STEMI for EMS

Jeff Stieglitz, MD FACEP

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WHO MAY HAVE STEMI?

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Classic signs and symptoms

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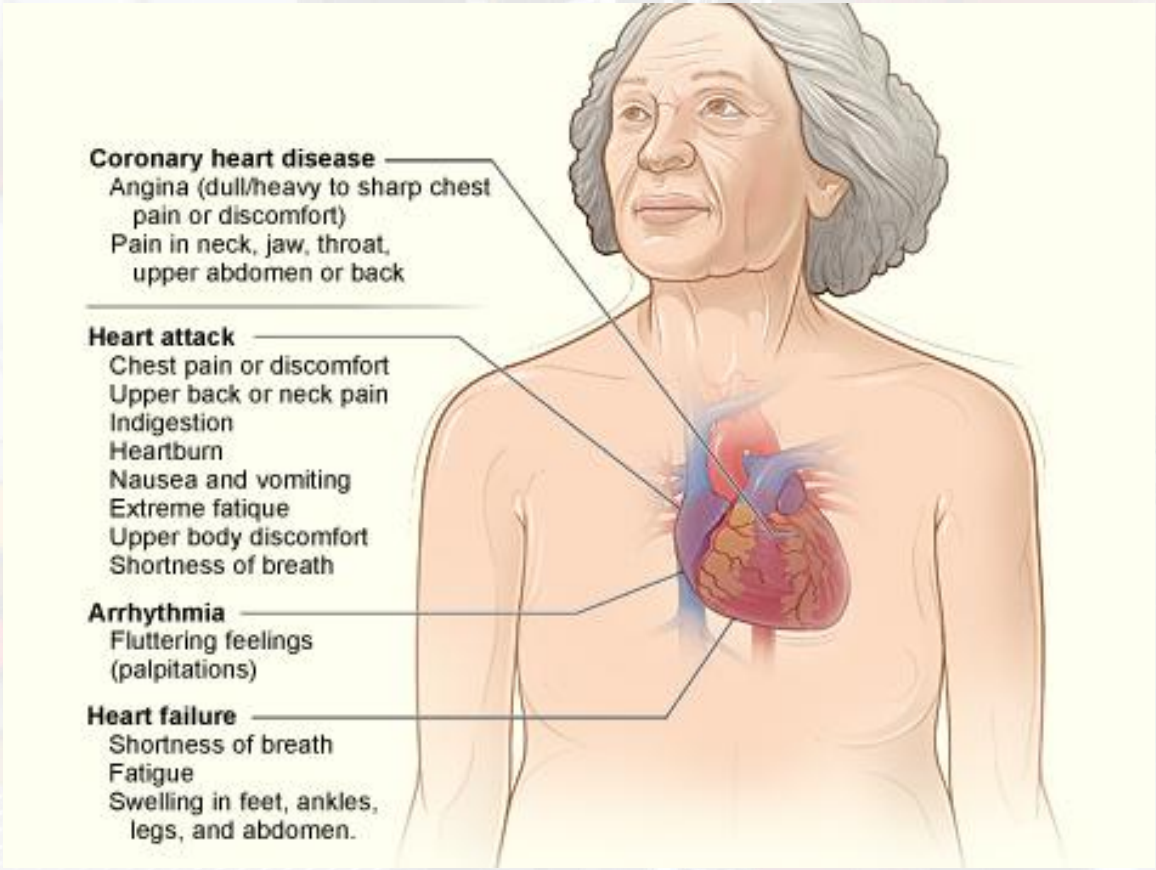

Symptoms

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Did you know?

Women and heart attacks

Although men and women typically experience pain, pressure or discomfort in the chest during heart attacks, women are more likely to have them without feeling chest pain.

TYPICAL SYMPTOMS

- Chest discomfort or pain
- Upper-body pain
- Stomach pain
- Shortness of breath
- Sweating, anxiety
- Lightheadedness
- Nausea, vomiting

SYMPTOMS COMMON IN WOMEN

- Discomfort or pain in neck, jaw, shoulder, upper back or abdomen
- Nausea, vomiting
- Sweating, anxiety
- Abdominal pain or heartburn
- Dizziness, lightheadedness
- Unusual, unexplained fatigue

Sources: Mayo Clinic, U.S. Department of Health and Human Services

THE COLUMBUS DISPATCH

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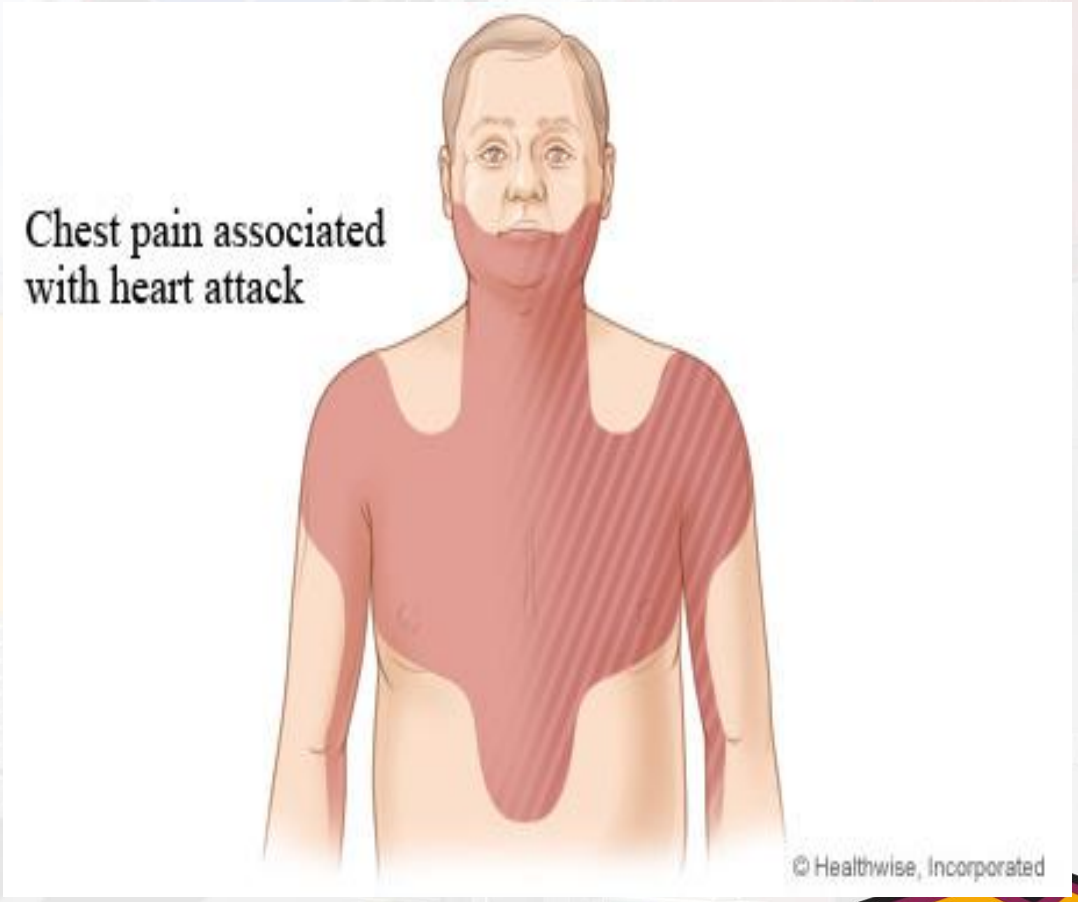
Discomfort Distribution



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What is STEMI

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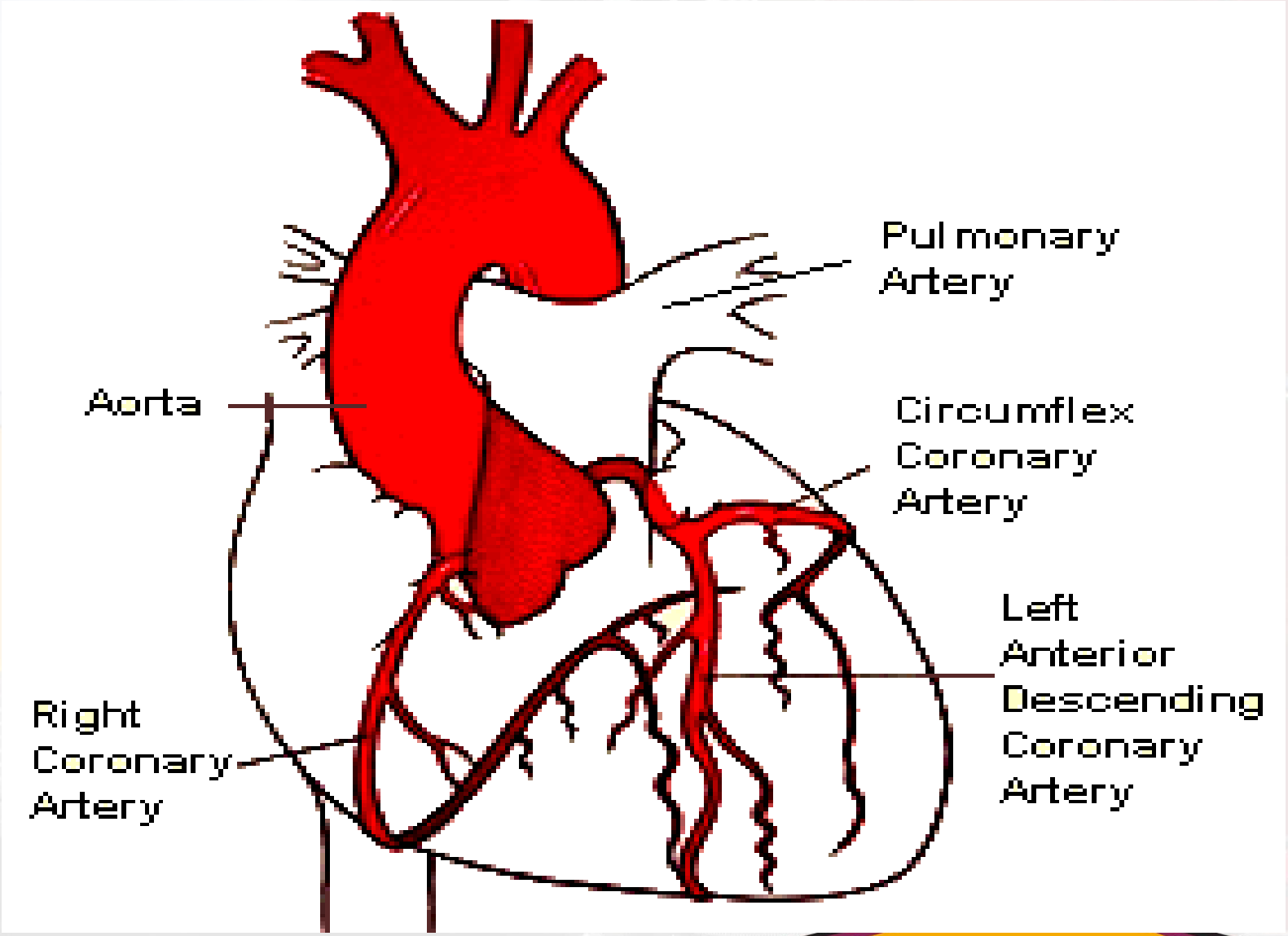

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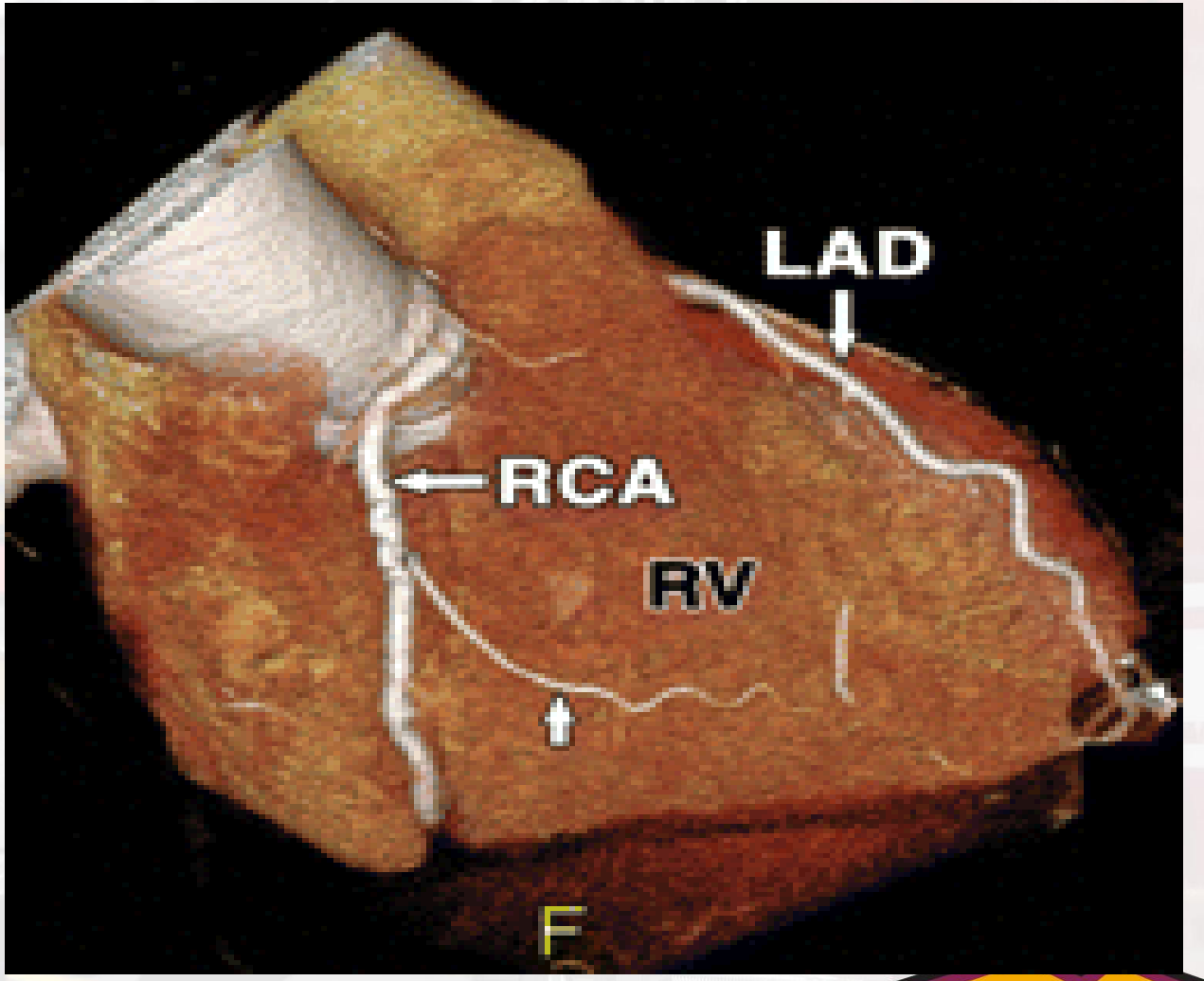

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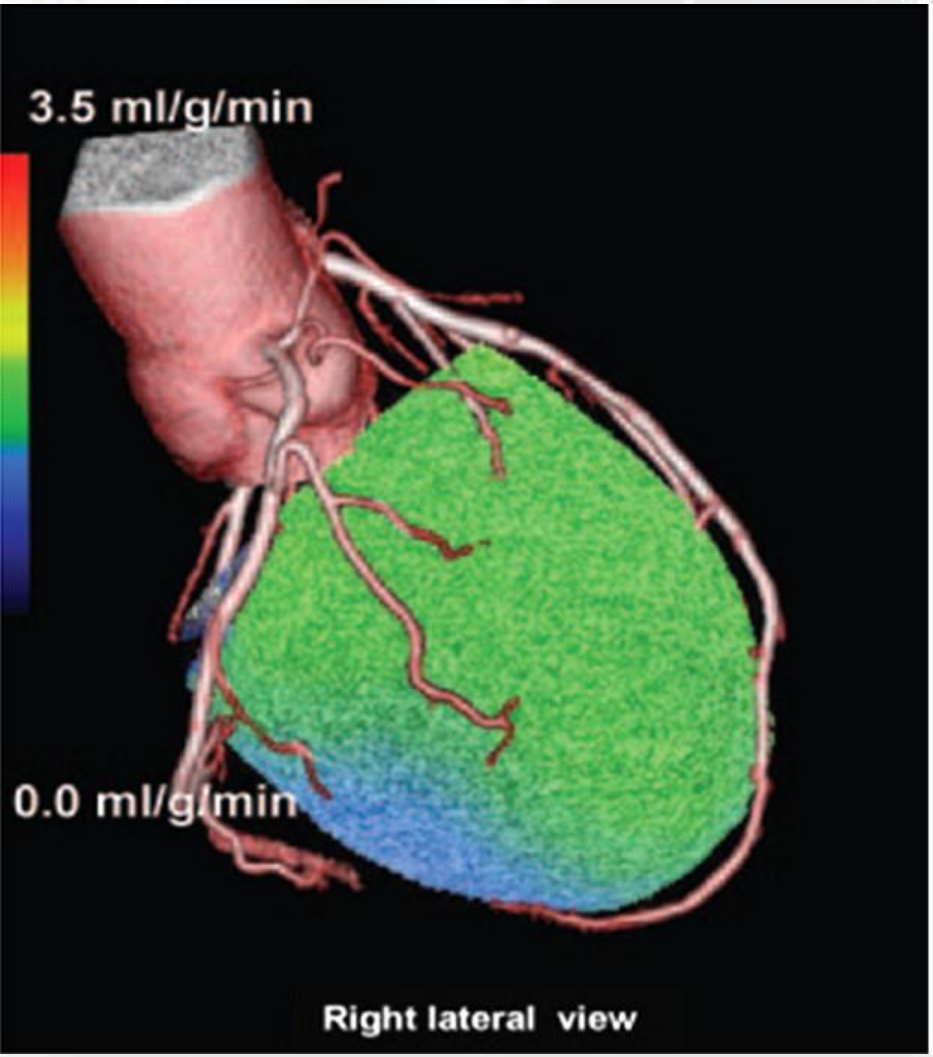

