

- **F Baharvand MD**

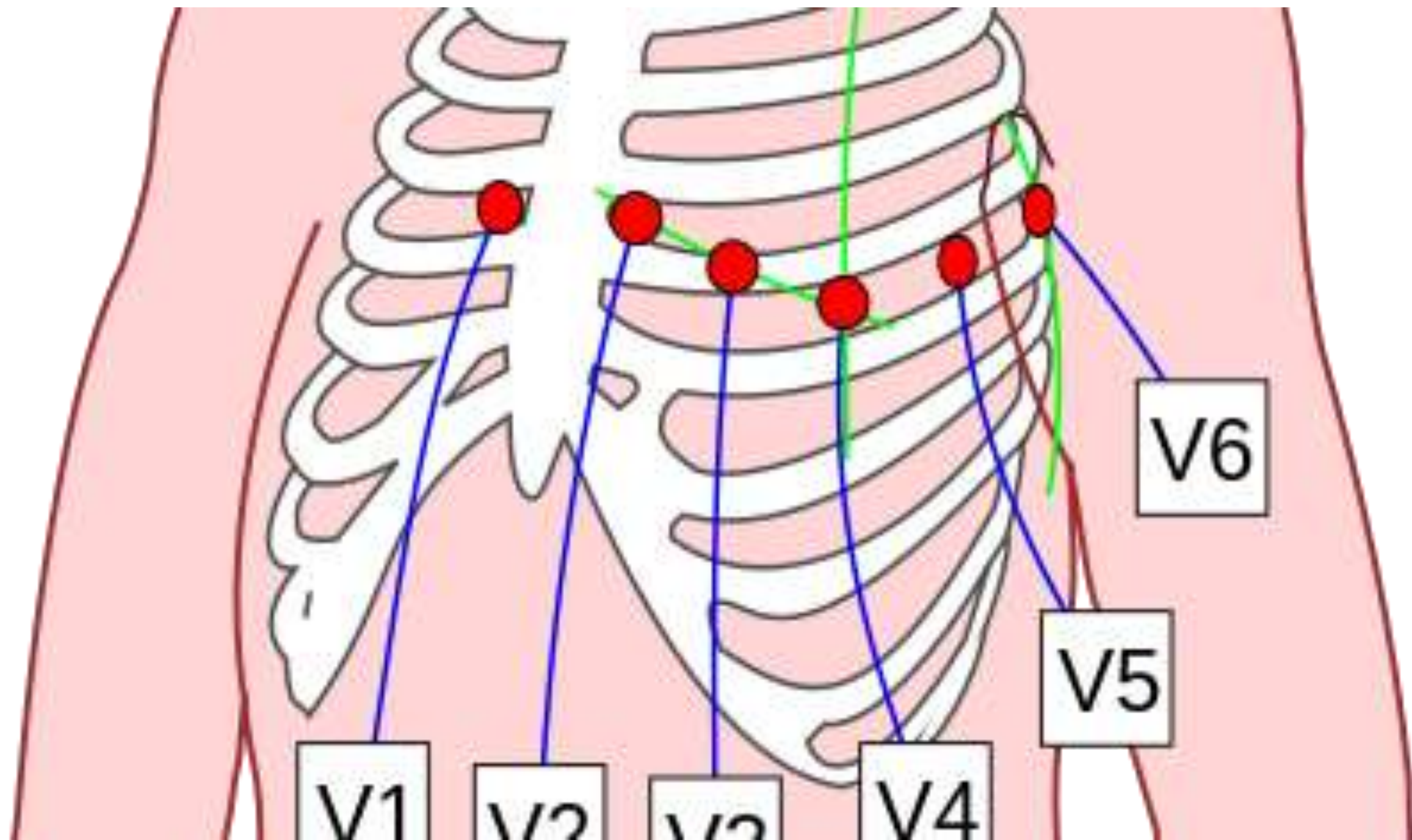
**Interventional cardiologist**

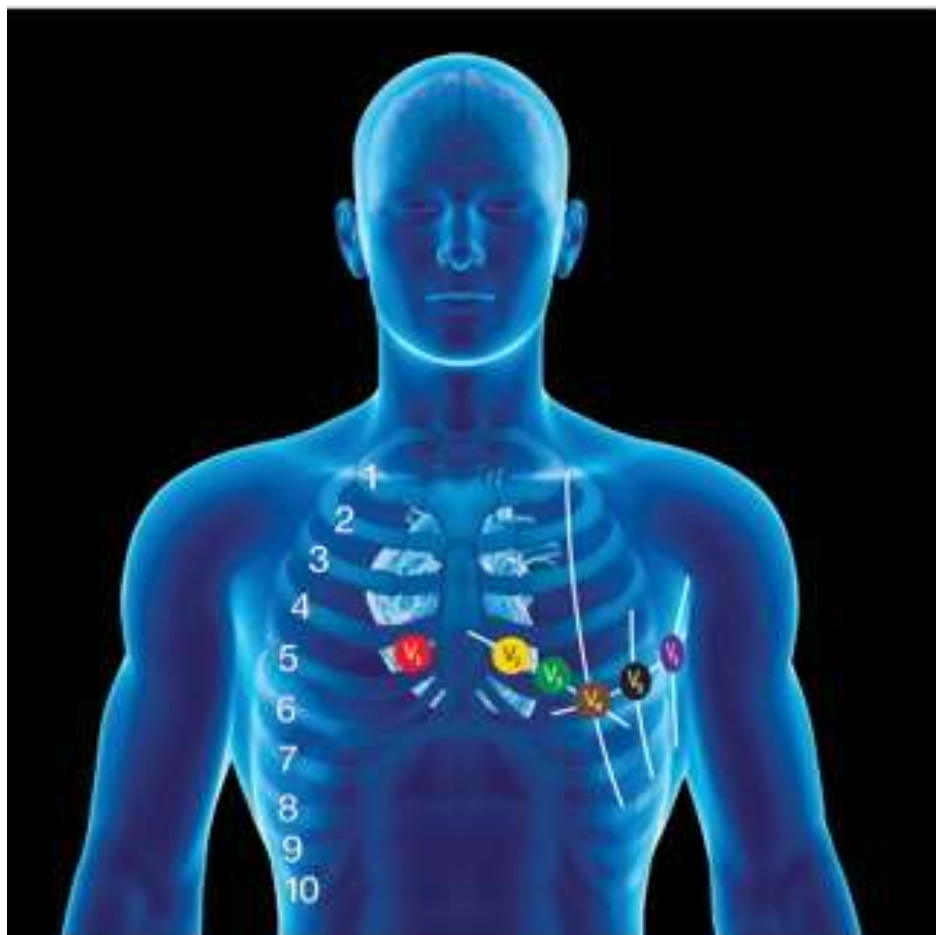
*Assistant professor in*

*Guilan university of medical scienc*

*Heshmat heart hospital*

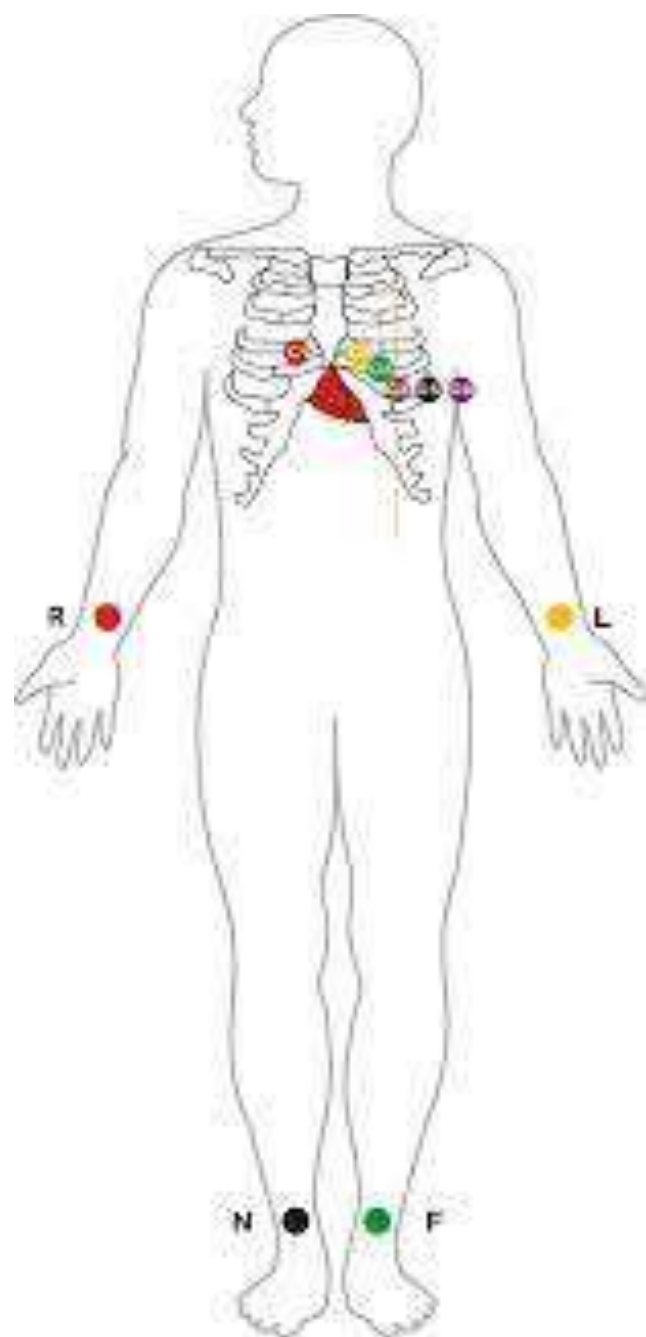




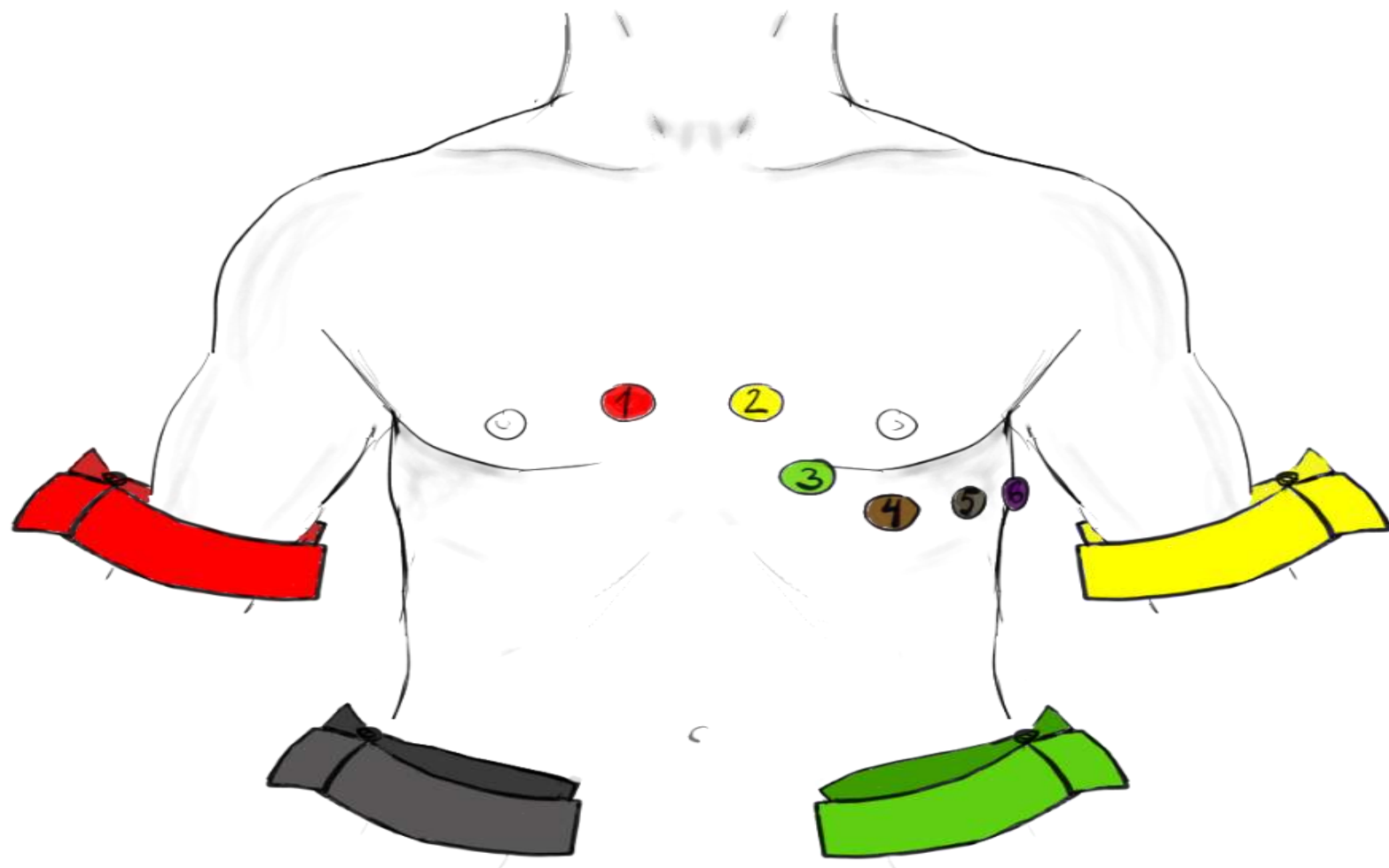


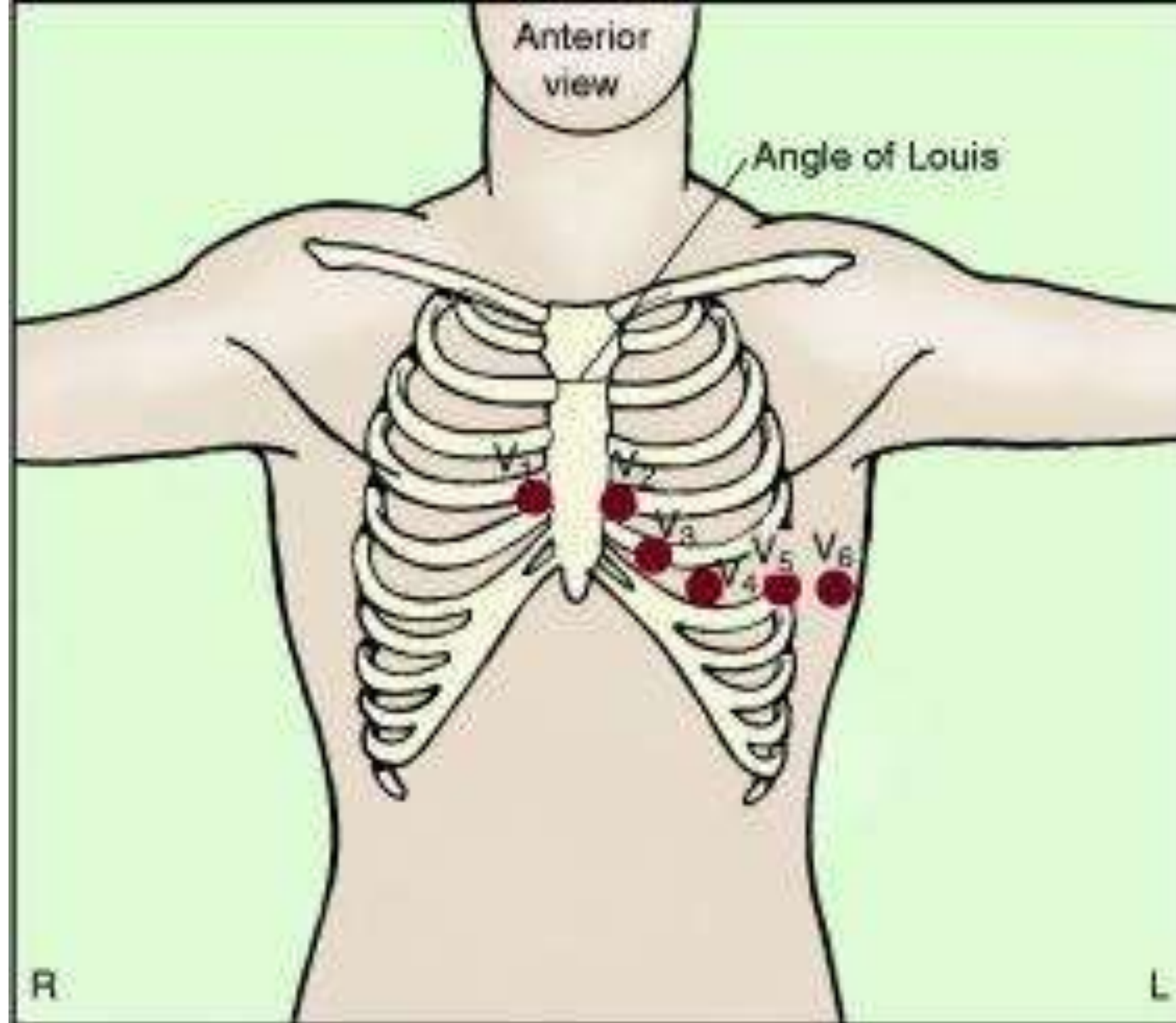
- V<sub>1</sub>** 4<sup>th</sup> intercostal space to the right of the sternum
- V<sub>2</sub>** 4<sup>th</sup> intercostal space to the left of the sternum
- V<sub>3</sub>** Directly between the leads V<sub>2</sub> and V<sub>4</sub>
- V<sub>4</sub>** 5<sup>th</sup> intercostal space at midclavicular line
- V<sub>5</sub>** Level with V<sub>4</sub> at left anterior axillary line
- V<sub>6</sub>** Level with V<sub>5</sub> at midaxillary line  
(*directly under the midpoint of the armpit*)

















