

12-Lead EKG Interpretation

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UP HEALTH SYSTEM MARQUETTE

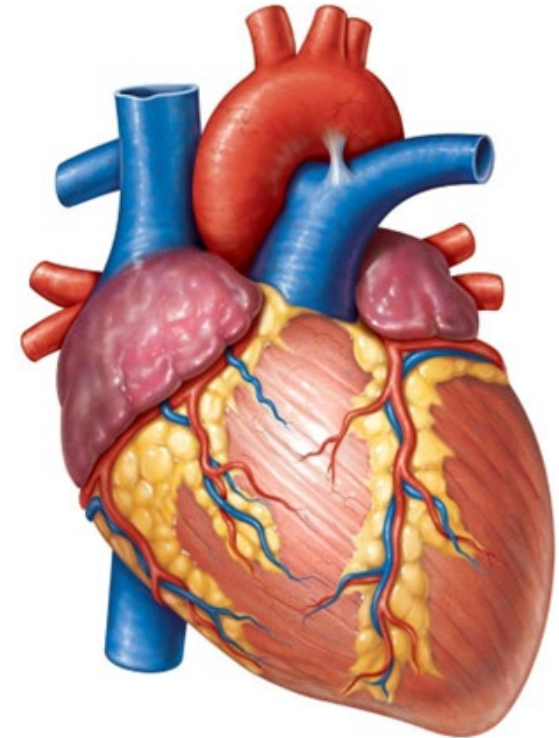


Disclosure Statement

This presenter has no conflicts of interest to disclose.

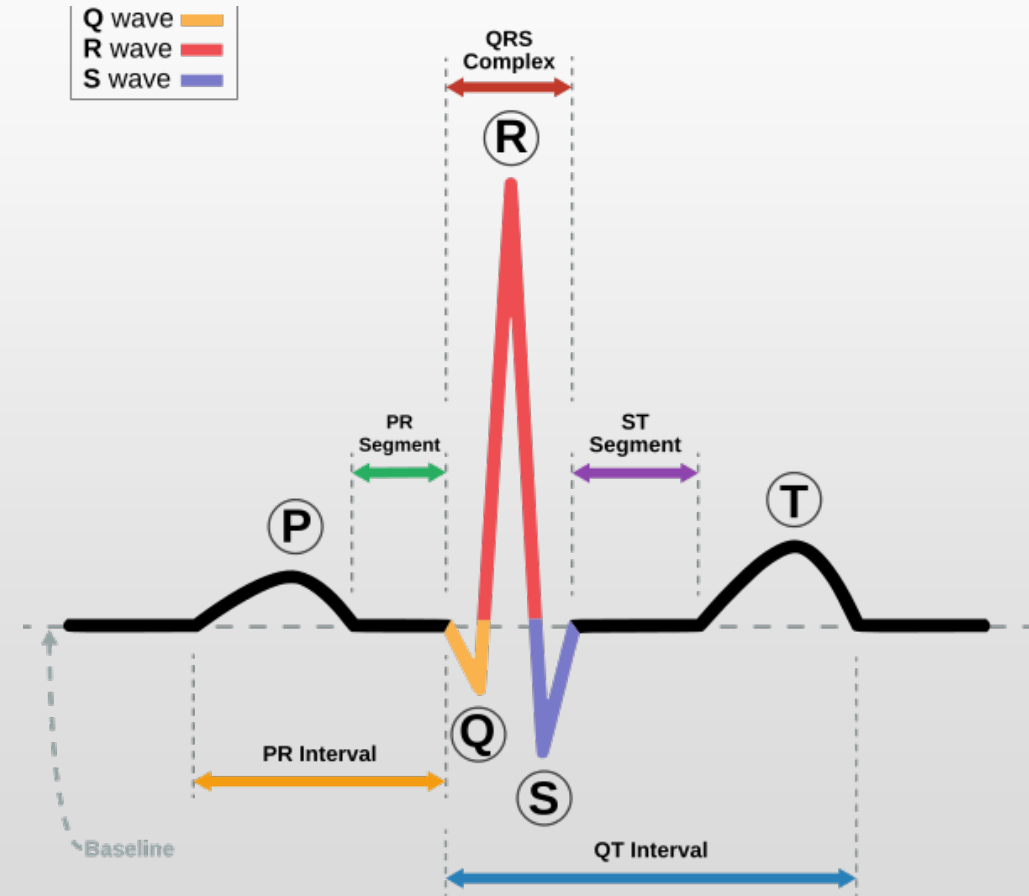
12-Lead EKG Interpretation Learning Objectives

- Define Basic EKG Interpretation 8 Steps
- Define 12-Lead EKG Interpretation 3 Steps
- Identify different STEMI EKG types
- Identify STEMI EKG Mimics



8 Steps to Rhythm Analysis

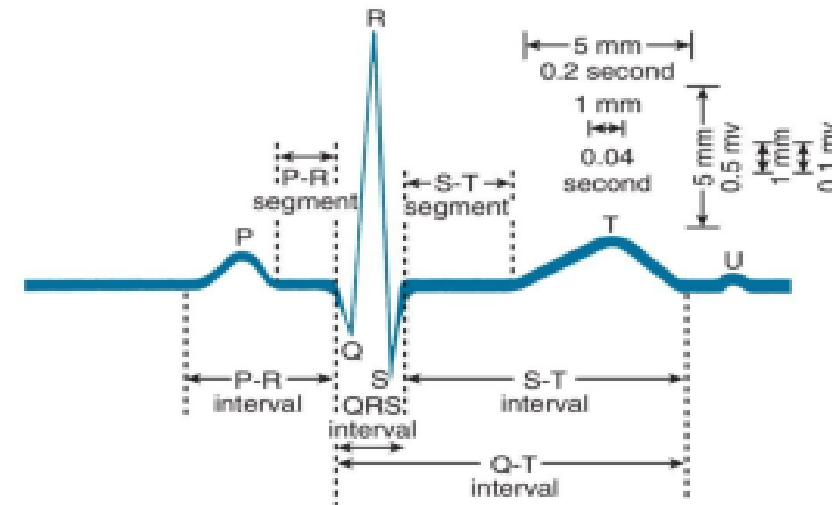
1. Rate
2. Rhythm
3. P waves
4. PR Intervals
5. QRS
6. QT Interval
7. ST Segment
8. T waves



8 Steps to Rhythm Analysis

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Components of the ECG demonstrating normal intervals



	P interval	QRS interval	Rate	Q-T interval	S-T interval
Normal ranges	Adults: 0.18–0.20 sec	0.07–0.10 sec	60	0.33–0.43 sec	0.14–0.16 sec
	Children: 0.15–0.18 sec		70	0.31–0.41 sec	0.13–0.15 sec
			80	0.29–0.38 sec	0.12–0.14 sec
			90	0.28–0.36 sec	0.11–0.13 sec
			100	0.27–0.35 sec	0.10–0.11 sec
			120	0.25–0.32 sec	0.08–0.07 sec



Calculation of rate

Count number of R-R intervals (3.5) in 3 seconds (15 time spaces of 0.2 second each)

↓

Multiply 3.5 by 20 to give rate per minute (70 in this case)

