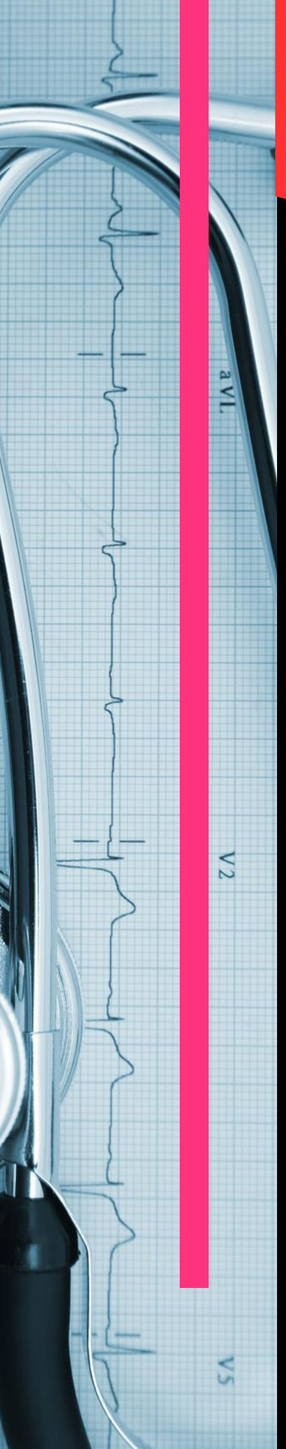


The Case

Not a real patients face

60 y.o F with dyspnea

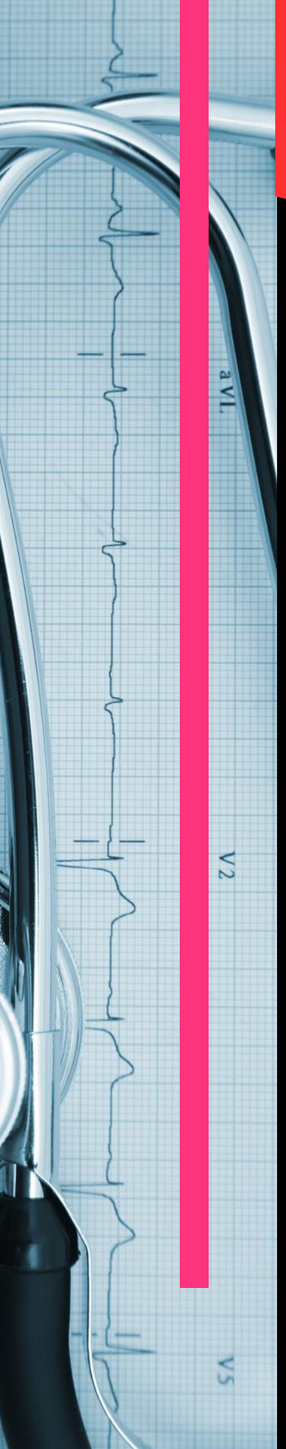
- Dyspea, fatigue, lightheaded for 4 days
- Went to urgent care given azithromycin and steroids
- Got worse and presented to the ER



WHAT IS THE NEXT STEP

Vitals: 160/90, RR 18, Sat 88%

What tests?
Imaging?
Labs?

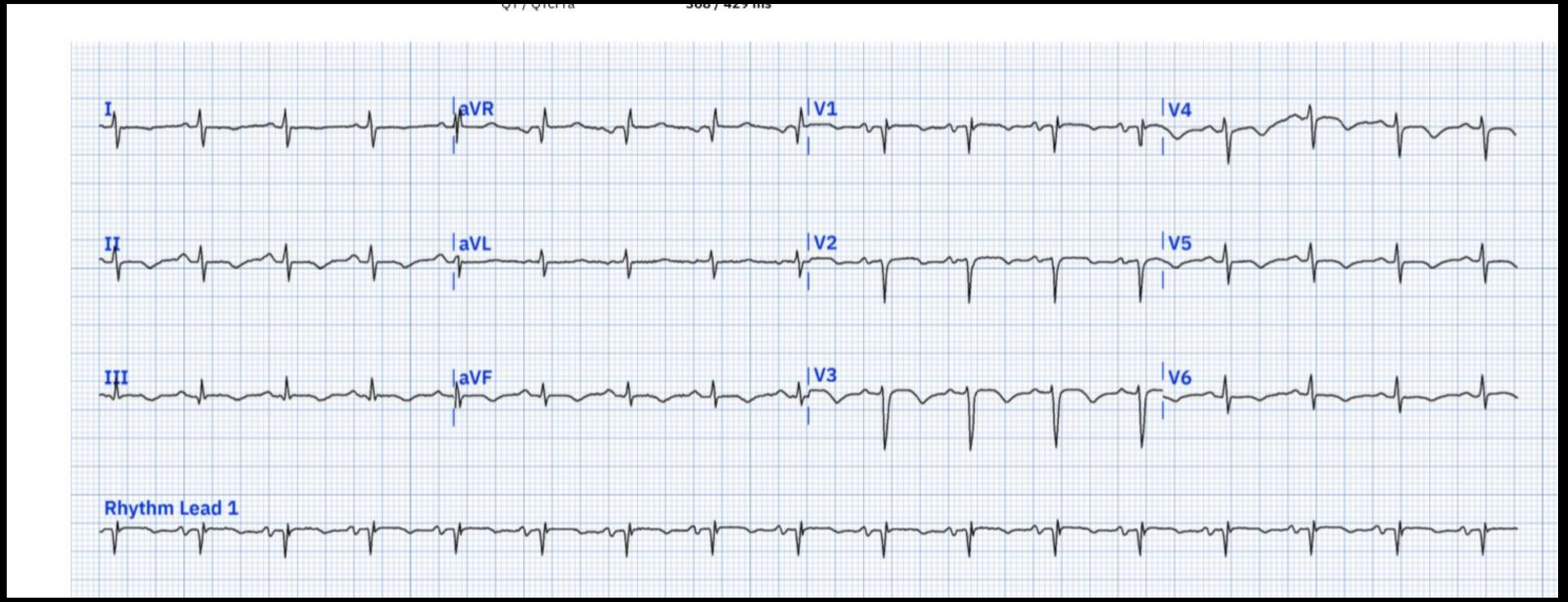


LABORATORY FINDINGS

Lab Results:

- **ProBNP:** 12,000 pg/mL (significantly elevated, indicating heart failure)
- **Creatinine:** 1.17 mg/dL (mild renal impairment)
- **AST:** 64 U/L (mildly elevated)
- **ALT:** 138 U/L (moderately elevated)
- **Lipase:** 48 U/L (normal)
- **WBC:** 11.8 x10^3/µL (mild leukocytosis)
- **Lactate:** 2.2 mmol/L (elevated, indicating possible hypoperfusion or sepsis)
- **High-sensitivity Troponin:** 25 → 24 (no significant delta)

EKG



CT

1. Saddle pulmonary embolism with near complete opacification of the main right and left pulmonary artery; there is contrast opacification distal to the emboli within the segm
branches possibly representing and element of recanalization.
2. RV/LV ratio is greater than 1 along with reflux of contrast into the hepatic veins and IVC; finding is indicative of right ventricular heart strain.

3. Nonspecific appearance of the gallbladder which could represent diffuse wall thickening, adenomyomatosis, pericholecystic fluid, or a dominant peripherally calcified cho
among other etiologies; no biliary duct dilatation. Correlate with
enzymes regarding cholecystitis.

4. Ill-defined possibly blind-ending tubular structure emanating off the cecum measures up to 1 cm in caliber; this could possibly represent an inflamed appendix as there is
adjacent stranding/fluid. This structure abuts the right adnexa and
therefore the fluid could also be related to this as there is also perceived scant fluid adjacent the left adnexa although this could be related to adjacent sigmoid diverticulitis.

