

# Non-Specific ECG Changes

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# Objectives

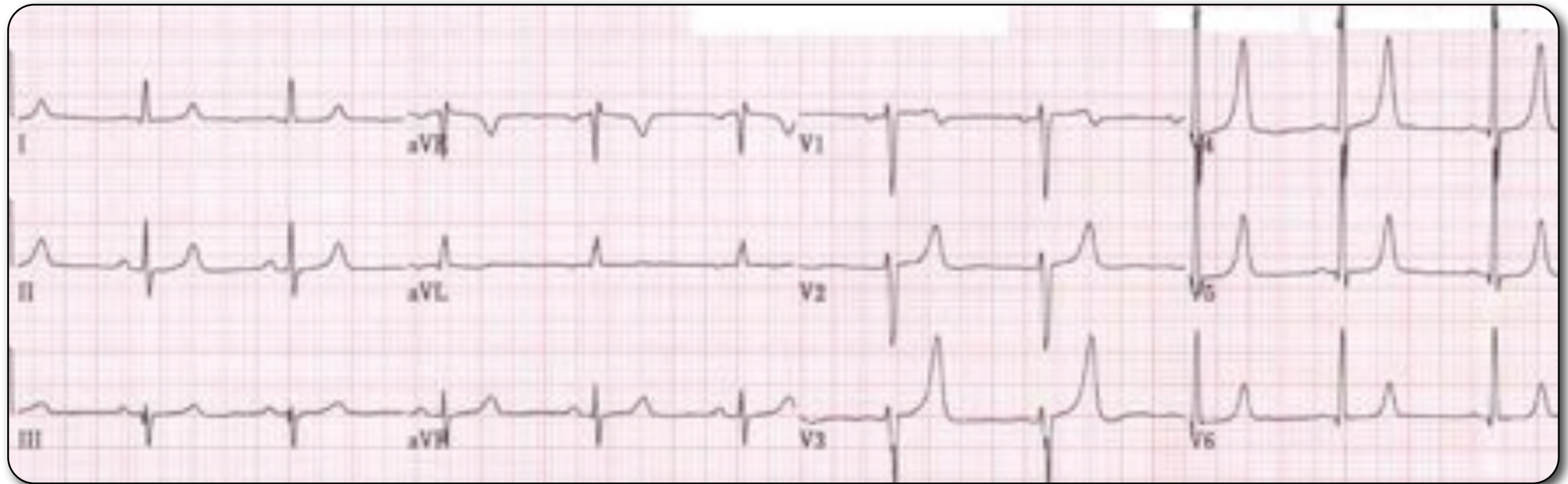
- Review non-specific ECG changes
  - Electrolyte abnormalities
  - Drug related ECG changes
  - Pericardial and pulmonary diseases
  - Intracranial Hemorrhage
  - Metabolic diseases
  - Temperature and ECG changes

# ECG & Electrolytes

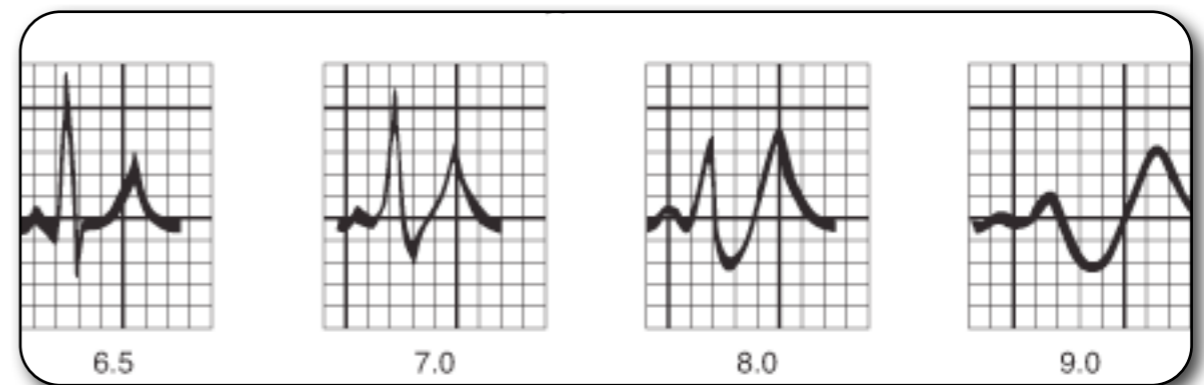
# Electrolyte abnormalities

- Hyperkalemia
- Hypokalemia
- Hypercalcemia
- Hypocalcemia

# Hyperkalemia



- Tall thin peaked T waves
- PR prolongation
- ST depression > QRS widening > Sine wave pattern with no P waves > V fib