Anterior  
view

Angle of Louis



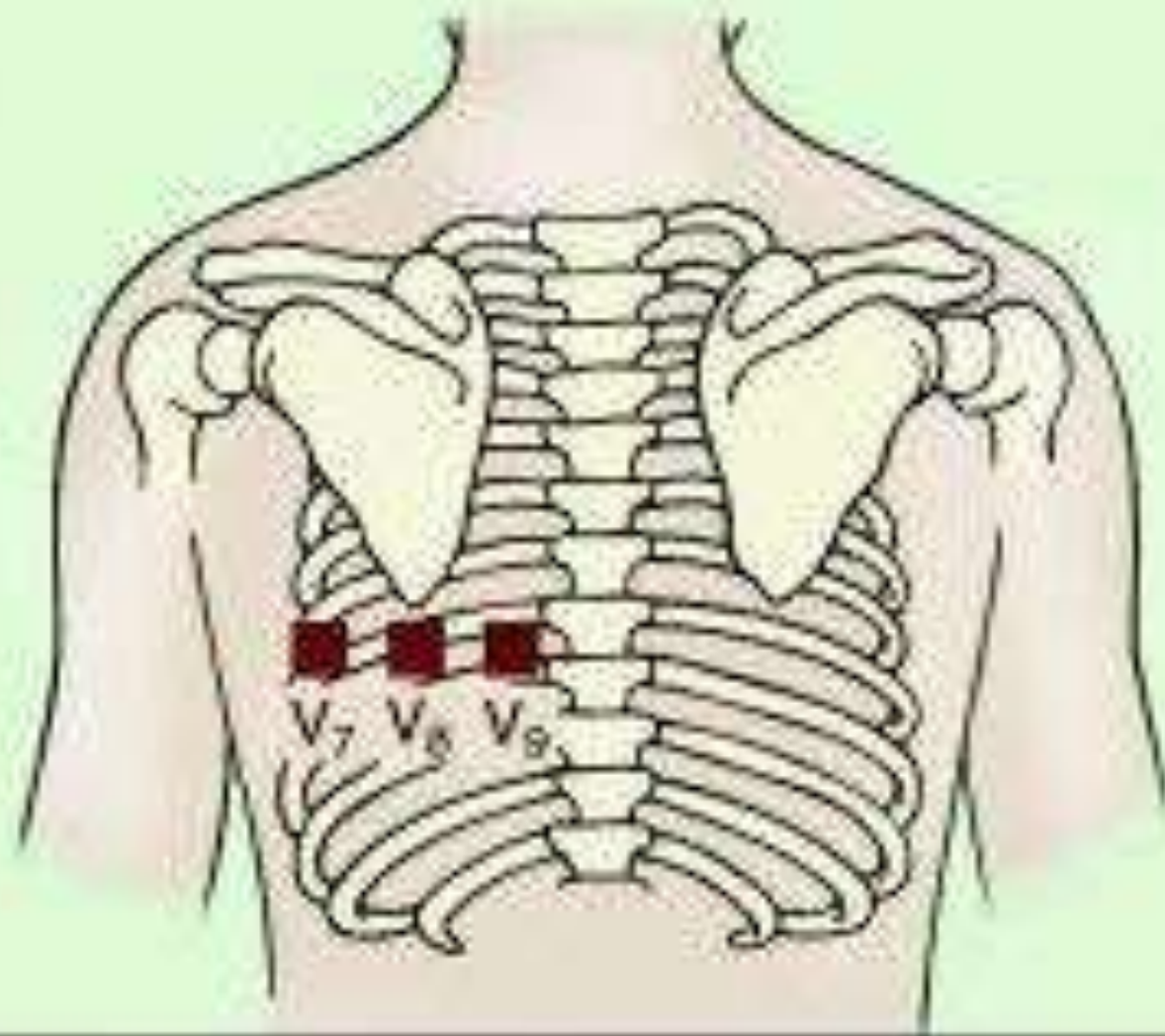
R

L

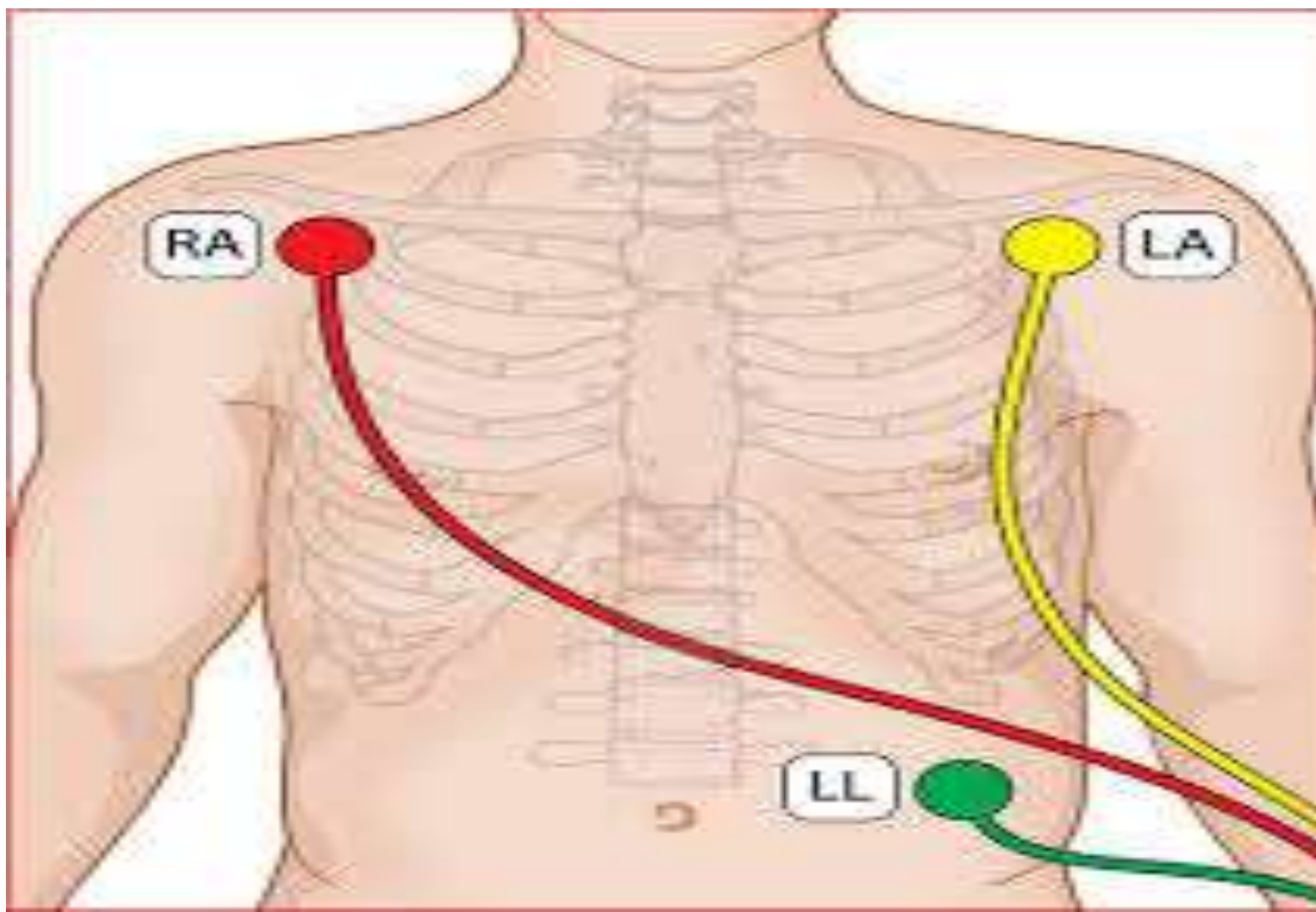
L

Posterior view

R



# مانیتورینگ در بخش CCU





# 12ECG لیدی

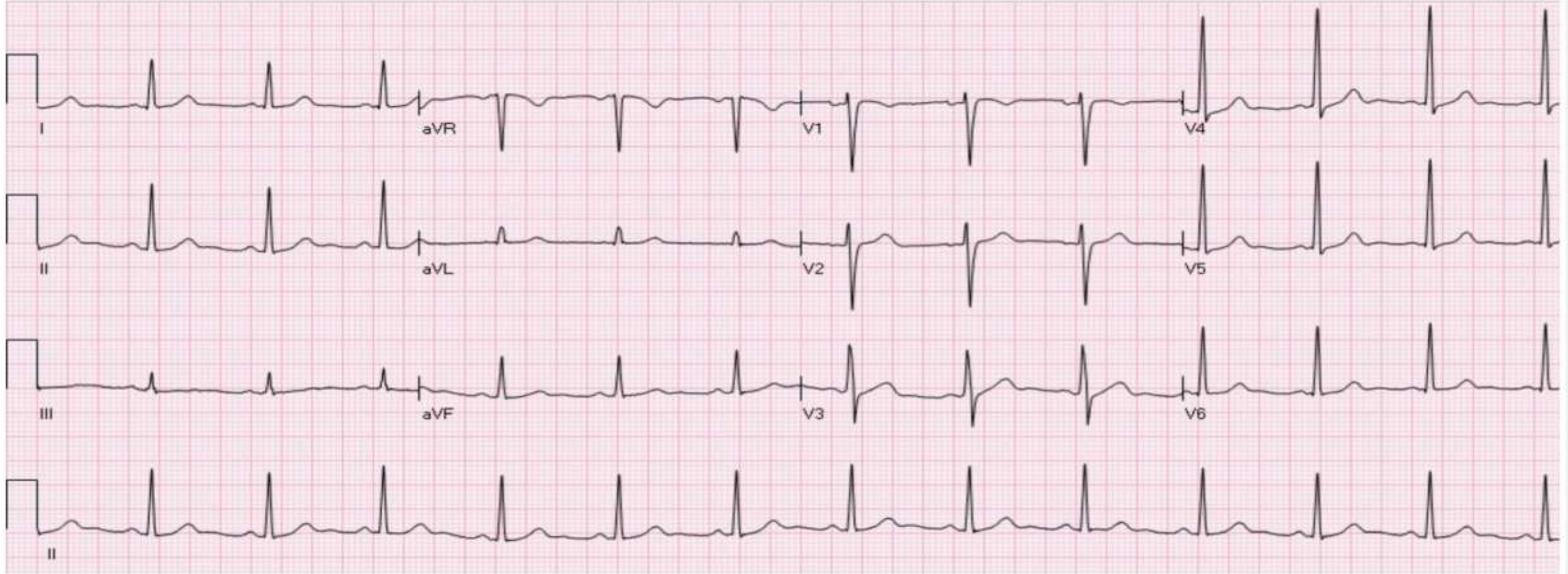
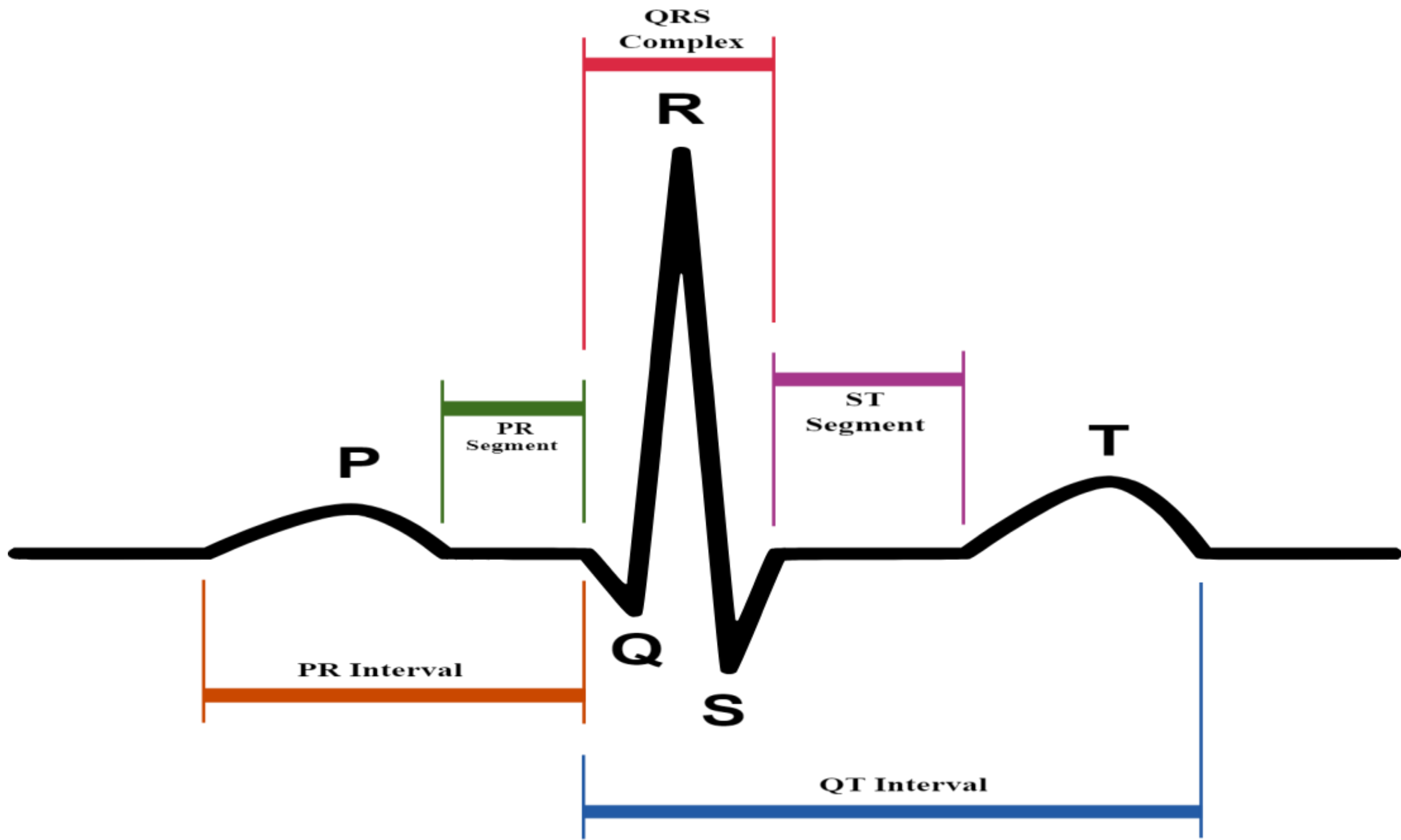
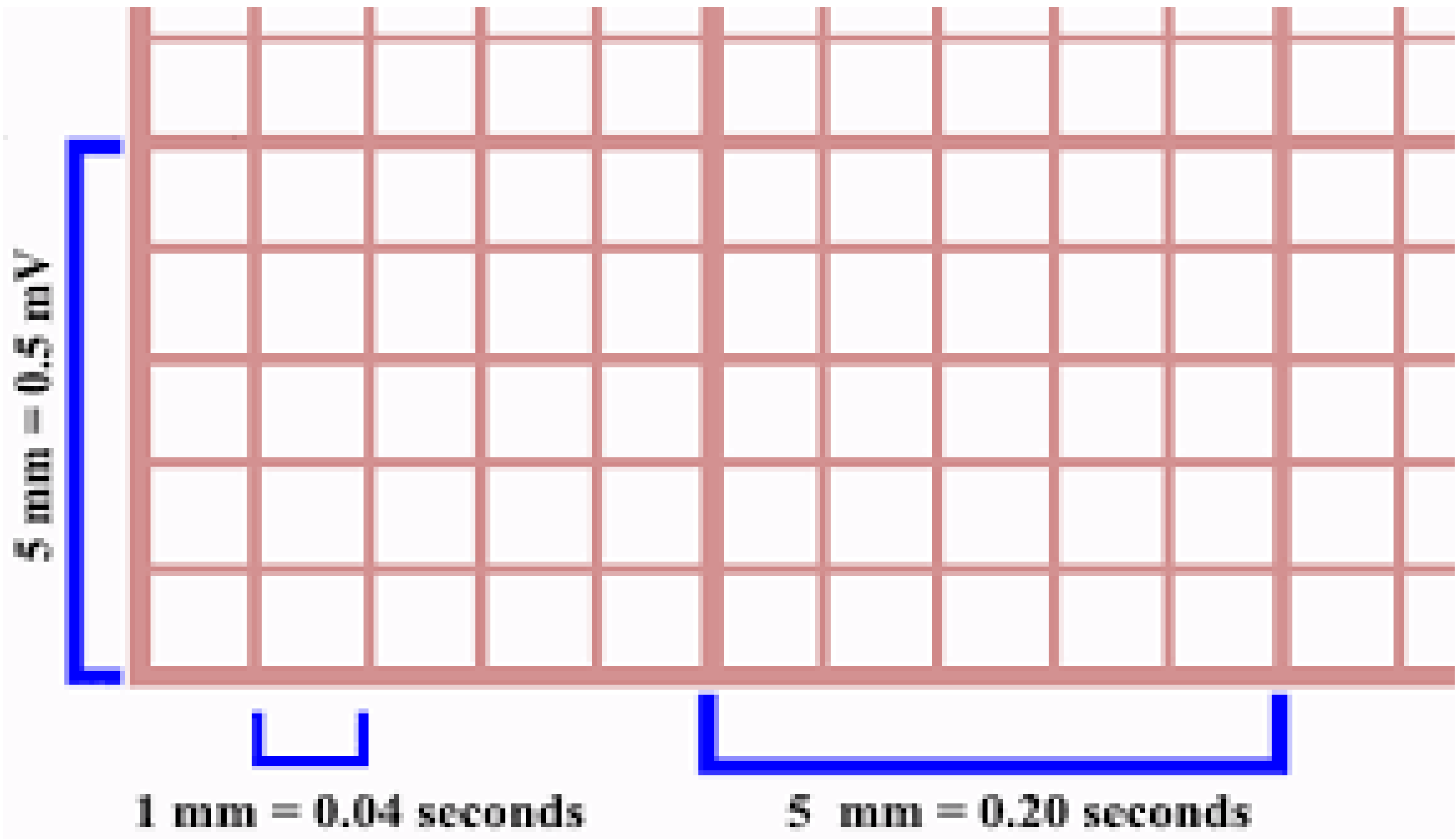


Figure 1. Normal ECG. No abnormal Q waves. ST is isoelectric in all leads







# نکته 1

نام و نام خانوادگی

شرح حال

تاریخ

ساعت

1400/ 8/14 06:10:26

Rec Type: Normal

Auto 6

Heart Rate(HR): 95 bpm

Name:

Patient ID:

Gender: None

Weight:

Height:

Blood Type: Unknown

Age:

Gain: 10 mm/mV

Filter: 0.5-150-H50-EMG

Hospital/Ward:

Speed: 25 mm/s

Physician name:

Rec Time: 5 Sec

Rhythm Lead: III

Rec Mode: SYNC

Am

سنگر فوکر

8/14

کتابخانه

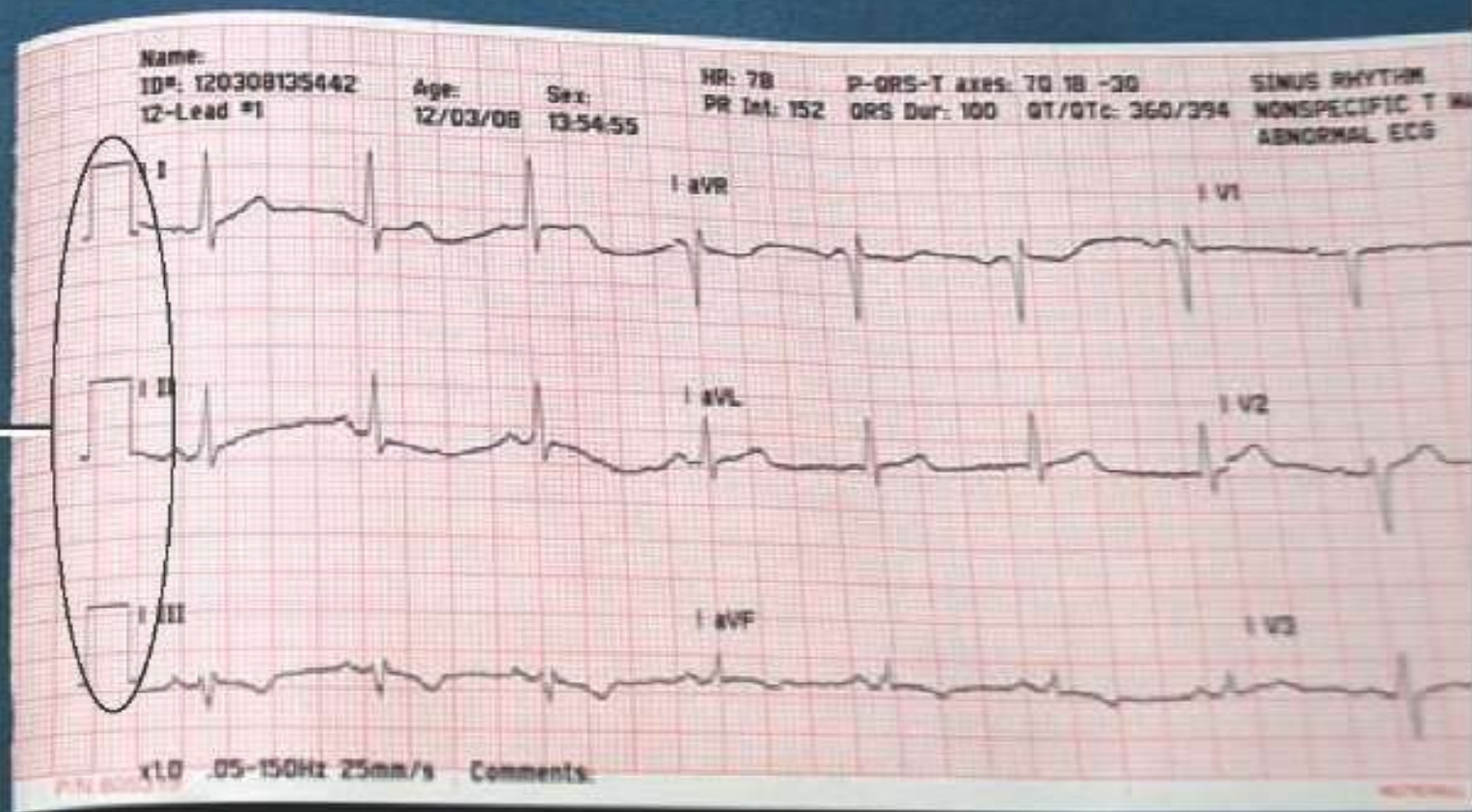
10/10/14

1mV

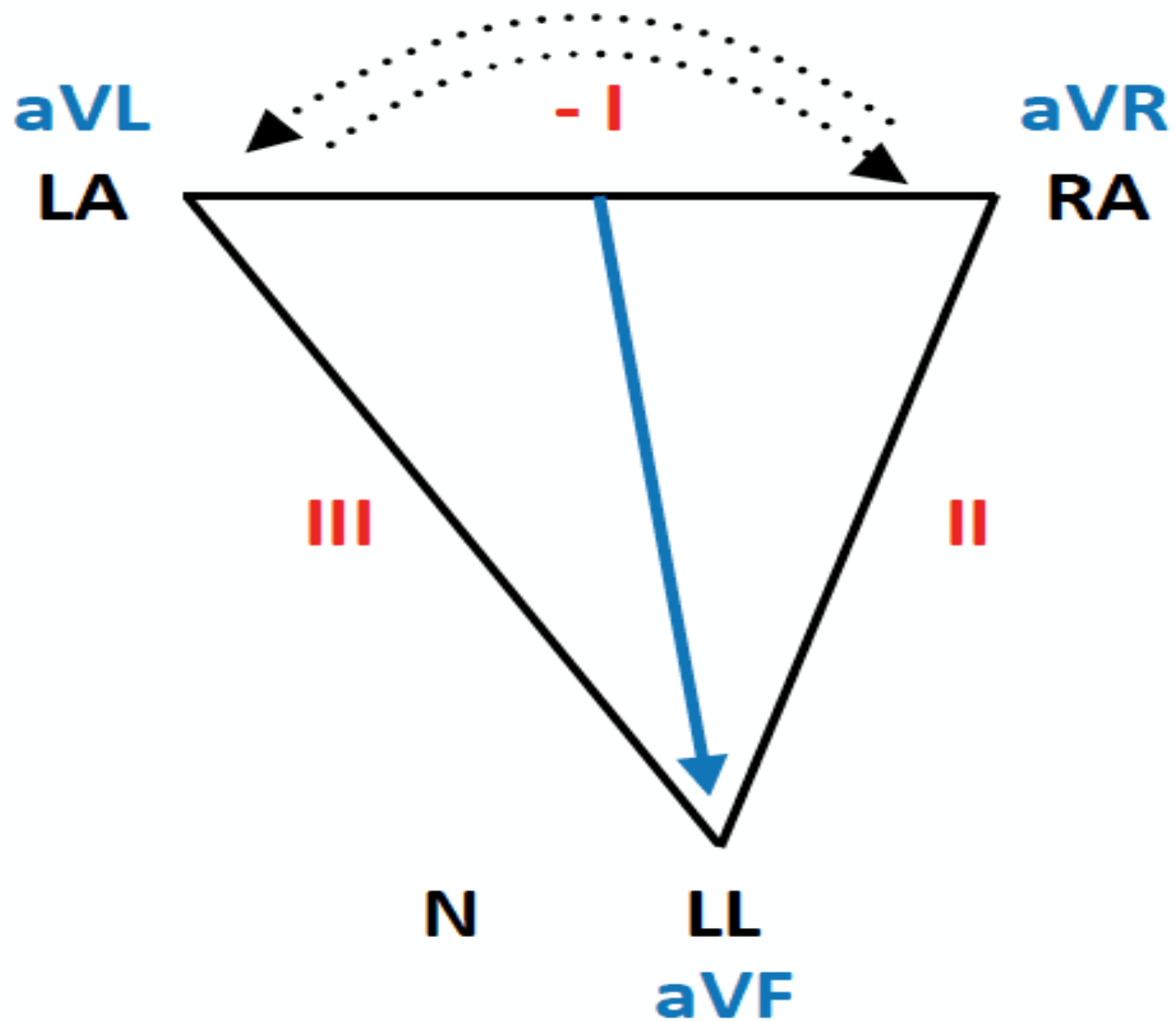


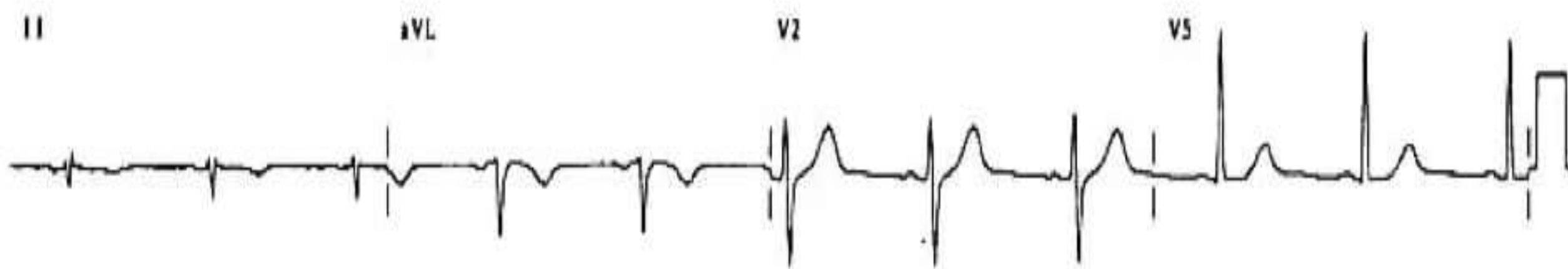
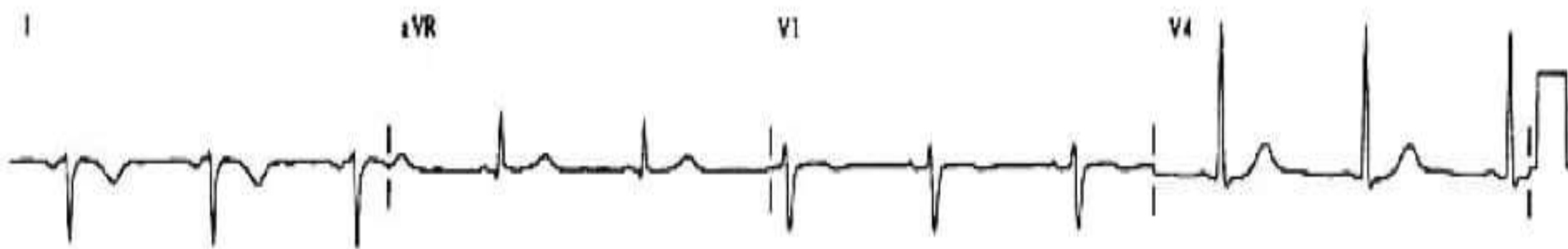


