

ECG Interpretation

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We diagnose PATIENTS not ECG

Always stick to your own methodology
analyzing ECG so as not to miss anything.

Methodology

Check for:

ID, date, time

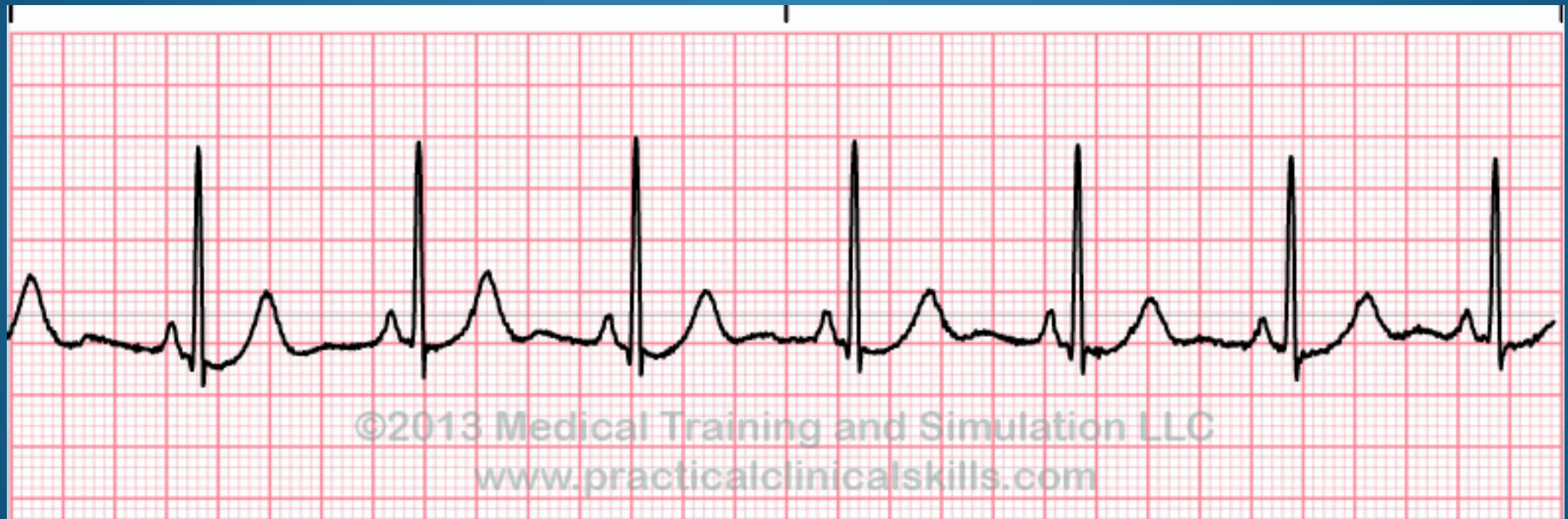
Rhythm

Rate

Axis

Waves, intervals, segments

Normal ECG



Normal Sinus Rhythm:

Regular R-R intervals
(card method).

every QRS complex is
preceded by a P wave.

Normal P-R intervals

If the heart rate is regular
(equal distances between Rs)

:

$HR = 300 / \text{no. Of large squares within R-R interval}$

or

$HR = 1500 / \text{no. Of small squares within R-R interval}$

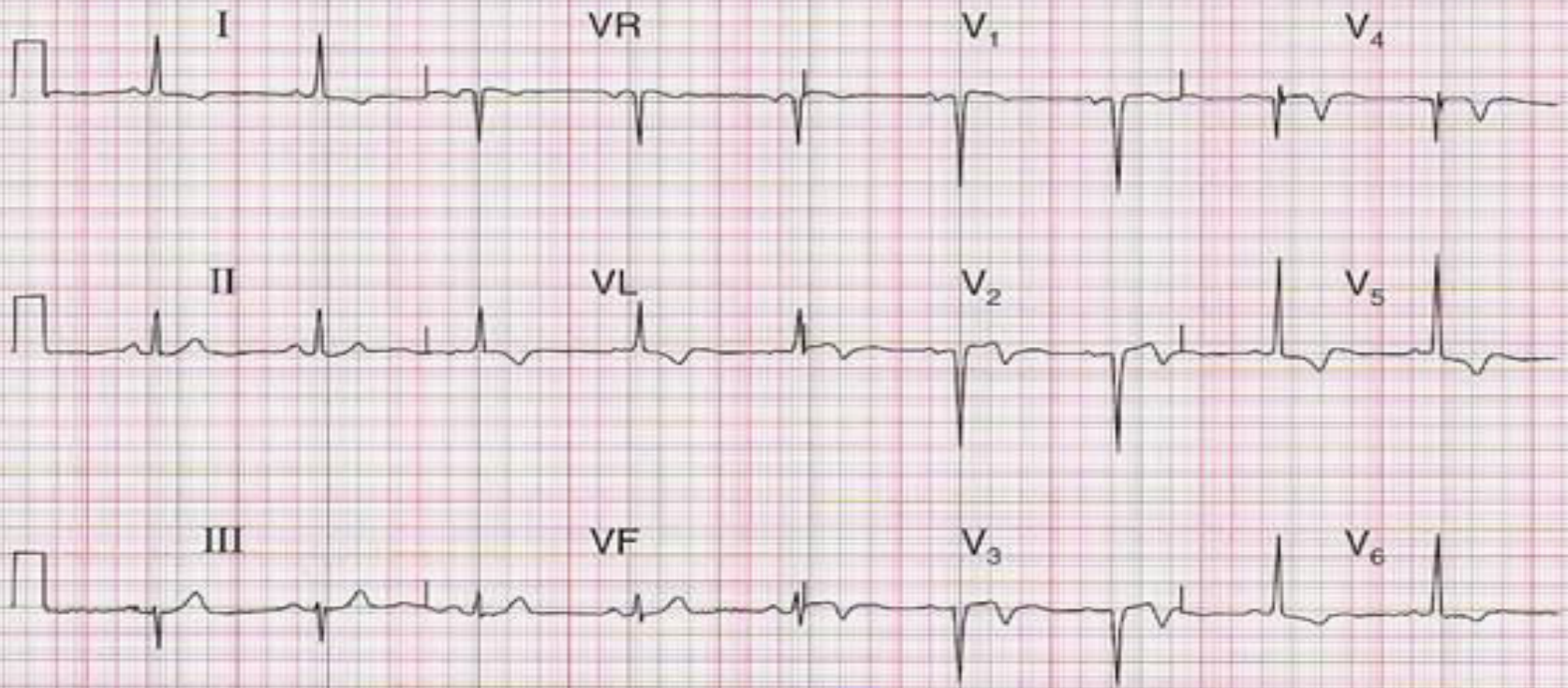
Normal Heart Rate

60- 100 bpm

if < 60 : sinus Bradycardia

if > 100 : sinus Tachycardia

Normal Axis

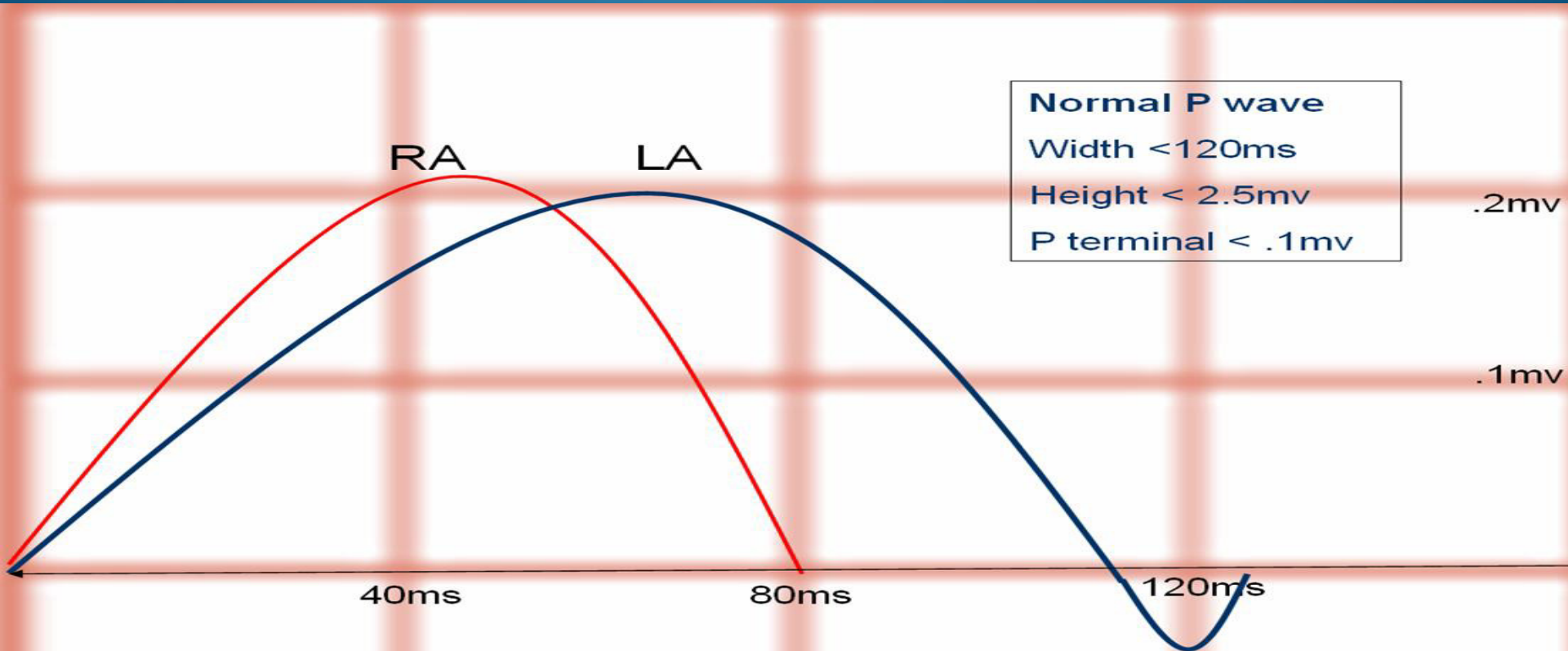


Normal Axis

We look at limb leads only.
if leads (I and II) +ve, then
normal cardiac axis.

RULE OF THUMBS

Normal P wave



Normal P-R interval
3- 5 ss (120- 200 ms)

Normal QRS complex
<3 ss (120 ms)

Normal QT interval

$QT_c = QT / \sqrt{RR}$

$\leq 0.44 \text{ s}$

or

$< 50\% \text{ of RR interval}$

**Normal ST segment
isoelectric (in comparison to
the T –P segment)**

T wave

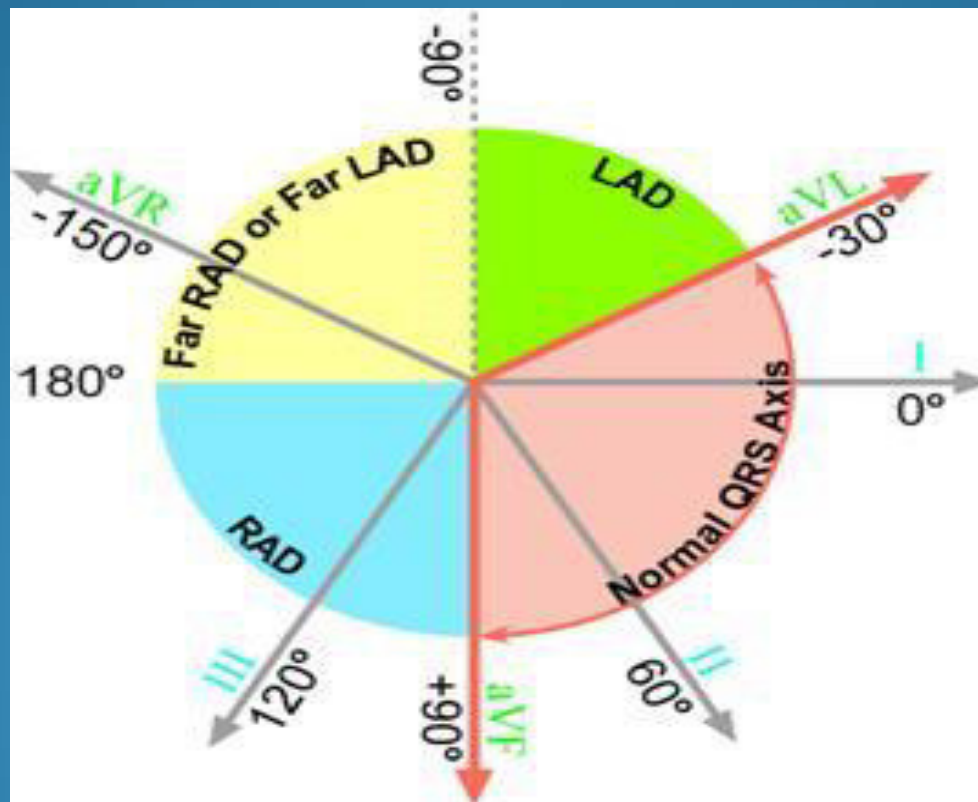
**Normally inverted in aVR ,V1,
v2 +/- v3, III.**