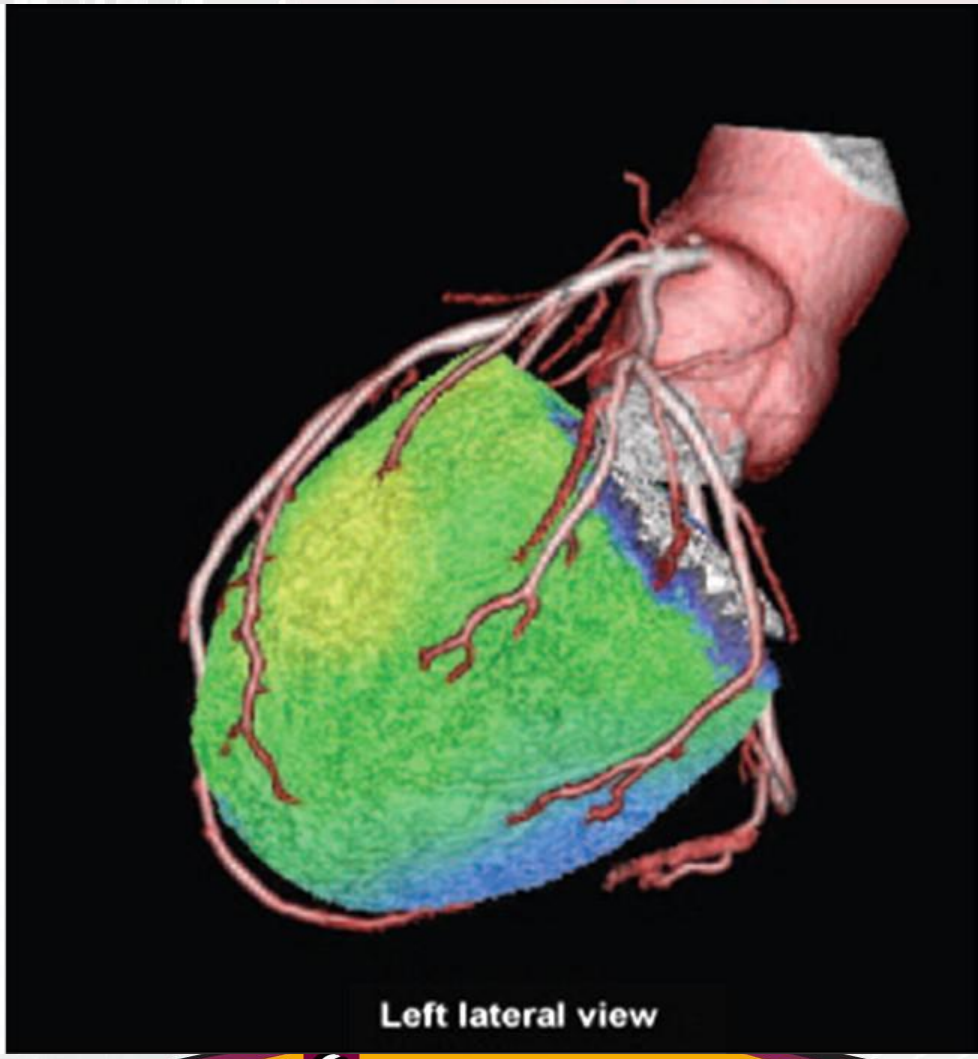

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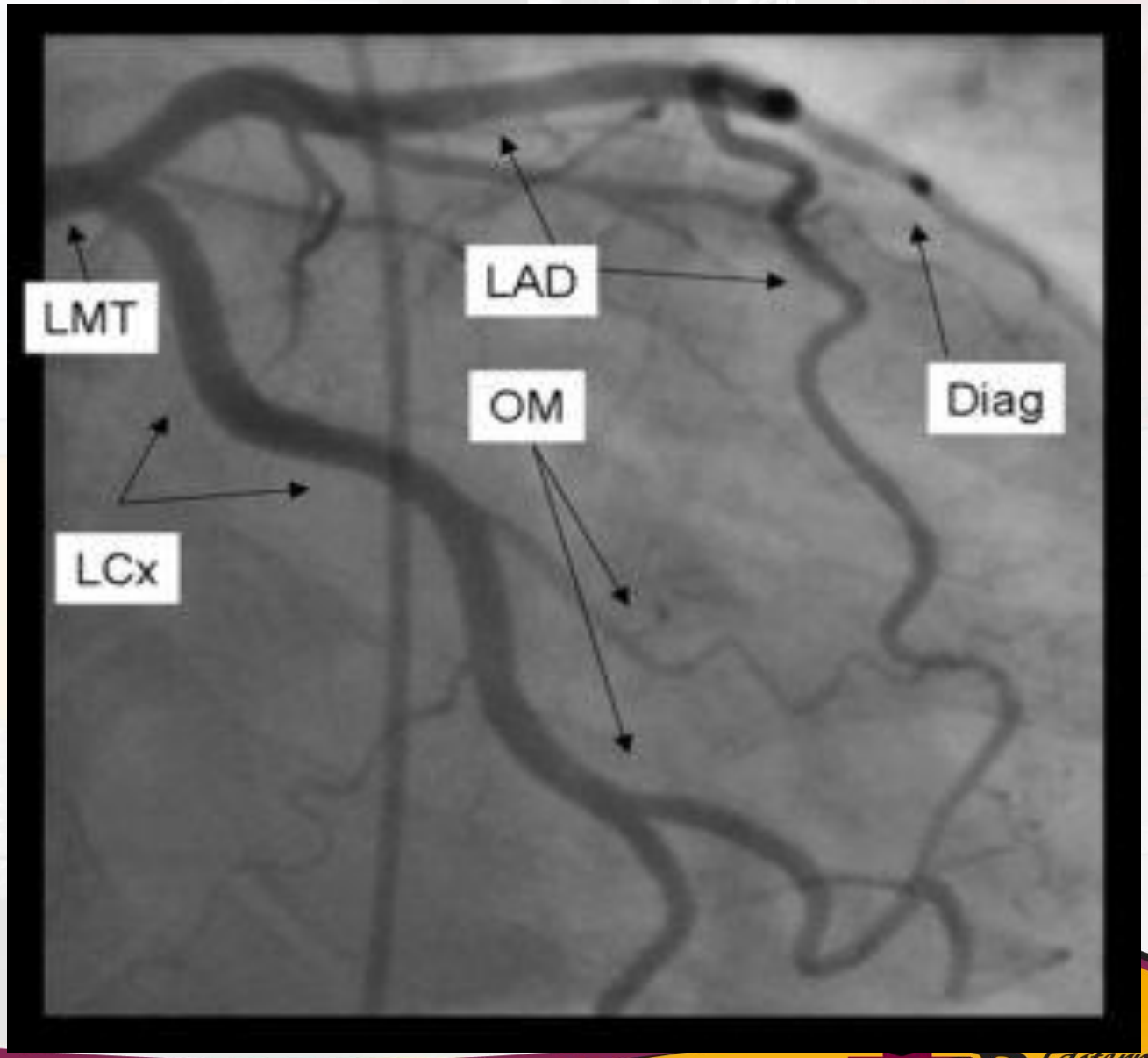

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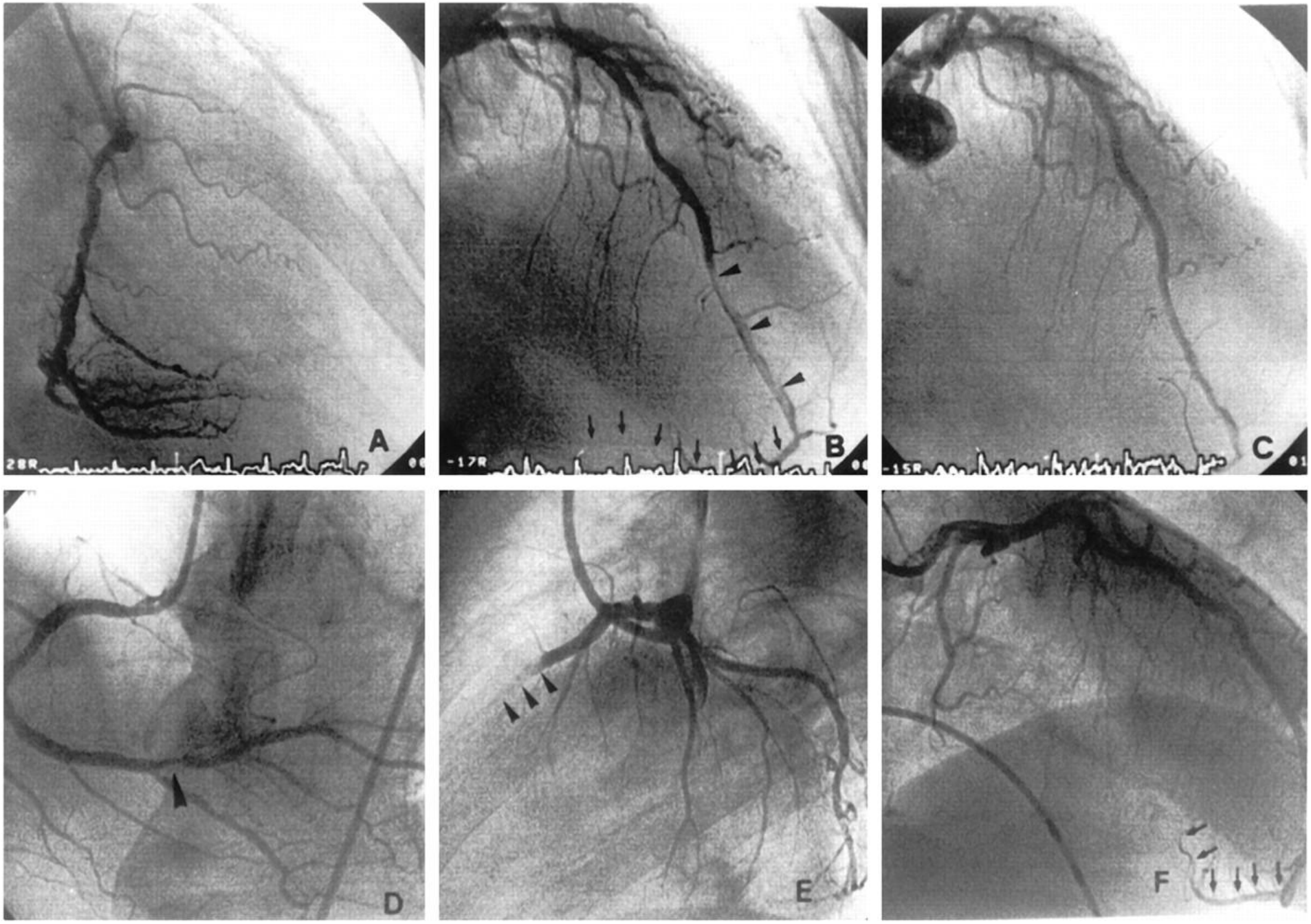
A
B
C
D
E
F

Why is STEMI important?

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Symptom Recognition

Call to Medical System

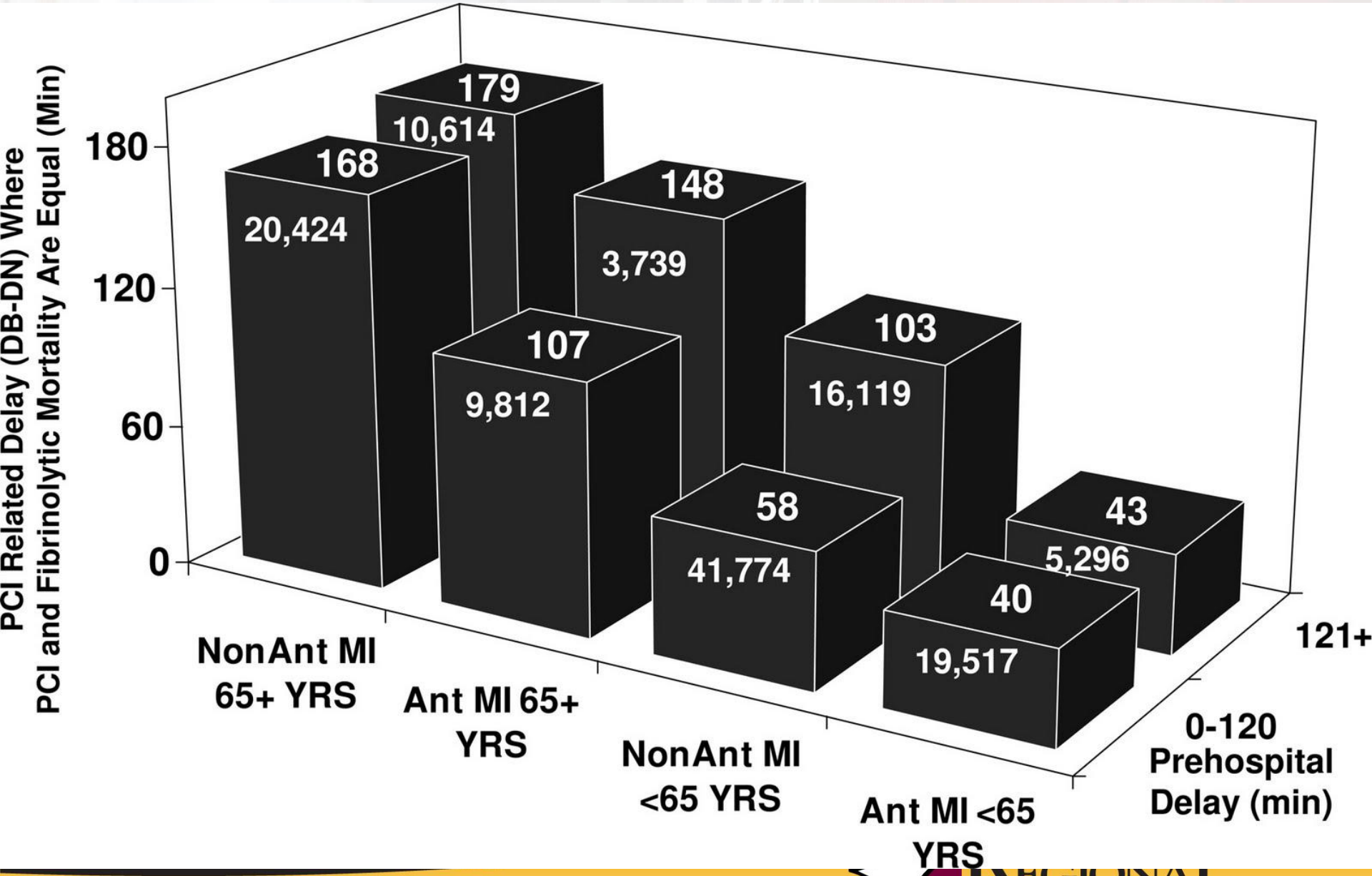
PreHospital

ED

CCU

Cath Lab

Delay in Initiation of Phamacologic Reperfusion


PCI Related Delay (DB-DN) Where
PCI and Fibrinolytic Mortality Are Equal (Min)
180
120
60
0
179
10,614
168
20,424
148
3,739
107
9,812
103
16,119
58
41,774
43
5,296
40
19,517
NonAnt MI
65+ YRS
Ant MI 65+
YRS
NonAnt MI
<65 YRS
Ant MI <65
YRS
0-120
121+
Prehospital
Delay (min)

TIMI RISK SCORE for STEMI

HISTORICAL	POINTS
Age ≥ 75	3
65-74	2
DM or HTN or angina	1
EXAM	
SBP < 100 mmHg	3
HR >100 bpm	2
Killip II-IV	2
Weight < 67 kg (150 lb)	1
PRESENTATION	
Anterior STE or LBBB	1
Time to Rx > 4 hrs	1

RISK SCORE = Total points (0 -14)

RISK SCORE	30-DAY MORTALITY IN TIMI II(%)*
0	0.8
1	1.6
2	2.2
3	4.4
4	7.3
5	12
6	16
7	23
8	27
>8	36

*Entry criteria: CP > 30 min, ST ↑, sx onset < 6hrs, fibrinolytic-eligible

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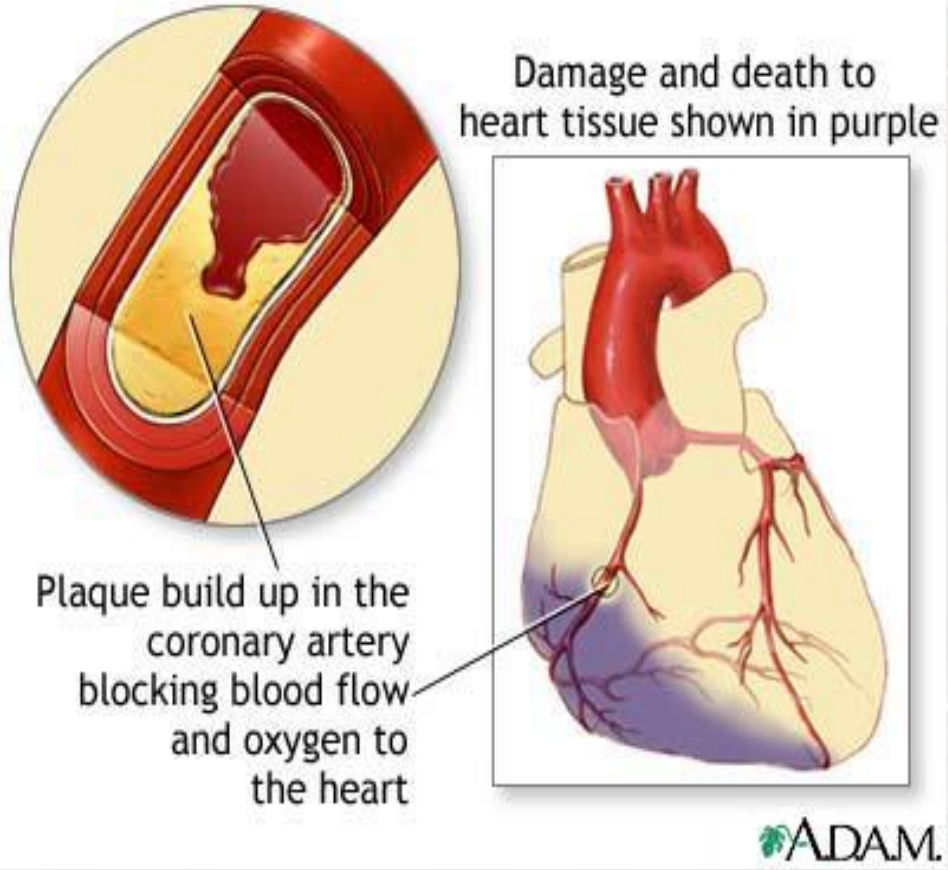
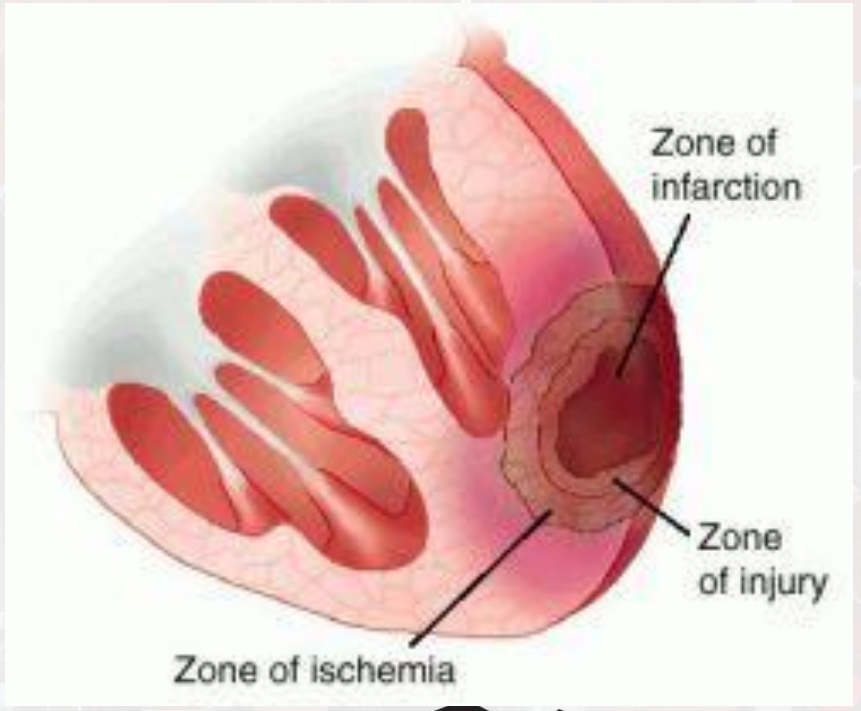
Acute MI





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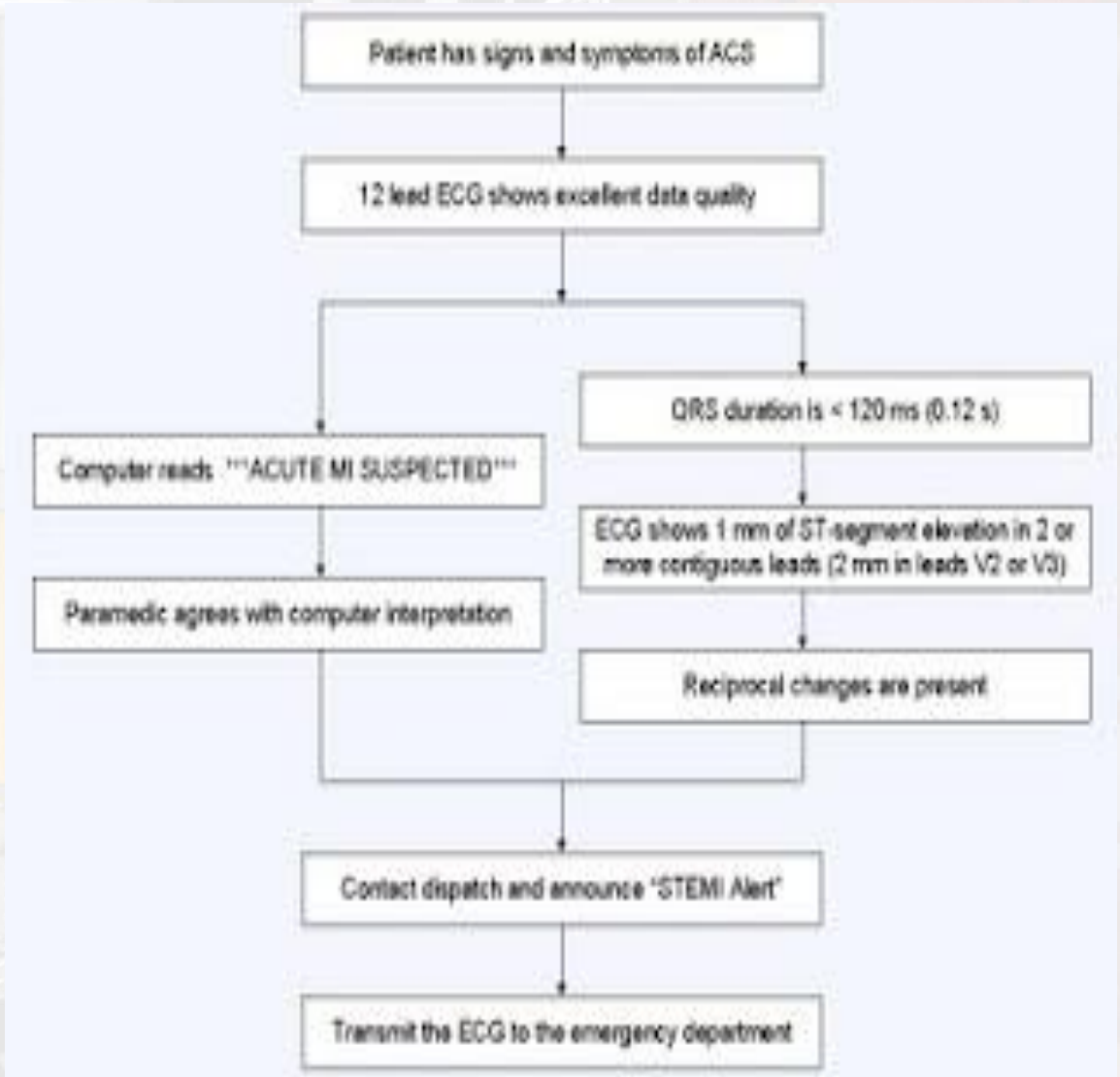