10 COMMON EKG HEART RHYTHMS

Normal Sinus Rhythm



Sinus Bradycardia



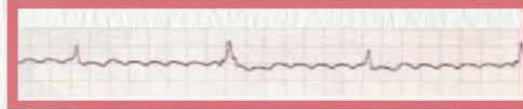
Sinus Tachycardia



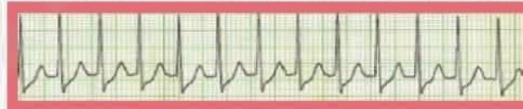
Atrial Fibrillation



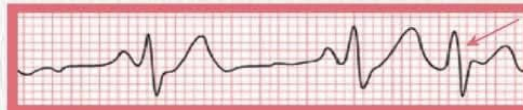
Atrial Flutter



Supraventricular
Tachycardia



Premature Atrial
Contraction



Premature Ventricular
Contraction



Ventricular Tachycardia



Ventricular Fibrillation



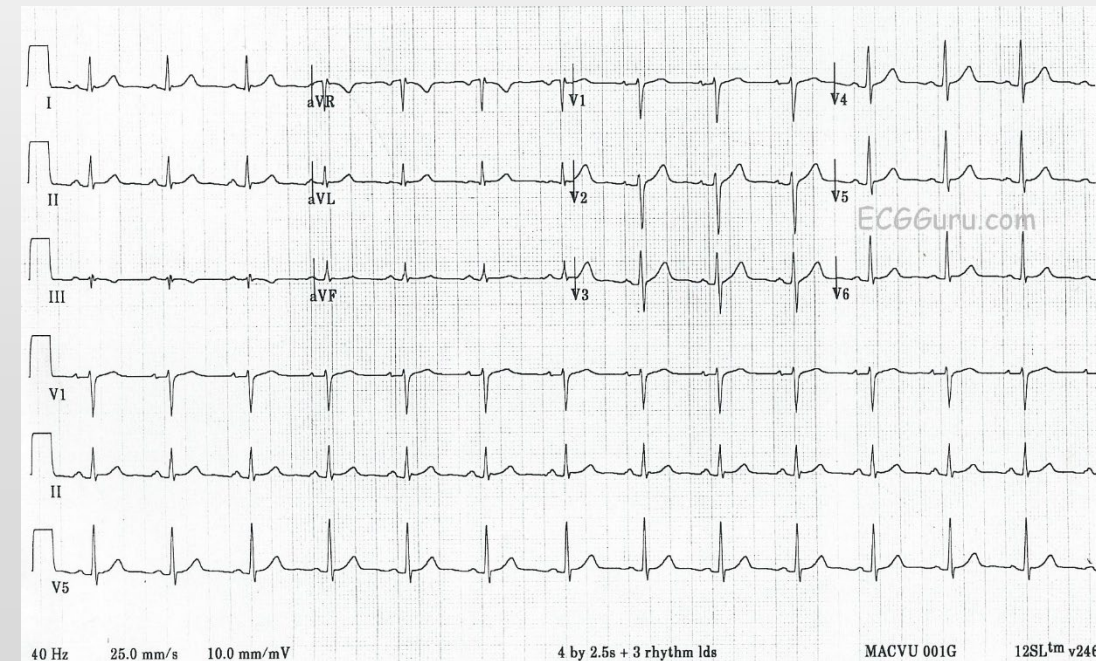
Common Rhythms

Single lead interpretation is expressed
through Lead II

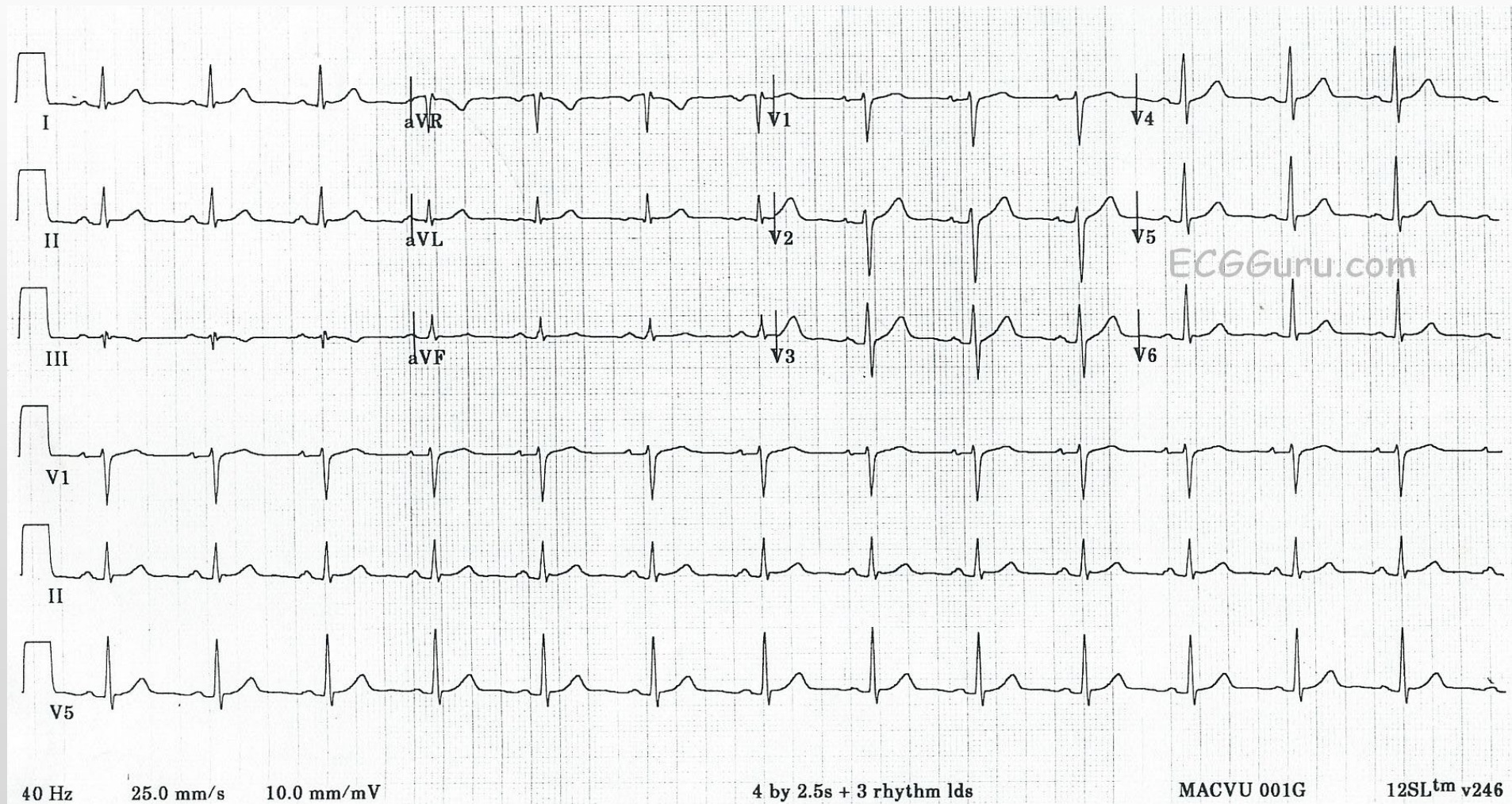
Provides a starting point for emergency
care

