EMET Tasmania
Emergency Medicine Education & Training

The Cardiac Society of Australia and New Zealand
Heart Foundation

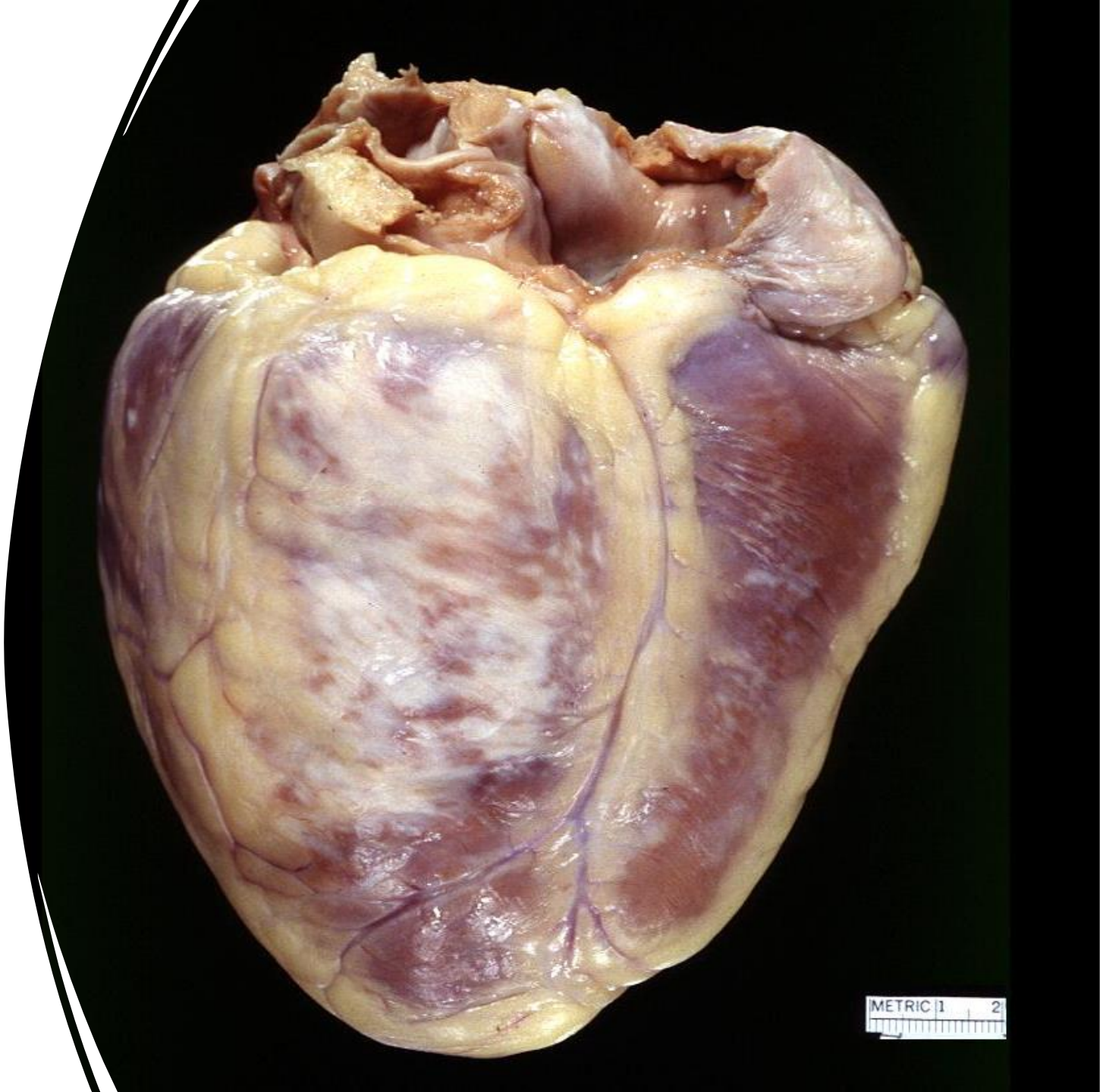
EMERGENCY MEDICINE EDUCATION AND TRAINING

Acute Coronary Syndrome & STEMI equivalents:

Clinical assessment and management of ACS patients in the Primary Care setting

Outline

- Current accepted Statewide STEMI and ? ACS pathways
- (A)typical ECGs
- (A)typical presentations



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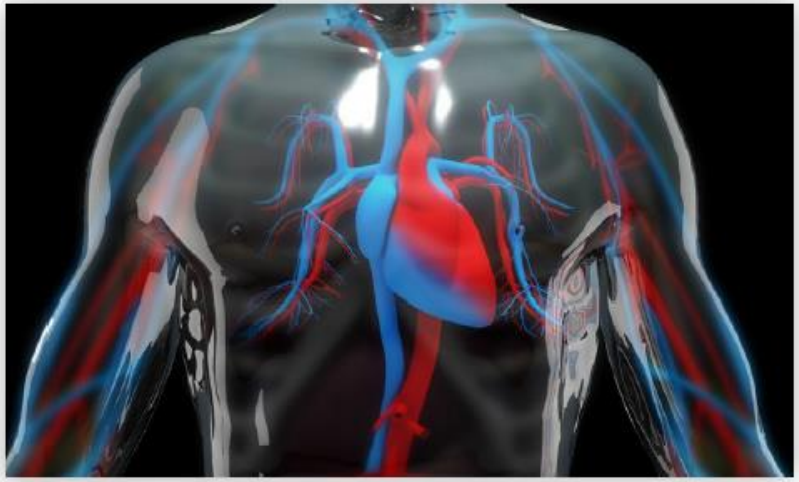
Australian Clinical Guidelines for the Management of Acute Coronary Syndromes 2016 [1]



1. Chew DP, et al. Heart Lung Circ 2016; 25: 895–951.

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Initial assessment

- **History (more on this later…)**
  - Pain: *time of onset*, site, character, severity, duration, aggravating/relieving factors
- **ECG**
  - Within 10 minutes of arrival
  - Review by experienced clinician
- **[Troponin:** On arrival to ED]

Is this a patient with STEMI?

- **Patient:**
  - Symptoms (**pain *may have resolved***)
    - Typical chest pain > 20min
    - Onset within 12 hours
  - **ECG:**
    - ST segment elevation in 2 or more contiguous leads

Call 000: State "STEMI"

Call MOIC NWRH or MCH

(Statewide Thrombolysis for STEMI Clinical Pathway)

Initial treatment – OXYGEN (just to clarify)

- Sats > 93%?
  - **Not** recommended
- Sats < 93%?
  - Start O2, just aiming for sats > 93%
- COPD patient?
  - Aim for sats 88-92%

Giving routine oxygen to non-hypoxemic patients has been shown to have no benefit, and some studies have even shown harm, including a larger infarct size and other secondary outcomes such as recurrent infarction and dysrhythmias

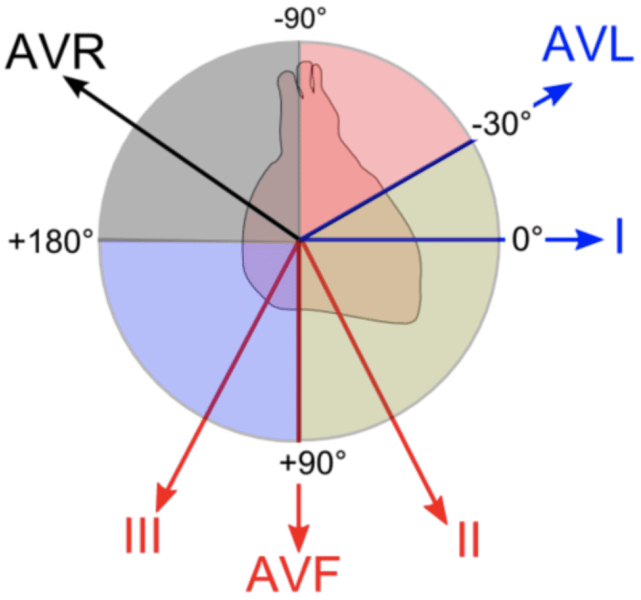
Arrival: Initial treatment – OTHER DRUGS