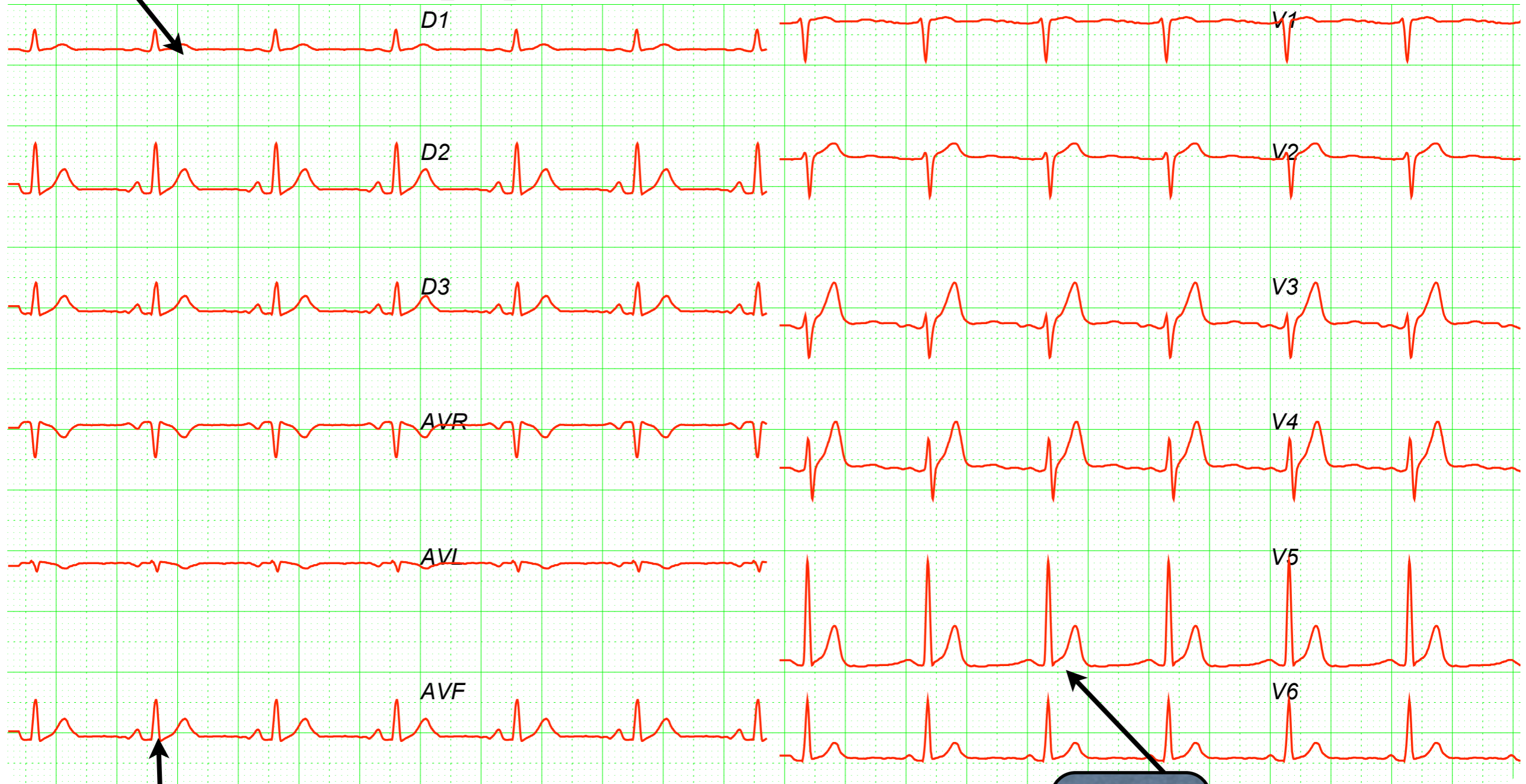
# Hypokalemia



- Shallow T waves with prominent U waves
- Widespread ST depression

SHORT  
QT  
<0.36

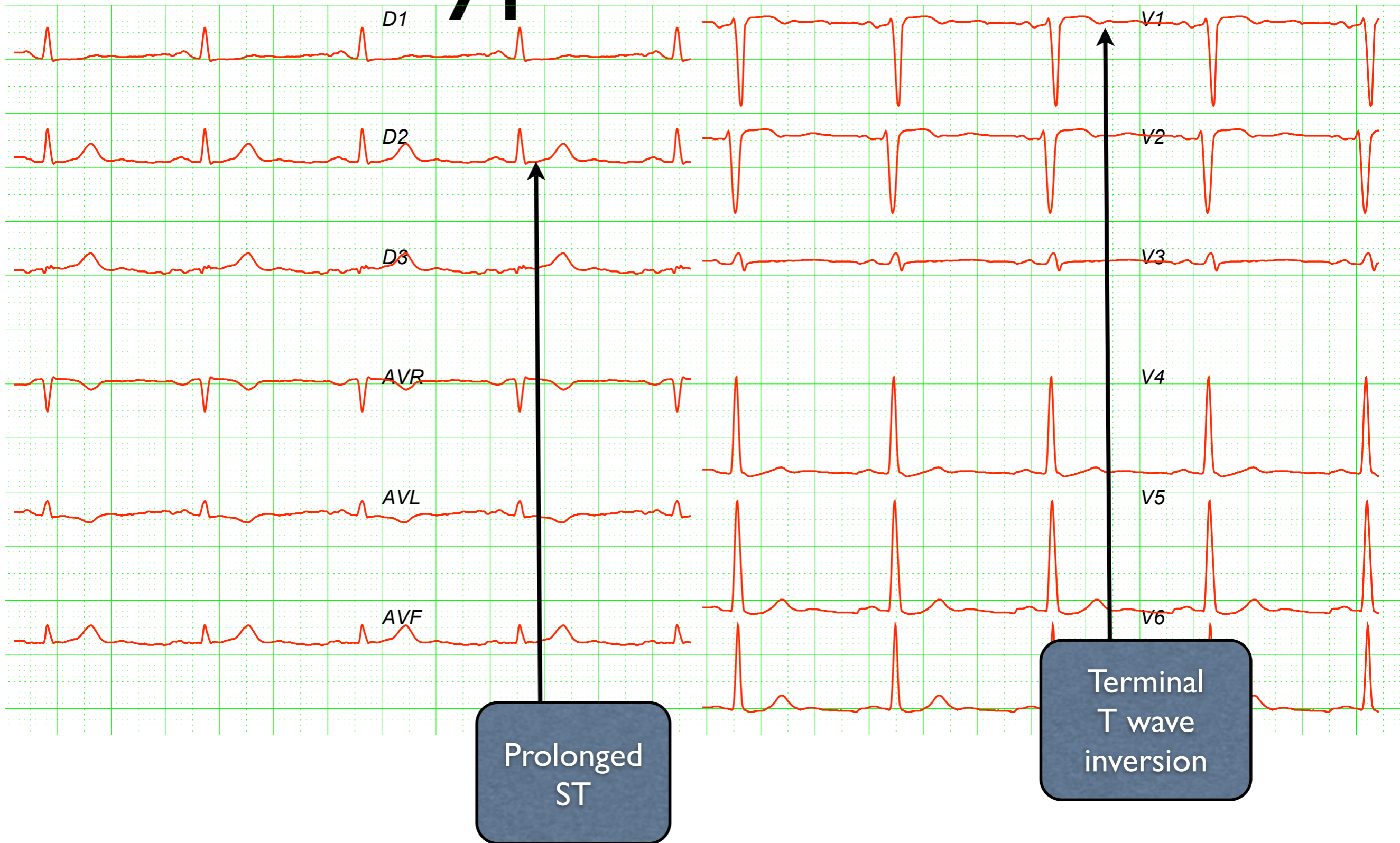
# Hypercalcemia



SHORT  
ST

Abrupt T  
upstroke

