Get Your ACS Together:

Sneaky STEMI Equivalents

Eileen Chu, MD, MS
Risk Management Fellow

1

No financial disclosures

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OBJECTIVES

- Understand common causes of malpractice related to chest pain
- Apply best practices to mitigate risk in the evaluation and management of chest pain
- Recognize features of STEMI equivalents

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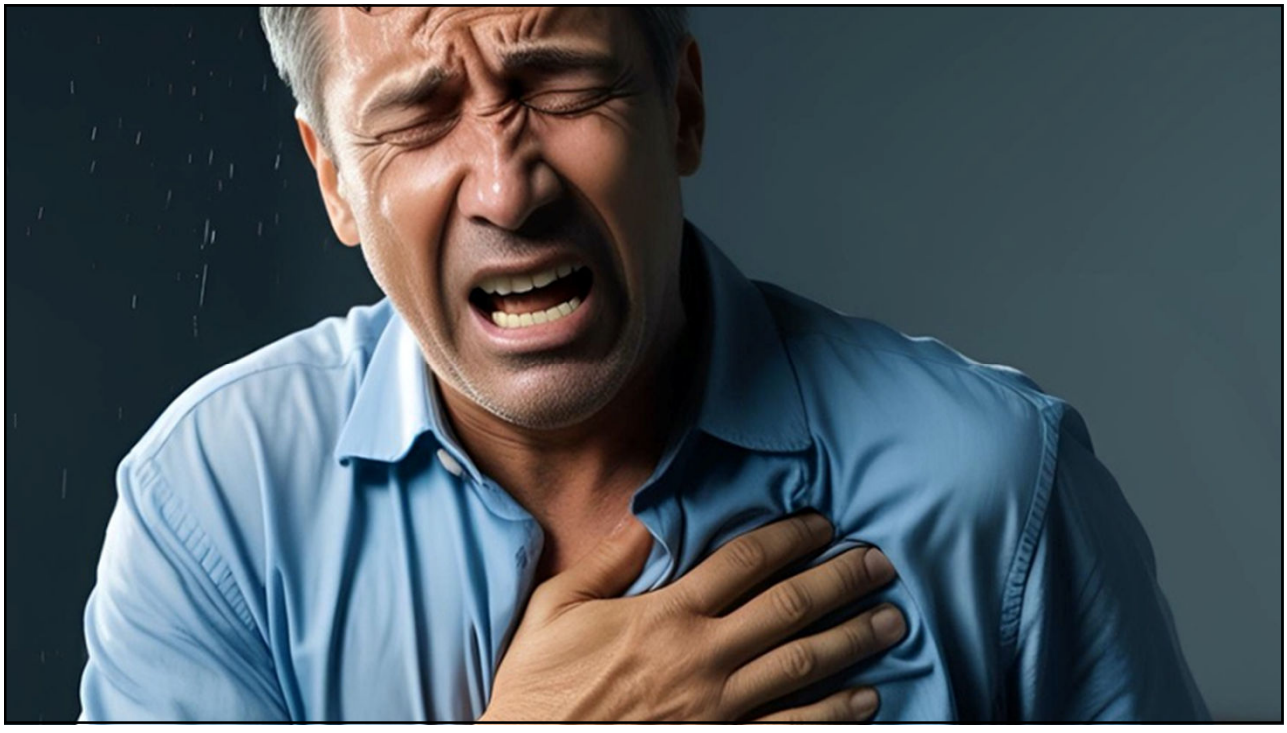

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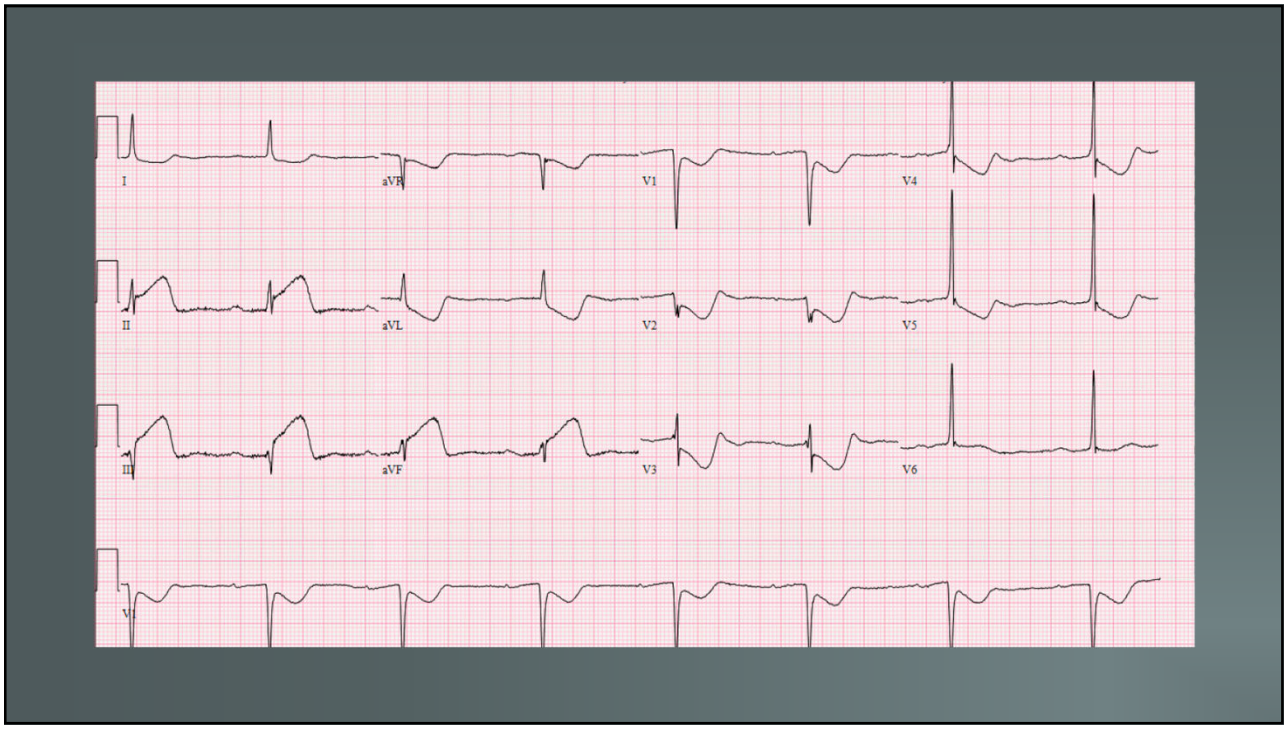

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Most common complaint

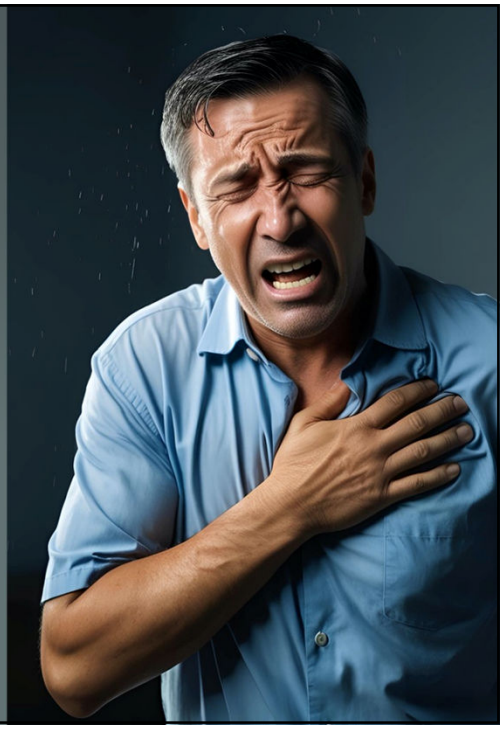
Source of ED malpractice claims

~2% of ACS discharged

Main reason for malpractice claims

High payouts for missed MI

More judgments in delayed care



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ATYPICAL CHEST PAIN

Approximately 26-34% of patients can have atypical presentation

8

ATYPICAL CHEST PAIN

- Female
- Diabetics
- Elderly
- Young
- Location of pain
- Reproducible pain
- GERD

9

YOUNG PATIENTS

- ~10% of acute MI annually
- Higher rates of unrecognized acute MI
- Increasing rates of obesity and insulin resistance