Abnormalities in ECG

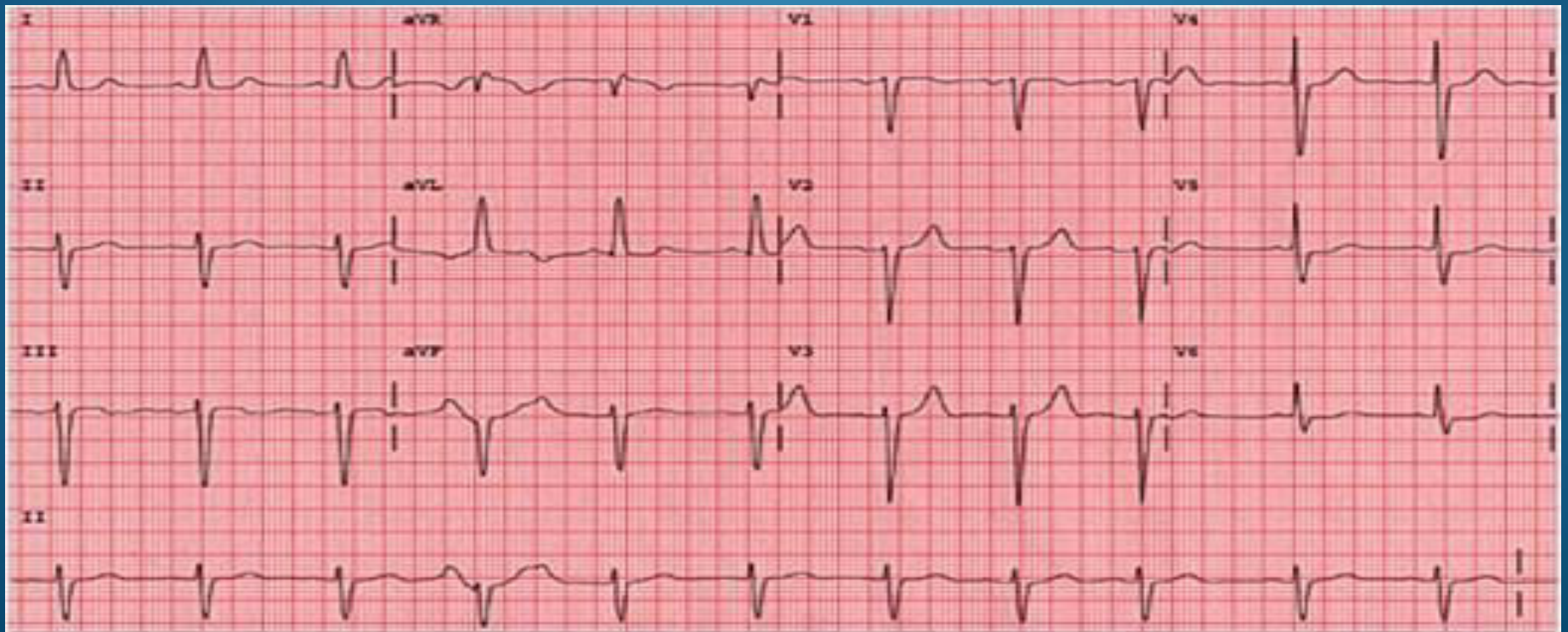
How to calculate Heart Rate in irregular rhythm?

