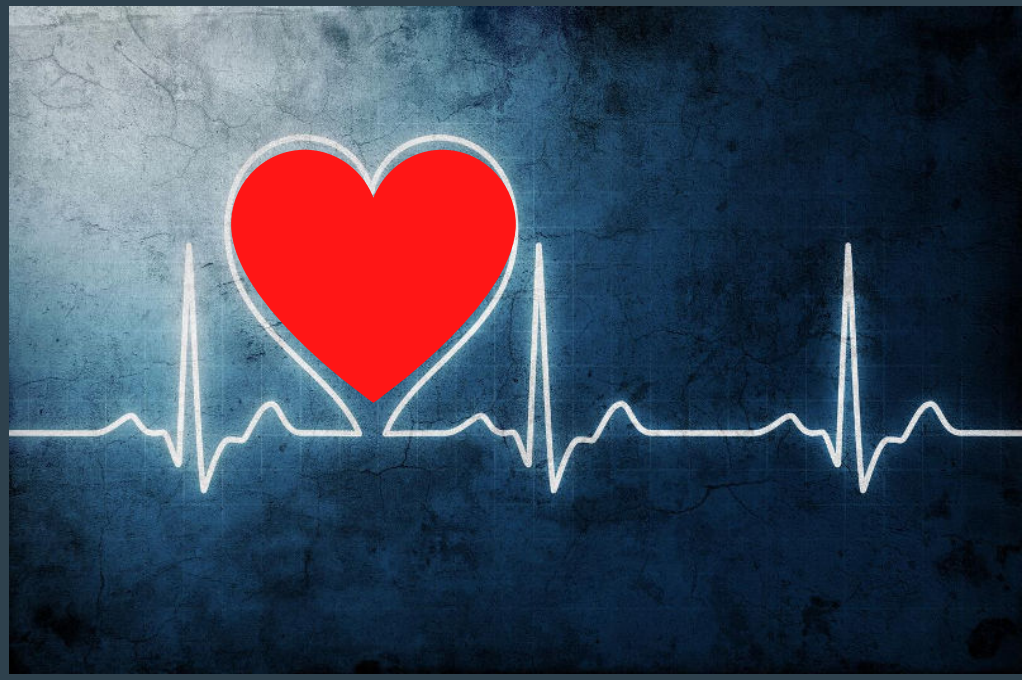
ACS Workshop



Jennifer Carlquist

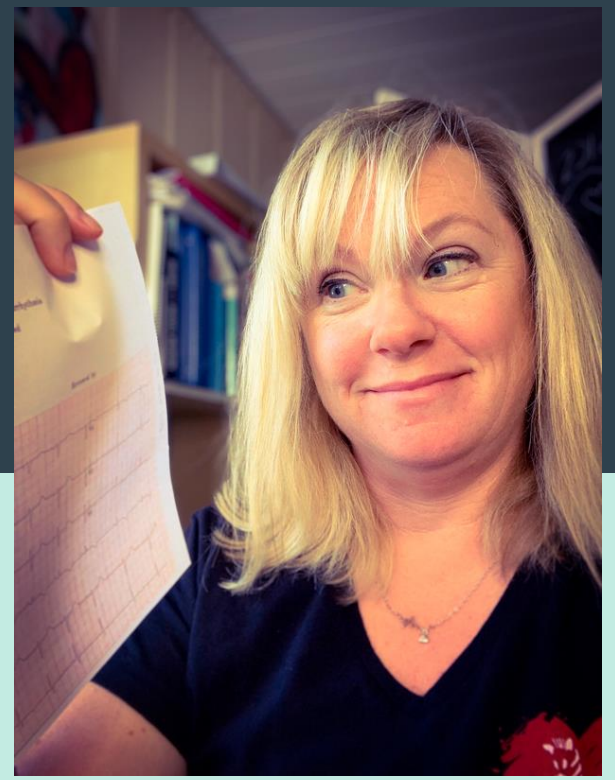
Disclosures



TACOS.

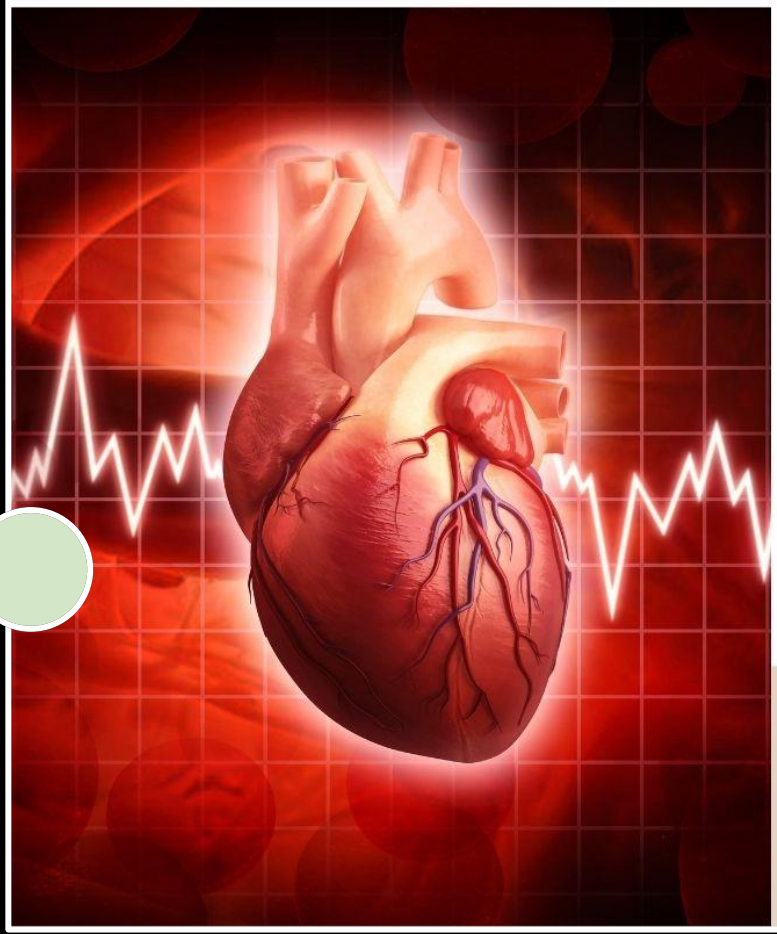
-I like them.

Objectives



REVIEW STEMI DEFINITION
REVIEW ACTUAL CASES
REVIEW DIFFERENT ACS PRESENTATIONS
DISCUSS MANAGEMENT

Flavors of heart disease

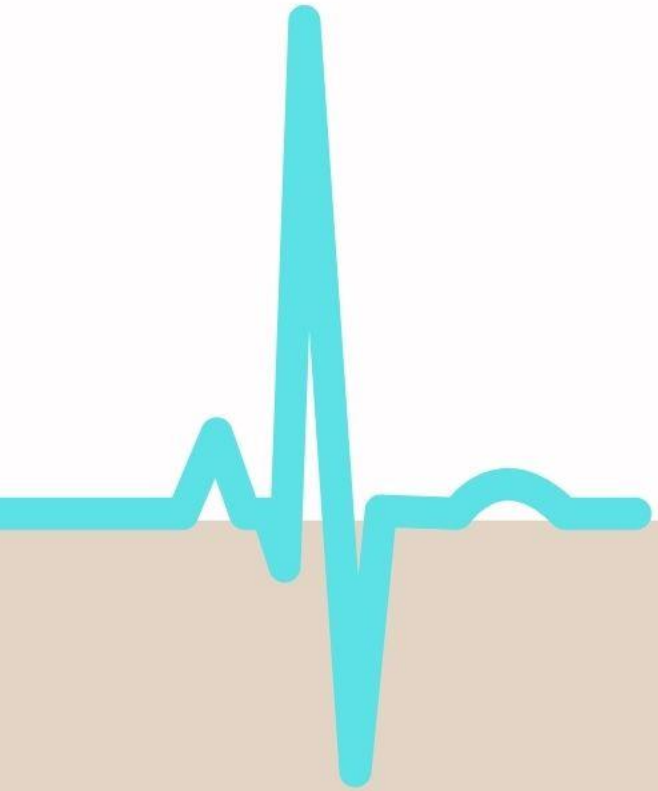


ANGINA

UNSTABLE ANGINA

NSTEMI

STEMI



How can you sort it out?

Definitions:

ANGINA?

Exertional, lasts less than 5 minutes, gets better with rest.

UNSTABLE ANGINA?

Occurs even at rest

Longer than 30 minutes or longer, may not disappear with

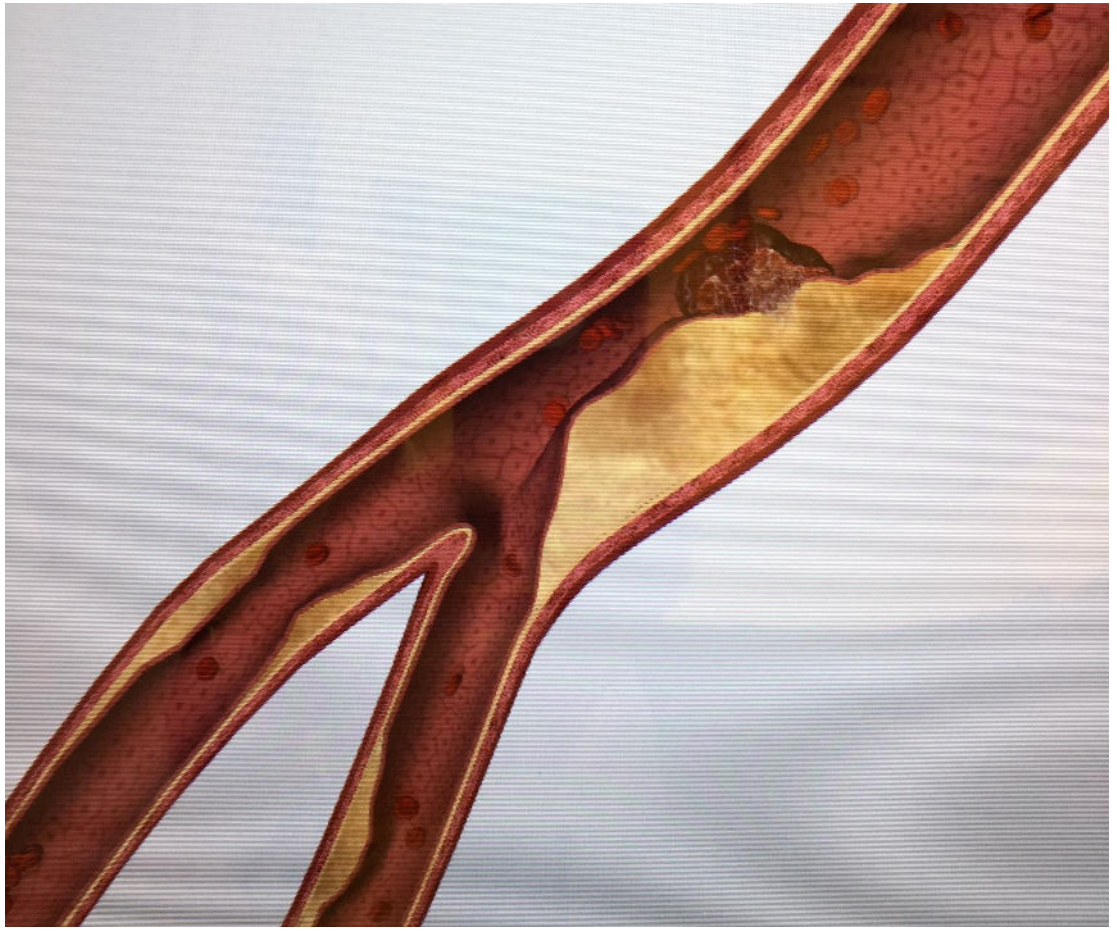
Nitro may not help angina

STEMI?

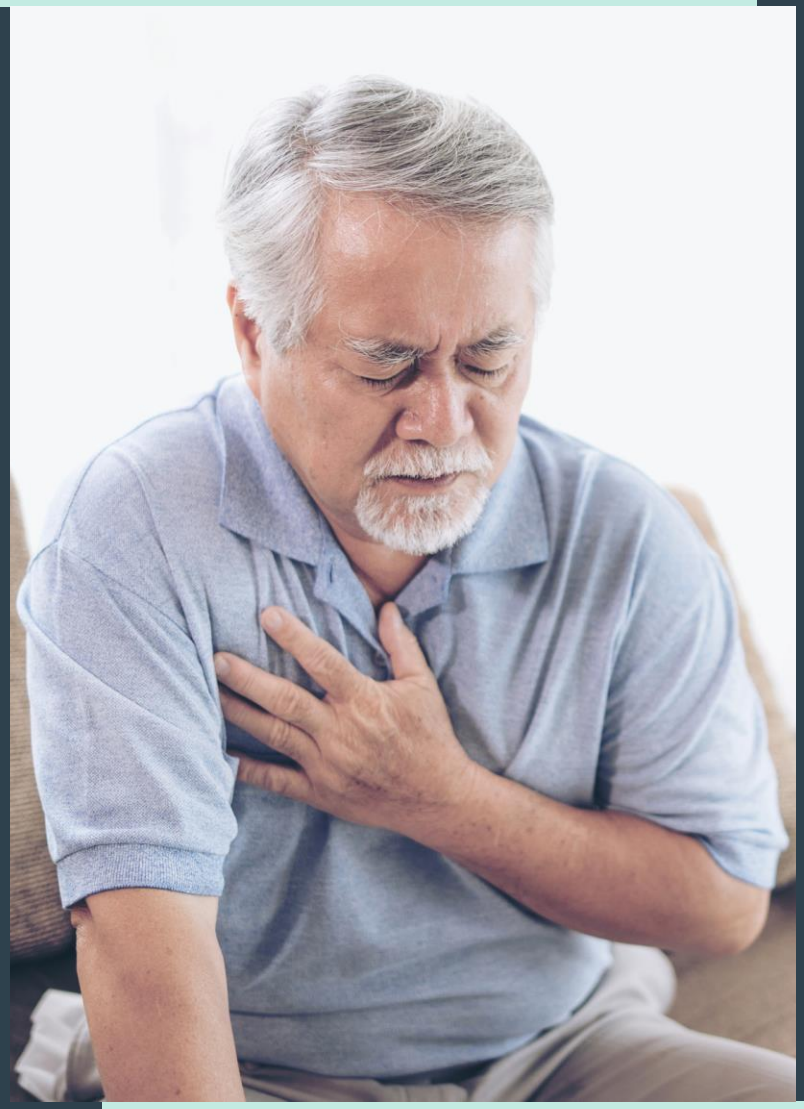
ST elevation plus biomarkers increased

CAD is a continuum

- Angina
- Unstable Angina
- Ischemia
- NSTEMI
- STEMI



Ischemia on film



- ~50% OF PEOPLE **NORMAL**
- T WAVE OR ST SEGMENT CHANGE (DEPRESSED, ELEVATED, FLIPPED)
- NSSTW
- NEW BBB

What is considered a STEMI?