Calibration  
mark



# جابجایی لیدها







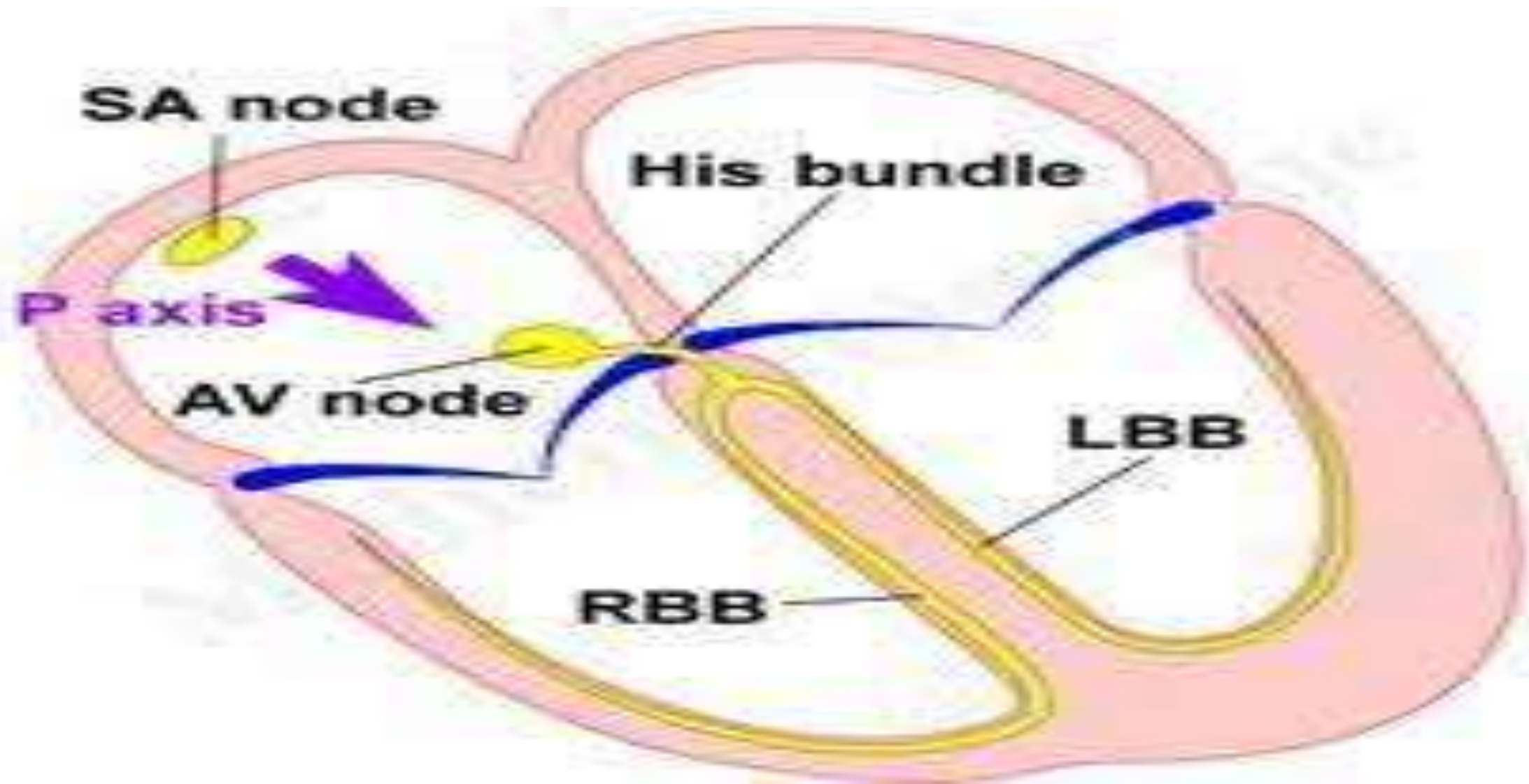
# Normal ECG



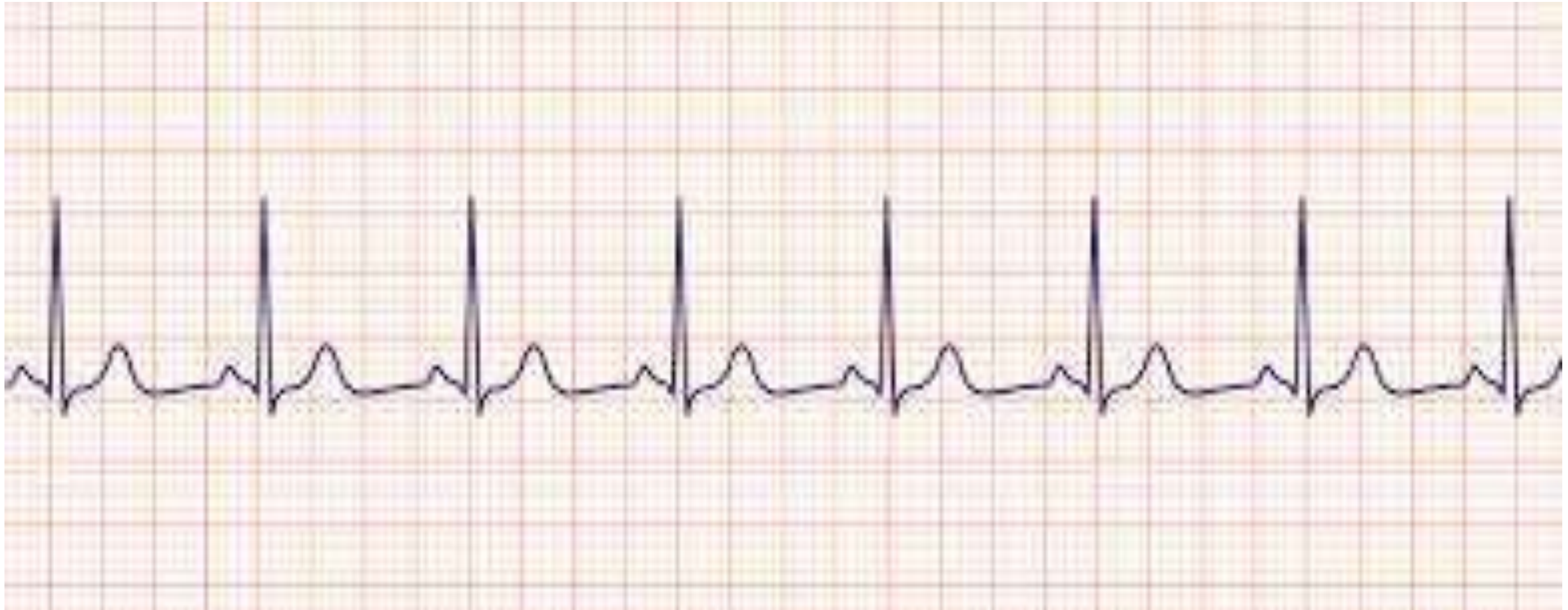
Figure 1. Normal ECG. No abnormal Q waves. ST is isoelectric in all leads

# نکته 4

ریتم سینوسی



# ریتم سینوسی





# Normal sinus rhythm

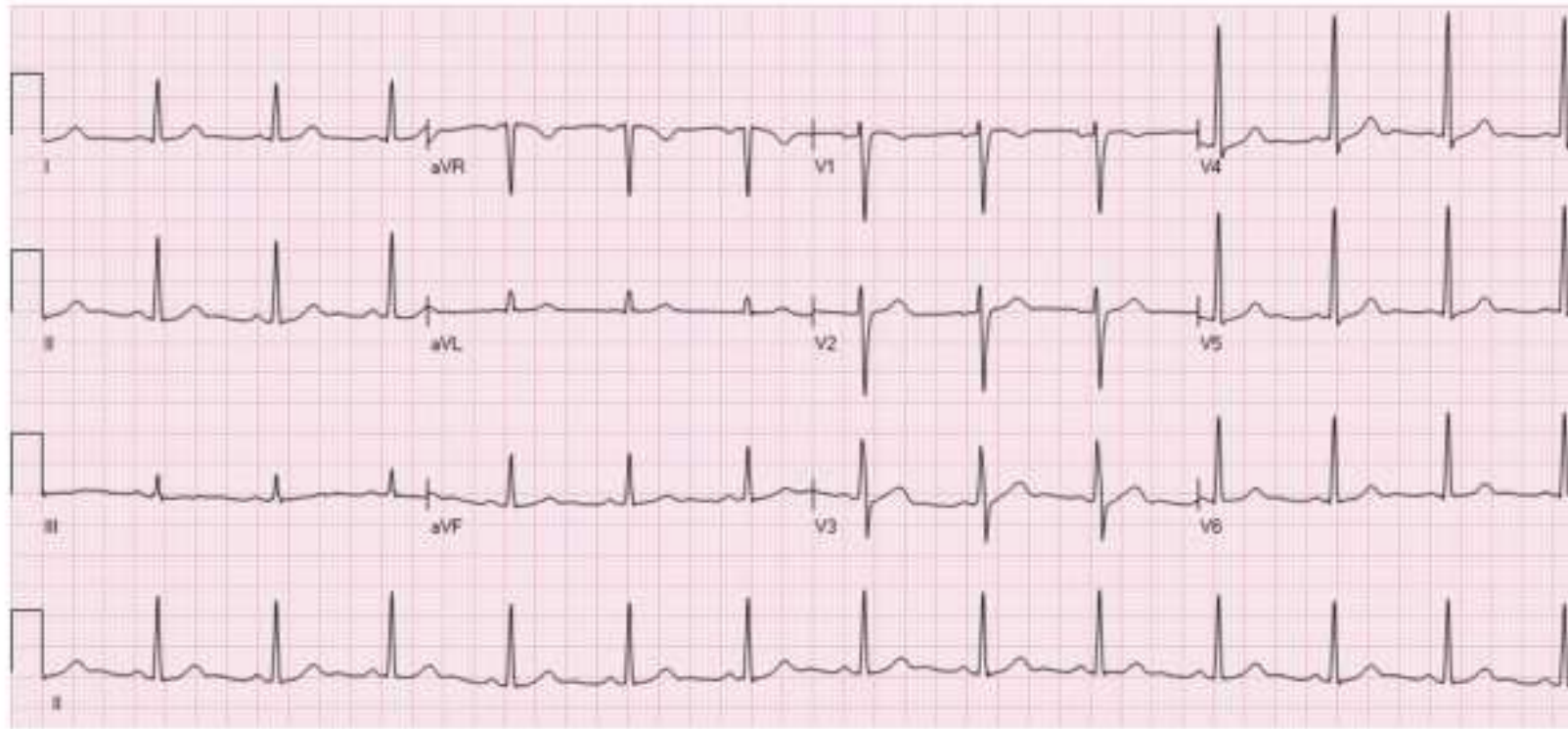
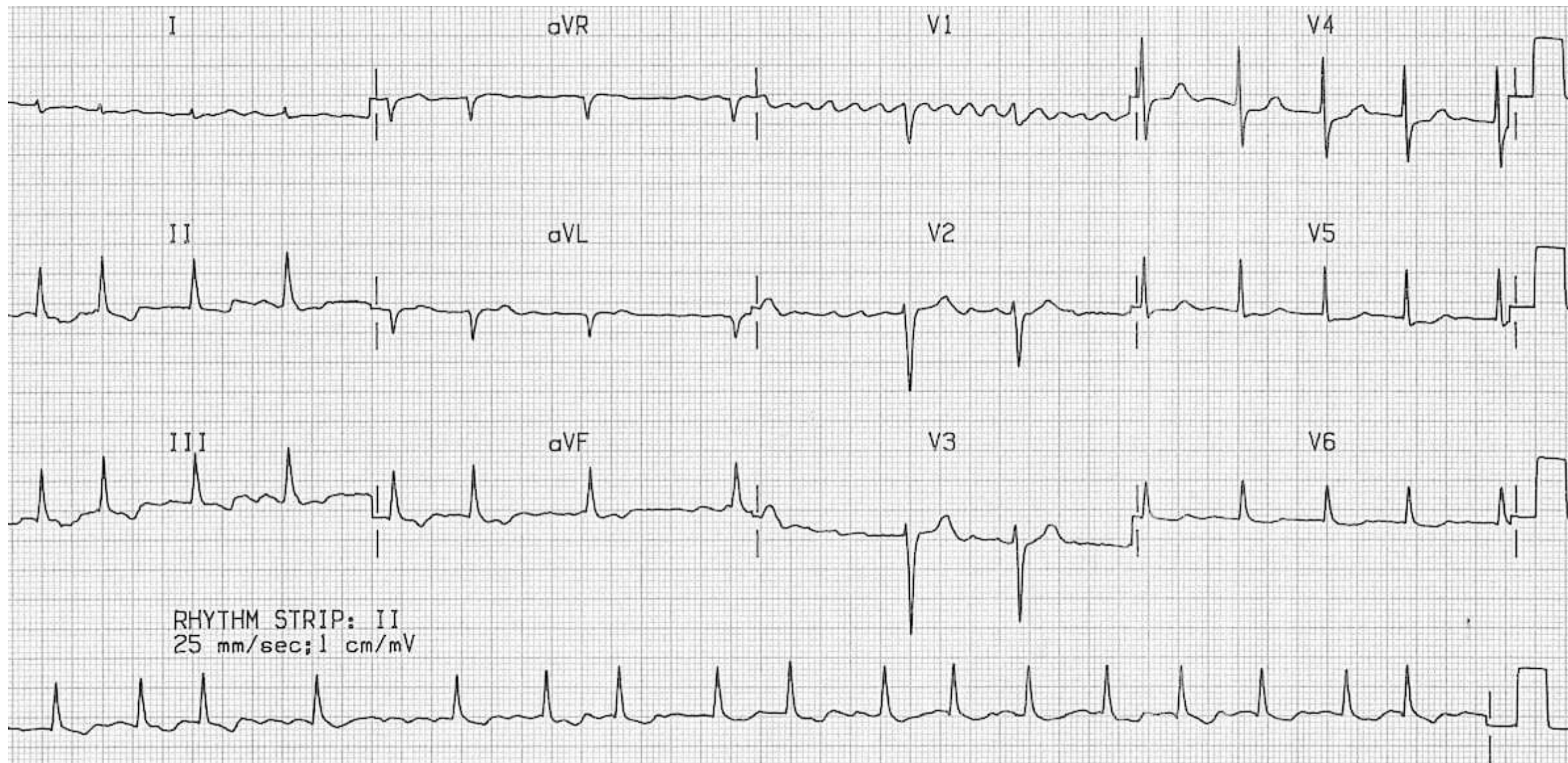
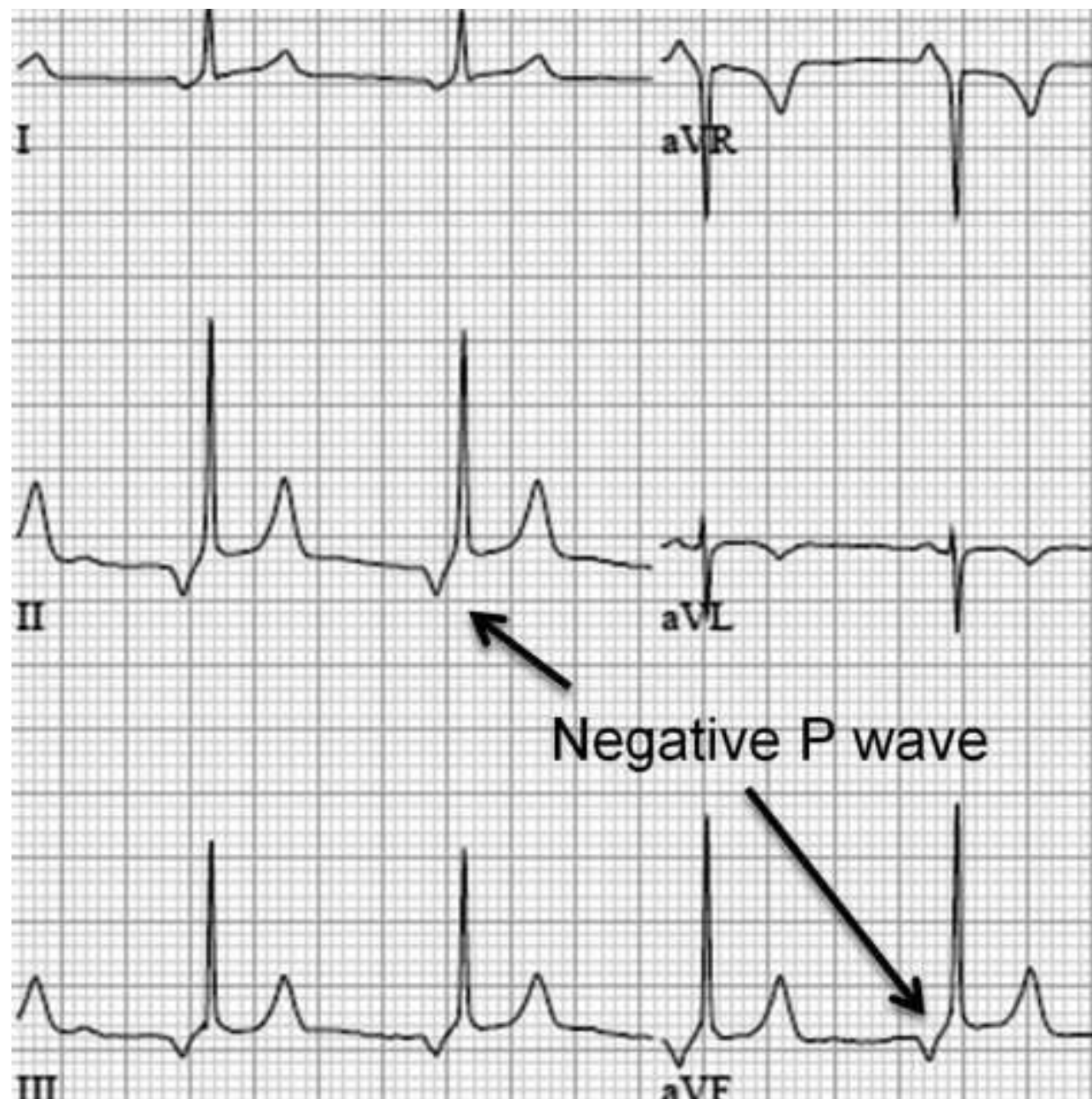


