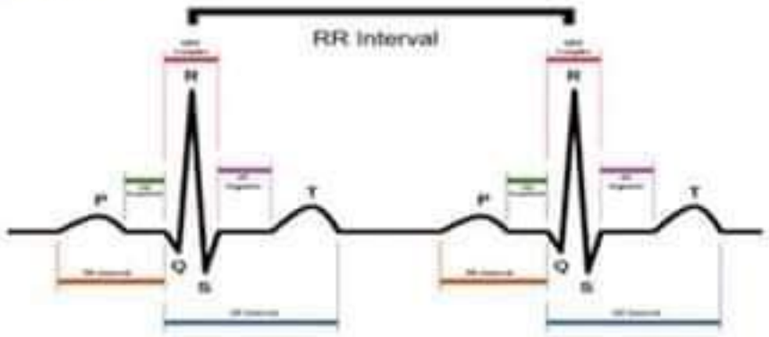
ELECTROCARDIOGRAM

How to read an ECG (in 10 steps)

Check: Caliberation - 25 mm/sec

1. Rhythm
2. Rate
3. Axis
4. P wave
5. PR interval

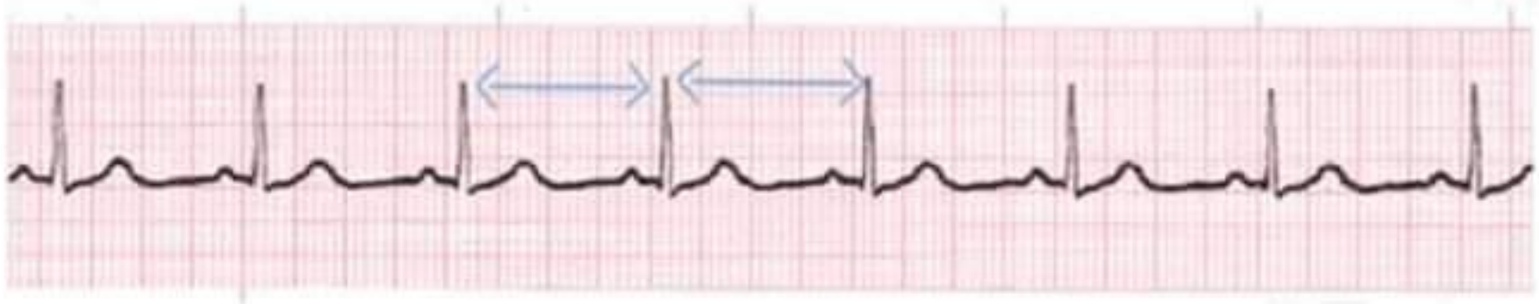


6. Q wave
7. QRS complex
8. QT interval
9. ST segment
10. T wave

1. Rhythm

Regular rhythm

(NORMAL SINUS RHYTHM)



Irregularly Irregular

(Atrial Fibrillation)