- **Aspirin**
  - 300mg
- ***GTN**
  - Ongoing chest pain
  - PO/SL/IV
  - **Know when to be cautious with GTN*
- **Morphine (or fentanyl)**
  - Refractory chest pain
  - *"Pain = myocardial damage"*

The benefit of **aspirin** vs. placebo in the setting of suspected STEMI has been quantitated in the ISIS-2 trial, in which aspirin conferred a **number needed to treat of 42 for mortality**

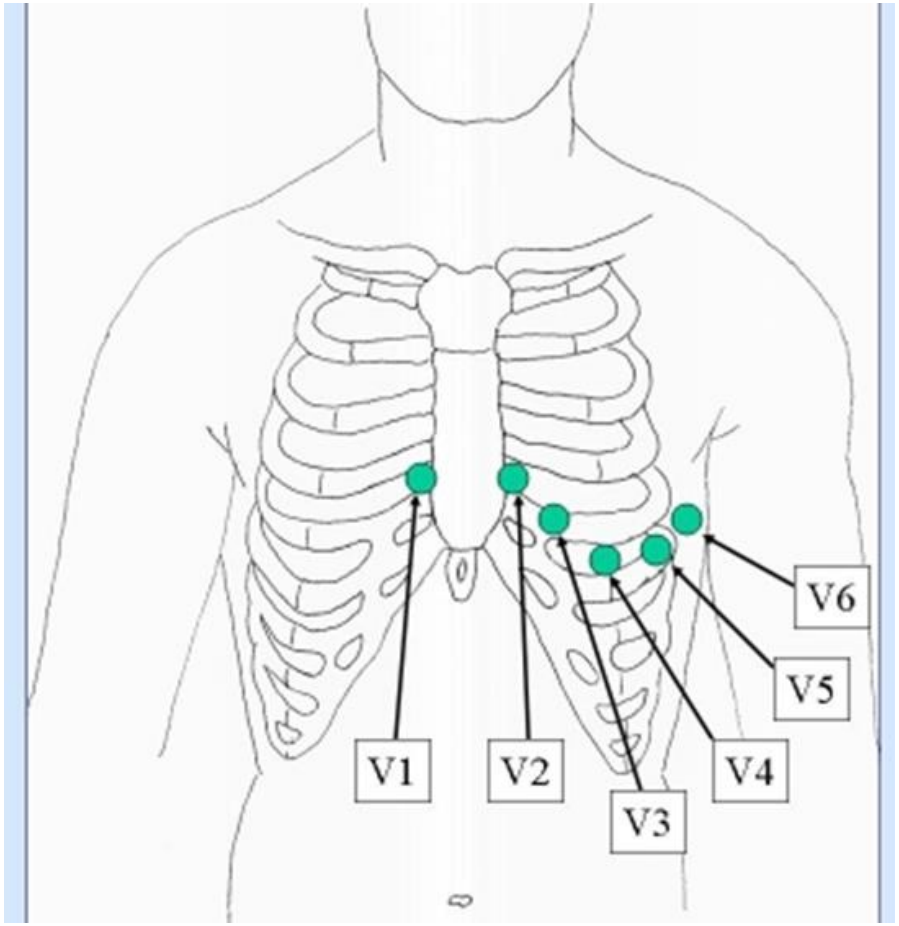
GTN: Indicated for ACS with ongoing chest pain, hypertension, or concomitant heart failure with pulmonary edema

ECG



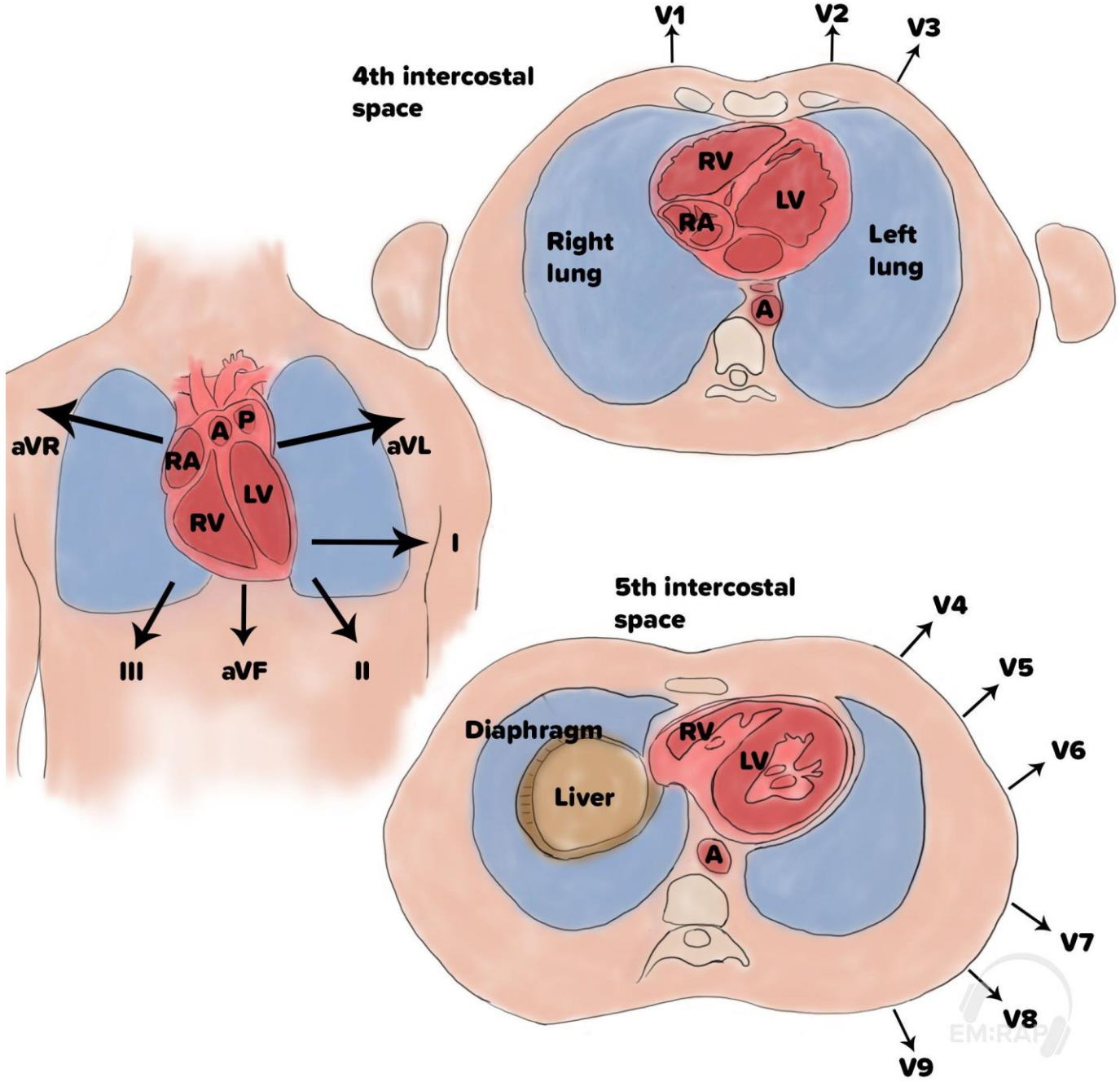
QRS Deflection		Axis
Lead I	Lead aVF	
+	+	Normal
+	-	LAD
-	+	RAD
-	-	Extreme Axis