10

PAIN LOCATION AND TENDERNESS

- Right? Left? Doesn't matter
- Be suspicious of epigastric pain
- Question reproducible chest pain

11

GERD

- 20% of ACS patients describe as heartburn
- 15% of ACS patients will respond to antacids
- Bottom line: Antacids cannot be used as a diagnostic test

12

MALPRACTICE PITFALLS IN CHEST PAIN

- **Missed or delayed diagnosis of acute MI**
- **Misinterpretation of ECG**
  - 1 in 4 missed MIs
- **Failure to get ECG**
- **Failure to repeat ECG**
  - Can identify additional 16% of MIs
- **Poor history and/or assessment of risk factors**

13

POOR HISTORY / RISK FACTORS

- Basic history with PQRST
- Triage or nursing note discrepancy
- Nontraditional risk factors

14

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15

American Heart Association (AHA)/American College of Cardiology

Patients with suspected ACS should get an ECG and have it interpreted within 10 minutes

16

MALPRACTICE PITFALLS IN CHEST PAIN

- Missed or delayed diagnosis of acute MI
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17

STEMI EQUIVALENTS

18

- Wellens Syndrome
- de Winters
- Posterior MI
- Aslanger
- Hyperacute T waves
- South African Flag Sign
- Sgarbossa

19

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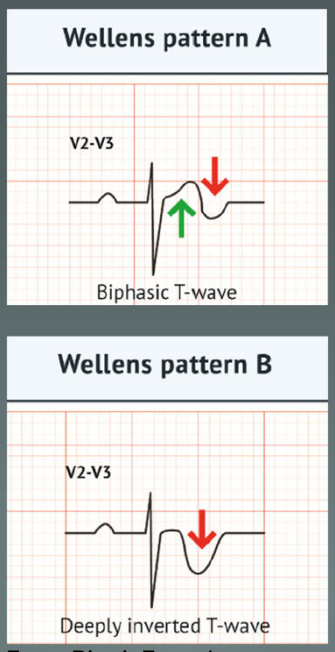
ACC recognized STEMI equivalents

20

WELLENS SYNDROME

- Transient proximal LAD occlusion
- Two types seen in V2-3
  - Biphasic T waves (A)
  - Deeply inverted T waves (B)
- Can evolve from A to B
- Finding persists until lesion is treated



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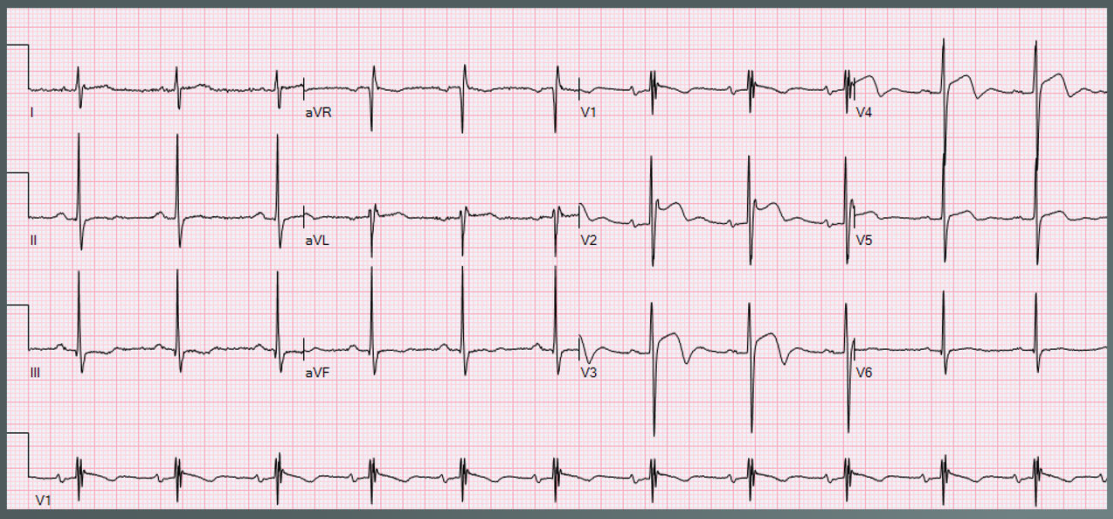
21



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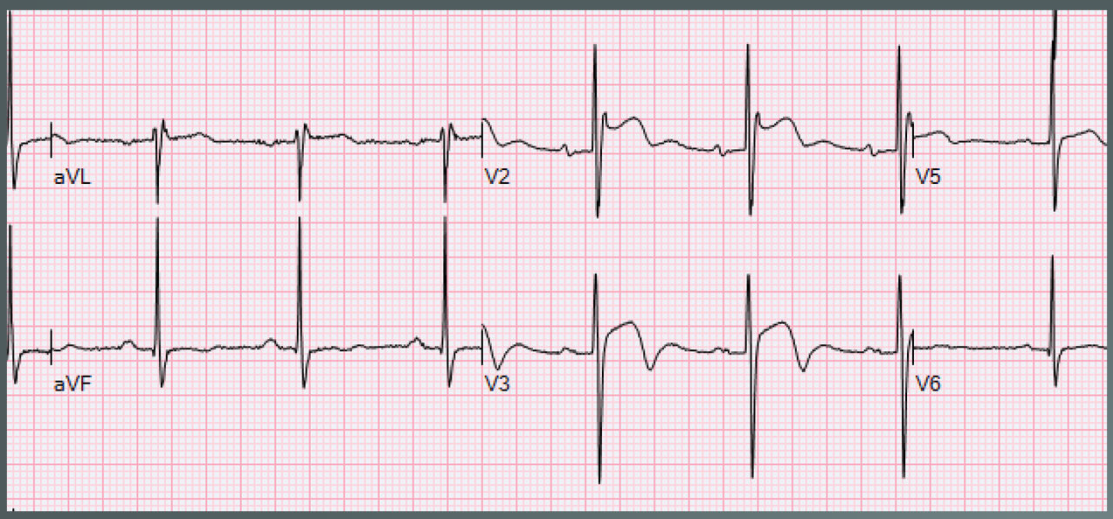

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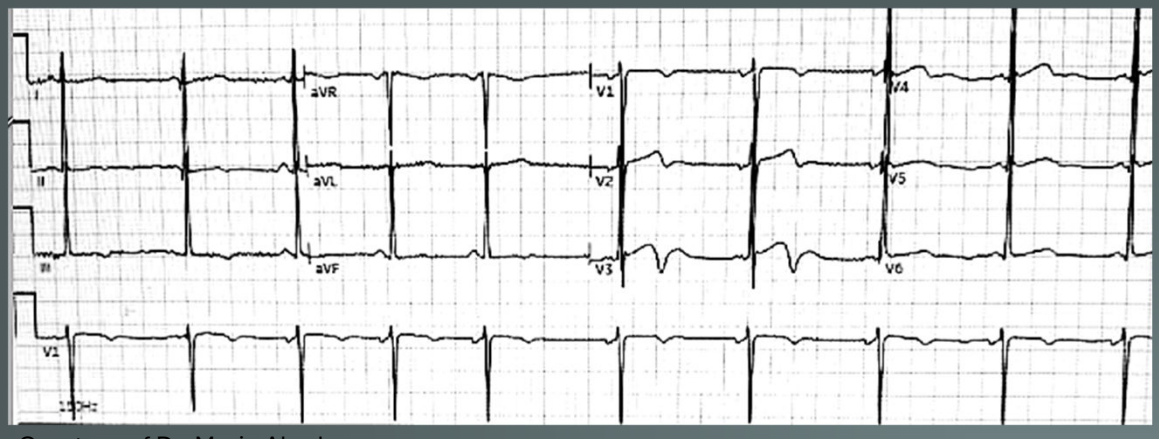