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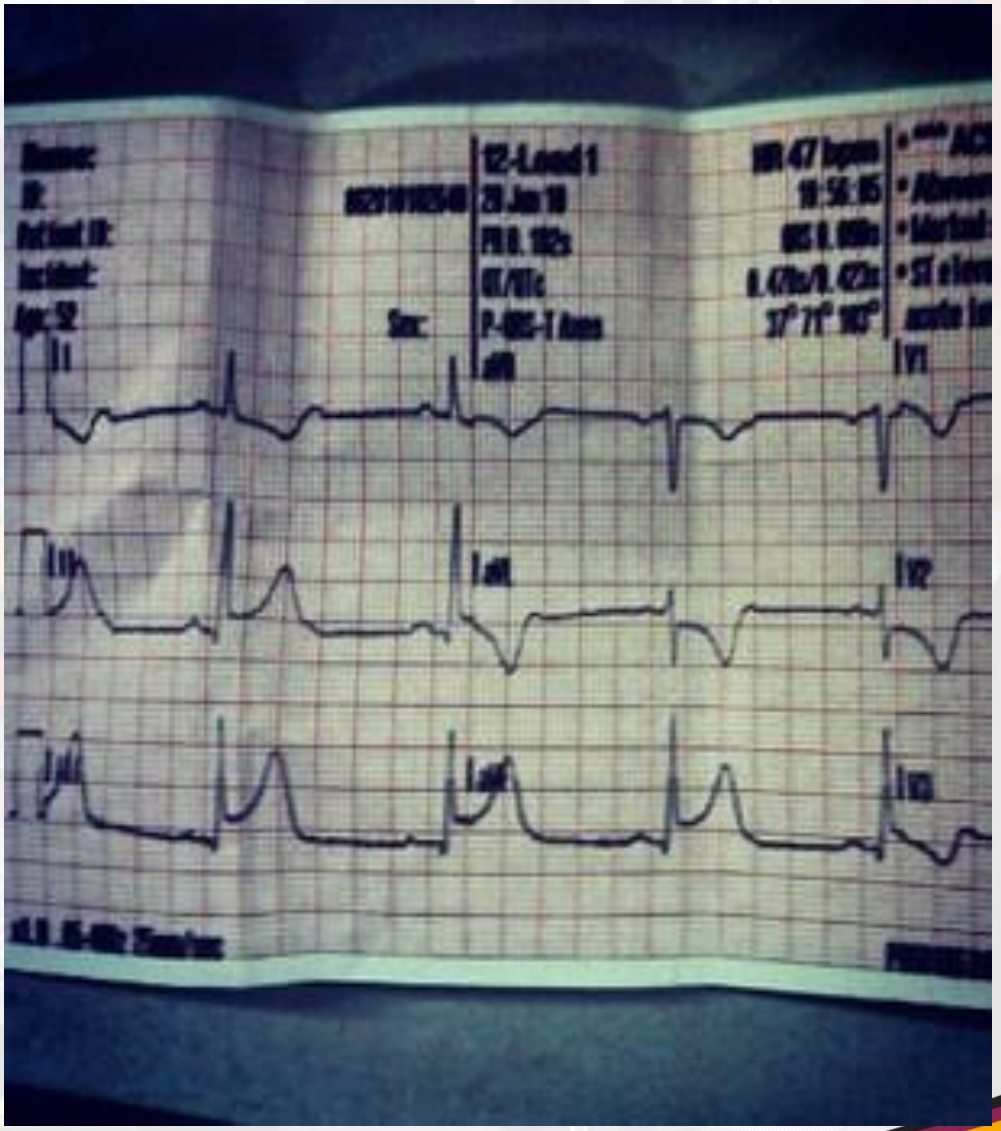

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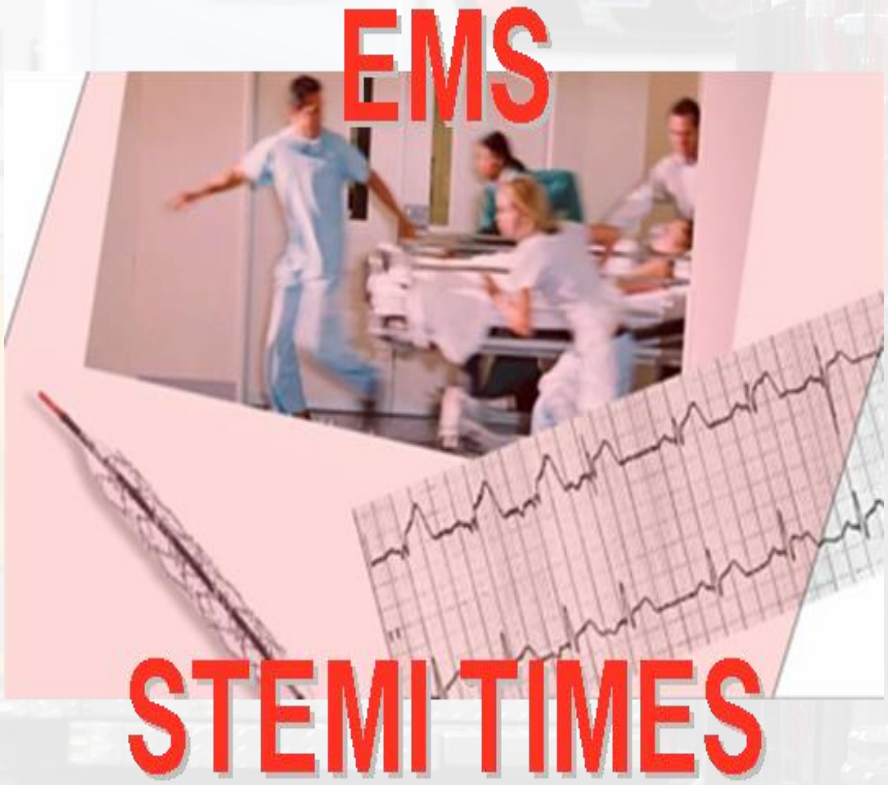

- Coming Soon to a Jurisdiction near you

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Call 9-1-1
Call fast

Onset of symptoms of STEMI → 9-1-1 EMS dispatch → **EMS on scene**
- Encourage 12-lead ECGs.
- Consider prehospital fibrinolytic if capable and EMS-to-needle within 30 min.

EMS triage plan
- Not PCI capable → Hospital fibrinolysis: Door-to-needle within 30 min.
- Not PCI capable → Inter-hospital transfer → PCI capable
- PCI capable

GOALS

5 min.		8 min.	EMS transport
Patient		EMS	

Dispatch 1 min.

Prehospital fibrinolysis
EMS-to-needle within 30 min.

EMS transport
EMS-to-balloon within 90 min.
Patient self-transport
Hospital door-to-balloon within 90 min.

Golden hour = first 60 min.

Total ischemic time: within 120 min.

Source: Longo DL, Fauci AS, Kasper DL, Hauser SL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine, 18th Edition*: www.accessmedicine.com

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ECG Review

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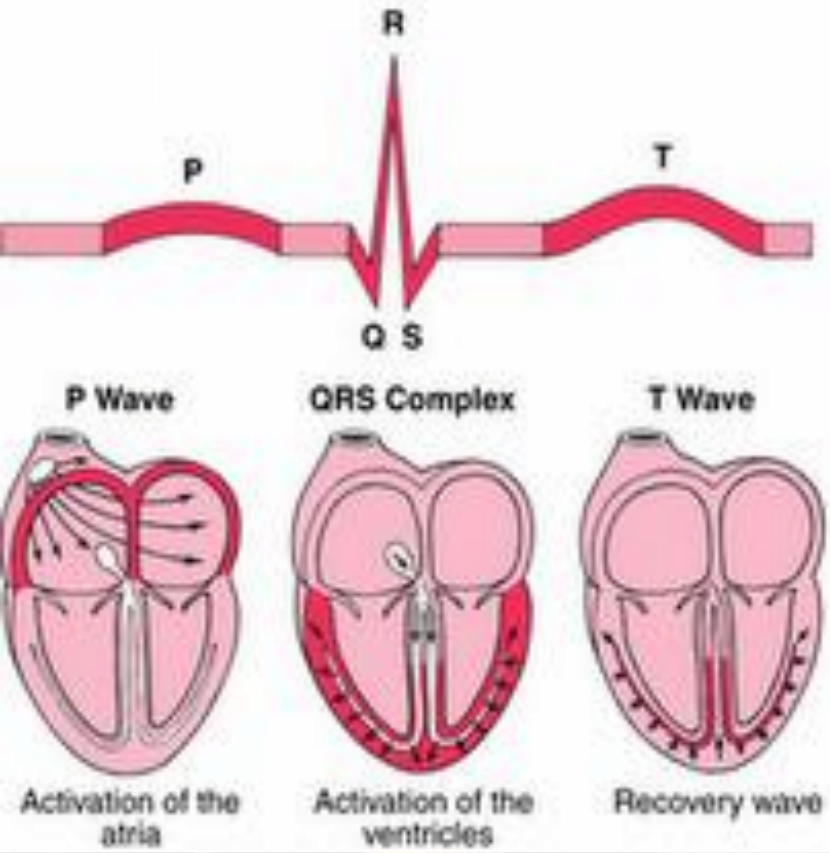
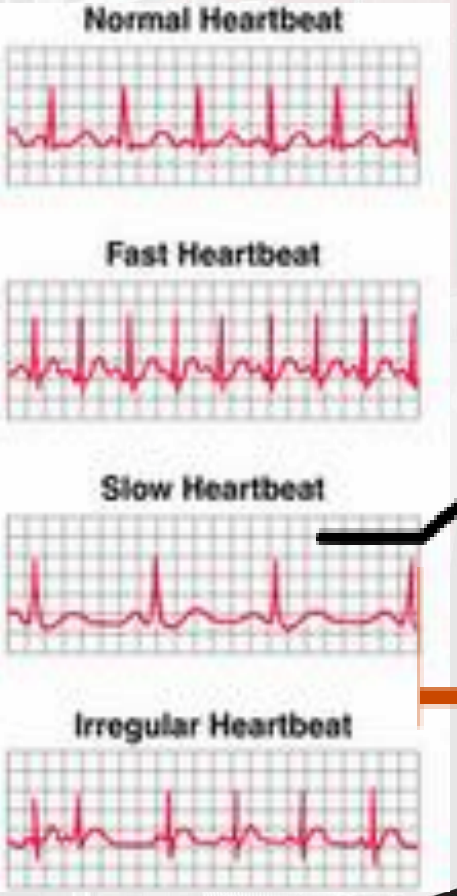
QRS





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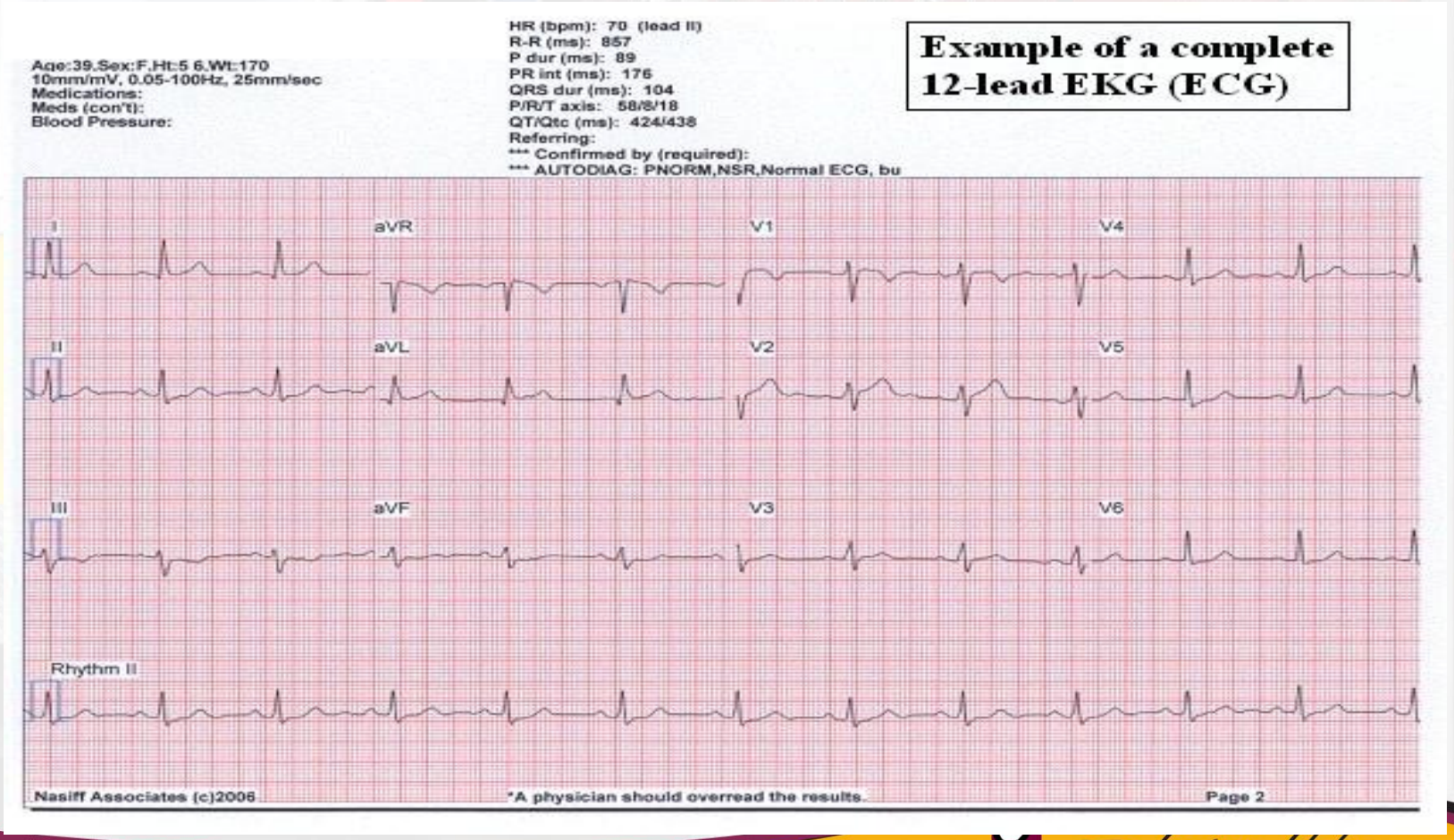
Normal EKG



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Our Challenge Today

Learn
Rapid STEMI ID
The AHA STEMI Recognition Course

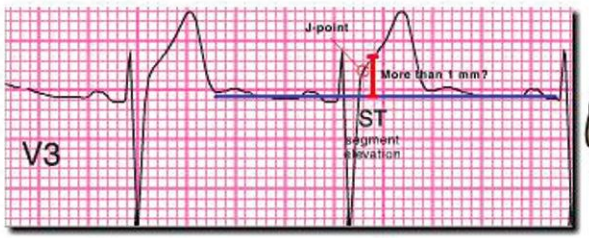
American Heart Association
Learn and Live

CHAPTER 5.1
Putting It All Together...

Introduction | Question 1: Wide QRS complex? | Question 2: ST-segment Elevation? | Question 3: Regional ST-segment Elevation? | Question 4: Call A Heart Alert?

2. Can you detect ST-segment elevation?

- T waves very early become tall and peaked
- The TP-segment is the preferred reference point for determination of ST-segment elevation
- If the ST-segment is elevated more than 1 mm, it may be consistent with STEMI



normal, ST-segment elevation is measured at a certain distance from the J point. For ACS, pattern interpretation measurement is made 0.04 second (or one small box) after the J point.

When deciding the answer to this question, remember to look for signs of early repolarization and distinguish it from ST elevation due to an injury current.

If you can answer No to question 2, your ECG interpretation ends and the patient should be transferred to the most appropriate hospital.

If the answer is Yes, then continue to the next question.