# Hypocalcemia

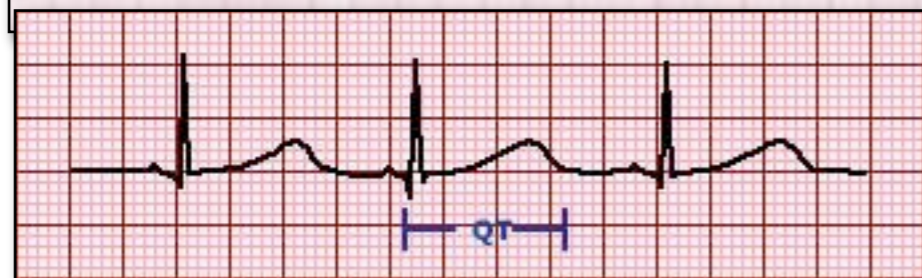


# Drugs & ECG

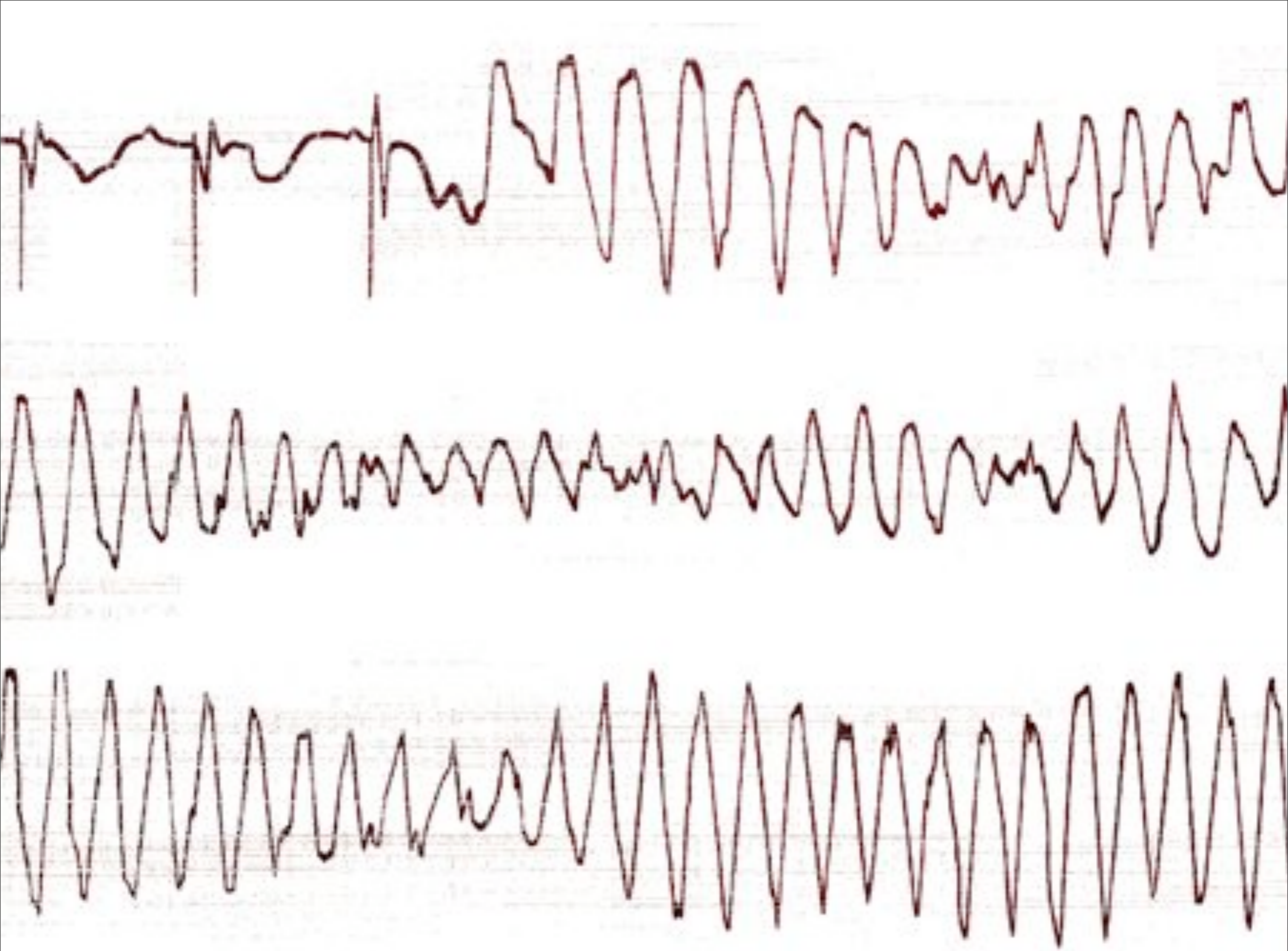
# Drugs and ECG

- Many drugs can alter the ECG
- Commonly used drugs are amiodarone, sotalol and digoxin
- Watch for drug interaction