- **2 or more** contiguous leads have ST elevation +
  Measured at the J joint…
- > 1mm (1 small box) of ST elevation (except V2/V3)
- V2/V3 → ≥ 2mm (men > 40 yo), ≥ 2.5mm (men < 40 yo)
  → ≥ 1.5mm for women

- Reciprocal changes!

- REMEMBER → New or presumed new LBBB = MI



CASE

#1

71 Y/O M

Chest pain

P - *Lifted a heavy box*

Q - *"Like my last MI"*

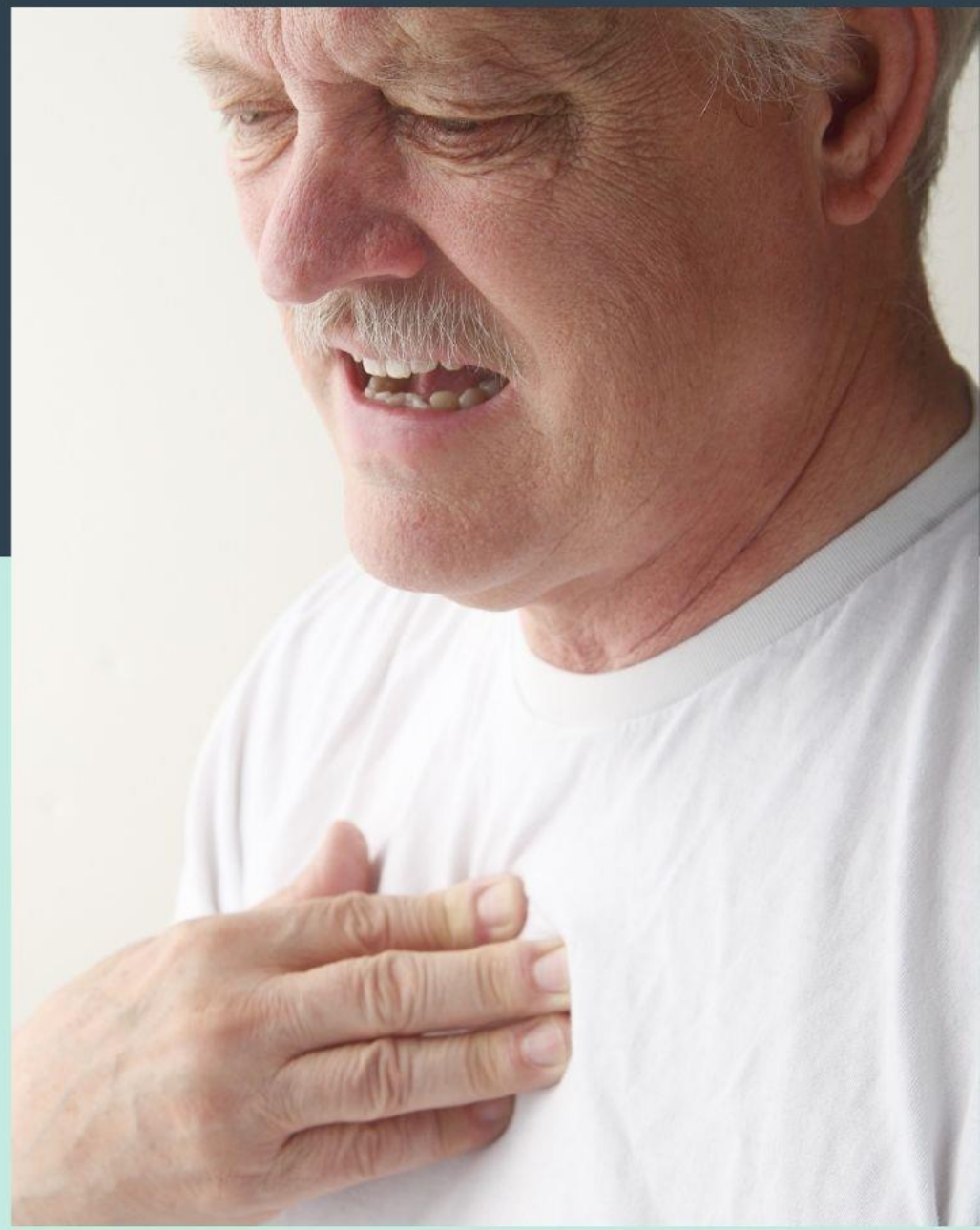
R - *Jaw, back, left arm*

S - *7/10*

T - *3 days worse this morning*

PMHx: HTN, DM, cardiac stents

Lightheaded



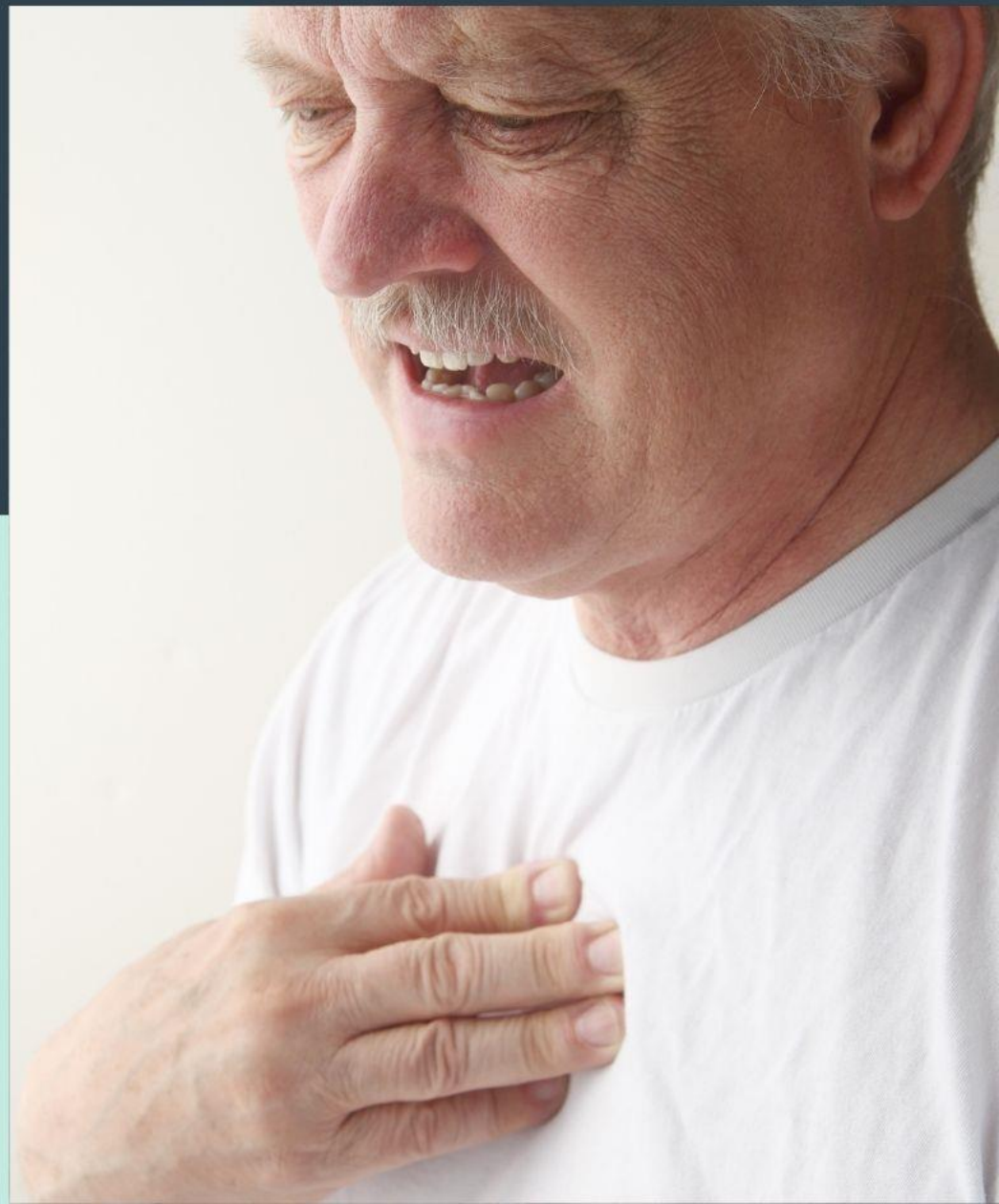
More on him

VS: 68/40, HR: 40 RR: 20 O2 sat 95%

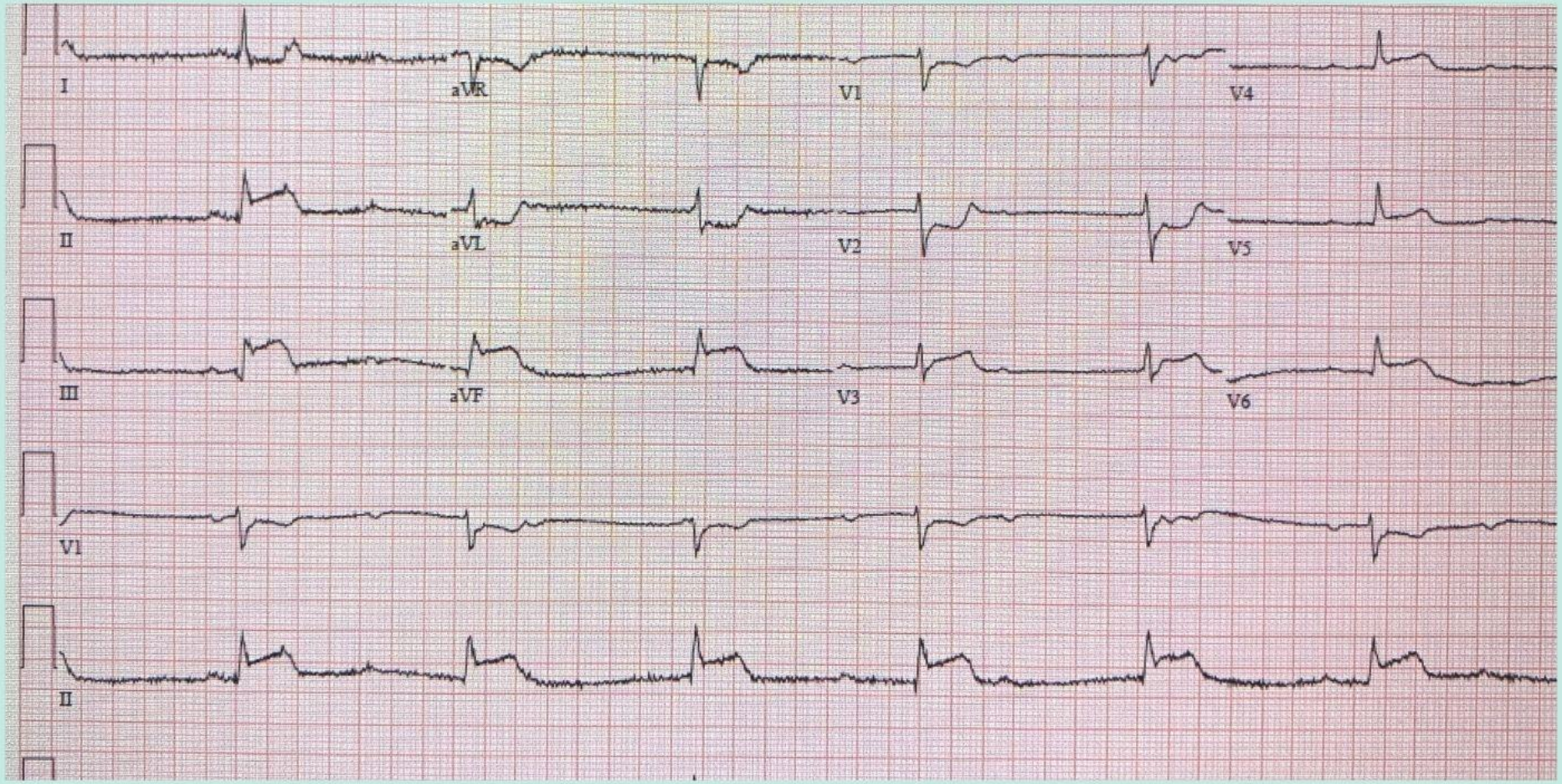
Labs:

TC: 108 **Tri:** 100 **HDL:** 22 **LDL:** 25

Trop: 6.058



His EKG



DO YOU AGREE?