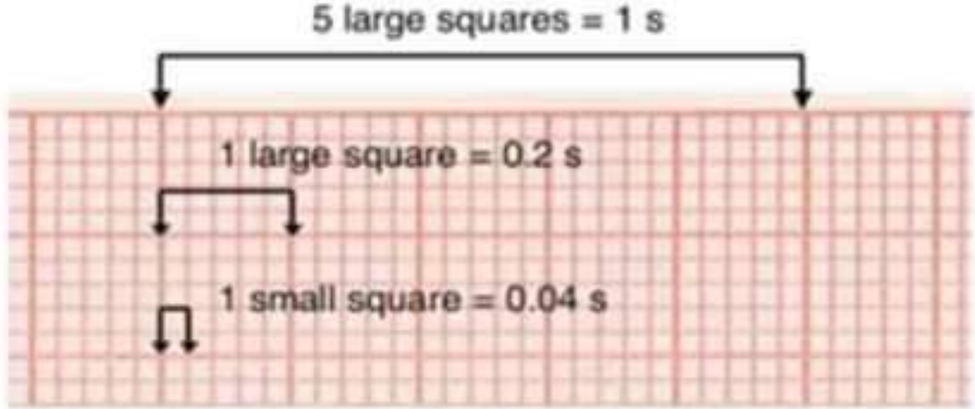
Regularly Irregular

(Second degree heart block) type 2

2. Rate

@MD,Sun Bunlorn Page

Regular rhythm = $\dfrac{300}{\text{R-R interval (large boxes)}}$



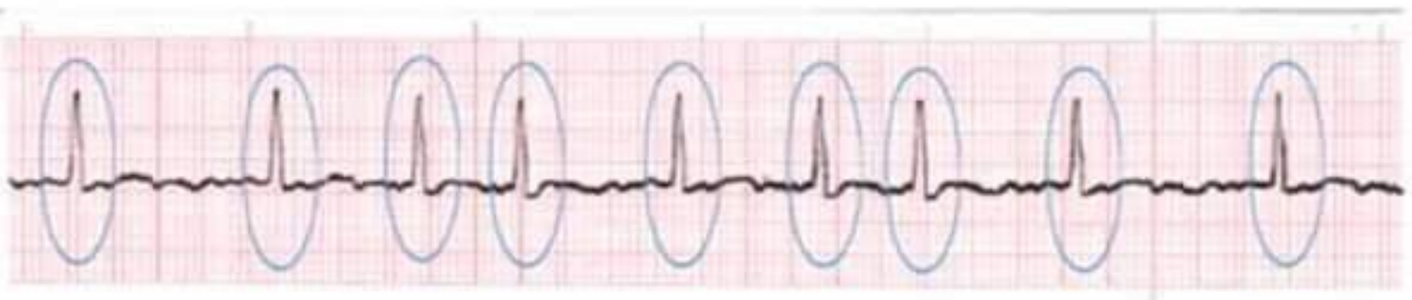
Rate= 300/4

=75 bpm

Irregular rhythm= **No. of R waves in 6 sec X 10**

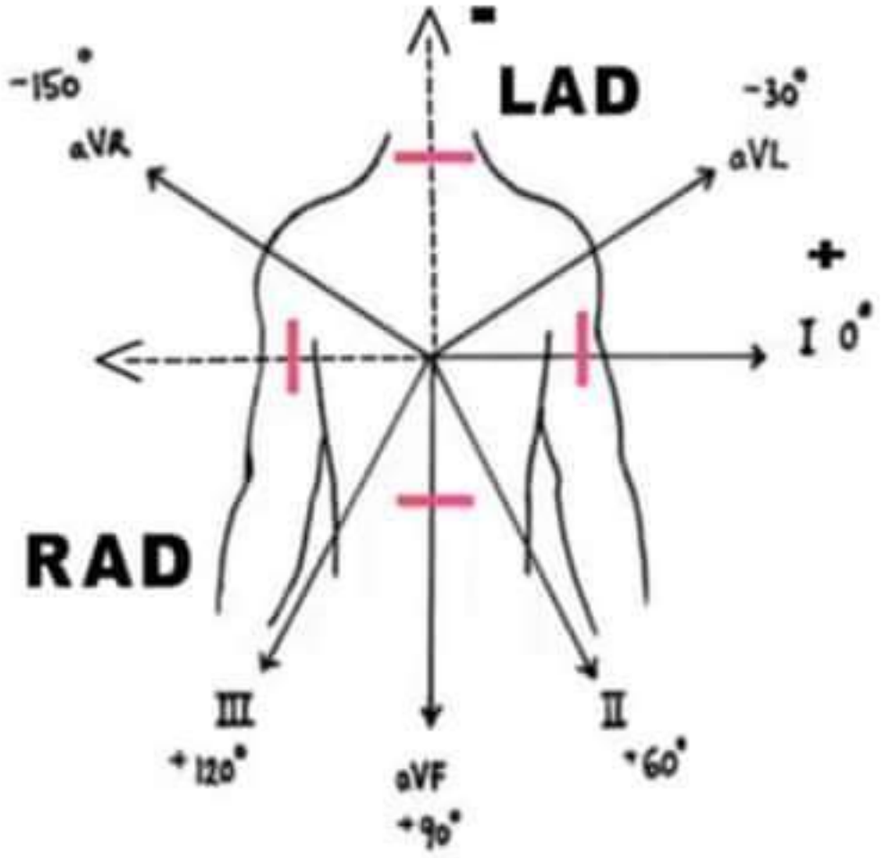