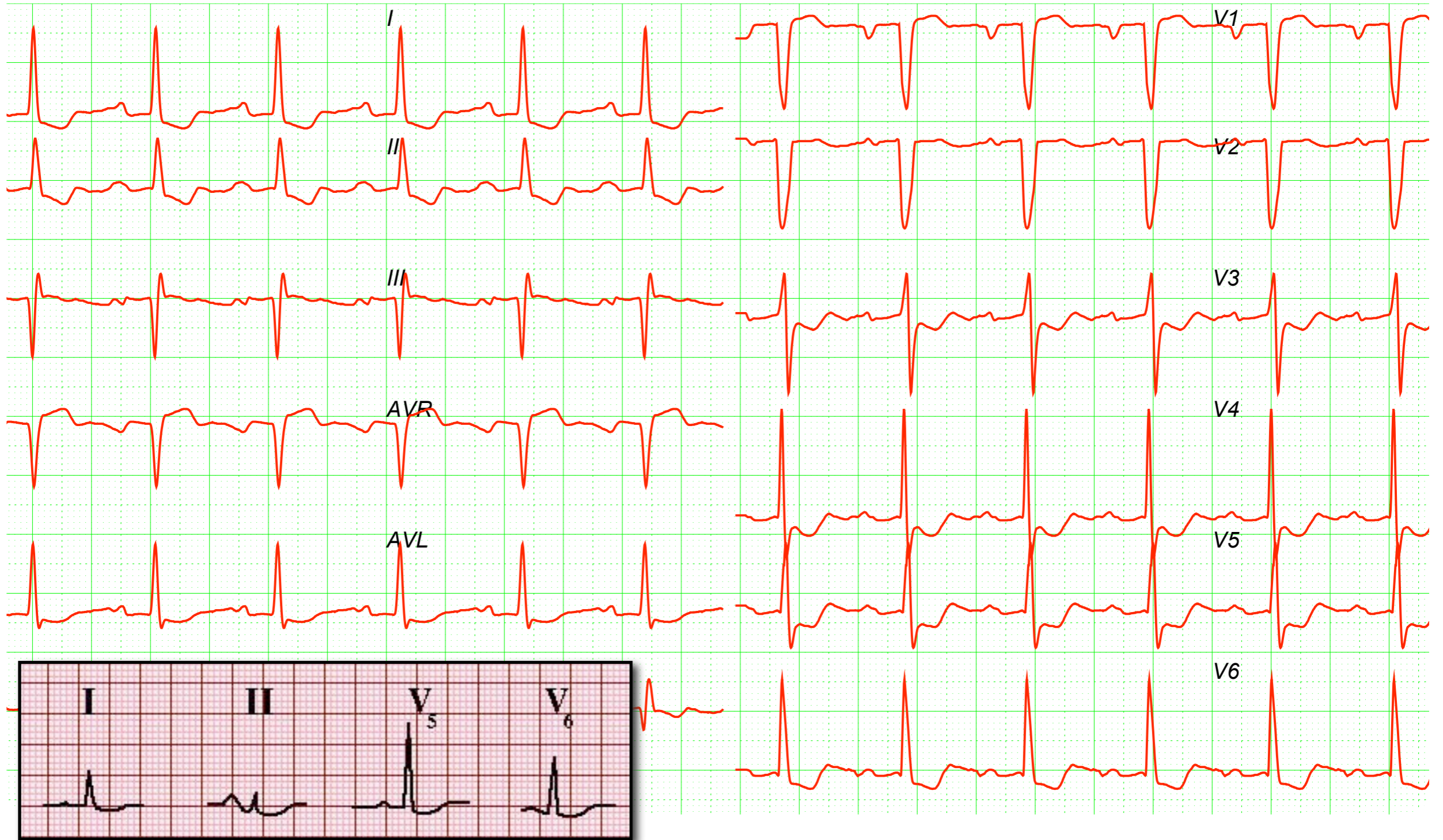
# Prolonged QT



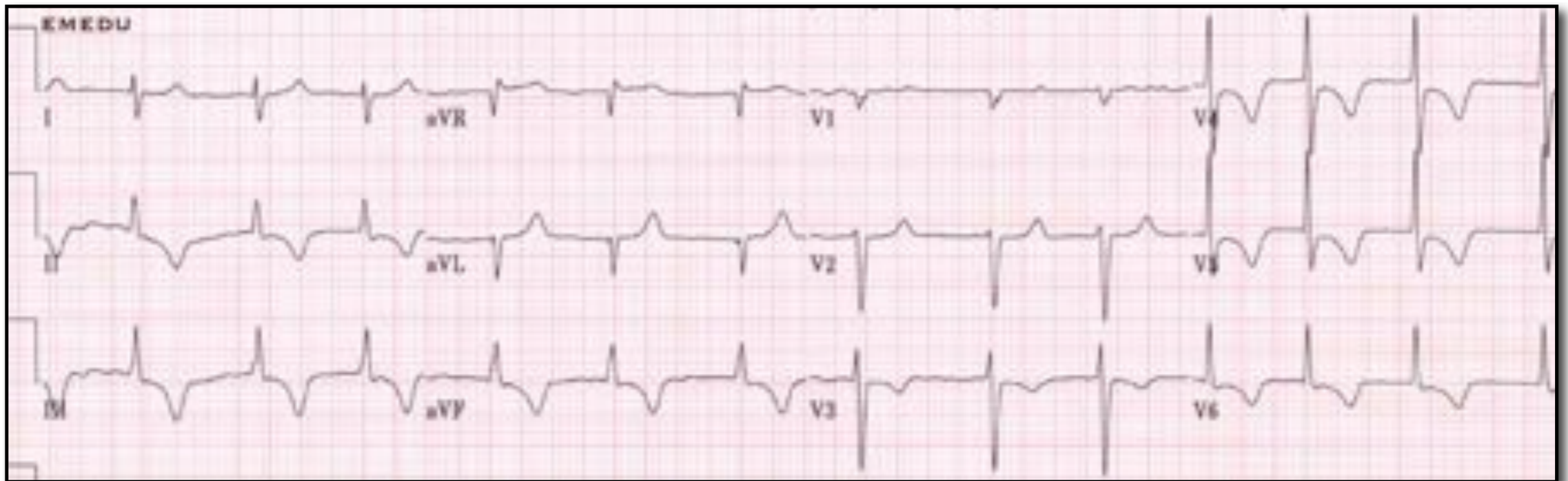
$$QT_c = QT / \sqrt{R-R}$$



# Digitalis Effect



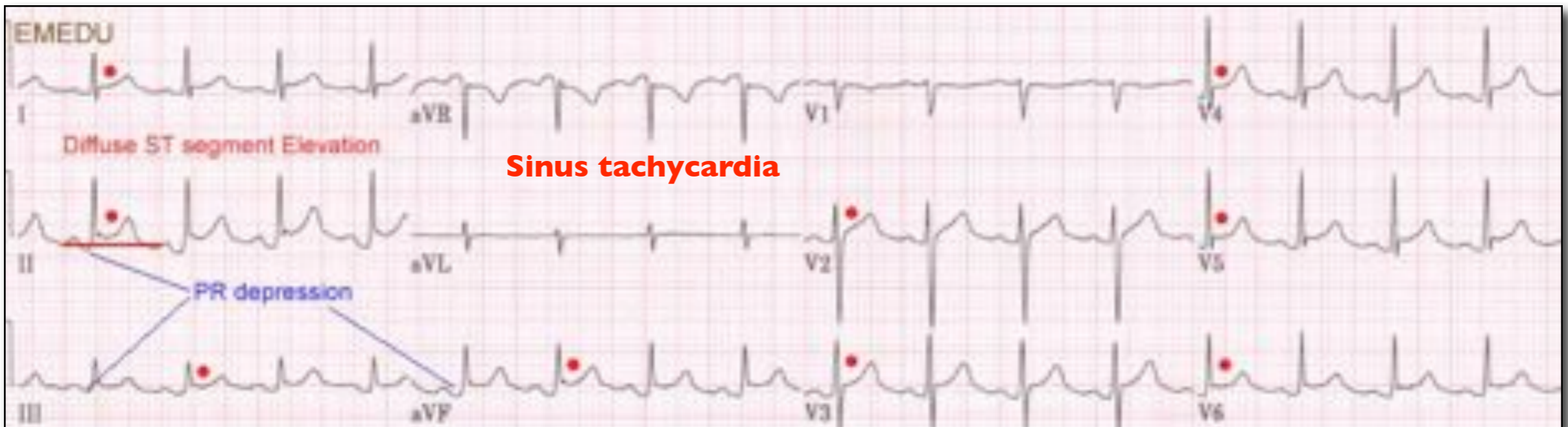
# Digitalis Effect



Salvador Dali's Mustache