Figure 1. Normal ECG. No abnormal Q waves. ST is isoelectric in all leads







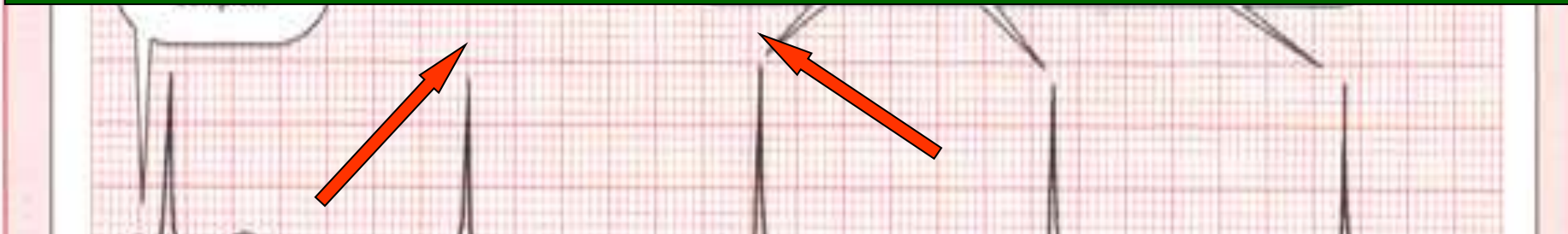
نکته 5

**Rate**

## روش دوم

1500

تعداد ضربانات قلبی =                       
تعداد خانه های کوچک

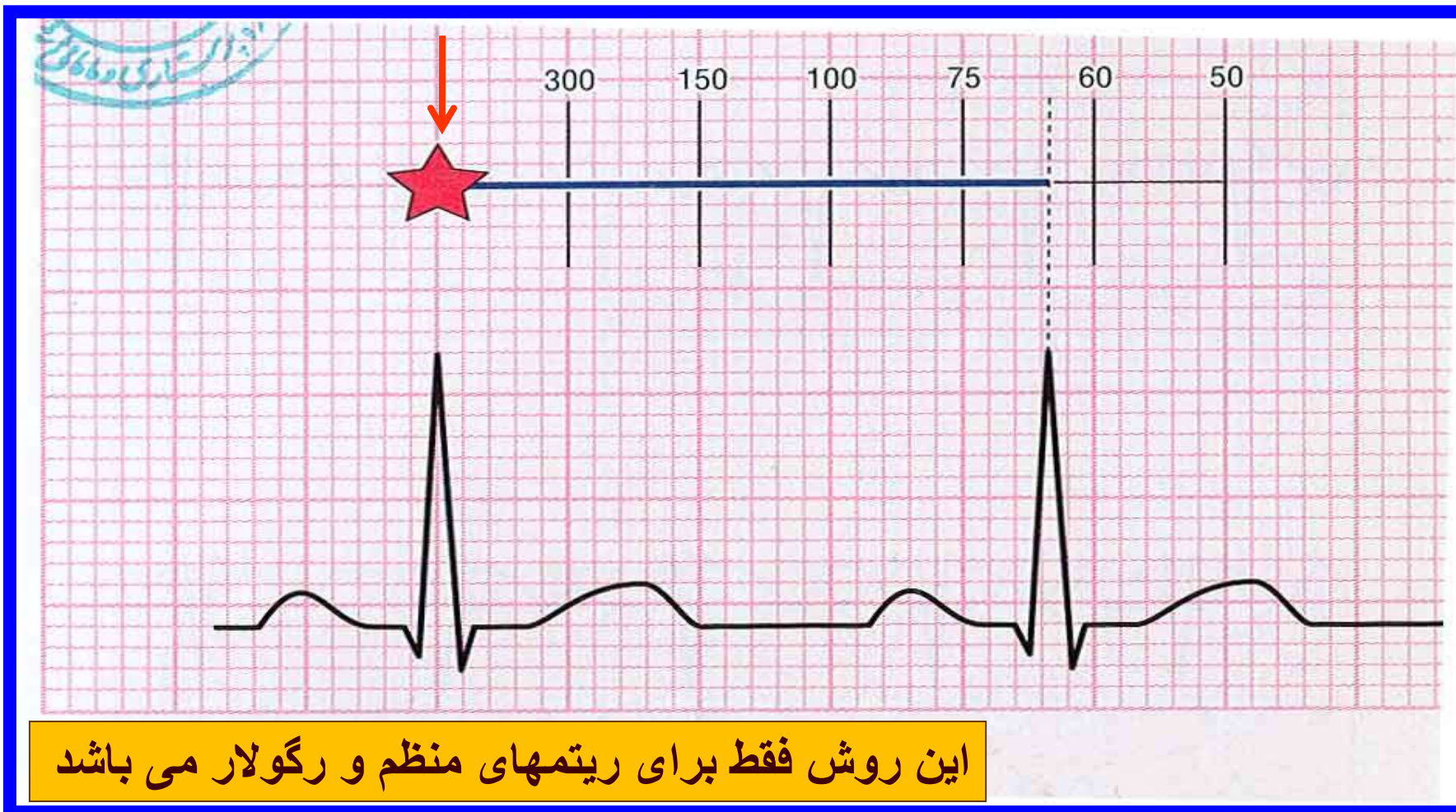


این روش فقط برای ریتمهای منظم و رگولار می باشد



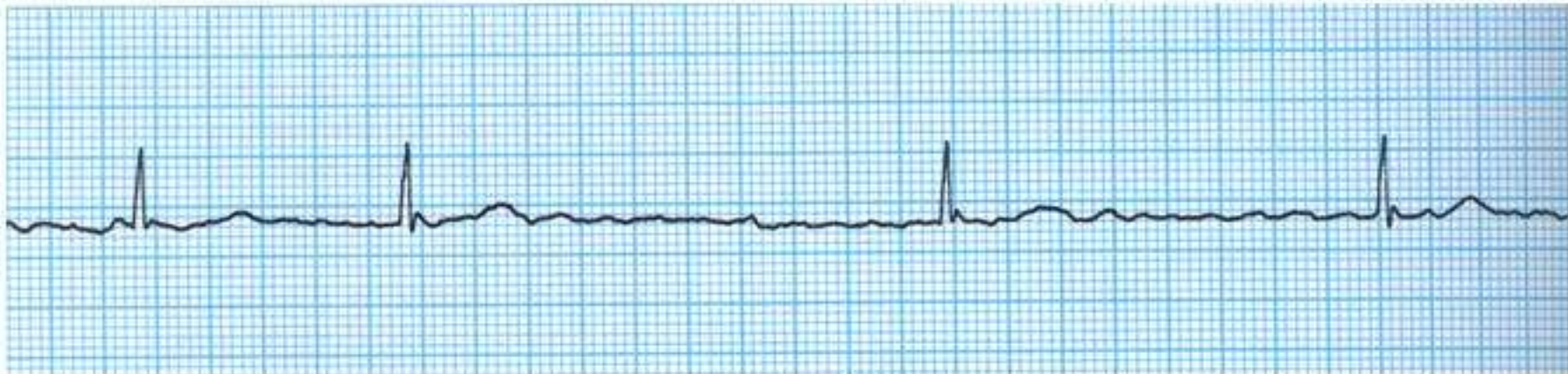
300 - 150 - 100 - 75 - 60 - 50

روش سوم



این روش فقط برای ریتمهای منظم و رگولار می باشد

**10 × تعداد کمپلکس QRS در 6 ثانیه = تعداد ضربانات قلبی**



1S

2S

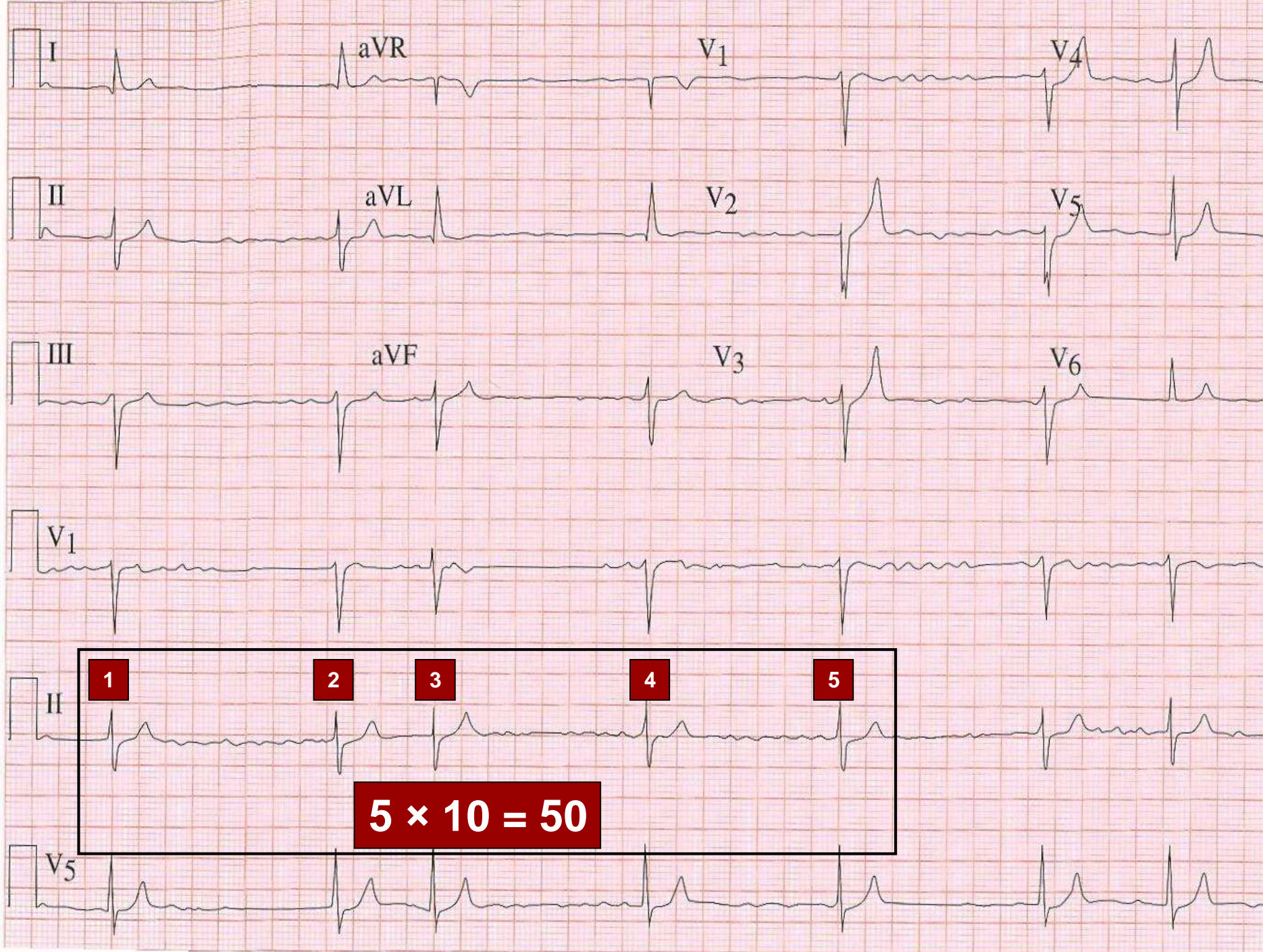
3S

4S

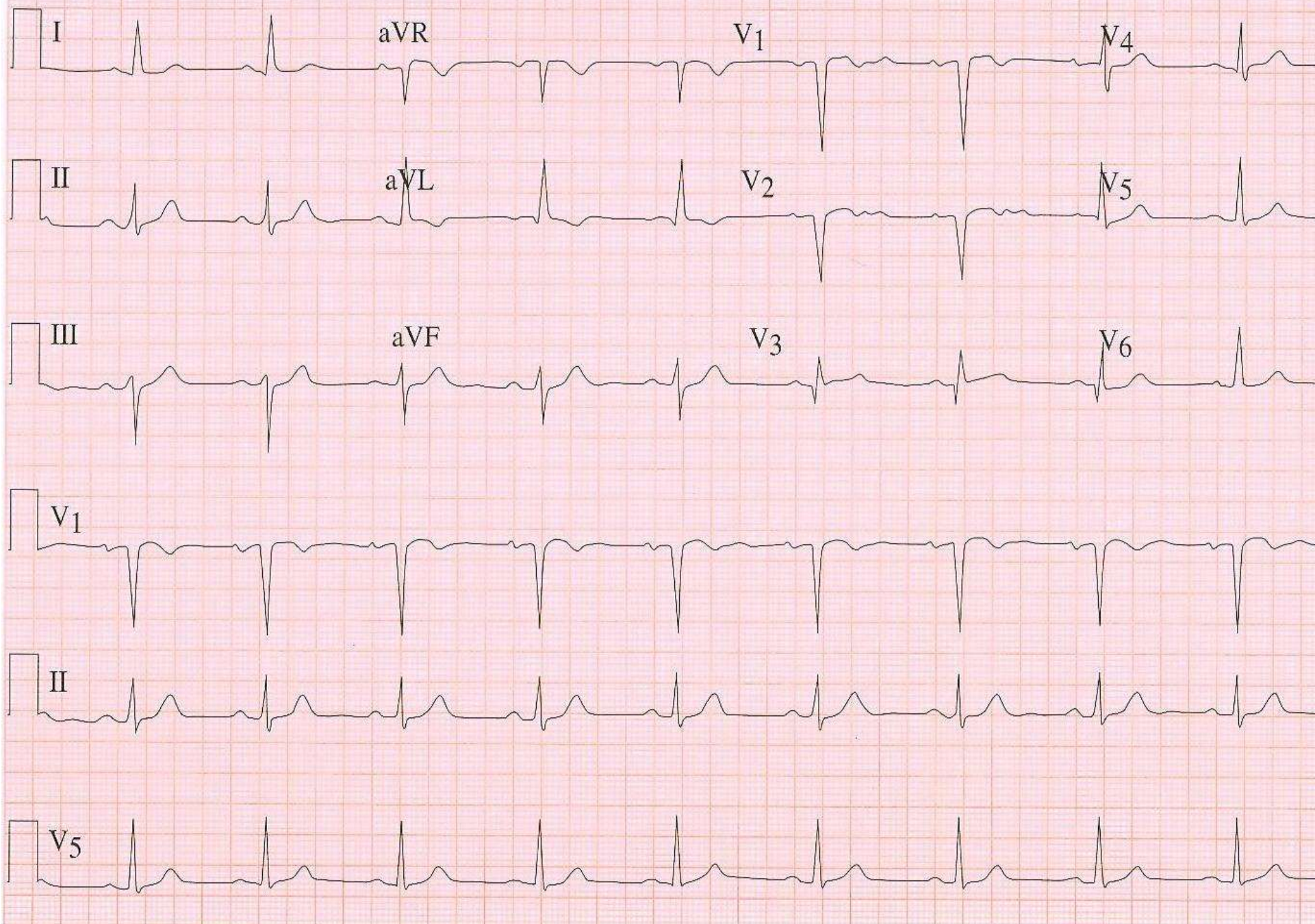
5S

6S











# AXIS

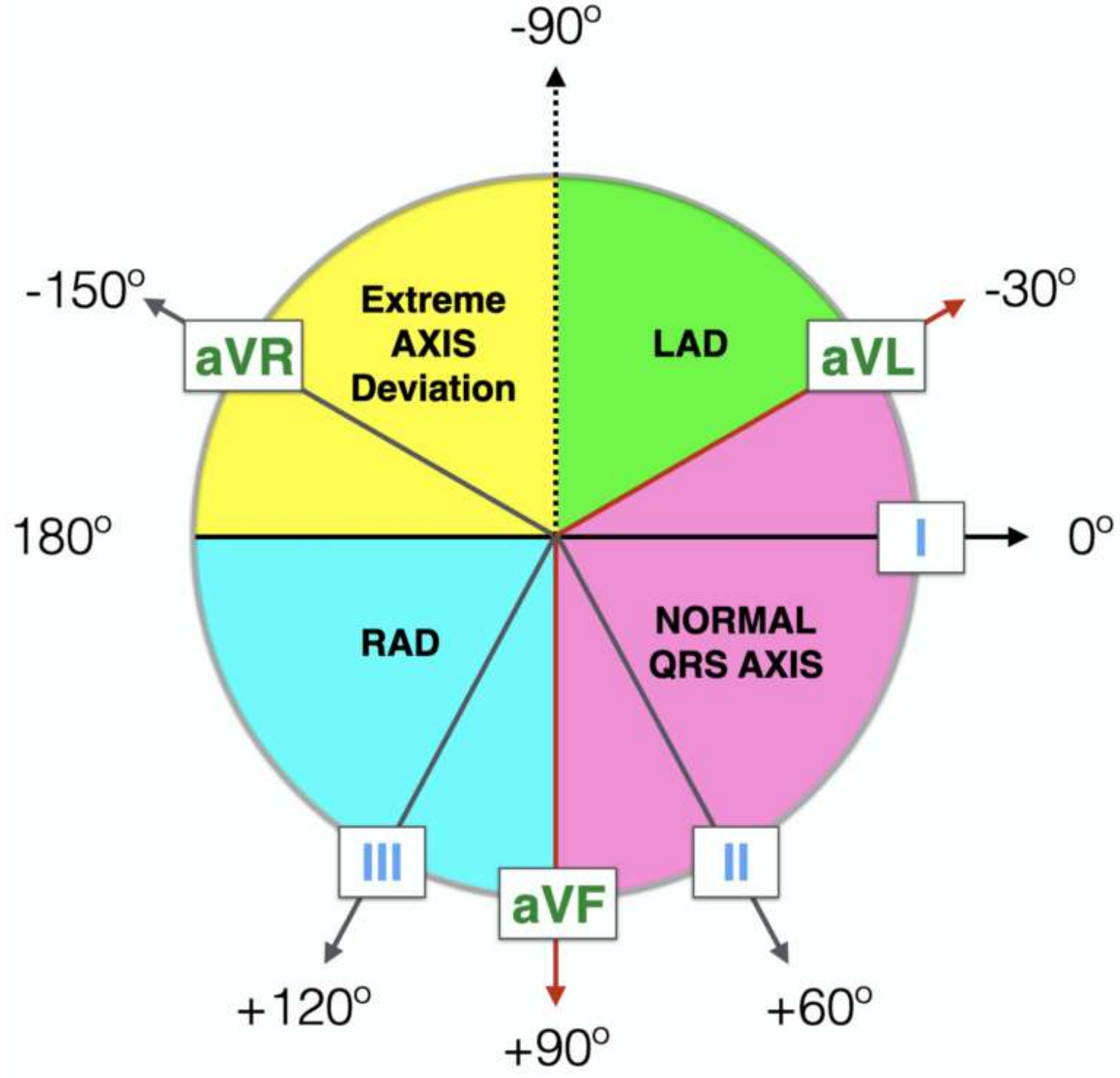
**Normal Axis** = QRS axis between  $-30^{\circ}$  and  $+90^{\circ}$ .

Abnormal axis deviation, indicating underlying pathology, is demonstrated by:

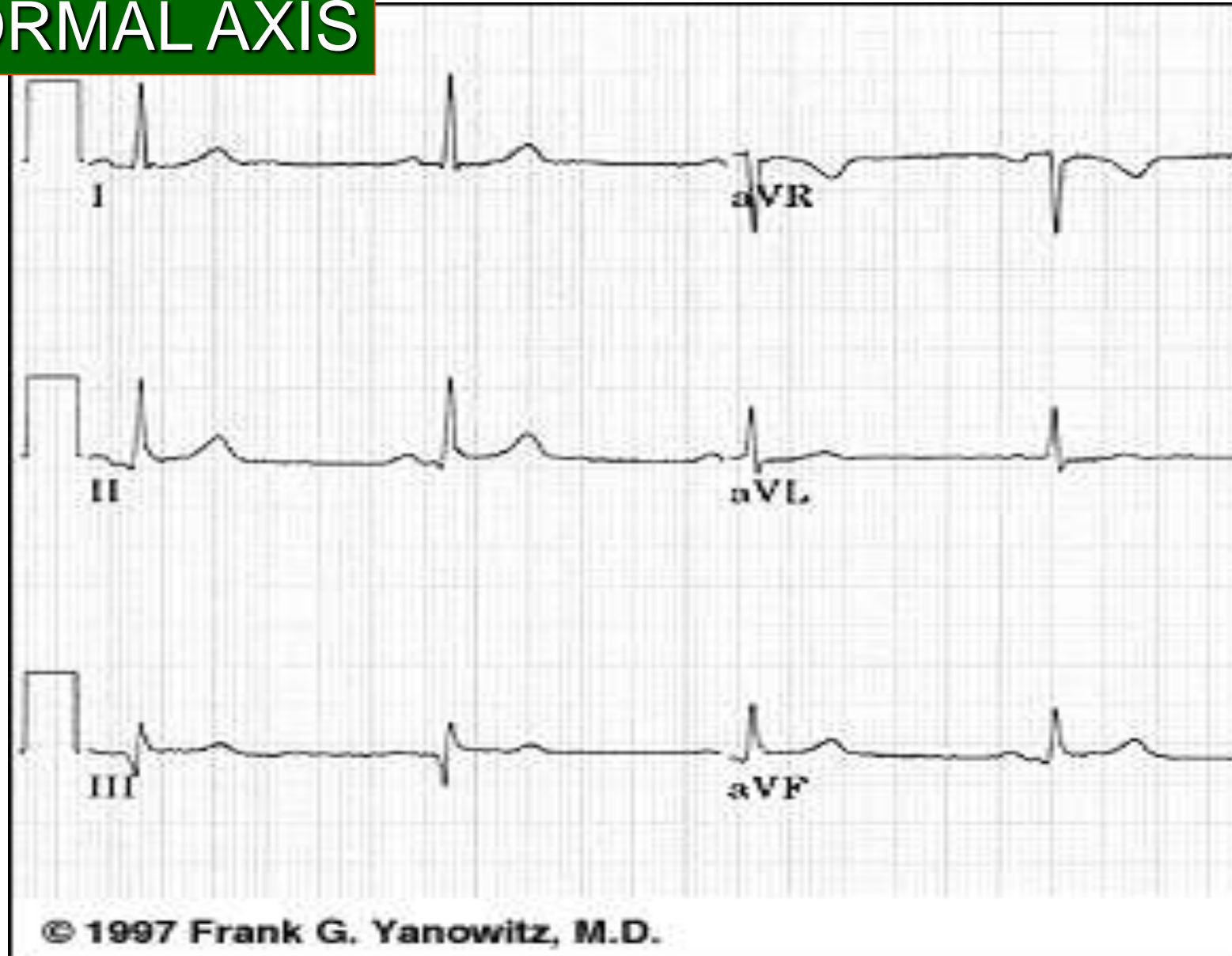
**Left Axis Deviation** = QRS axis less than  $-30^{\circ}$ .

**Right Axis Deviation** = QRS axis greater than  $+90^{\circ}$ .

**Extreme Axis Deviation** = QRS axis between  $-90^{\circ}$  and  $180^{\circ}$  (AKA “Northwest Axis”).

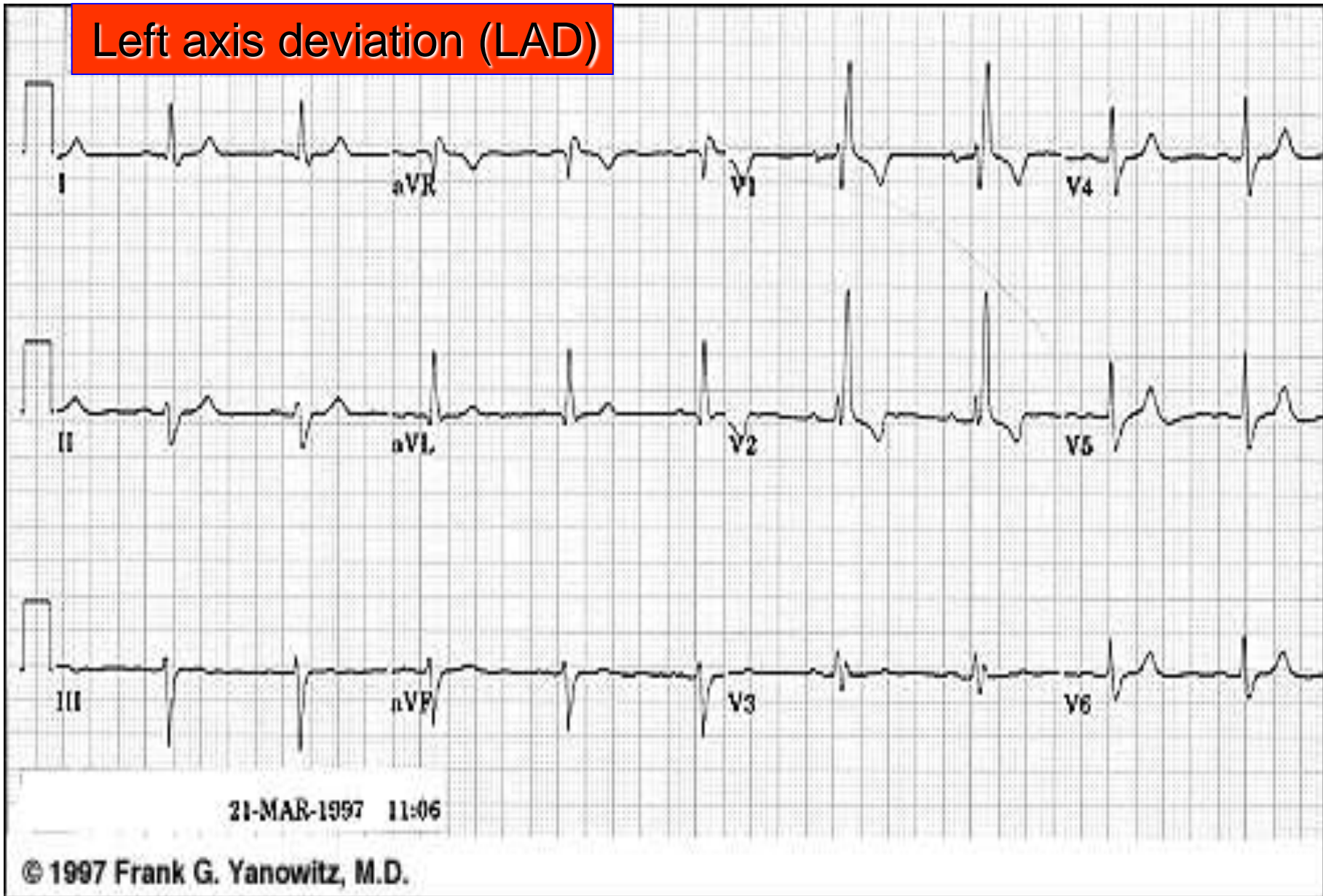


# NORMAL AXIS

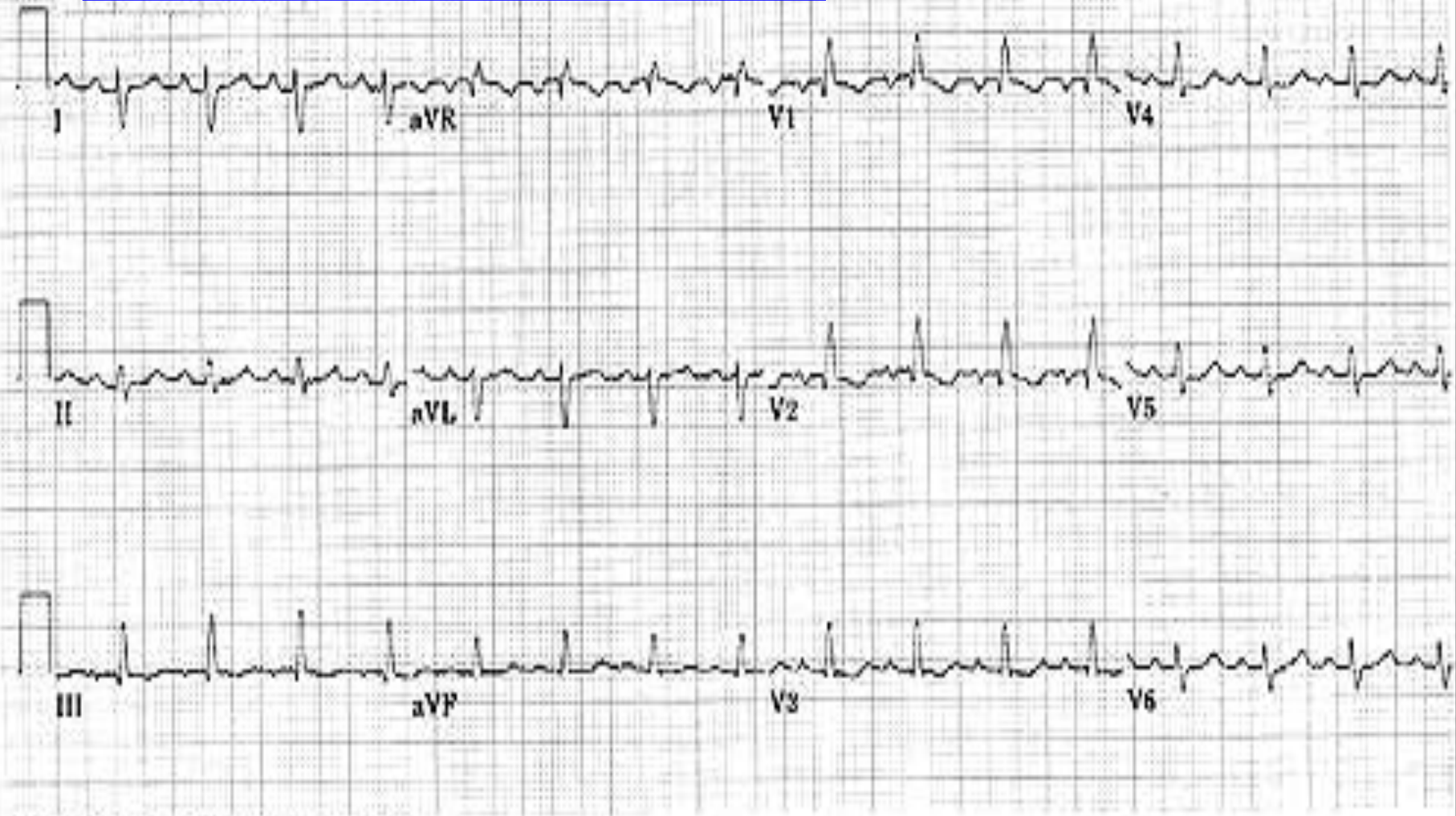




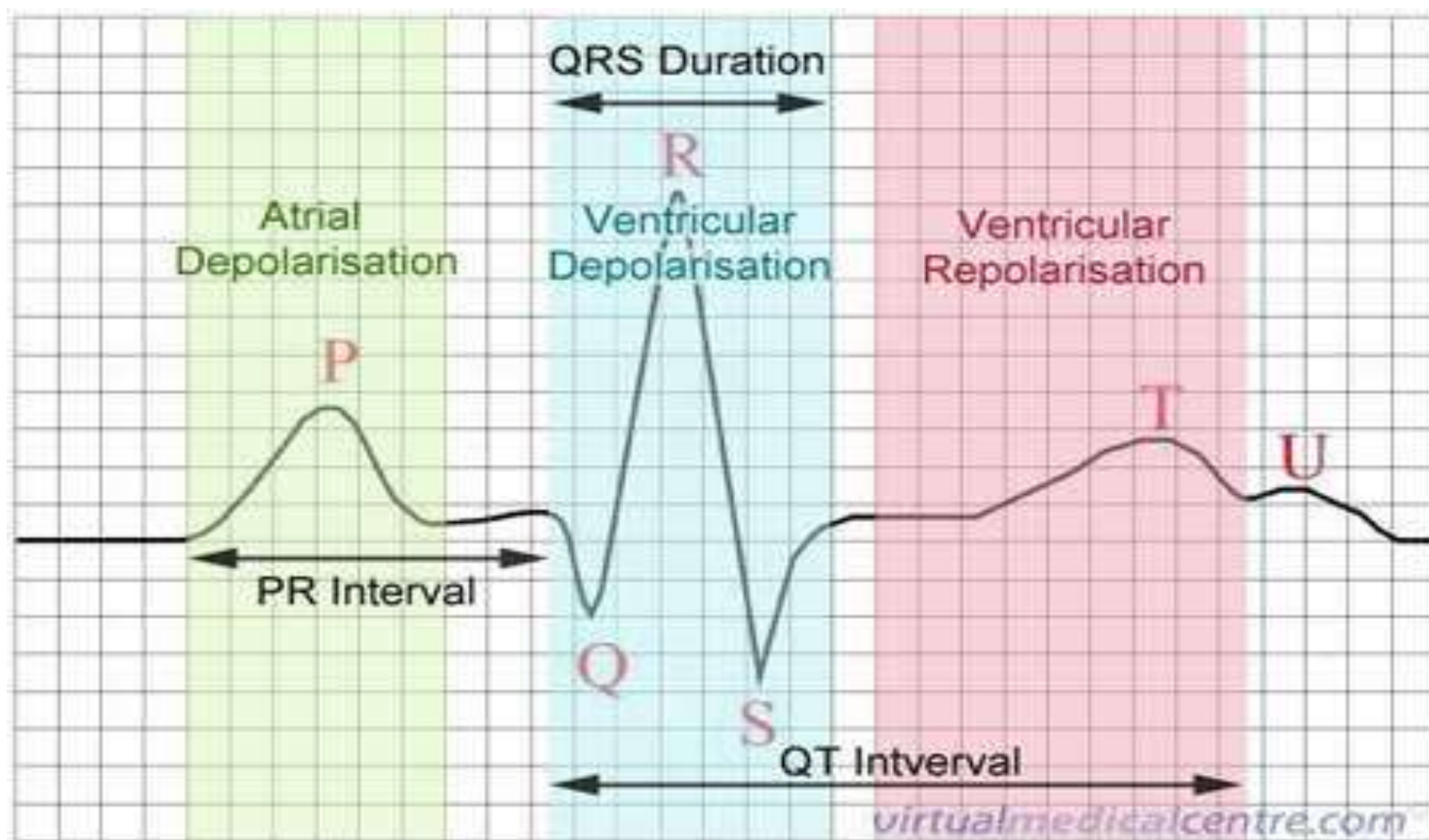
## Left axis deviation (LAD)