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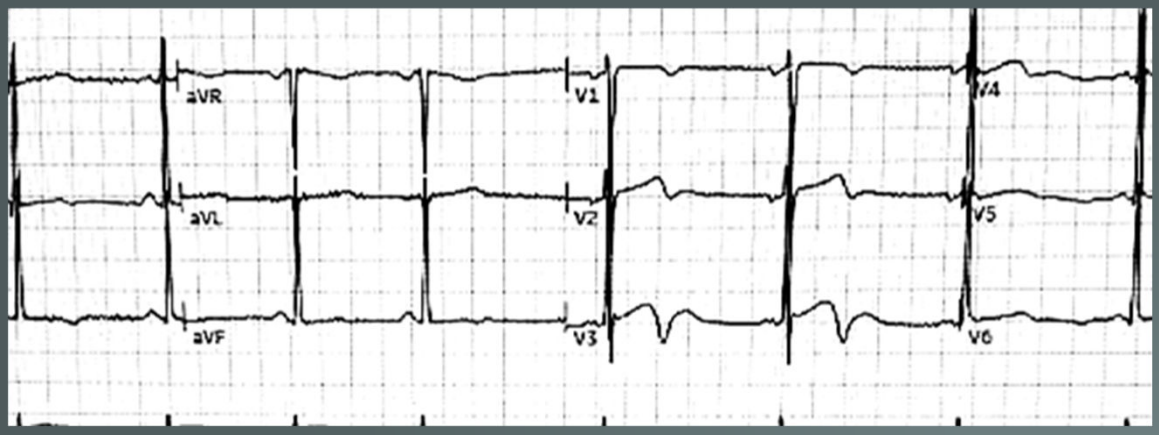

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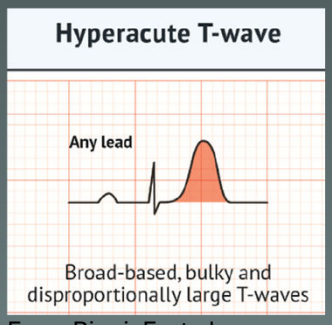
HYPERACUTE T WAVES

- Early finding in ischemia
- Large, broad asymmetrical T waves in proportion to QRS amplitude
  - ≥ 2 contiguous leads
- Get serial ECGs
  - Evolve over time into STEMI
  - Avoid mimics (eg. hyperkalemia, LVH)



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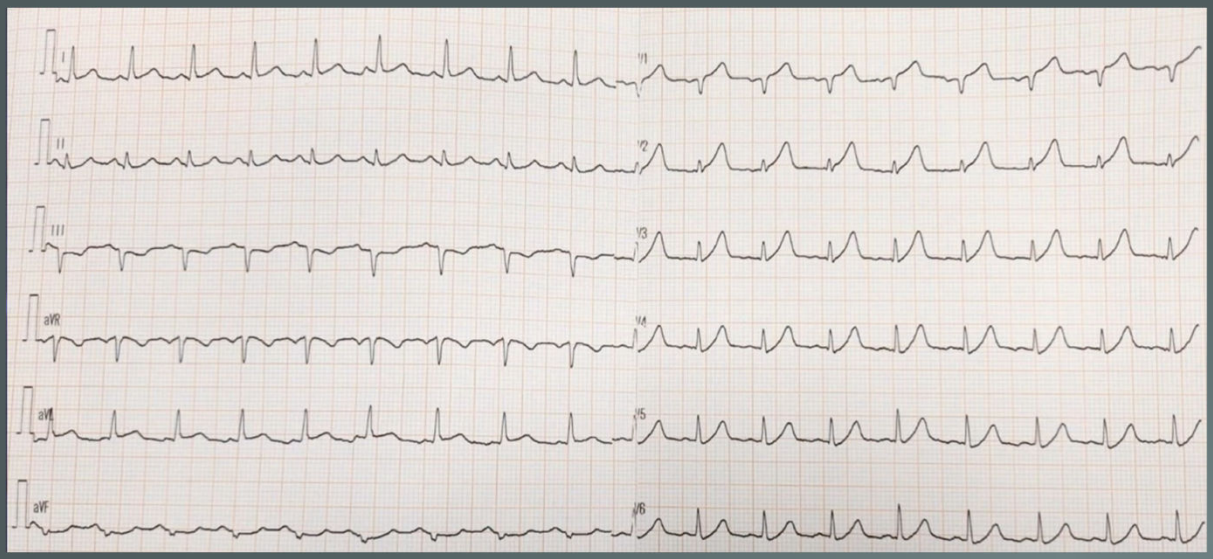

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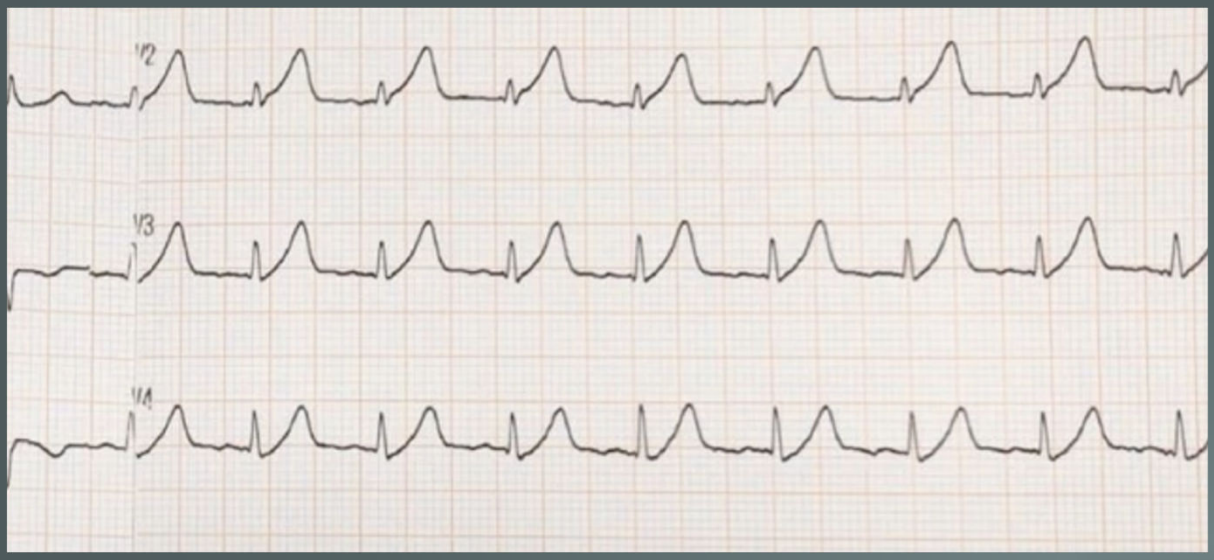

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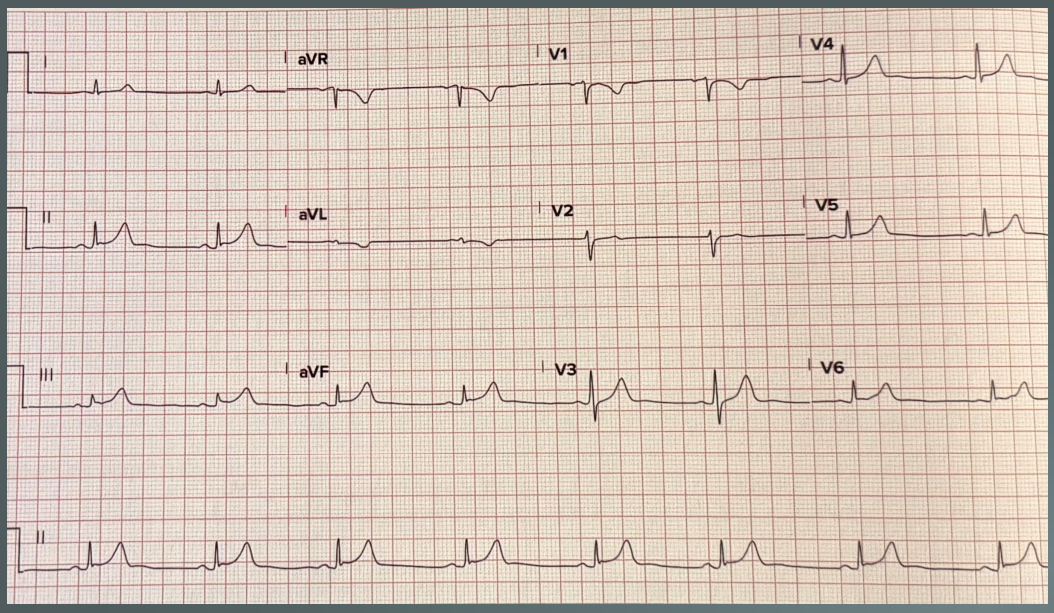