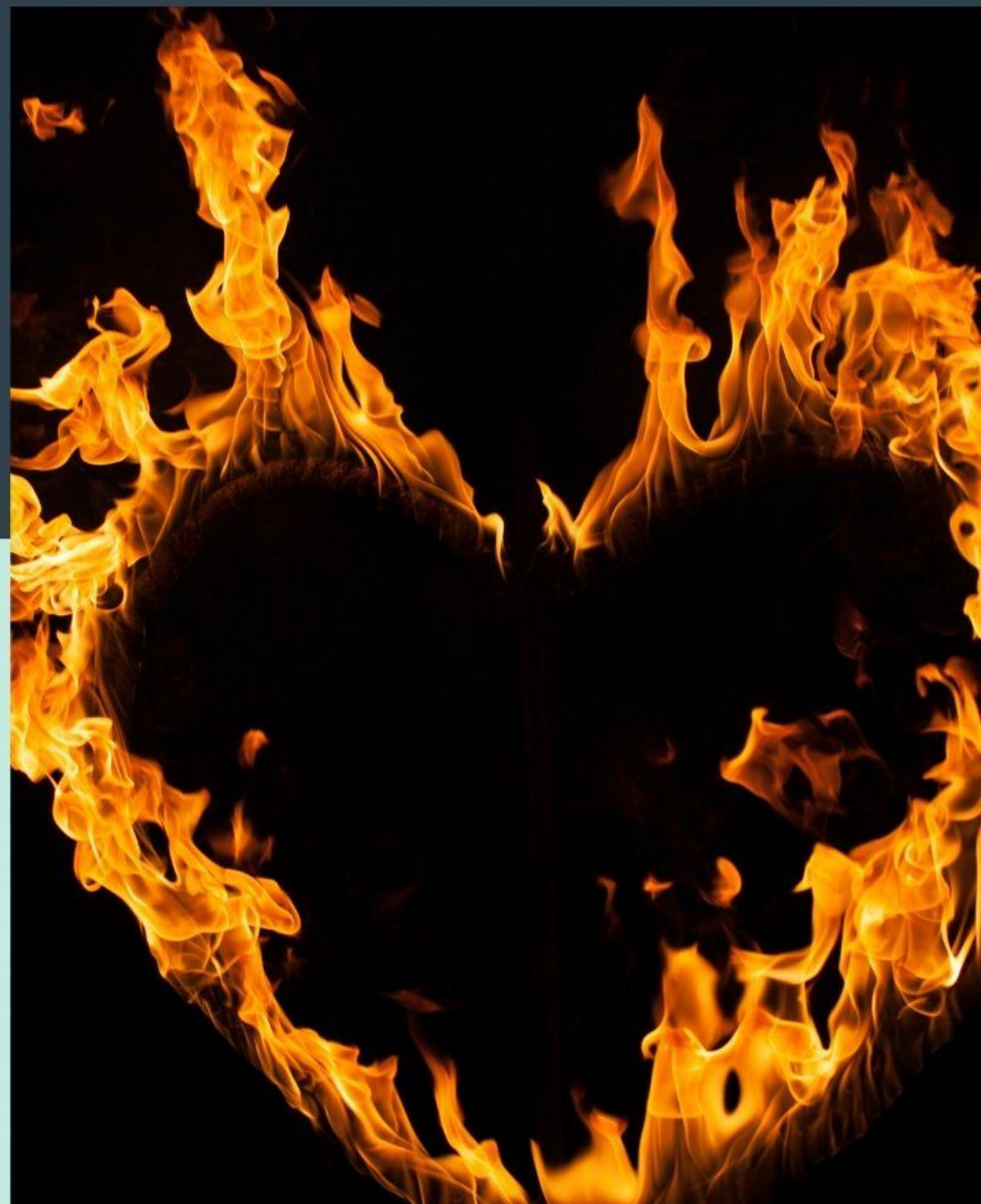
JUNCTIONAL BRADYCARDIA

INFERIOR INFARCT ACUTE

LATERAL INJURY PATTERN

** ** ACUTE MI / STEMI ** **

Consider right ventricular involvement in acute inferior infarct



His Echo

Left ventricular chamber size is mildly dilated.
There is mild concentric left ventricular hypertrophy.
Ejection fraction is visually estimated at 20-25%, severely globally decreased.
Indeterminate diastolic function.
Normal left atrial size.
Normal right ventricular size and function.
Normal right atrial size.
Cardiac valves are structurally normal. Trace TR noted.
The pericardium is normal.

The aorta is normal in size.



CASE

#2

71 Y/O MALE

"I feel shaky"



Pmhx: *HTN (Normal BP 120)*
DM (My sugars have been high),
Previous stent RCA
HLD on Atorvastatin
Meds: *ASA, Lisinopril, Lipitor, metoprolol*
VS: *72/40, HR 46, RR 12*

"Feels like my last MI"

P - Going up stairs

Q - "Discomfort"

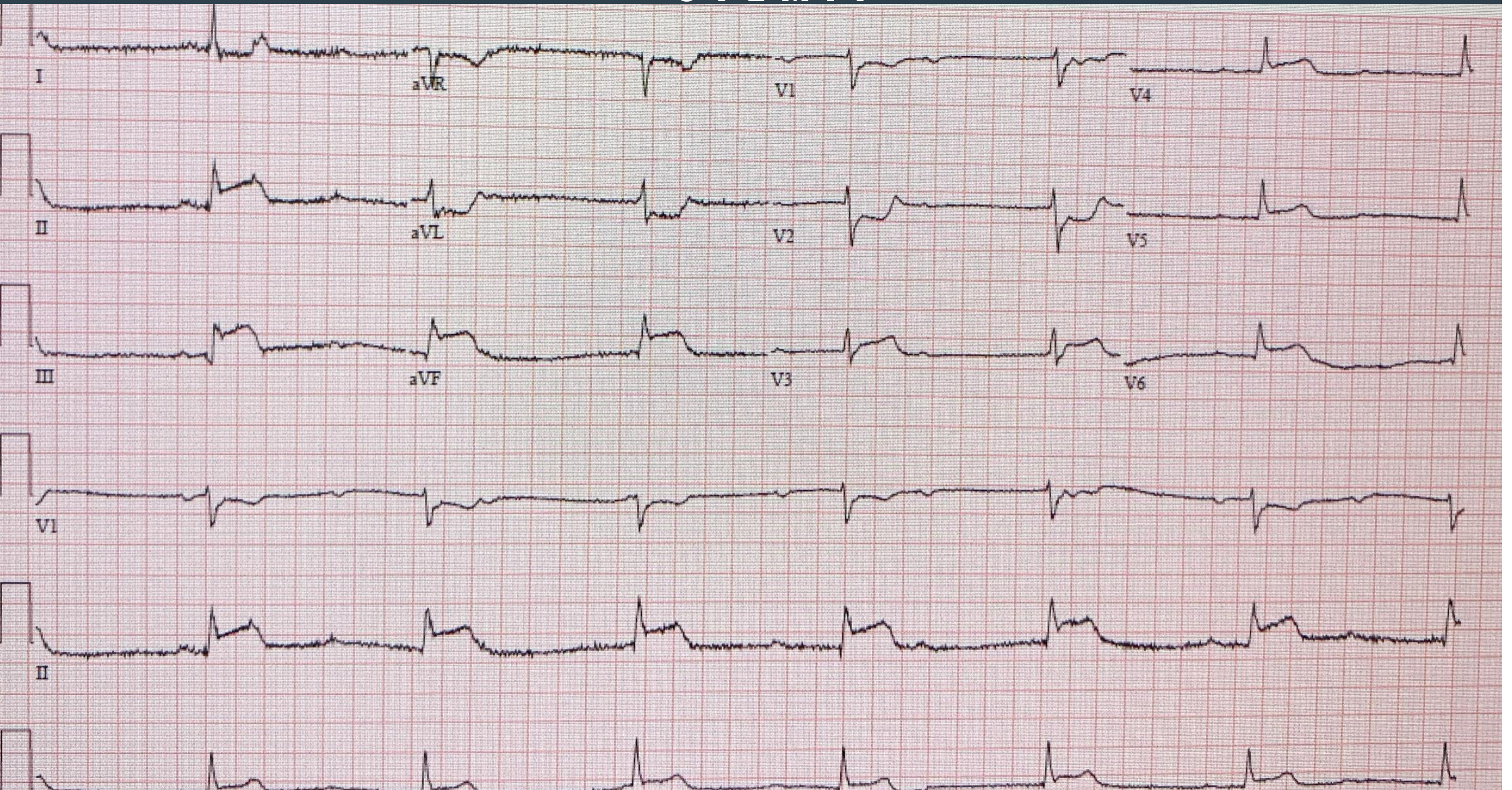
R - Jaw, back, upper arm

S - 7/10

T - A few days got worse today



STEMI?



Cath Report

Circ: Prox CX: Mid subsection 40%

LAD: Normal.

Prox RCA: Distal subsection.**100**% stenosis

LMCA: Normal.





CASE

#3

54 y/o male with chest pain

54 y/o M who has chest pain

- *P – unprovoked*
- *Q- pressure*
- *R – Left arm, jaw, neck, head*
- *S – 8/10. Dyspnea, diaphoresis at home*
- *T – Intermittent for four days*



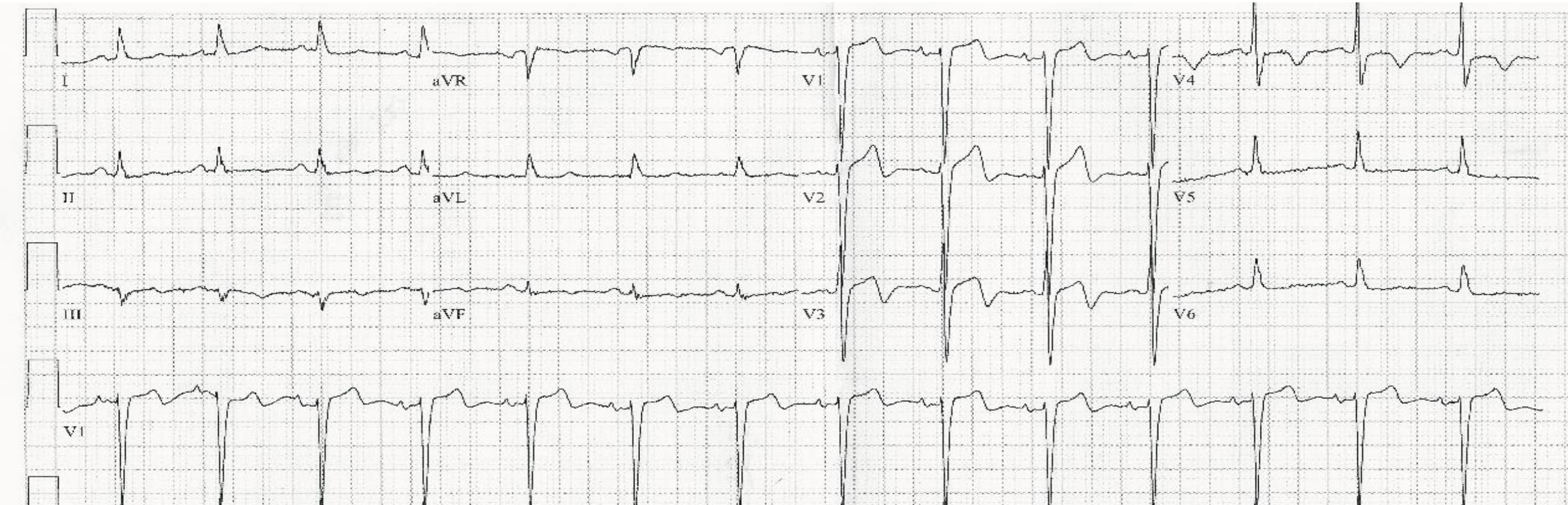
54 y/o M who has chest pain

- PMH: None
- Meds: None
- SH: Lives with girlfriend, wife lives in Mexico. Drives a tractor
- Hasn’t seen a doctor in 20 years +
- Former smoker, drinks 12 beers a day



75% stenosis on LAD

Vent. rate	86	BPM	NORMAL SINUS RHYTHM
PR interval	140	ms	T WAVE ABNORMALITY, CONSIDER ANTERIOR ISCHEMIA
QRS duration	100	ms	PROLONGED QT
QT/QTc	410/490	ms	ABNORMAL ECG
P-R-T axes	56 9	-26	NO PREVIOUS ECGS AVAILABLE





CASE

#4

70 y/o male with neck pain

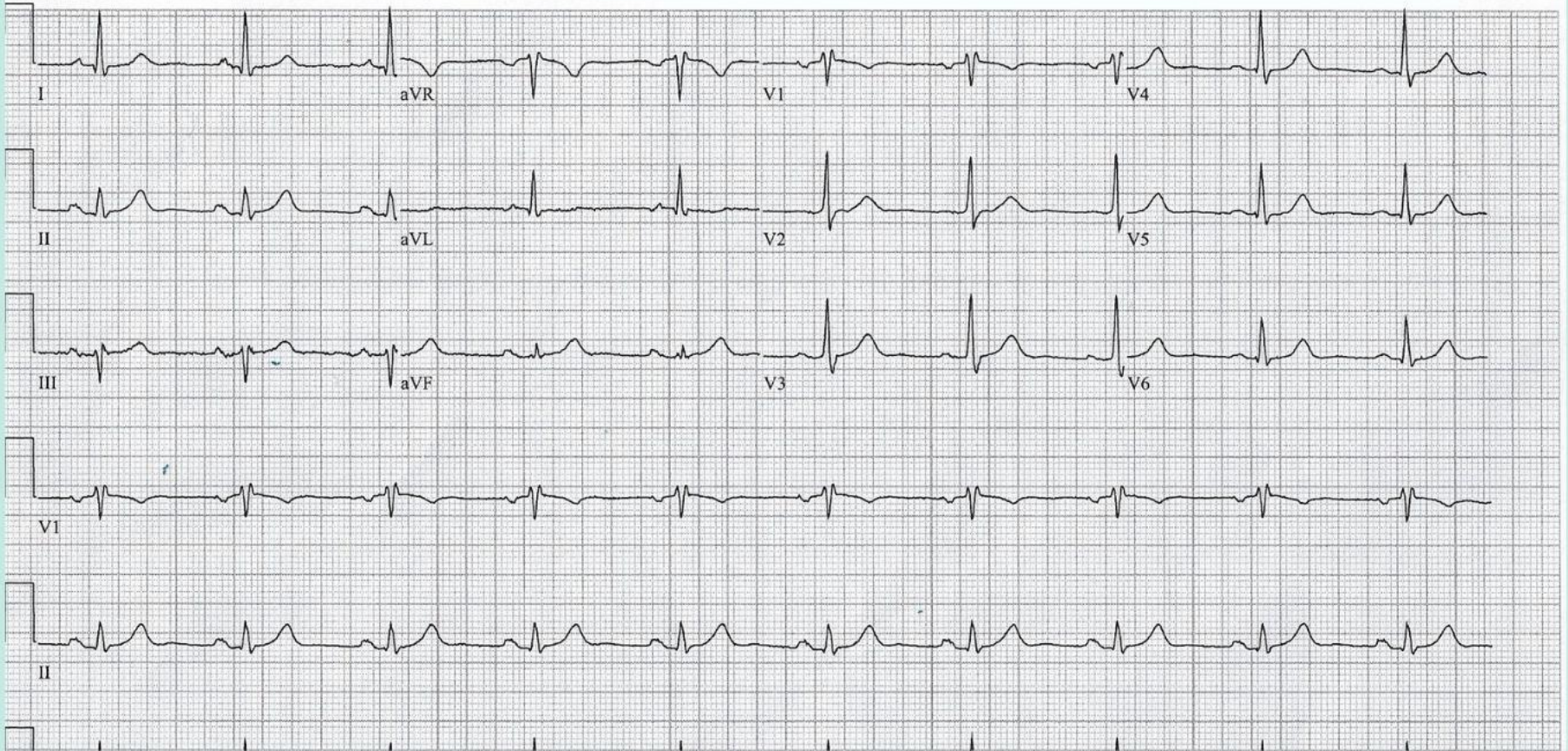
"My neck hurts"

70: Y/O M
PMHX: NONE



"His EKG"

PR interval	174	ms	INCOMPLETE RIGHT BUNDLE BRANCH BLOCK
QRS duration	106	ms	BORDERLINE ECG
QT/QTc	438/438	ms	NO PREVIOUS ECGS AVAILABLE
P-R-T axes	54 0	61	