Count the Rs in 30 large
squares then multiply by 10

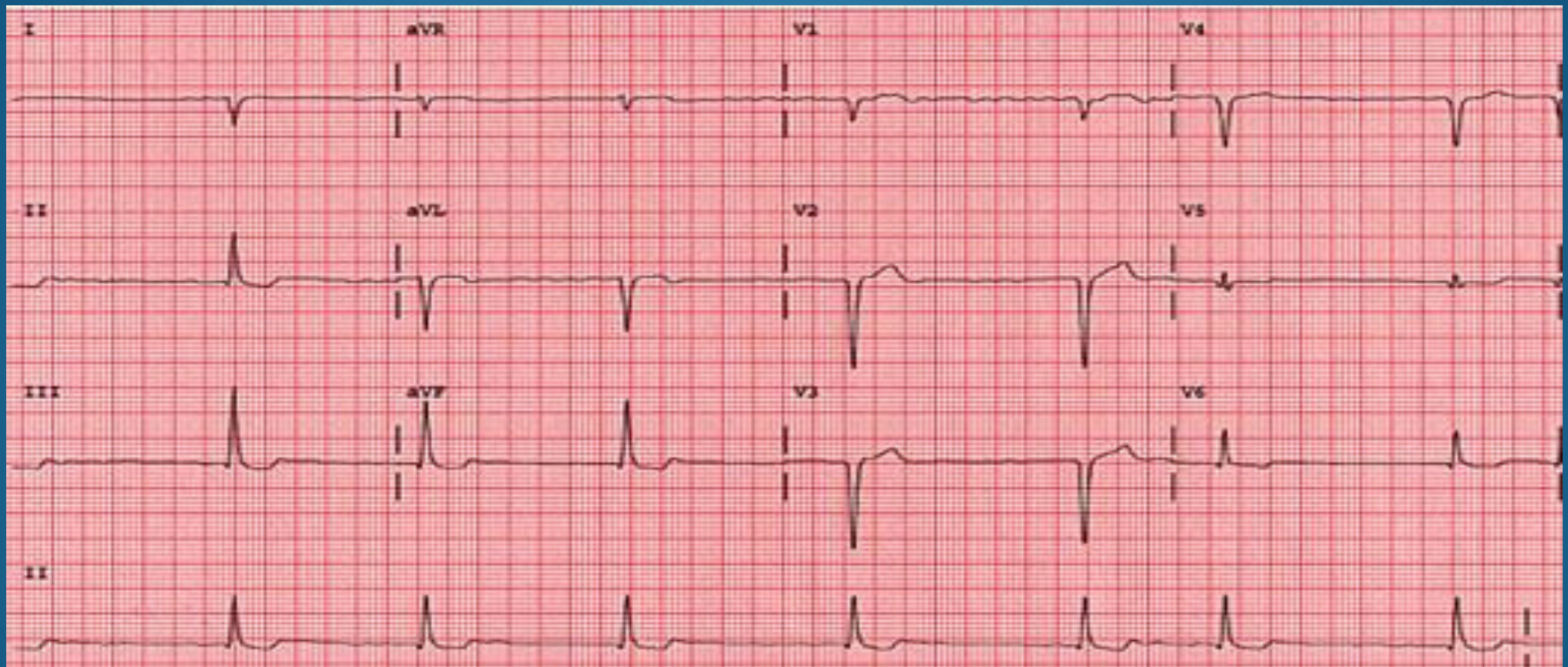
Axis deviation



LAD



RAD



P wave

```
graph TD; A[P wave] --> B[Present]; A --> C[Abscent]; B --> D[Normal Morphology]; B --> E[Abnormal Morphology];
```

A hierarchical flowchart on a blue background. The root node is 'P wave'. It branches into two nodes: 'Present' and 'Abscent'. The 'Present' node further branches into two nodes: 'Normal Morphology' and 'Abnormal Morphology'. All nodes are white rounded rectangles with blue borders and shadows.