5. Sigmoid diverticulosis with subtle pericolonic induration; correlate for sigmoid diverticulitis.


Not a real patients face

The Case

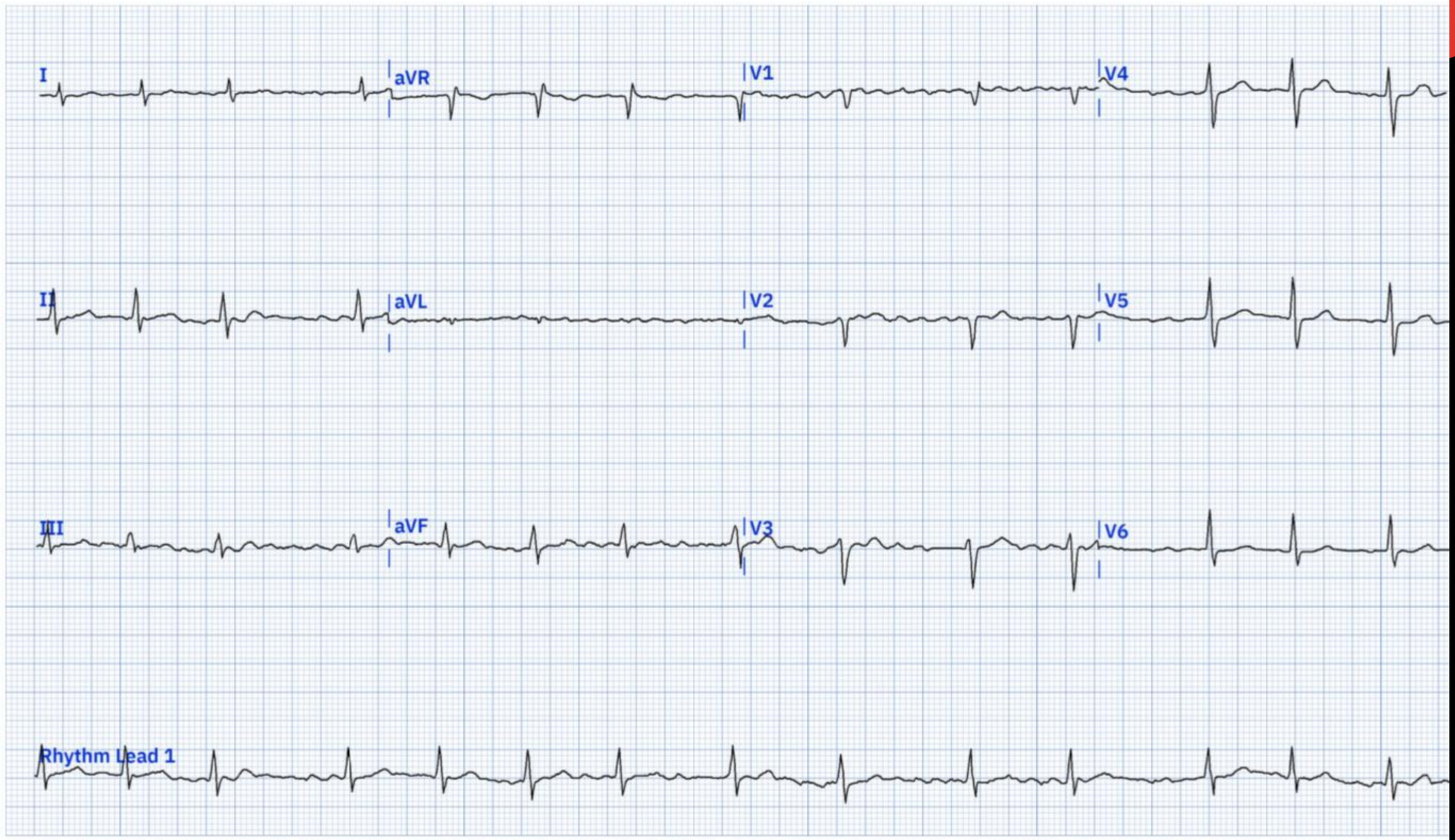
59-year-old male

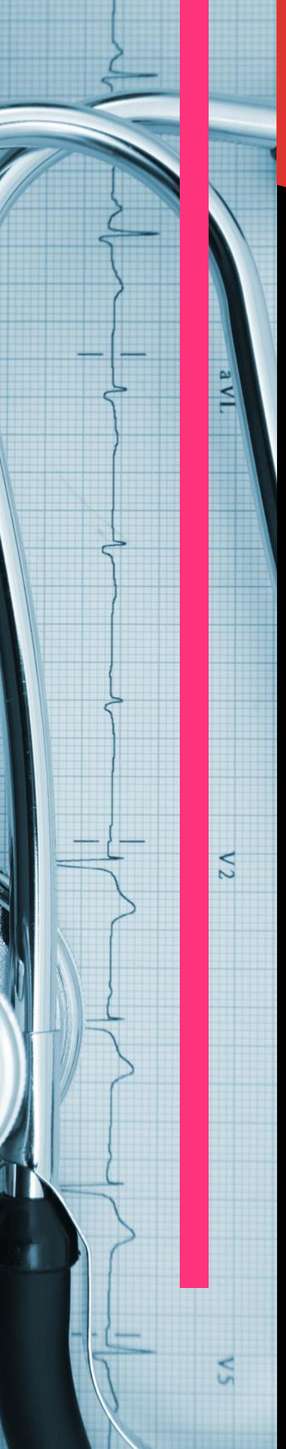
Complained of chest pain



“I don’t believe in stress tests”

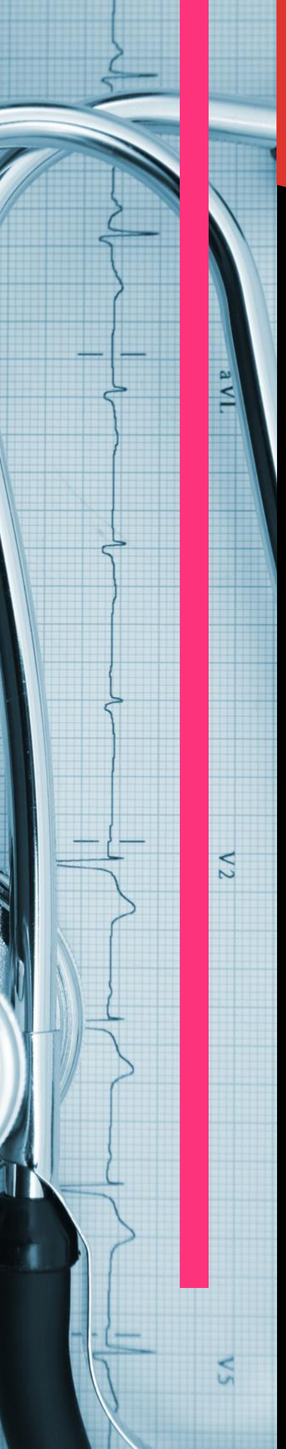
EKG





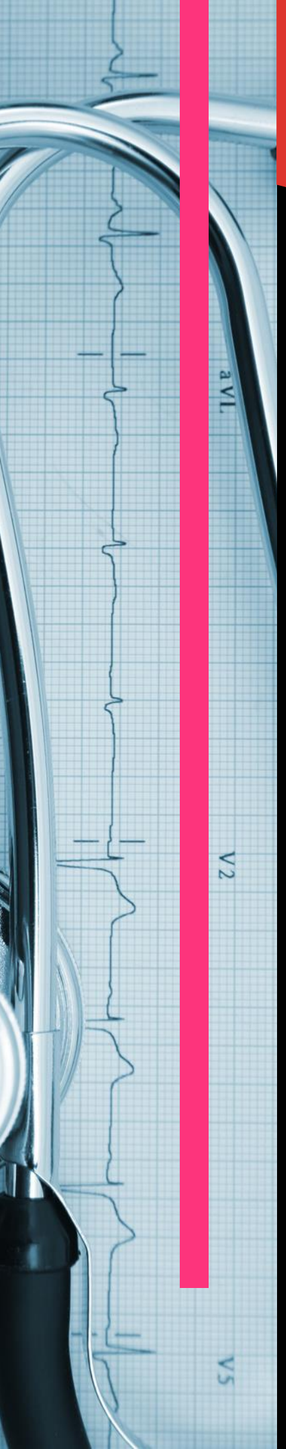
CALCIUM SCORE

Coronary Calcium Score (Agatston):	Volume Score:
LM: 161	126
LAD: 309	25
RCA: 578	494
LCx: 91	73
Total: 1139	948