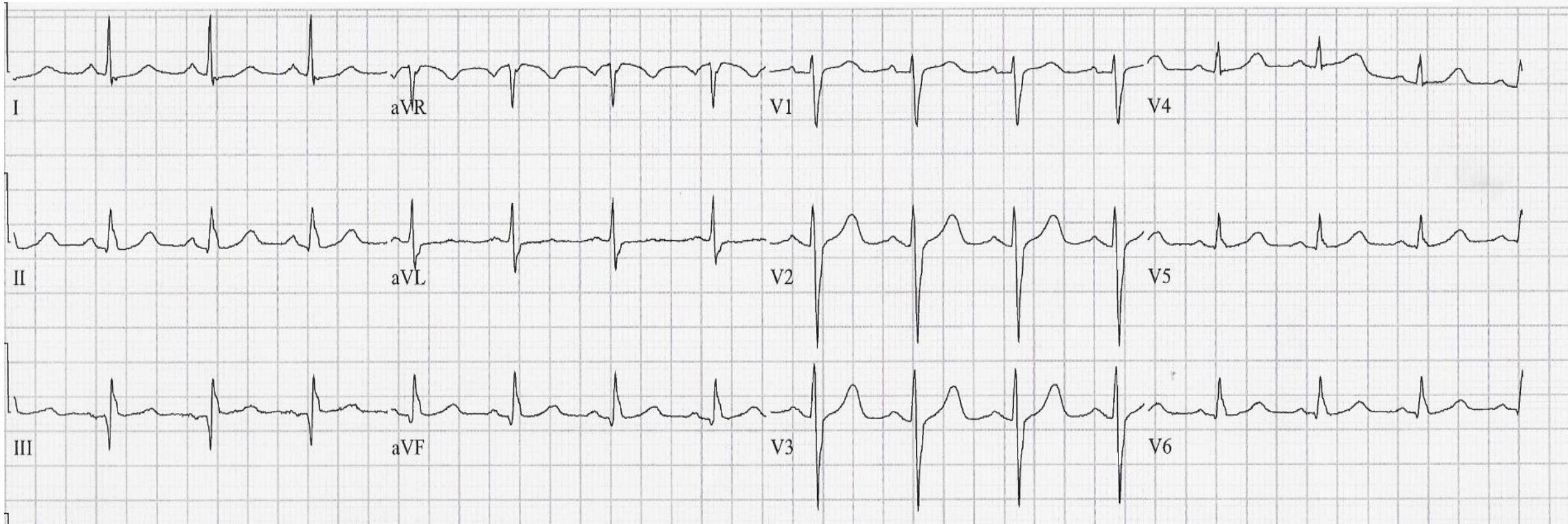


CASE

#5

24 y/o female with chest pain

Vent. rate	90	BPM	NORMAL SINUS RHYTHM
PR interval	154	ms	CANNOT EXCLUDE INFERIOR INFARCT (CITED ON OR BEFORE 1
QRS duration	88	ms	AB NORMAL ECG
QT/QTc	382/467	ms	WHEN COMPARED WITH ECG OF
P-R-T axes	25 32	67	QT HAS LENGTHENED



Why

did you get an EKG on that 24 year old?

"They didn't listen to me!"

- BIB ems – unresponsive – **BG 30** – dextrose IV

On dialysis, diabetic, htn, anemia

.

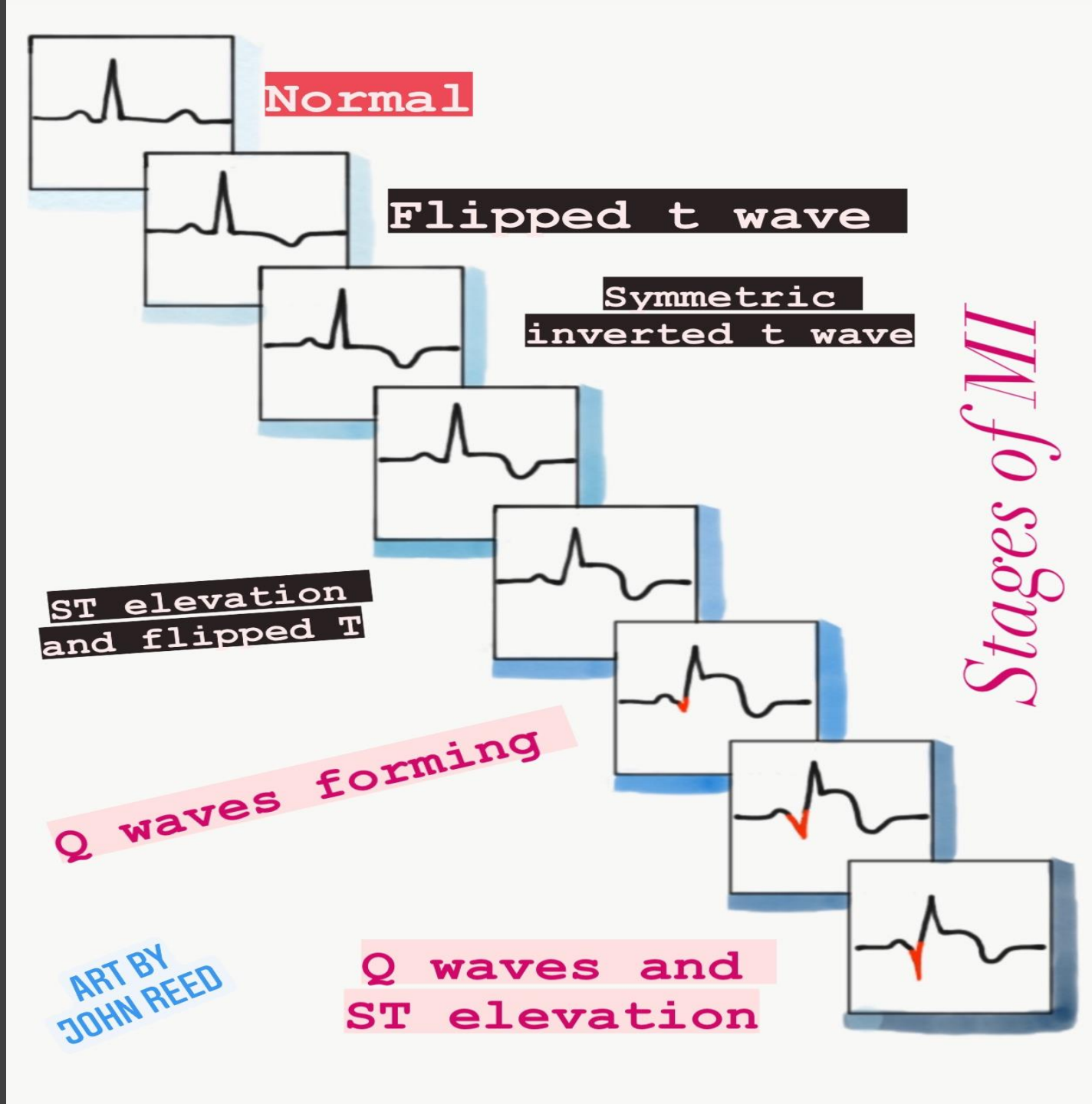
Cath report:

Prox LAD: 95% - stent

Circ: 95% - stent



Q Waves


Normal
Flipped t wave
Symmetric inverted t wave
ST elevation and flipped T
Q waves forming
Q waves and ST elevation
ART BY JOHN REED
Stages of MI



CASE

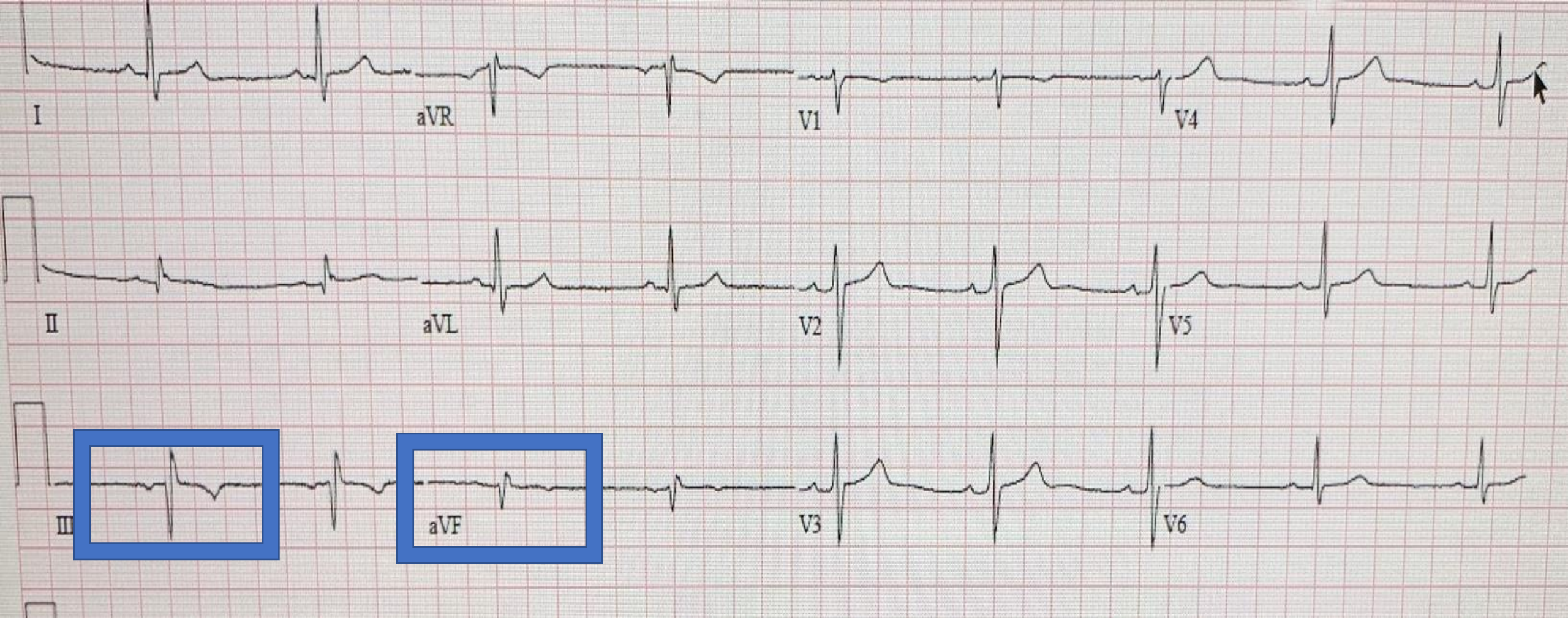
#6

63 y/o male with chest pain, cough

63 y/o M with chest pain when I cough x 10 d

63-year-old male presenting to the emergency room sent by his primary care PA for chest pain for the last 10 days. Patient's pain is only present when he exerts himself moderately or when he has a very "strong" cough.





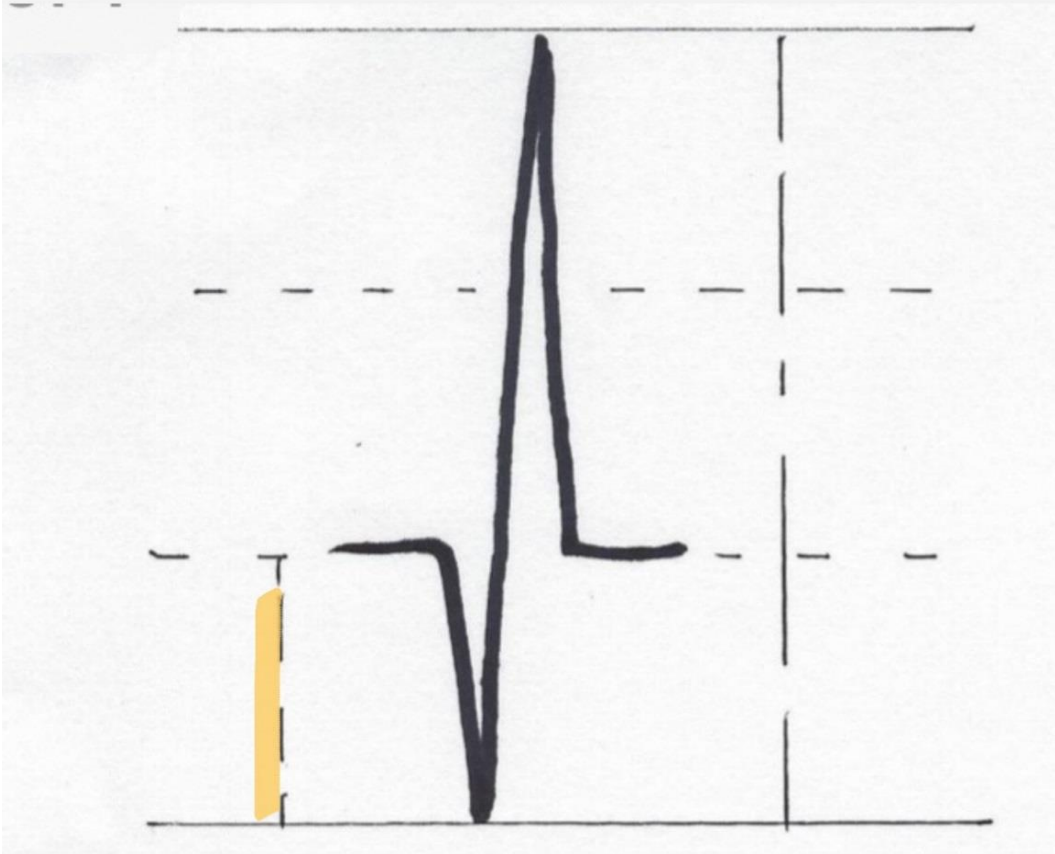
1. **1/3** the height of the R wave
2. Wide
3. Deep
4. In a pattern

HIS LABS

- Total cholesterol: **149**
- Triglycerides: **189**
- LDL: **74**
- HDL **37**
- TSH: Normal
- Hemoglobin A1c 6.6
- Troponin