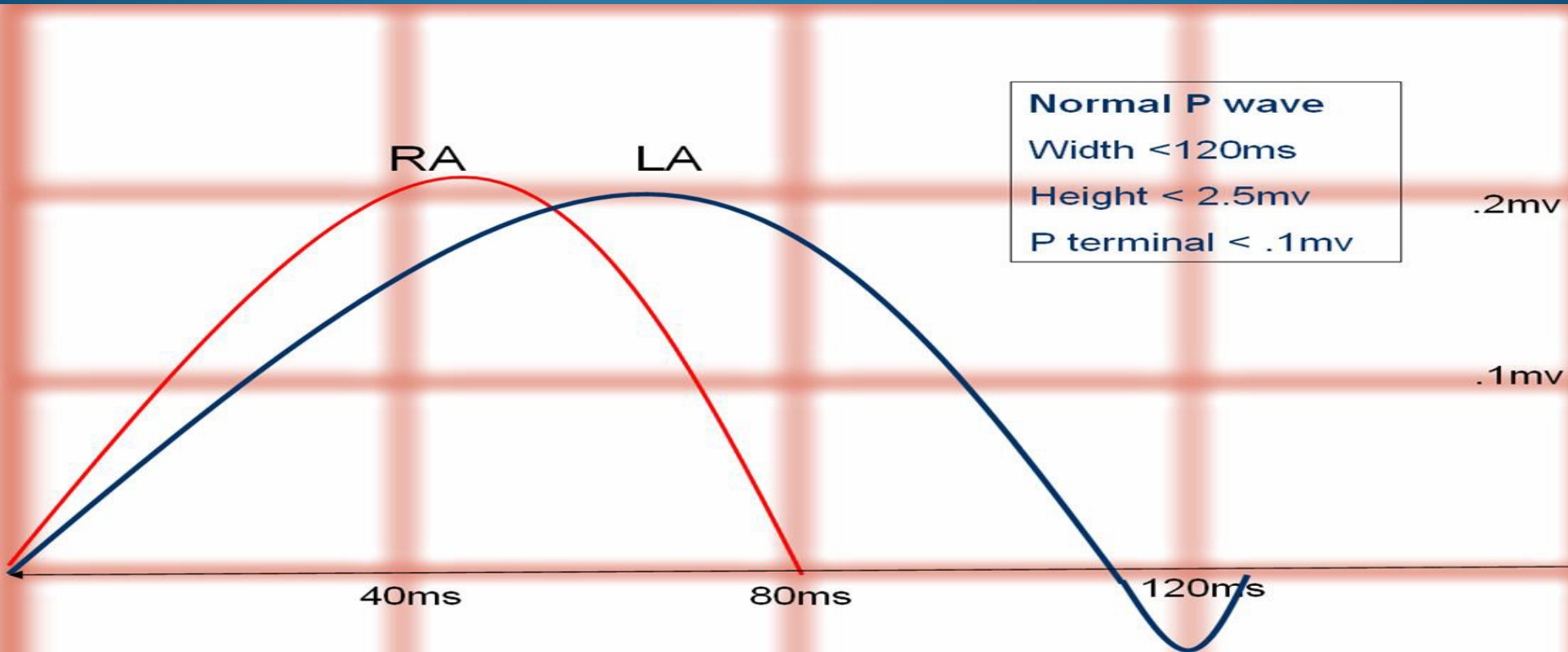
Present

Abscent

Normal
Morphology

Abnormal
Morphology

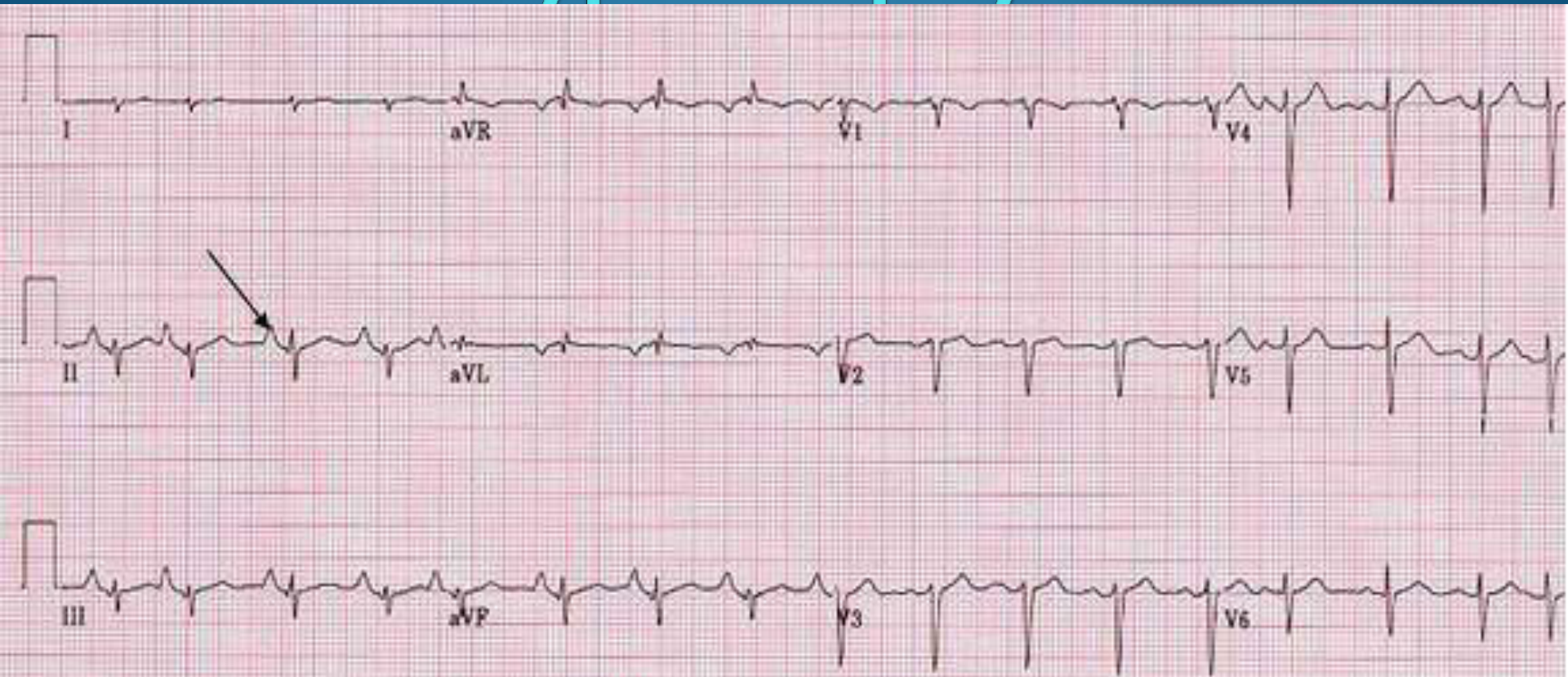
P wave



P Pulmonale

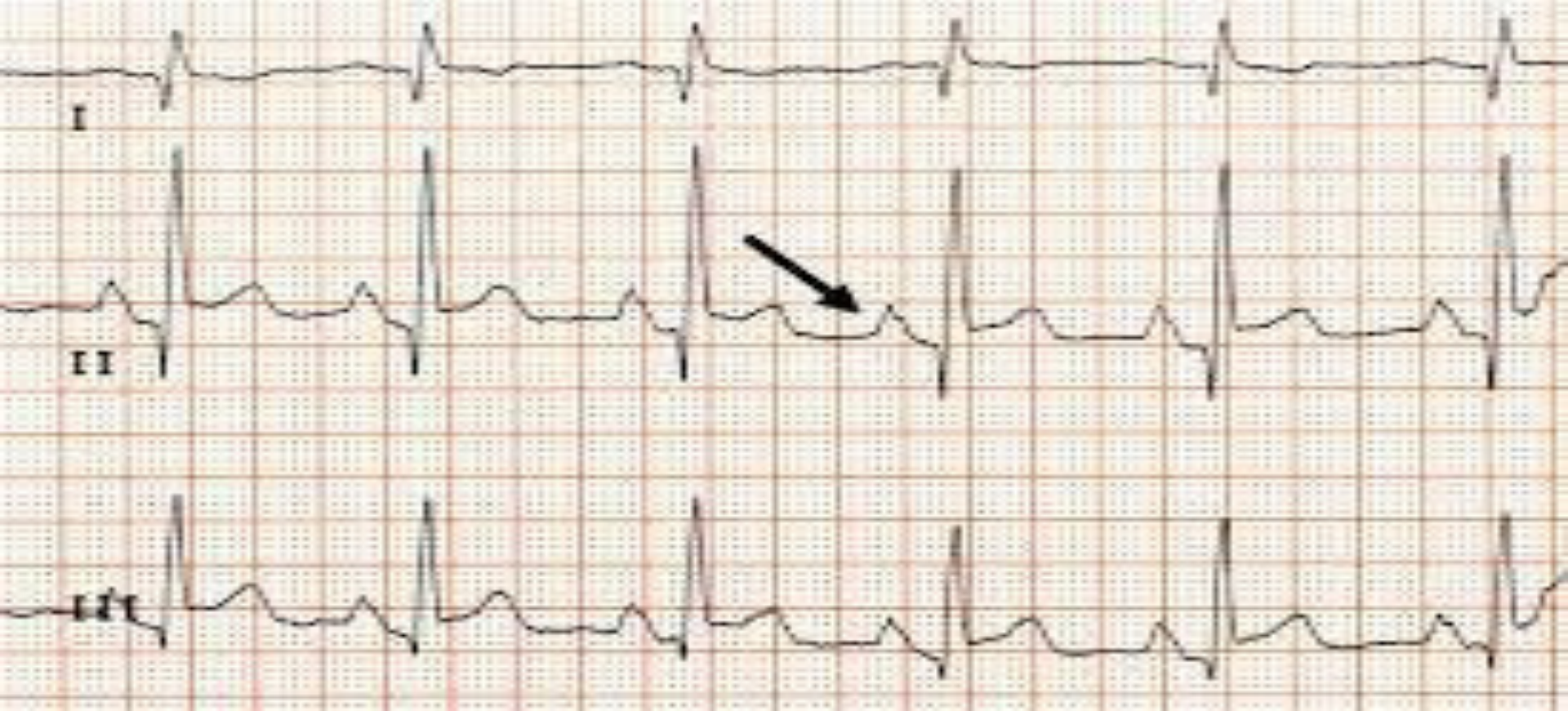
Peaked P wave in RA

hypertrophy



P Mitrale

Bifid P wave in LA hypertrophy



P-R INTERVAL

Normal

- 120 – 200 ms (3-5 ss)