From *Emergency ECGs: Case-Based Review and Interpretations*

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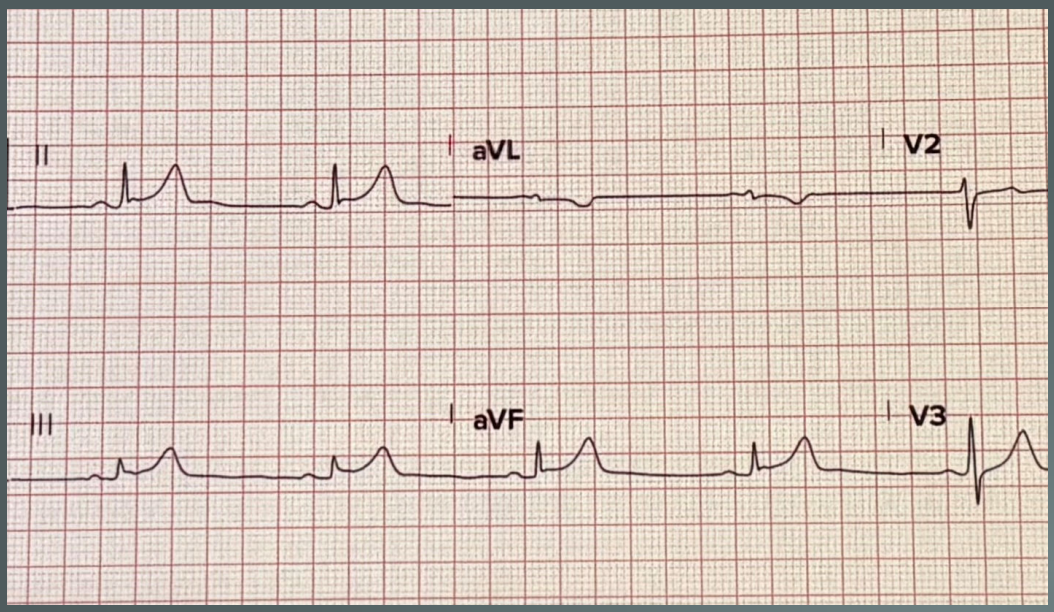

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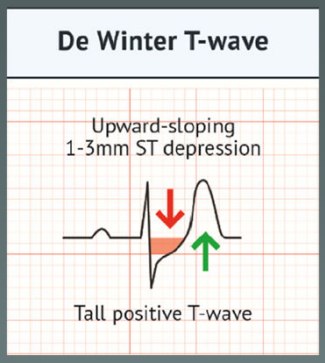
DE WINTERS

- Unstable occlusion proximal LAD
- Upward sloping ST depression in V1-6
- Tall symmetrical T wave
- May be 0.5-1 mm ST elevation in aVR
  - Should be none in precordial leads
- Stable over time



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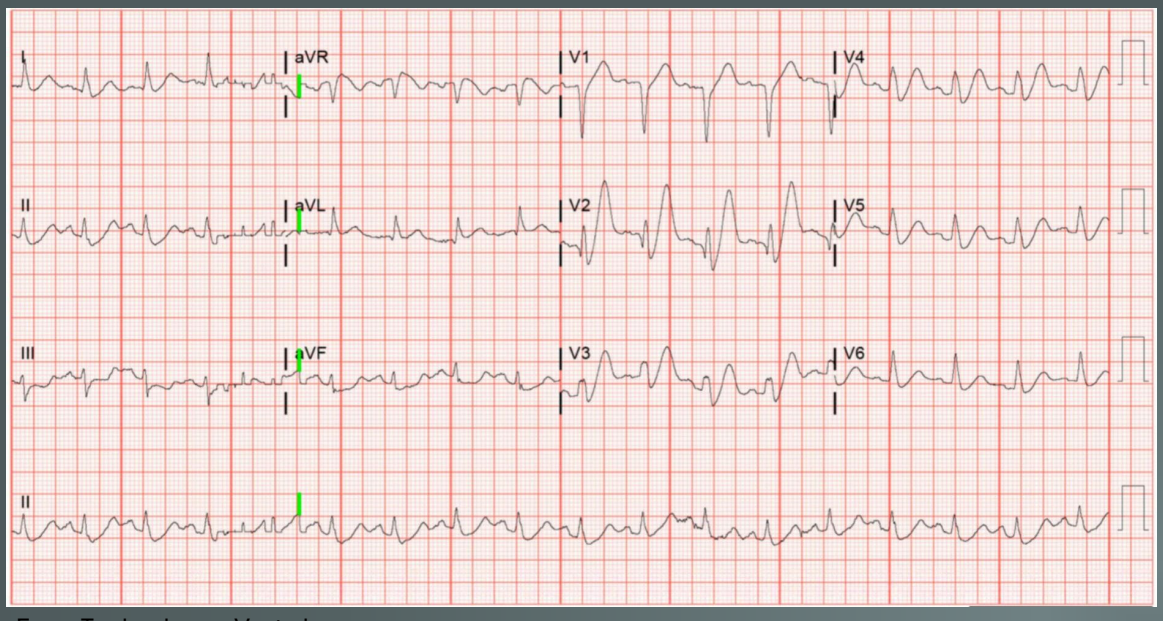

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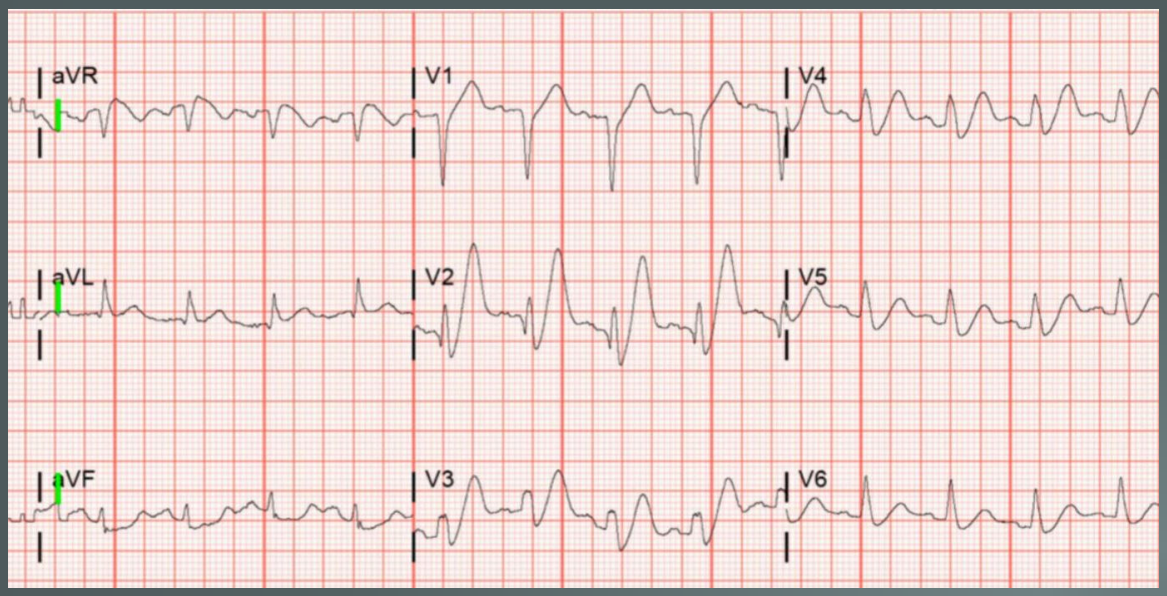