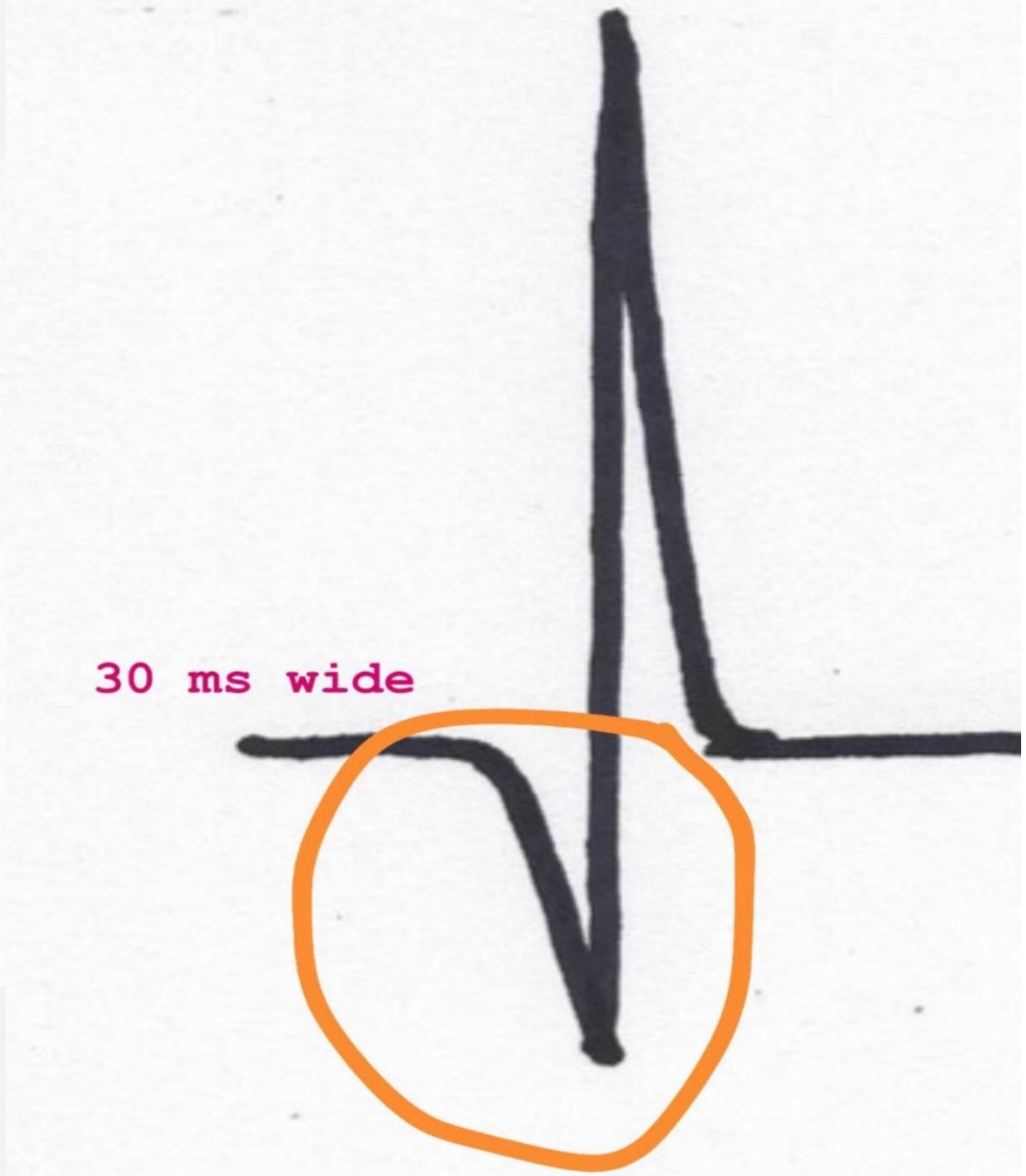
0.057 - 0.059 - 0.045 -0.027

Q WAVE



1/3 height of R wave

Pathologic Q Waves



Lexiscan Stress Test

CLINICAL FINDINGS: **CP during infusion**

IMPRESSION:

- 1. Abnormal myocardial perfusion study. Moderate sized, severe **inferior Ischemia in the RCA territory**.
- 2. Inferior hypokinesis. Normal LV size without transient ischemic dilatation.
- 3. Scan significance: suggestive of a(n) intermediate risk for hard cardiac events. EF 58%



CASE

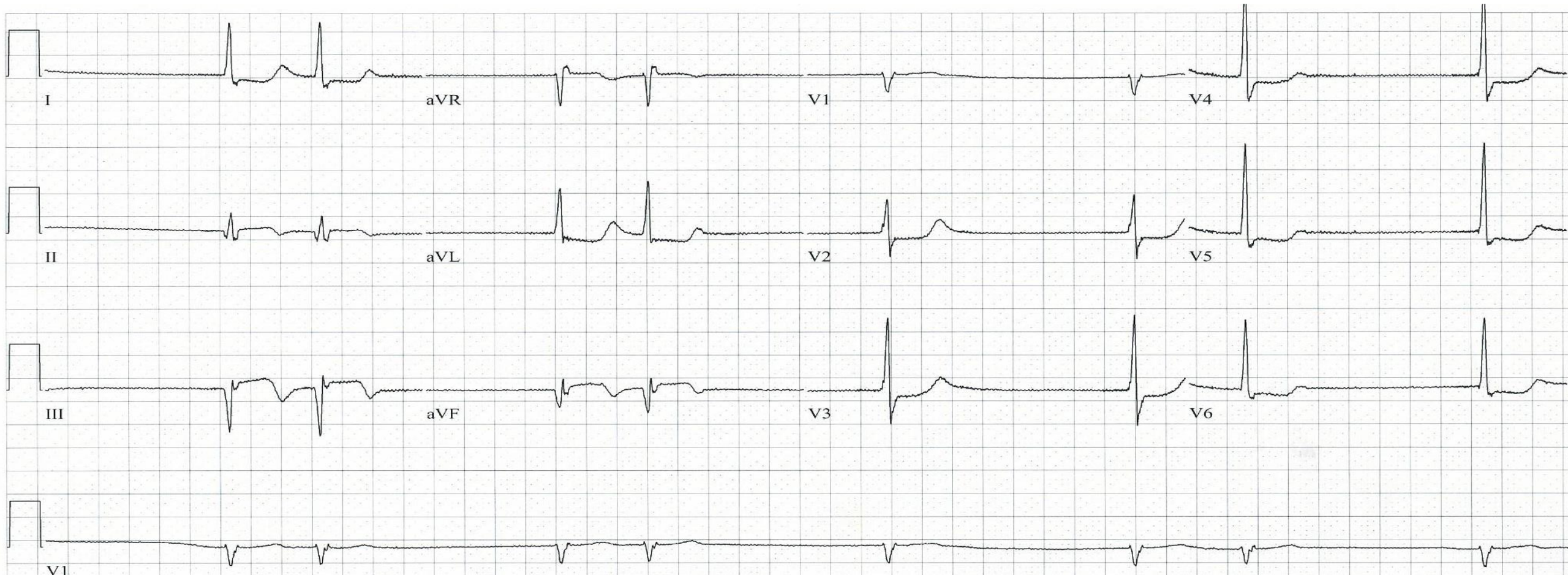
#7

56 y/o M with chest pain

56 year old male “Chest pain”

Vent. rate	51	BPM
PR interval	*	ms
QRS duration	94	ms
QT/QTc	470/433	ms
P-R-T axes	* -15	75

*** Critical Test Result: STEMI
Most Likely WITH PREMATURE JUNCTIONAL COMPLEXES
Also Consider ATRIAL FIBRILLATION WITH SLOW VENTRICULAR RESPONSE
INFERIOR-POSTERIOR INFARCT (CITED ON OR BEFORE 10-OCT-2016)with recurrent ST elevation and reciprocal ST depression
** ** ACUTE MI / STEMI ** **



- Most important question to ask him: _____



- P – “I was arguing with my wife”
- Q – “Feels like an elephant is sitting on my chest”
- R – “ To my left arm, but I do construction, it always hurts”
- S – “My wife made me come but it does hurt…”
- T – 30 minutes prior to arrival

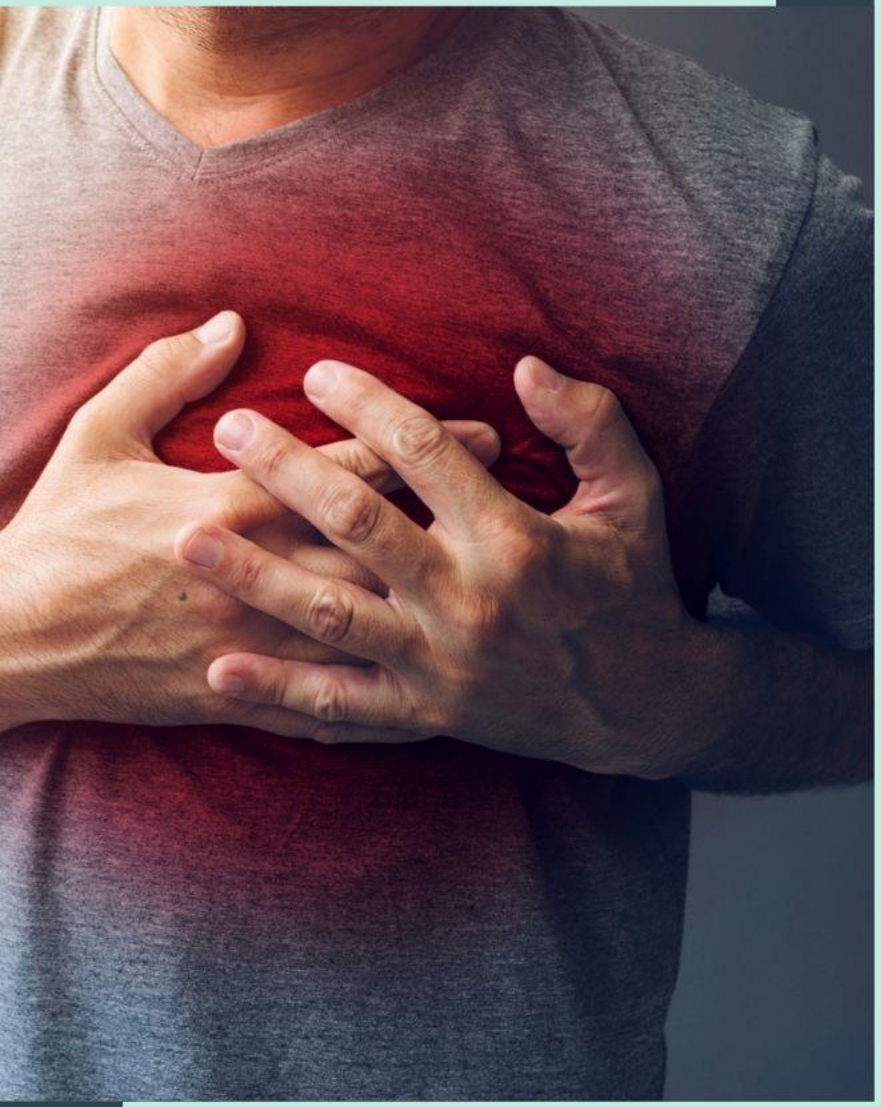
- HX: Stent in 2013, hyperlipidemia, hypertension, obese
- SH: “ A few beers to unwind” “I smoke with the guys”
- FH: Mom – CHF, stroke Dad: MI, CVA

His meds



DM, HTN, CHF, Hyperlipidemia

Differentials



- P - PERICARDITIS
- A - AMI
- P - PNEUMOTHORAX
- P - PNEUMONIA
- A – ANEURYSM

HE'S FAKING IT TO GET OUT OF GOING TO WORK?

How much do we worry?



Syncopal last night

- Left sided chest pain, previous stent
- HX: HTN, Hyperlipidemia
- VS: 98%, 50, 18, 114/91
- Trop **12.3** - 7.9
- Glucose 173
-
- VS: RR 20, pulse ox 99% RA, HR 54, BP 90/60

He’s admitted…

- Nurse calls: His HR is low
- Nurse calls: He is in AF
- Nurse calls: His sats are 76 when he sleeps and he stops breathing

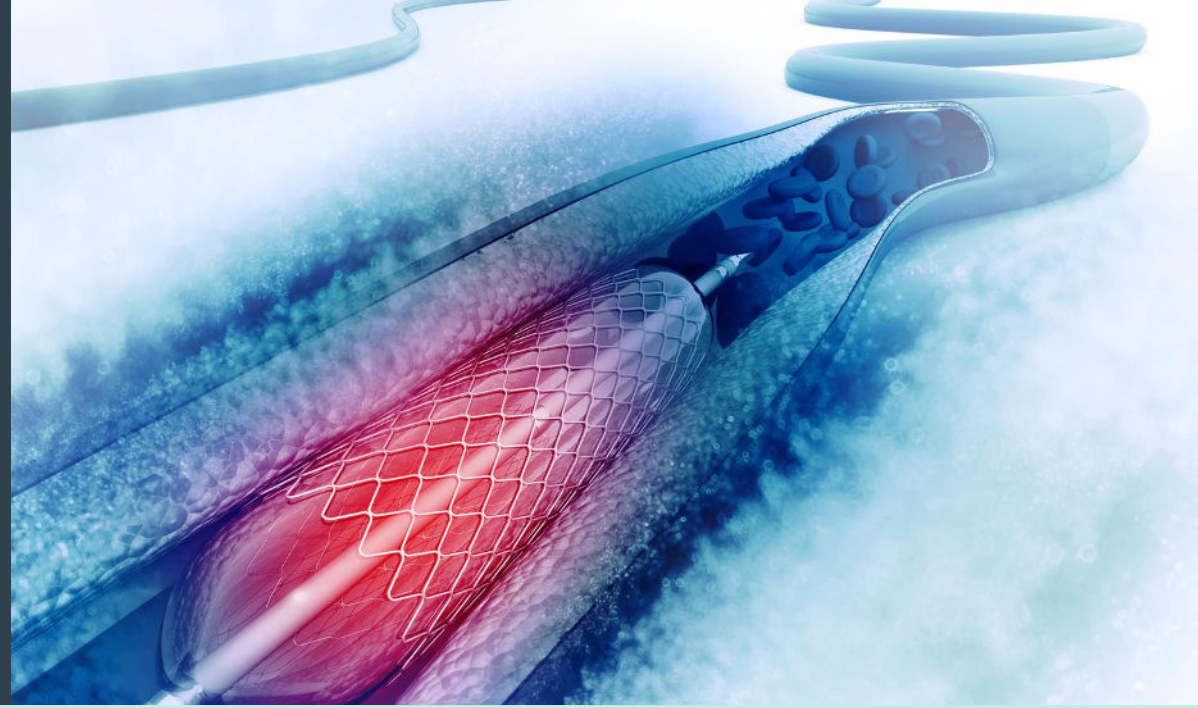
What does he need?