# pericardial & pulmonary diseases

# Pericarditis



# Pulmonary Embolism

RAD  
S in I

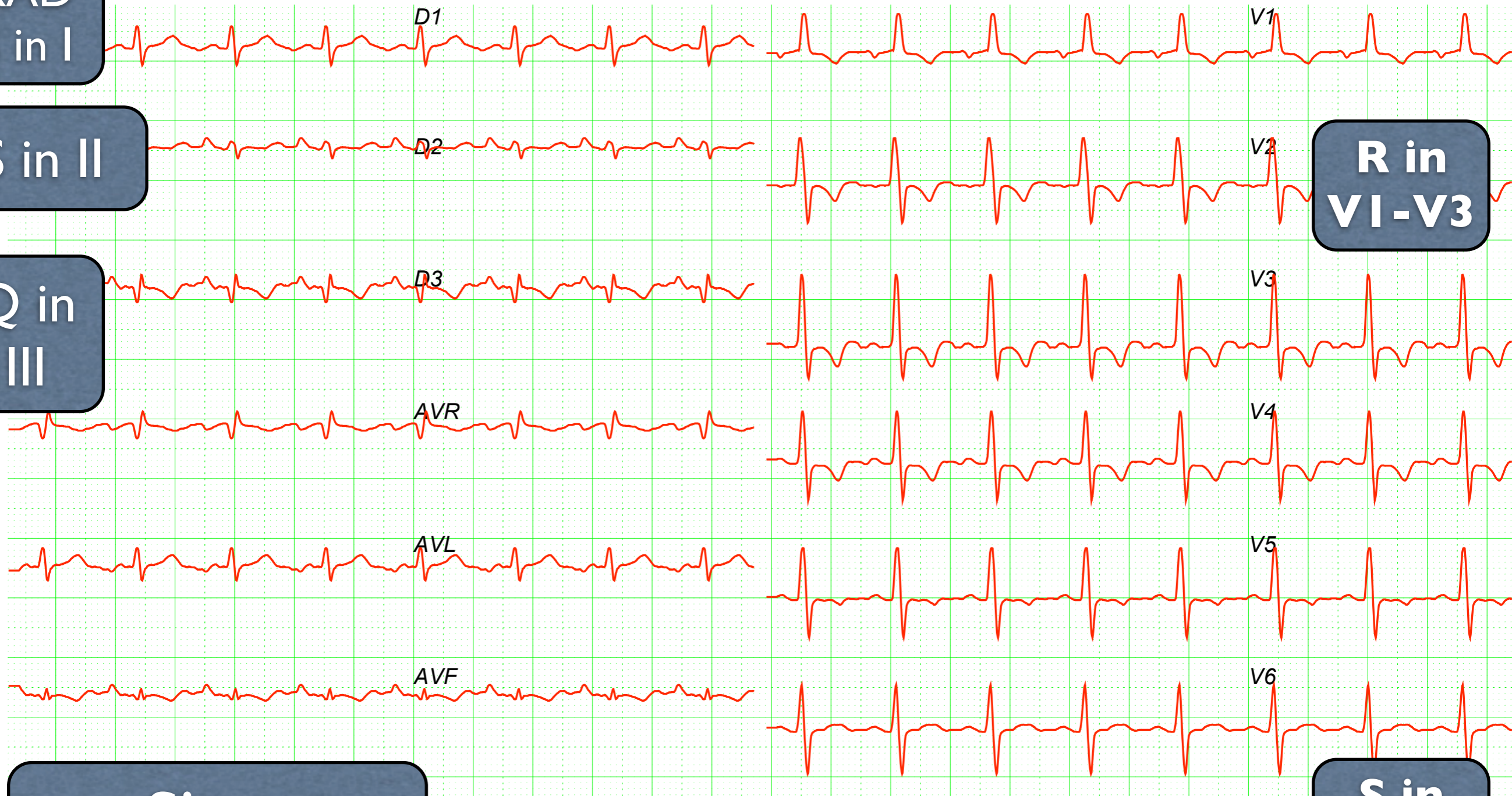
S in II

Q in  
III

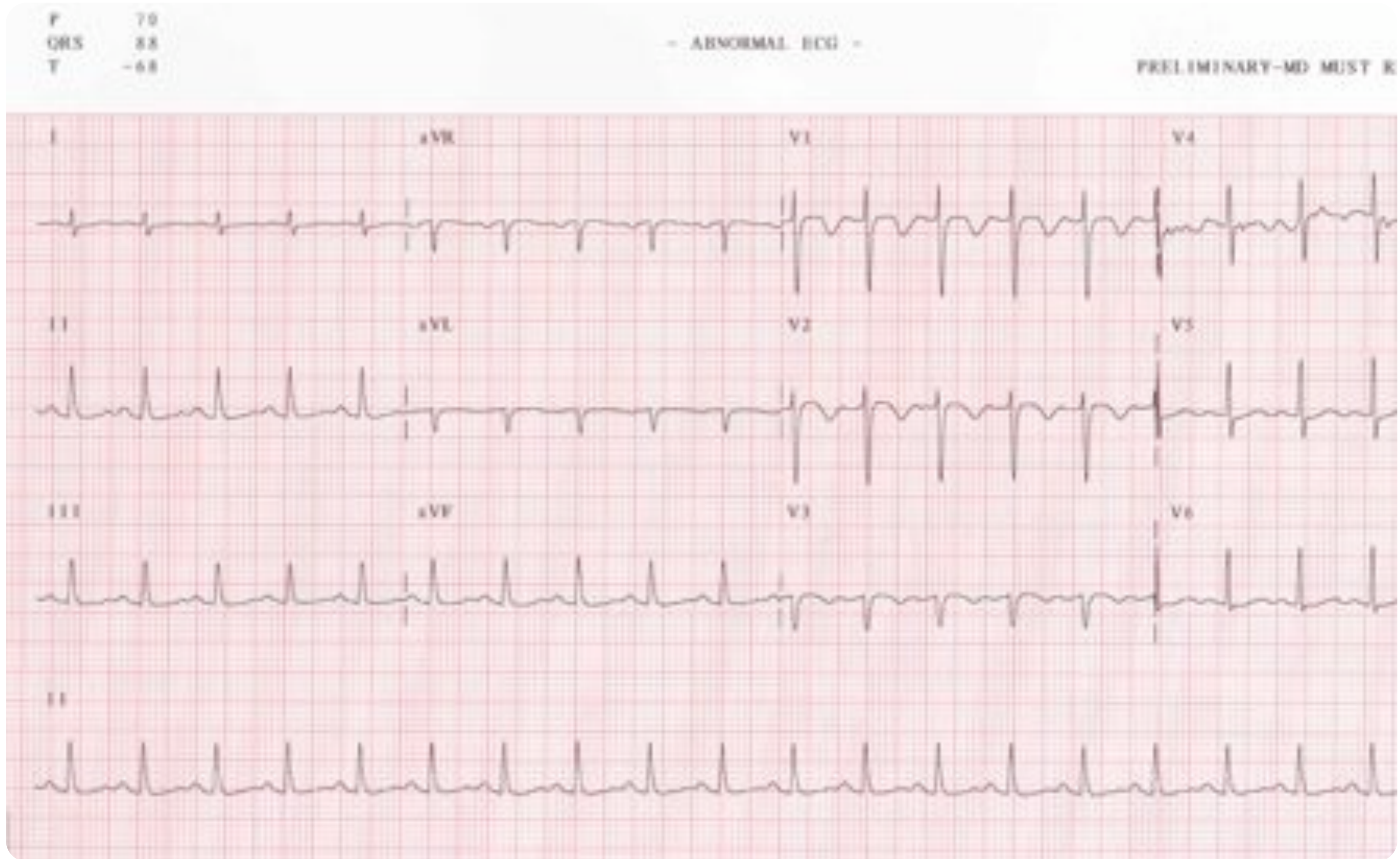
R in  
VI-V3

S in  