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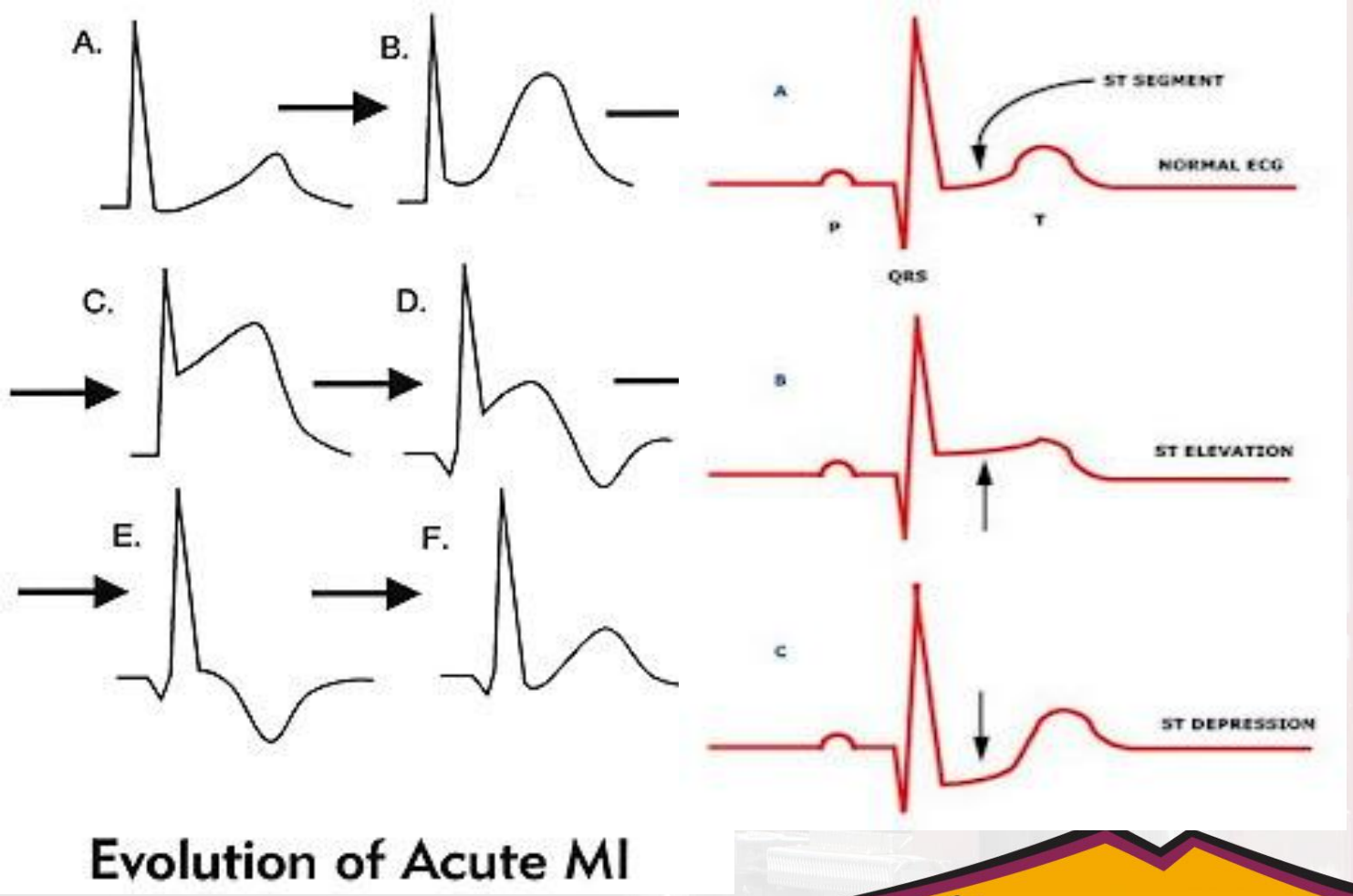
ST Changes in STEMI



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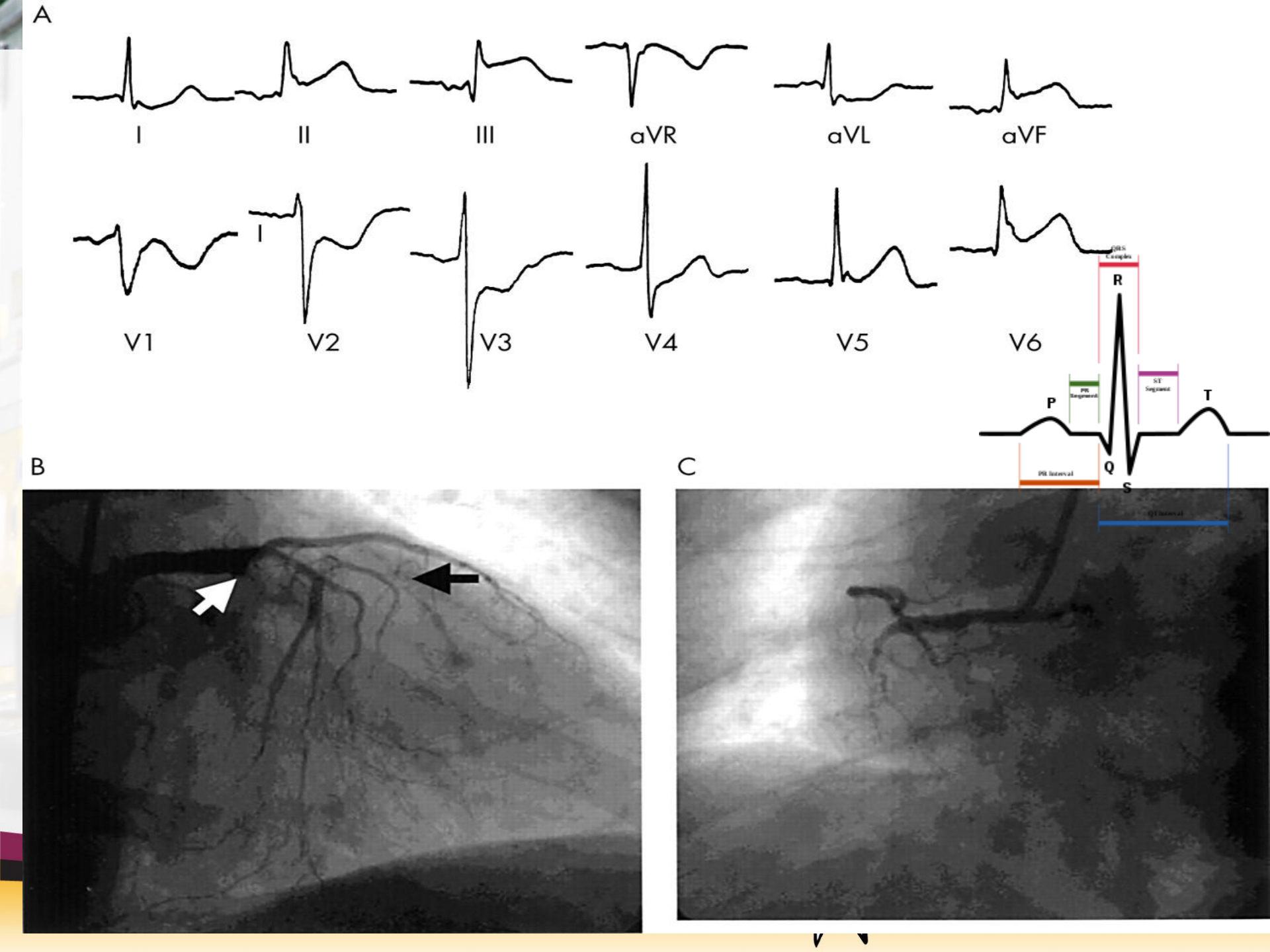
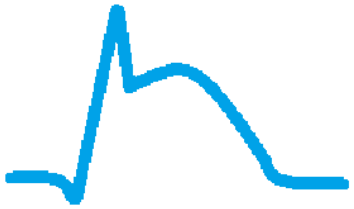

A
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
R
P
T
Q
S
B
C

STEMI Progression

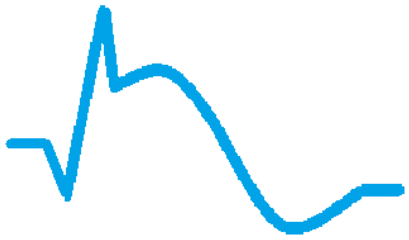
Normal

Hours



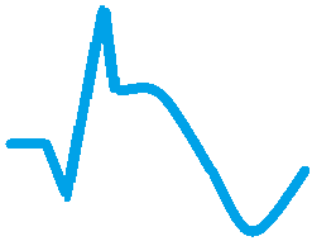
- ST elevation

Days



- ST elevation
- Pathological Q waves
- Inverted T waves

Weeks



- ST flattening off
- Pathologyical Q waves

Months

- Pathological Q waves

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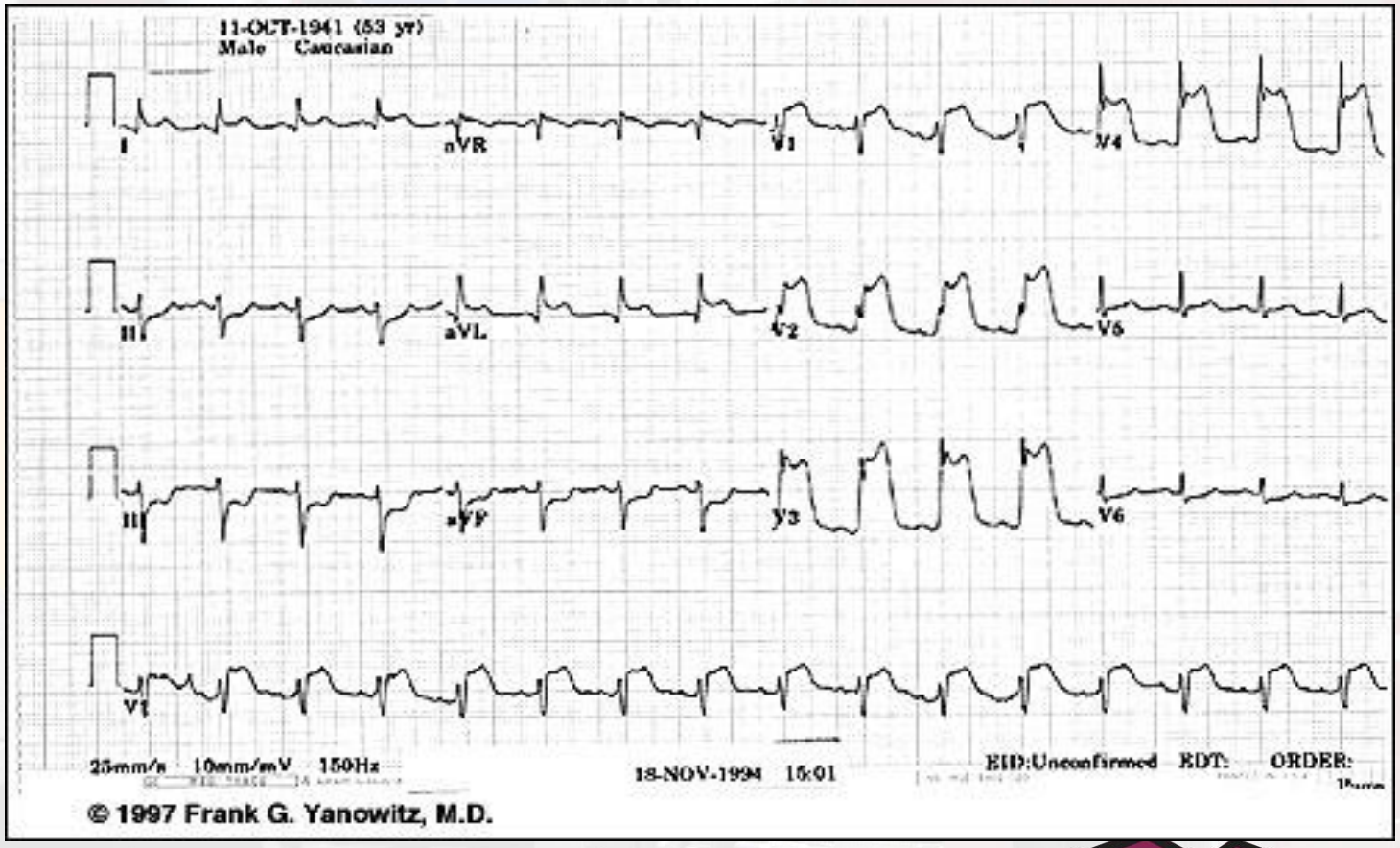
STEMI



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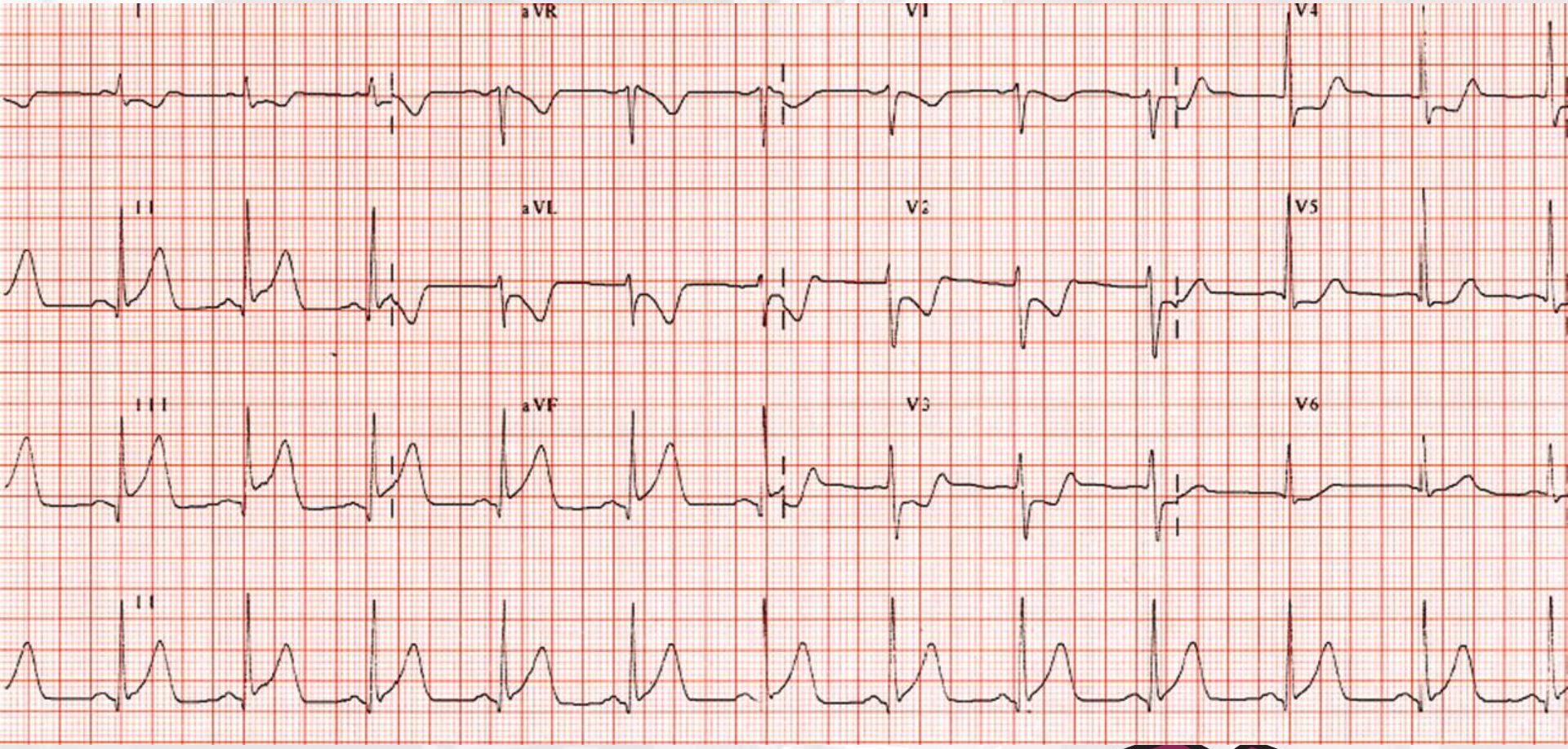
STEMI



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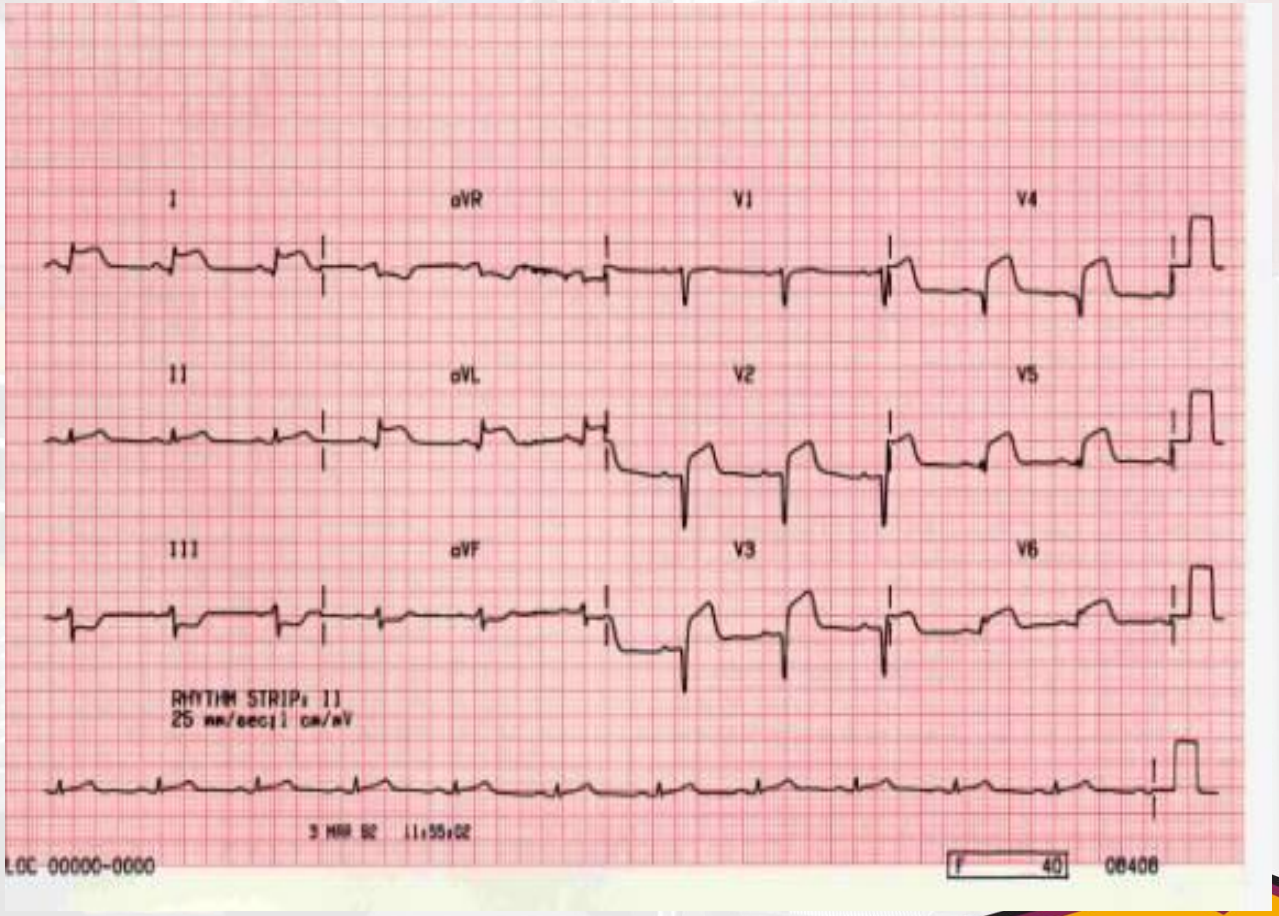
STEMI



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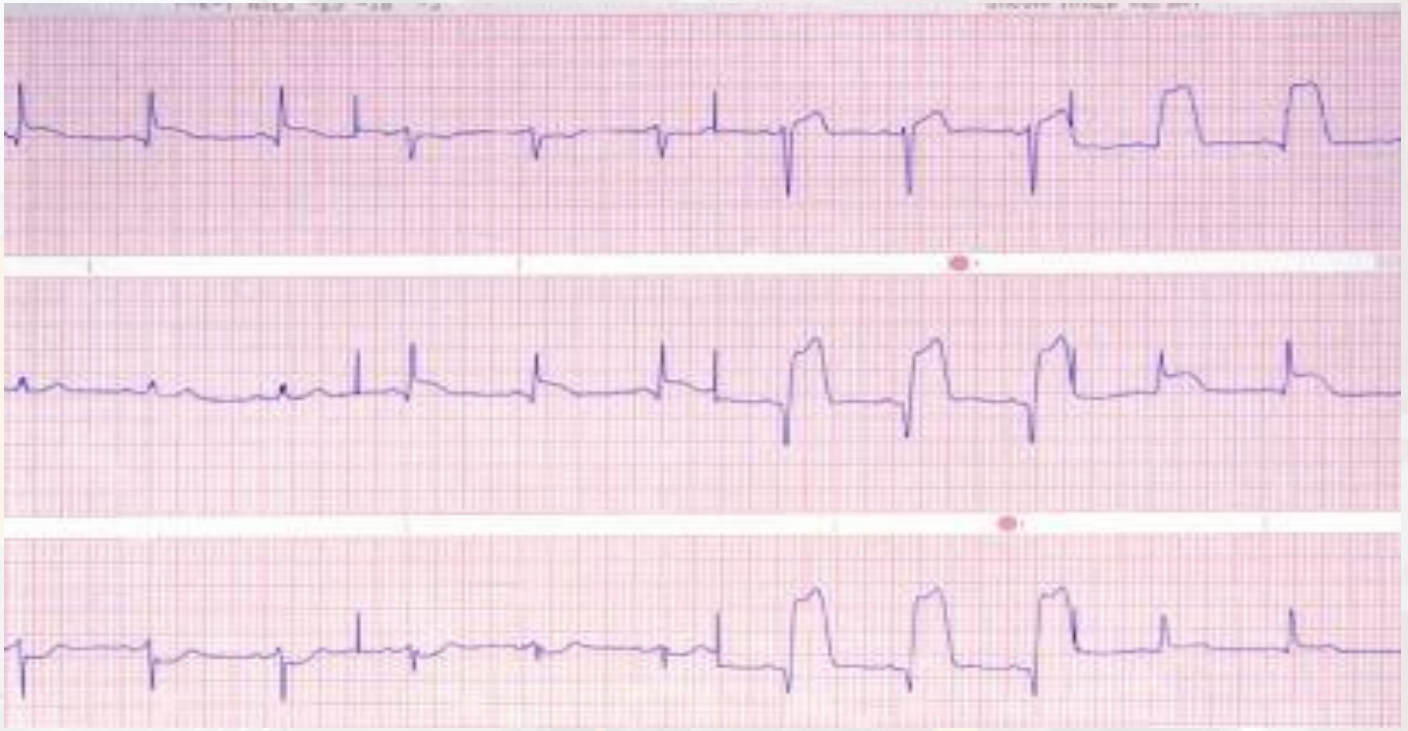
STEMI