## Right axis deviation (RAD)



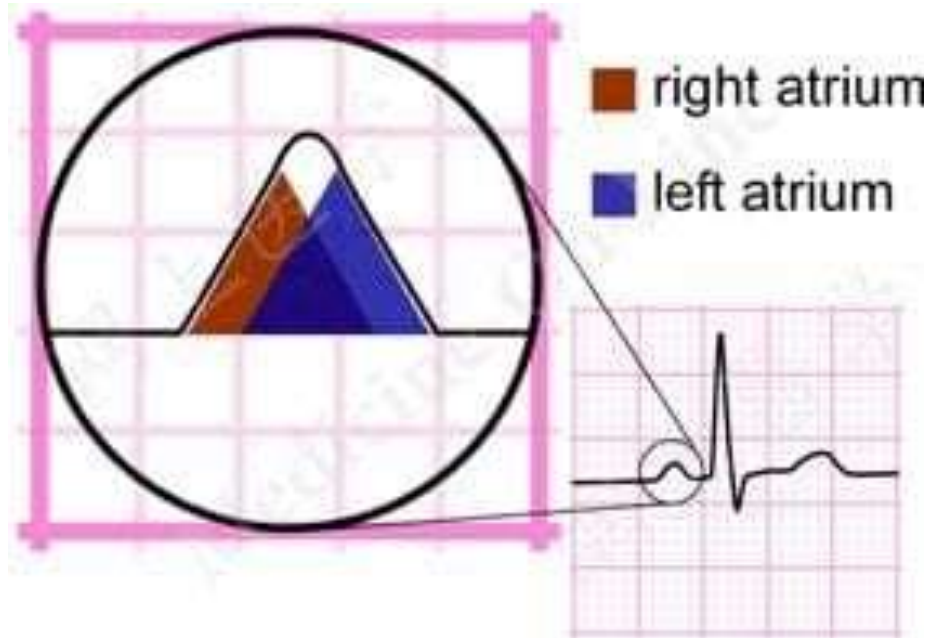
© 1997 Frank G. Yanowitz, M.D.



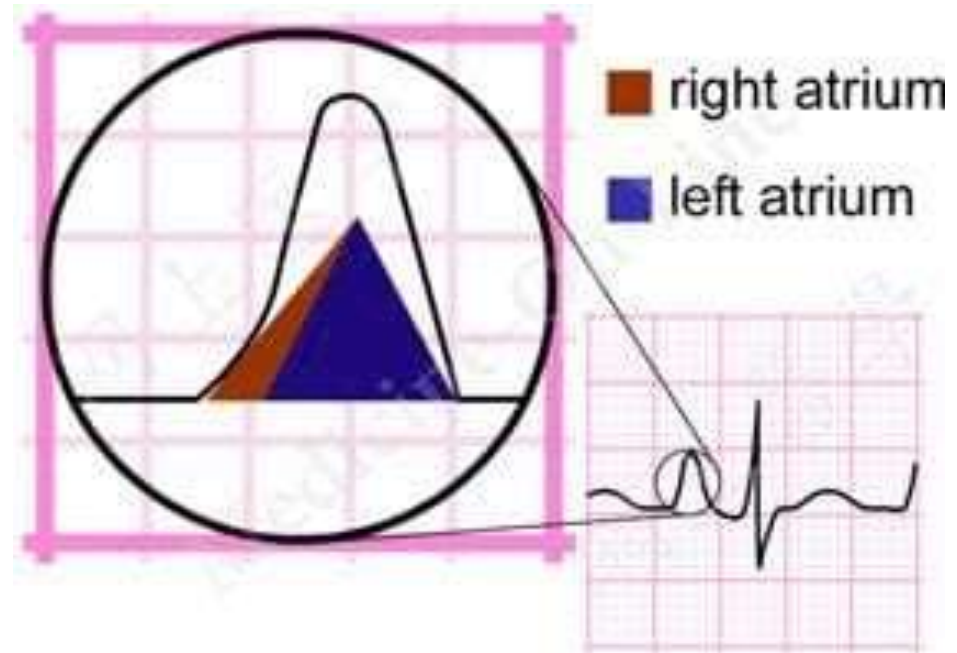
# P wave

- The P wave is the first positive deflection on the ECG
- It represents **atrial depolarisation**
- Normal duration:  $< 0.12 \text{ s}$  ( $< 120\text{ms}$  or 3 small squares)
- **Amplitude**
  - $< 2.5 \text{ mm}$  ( $0.25\text{mV}$ ) in the limb leads
  - $< 1.5 \text{ mm}$  ( $0.15\text{mV}$ ) in the precordial leads