- *Echo showed EF of 37% - What is normal?*
- *Had temp pacer placed – why did he need it?*
- *Had angiogram: LAD: 100%, LCX: 99%, RCA: 100%*

STEMI

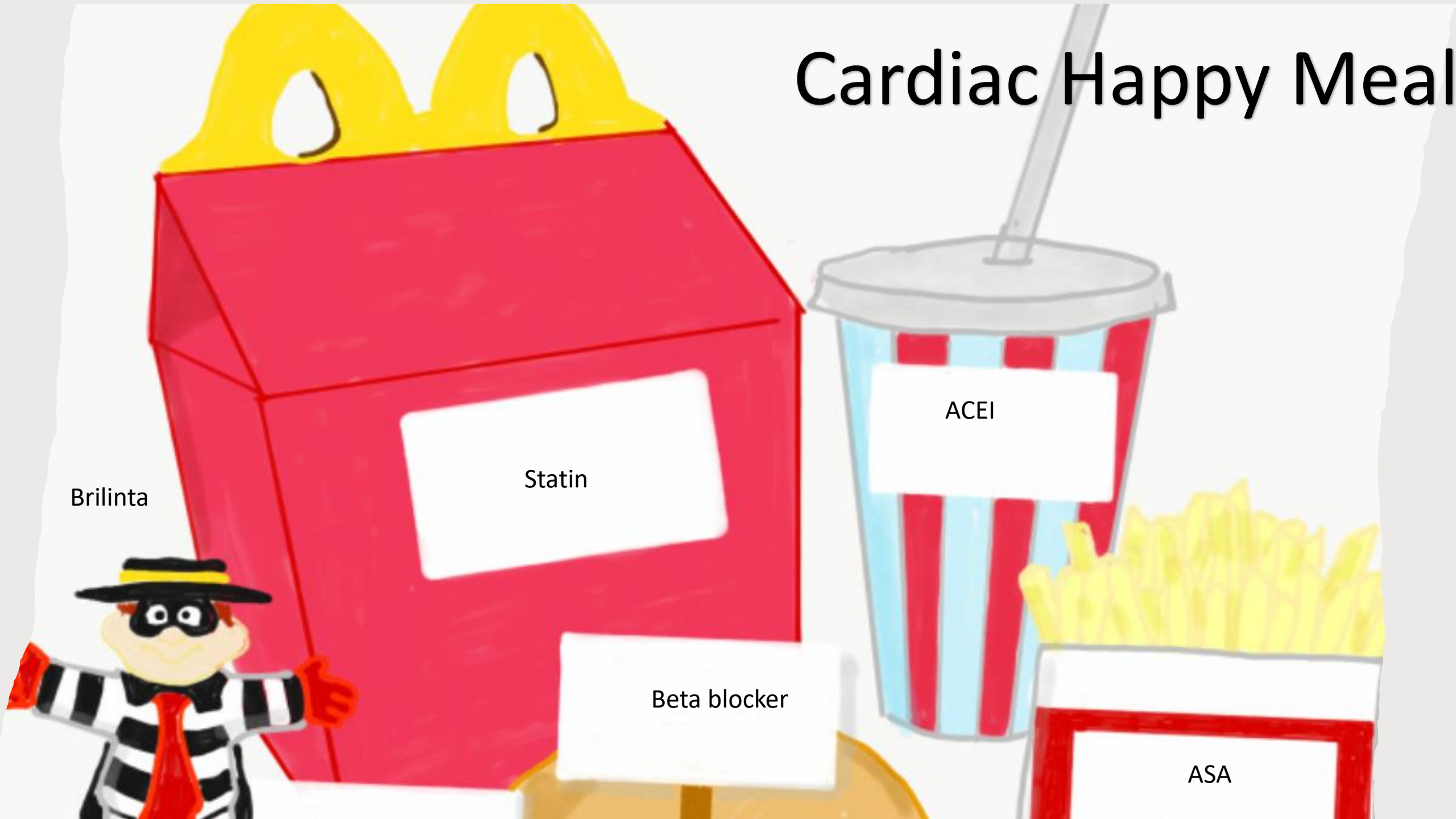
- 1. S/P PCI, DES RCA
- 2. Hyperlipidemia - uncontrolled
- 3. Probable sleep apnea
-



- Follow up with cardiology
- Cardiac rehab
- 30 Day heart tune up
- BP log



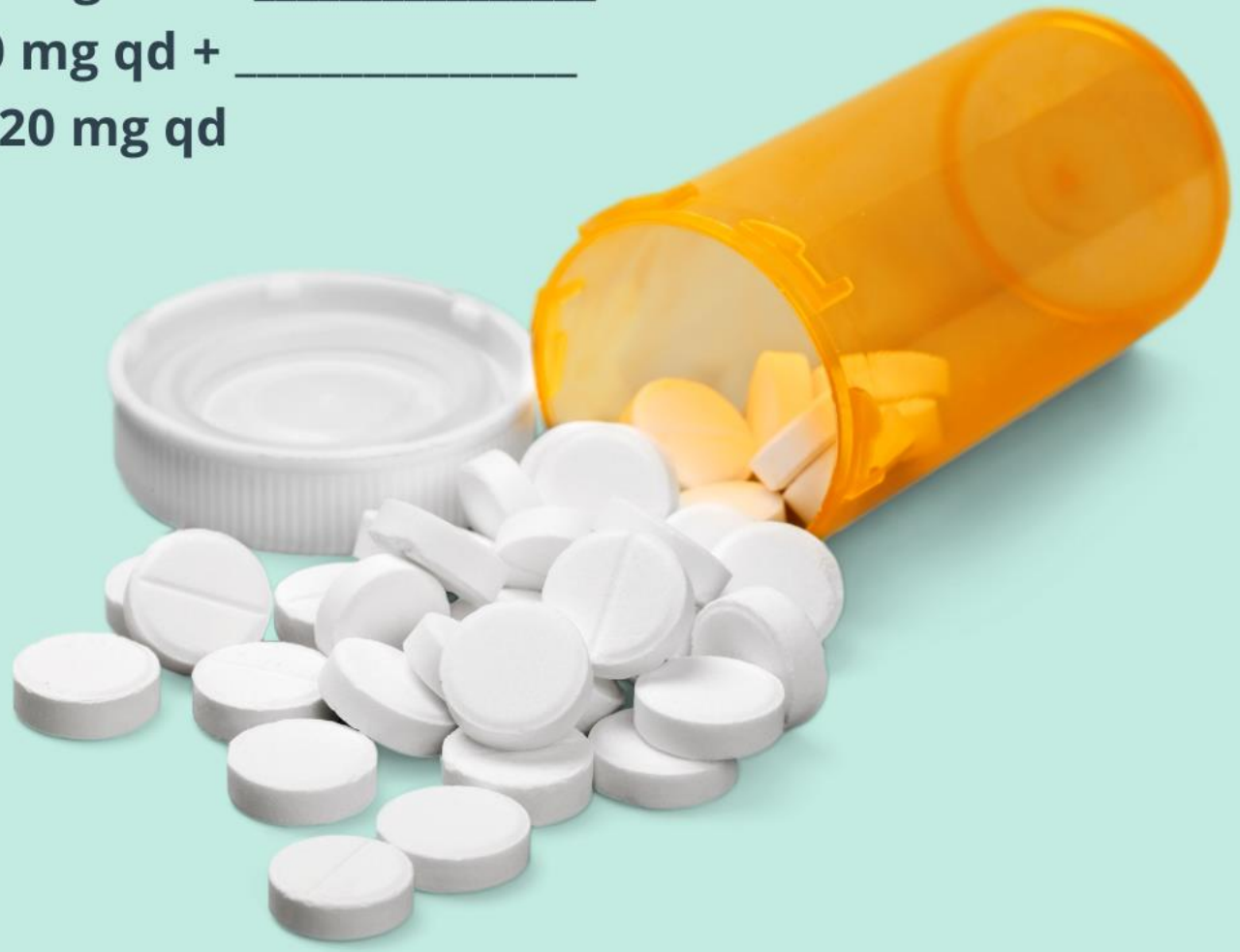
Cardiac Happy Meal



Cardiac Happy Meal

WHAT'S MISSING?

- Coreg 6.25 mg bid
- Brilinta 90 mg bid + _____
- Crestor 40 mg qd + _____
- Lisinopril 20 mg qd





The Happy Meal: Not so **happy**?

- “I feel dizzy now”
- “I don’t want to be on all these medications”
- Phase II Cardiac Rehab


"I have chest pain"

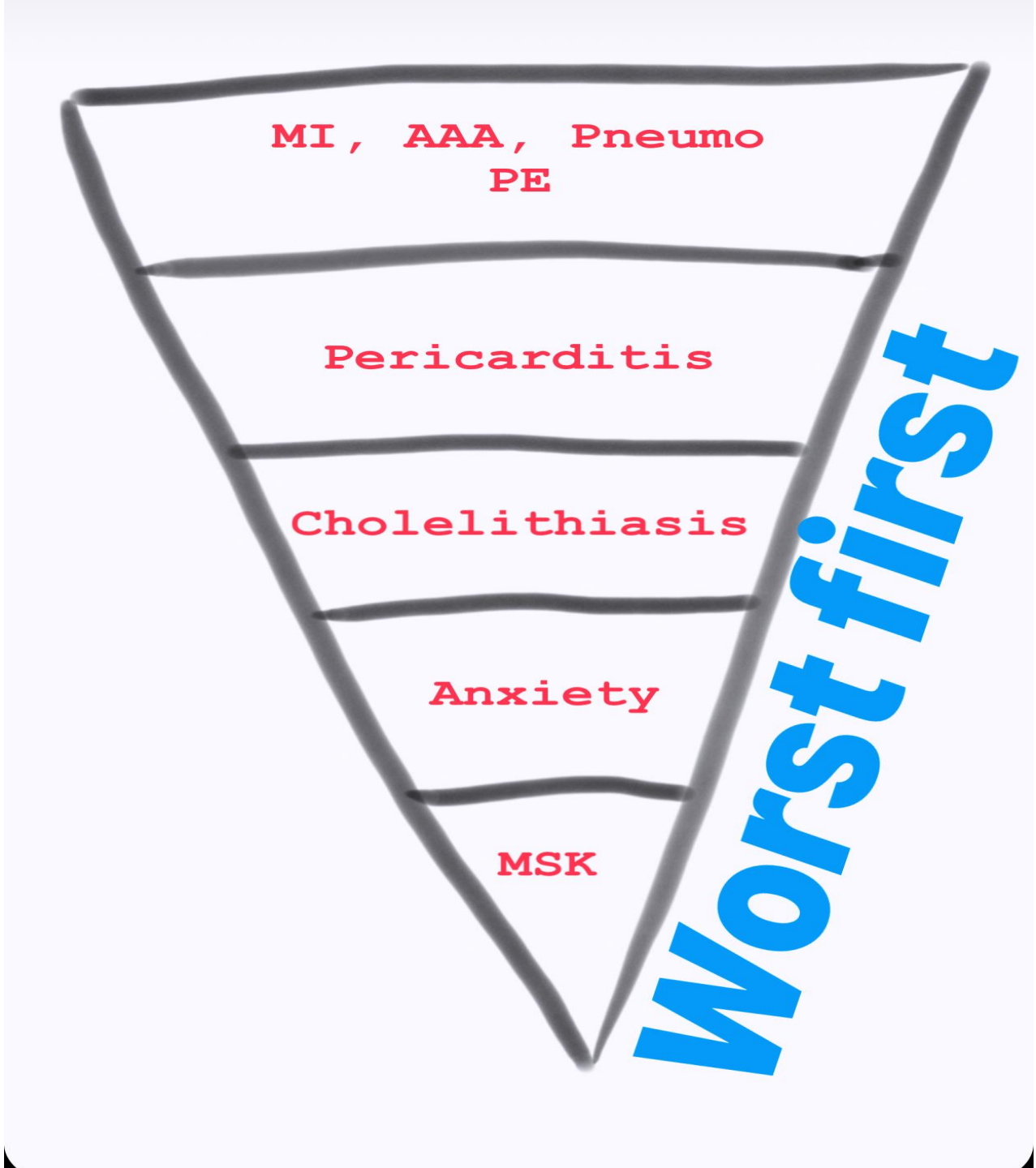
67 Y/O M STUTTERING CHEST PAIN

- Chest pain for 4 months
- Drives to the ER
- **VS:** 172/90, HR 109, RR 18, T 98.5
- **HX:** None
- SH: Still works, is active. Nonsmoker



What are the chest pain differentials?

- ACS
- AAA
- PE
- Pericarditis
- MSK
- GERD/Gastritis



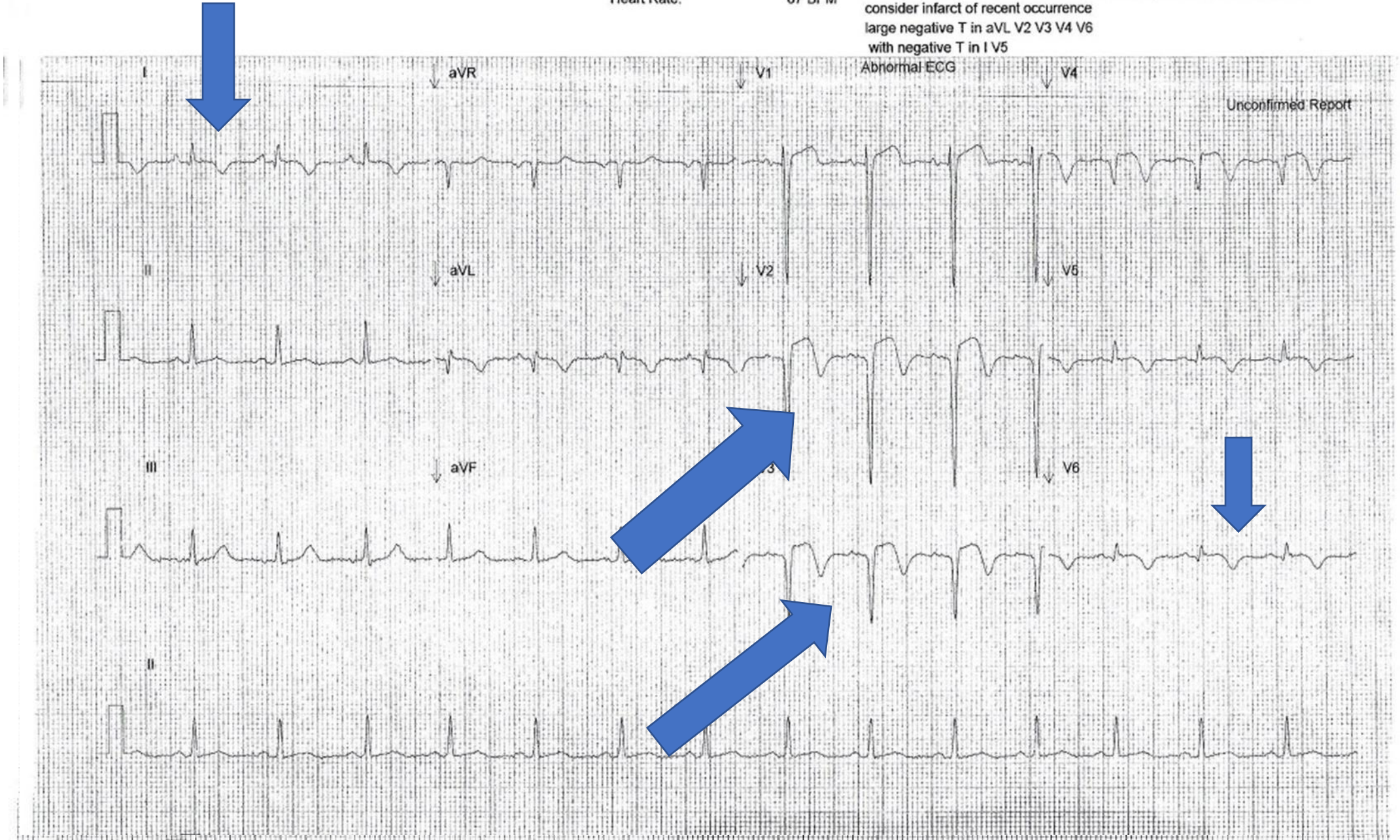
Comments:

Gender: Male

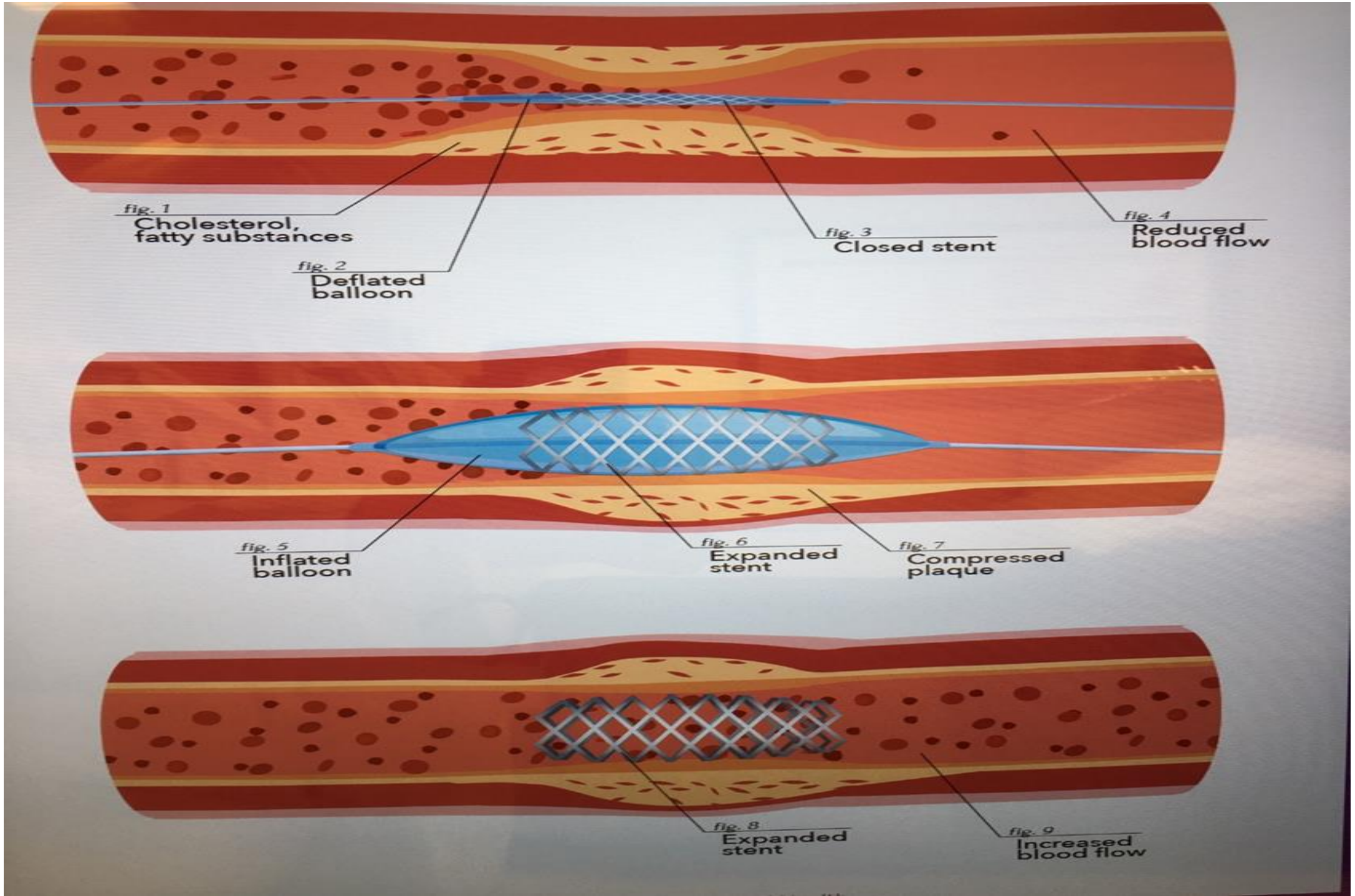
P/PR:	108/148 ms
QRS:	94 ms
QT/QTc:	400/481 ms
P/QRS/T Axis:	26/67/124 deg
Heart Rate:	87 BPM

extensive anterior infarct
QS in V2 V3 V4
25 < Q < 35 ms in V6
Q/R > 1/3 in V6
marked extensive precordial and high-lateral repolarization disturbance,
consider infarct of recent occurrence
large negative T in aVL V2 V3 V4 V6
with negative T in I V5

Abnormal ECG



Can we stent it?



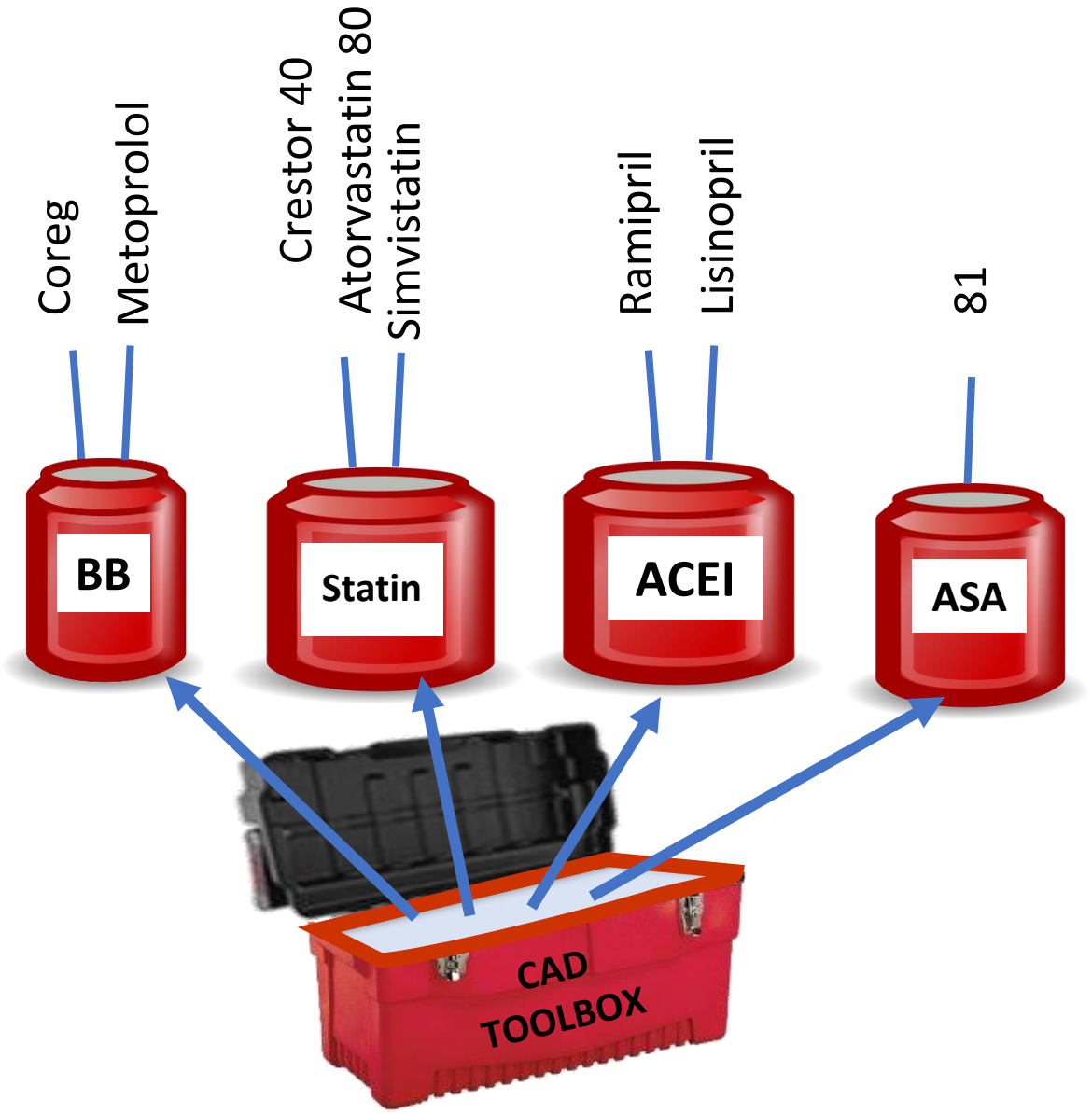
Indications for CABG



- CABG is the preferred treatment for:
  1. <u>Left main coronary artery with low EF</u>
  2. Triple Vessel Disease
     LAD,LCX and RCA
  3. Diffuse disease not amenable to treatment with a PCI

The 2005 ACC/AHA guidelines:

<u>Also</u> high-risk patients: severe ventricular dysfunction (i.e. low ejection fraction)



+

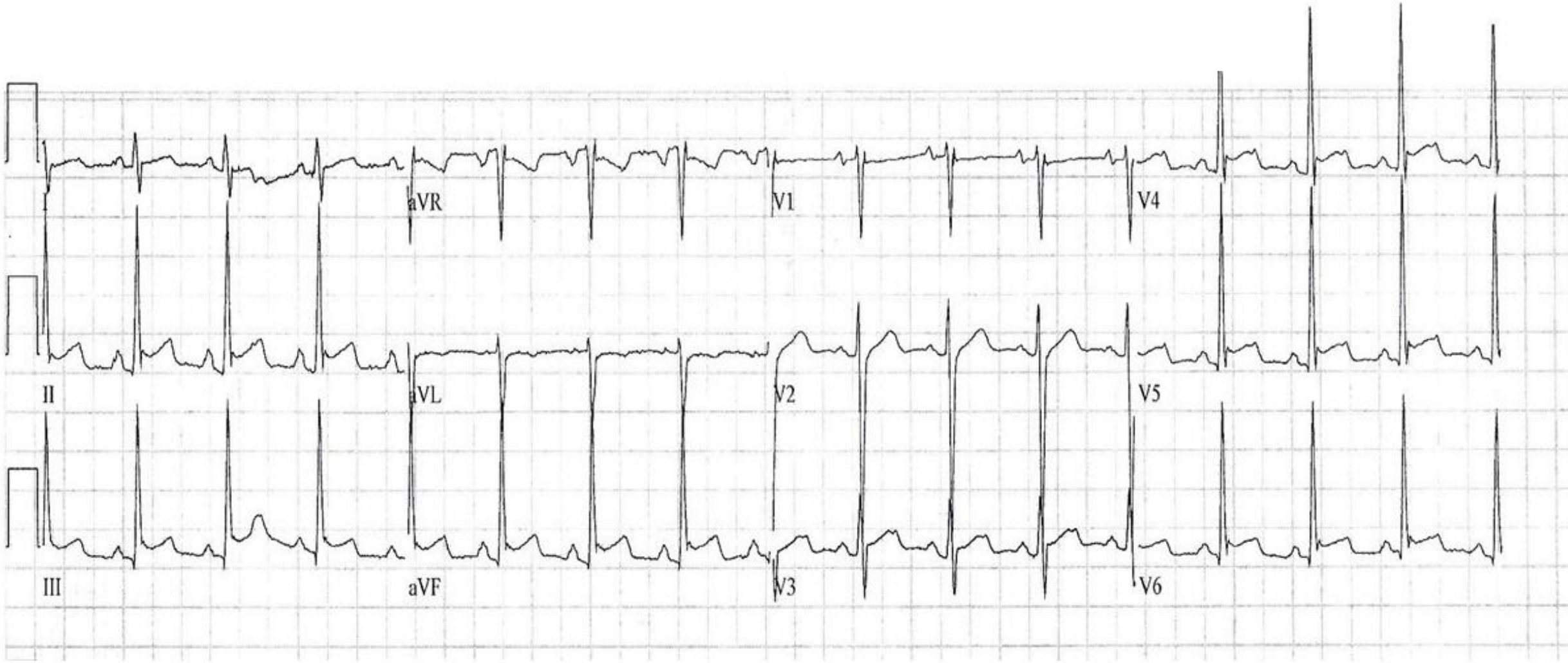
If stent

- Plavix $
- Effient $$
- Brilinta $$

MI Complications

- **Dressler's syndrome (Pericarditis)**
- **CHF**
- **Arrhythmia**
- **Left ventricular Aneurysm**
- **LV Thrombus**

Vent. rate	97	BPM	*** Critical Test Result: STEMI
PR interval	134	ms	NORMAL SINUS RHYTHM
QRS duration	82	ms	RIGHT ATRIAL ENLARGEMENT
QT/QTc	344/436	ms	ST ELEVATION CONSIDER INFEROLATERAL INJURY OR ACUTE INFARCT
P-R-T axes	62 85	66	** ** ACUTE MI / STEMI ** **
			ABNORMAL ECG



Thank you!



Jennifer Carlquist


“I feel weak”

What are the “weak” differentials?

- ACS
- Anemia/GI bleed
- Hypothyroidism
- Hypovolemia
- Over medicated
- UTI
- Dehydrated/malnourished

Vent. rate	109 bpm
PR interval	132 ms
QRS duration	94 ms
QT/QTc	372/500 ms
P-R-T axes	43 94 156

*** Critical Test Result: STEMI
Sinus tachycardia with premature supraventricular complexes
Anterolateral infarct, possibly acute
** ** ACUTE MI / STEMI ** **
Abnormal ECG

Referred by: ERMD

Unconfirmed



150 Hz 25.0 mm/s 10.0 mm/mV 4 by 2.5s + 1 rhythm ld MAC55 010A 12SL™v2

What do we order on him?