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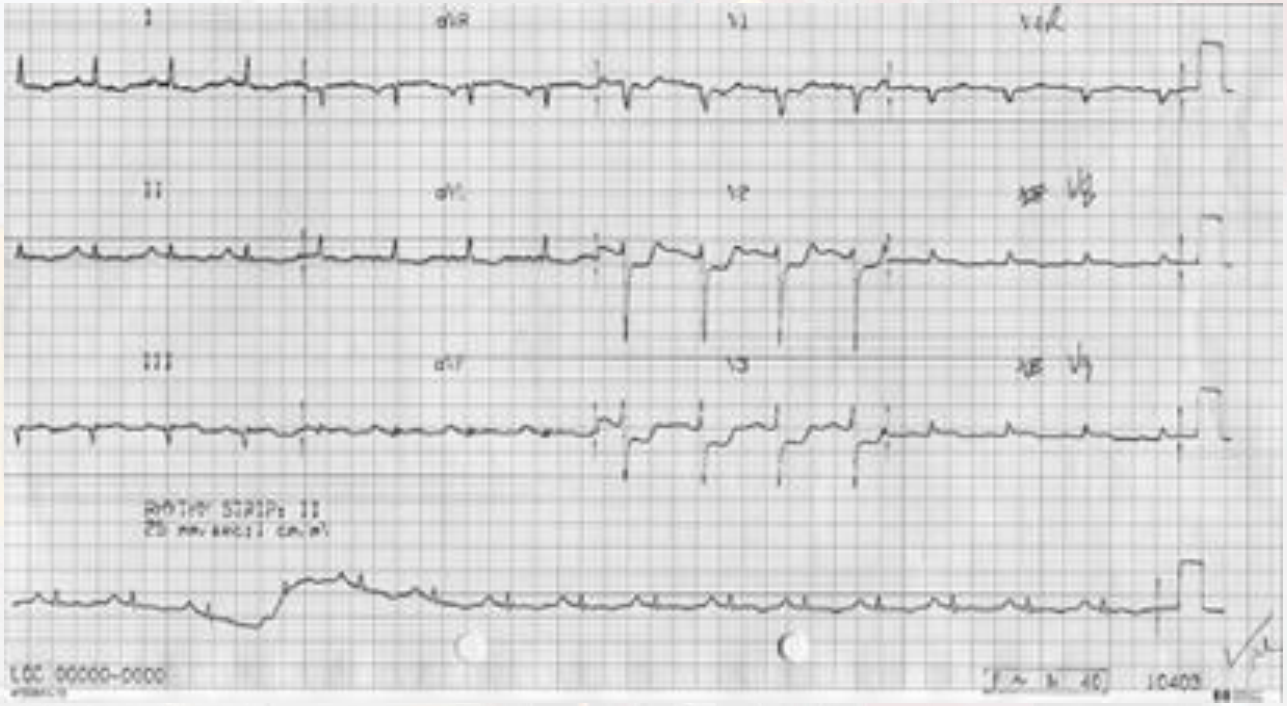
STEMI



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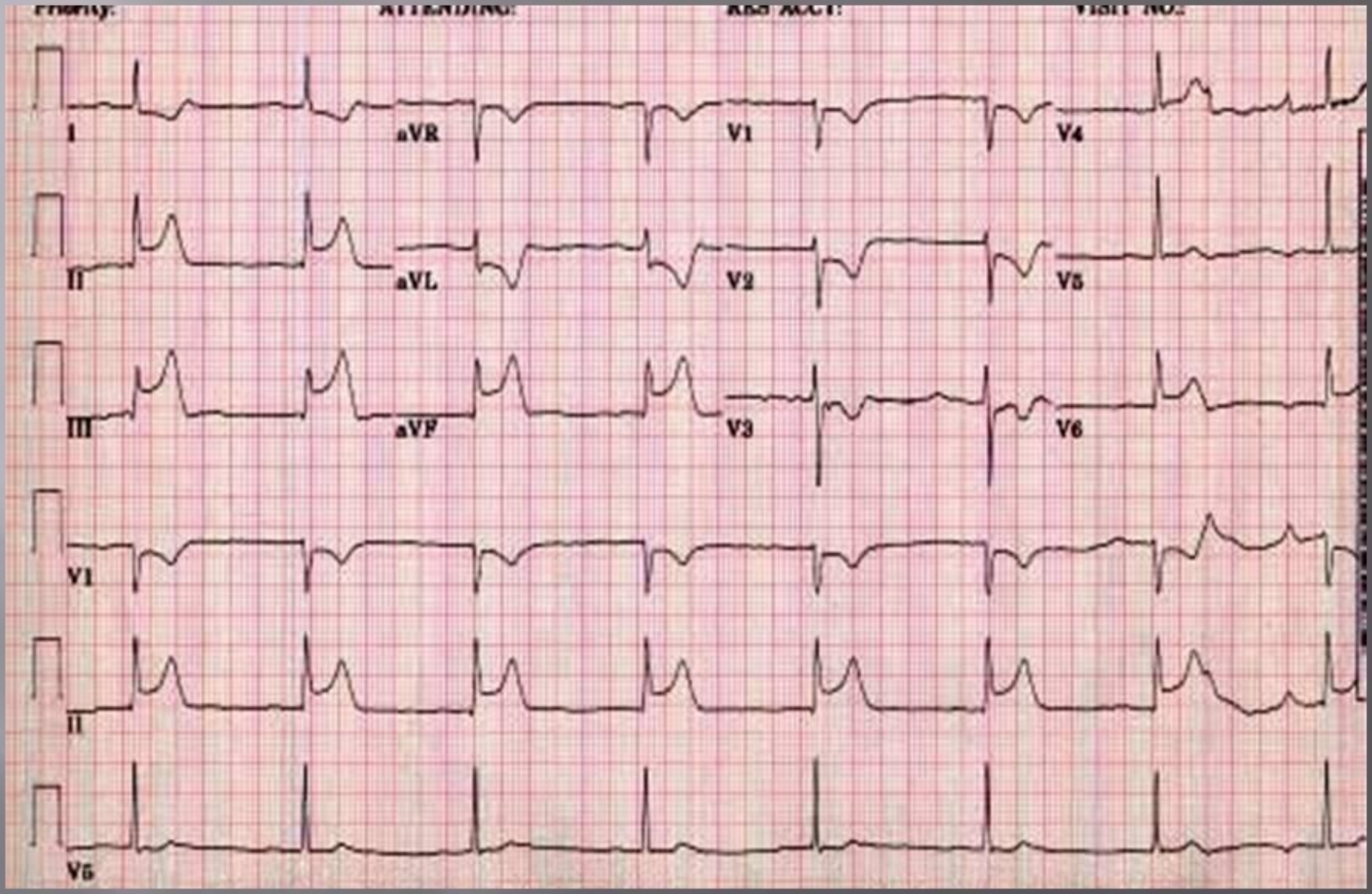

Acute Inferio Posterio lateral MI

The Confusing other Causes of ST elevation

Left Bundle Branch Block (LBBB) and Left Ventricular Hypertrophy (LVH) are the most common problems

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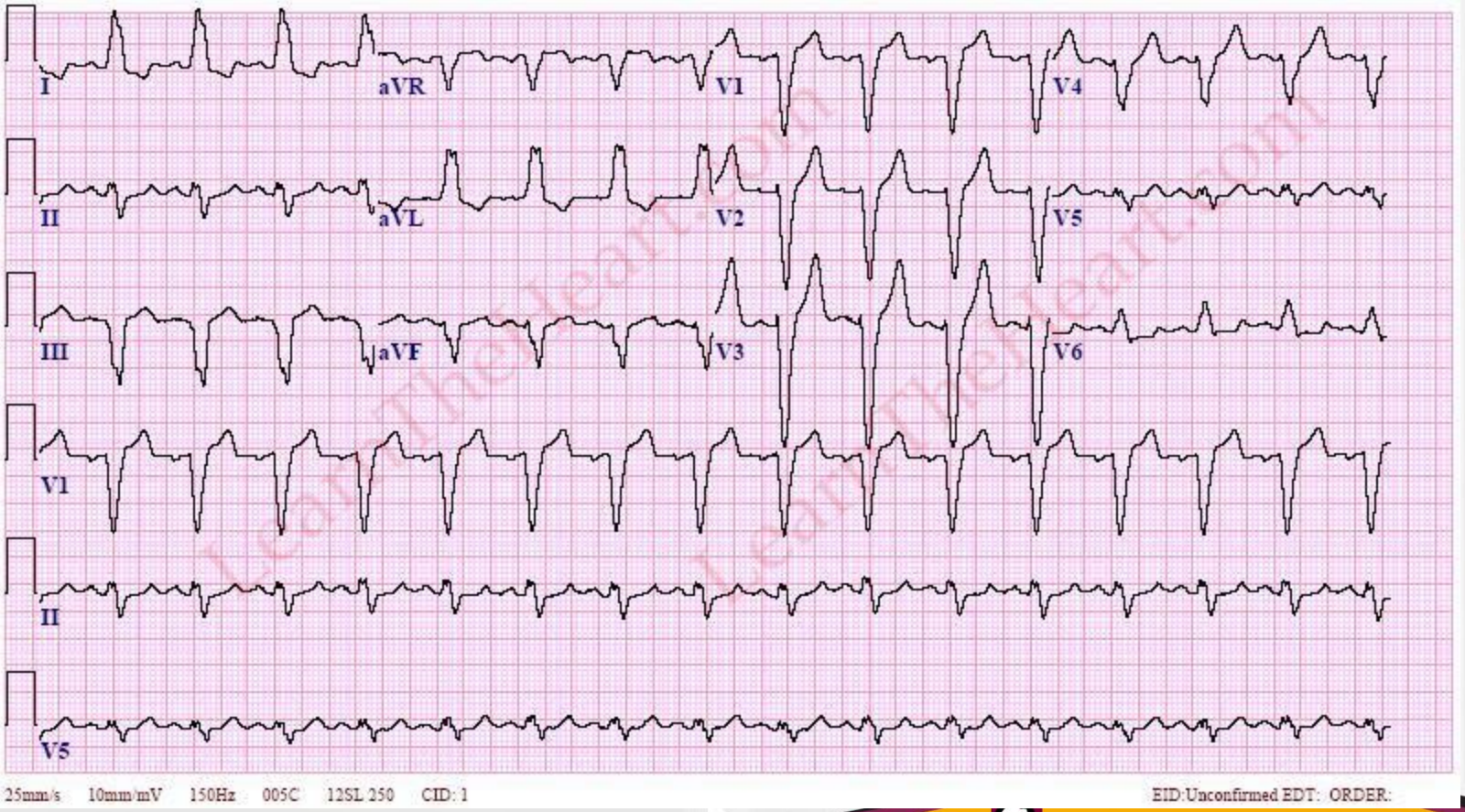
LBBB



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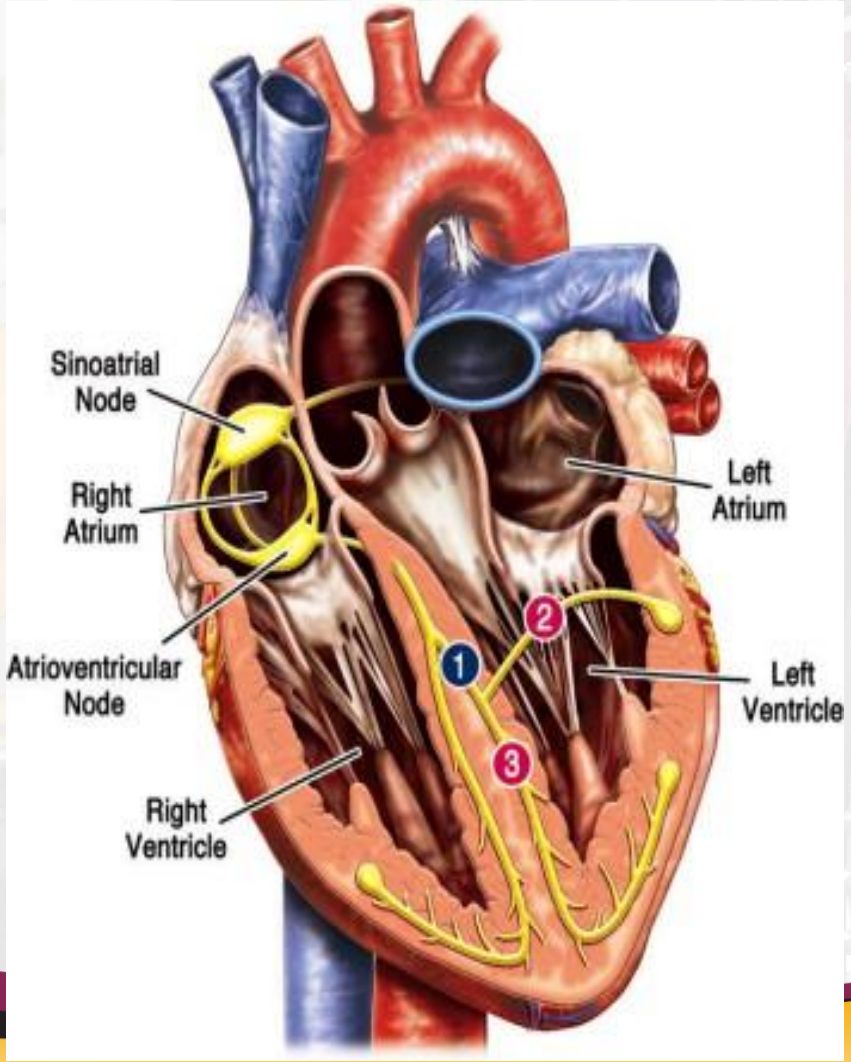
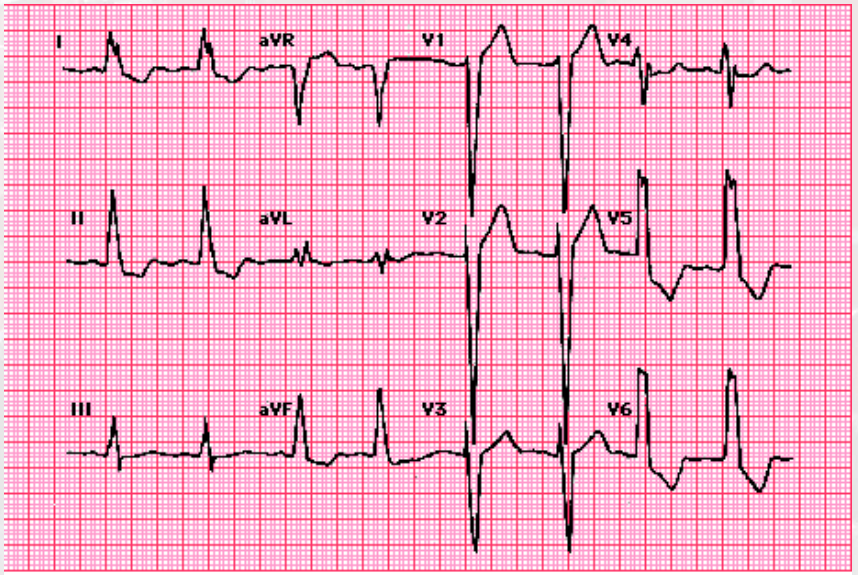
LBBB





Typical left bundle branch block Electrocardiogram in typical complete LBBB. The asynchronous activation of the two ventricles increases the QRS duration (0.16 sec). The abnormal initial vector results in loss of "normal" septal forces as manifested by absence of q waves in leads I, aVL, and V6. The late activation of the left ventricle prolongation of the dominant leftward progression of the middle and terminal forces, leading to a positive and widened R wave in the lateral leads. Both the ST segment and T wave vectors are opposite in direction from the QRS, a "secondary" repolarizationa abnormality. Courtesy of Ary Goldberger, MD.

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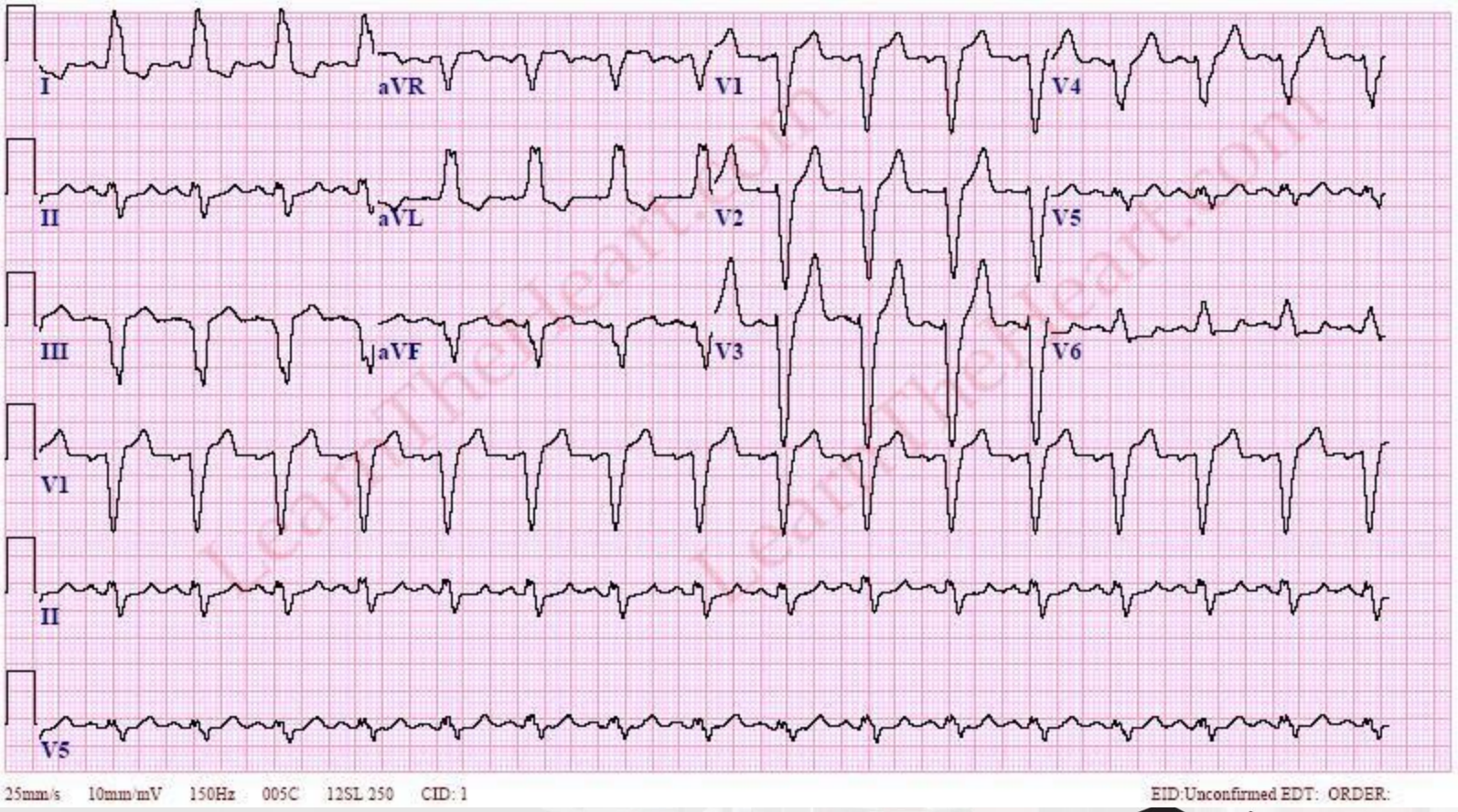
LBBB