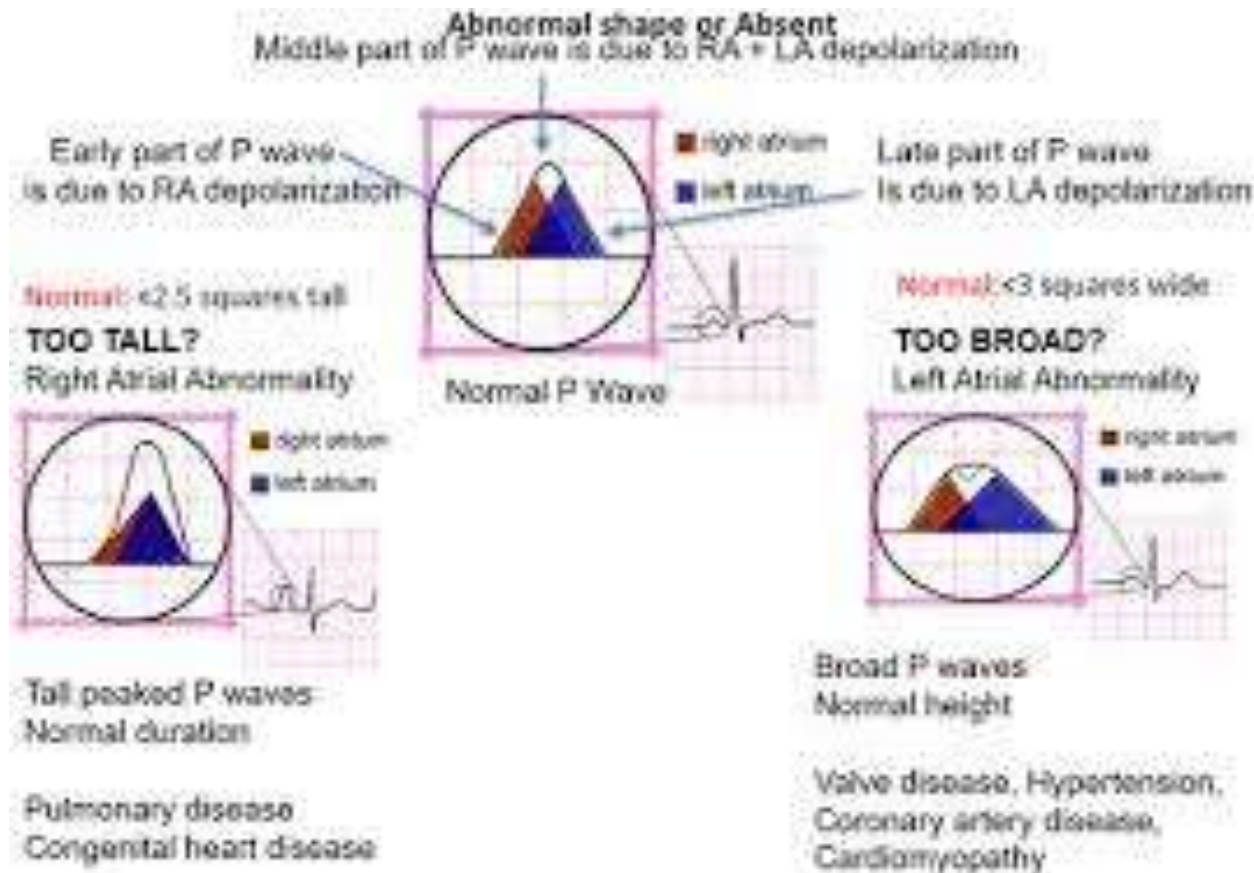




# RA enlargement



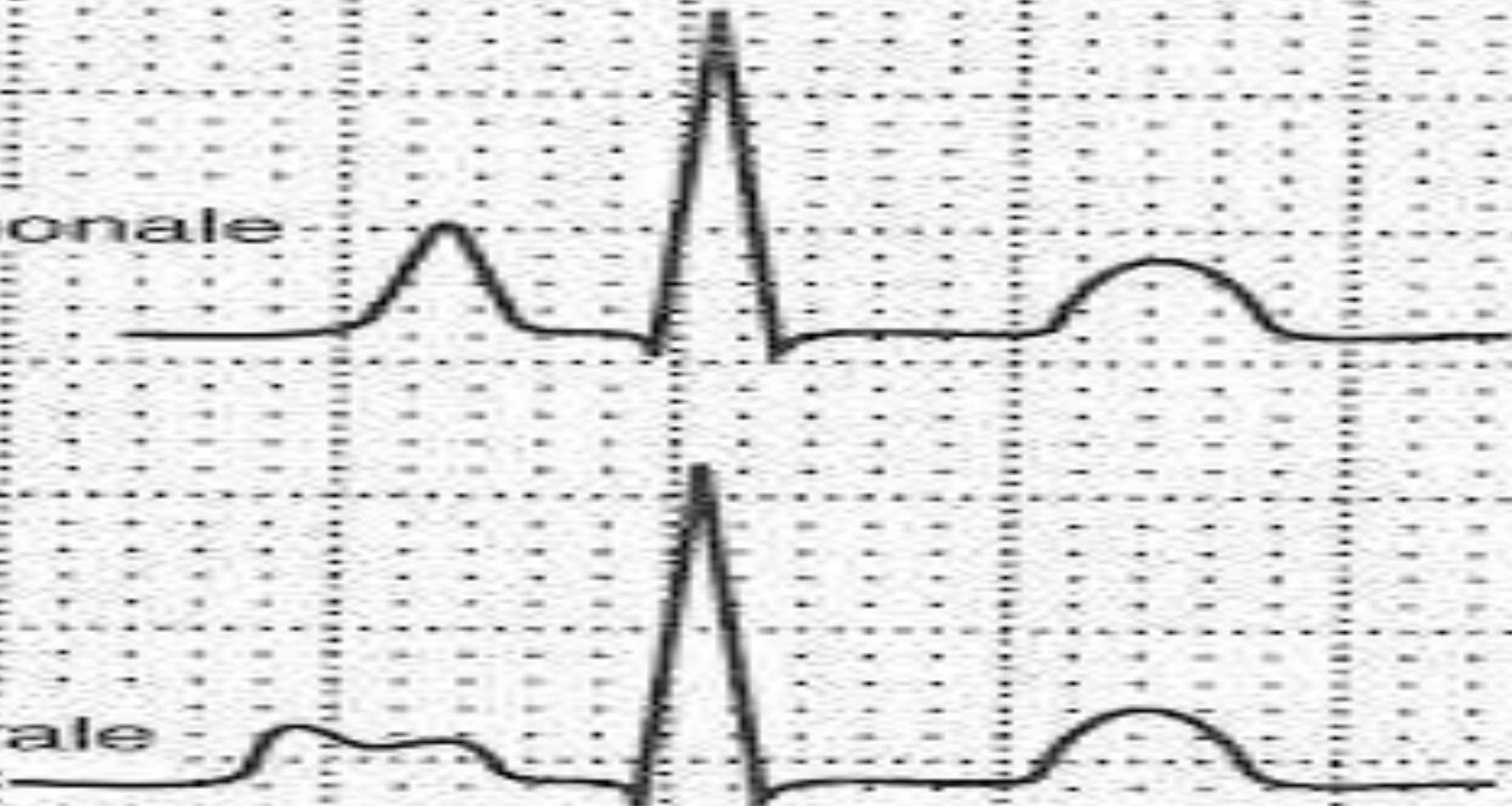
# LA enlargement



# نکته 7 موج P

P-Pulmonale

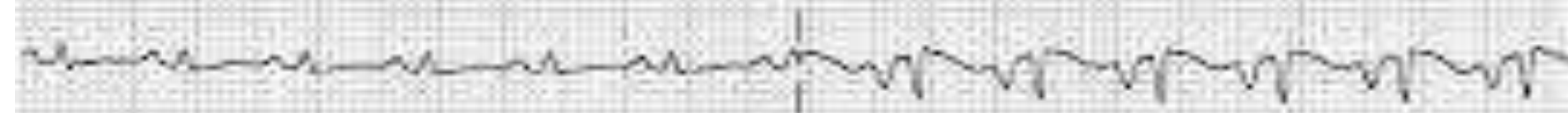
P-Mitrale





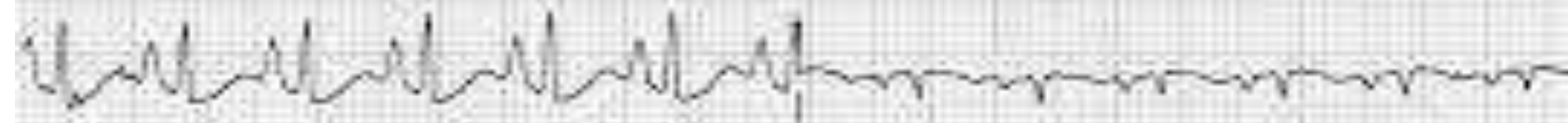
I

aVR



II

aVL

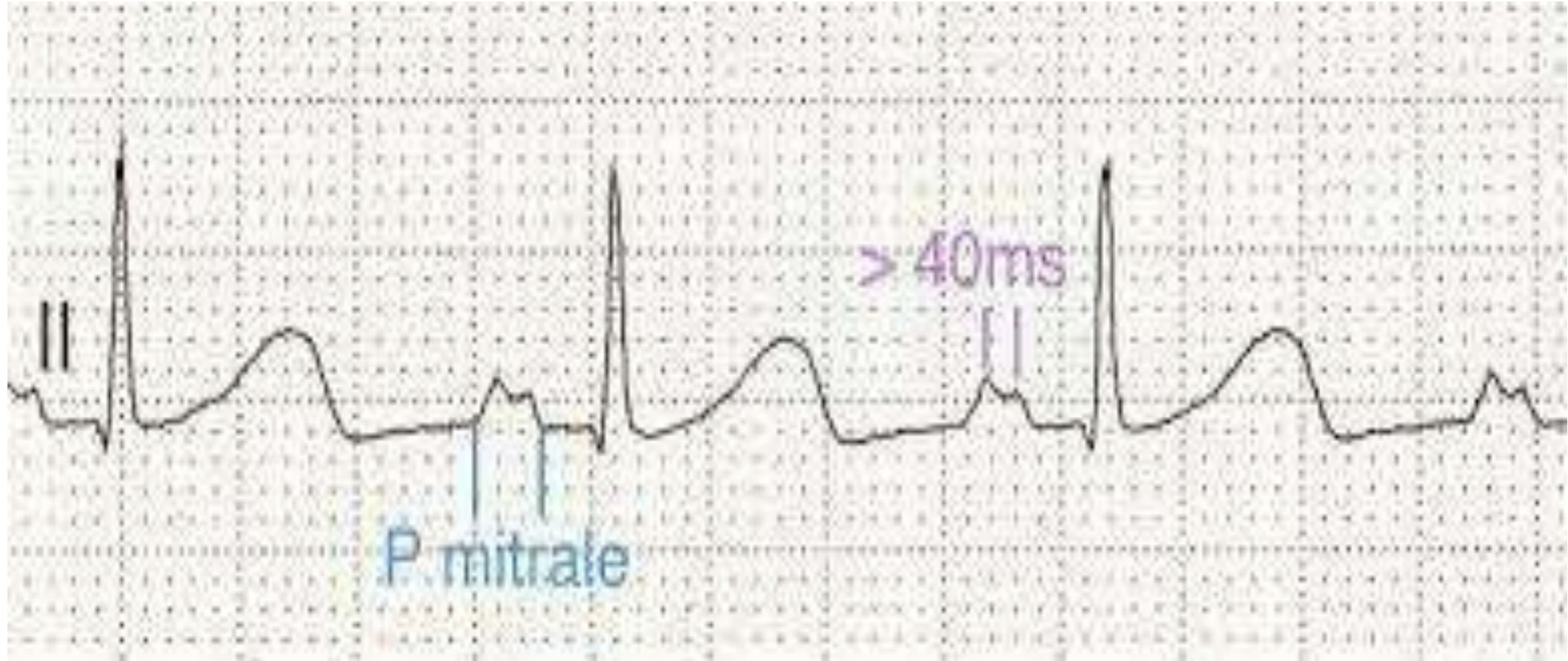


III

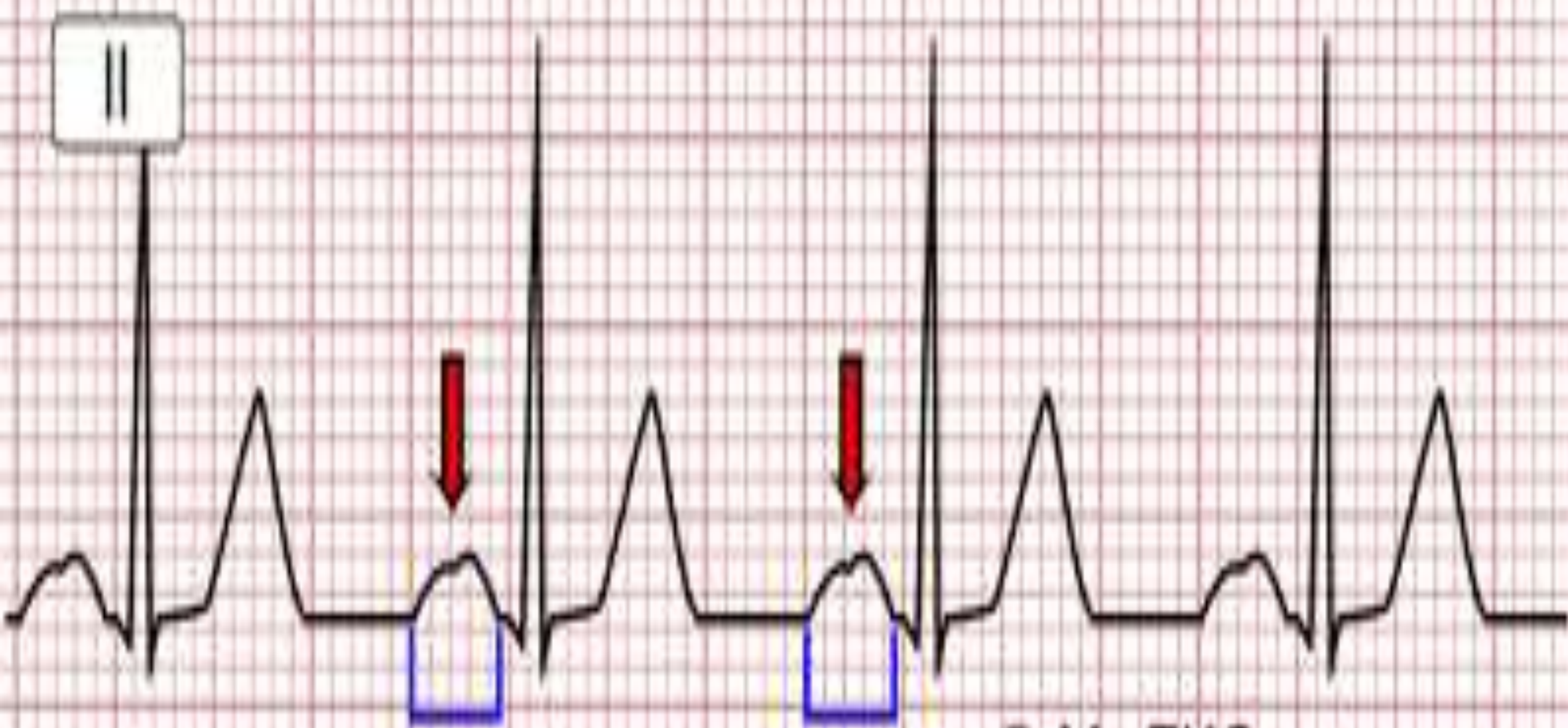
aVF



# P mitral



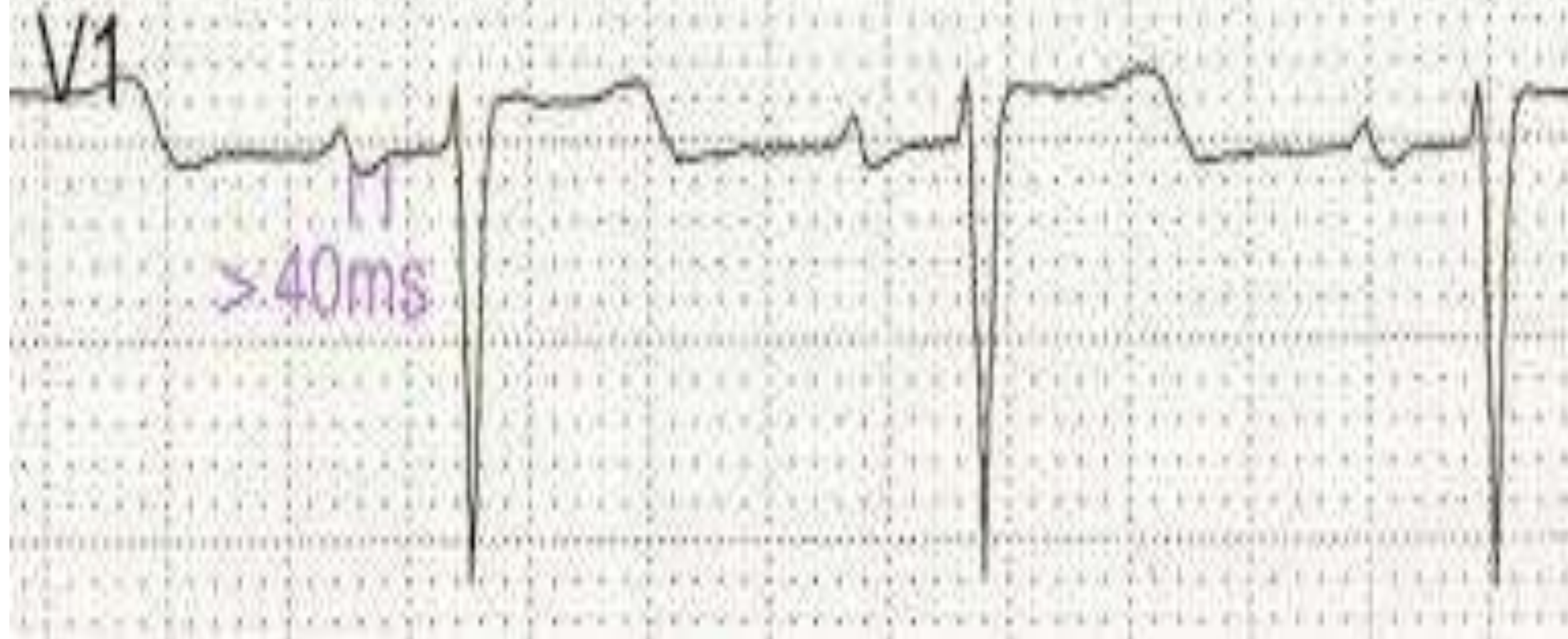




© My EKG

V1

II  
>40ms





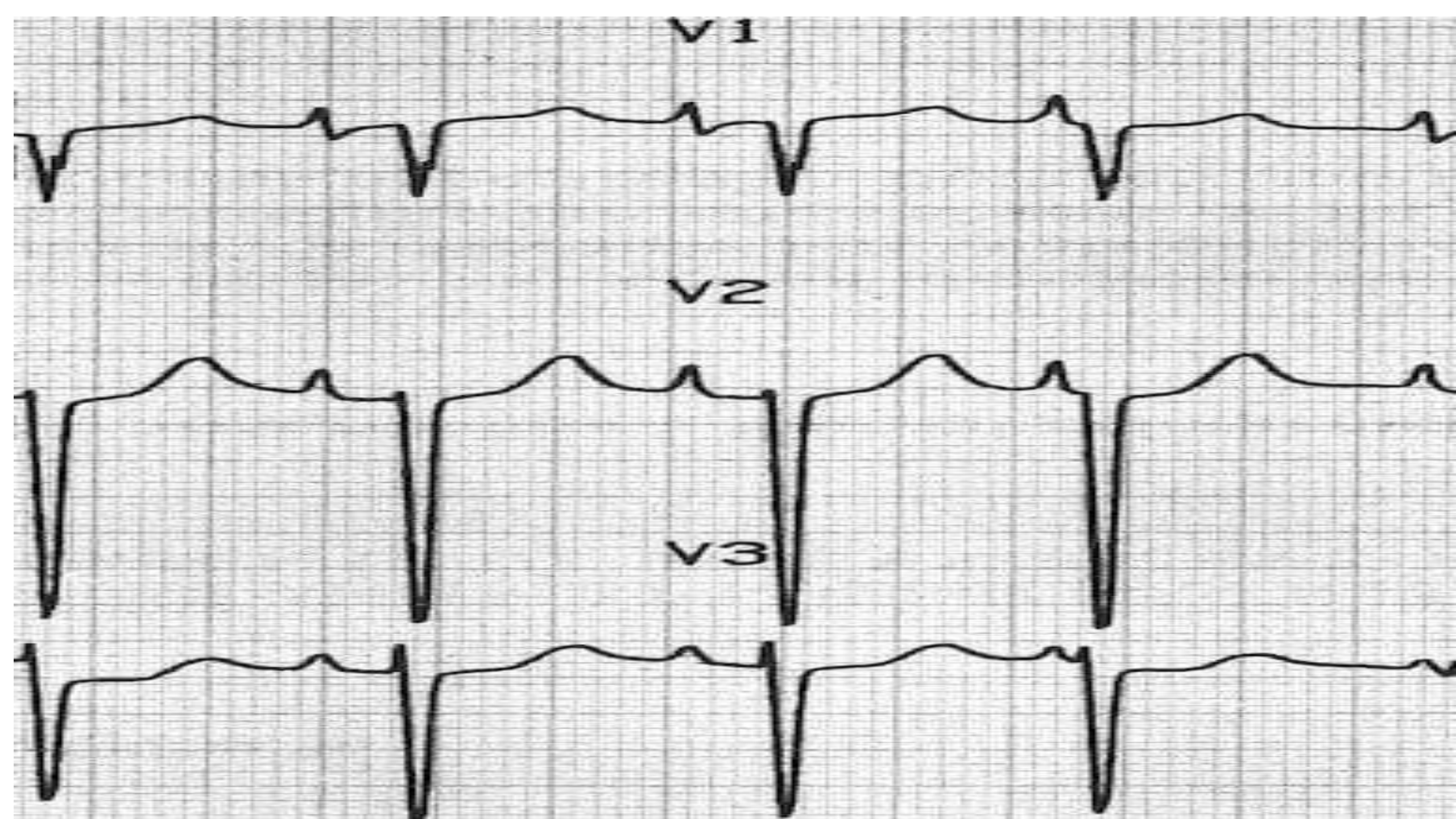
# P پولمونل در لید V1



V1

V2

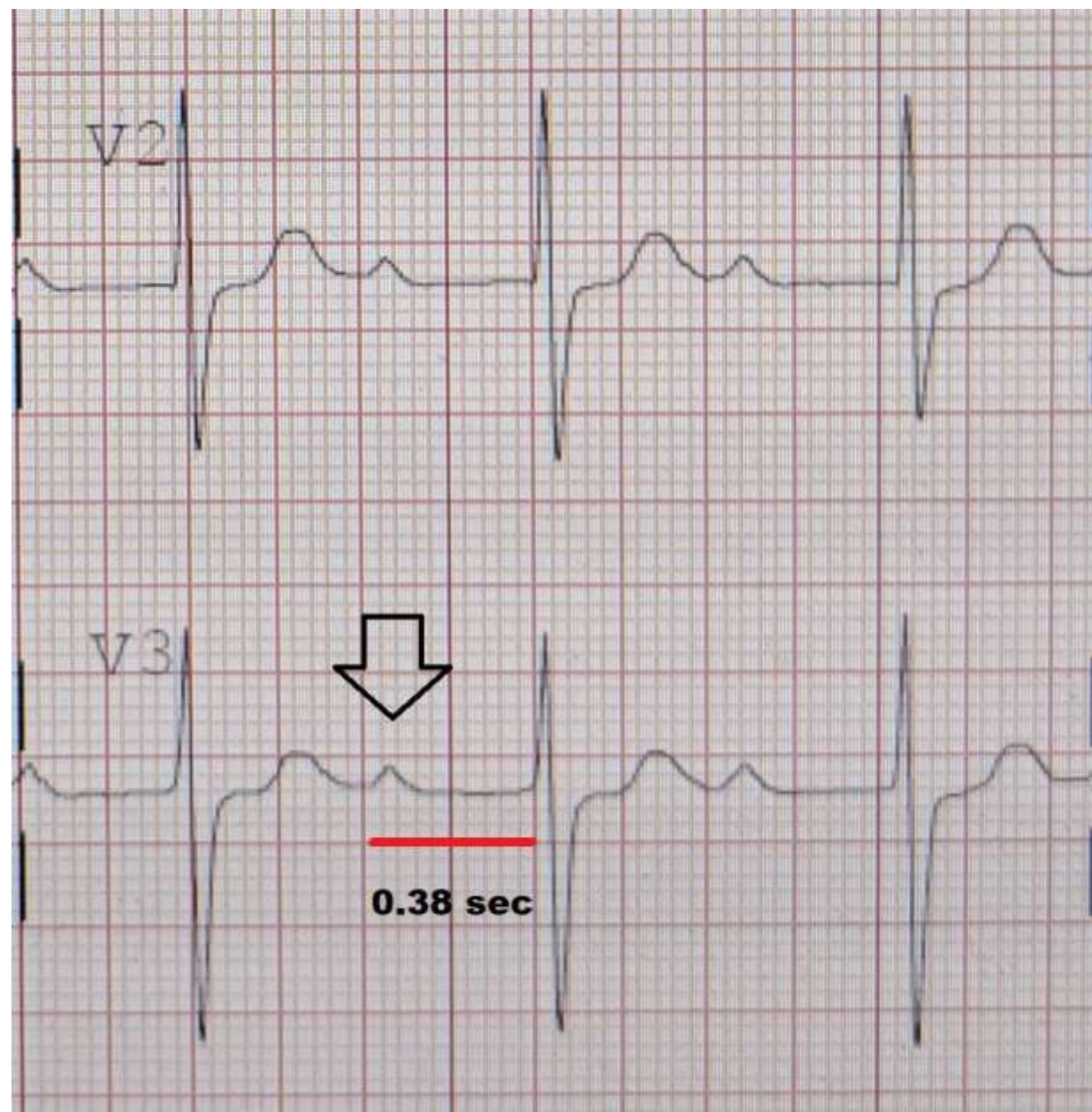
V3



# PR interval

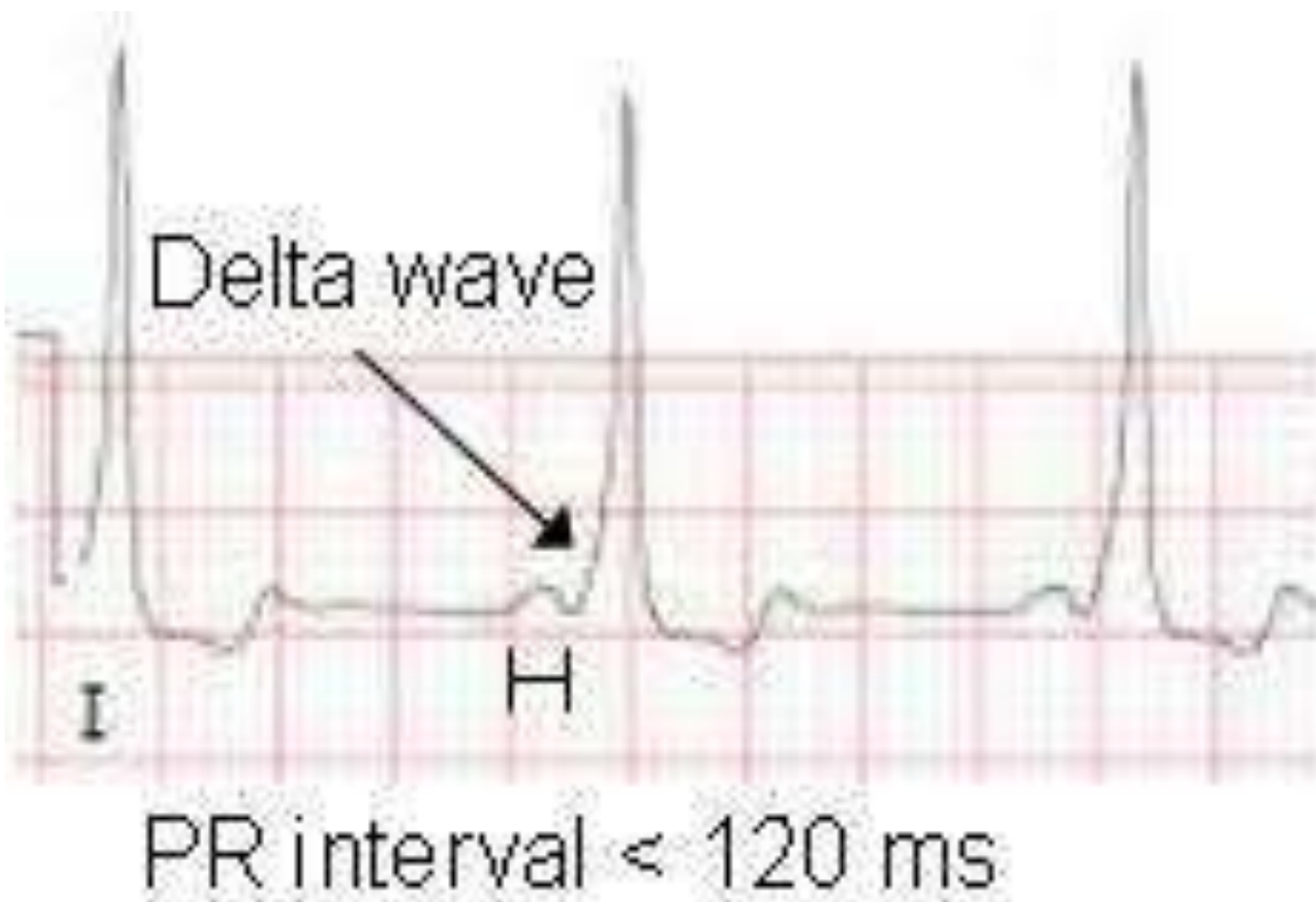
- **Prolonged PR Interval – AV block (PR >200ms)**
- **First degree AV block**







# WPW



# WPW syndrome

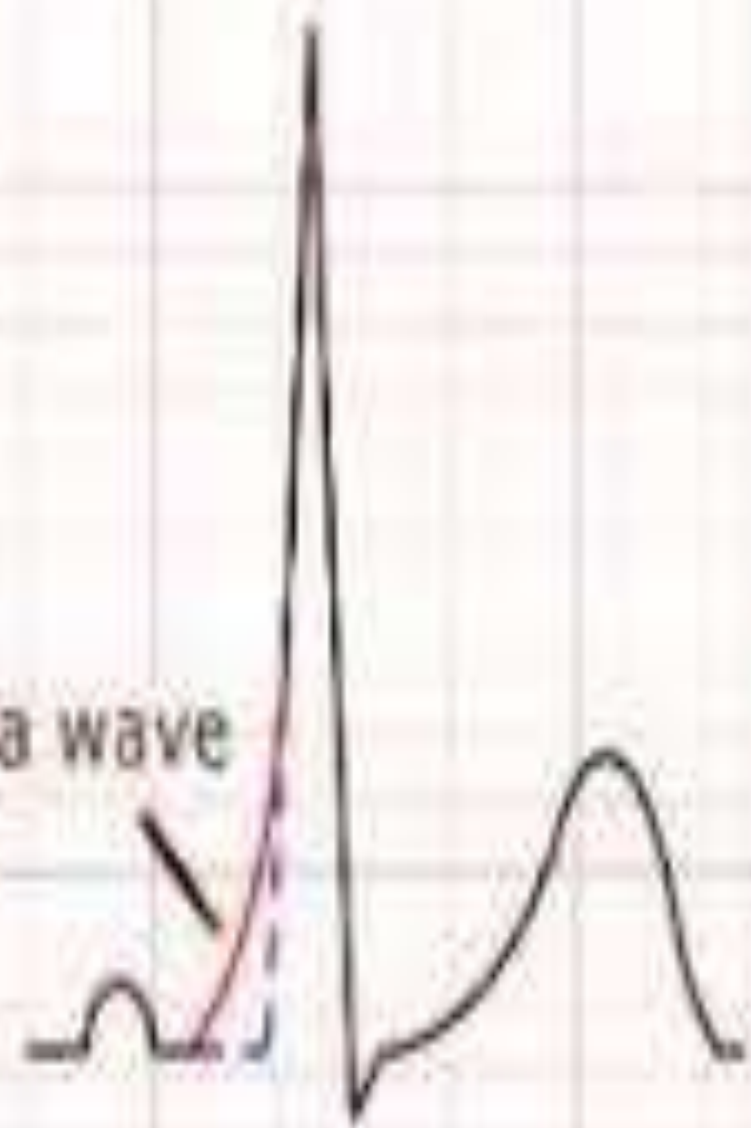
$\omega$  = Wide QRS complex.

$\dot{P}$  = PR-interval short (< 12 sec).

$\omega$  = Wave  $\rightarrow$  Delta wave.



Delta wave



Delta wave

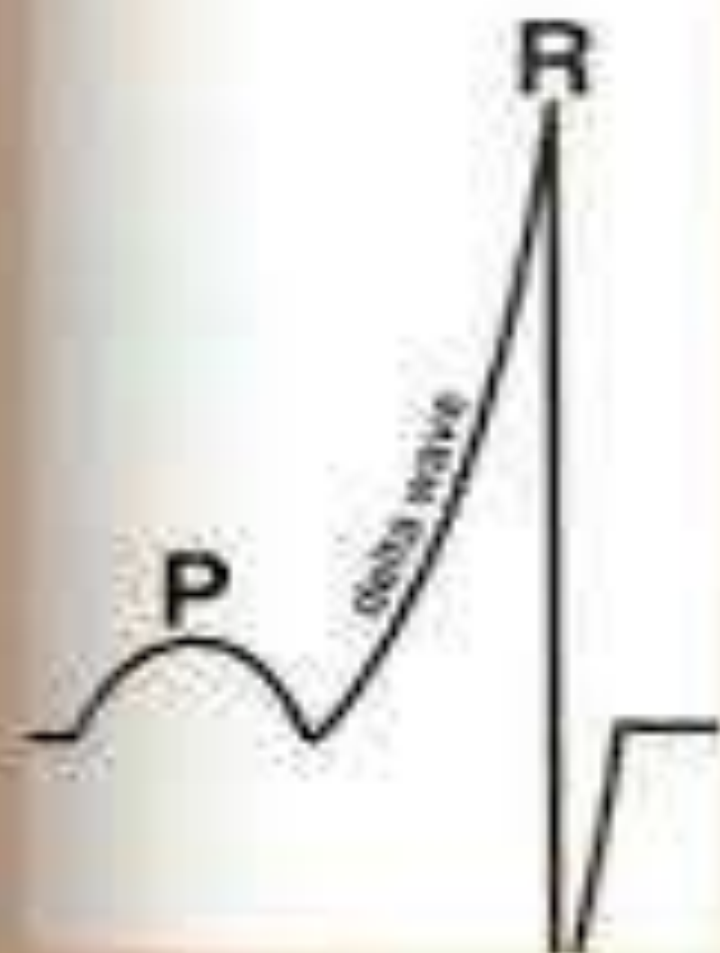


Delta wave



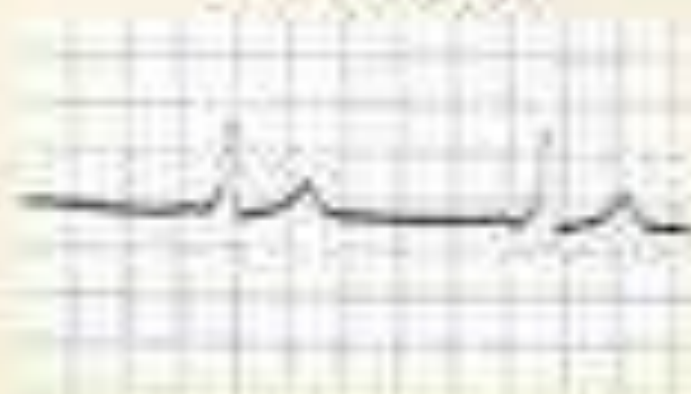
# Wolff-Parkinson-White Syndrome

enlarged



Bundle of Kent

on EKG

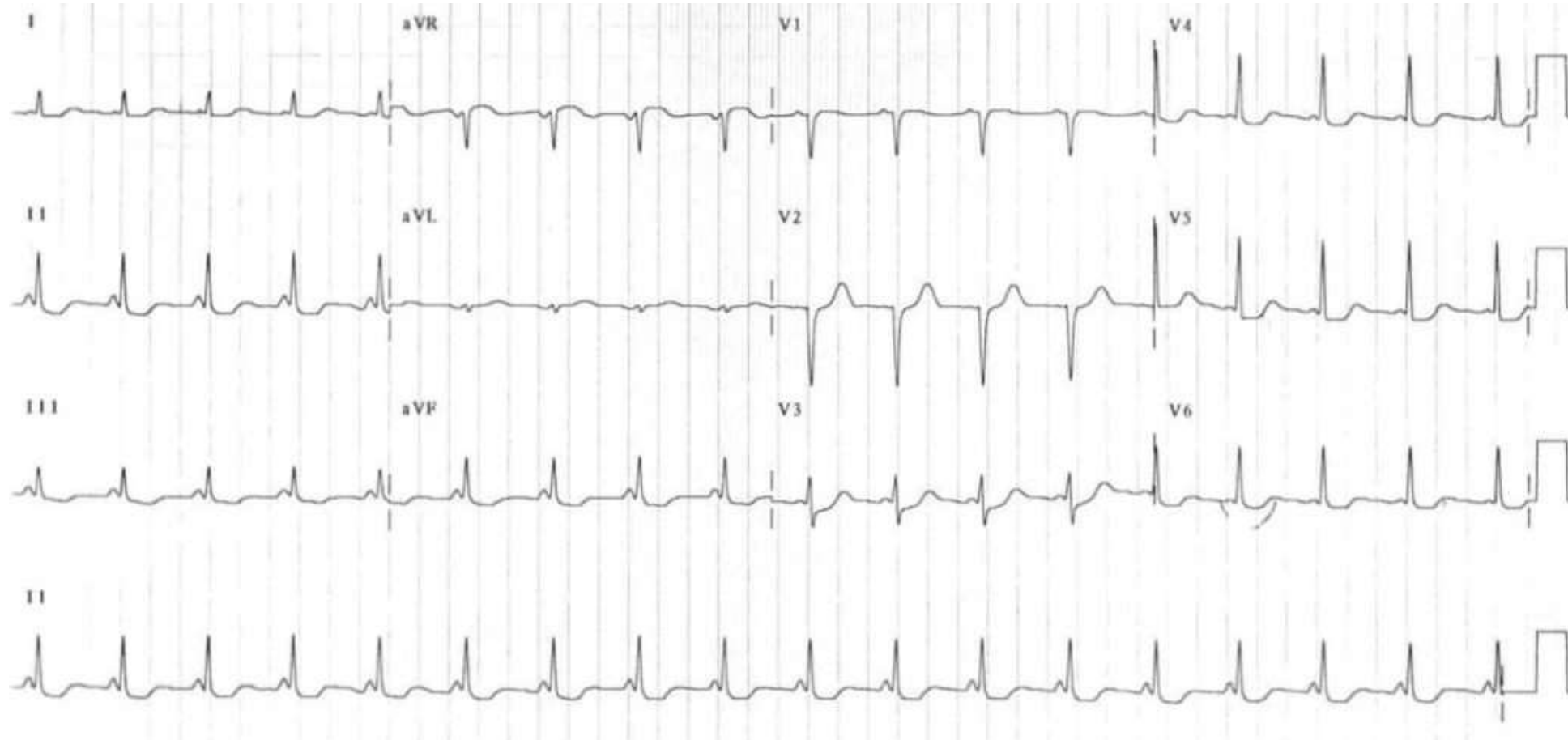


Initial ventricular depolarization begins here, producing a delta wave on EKG.





# Lown-Ganong-Levine syndrome



# QRS Interval

- Width of the complexes: Narrow versus broad.