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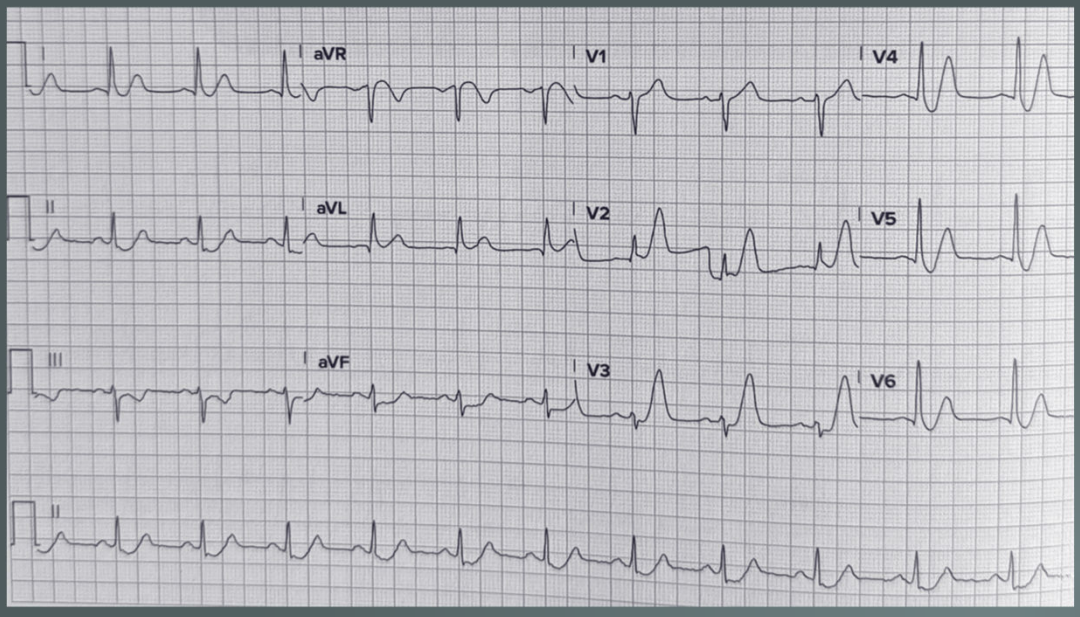

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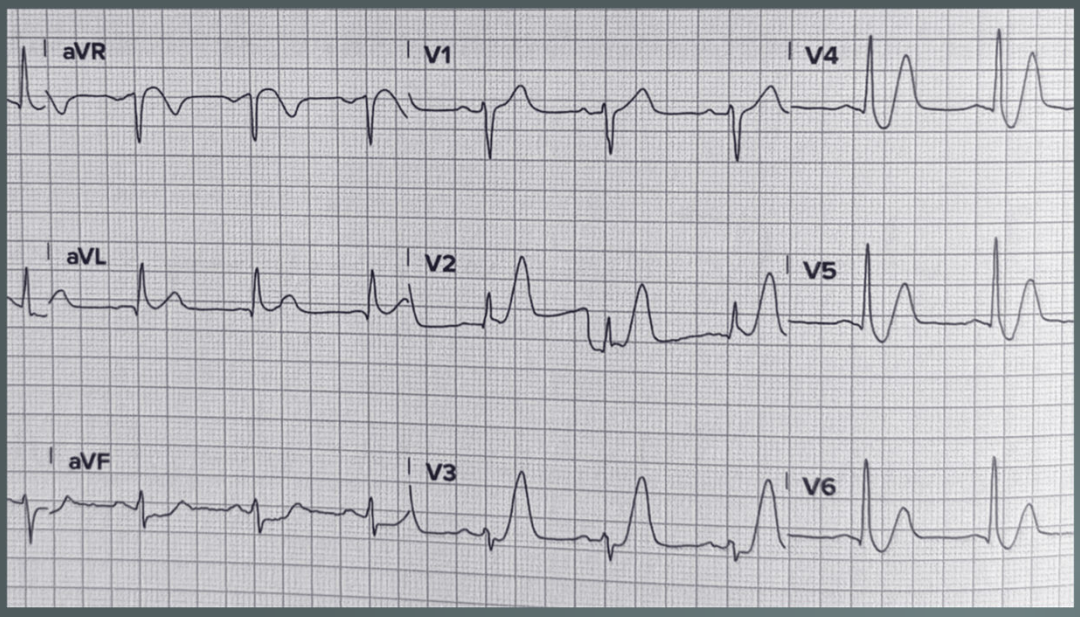

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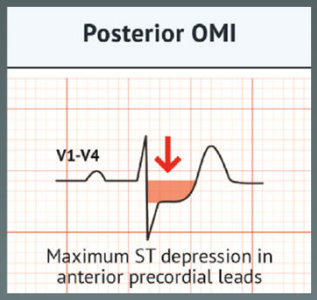
POSTERIOR MI

- ST depression in V1-V4 with upright T waves
- Tall R wave in V2
- ST depression can't be due to abnormal QRS
- Get a posterior ECG (V7-9)



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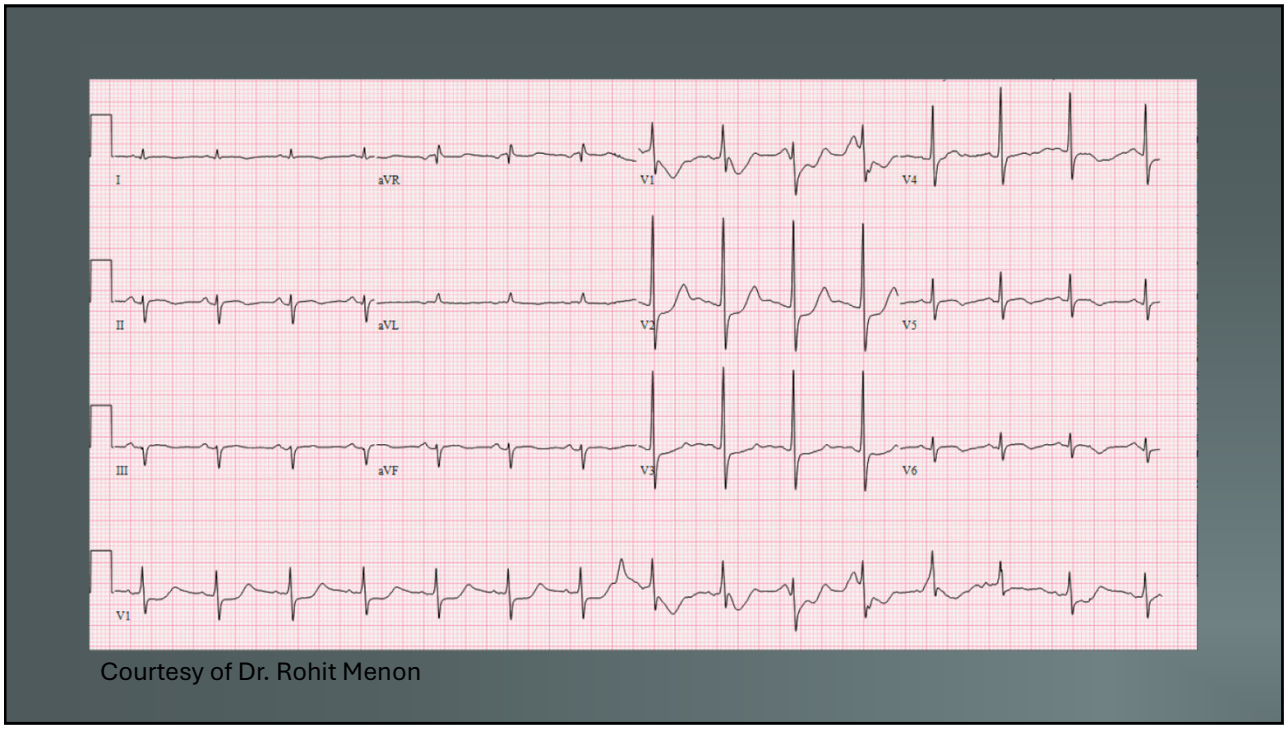