Rate= 9 R-waves x 10

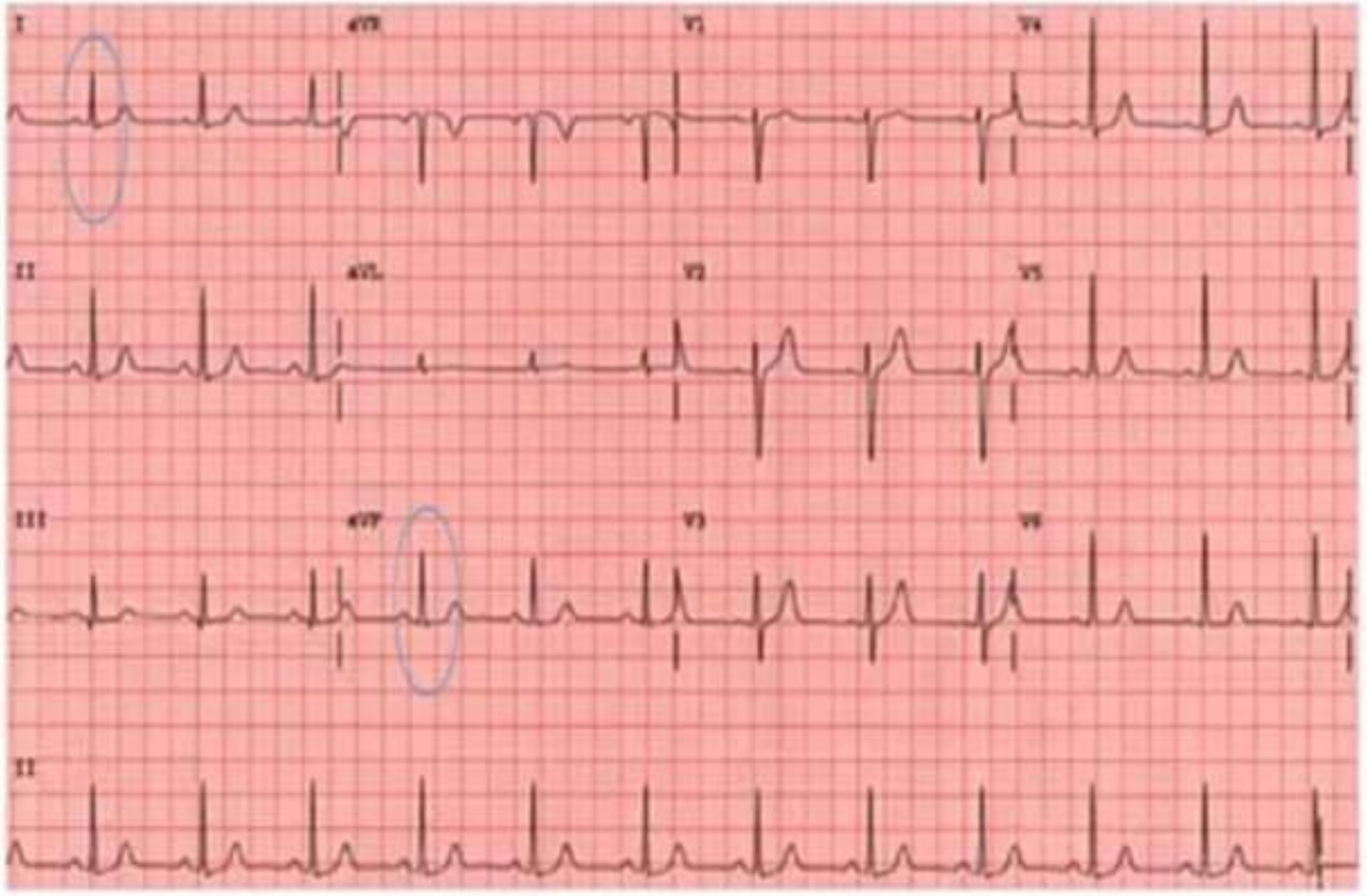
= 90 bpm



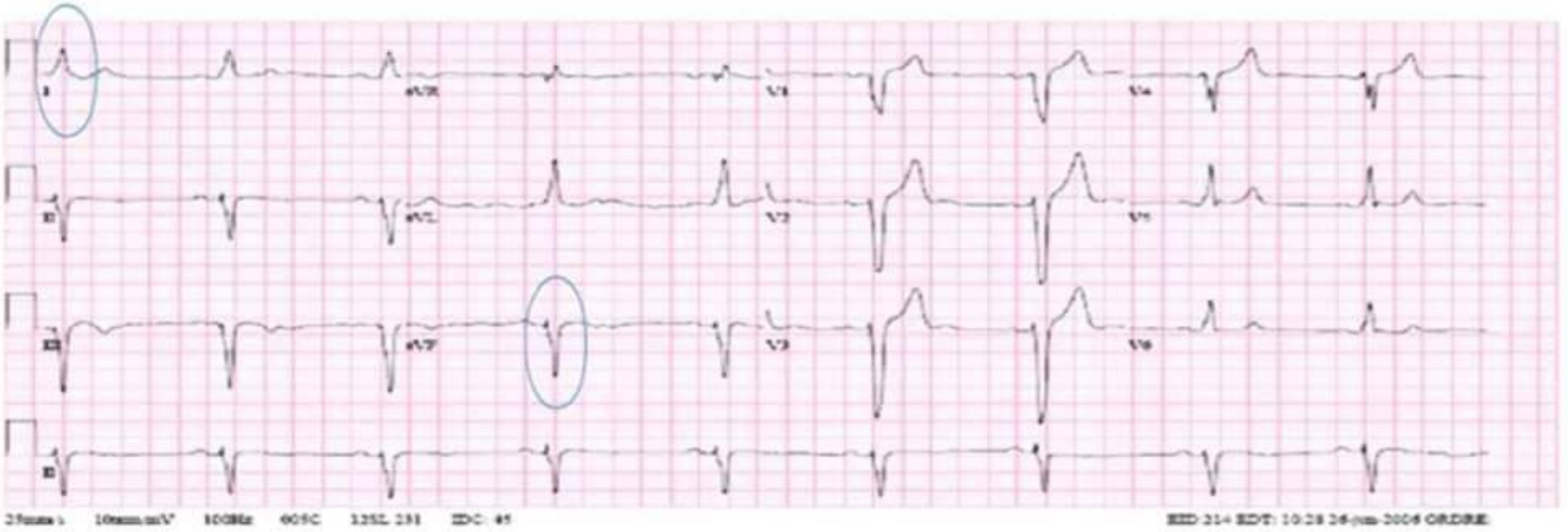
3. Axis

Normal cardiac axis is -30 to +110





Normal Axis



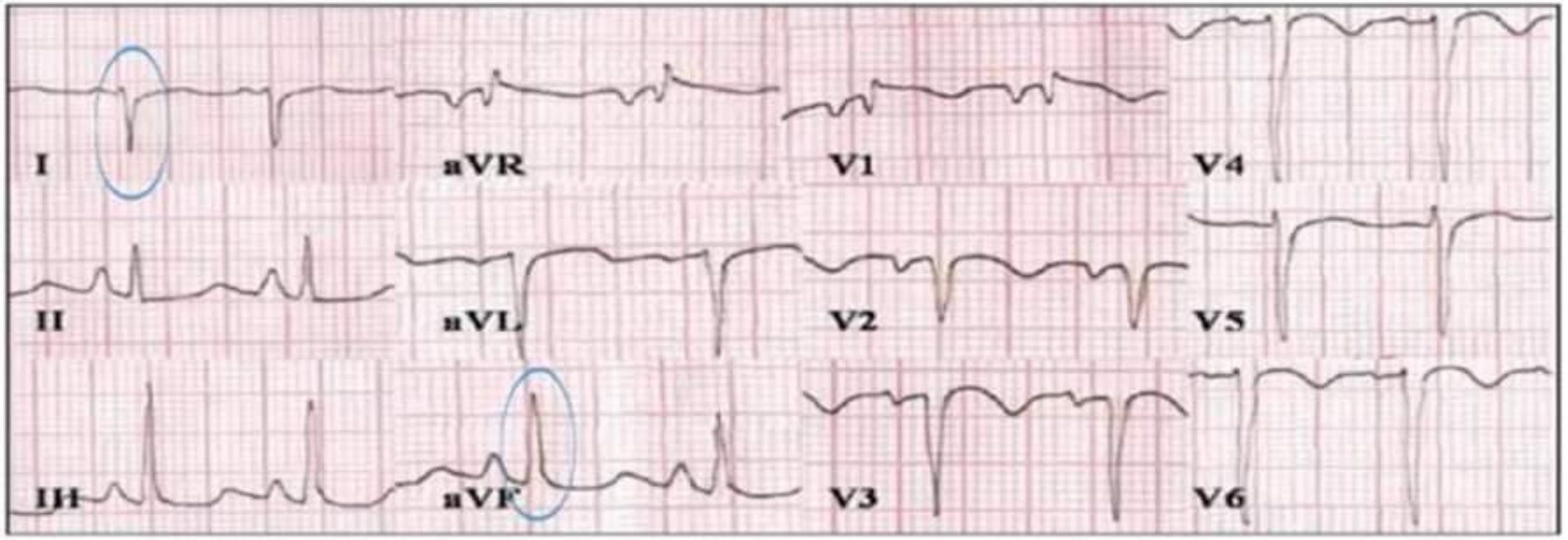
LEFT AXIS DEVIATION (LAD)

Mnemonic

Left - Leaves

I ↑

aVF ↓



RIGHT AXIS DEVIATION (RAD)