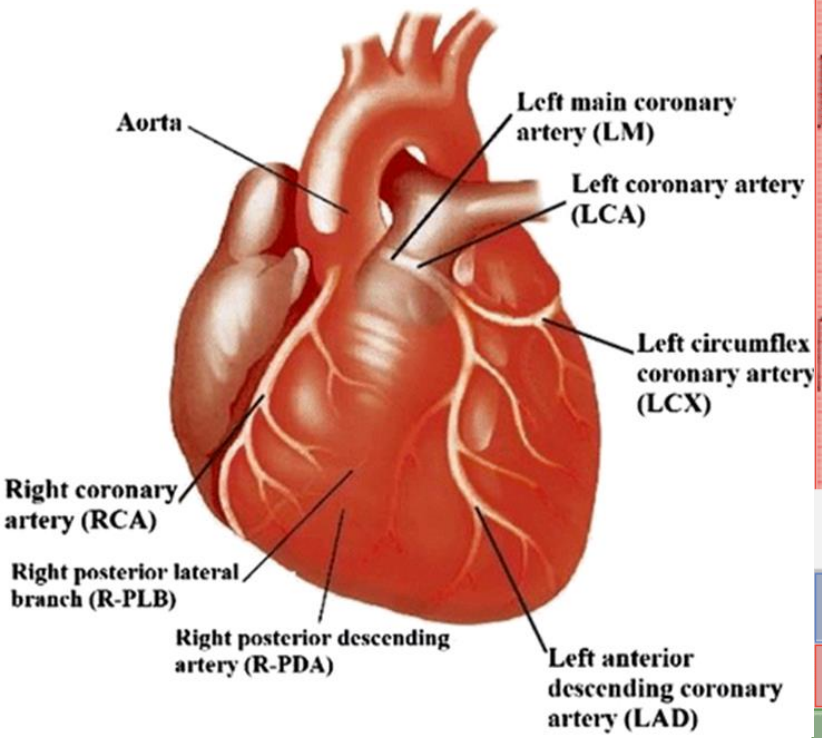
REBEL REVIEWS

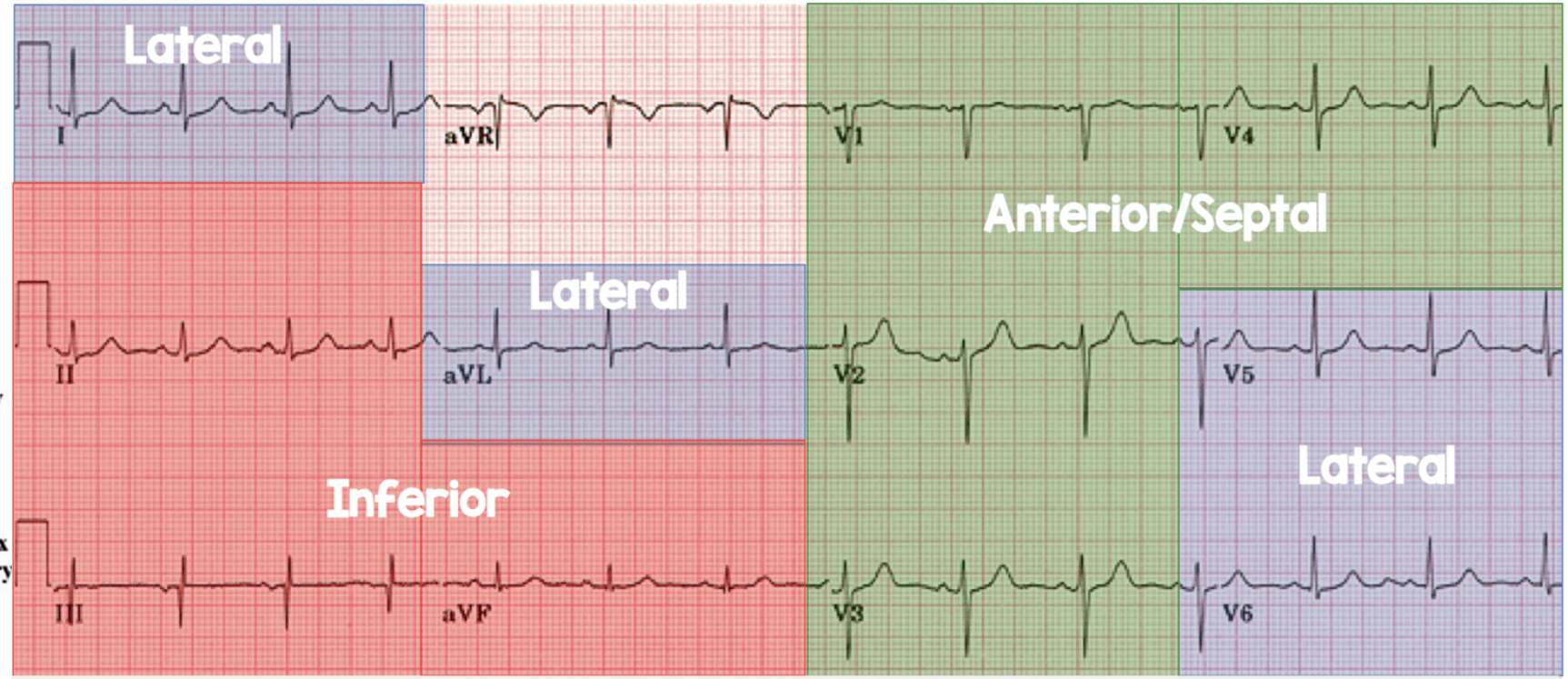


ECG Lead Positioning

- It helps to think about which area of the heart the lead's "looking at"





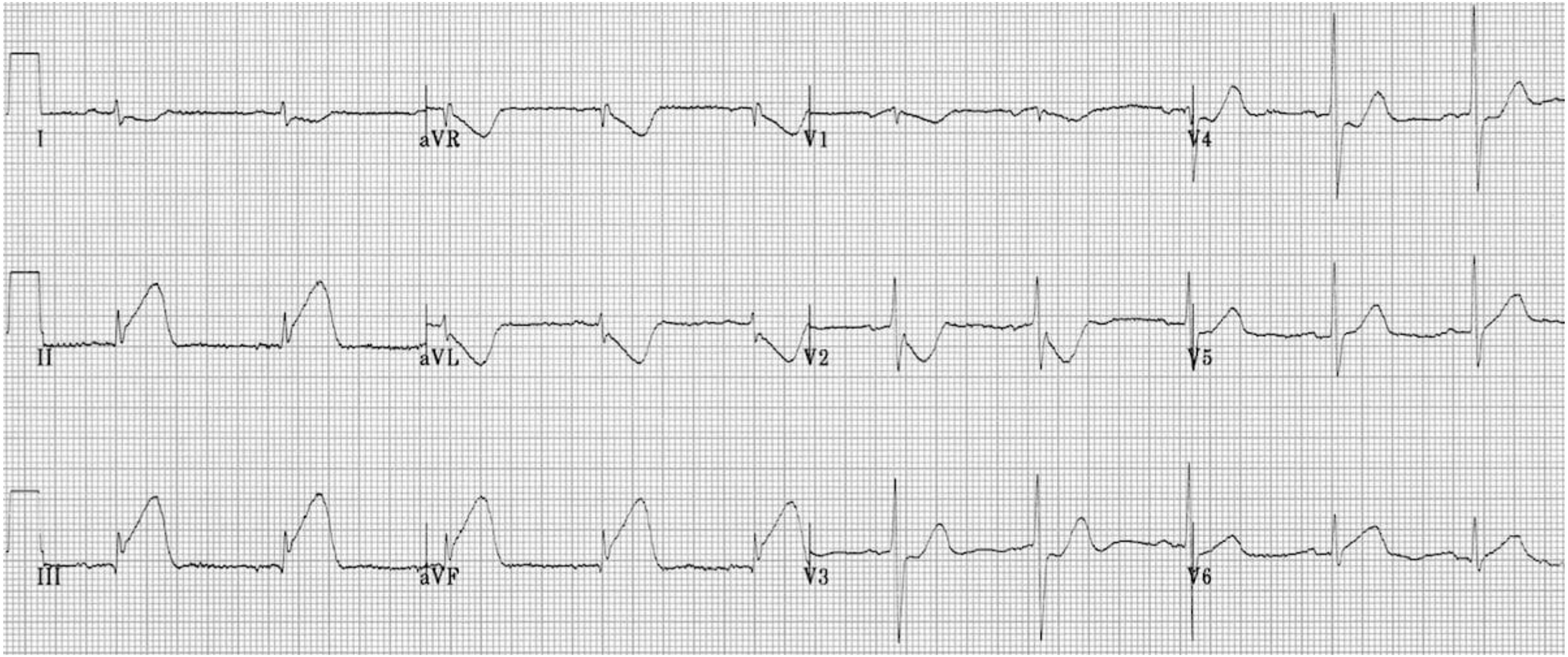


Coronary Anatomy & ECG Leads

Lateral Leads	I, aVL, V5 - V6	LCx or Diagonal of LAD
Inferior Leads	II, III, aVF	RCA and/or LCx
Anterior/Septal Leads	V1 - V4	LAD