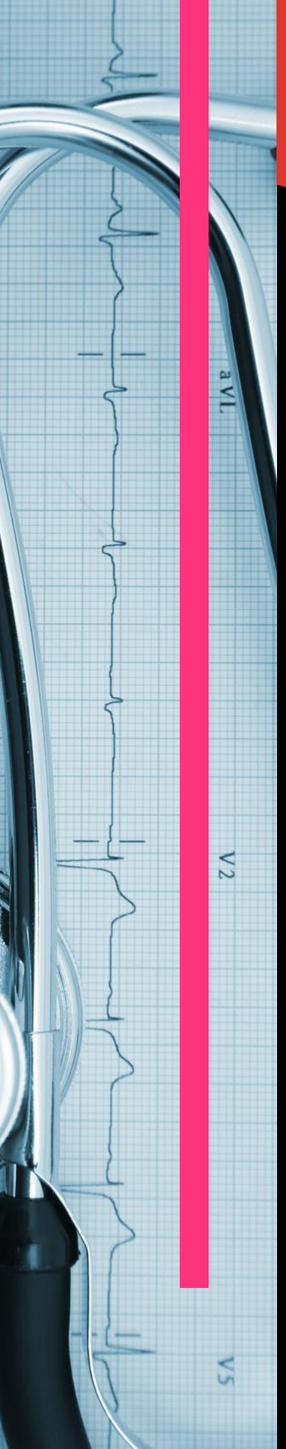
IMPRESSION:

1. Total Agatston score of 1139 units and volume score of 948. This suggests the patient has very high risk for adverse coronary heart disease events based on the coronary calcium score alone.
2. The patient is at the 90th to 100th percentile for age, sex, and ethnicity according to the MESA (multiethnic study of atherosclerosis) table in reference to peer group.
3. There is severe diffuse calcification in the left main, proximal LAD, mild multifocal calcification in the mid LAD, mild and moderate focal calcification in the proximal circumflex artery, mild multifocal calcification in the proximal and mid RCA, as well as moderate and mild multifocal calcification in the distal RCA.



STRESS ECHO:

- Abnormal and positive submaximal treadmill stress test with reproduction of symptoms of chest discomfort, dyspnea and diaphoresis and hypotensive response with decline in BP from 97/70 to at peak stress. Ischemic changes with 1 mm ST depression in the inferior leads II, III, aVF which resolved with recovery.
- Negative submaximal exercise stress echocardiography, with no resting or exercise induced wall motion abnormalities.
- Discordance noted between exercise tolerance, symptoms, ECG findings and echocardiography findings.
- Cardiac catheterization with coronary angiography recommended.
- Abnormal and positive submaximal treadmill stress test with reproduction of symptoms of chest discomfort, dyspnea and diaphoresis and hypotensive response with decline in BP from 97/70 to at peak stress. Ischemic changes with 1 mm ST depression in the inferior leads II, III, aVF which resolved with recovery.



CONCLUSIONS

- Post-Operative Diagnosis
- Angina pectoris
- Coronary Atherosclerosis
- Conclusions
- Severe coronary atherosclerosis.
- Successful single vessel percutaneous coronary intervention, proximal Left Anterior Descending Branch, with insertion of a single drug eluting stent.
- Mild left ventricular systolic dysfunction.



The Case

Not a real patients face

54-year-old female

Chief Complaint:

Chest pain for 3 hours accompanied by nausea

History:

- Obesity
- Diabetes mellitus
- Hyperlipidemia (not on statin)

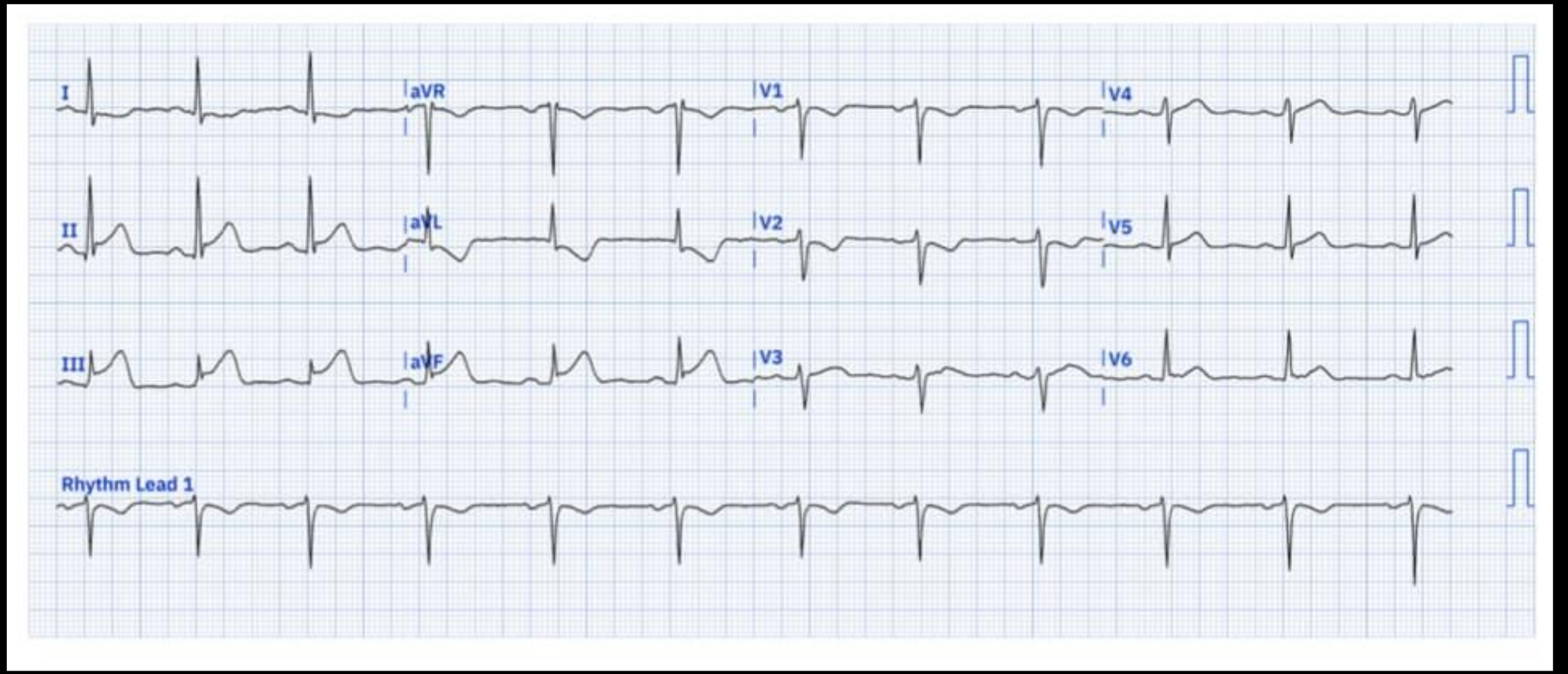
VITALS:

- **Blood pressure:** 154/100
- **Heart rate:** 75

Oxygen saturation: 95%



EKG

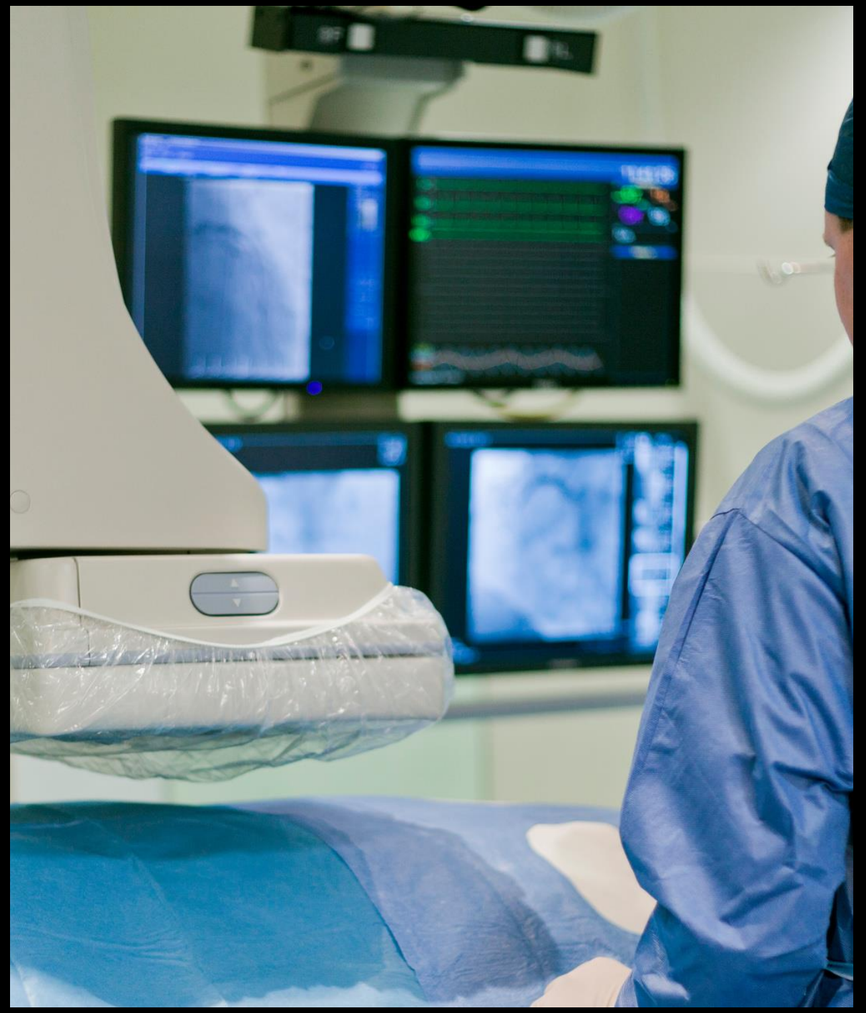


LABS

- **Troponin:** Negative
- **Potassium:** 3.2
- **Total cholesterol:** 293
- **Triglycerides:** 119
- **LDL:** 222
- **HDL:** 47

CATH

99% RCA occlusion





Not a real patients face

THE CASE

56-YEAR-OLD MALE

Presenting Symptoms:

- Chest pressure
- Shortness of breath
- Radiation to bilateral shoulders
- Diaphoresis

EKG



INITIAL LABS

- hs-Troponin: 67 → 344 (rising)
- CK: 694
- Pro-BNP: 937
- Creatinine: 1.44
- D-dimer: 1106