V4-V6

Sinus  
tachycardia



# Pulmonary Embolism



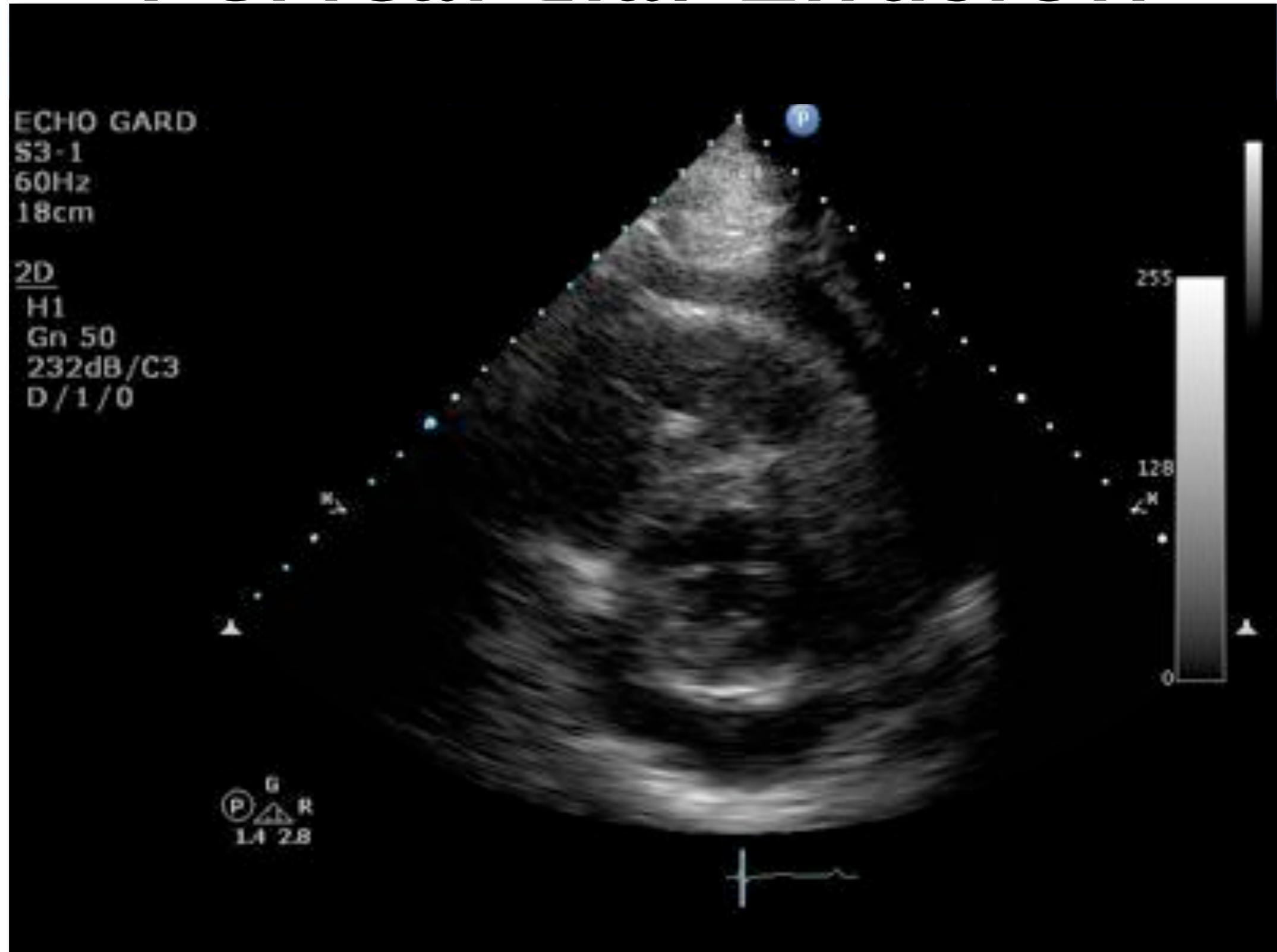
# COPD

- Right axis deviation
- Inverted or biphasic T waves in V1-V3
- ST depression in II, III, aVf
- Right bundle branch block