REBEL REVIEWS

Acute inferior STEMI



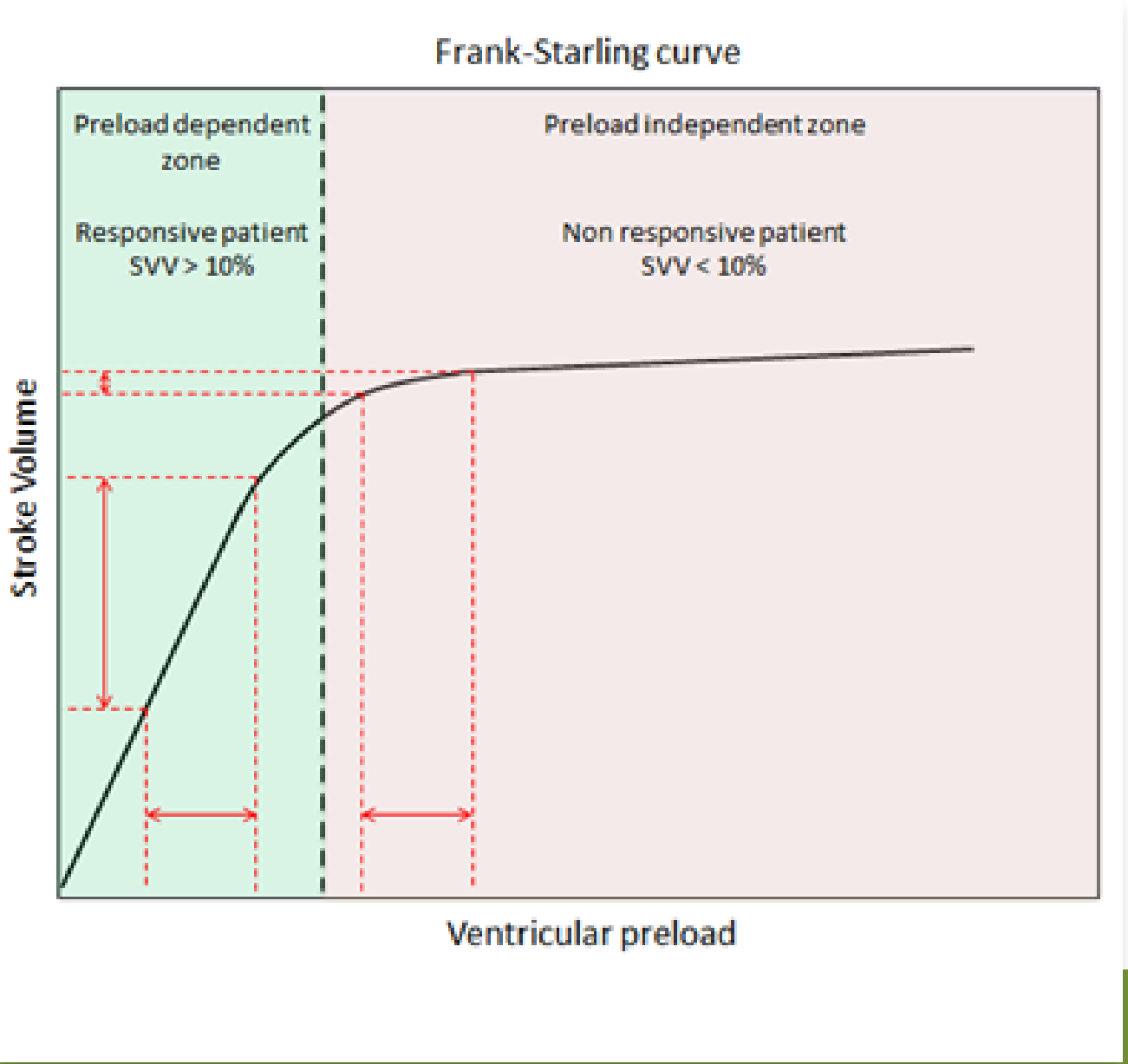
A note on Right Ventricular MIs

- 1/3 of INFERIOR MIs have RV involvement
- Also look for concurrent STE in V1

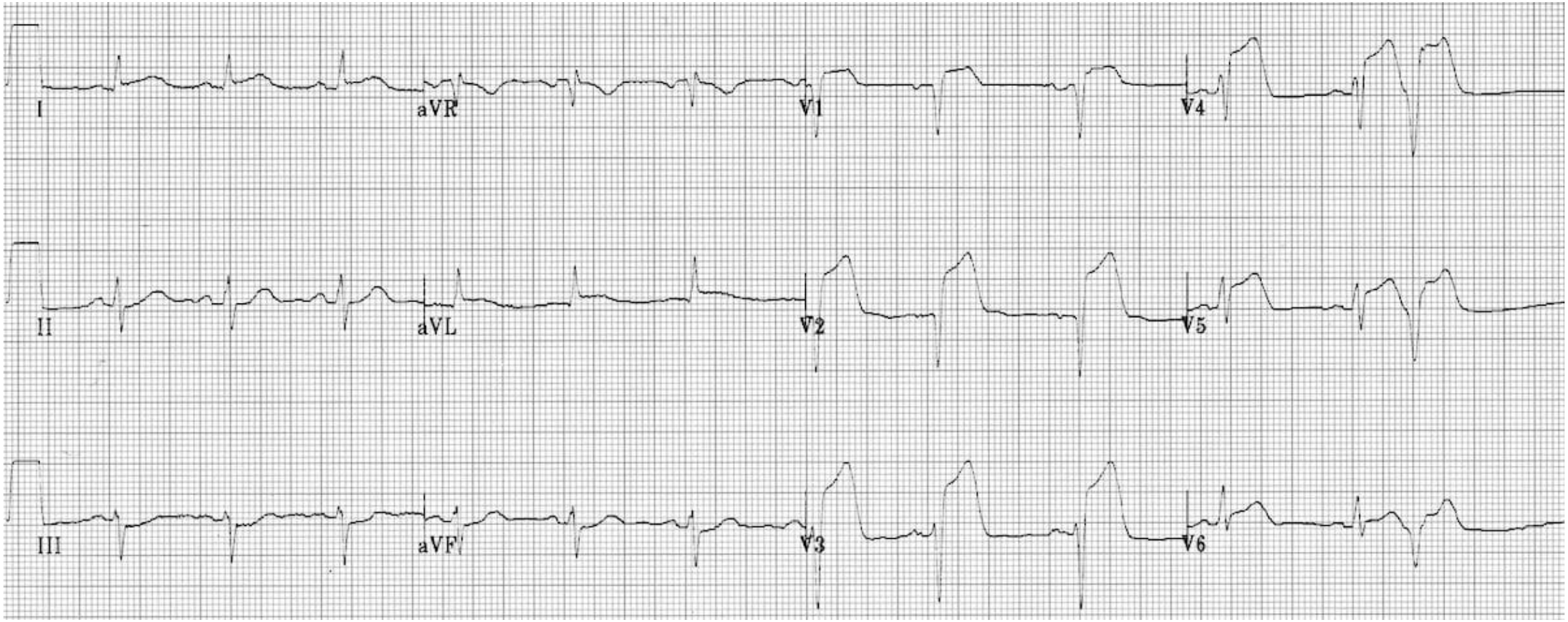
- These Pts are PRE-LOAD DEPENDENT

- ***Medications that reduce preload (GTN, B-blockers, morphine) may precipitate hypotension***