Mnemonic

Right- Returns

I ↓

aVF ↑

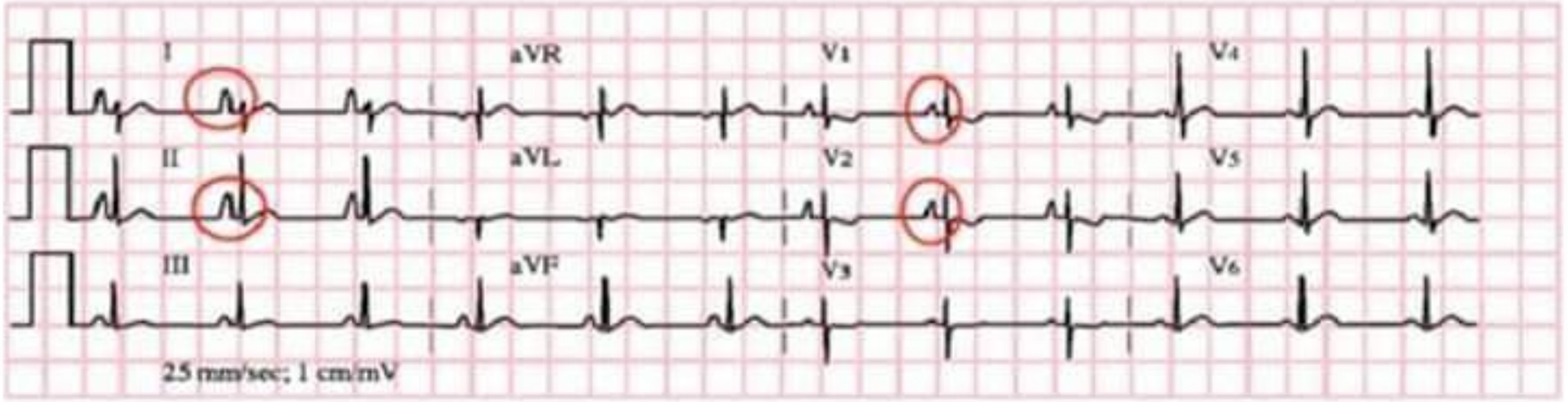
4. P wave

Height <2.5mm(lead II)
<1.5mm(v1)

Width <0.12 sec

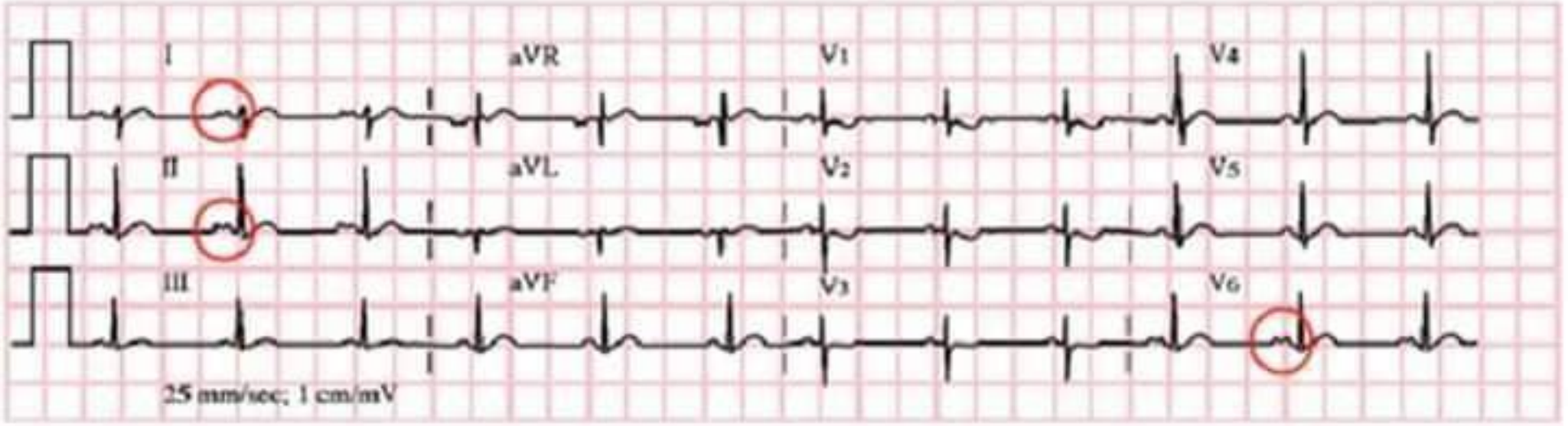
P- Pulmonale

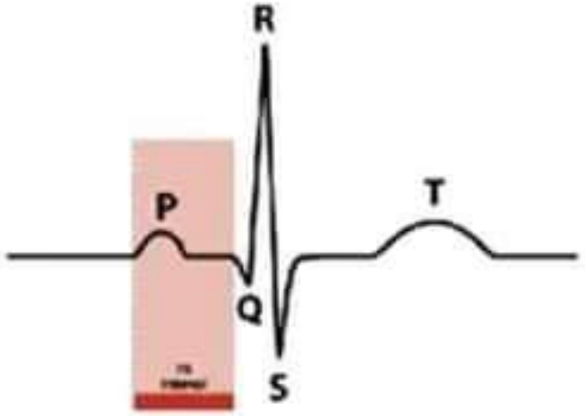
Right atrial enlargement



P- Mitrale

Left atrial enlargement





5. P-R interval

0.12 - 0.2 sec (3-5 small squares)