12-Lead EKG

- Stick to a systematic approach to interpretation
- Knowing “normal” will assist in recognizing “abnormal”
- 3 STEPS to focus on
 - Rate & Rhythm analysis
 - QRS INTERVAL & Morphology
 - ST Segment, T waves, & QT Intervals



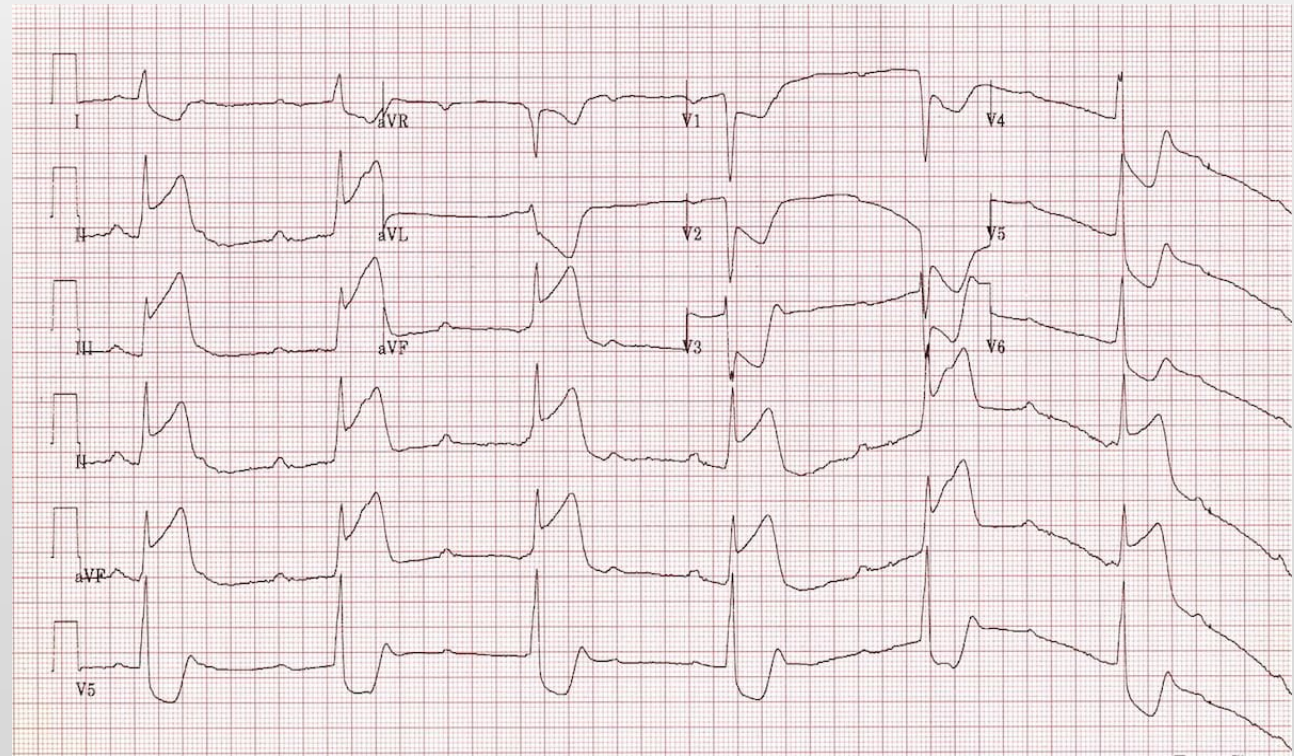
12-Lead EKG



STEMI 12-Lead EKG

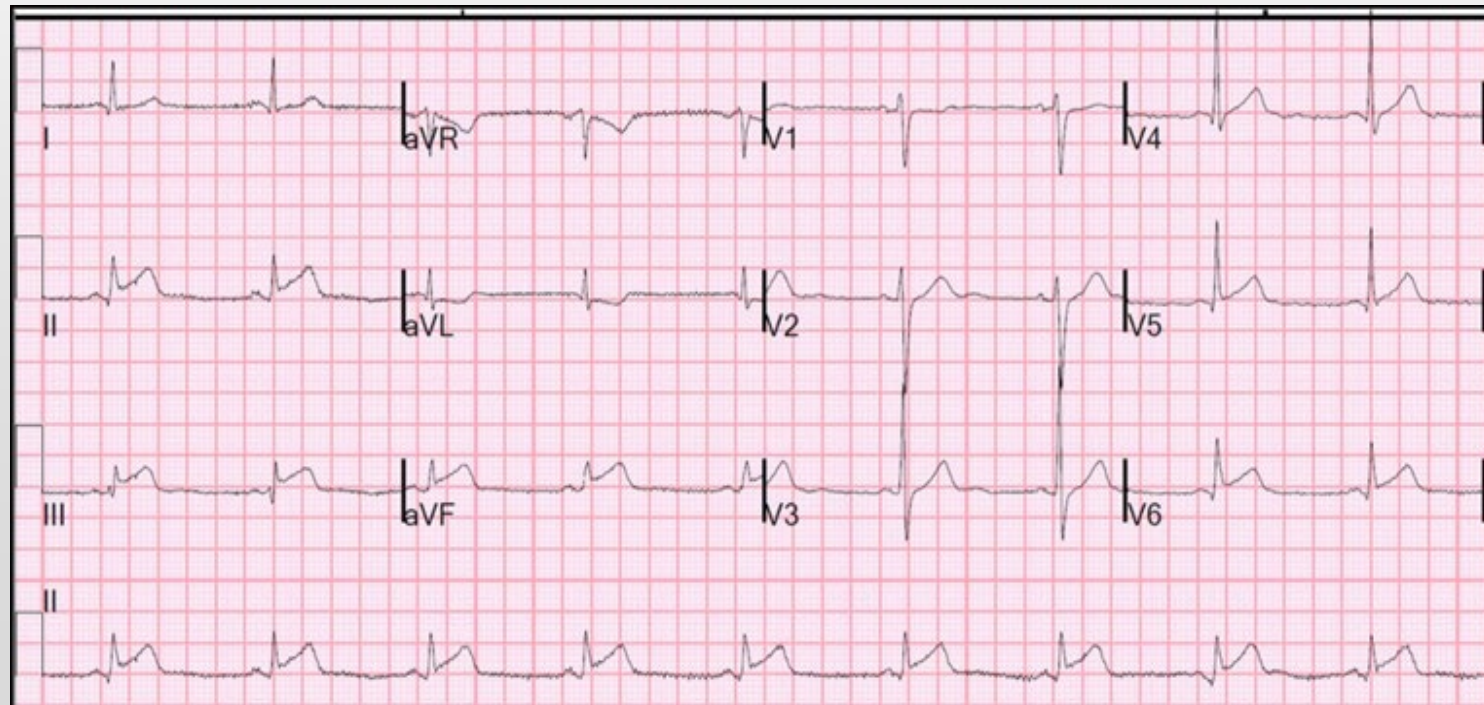
- Life threatening situation
- Rapid Recognition is the first step
- Rapid response can reduce damage but no guarantee to save a life
- Thrombus completely obstructs blood flow
- Leads to large area of damage, effects depolarization, leaving tissue positive, resulting in ST elevation