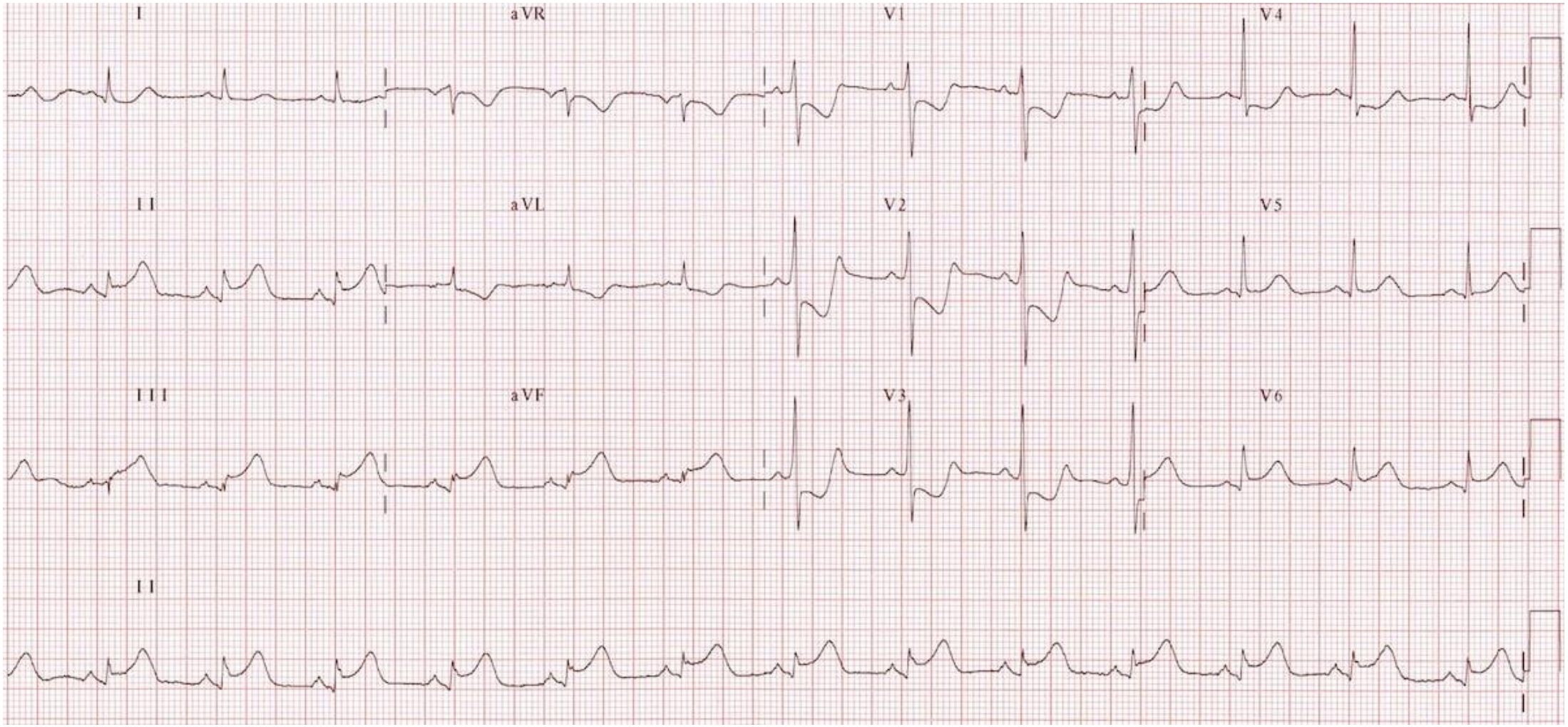
- May need small fluid bolus…

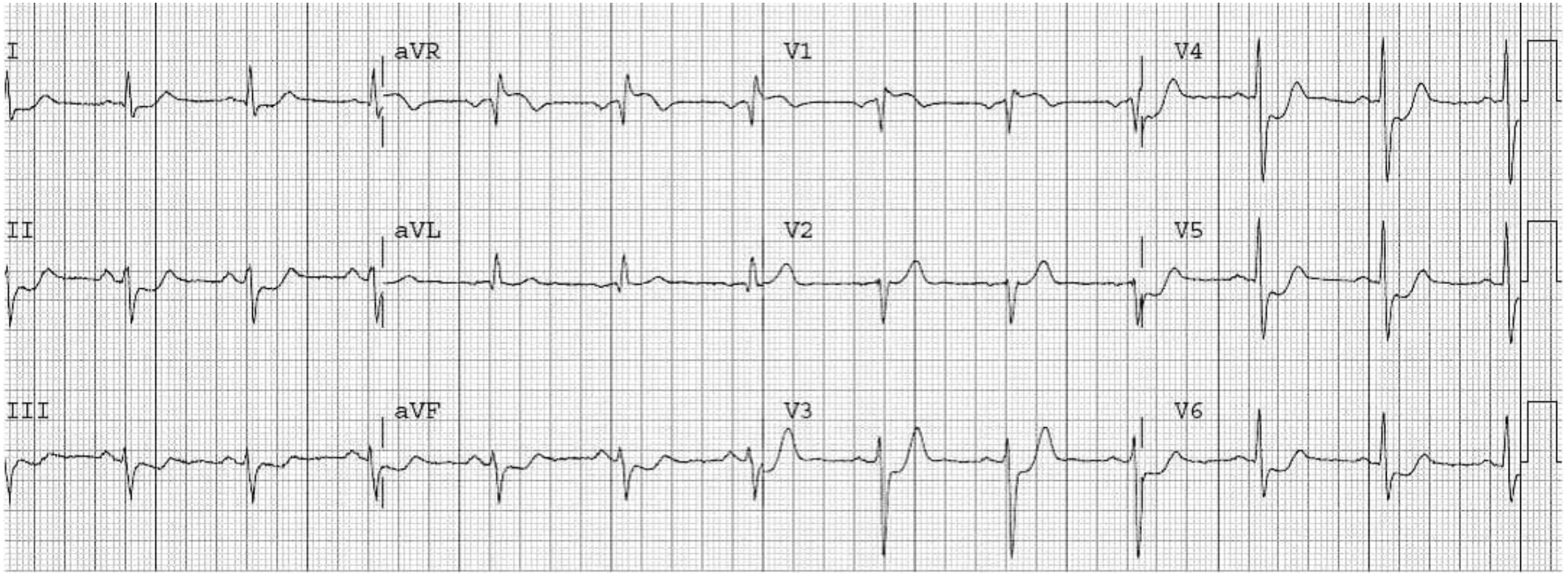


Acute anterior STEMI



Acute (infero-)posterior STEMI





What about aVR?