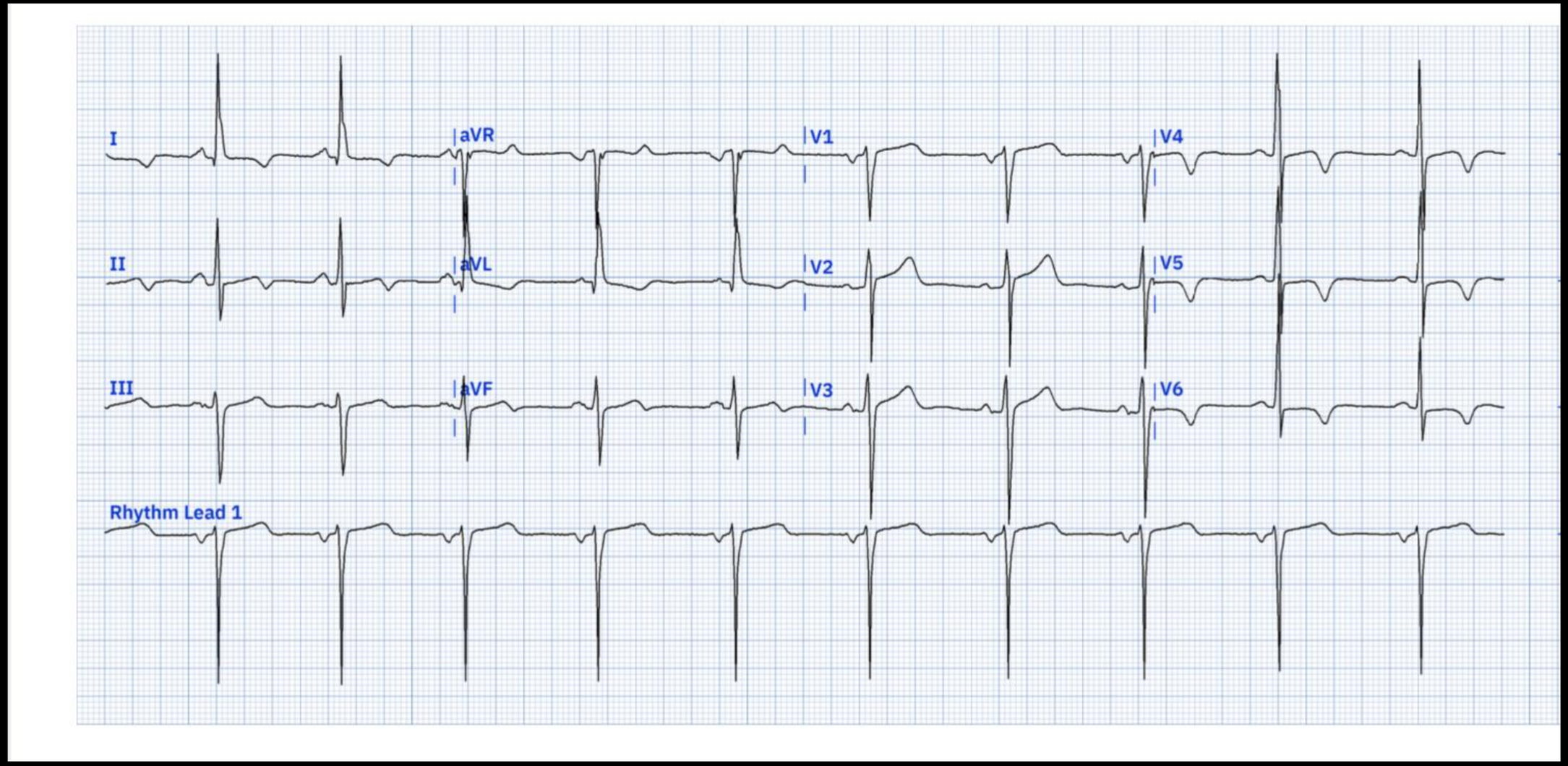
ECHO

- EF: 61–65% (preserved)
- Severe apical hypertrophy
- Complete obliteration of LV cavity mid-apical during systole
- Grade I diastolic dysfunction

CARDIAC CATHETERIZATION

- Normal coronary arteries

LVH and ischemia





The Case

Not a real patients face



80-year-old male

Chief Complaint: Syncope today

Past Medical History:

- Pulmonary Embolism (PE) – *1 year ago*
- Recently stopped Apixiban *(1 month ago)*

Lifestyle: Prefers natural health methods

Recent History: Long travel 2 weeks ago

PRESENTING SYMPTOMS

- Syncope episode **today**
- Progressive dyspnea
- **Lower extremity edema** (x3 weeks)
- **Chest pain**

MEDICATIONS

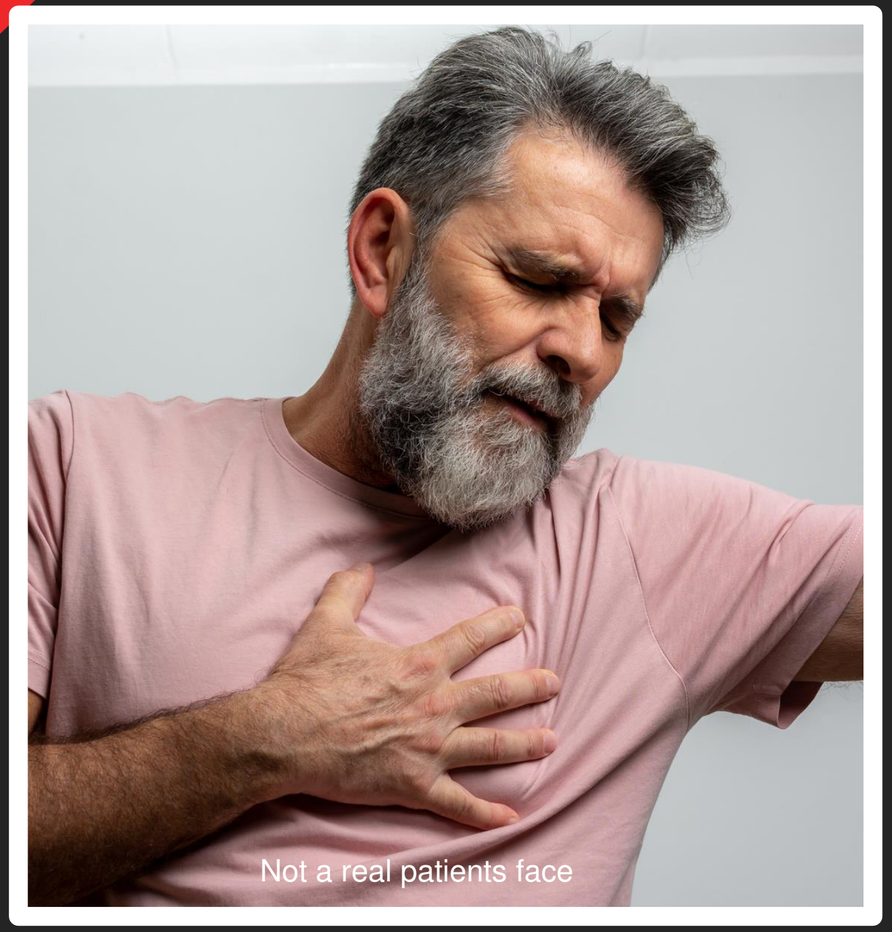
- **Recently Discontinued: Apixiban (1 month ago)**