Prolonged

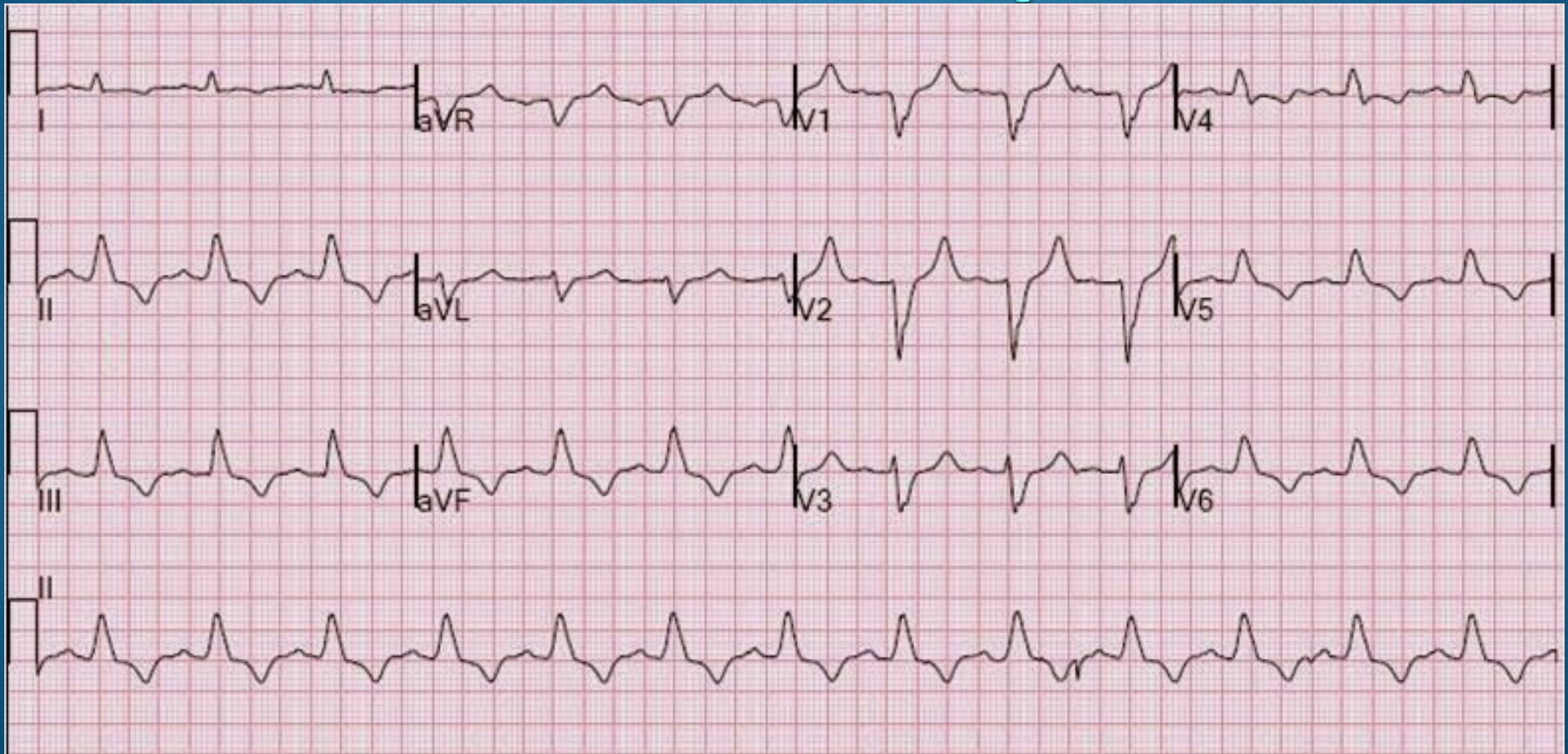
- Heart Block
- > 5 ss

Shortened

- < 3 ss
- WPW



**wide QRS(>3 ss) = ventricular
abnormality**



ST segment

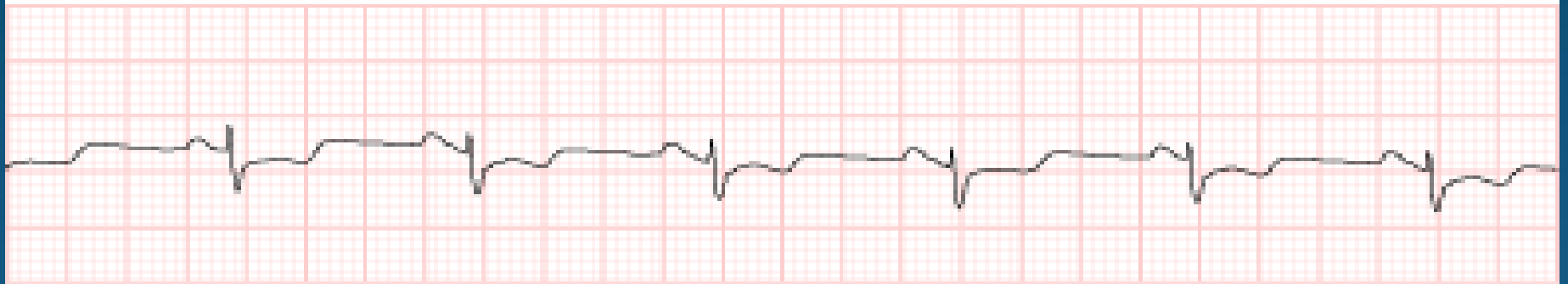
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graph TD; A[ST segment] --> B[Iso electric (normal)]; A --> C[Elevated (MI or Pericarditis)]; A --> D[Depressed (Ischemia)];