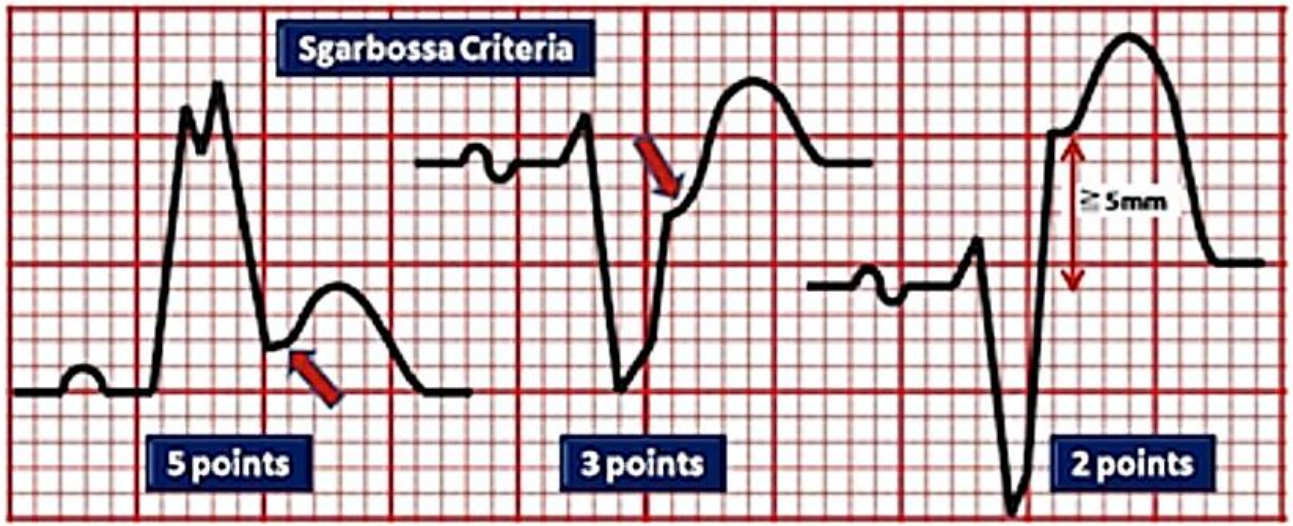
- STE in aVR + multi-lead ST depression

  =

- acute occlusion of Left Main or Proximal LAD

What's a STEMI Equivalent?

- Represents ***coronary occlusion without meeting traditional STE criteria***
- **Equally important to recognize ASAP**
- NB: LBBB + chest pain…

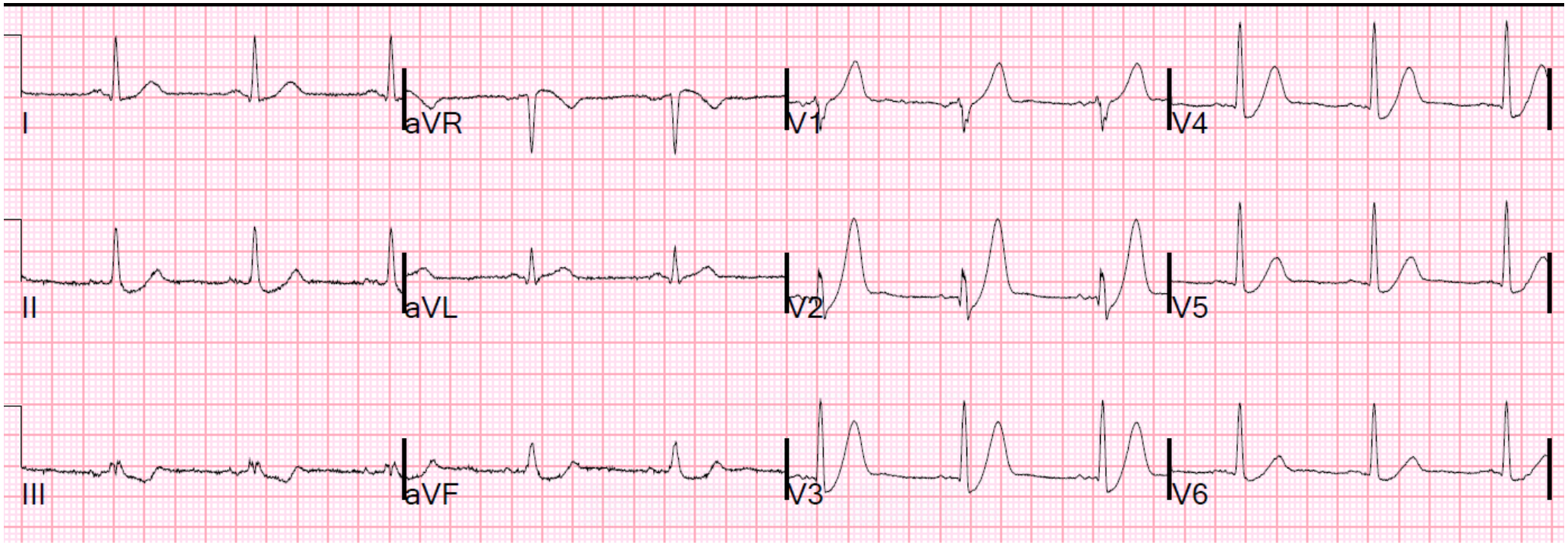


Sgarbossa ECG Criteria for LBBB	
Concordant STE ≥1mm	5 points
STD ≥1mm in V1 – V3	3 points
Discordant STE ≥5mm	2 points

De Winter T-waves

- > 1mm upsloping STD & tall symmetric T waves, usually praecordial leads
- May be STE in aVR