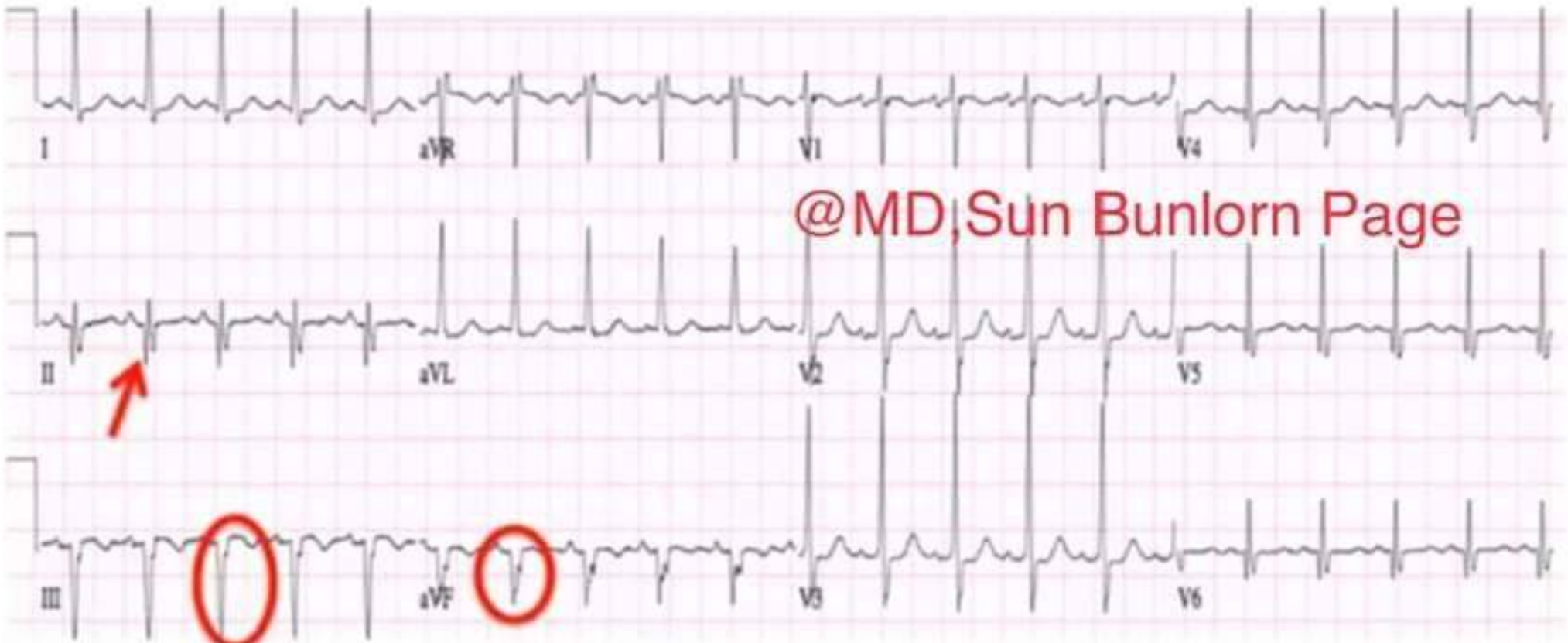
Prolonged: A-V blocks

Reduced: WPW syndrome

Depressed: Pericarditis

6. Q wave

Pathological: >2 small squares deep

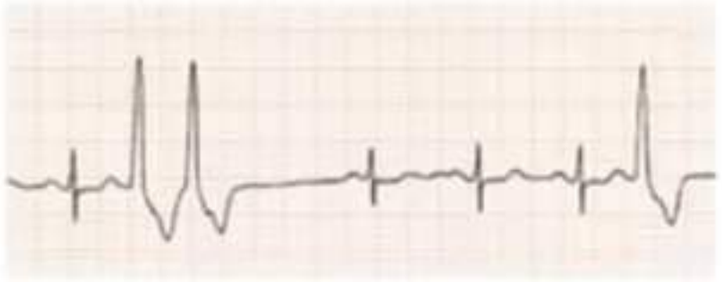


Old Inferior wall MI

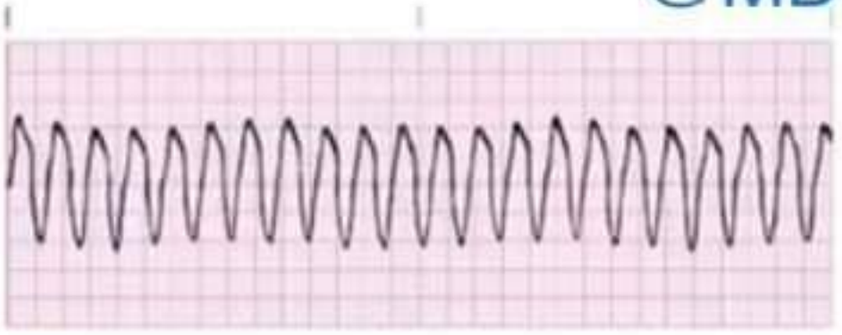
7. QRS complex

0.08-0.12 sec (2-3 small squares)