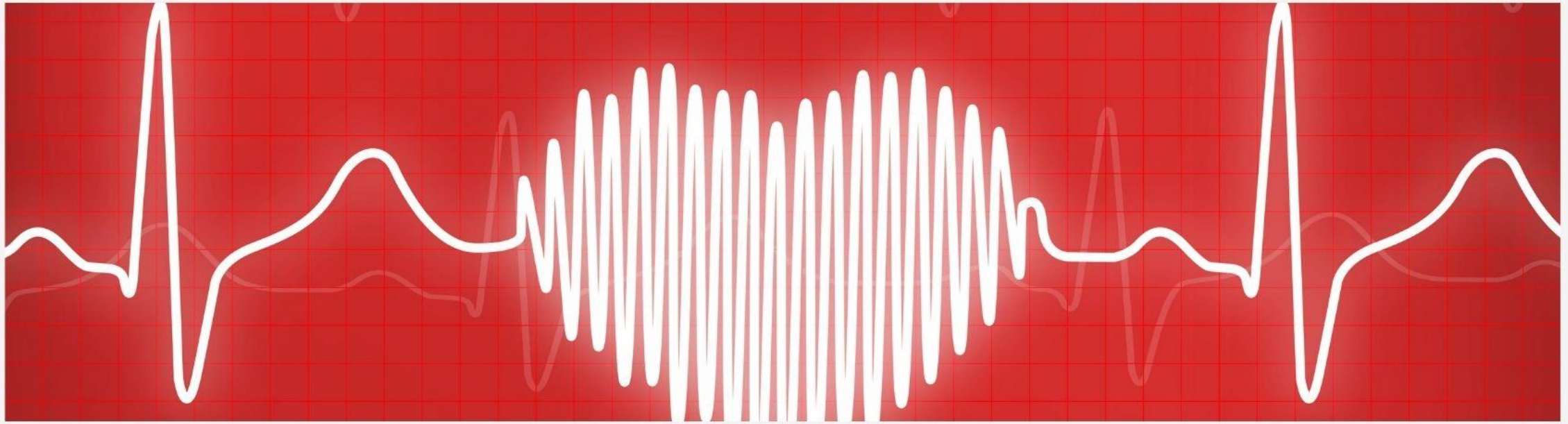
- Troponin q 2 x 3
- CBC
- CMP
- INR
- EKG
- CXR
- Bilateral blood pressures

The labs

- **Myoglobin**: Sensitive/not specific
  - **Rises in 2-3 hours/peaks in 3-6 hours**
  - **Doubling over 90 minutes highly predicative of AMI**

- **Troponin**:
  - **Rises in 3-5 hours/peaks in 12 hours**
  - **Closest to ideal**

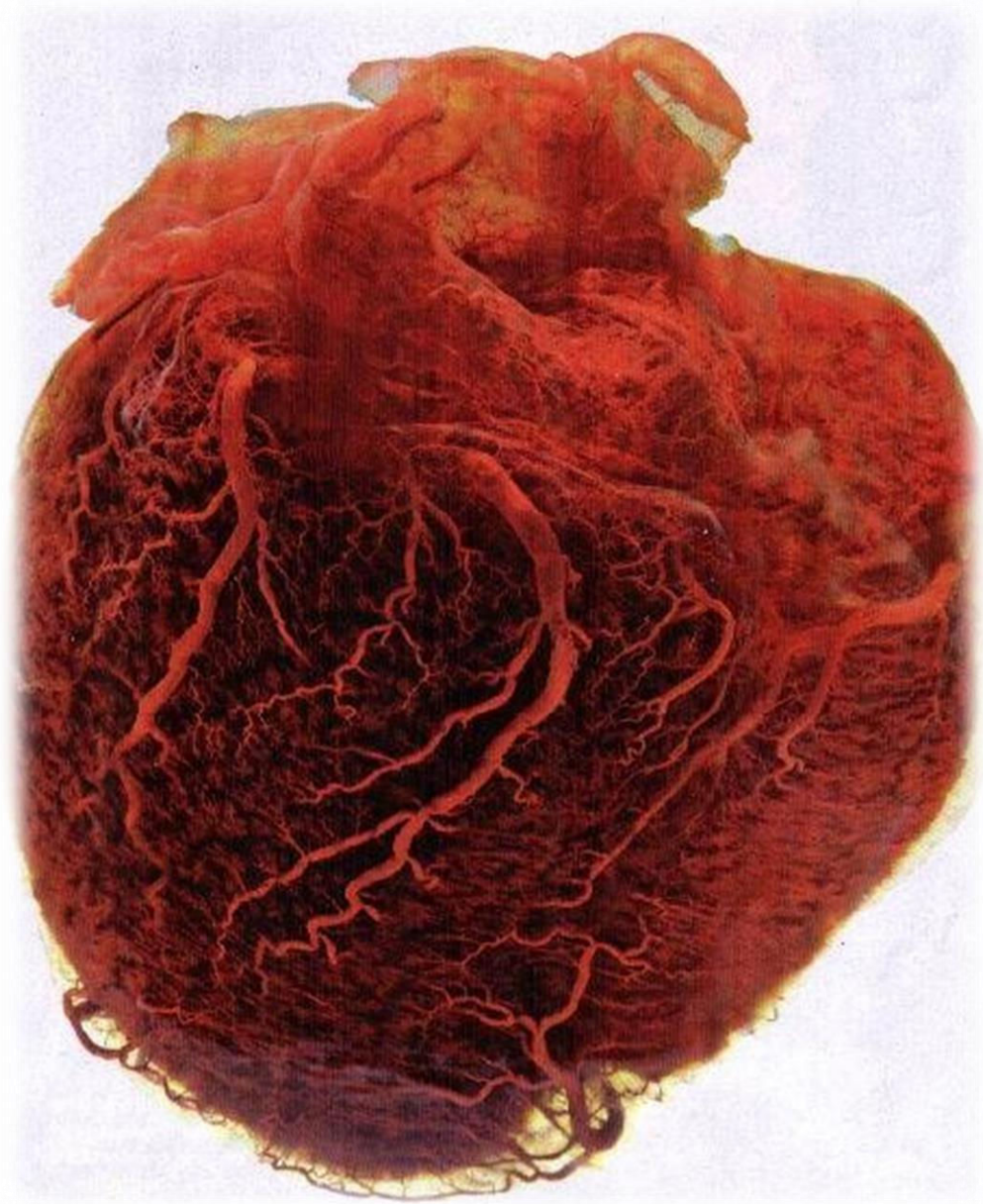
Cath Report



15% EF 100% OCCLUDED LAD CIRC 60%

Refractory Angina

- Ranexa
- Imdur
- Amlodipine



Vent. rate	109	bpm
PR interval	132	ms
QRS duration	94	ms
QT/QTc	372/500	ms
P-R-T axes	43	94 156

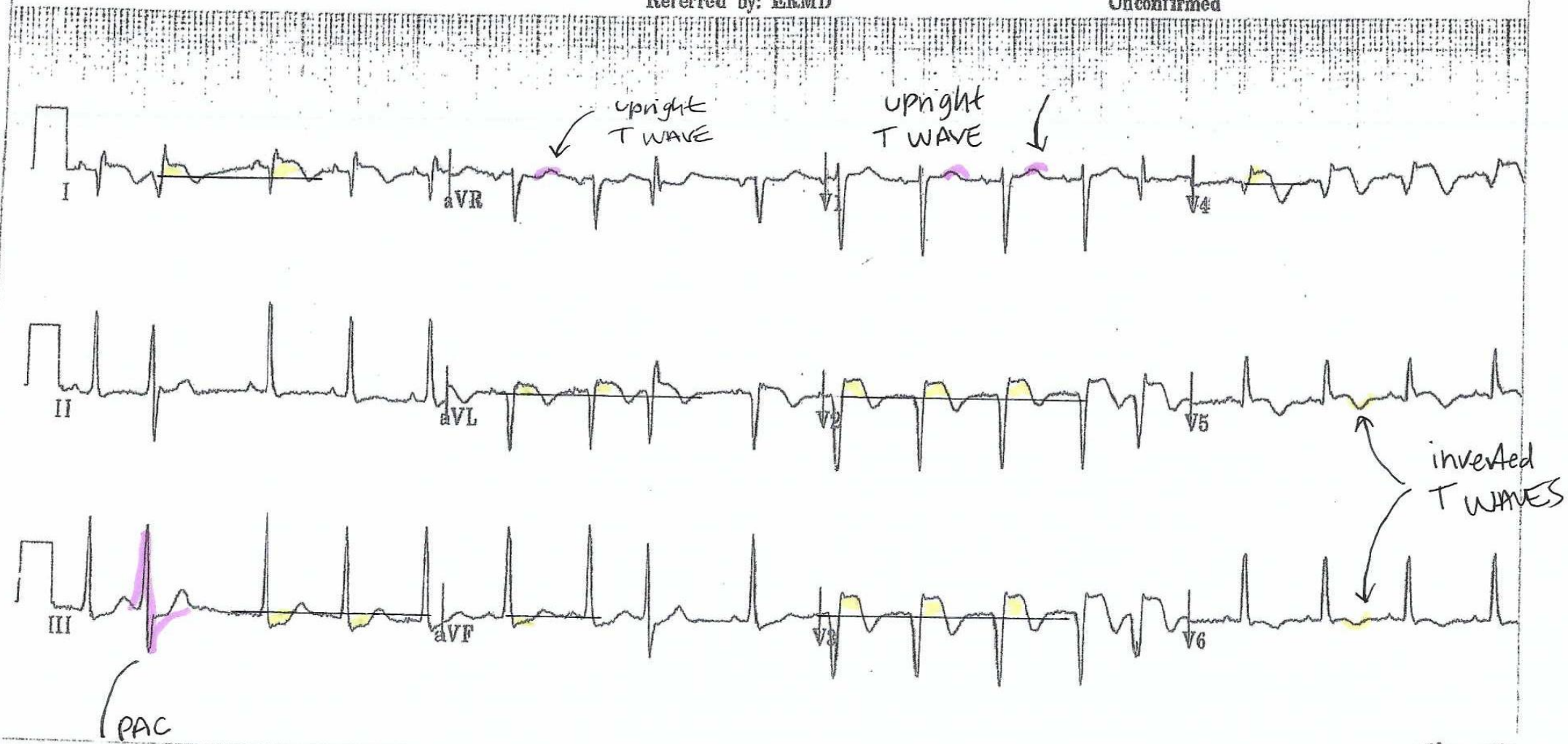
*** Critical Test Result: STEMI
Sinus tachycardia with premature supraventricular complexes
Anterolateral infarct, possibly acute
** ** ACUTE MI / STEMI ** **
Abnormal ECG

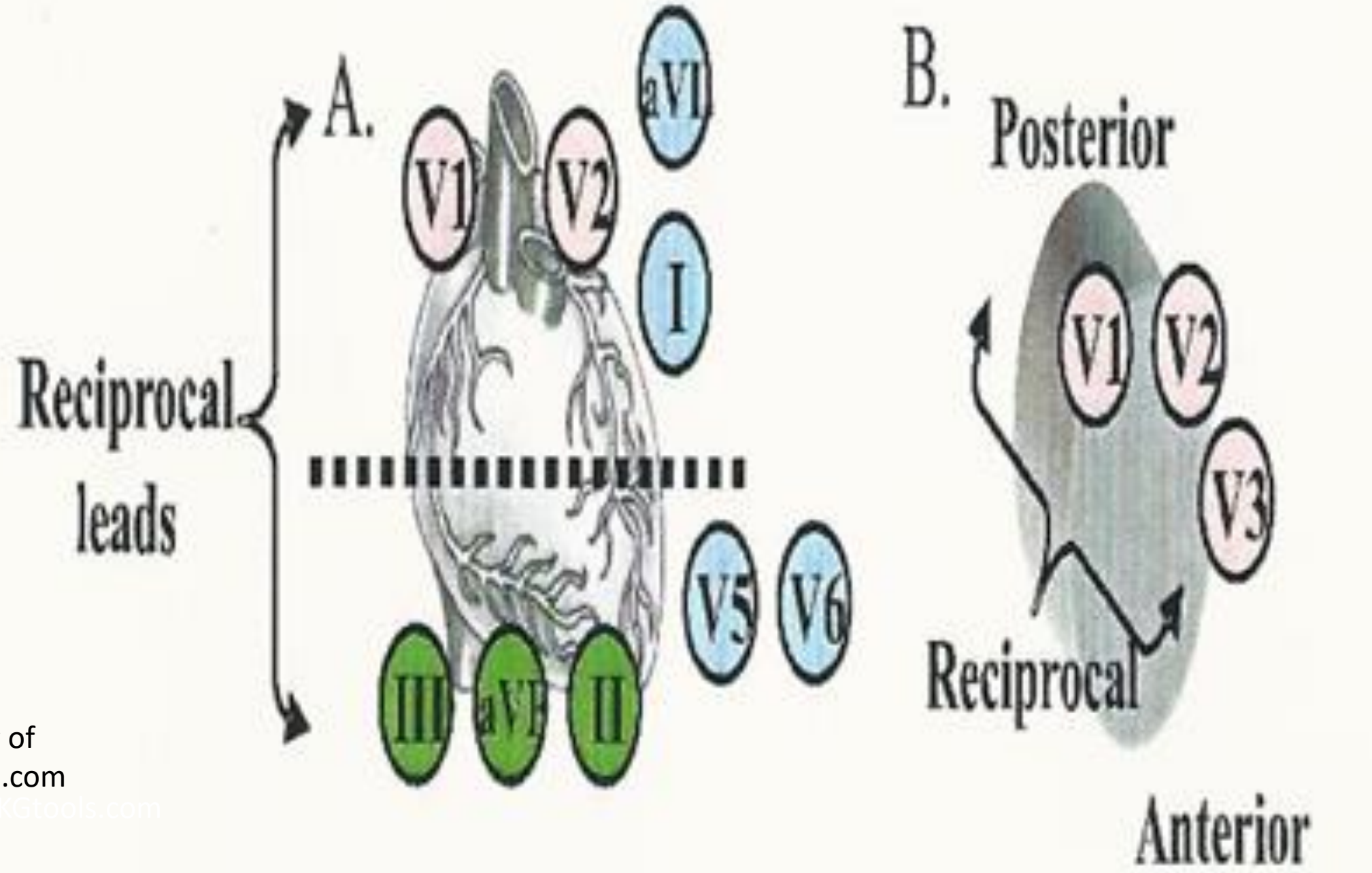
☑ TRUE

Prolonged QT

Referred by: ERMD

Unconfirmed





Courtesy of
EKGtools.com

EKGtools.com