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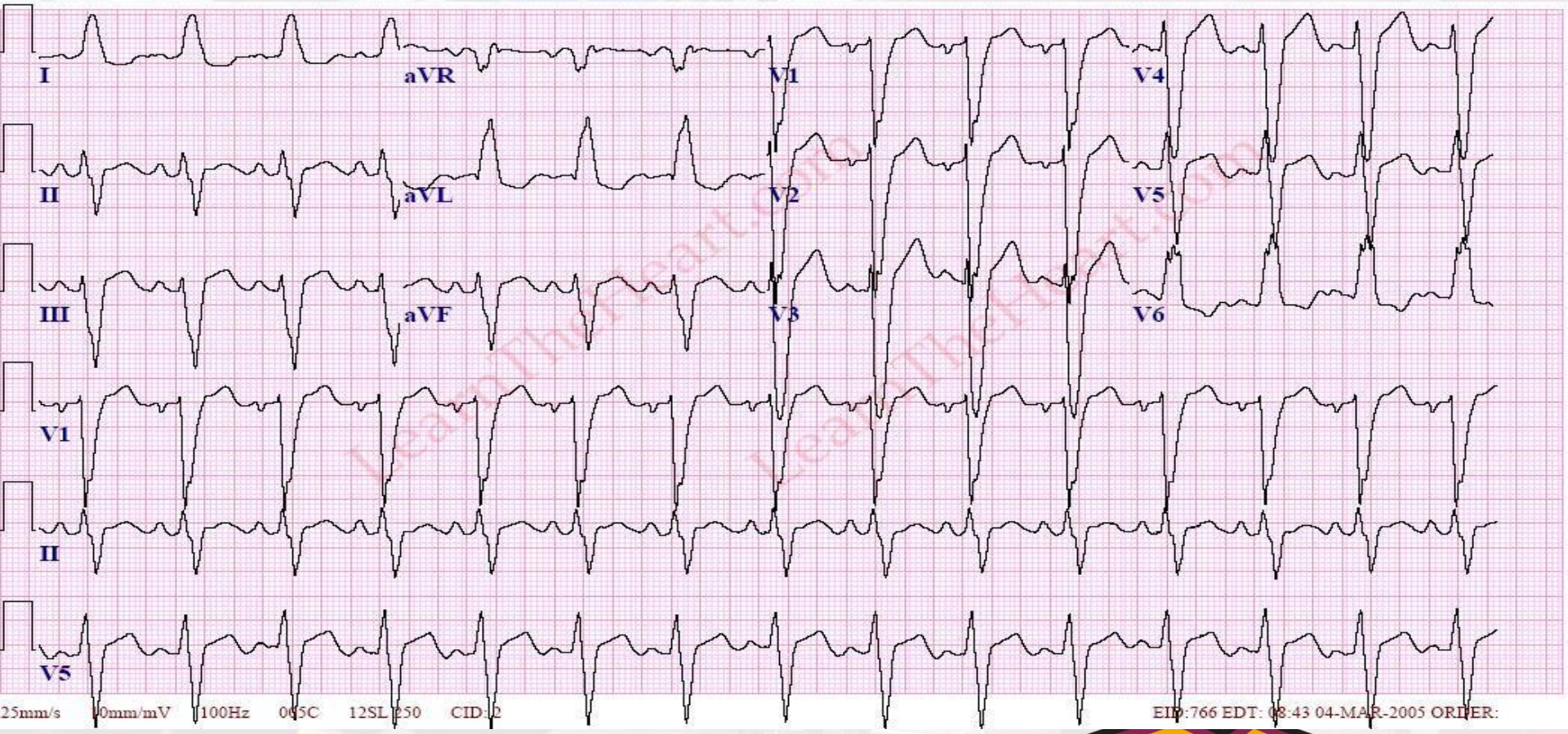
LBBB



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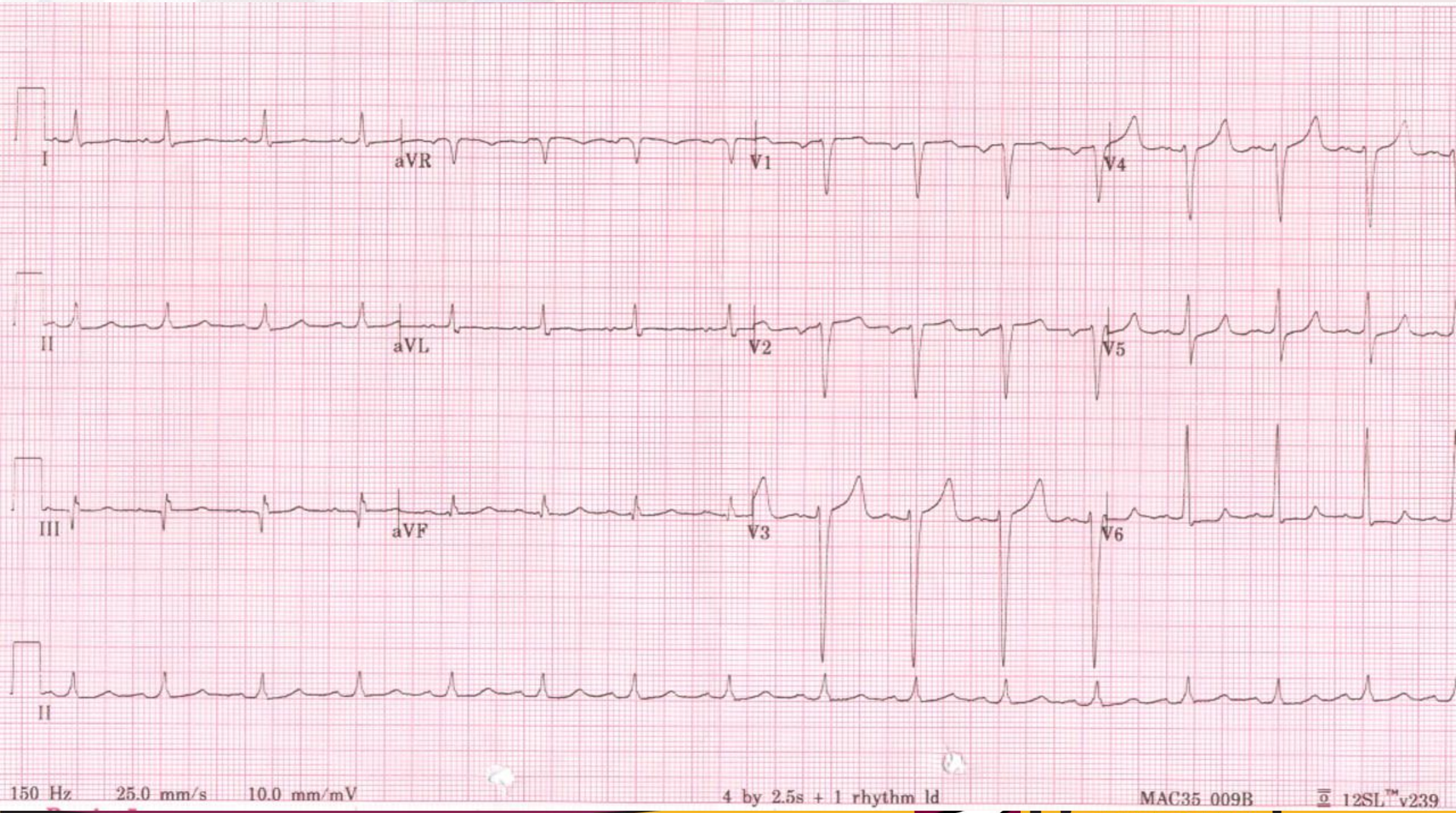
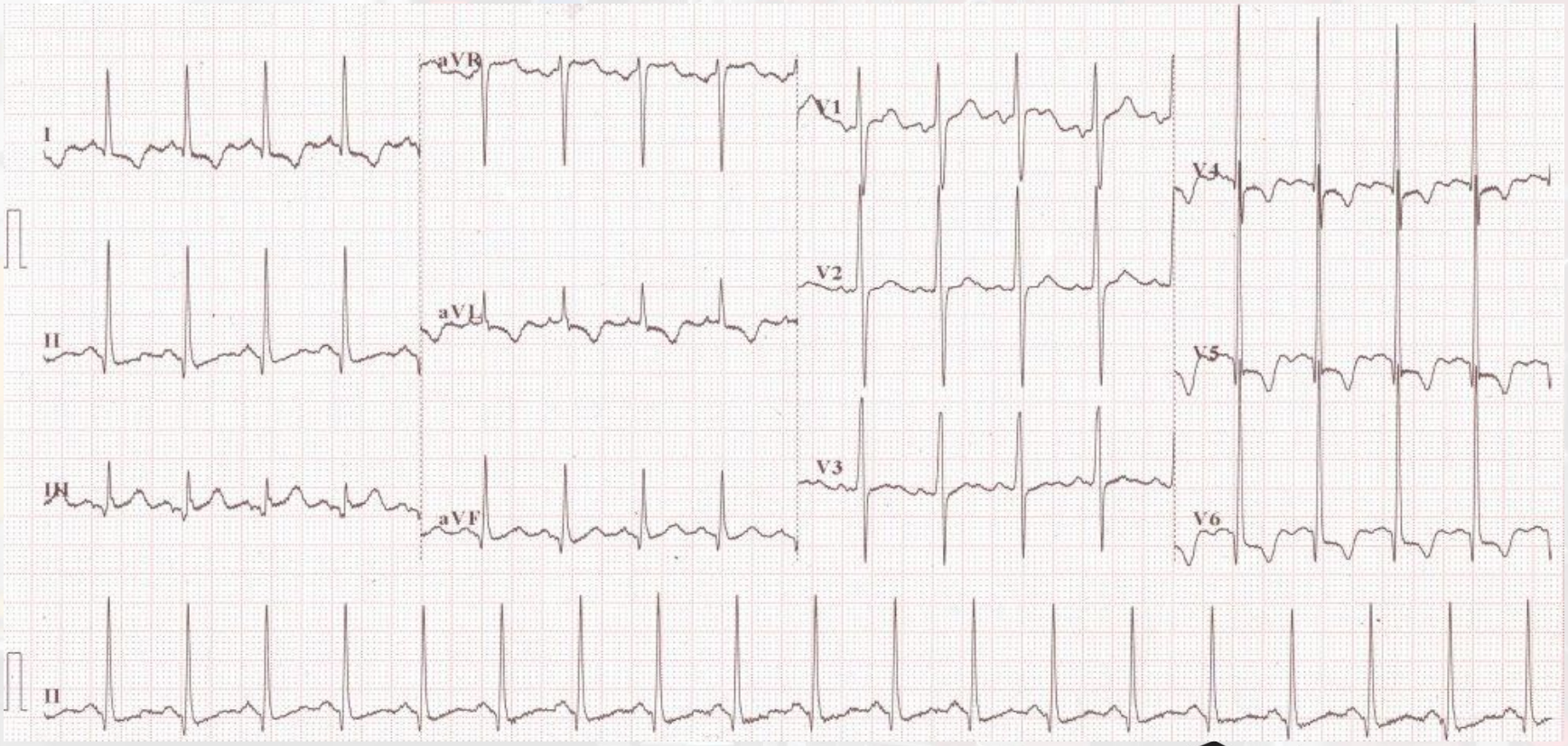
LVH


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
150 Hz
25.0 mm/s
10.0 mm/mV
4 by 2.5s + 1 rhythm ld
MAC35 009B
12SL™v239

LVH



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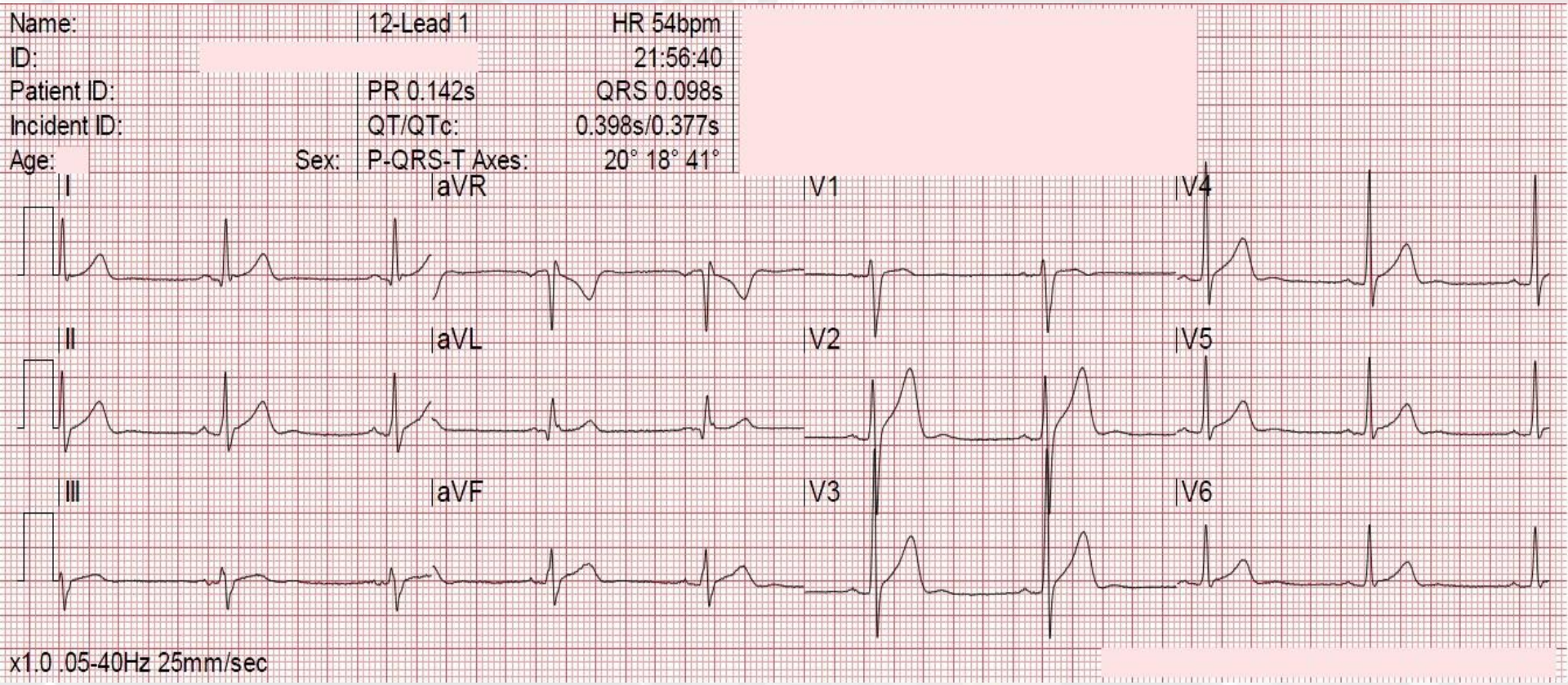
Benign Early Repolarization



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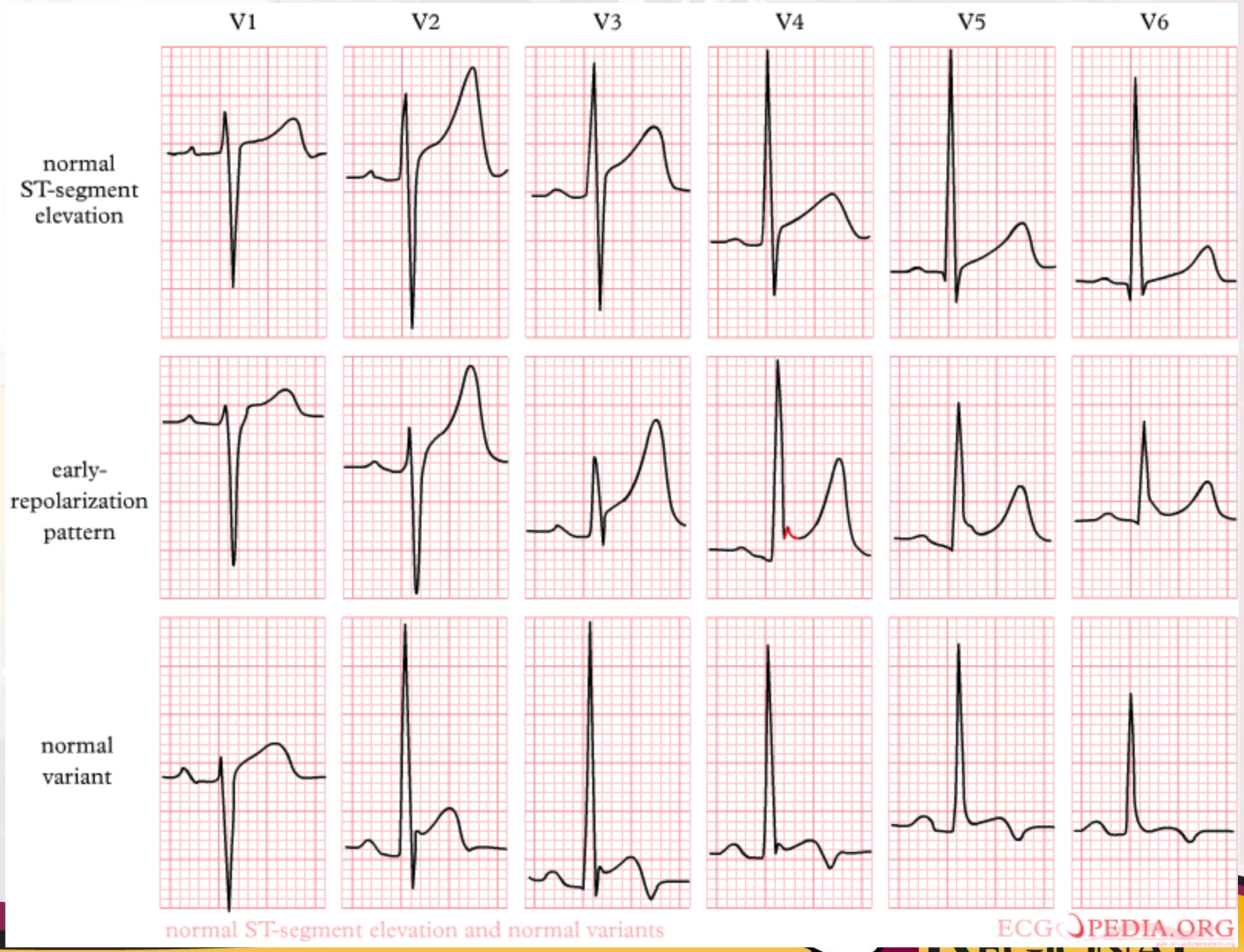

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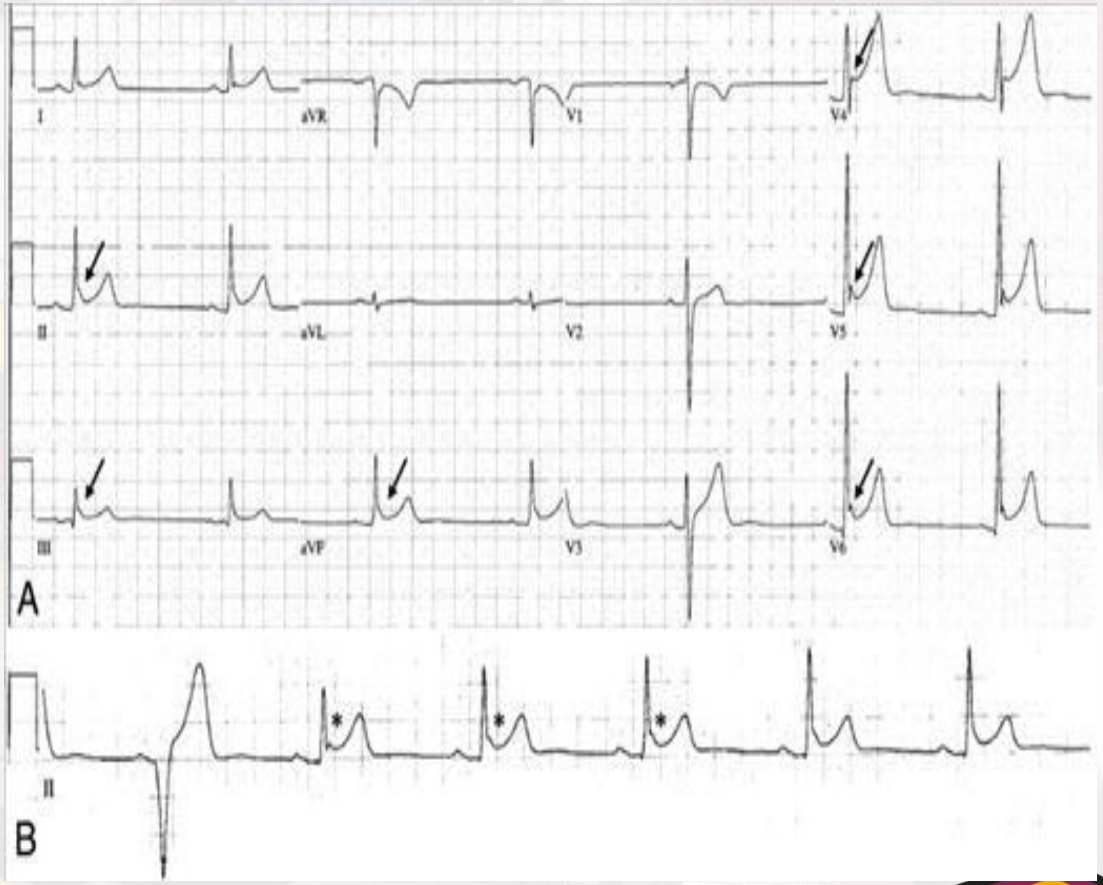