BROAD QRS **Ventricular arrythmias**



Ventricular Ectopic

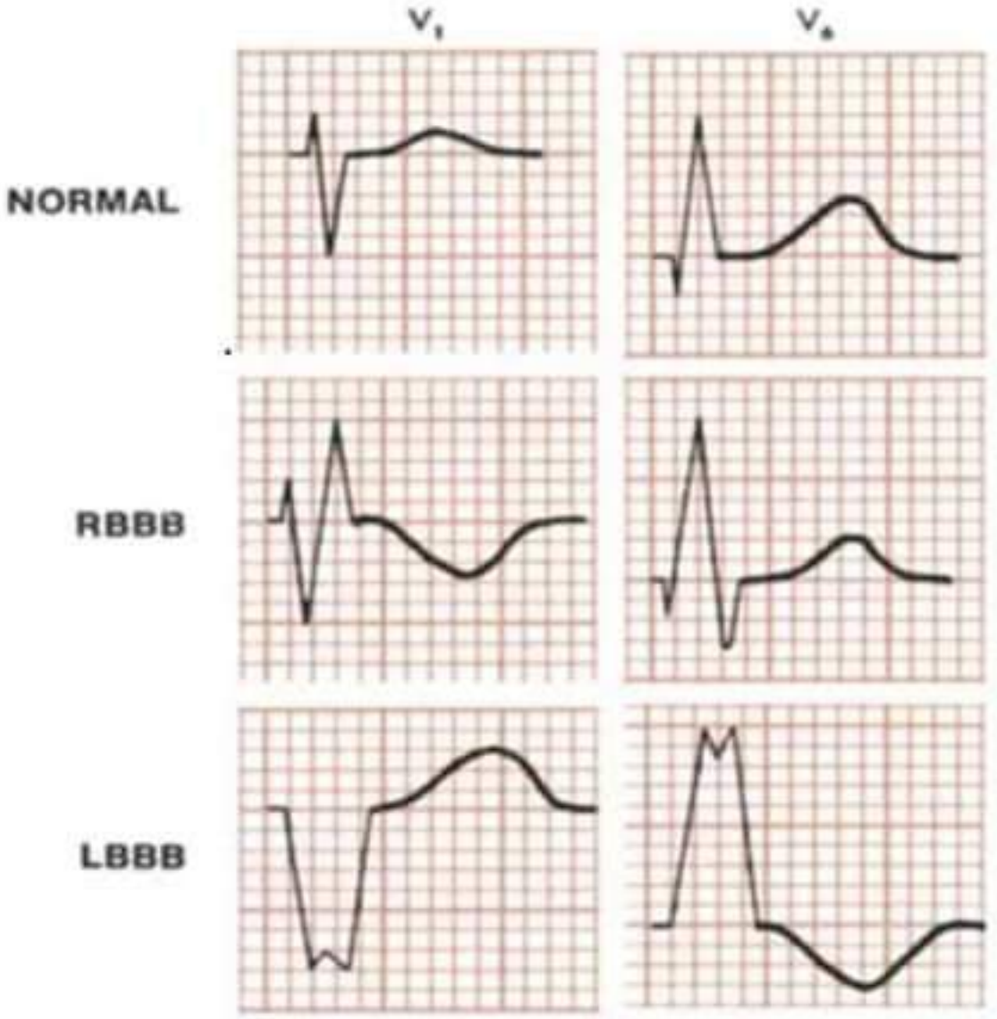


Ventricular Tachycardia

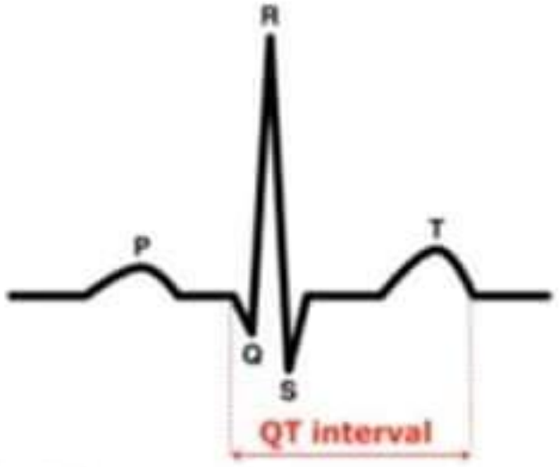
Ventricular Fibrillation

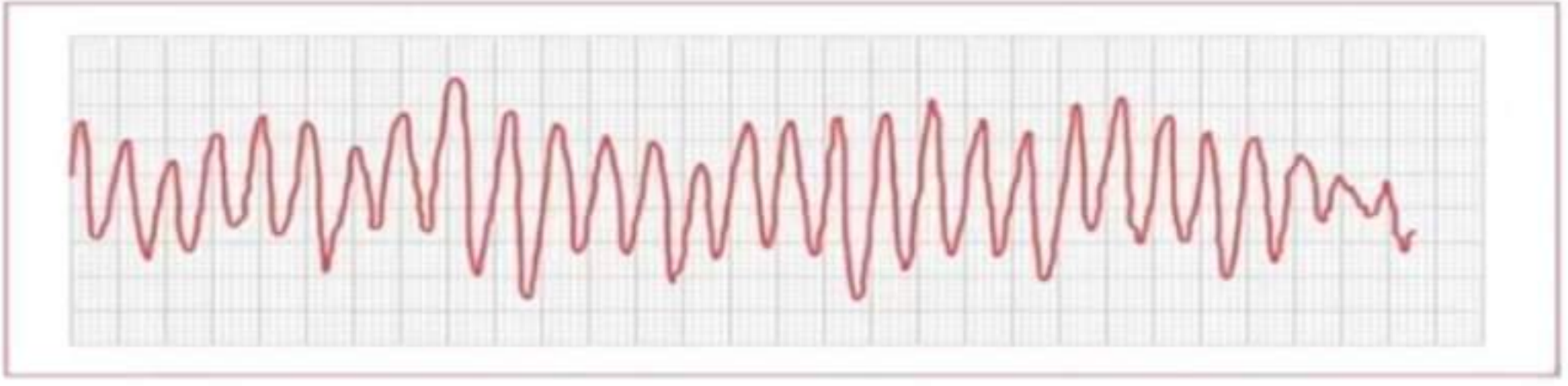
Bundle Branch Blocks

@MD,Sun Bunlorn Page



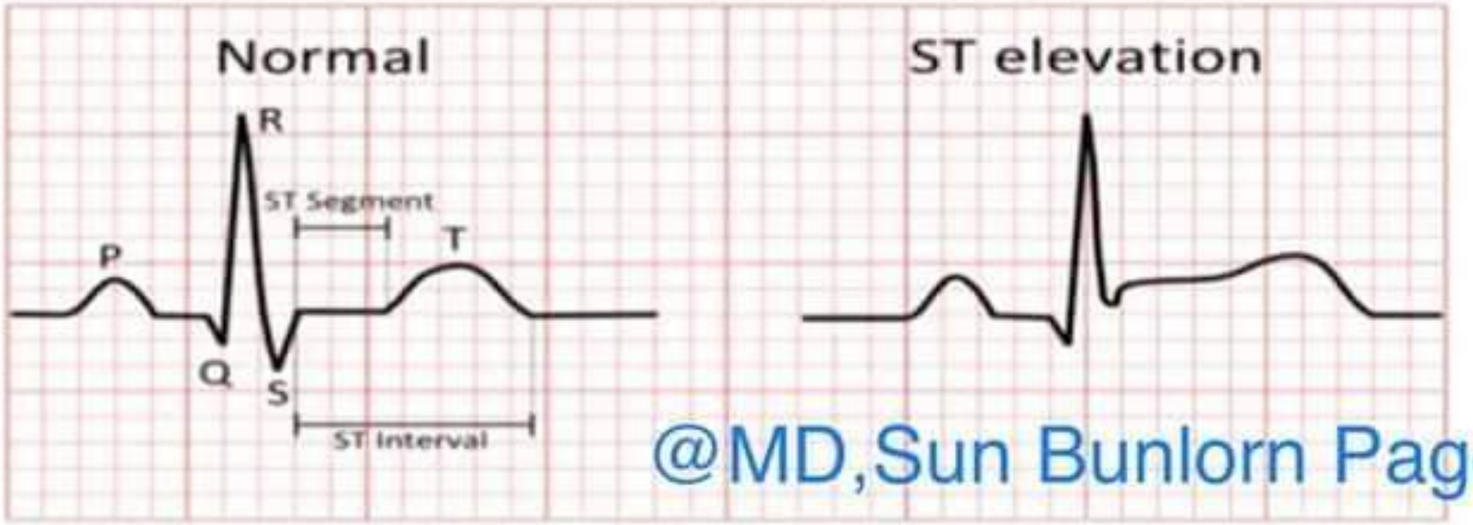
8. Q-T interval





TORSADES DE POINTES

9. ST segment



Acute Myocardial infarction