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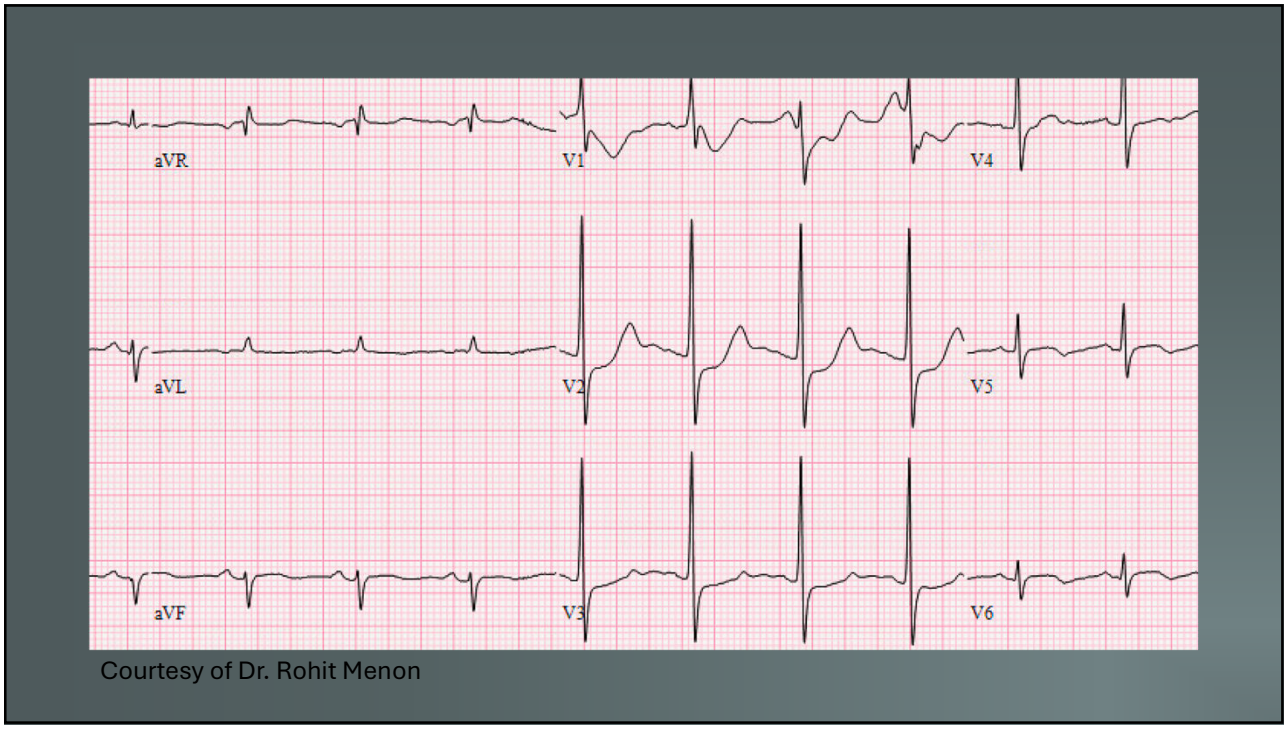

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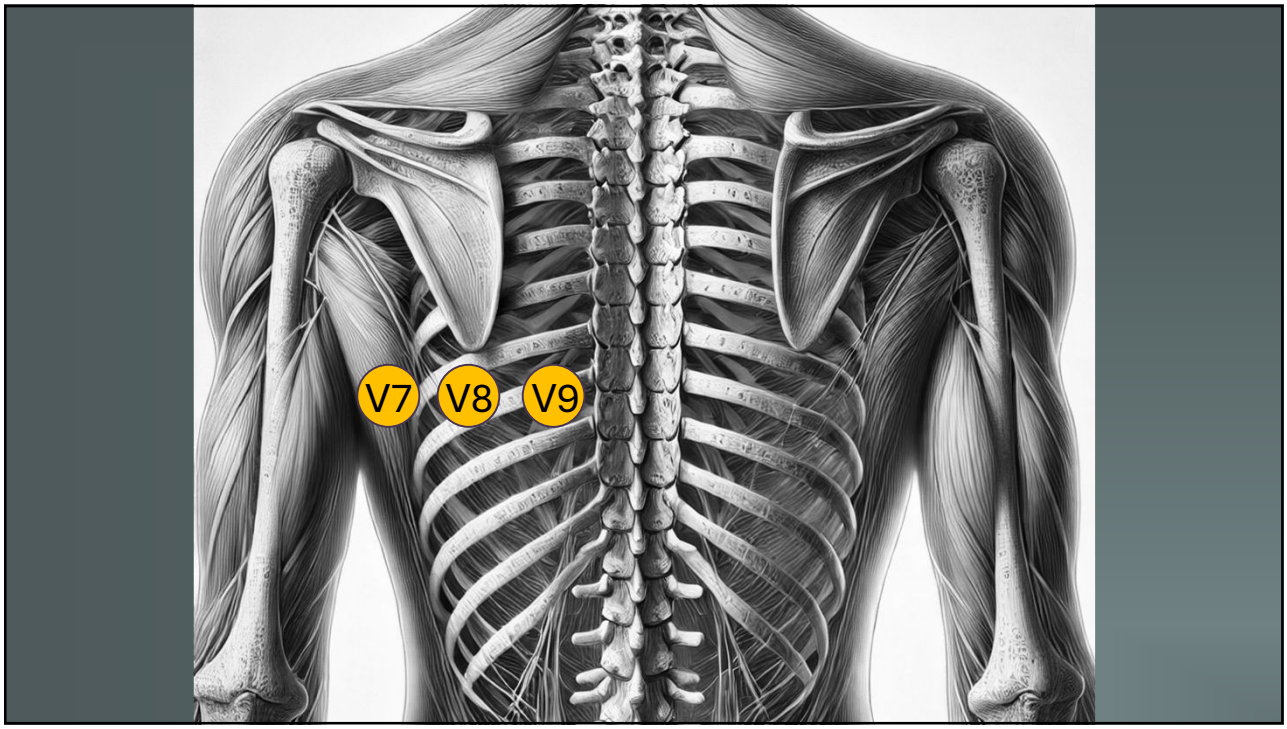
V7
V8
V9

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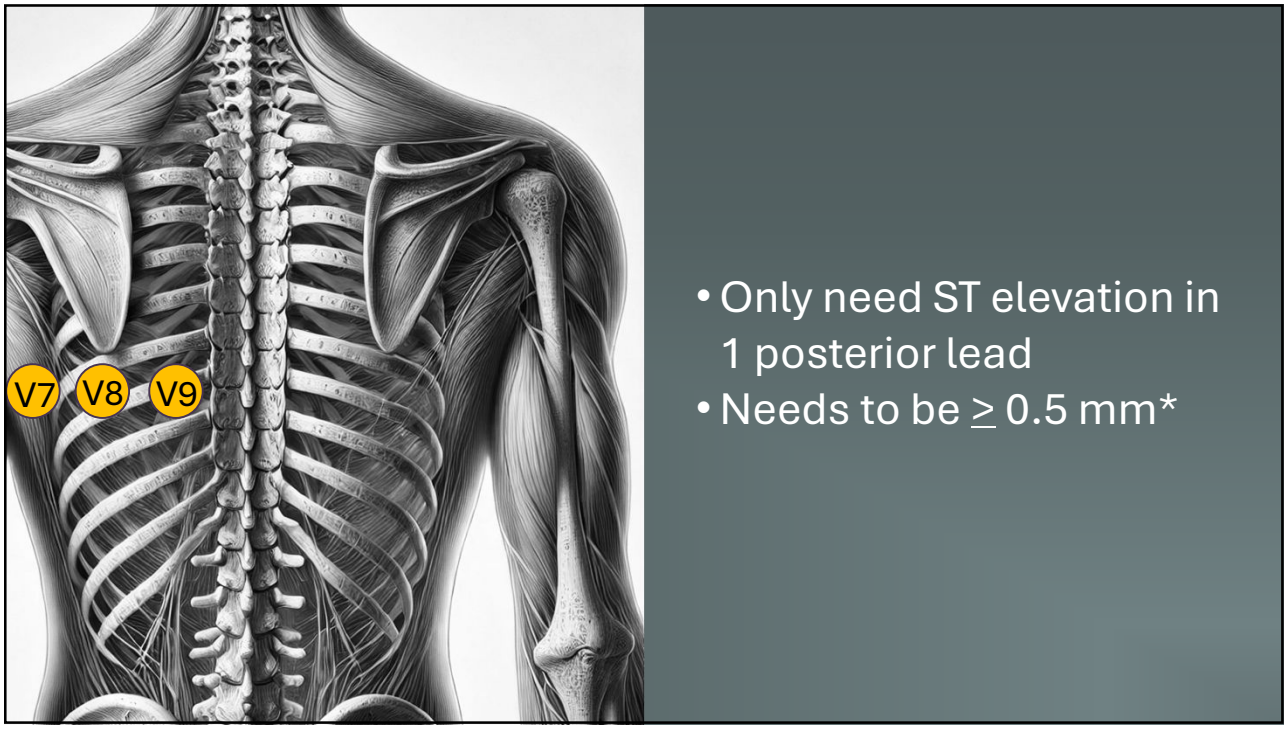
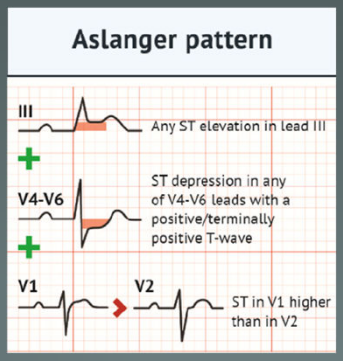