- **NON-ACS causes**
 - Coronary embolism
 - Coronary dissection
 - Coronary vasospasm

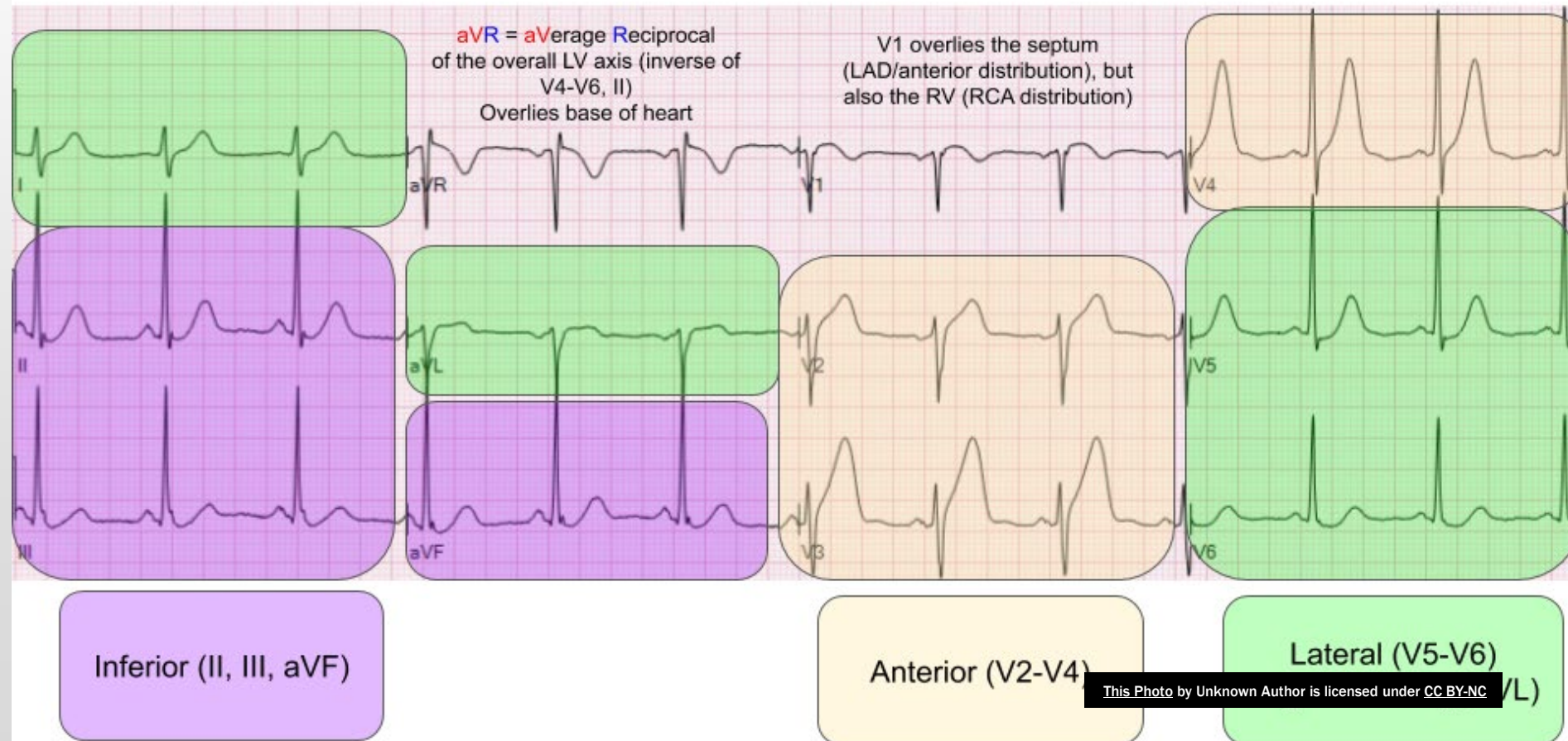


STEMI 12-Lead EKG - Definition

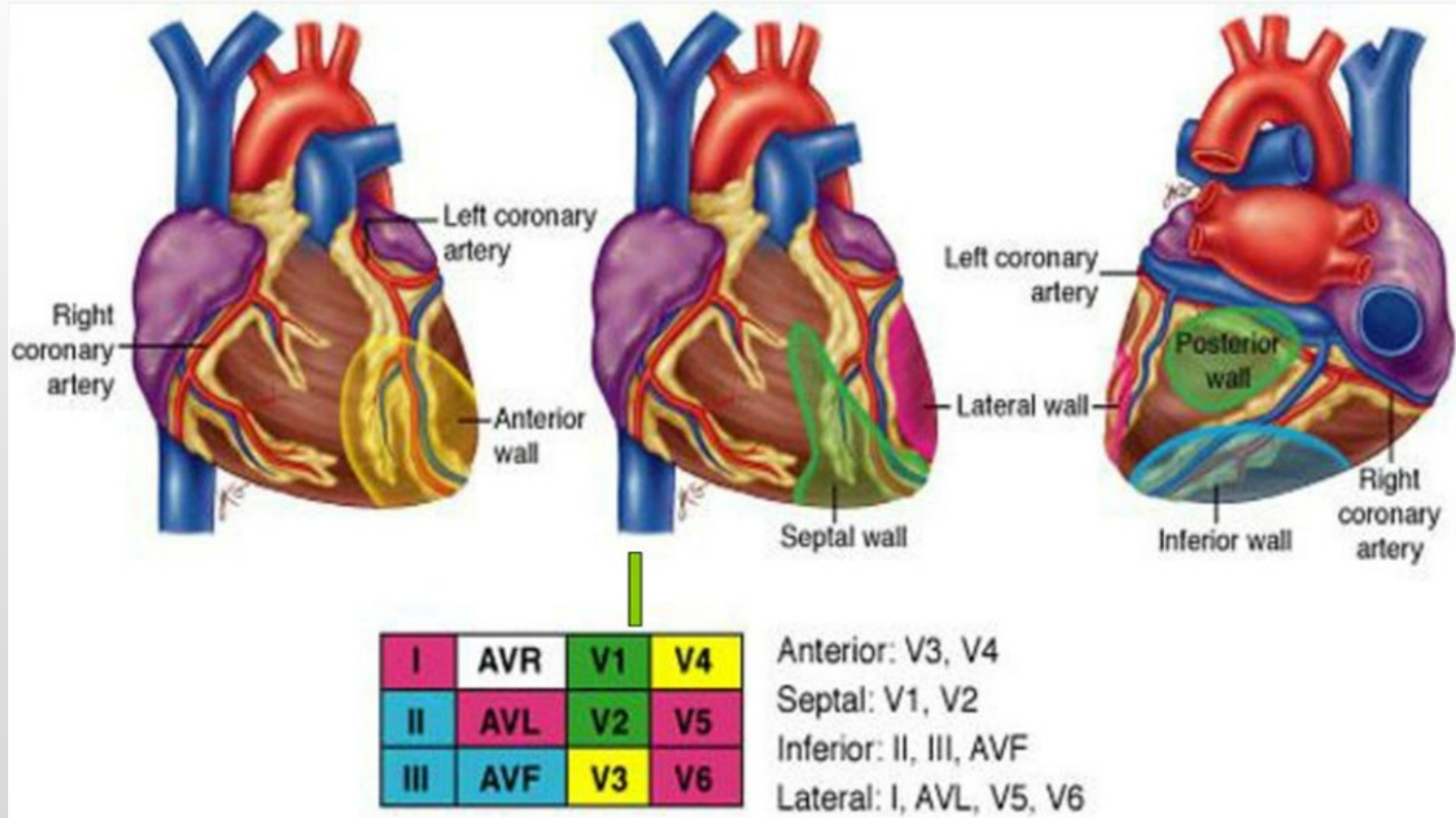
- Classically, STEMI is diagnosed if **there is >1-2mm of ST elevation in two contiguous leads on the ECG or new LBBB with a clinical picture consistent with ischemic chest pain**. Classically the ST elevations are described as “tombstone” and concave or “upwards” in appearance.