# NARROW QRS

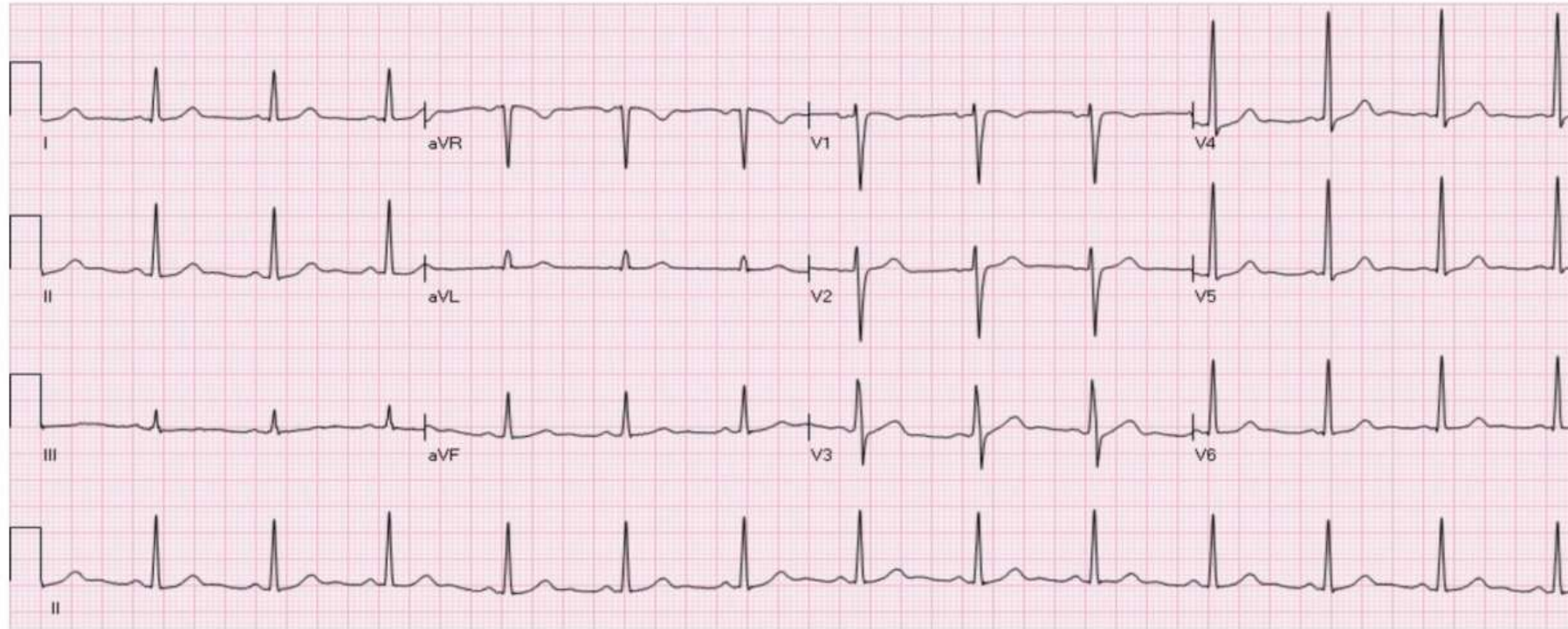
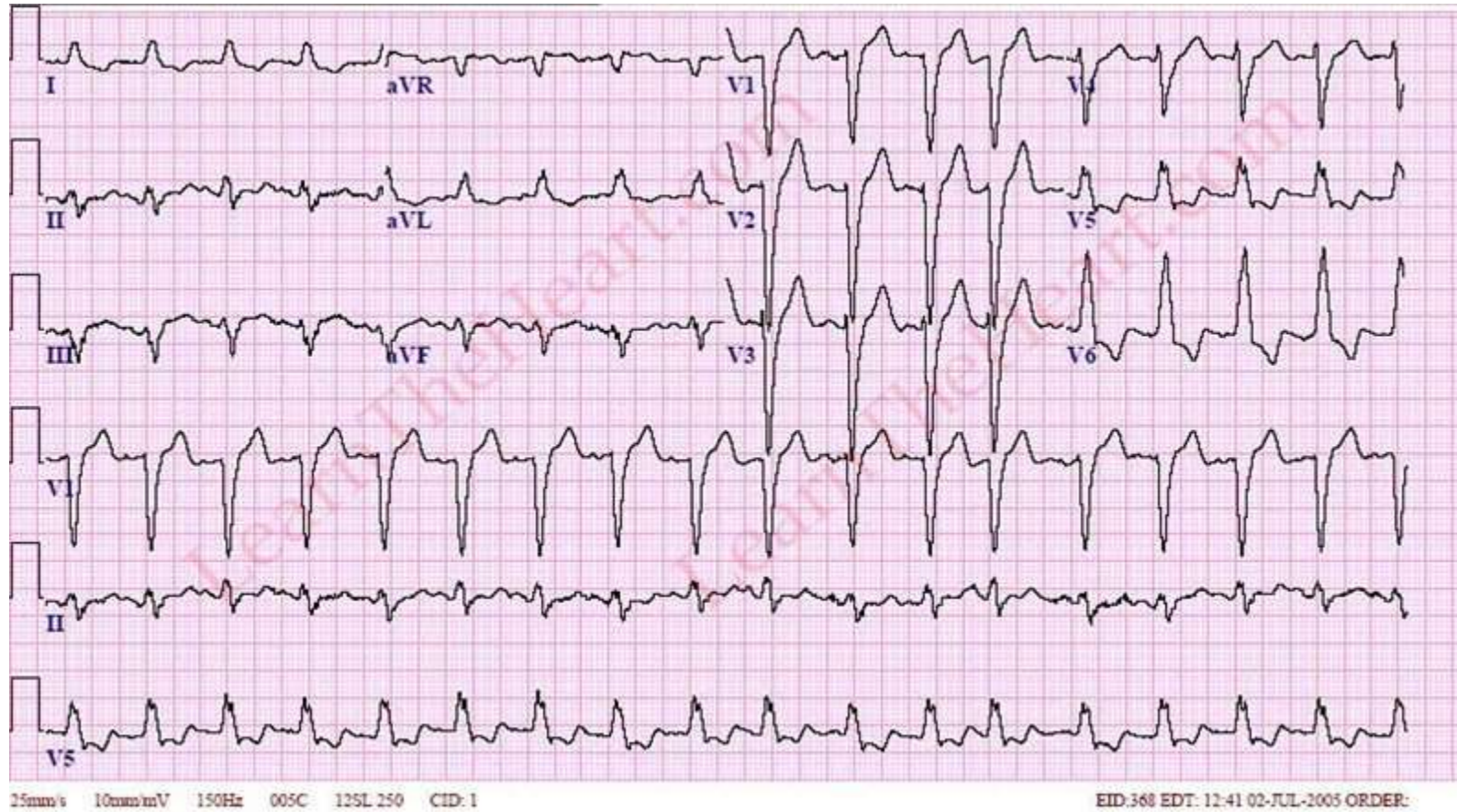


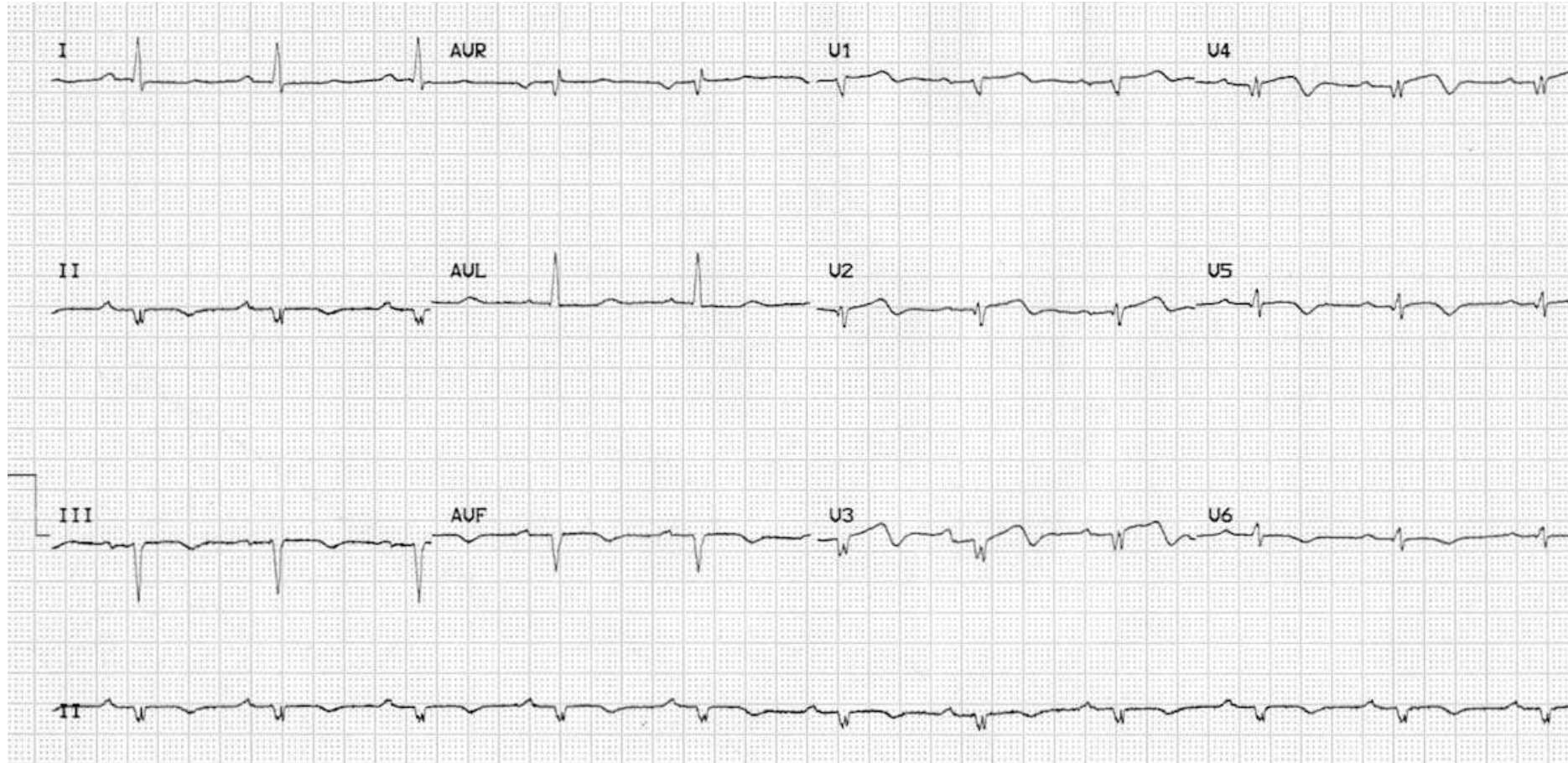
Figure 1. Normal ECG. No abnormal Q waves. ST is isoelectric in all leads