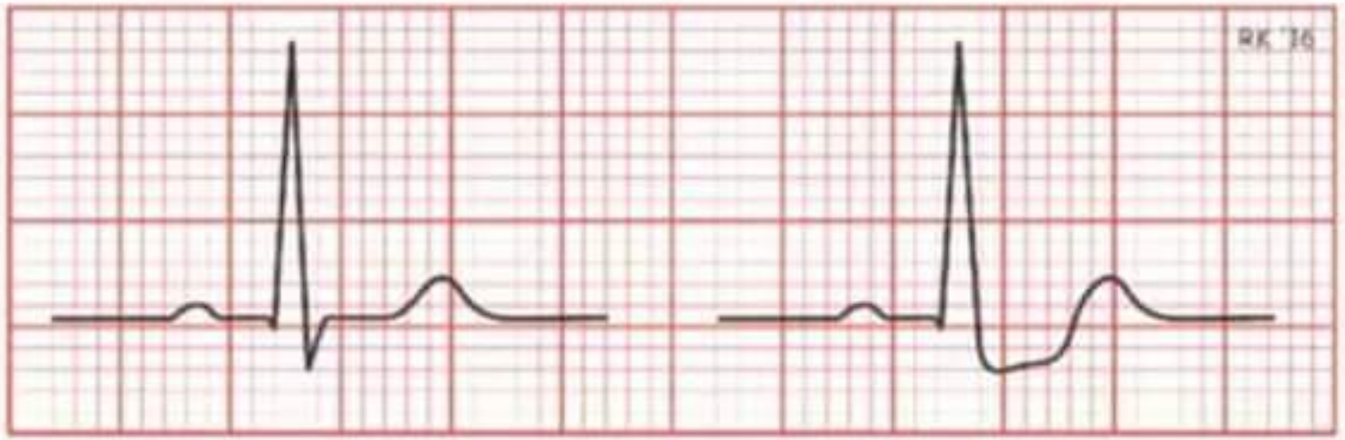
Pericarditis

V1,V2: **Septal wall MI**

V3,V4: **Anterior wall MI**

I+aVL, V5V6: **Lateral wall MI**

II, III ,aVF: **Inferior wall MI**



NSTEMI

Myocardial Ischemia

Posterior MI

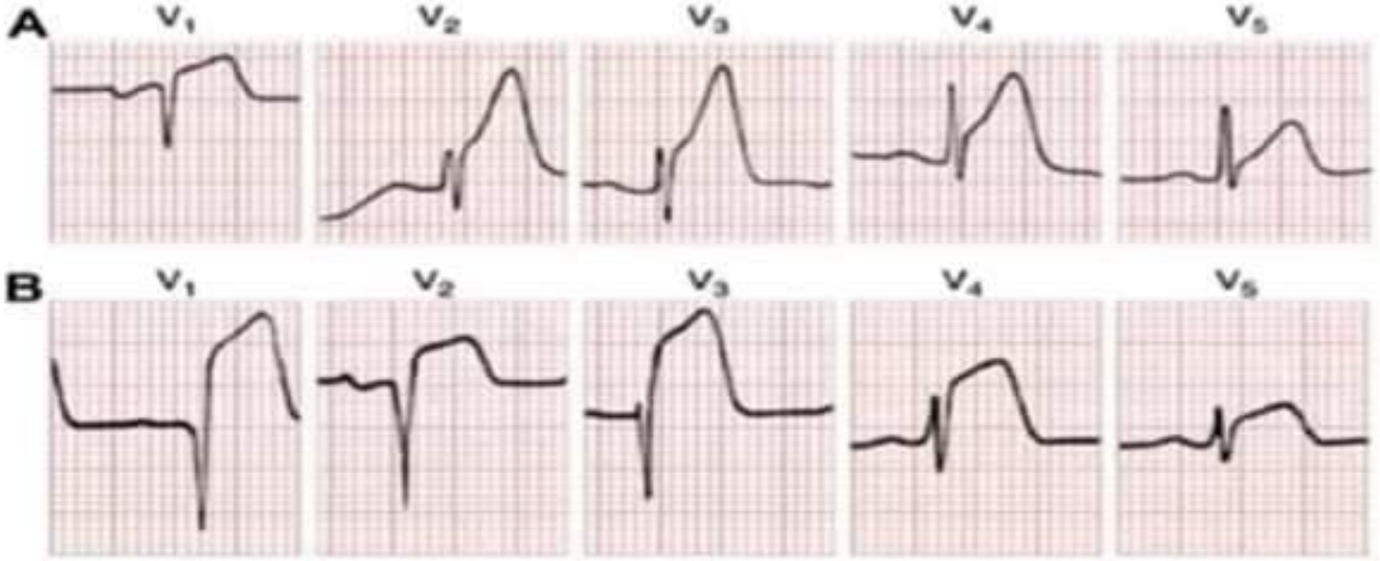
10. T wave

Upright in all leads except aVR & V1

@MD,Sun Bunlorn Page

Peaked T waves

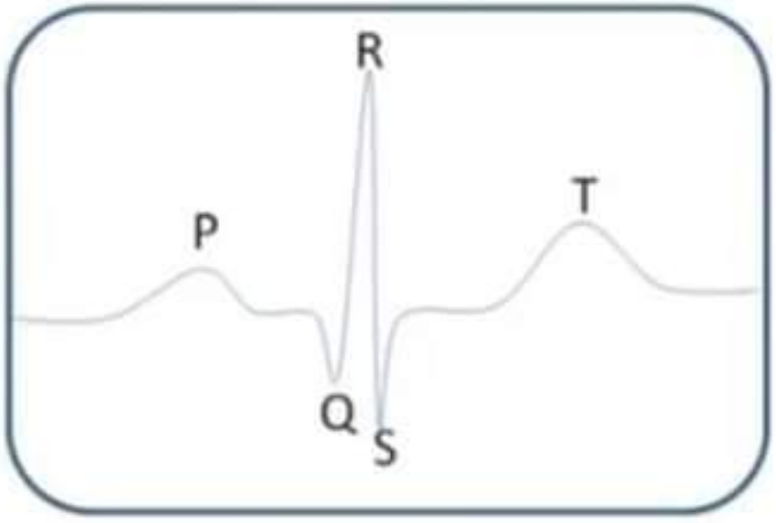