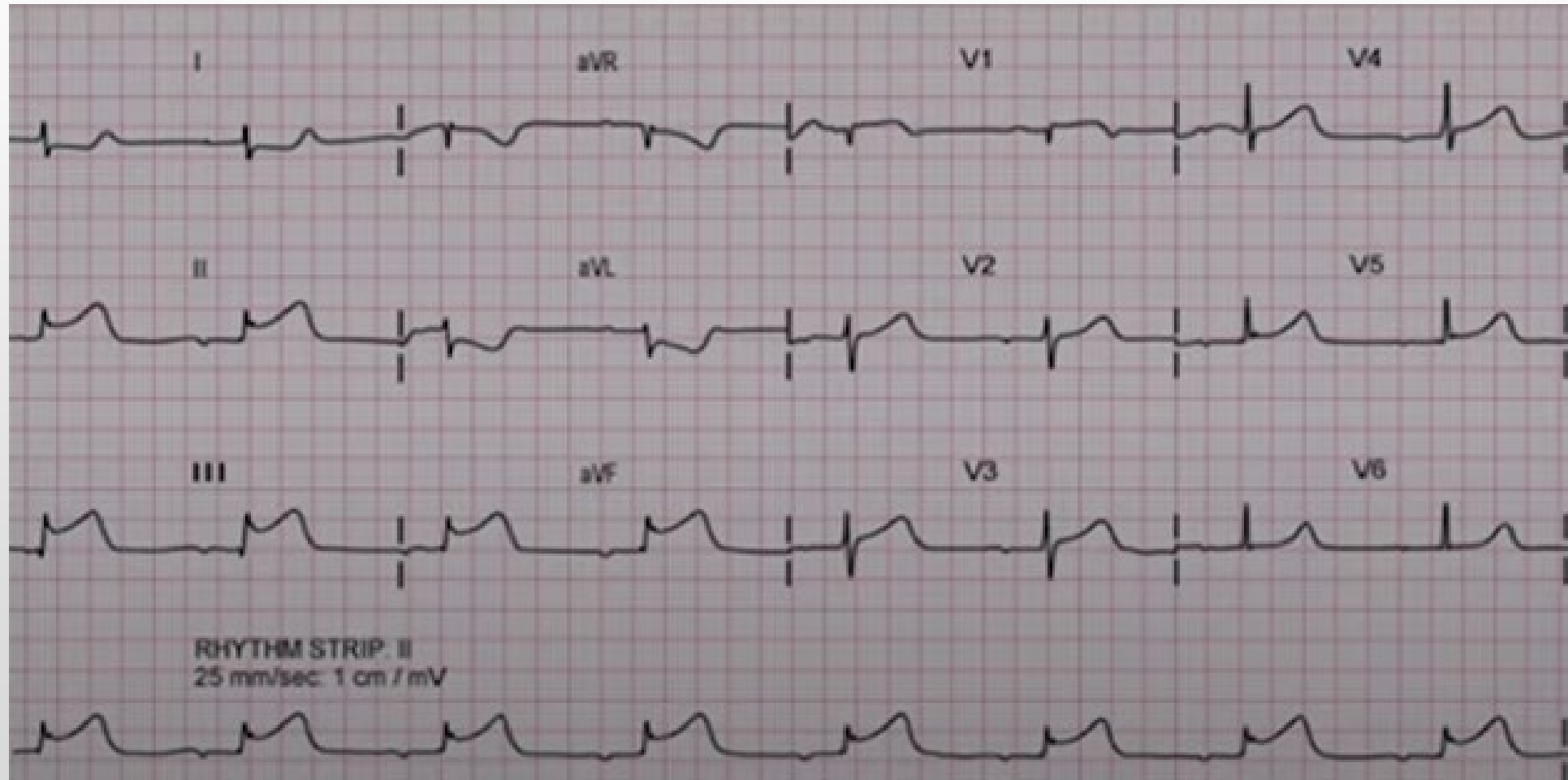
STEMI 12-Lead EKG – Infarct Regions



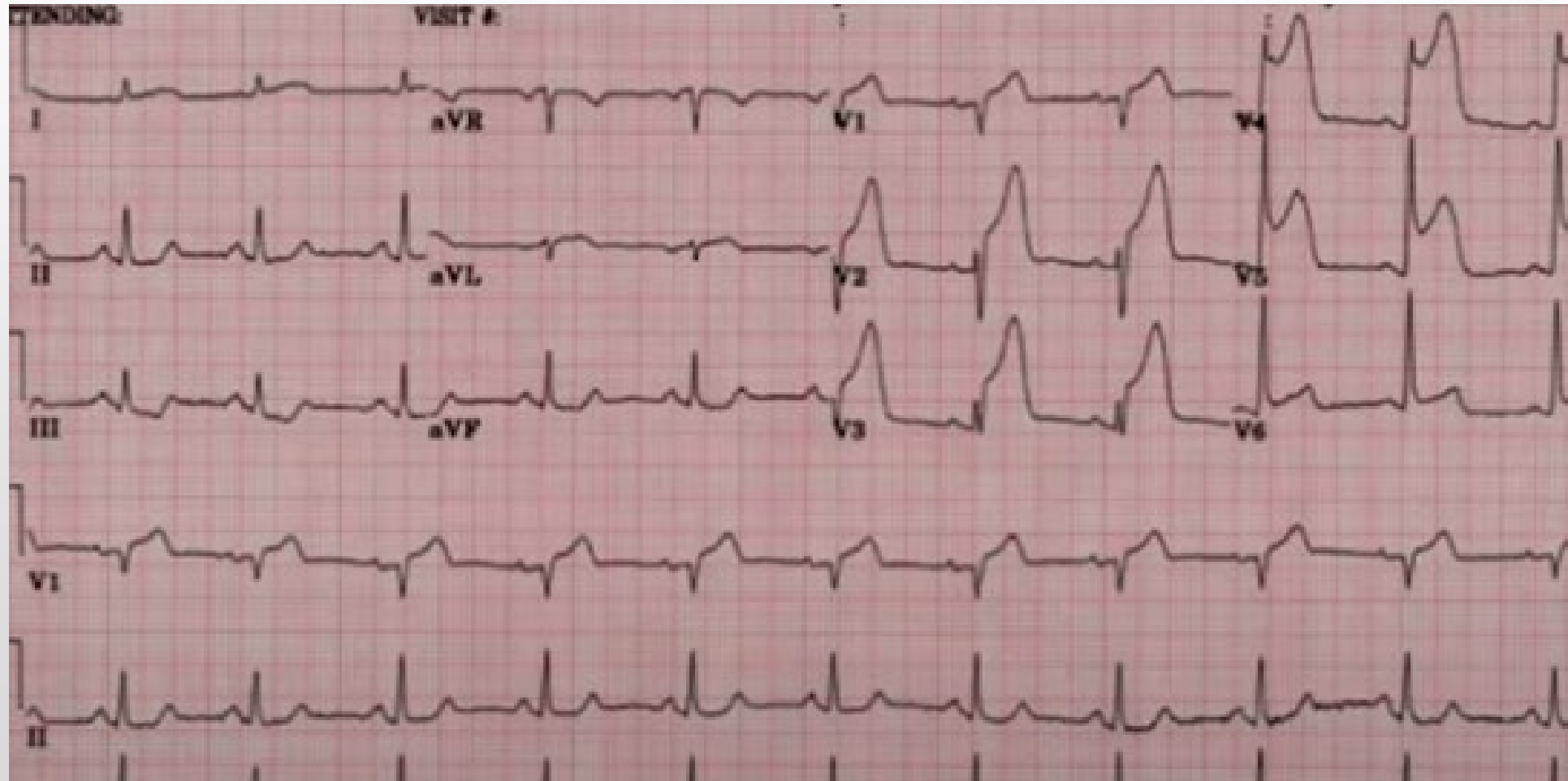
STEMI 12-Lead EKG – Infarct Regions



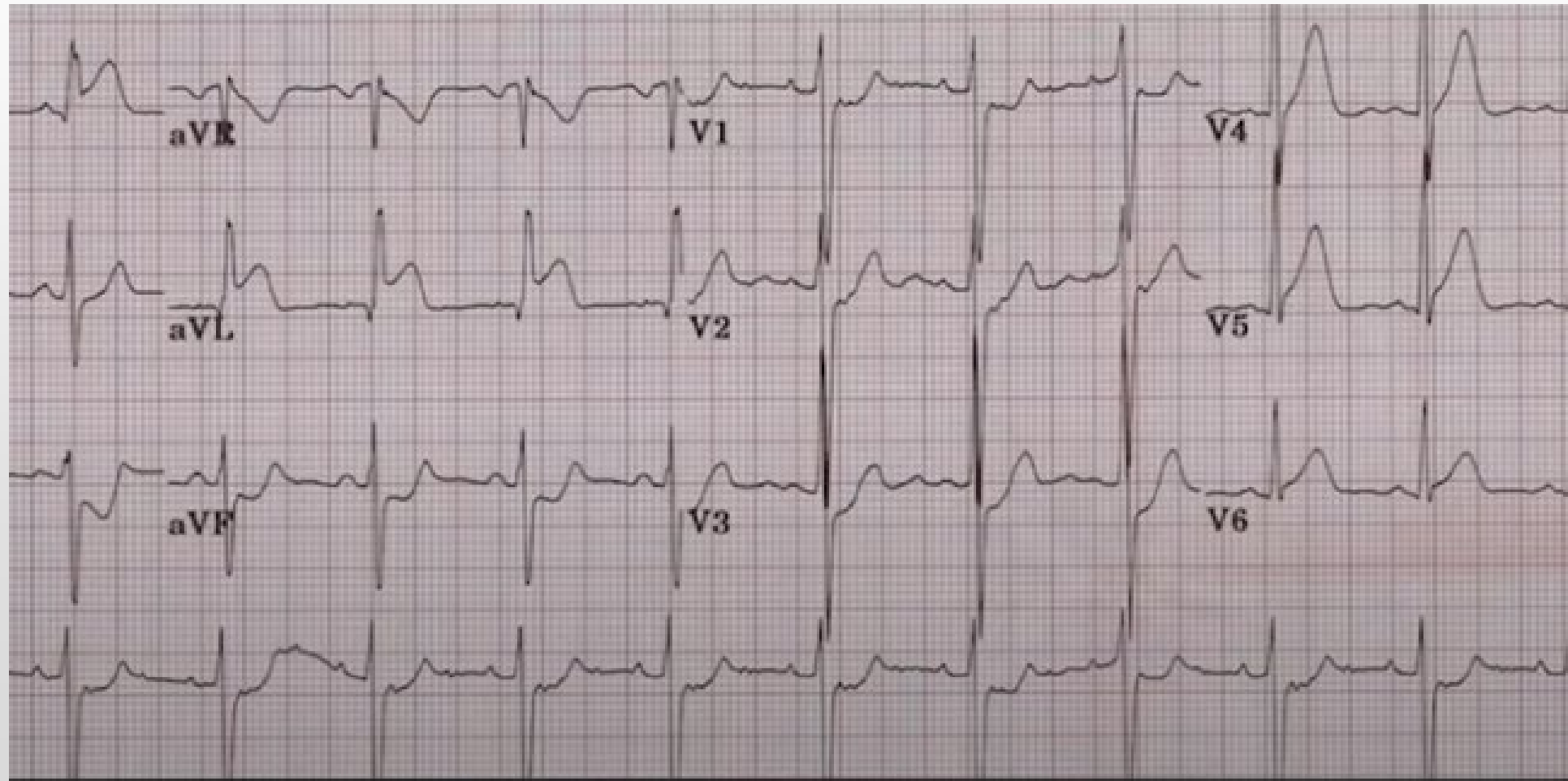
STEMI 12-Lead EKG – Inferior MI



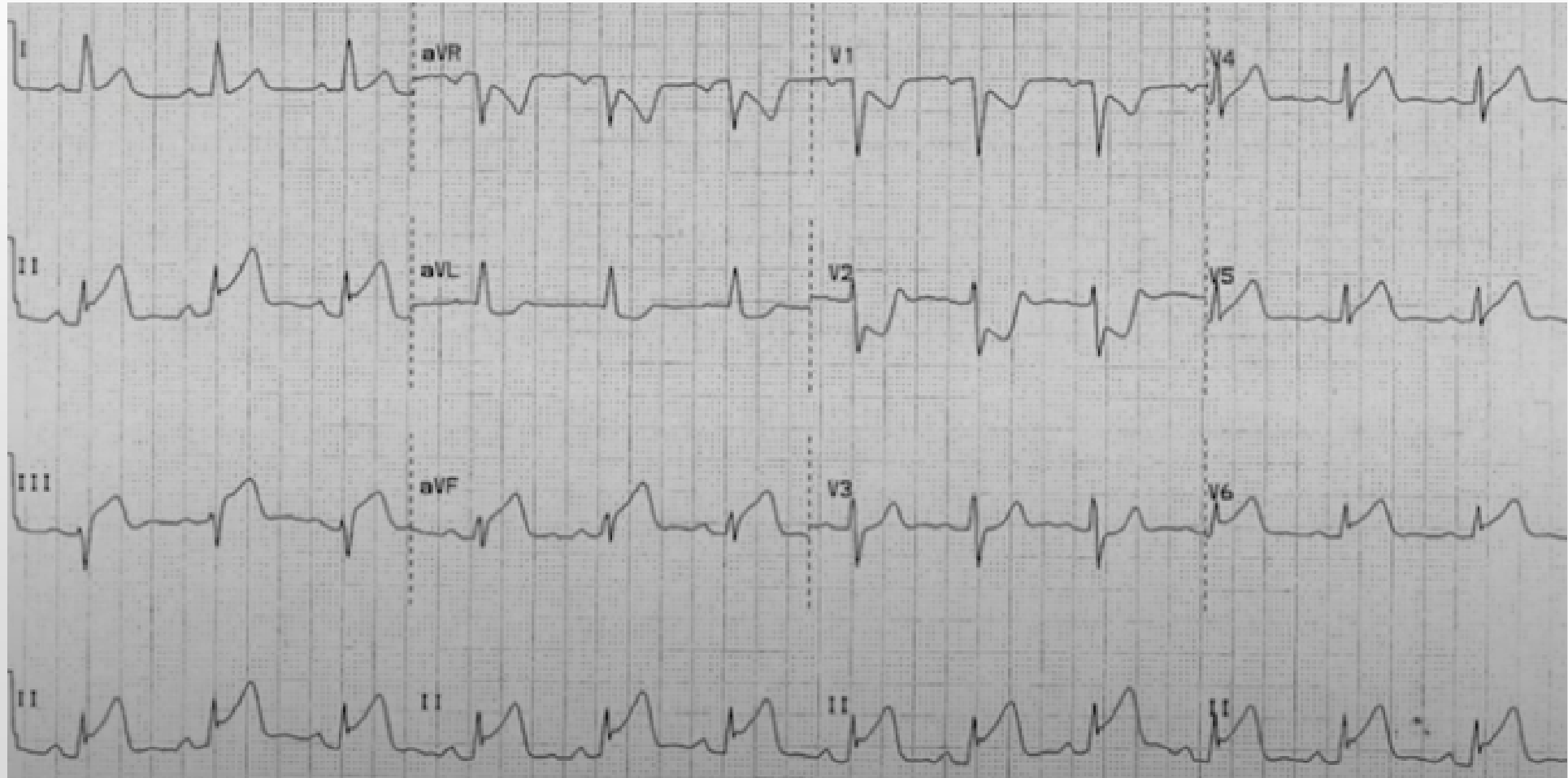
STEMI 12-Lead EKG – Anterior MI



STEMI 12-Lead EKG – Lateral MI



STEMI 12-Lead EKG – Posterior MI

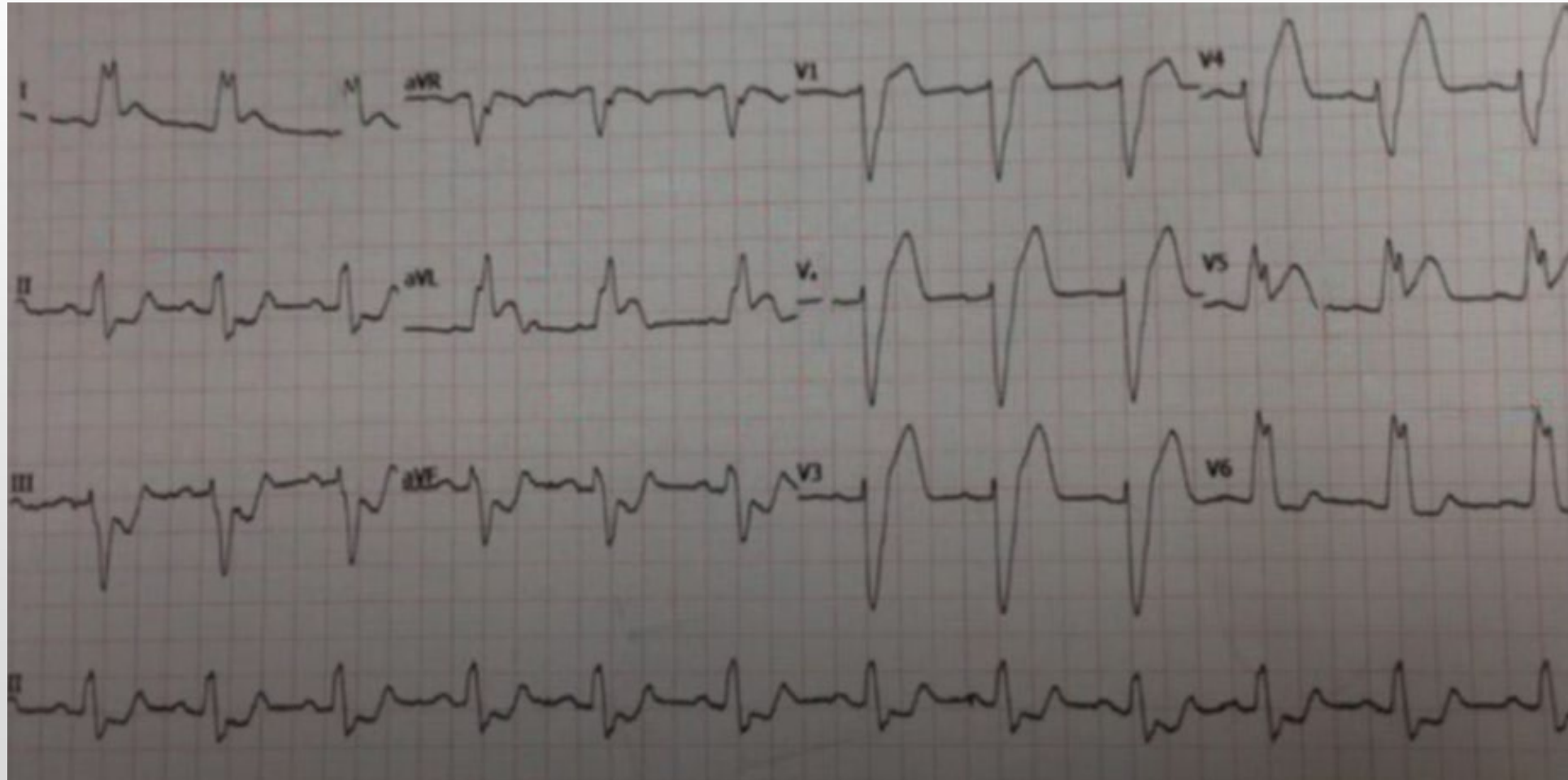




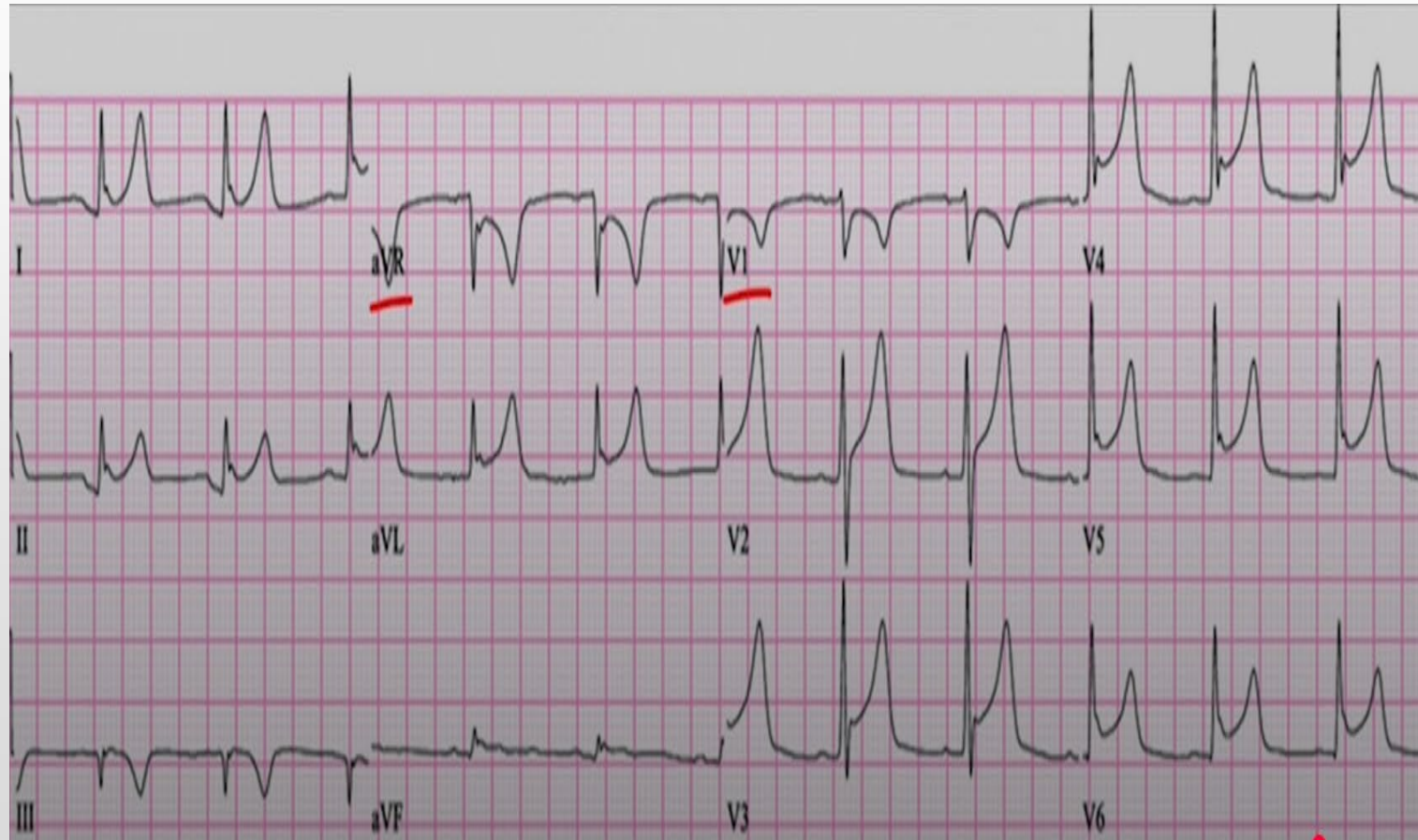