# WIDE QRS

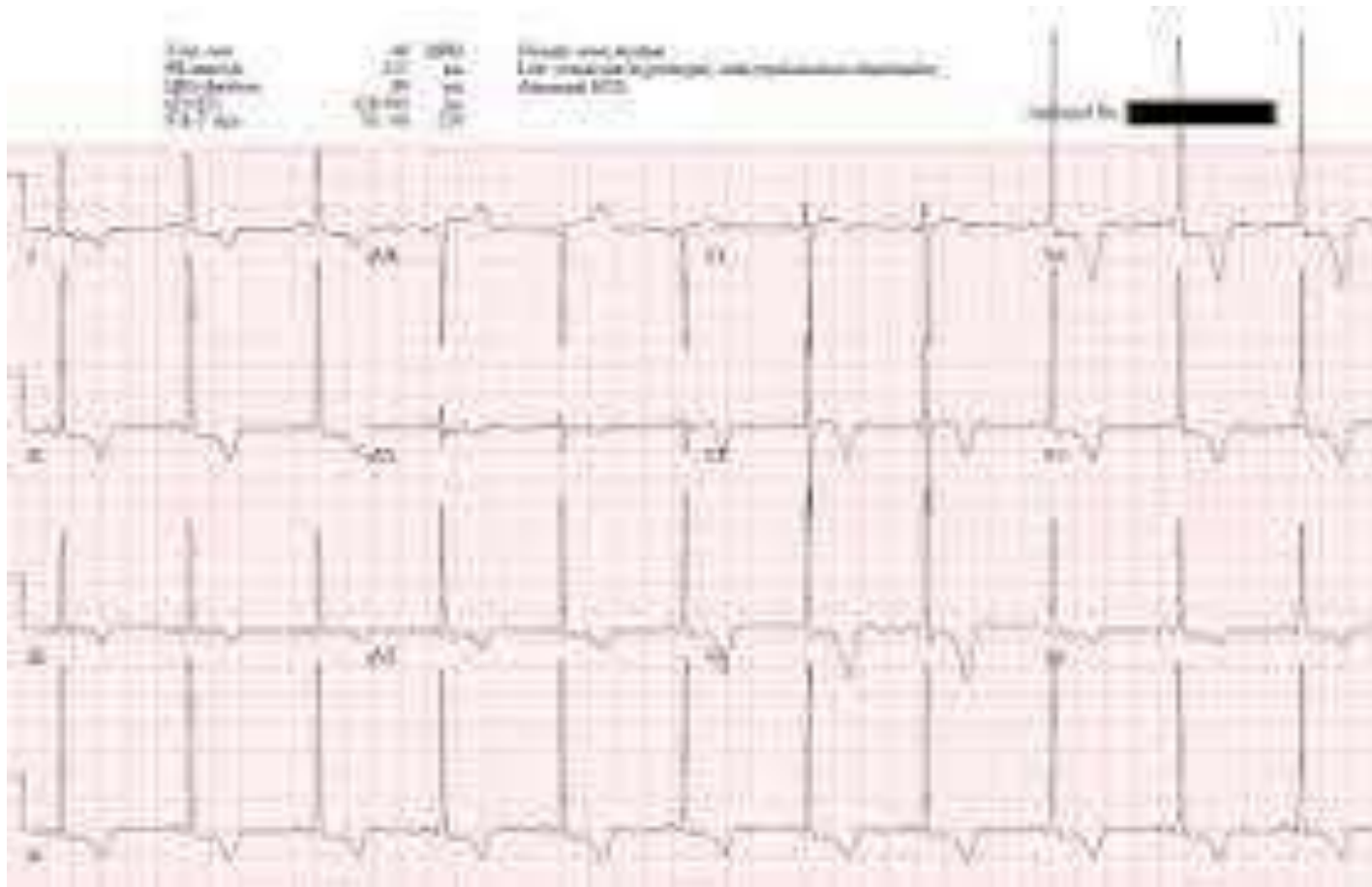




# LOW VOLTAGE ECG

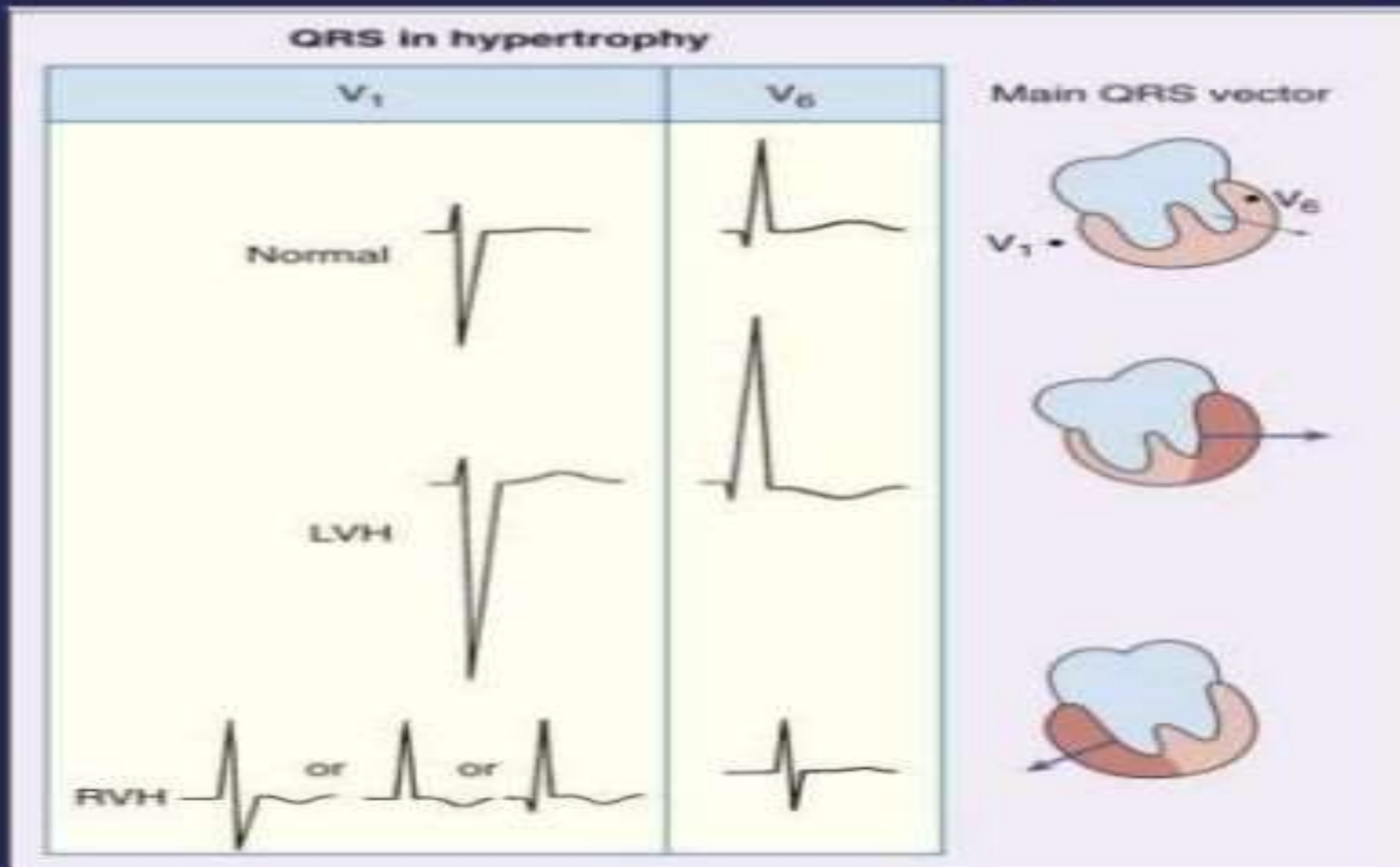


# HIGH VOLTAGE ECG

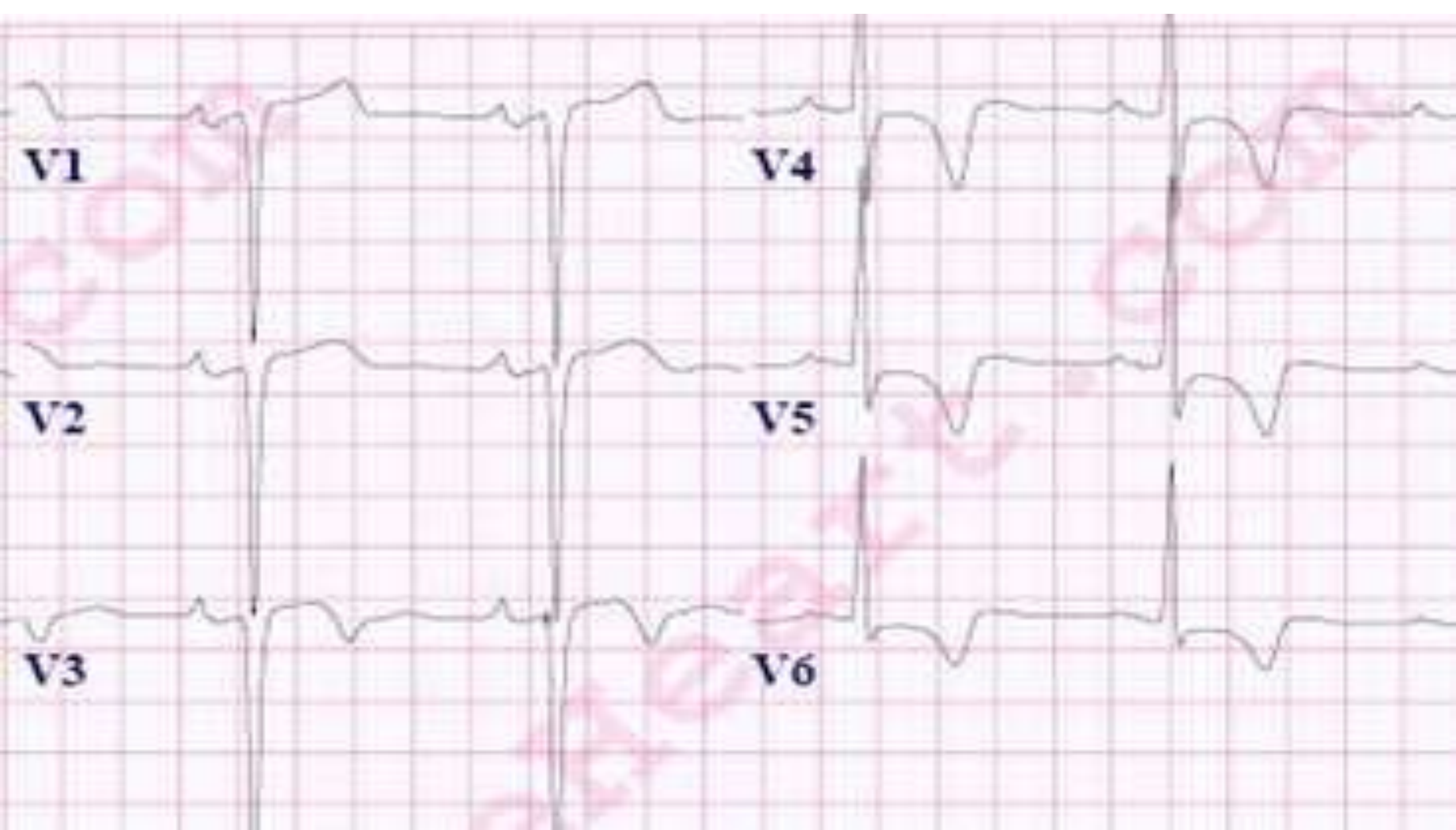


LVH

# Left Ventricular Hypertrophy





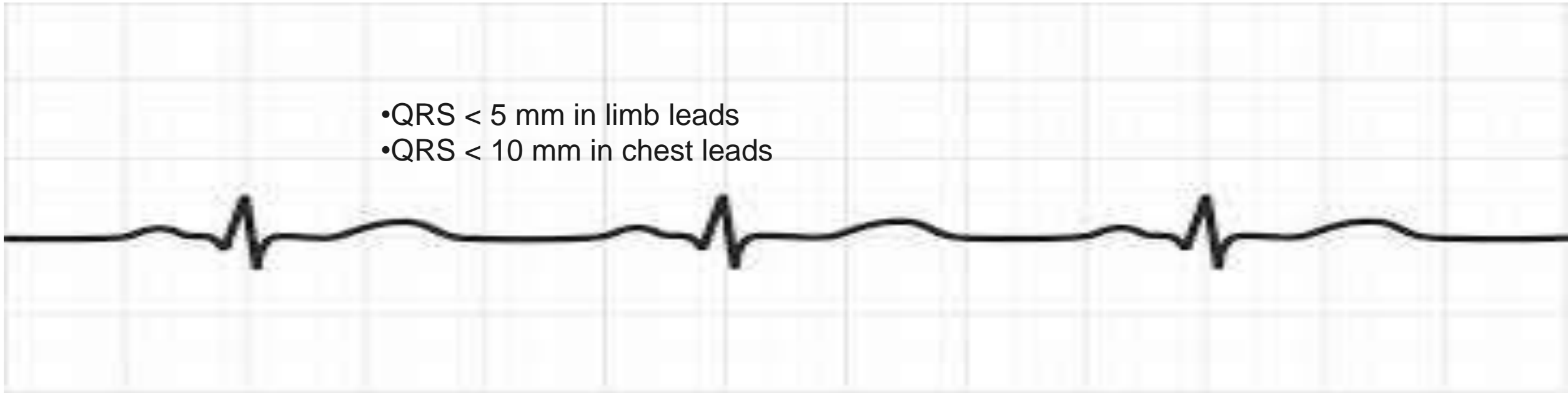


RVH



# Low voltage

- QRS < 5 mm in limb leads
- QRS < 10 mm in chest leads





# Low voltage





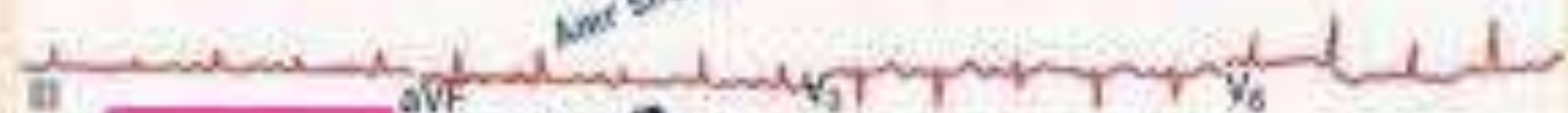
# آلترانانس الکتريکی



Cardiac Tamponade



Low QRS Voltage



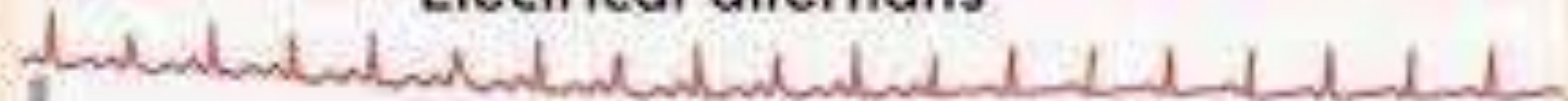
#CCU\_ECG



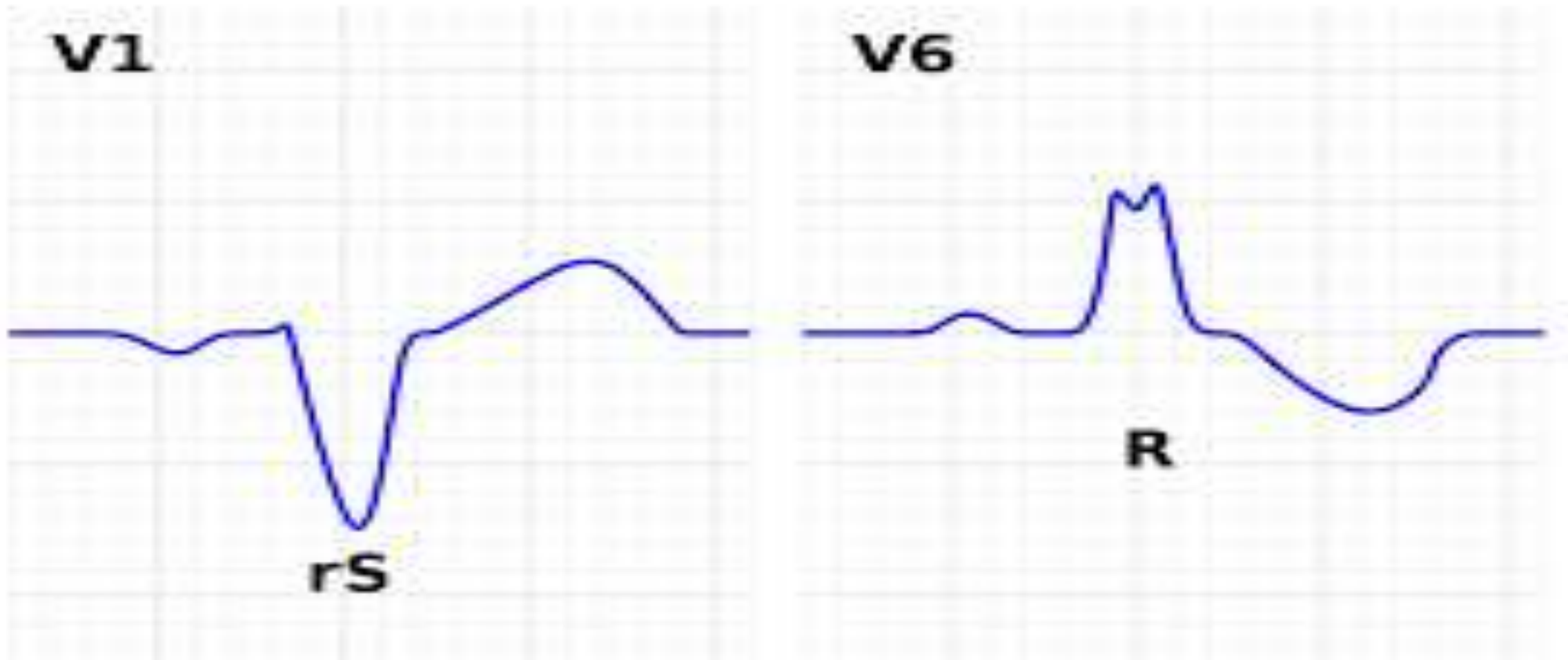
Tachycardia



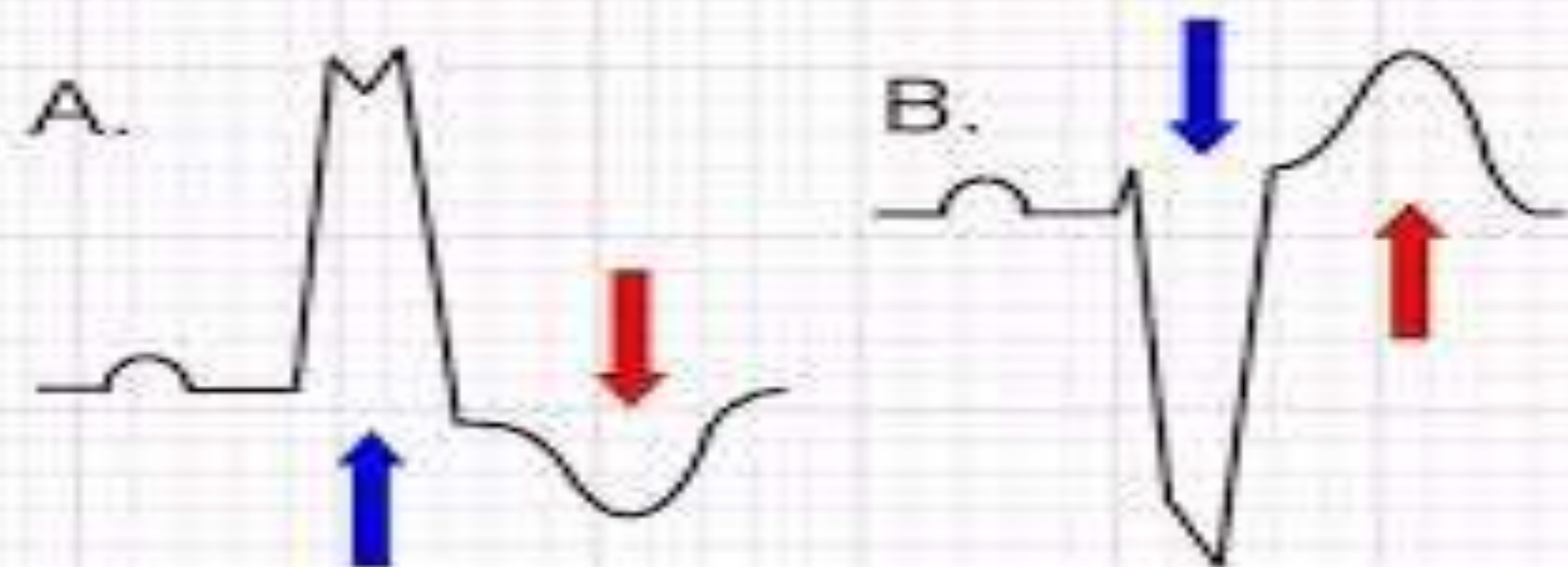
Electrical alternans



# نکتہ LB12



# Discordant ST-Segments and T-Waves



Normal for LBBB and paced rhythm

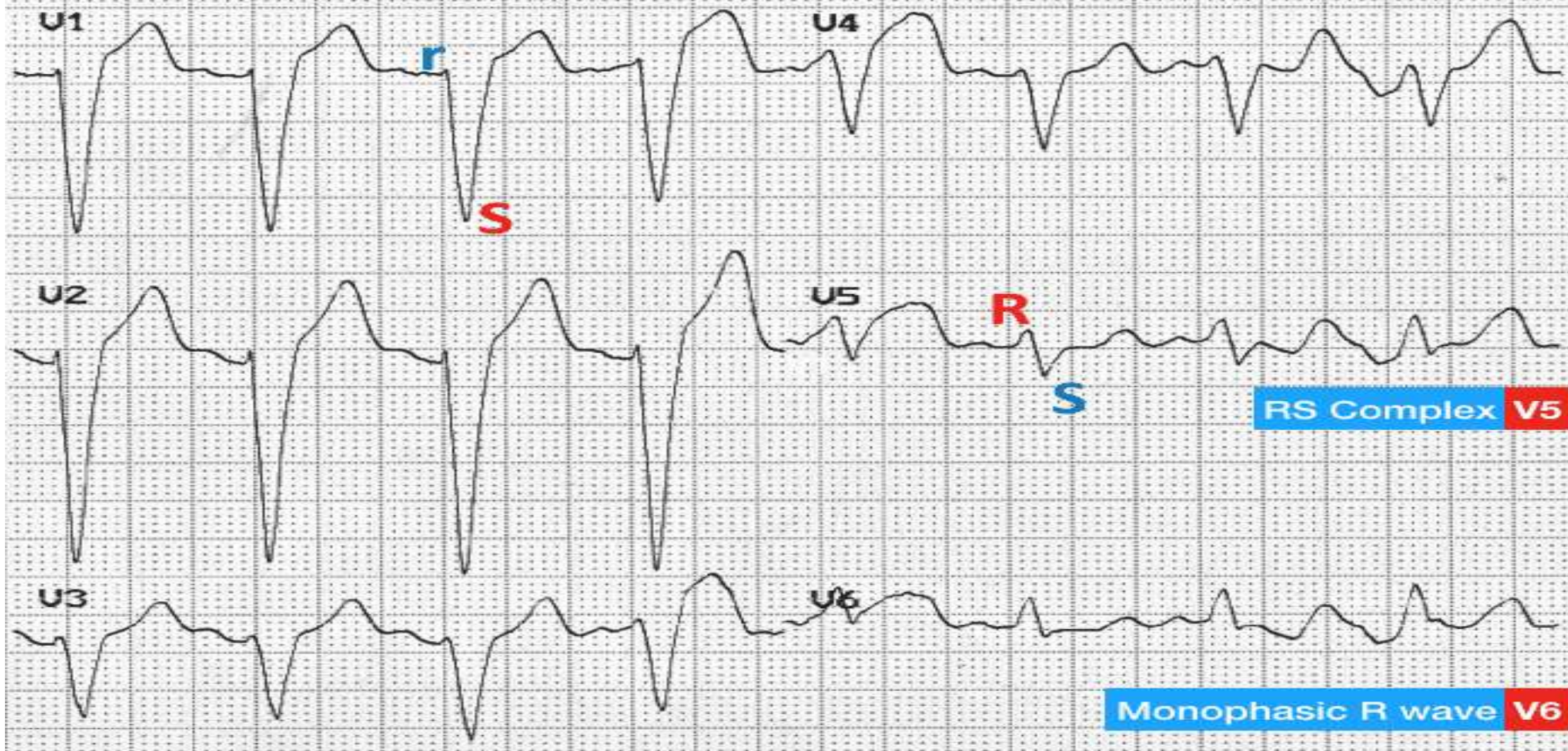


# LBBB

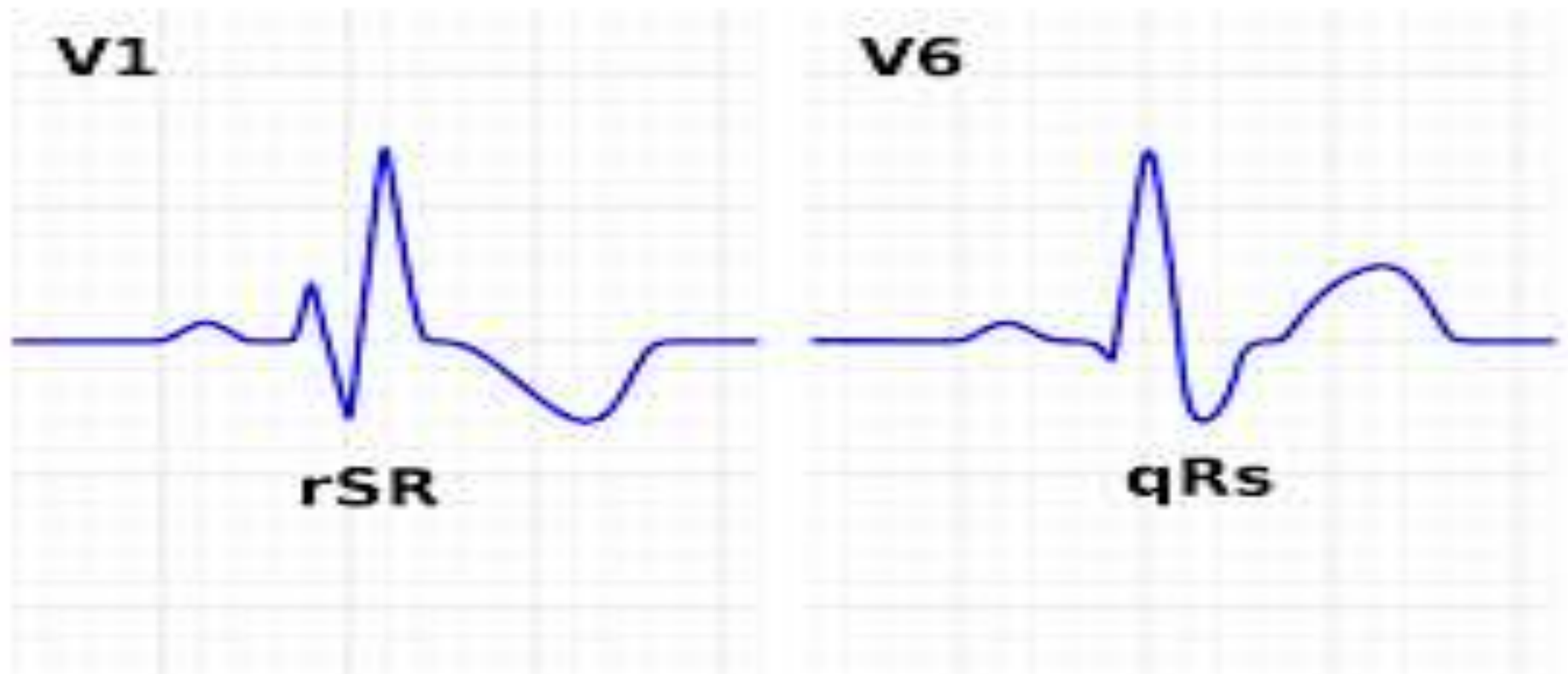




**V1 rS Complex**



# RBBB





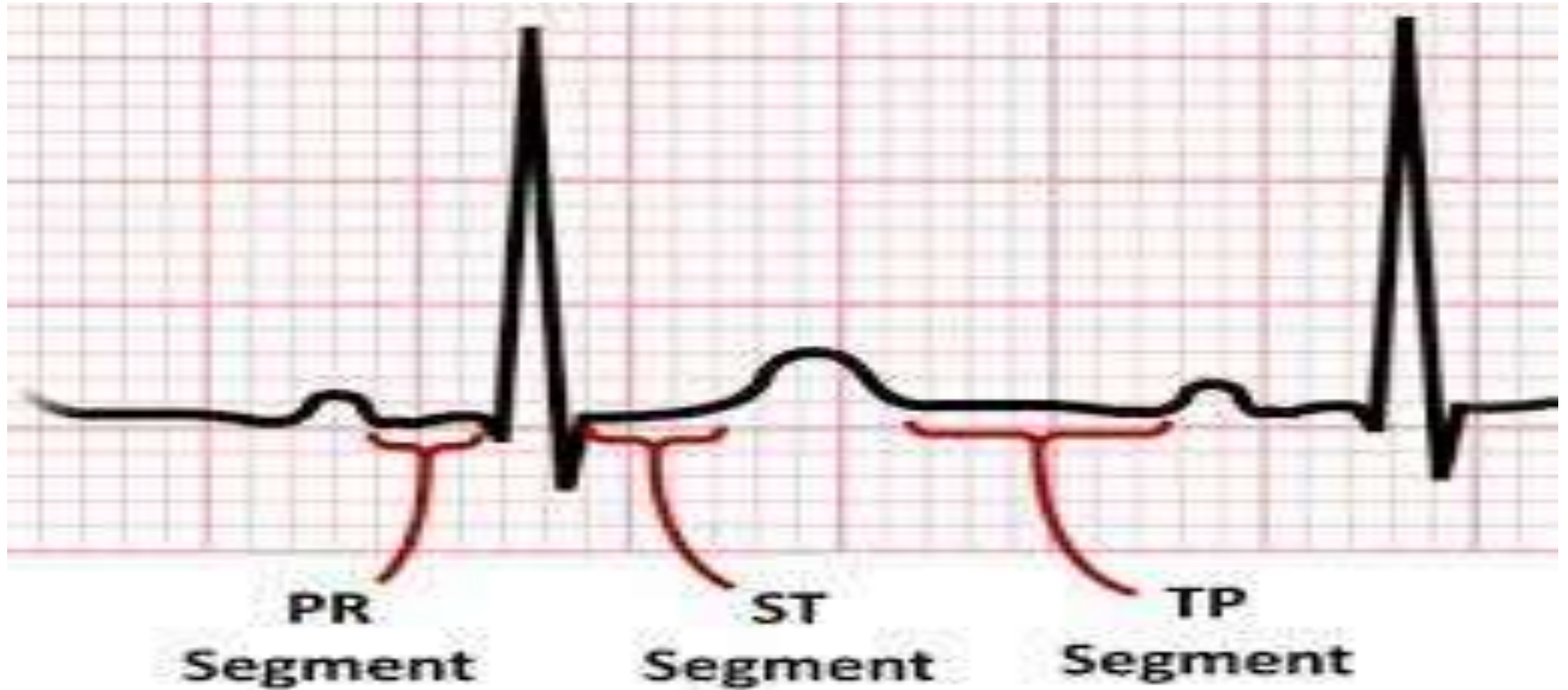
# RBBB





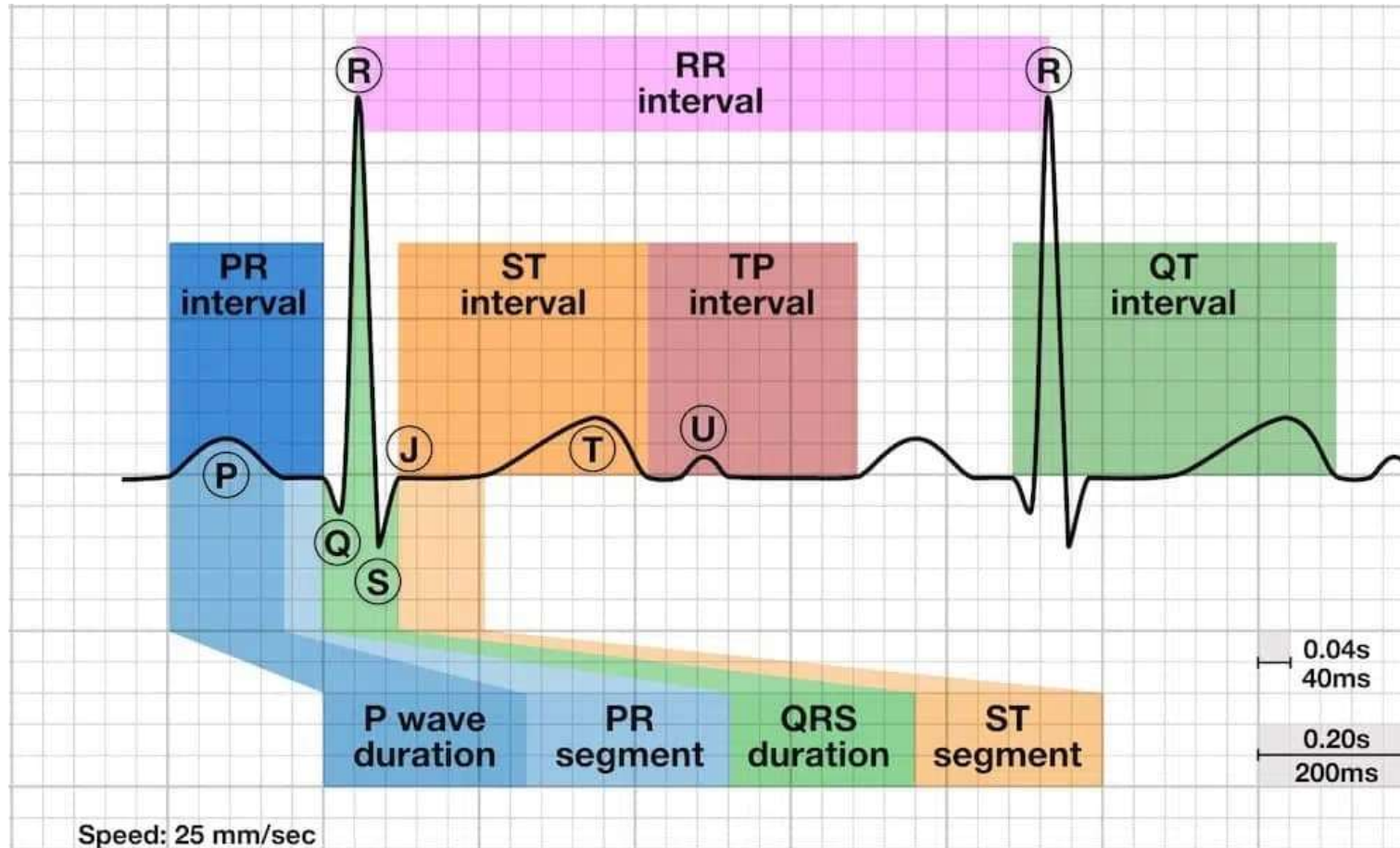


# خط ایزوالکتریک





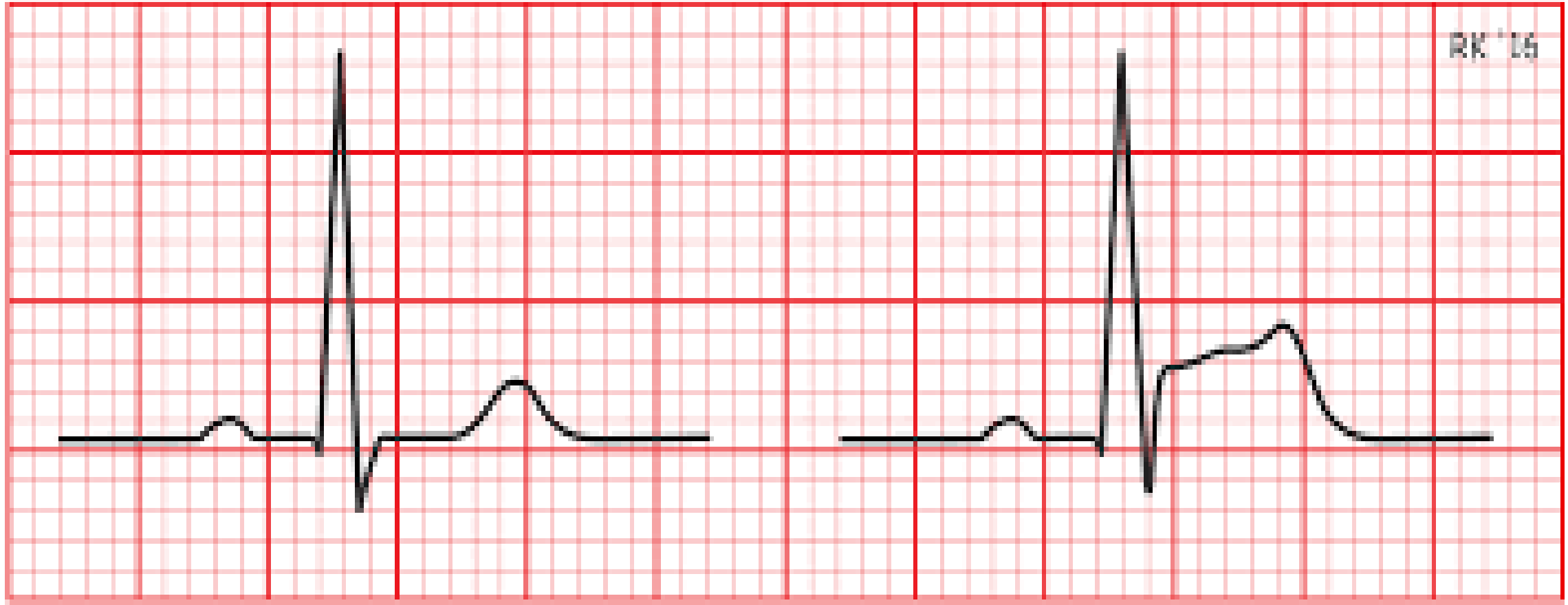
# ST segment





# نکتہ 13

ST elevation



Normal

ST elevation

## Isoelectric Line (TP Interval)