LABS

- **D-dimer:** 26,368 ng/mL
- **Pro-BNP:** 2,046 pg/mL
- **Troponin:** HS 40-45
- **Creatinine:** 1.12 mg/dL
- **Lipid Panel:**
  - **Total Cholesterol:** 153 mg/dL
  - **LDL:** 70 mg/dL

EKG





THE CASE

55-YEAR-OLD MALE

Chief Complaint: Chest pain

History of Present Illness

- Dyspnea, worse with ambulation (progressive, a few months)
- Exertional fatigue
- No rest pain noted

PAST MEDICAL HISTORY

- Hypertension (HTN)
- Hyperlipidemia (HLD)
- Diabetes mellitus (DM)

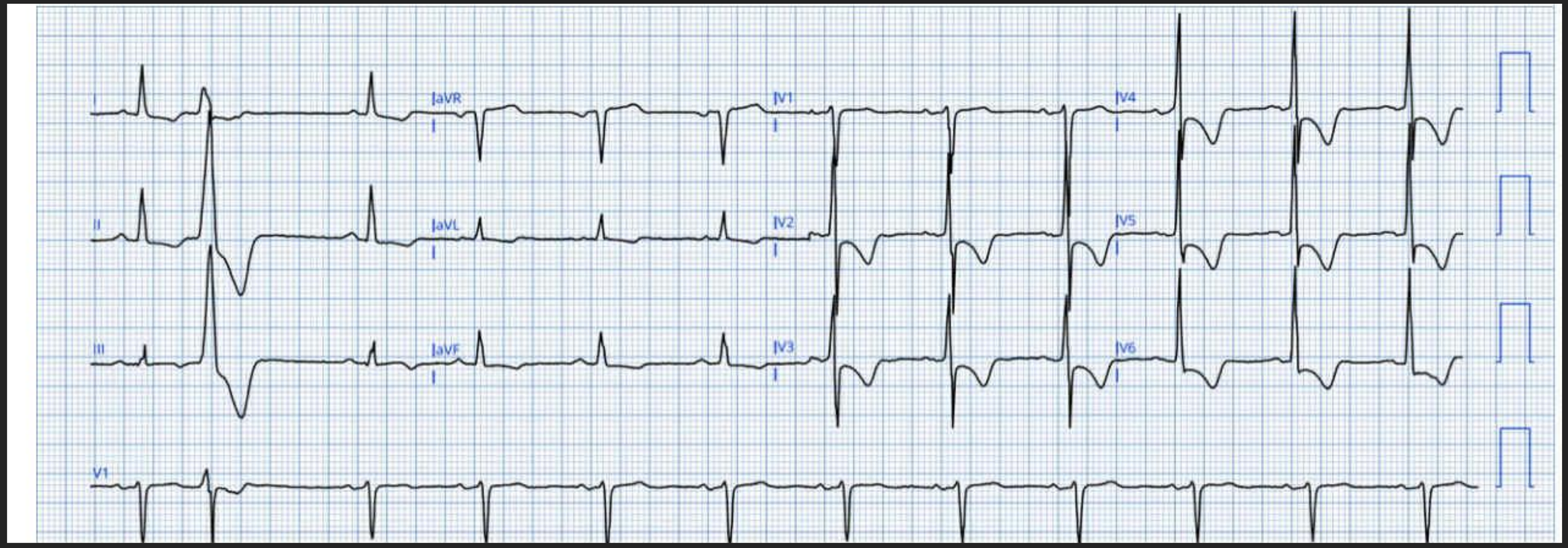
MEDS

- Rouvastatin
- Amlodipine

EKG #1



EKG #2



CATH RESULTS

- **Left Main (LM):** 80% stenosis
- **Left Anterior Descending (LAD):** 60% stenosis
- **Left Circumflex (LCx):** 80% stenosis
- **Right Coronary Artery (RCA):** 99% stenosis



The Case

Not a real patients face

75-year-old Female

History: HTN, HLD, HFpEF, DM

Medications:

Insulin

Losartan 25 mg qd,

Furosemide 40 QOD, Atorvastatin 80

CHIEF COMPLAINT

Tearing chest pain

radiating to back x 1 hour

No dyspnea



Vitals:

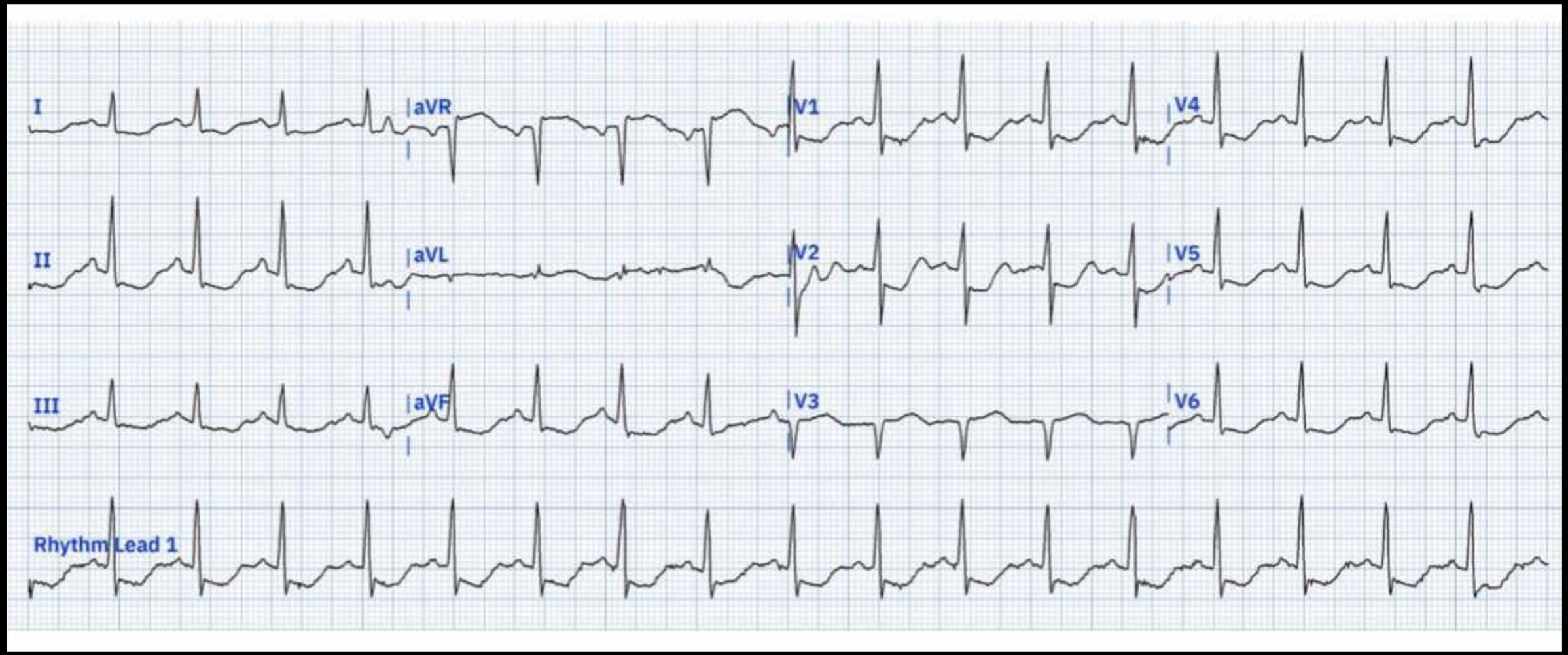
BP: 105/64

HR: 104

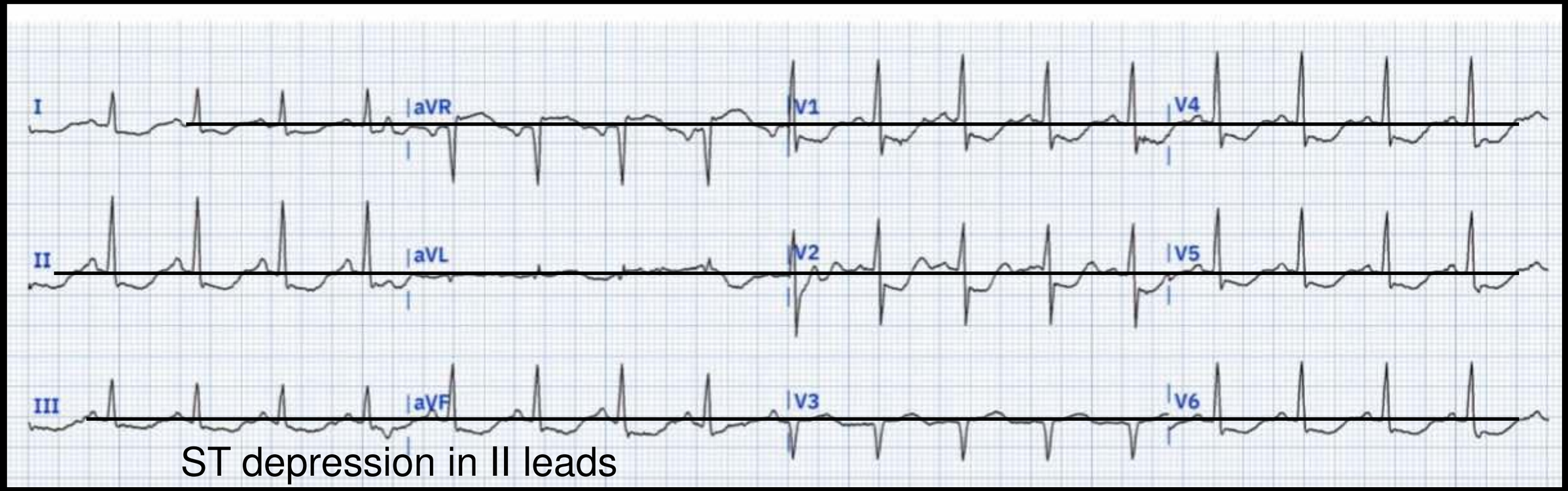
RR: 20

What should you think about?

THE EKG



LET’S TAKE A CLOSER LOOK



ST depression in II leads

LAB FINDINGS

- High-sensitivity Troponin: 65 → 178
- Total Cholesterol: 110
- LDL: 38
- Creatinine: 1.09
- Potassium: 4.2

Cath Lab Findings

- 99% Occluded RCA
- EF: 65%

Take Home Points:



1.Young people can have heart disease

3. If someone has chest pain and it is sharp it can still be ACS

4. Have a low threshold to get a stress test

References:

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