```

Iso electric
(normal)

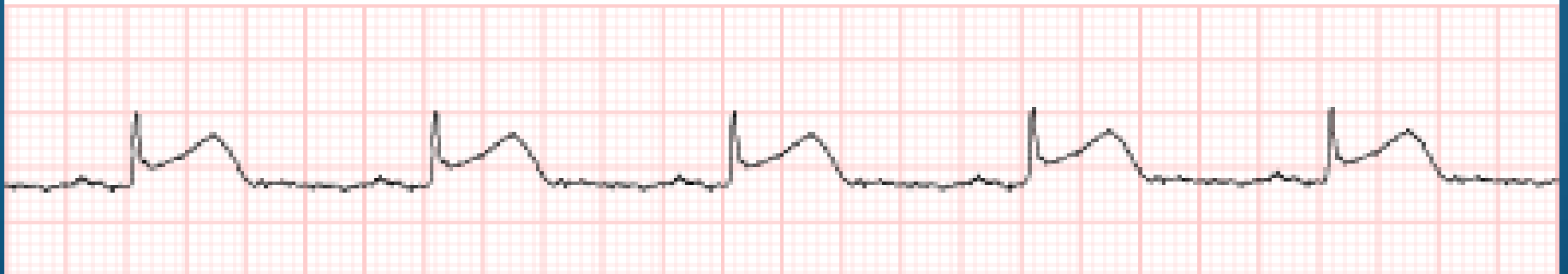
Elevated
(MI or
Pericarditis)

Depressed
(Ischemia)

ST Depression



ST Elevation



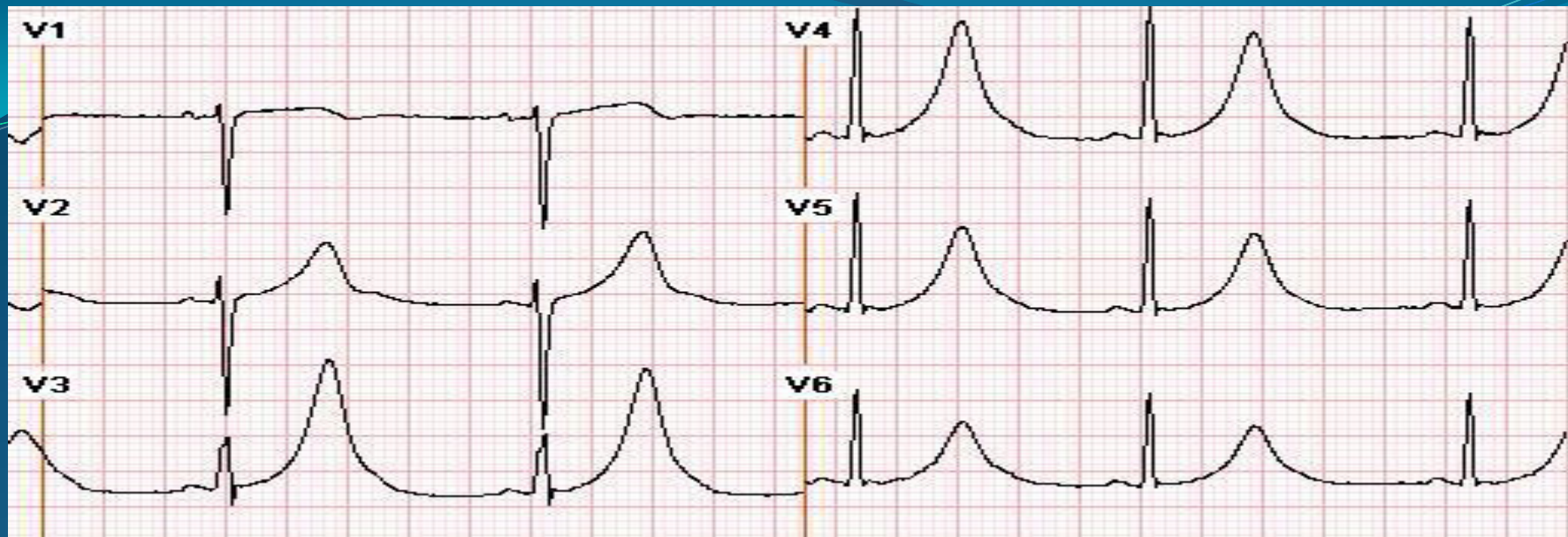
NL T wave

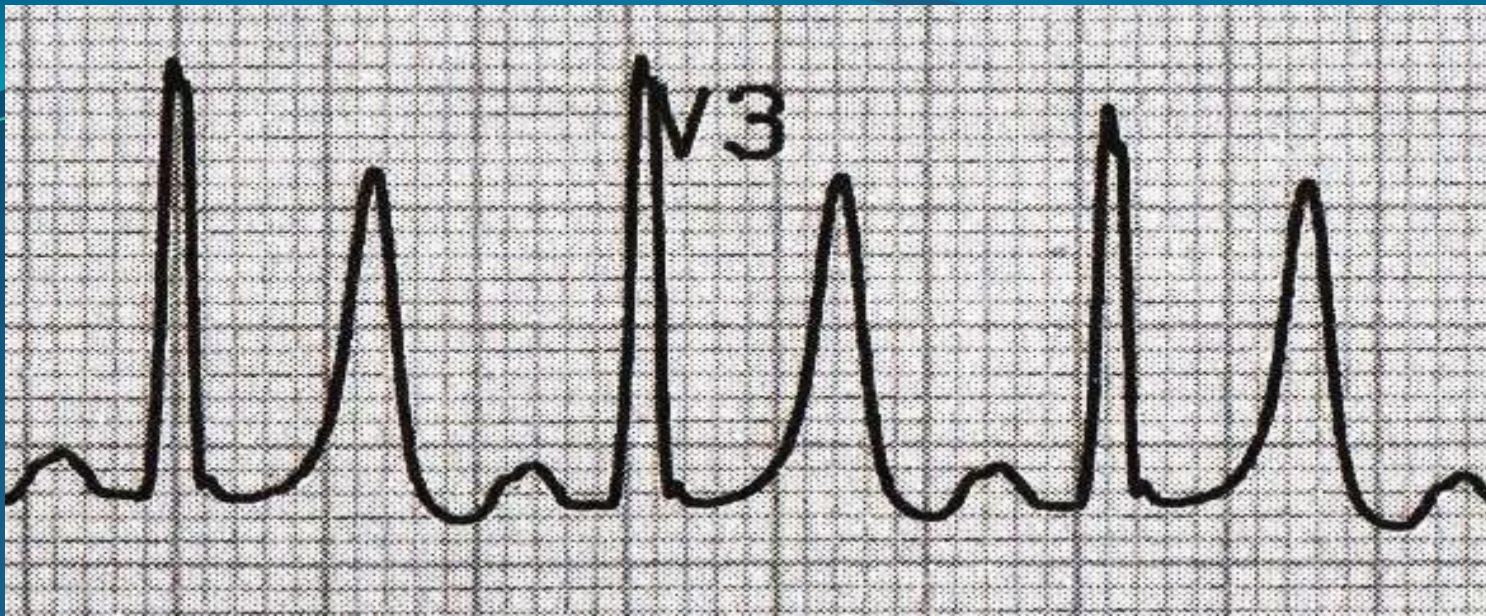
Inverted

Hyper acute
(MI)

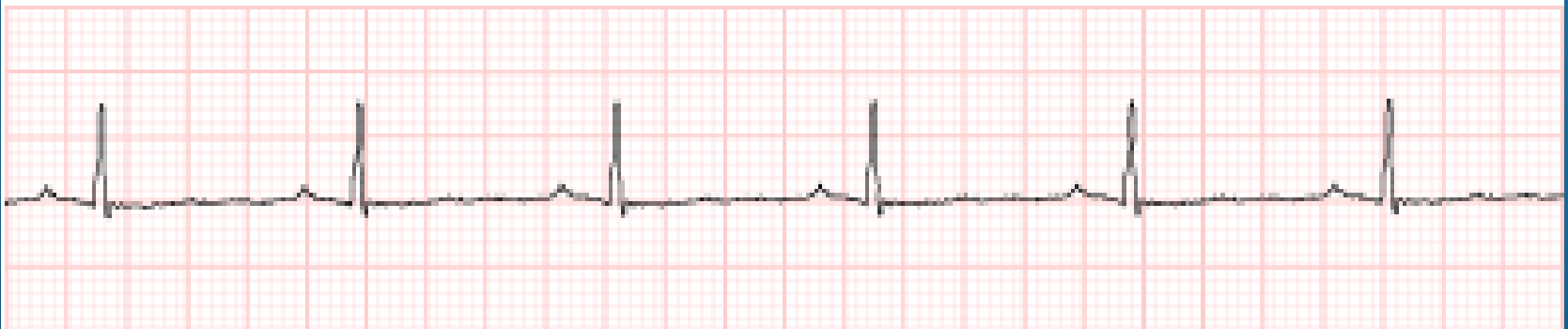
Peaked
(hyperkalemia)