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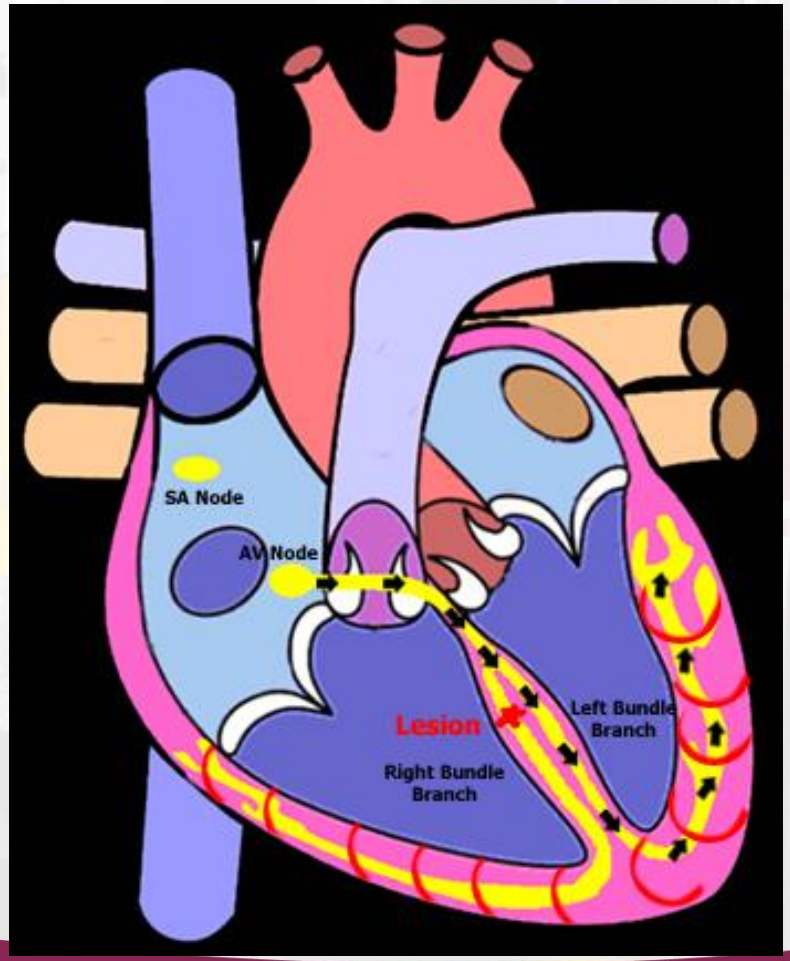
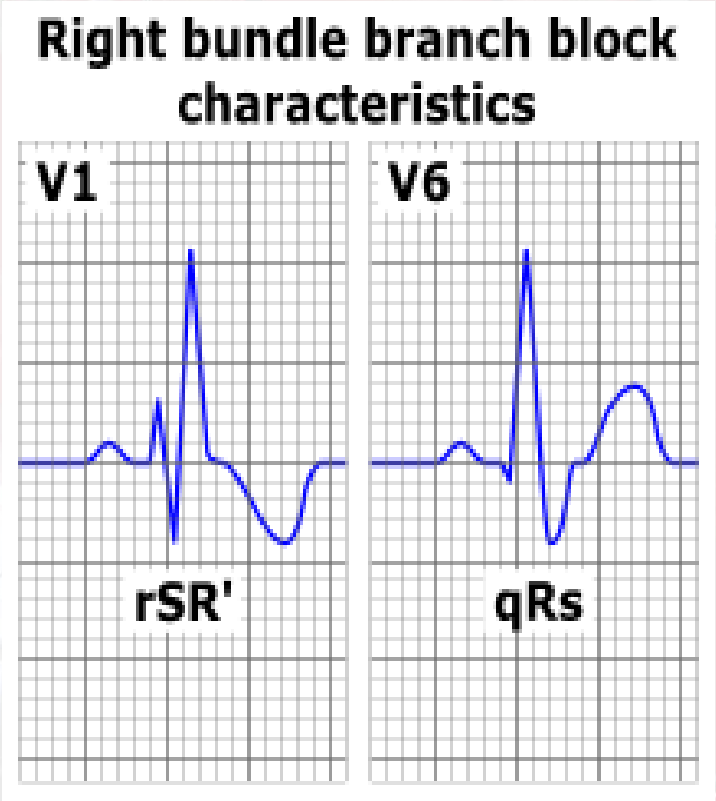
RBBB





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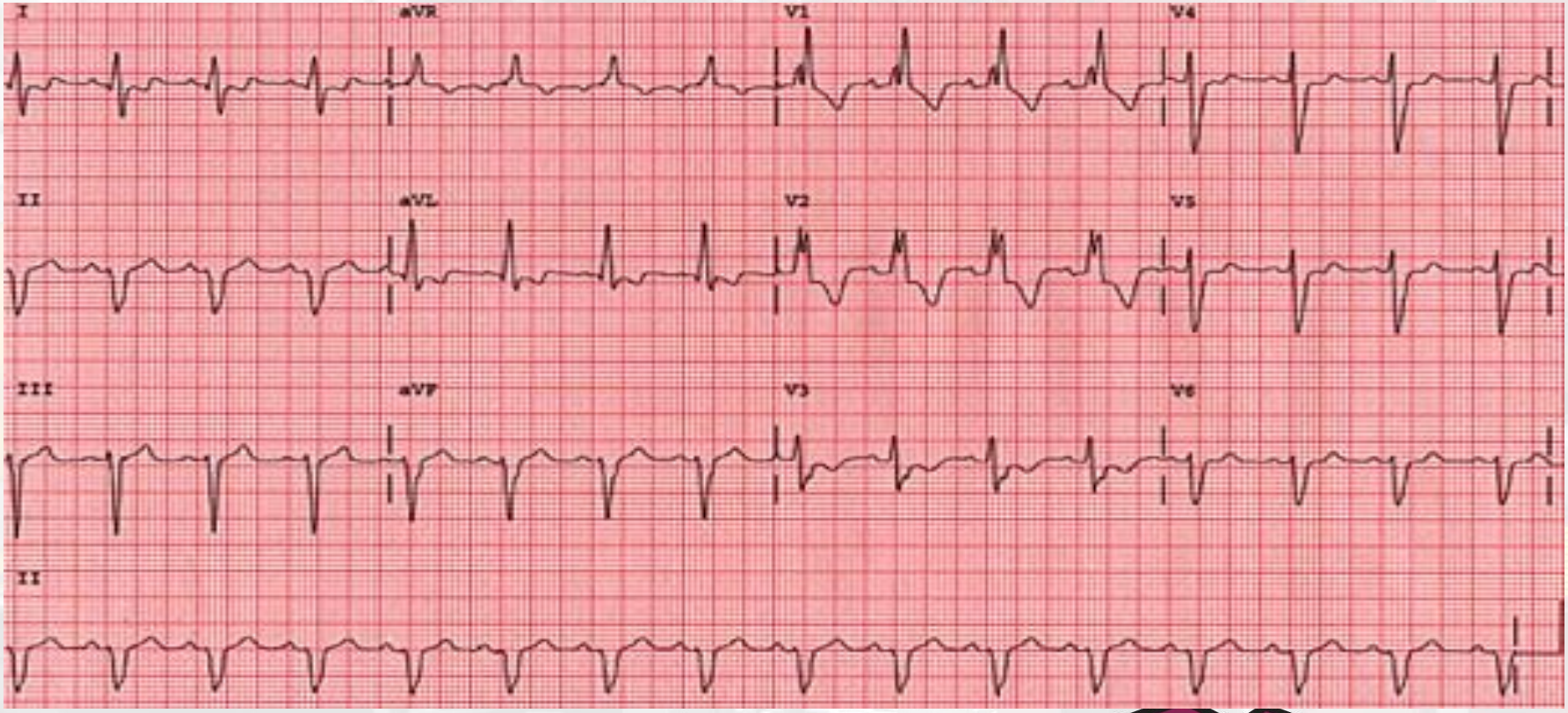
RBBB



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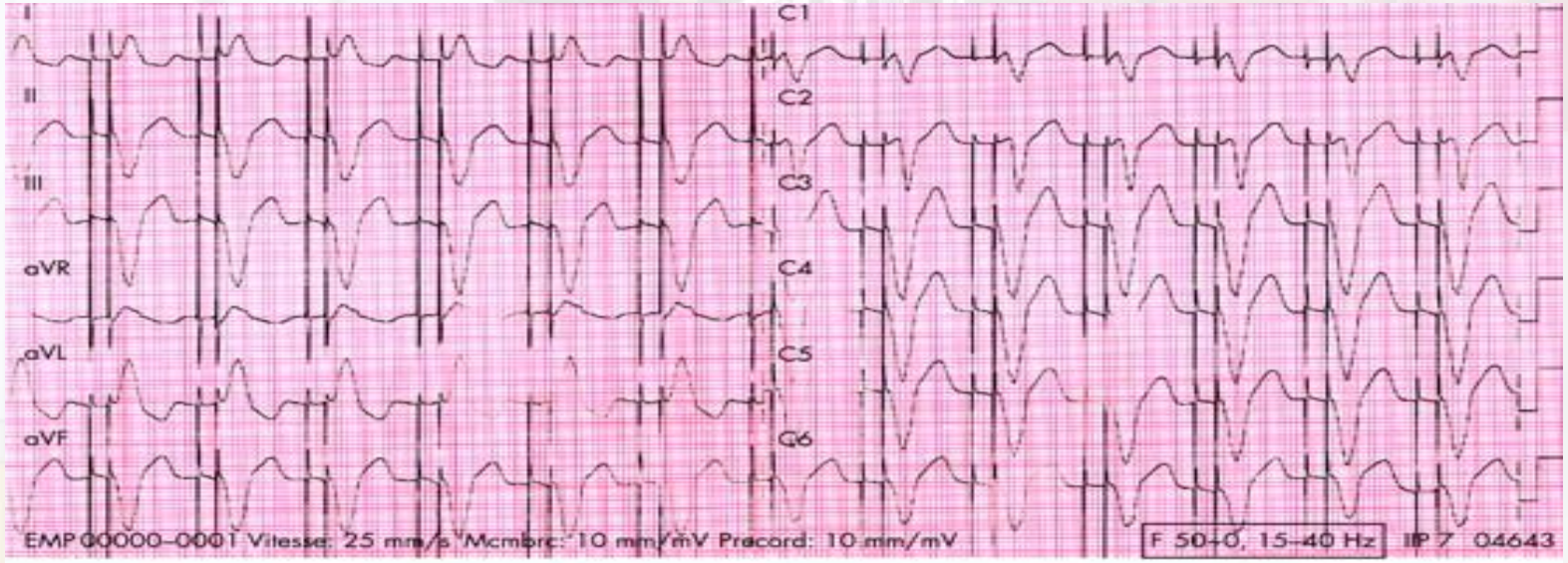


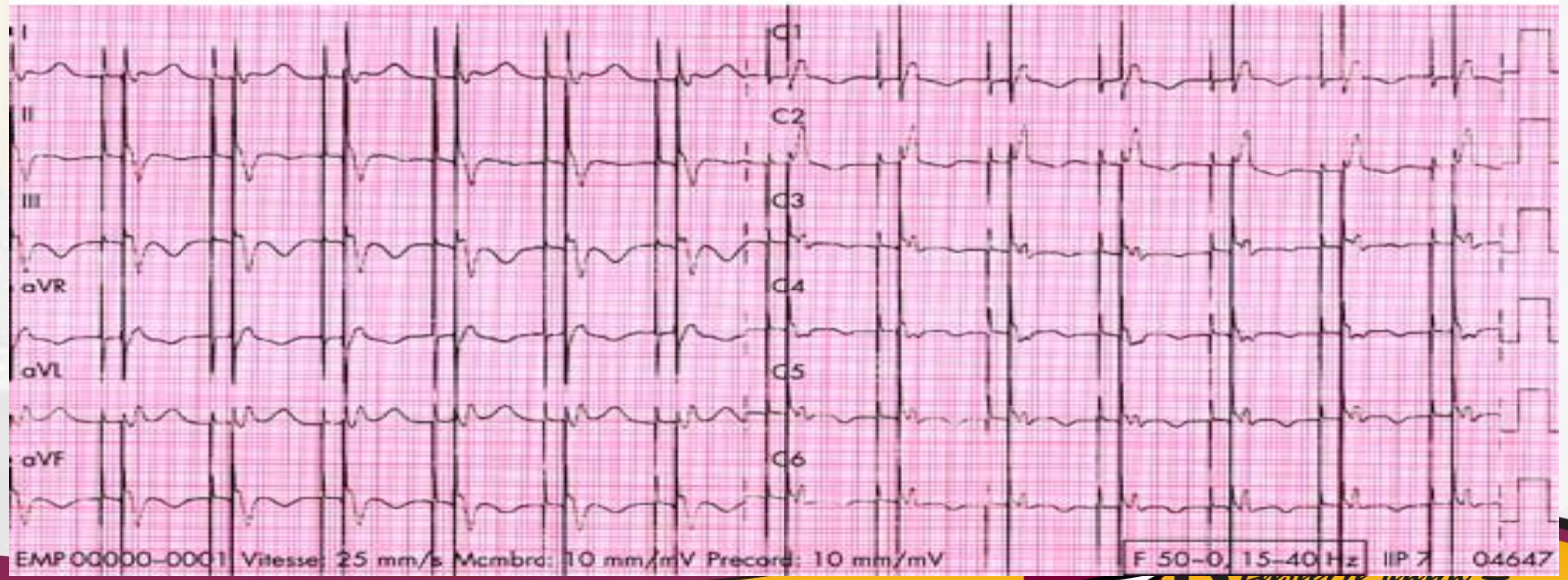
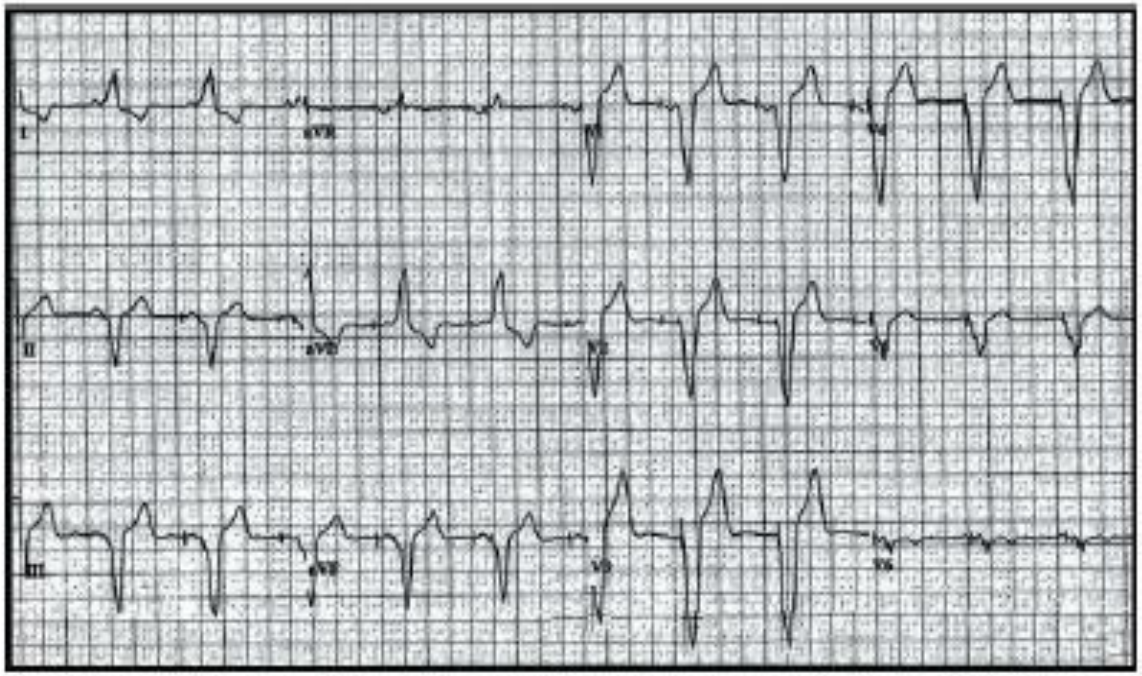


Figure 9B. Ventricular paced rhythm (VPR).



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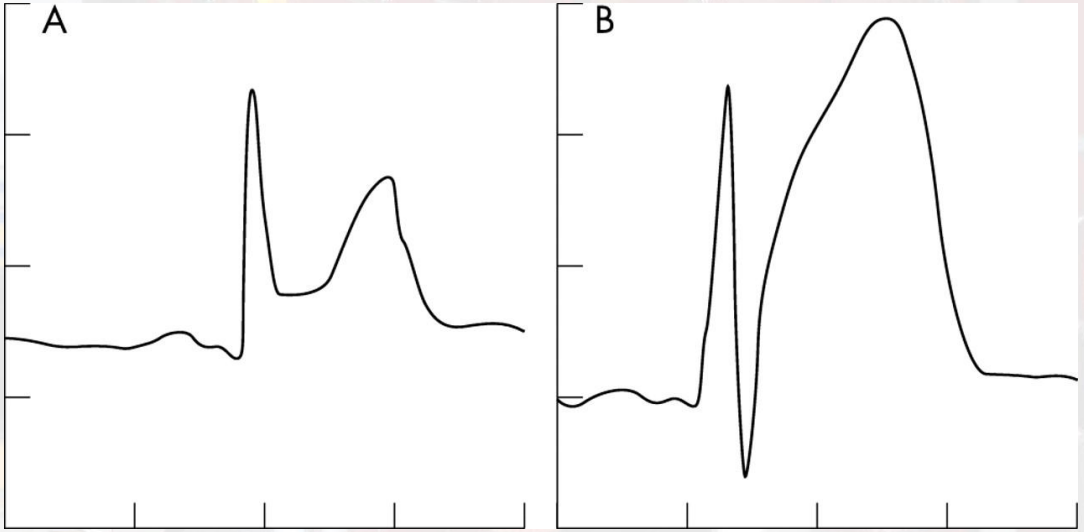
Pericarditis

One of the most confusing



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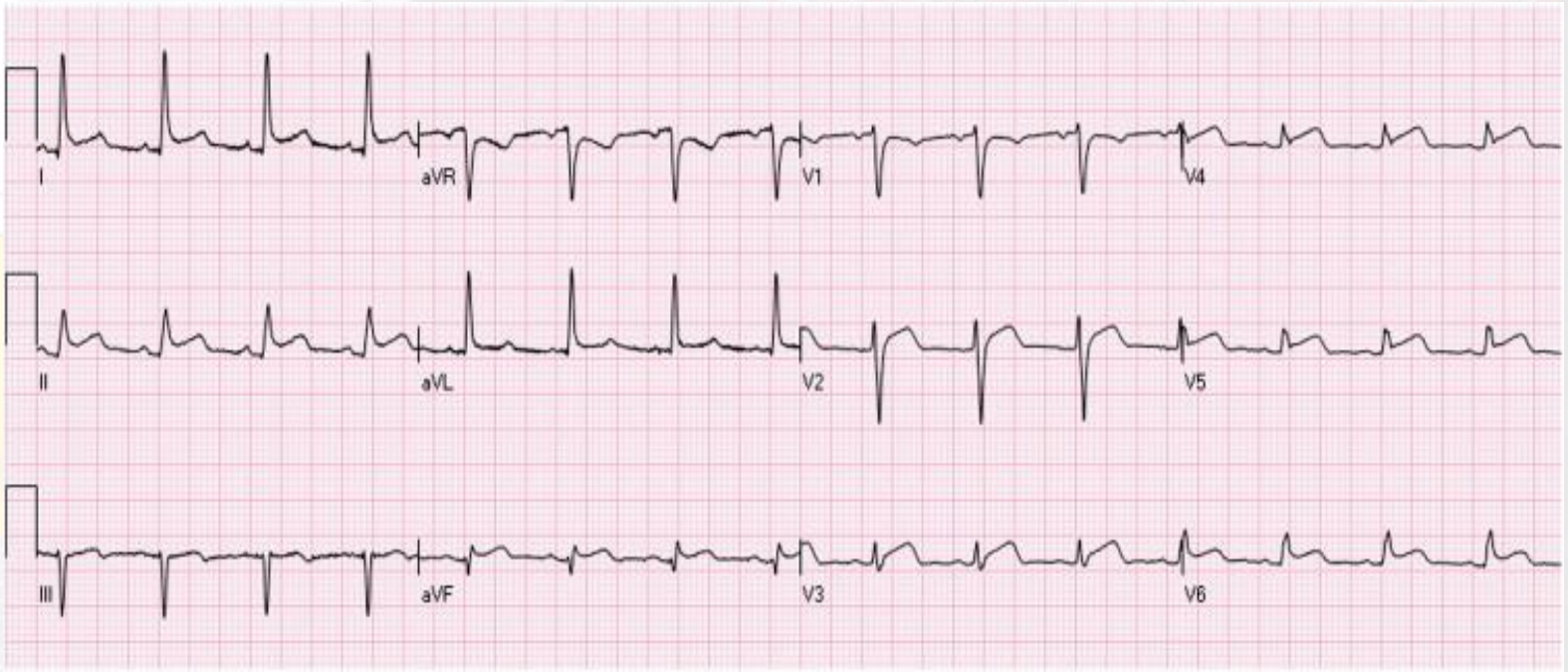
Pericarditis