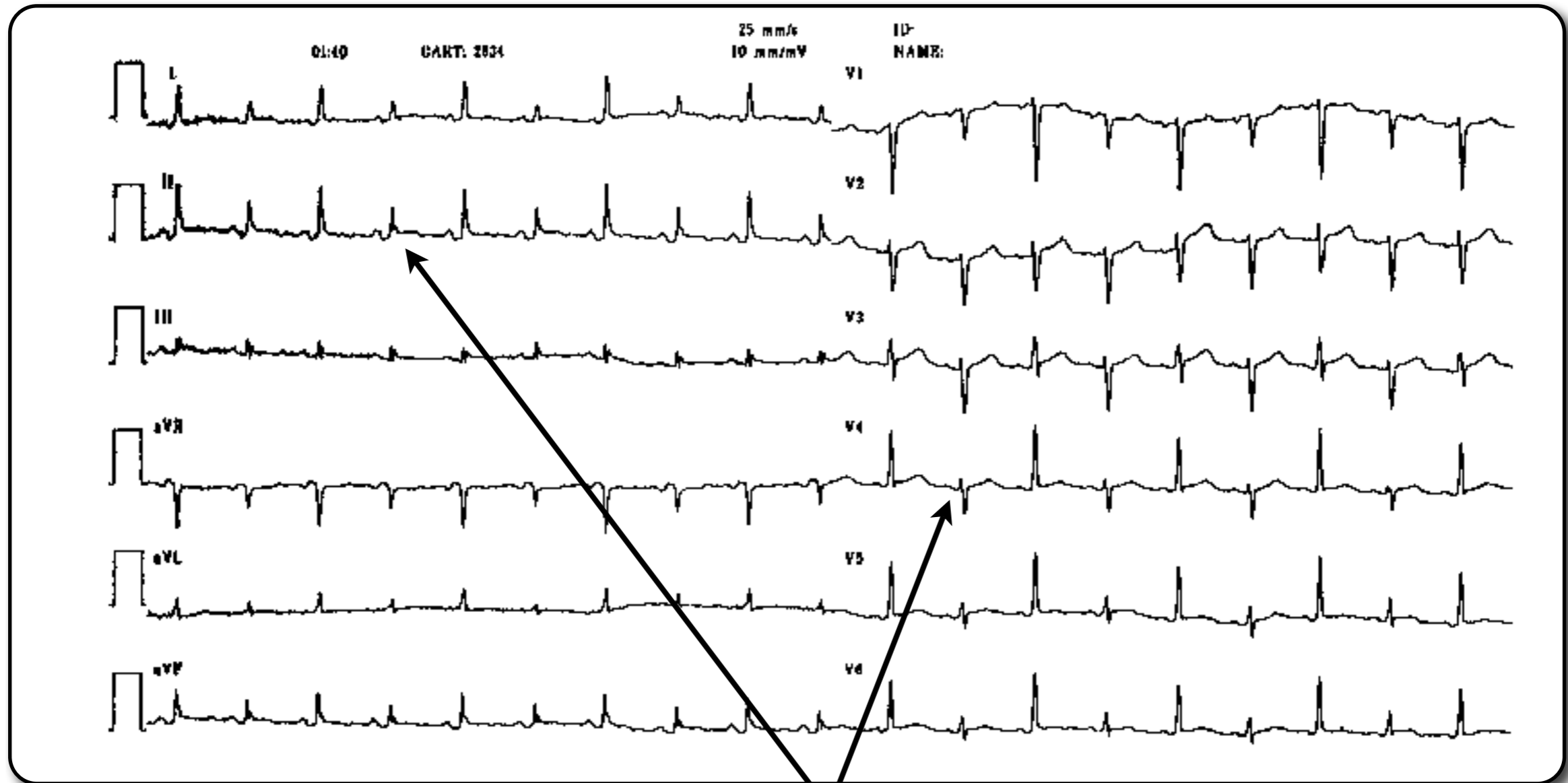
# COPD



# Pericardial Effusion



# Pericardial effusion



Electrical  
Alternans

# Intracranial Hemorrhage

# Intracranial bleed

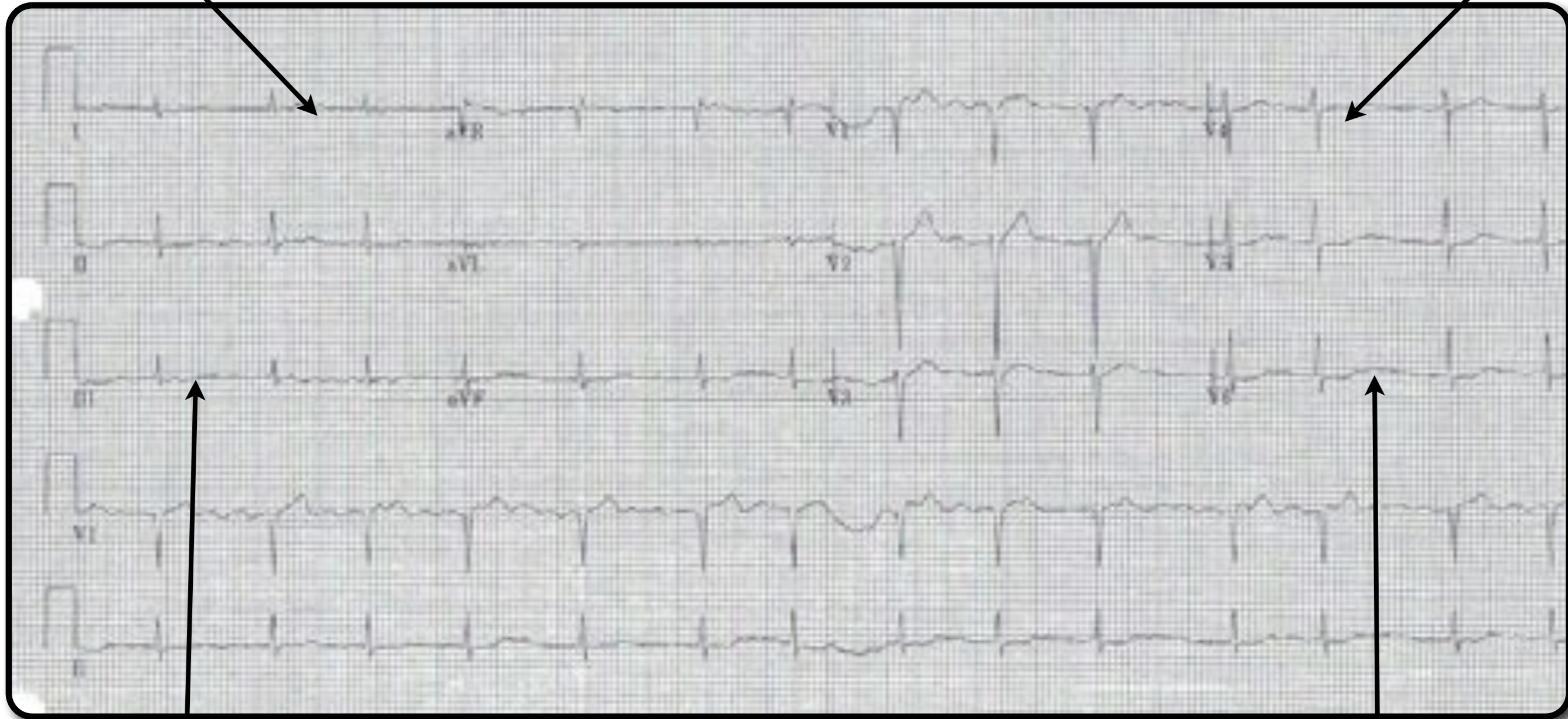


# Metabolic abnormalities

# Hypothyroidism

Low  
Voltage

Flat or  
T↓

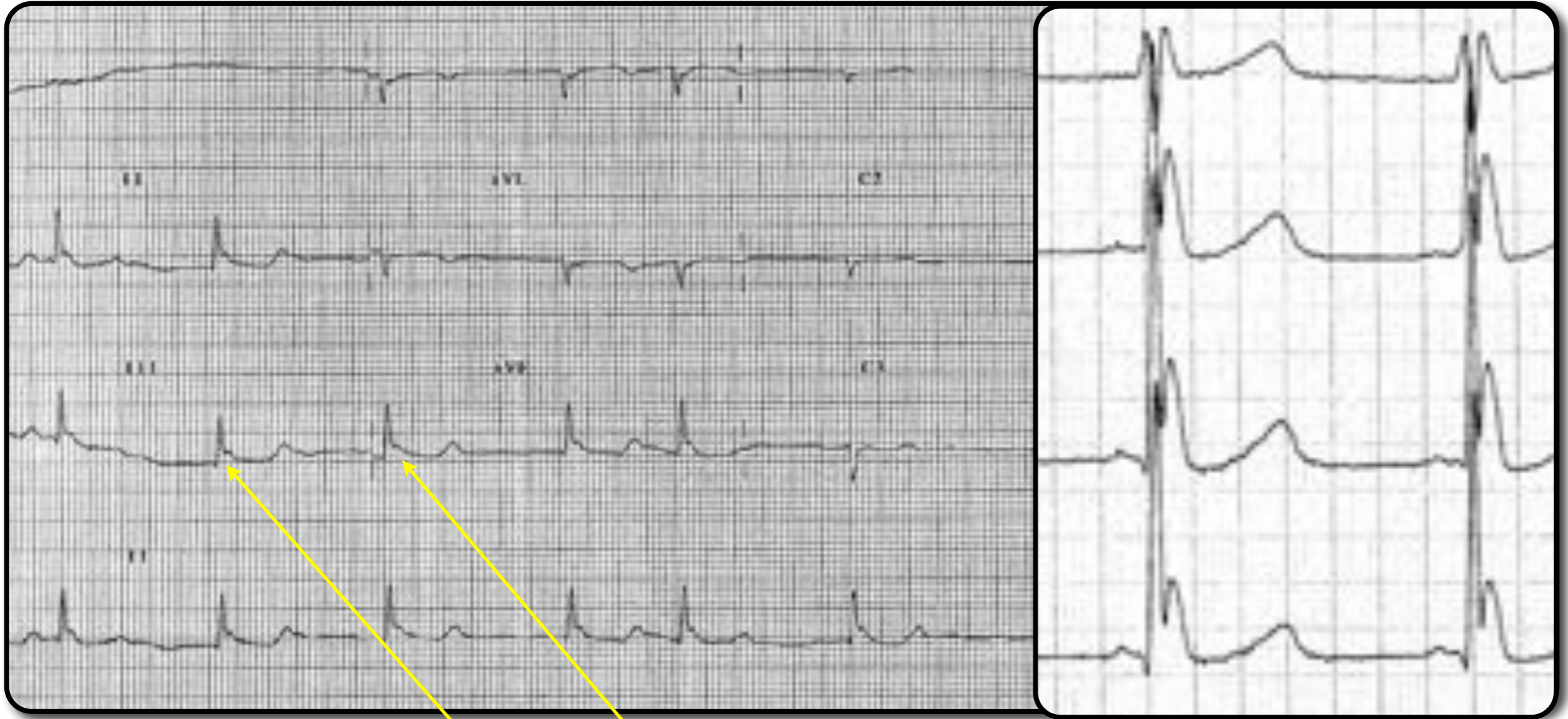


Atrial  
Fibrillation

QT  
prolongati