STEMI 12-Lead EKG – Mimics

- Electrolytes – Hyperkalemia
- LBBB – can also see in RBBB
- Electricity – Early repolarization; ventricular paced
- Ventricular hypertrophy
- Aggravation – irritation/inflammation of pericardium (pericarditis)
- Thrombus – PE; coronary thrombus
- Injury – Infarction; heart contusion
- Osborne Waves (J waves) – hypothermia (rare in Takotsubo) Deflection in J point
- Non-occlusive vasospasm

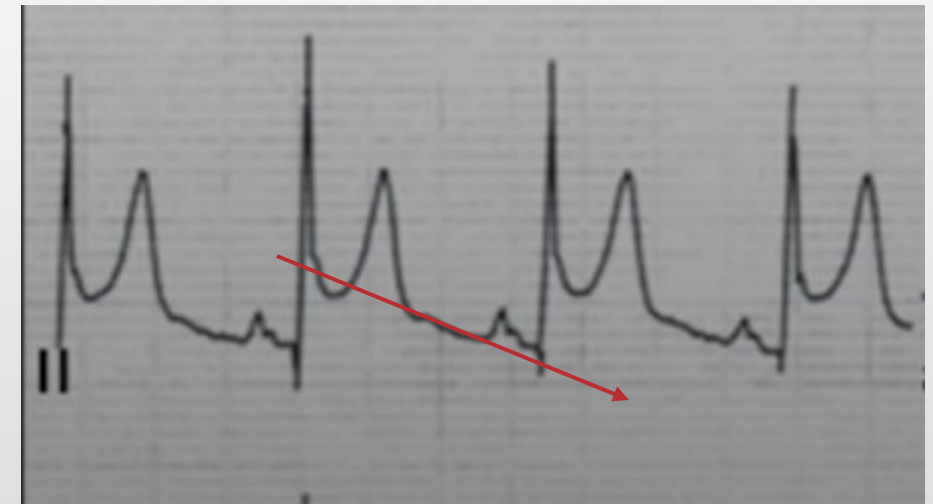
STEMI 12-Lead EKG – Mimics- LBBB Sgarbossa Criteria



STEMI 12-Lead EKG – Mimics - Pericarditis



Spodick's Sign





Key Points

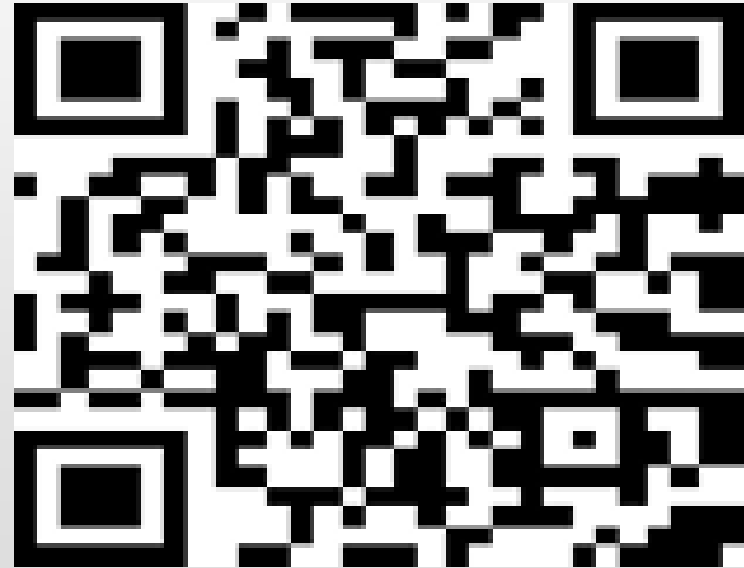
- Find a systematic approach and stick with it!
- Knowledge of what is “Normal” will assist in identifying “Abnormal”
- Anteroseptal infarcts are the most common MI
- Inferior infarct is the second most common MI
- Inferior infarcts may require Right-sided EKG to determine RV involvement (avoid vasodilators)
- Mnemonic “E-L-E-V-A-T-I-O-N” for STEMI mimics

Thank You!!



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References

- Cowan, Mark (2017) The 12-Lead Electrocardiogram for Nurses and Allied Professionals, Page Publishing, New York, NY
- Watson, Eric ICU Advantage, “The Simple Steps of 12-Lead EKG Interpretation”; <https://www.youtube.com/watch?v=yopy6QUjRbY>