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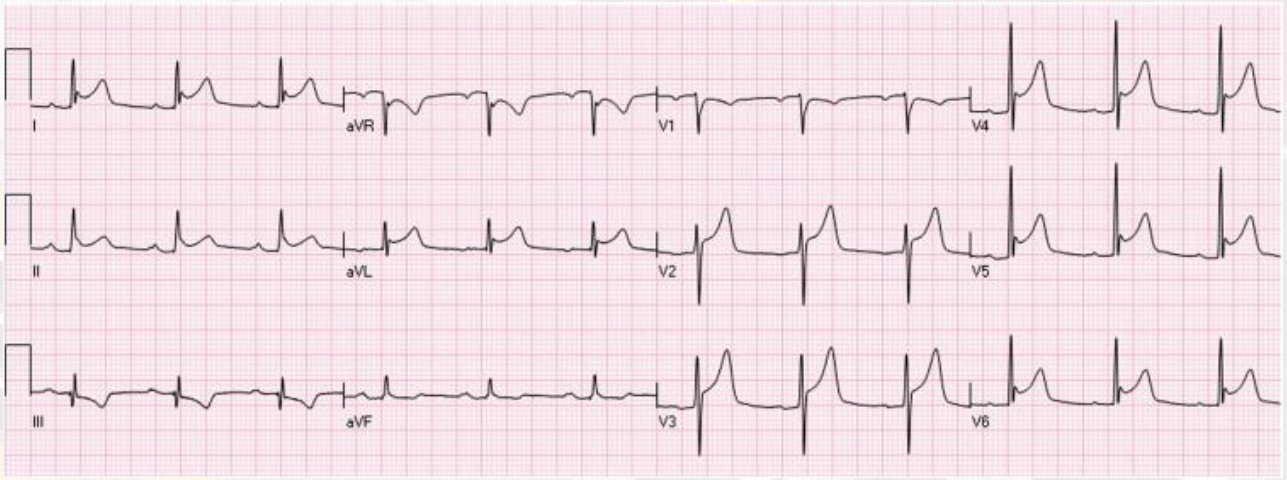
PERICARDITIS



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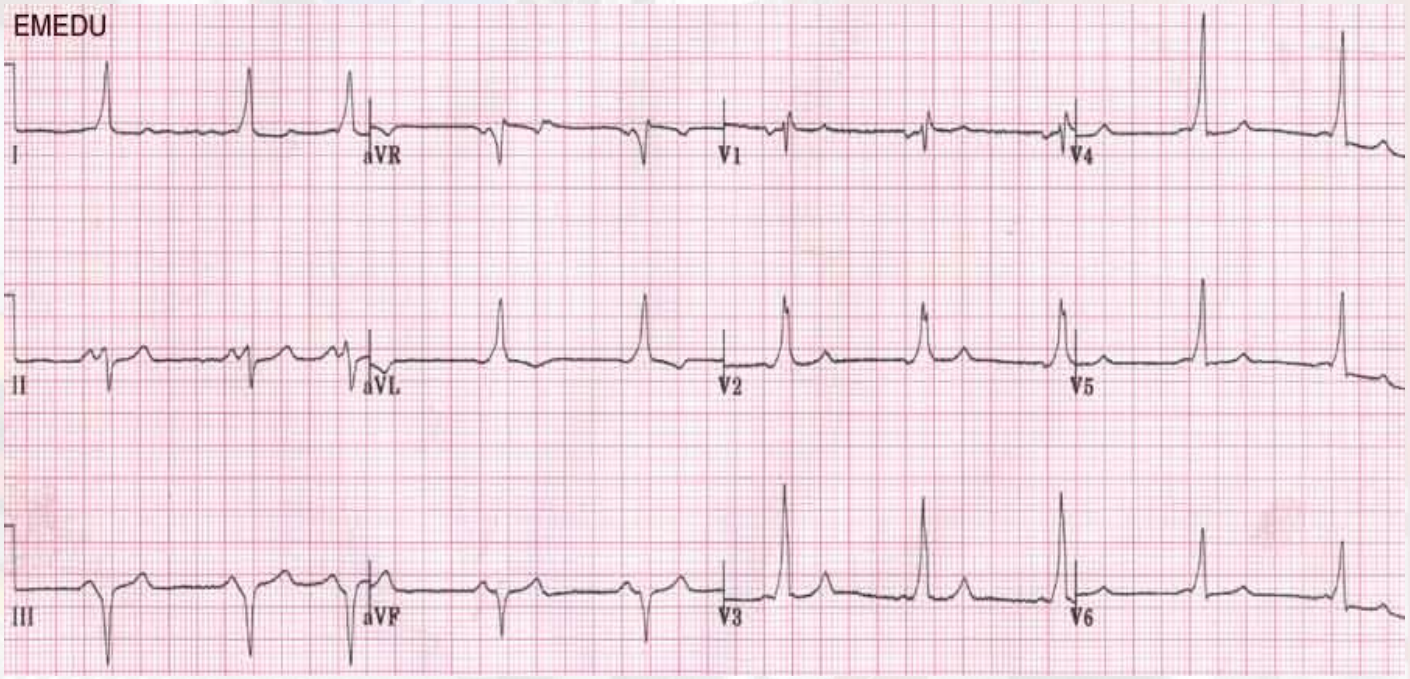
Wolf-Parkinson-White (WPW)



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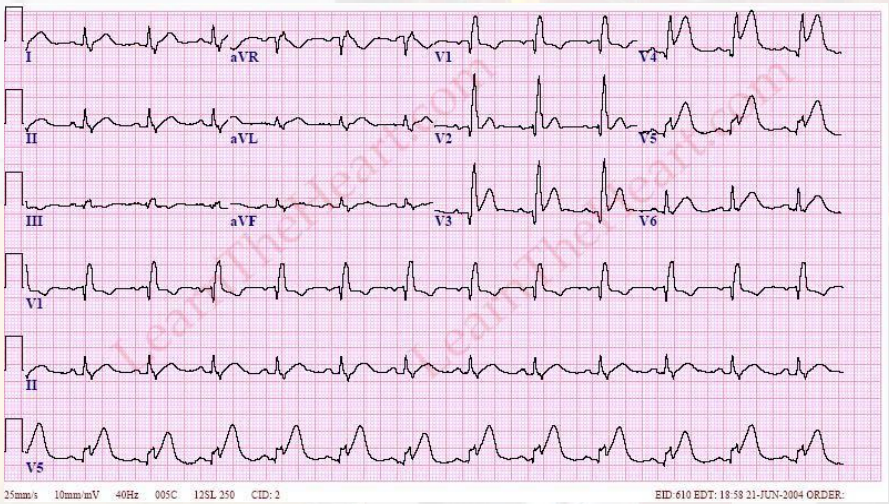
RBBB and STEMI



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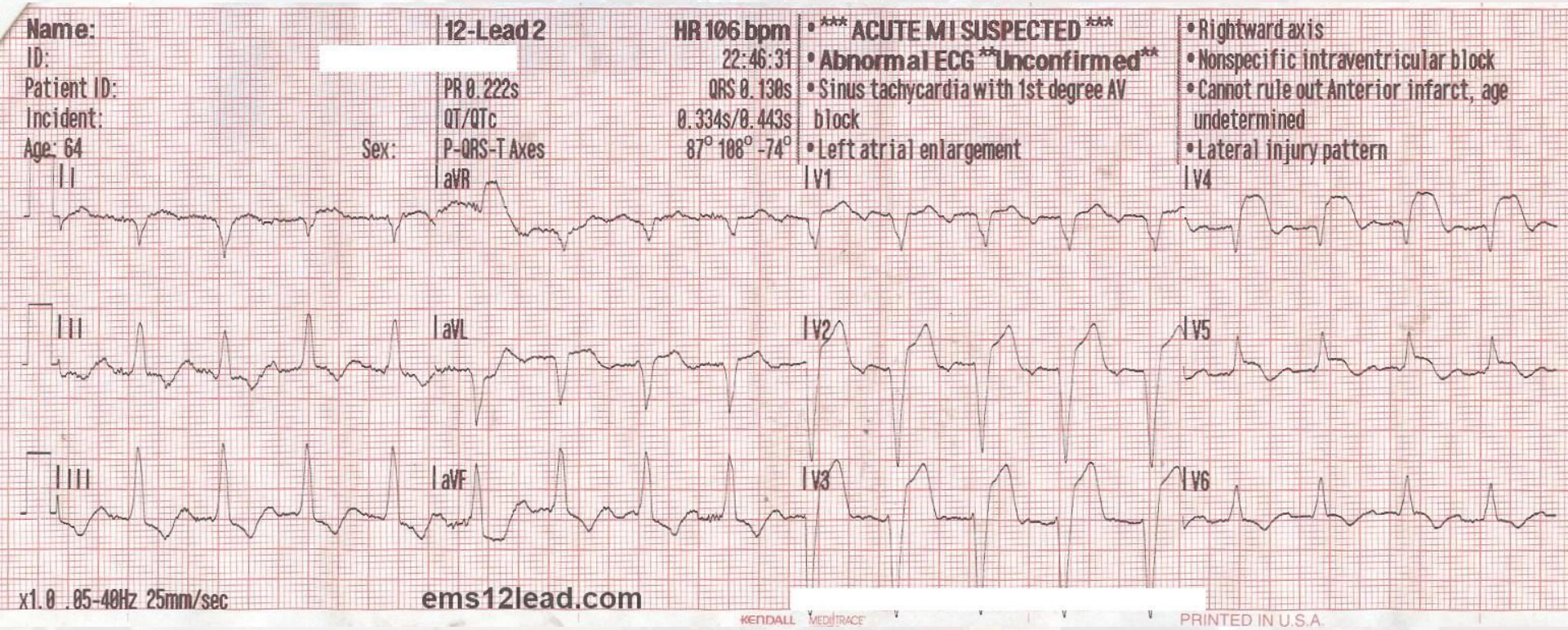
LBBB and STEMI



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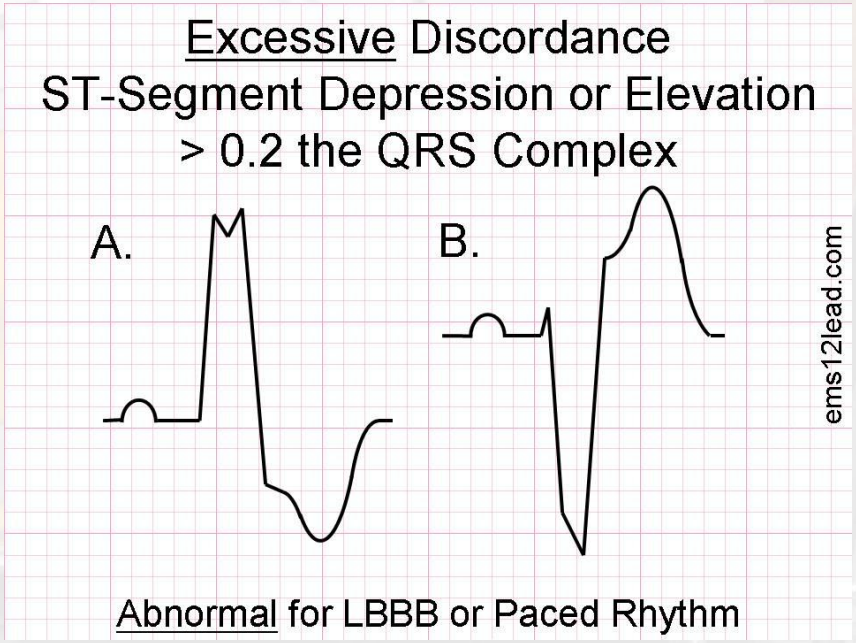
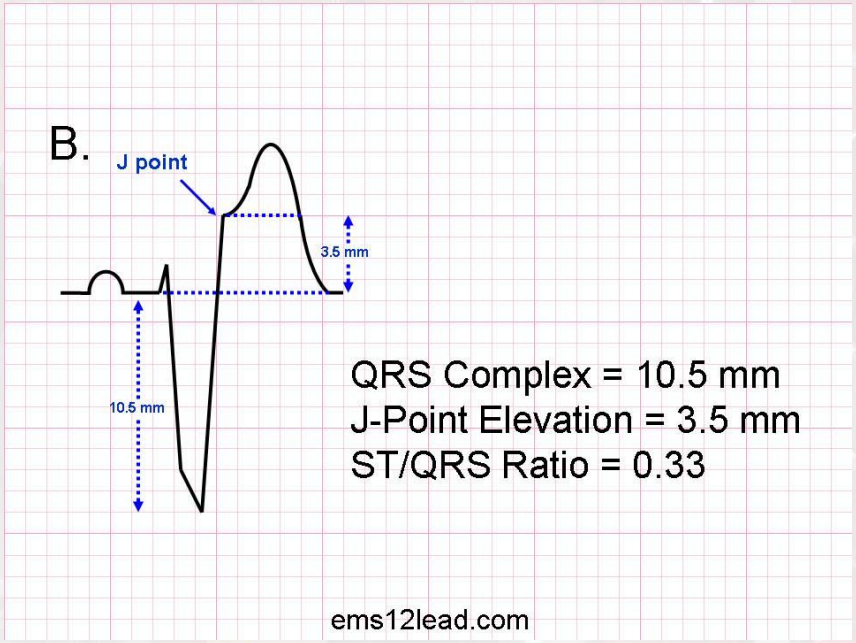
STEMI in LBBB





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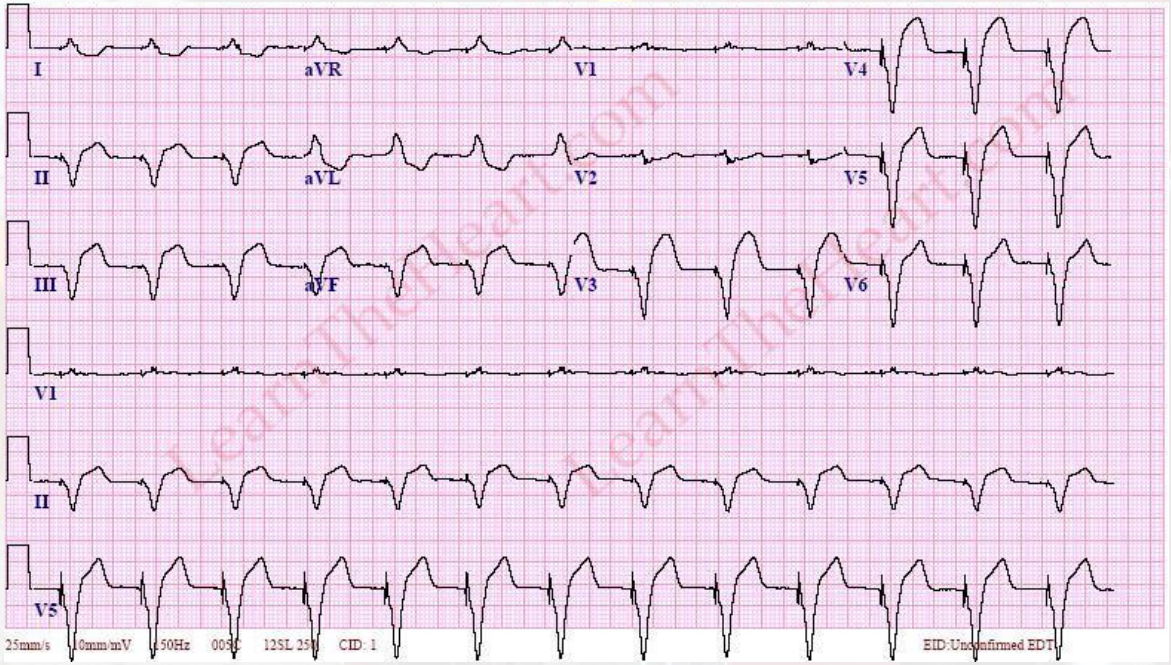
Paced STEMI



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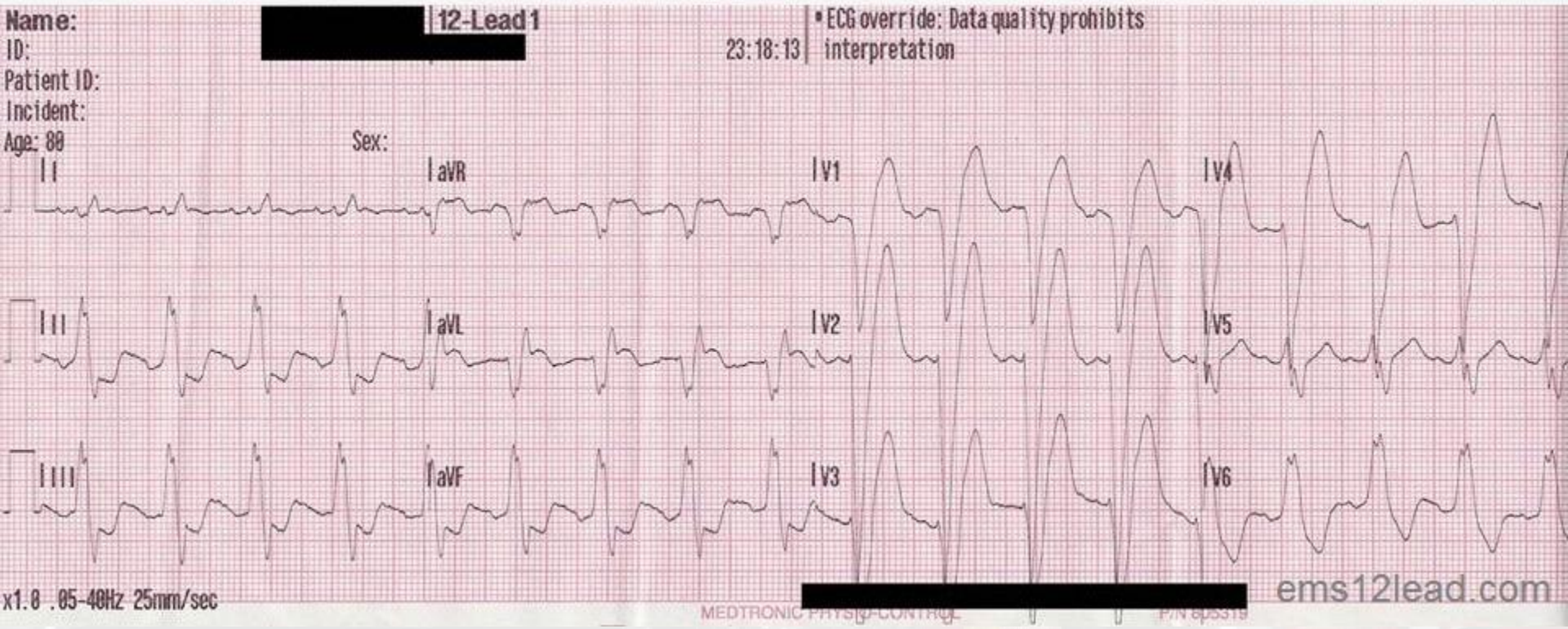
STEMI in LBBB



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Thanks

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