V7
V8
V9
• Only need ST elevation in 1 posterior lead
• Needs to be ≥ 0.5 mm*

40

ASLANGER

- Left circumflex occlusion
- Predictor of large infarct size and higher mortality
- Isolated ST elevation in lead III
  - No elevation in II, aVF
- ST segment in V1 > V2
- ST depression in any of V4-6



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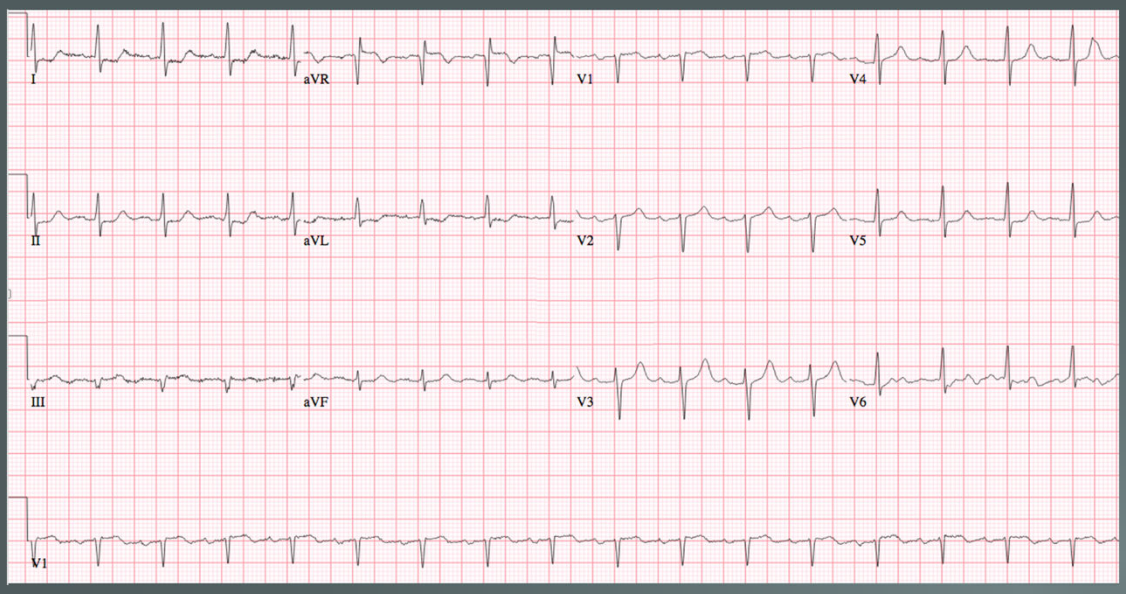

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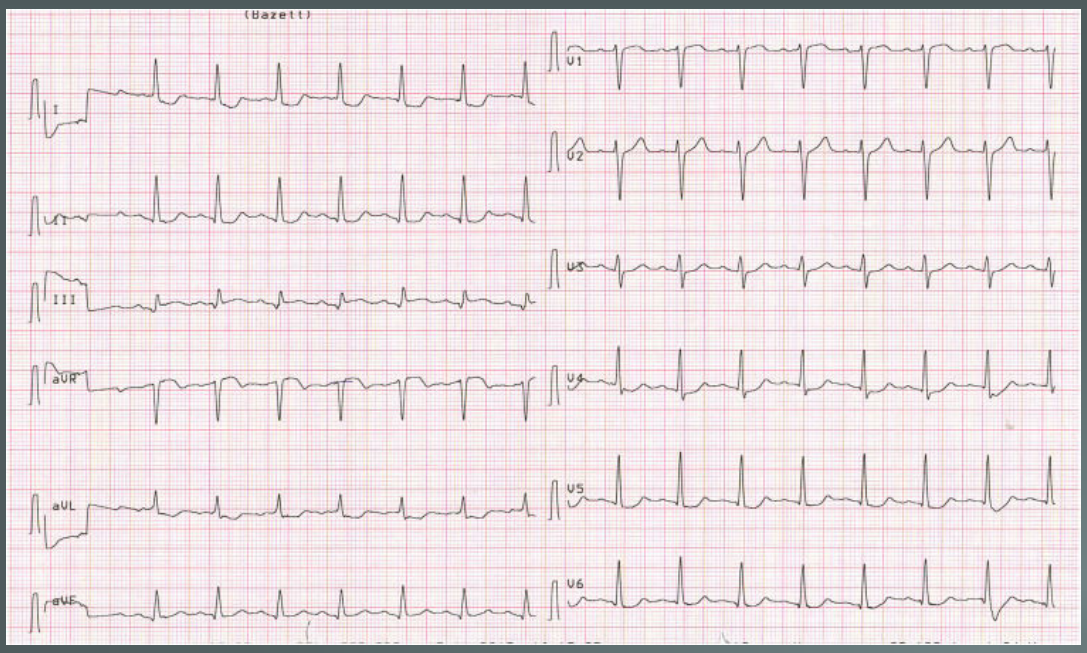
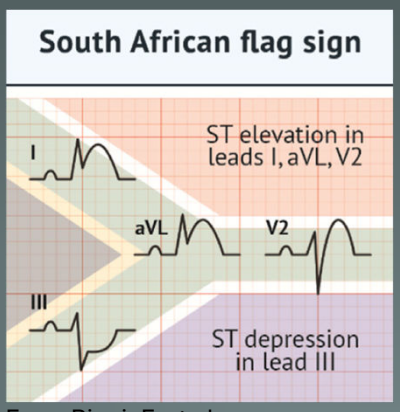


From Aslanger, E. et al

43

SOUTH AFRICAN FLAG SIGN

- Occlusion of first diagonal branch of LAD
- ST elevation in I, aVL, and V2
  - Can be subtle
- Reciprocal ST depression in III



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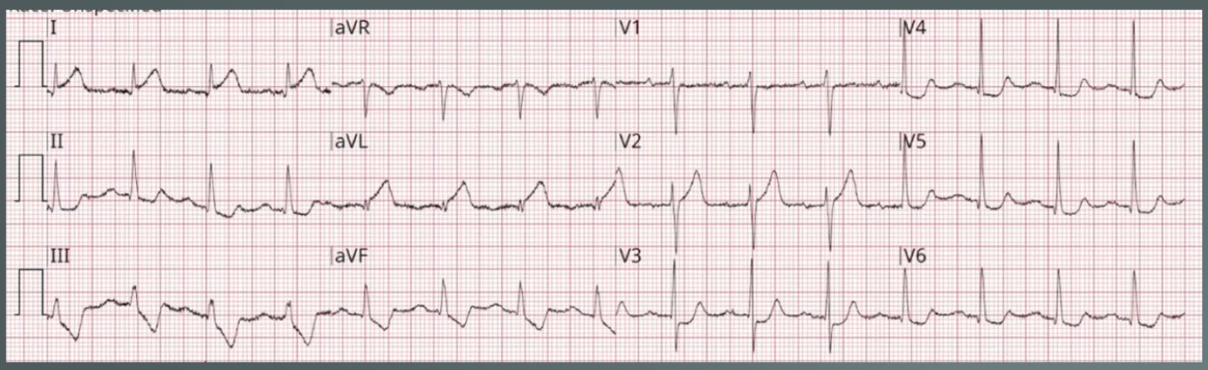

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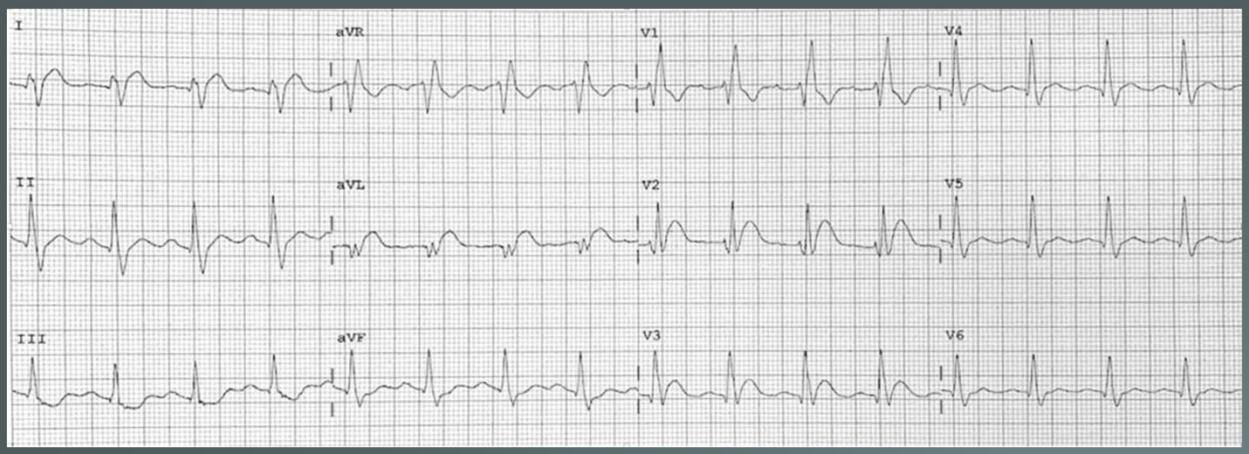
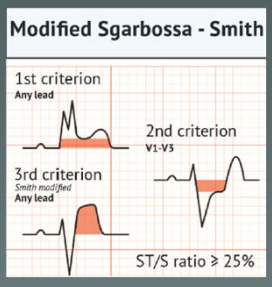