= LAD occlusion



Wellen's Syndrome = Critical proximal LAD disease

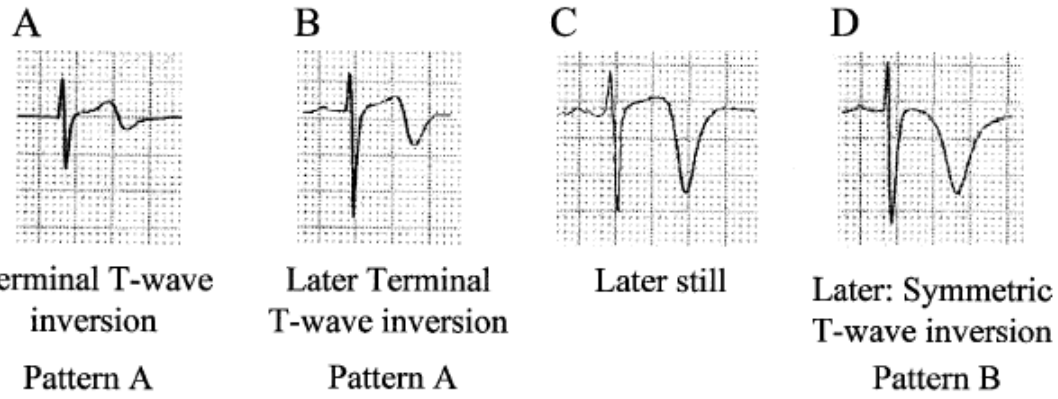
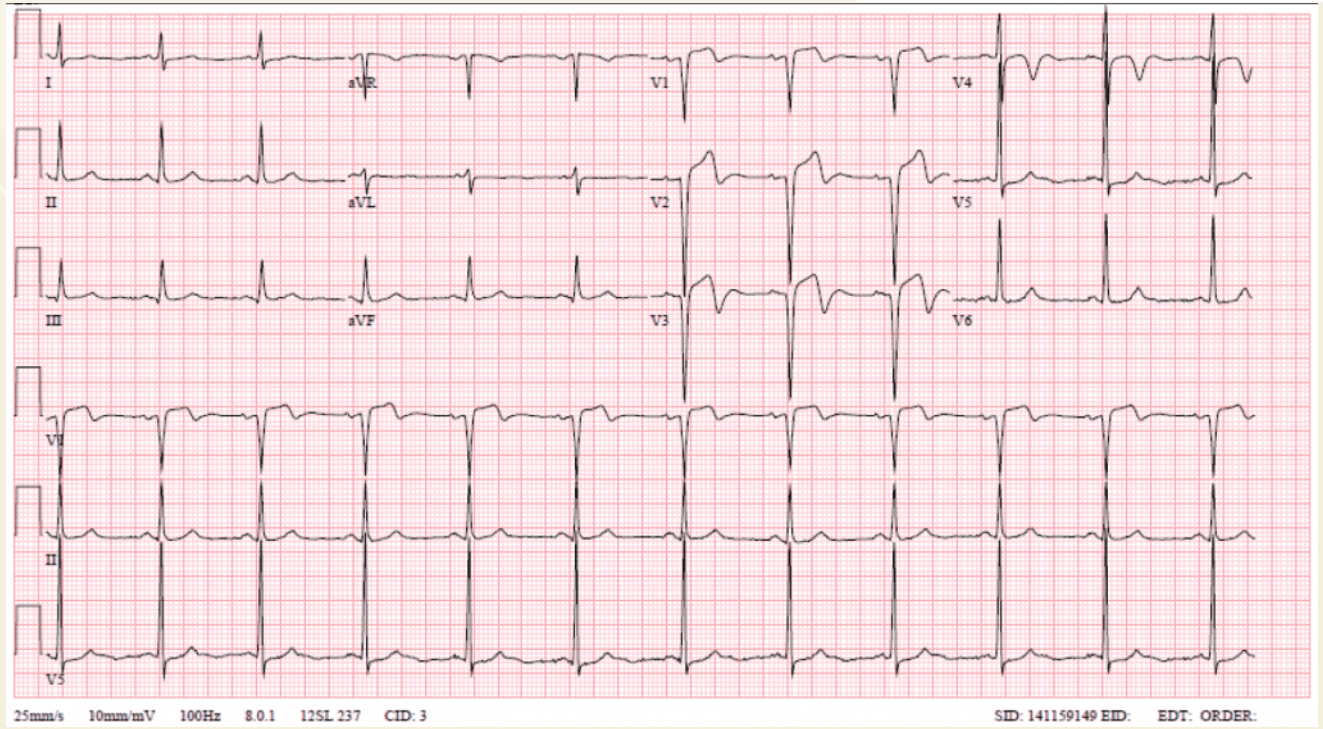
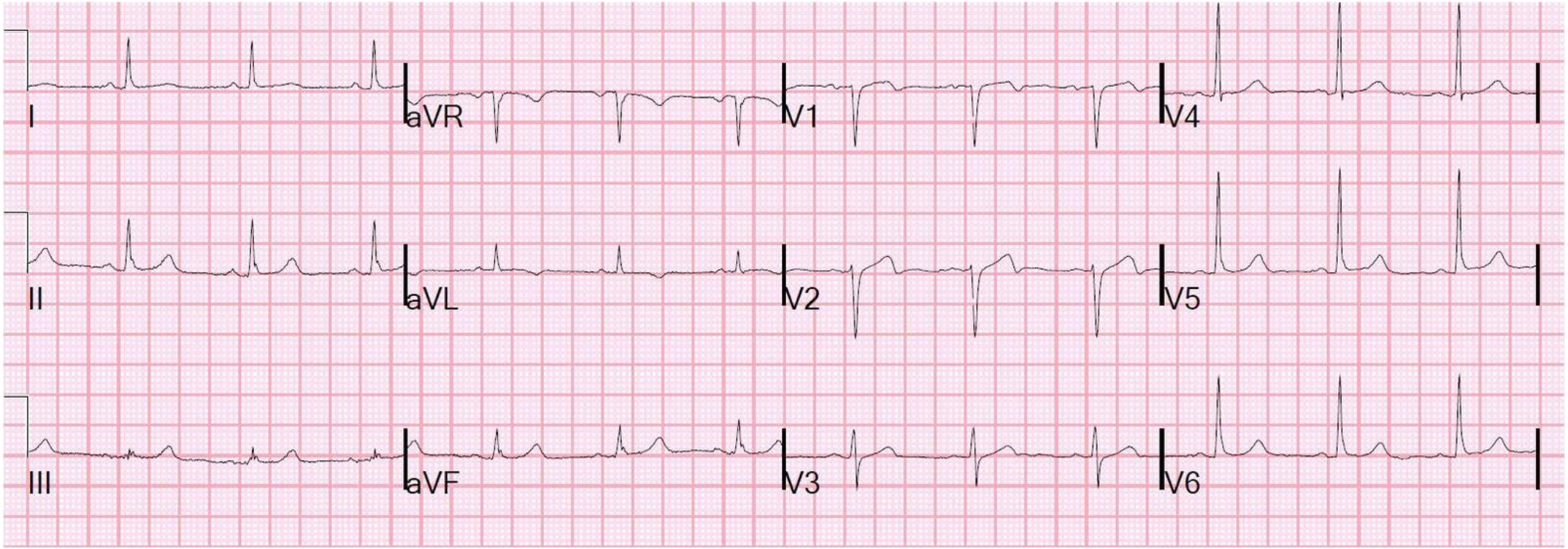


Fig. 19. Evolution of T-wave inversion (*A–D*) after coronary reperfusion in STEMI reperfusion and in Wellens syndrome (NSTEMI). *Reprinted with permission from* Smith SW, Zvosec DL, Sharkey SW, Henry TD. The ECG in acute MI: an evidence-based manual of reperfusion therapy. 1st edition. Philadelphia: Lippincott, Williams, and Wilkins: 2002. p. 358.





aVL: TWI +/- hyperacute T waves inferior leads

- Isolated TWI in aVL is associated with ***impending inferior MI*** & ***mid-LAD lesions***
- Serial ECGs may help

OK, so it's not a STEMI but your Patient has chest pain…

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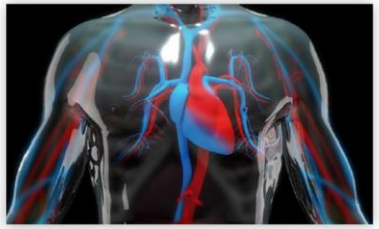


1. Chew DP, et al. Heart Lung Circ 2016; 25: 895–951.

Patients who present to primary care physicians or to clinicians in other outpatient settings with chest pain (within 24 hours) and suspected ACS should be referred as soon as possible to the ED or a facility capable of definitive risk stratification and diagnosis of ACS

Risk stratification (what we do in ED)

Pts with ? ACS:

Care should be guided by an evidence-based "Suspected ACS" protocol (THS has one)

Aim is to estimate the ***probability of ACS & ACS-related morbidity/mortality***

HEART score for chest pain patients

History (Anamnesis)	Highly suspicious	2	
	Moderately suspicious	1	
	Slightly suspicious	0	
ECG	Significant ST-deviation	2	
	Non-specific repolarisation disturbance / LBBB / PM	1	
	Normal	0	
Age	≥ 65 years	2	
	45 – 65 years	1	
	≤ 45 years	0	
Risk factors	≥ 3 risk factors *or* history of atherosclerotic disease	2	
	1 or 2 risk factors	1	
	No risk factors known	0	
Troponin	≥ 3x normal limit	2	
	1-3x normal limit	1	
	≤ normal limit	0	
		Total	

Risk factors for atherosclerotic disease:

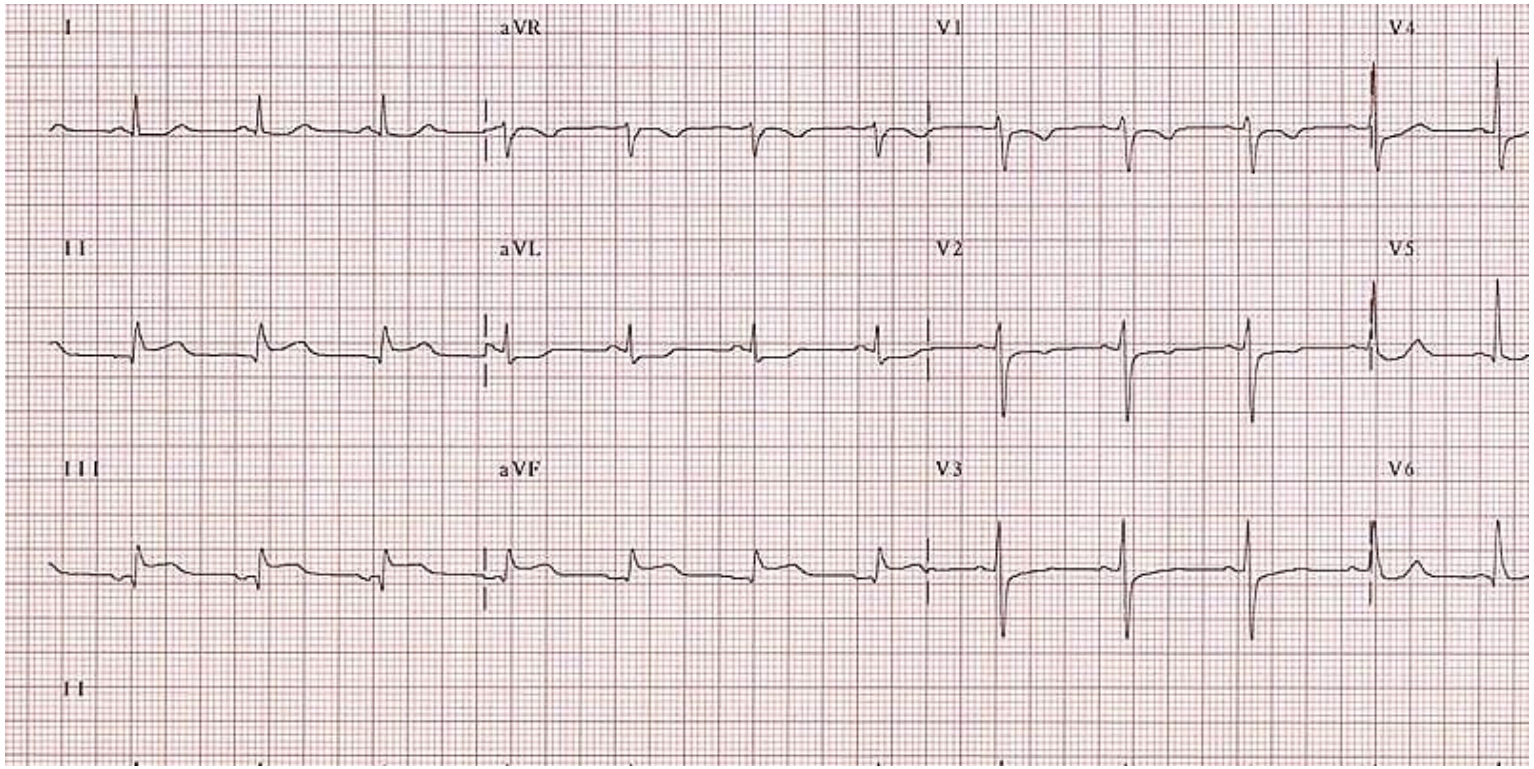
Hypercholesterolemia
Hypertension
Cigarette smoking
Positive family history

Atypical presentations

82 year old woman brought in by family; only complaint is general malaise & nausea – thinks related to recent meal; looks well.

- Significant ECG delay…

- ***Beware ACS in older patients***:
- Often non-specific Sx, especially in older females
- Pt may give good Hx for GI problem
- ***ECG early and for all!***



CAUTION!

33% of both STEMI & NSTEMI and as many as *75% of patients over 75* present **without any chest pain**

<u>> 40% of women</u> with AMI have **no chest pain**

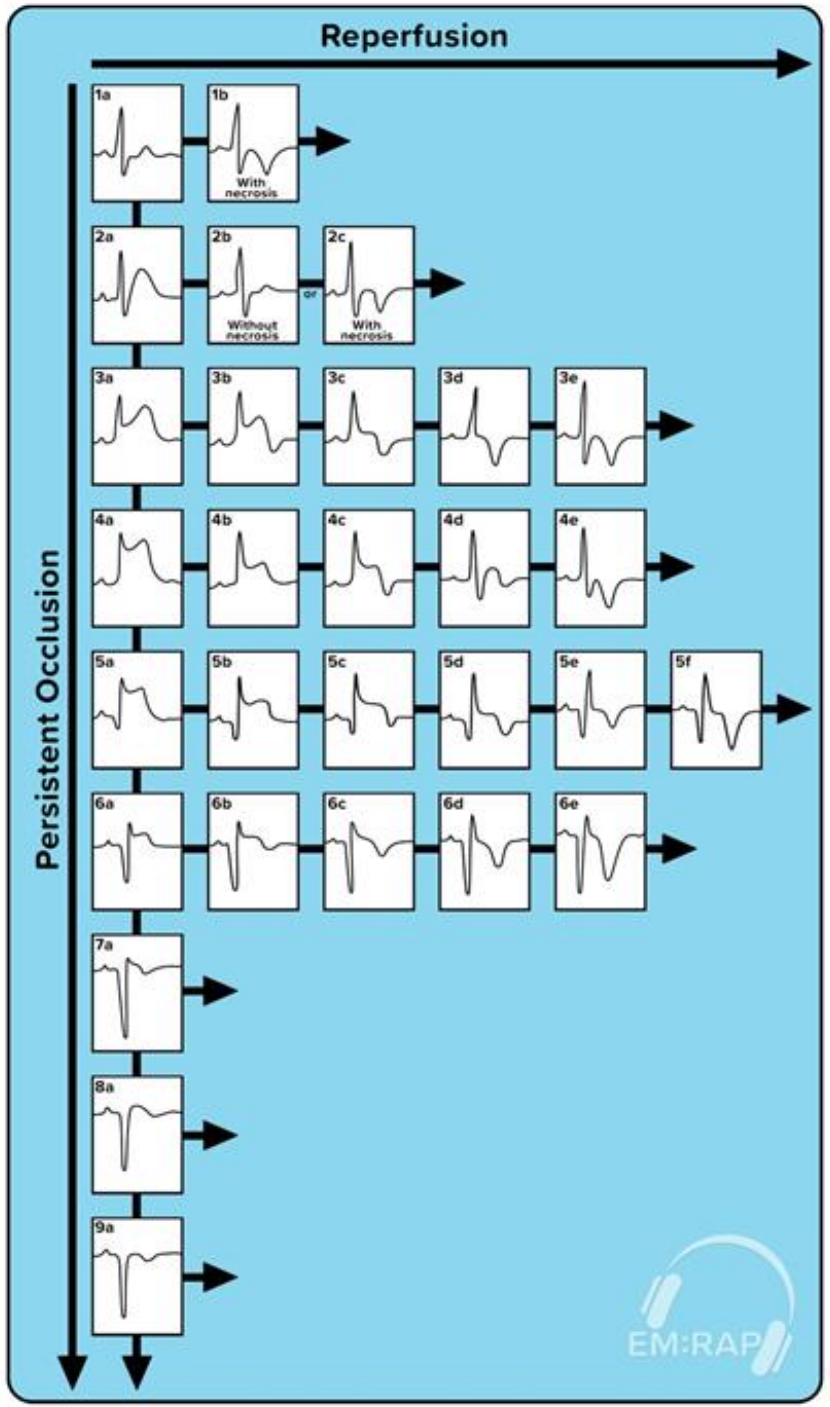
The role of (patient) history…

- The **most useful symptoms** in the acute setting include:
  - Pain radiating to both arms (LR+ 2.6)
  - Pain similar to prior ischemia (LR+ 2.2)
  - A change in the pattern of chest pain over the most recent 24 h (LR+ 2.0)
- These patient descriptions of chest discomfort are all associated with the *same incidence of AMI*:
  - Burning, pressure squeezing, indigestion, crushing, tightness, numbness & nondescript chest discomfort.
- Only "stabbing" is associated with a lower probability.

- Conversely, helpful historical features that **decrease the likelihood of ACS** are pain that is:
  - Fully reproducible by palpation (LR+ 0.28)
  - Fully pleuritic or fully positional
- *The response to nitroglycerin (both improvement and lack of improvement) was unhelpful with LRs approaching 1.0*

Other pitfalls…

- [Nitroglycerin cannot be used as a diagnostic test for ruling in or out ACS]
- **Antacids** cannot be used as a diagnostic test for ruling in or out ACS: may be associated with pain relief in as many as 25% of AMI cases.
- A **normal ECG does not rule out ACS**.
- Be wary of diagnosing chest pain as having a gastrointestinal (GI) aetiology. Cardiac ischemia can produce symptoms that mimic GI pathology, and vice versa.



Any questions?

SUMMARY

- ACS is a diverse clinical syndrome
- “Classical” presentation = easy so **high index of suspicion** in those high risk groups (elderly, DM, female patient groups)
- *ECG may be normal*
- The ECG corresponds to specific areas of the heart which correspond to specific coronary vessels (variable anatomy though!)

Thank you!