# Hypothermia

# Hypothermia

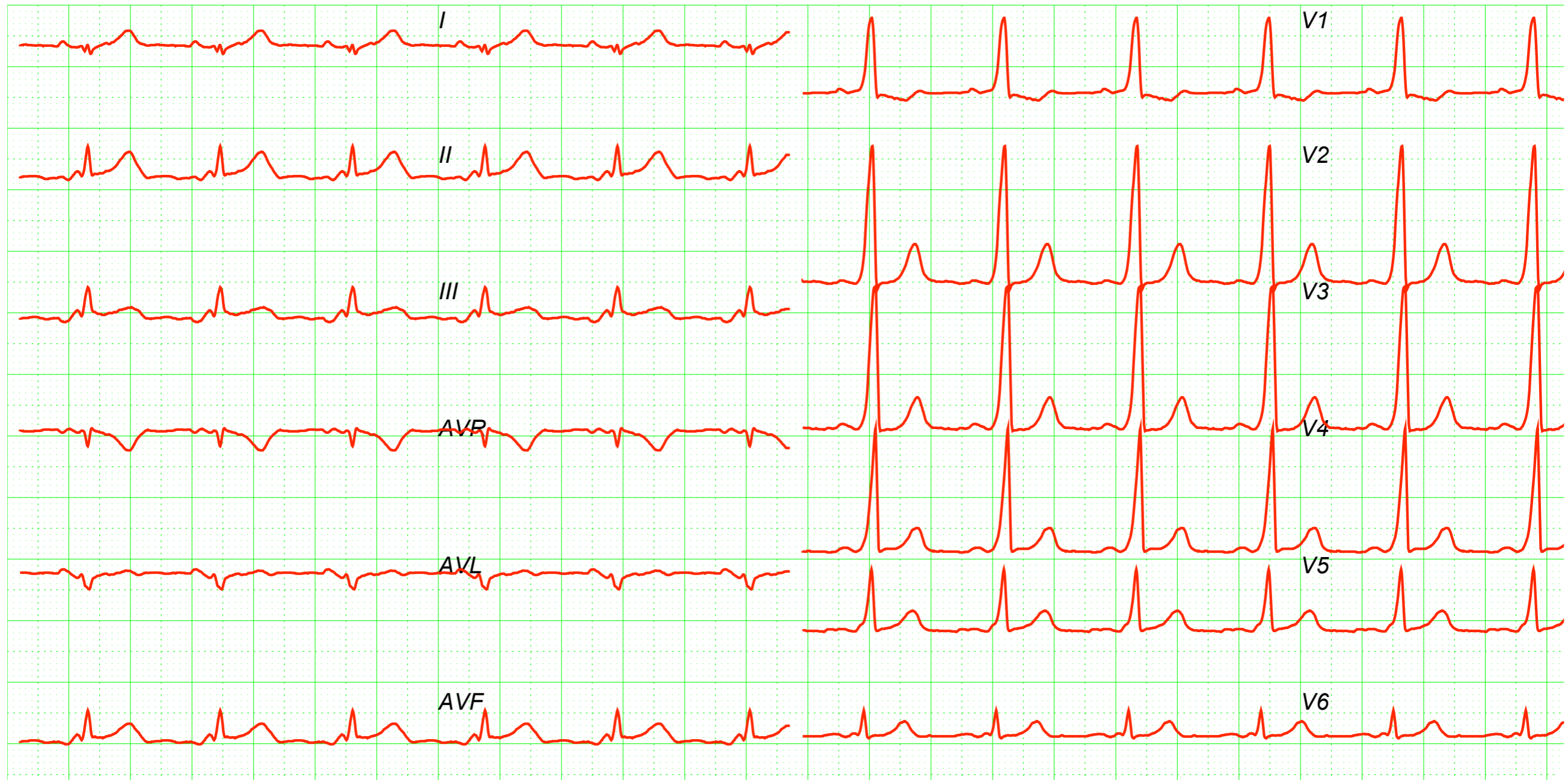


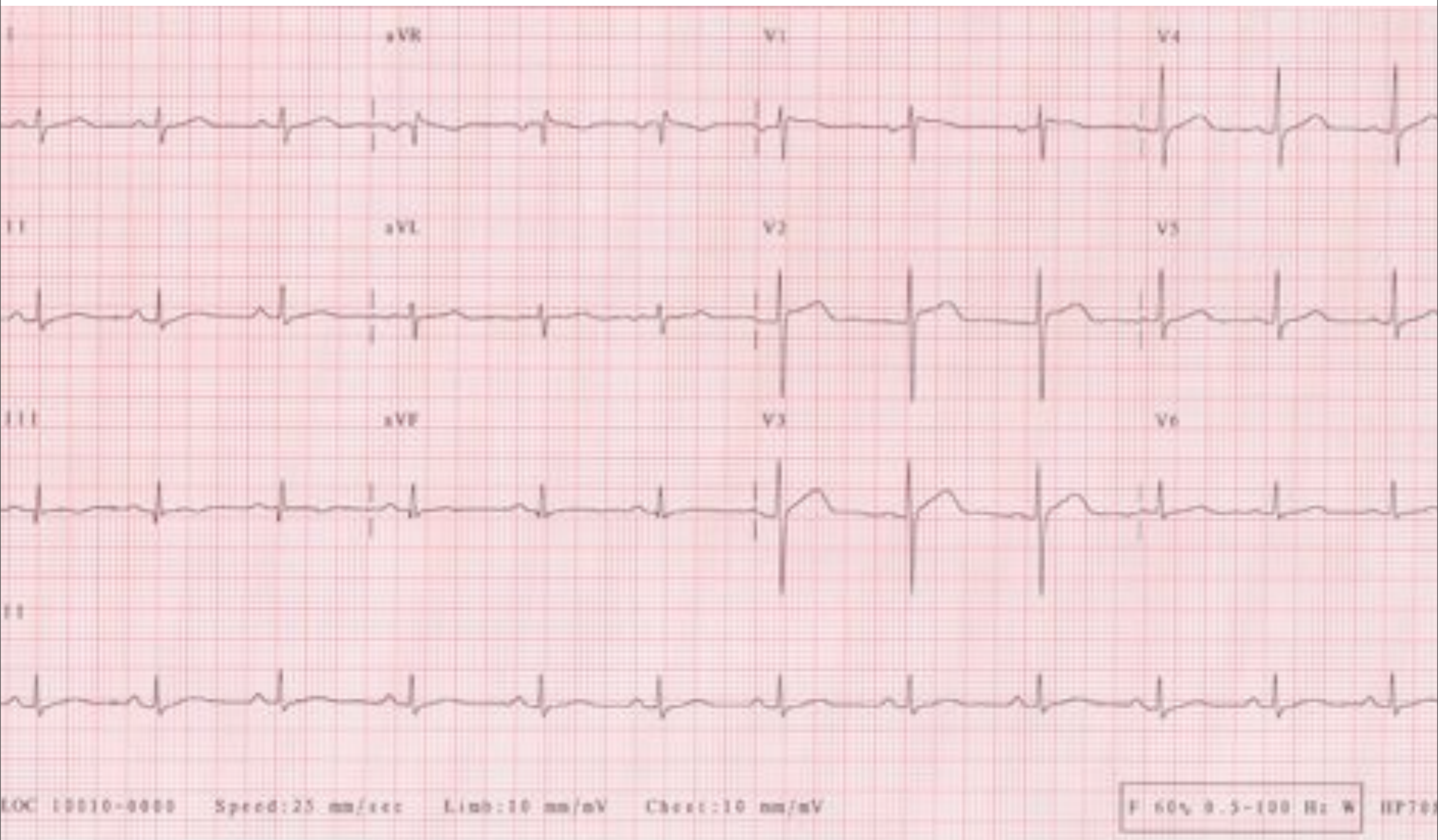
J wave or Osborne wave

Bradycardia

Other

# WPW





# Summary

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# Summary

- Reference:
  - Marriot, H.J.L, Practical Electrocardiography
- Slides are available as a PDF. Can be downloaded from the University of Saskatchewan CME website