From Life in the Fast Lane

47

SGARBOSSA

- **Criteria A**
  - Concordant ST elevation ≥ 1 mm in any lead
- **Criteria B**
  - Concordant ST depression ≥1 mm in V1, V2 or V3
- **Criteria C**
  - Discordant ST elevation ≥ 5mm



From Ricci, F. et al.

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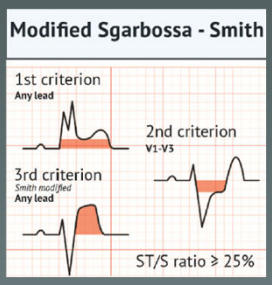
SMITH-MODIFIED SGARBOSSA

- **Criteria A**
  - Concordant ST elevation ≥ 1 mm in any lead
- **Criteria B**
  - Concordant ST depression ≥1 mm in V1, V2 or V3
- **Criteria C**
  - Discordant ST elevation with ST/S ratio ≥ 25%



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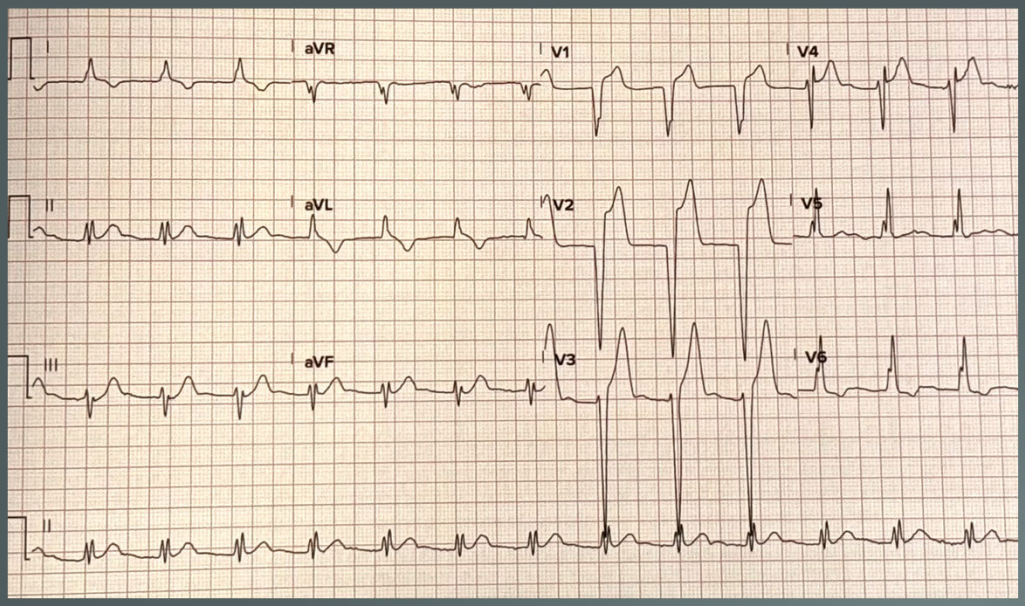

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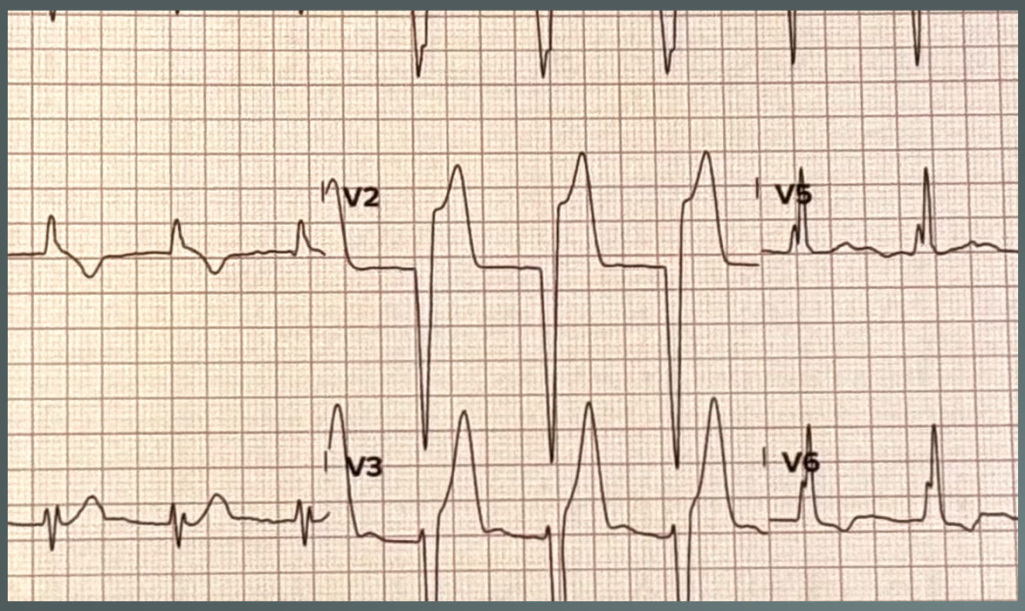

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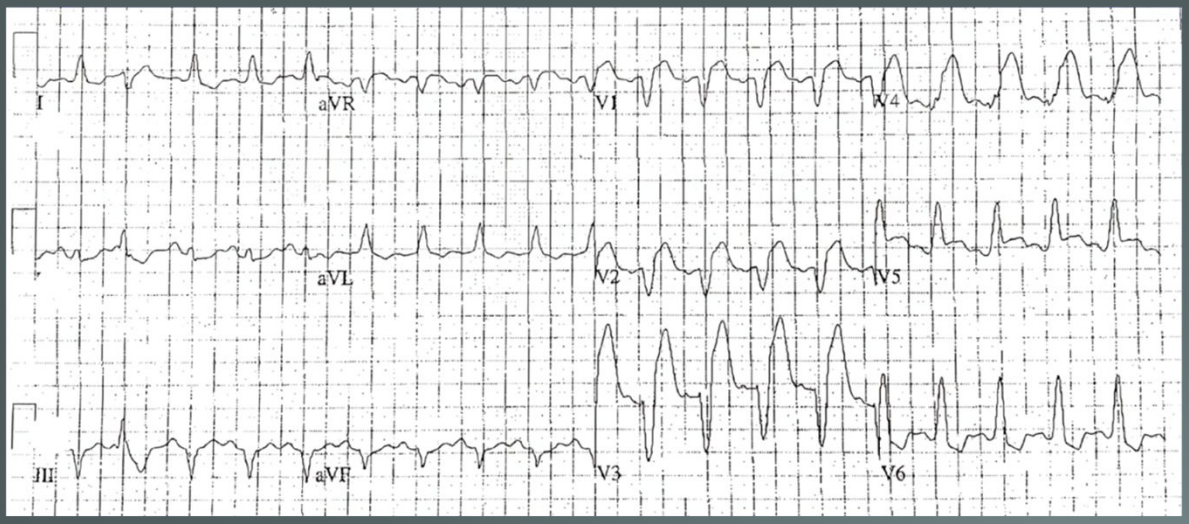

From ECGWeekly

52

From ECGWeekly

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TAKE HOME POINTS

- Beware of atypical presentations
- Look out for your STEMI equivalents
- Don’t be afraid to get or repeat ECG
- Get a thorough history, assess risk factors, and document

54