Hyperkalemia



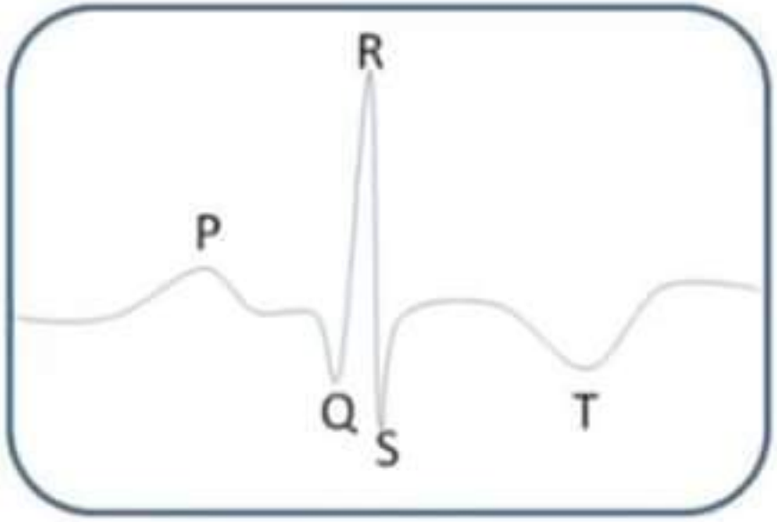
Hyperacute T waves

Early STEMI

Inverted T wave



An ECG showing the normal P Q R S T waves

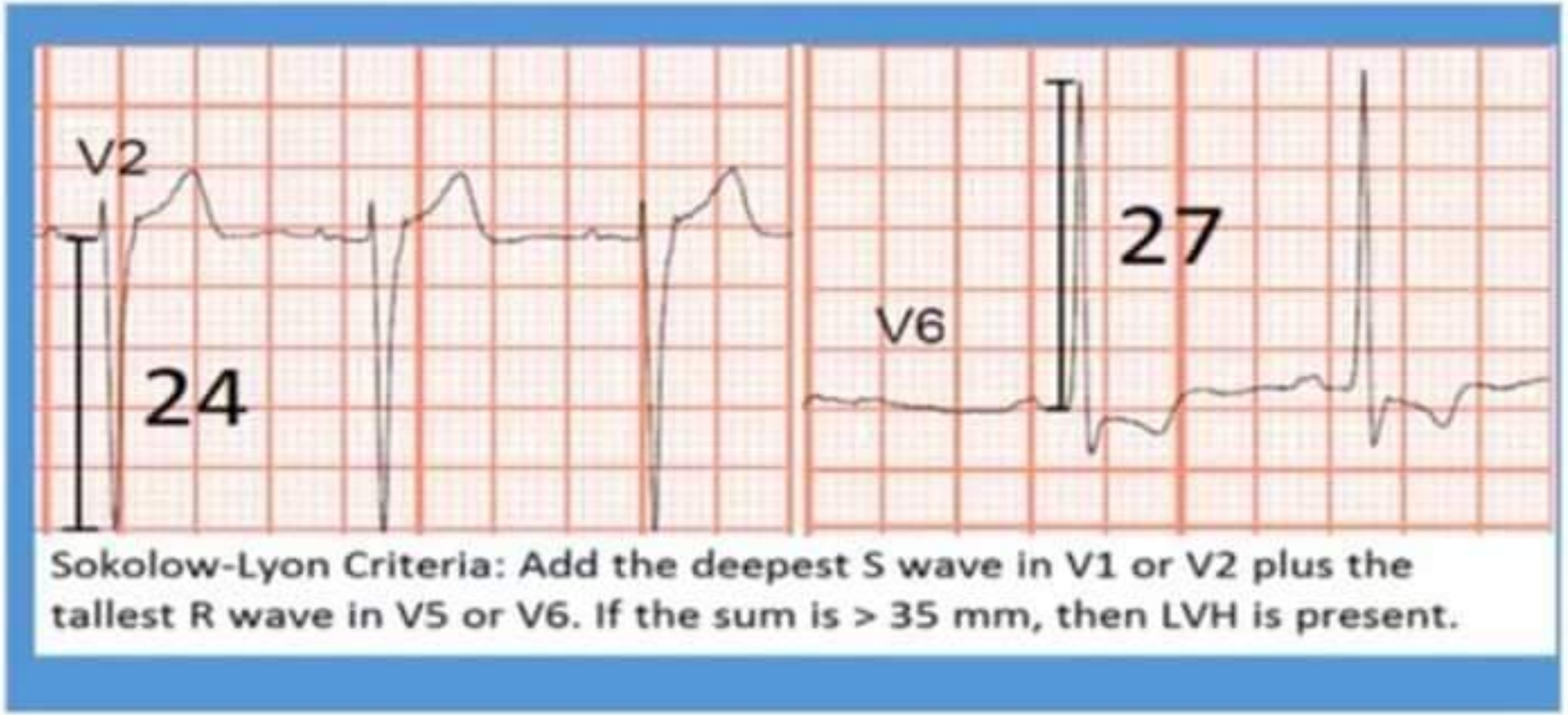


An ECG showing an inverted T-wave

Myocardial Ischemia

Ventricular Hypertrophy

Left Ventricular Hypertrophy



Right Ventricular Hypertrophy

Right Axis Deviation

R/S >1 in V1

<1 in V5V6

R (V1)>7 mm