Flat
(hypokalemia)





Flat T Wave



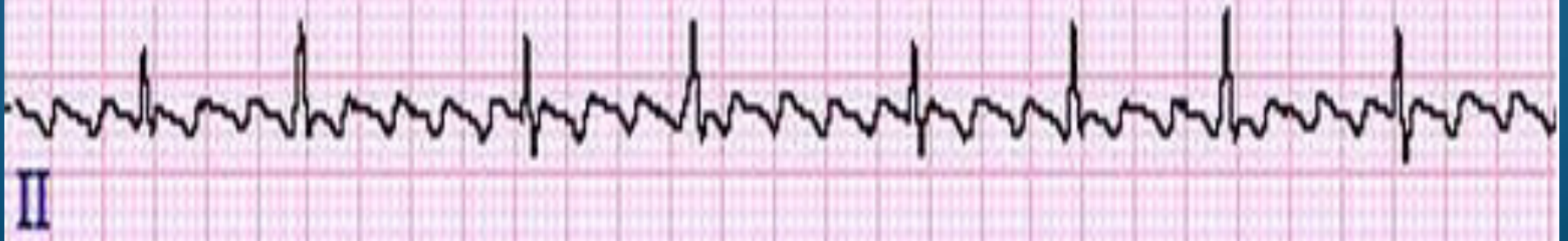
Abnormal Rhythm

Atrial Rhythm

Atrial Fibrillation - fibrillatory waves

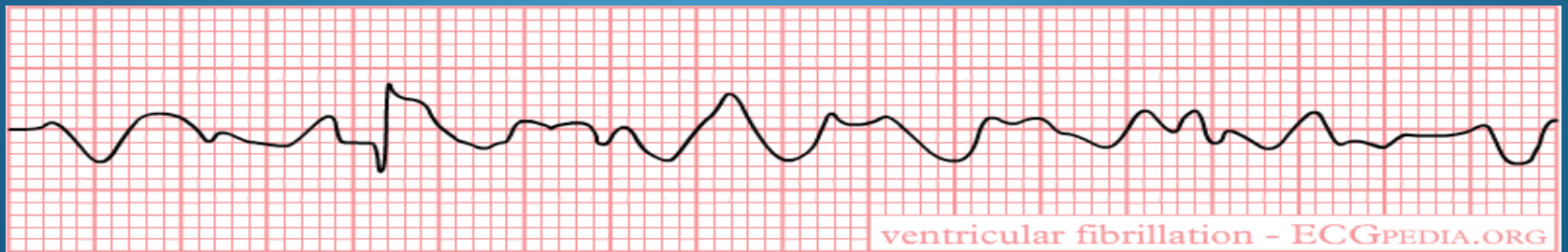


Atrial Flutter - sawtooth pattern



Ventricular Rhythm

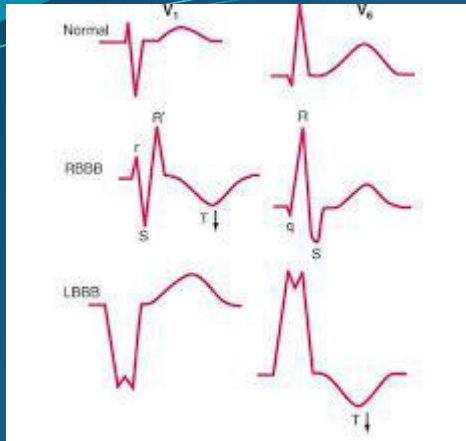
Ventricular Tachycardia and Ventricular Fibrillation



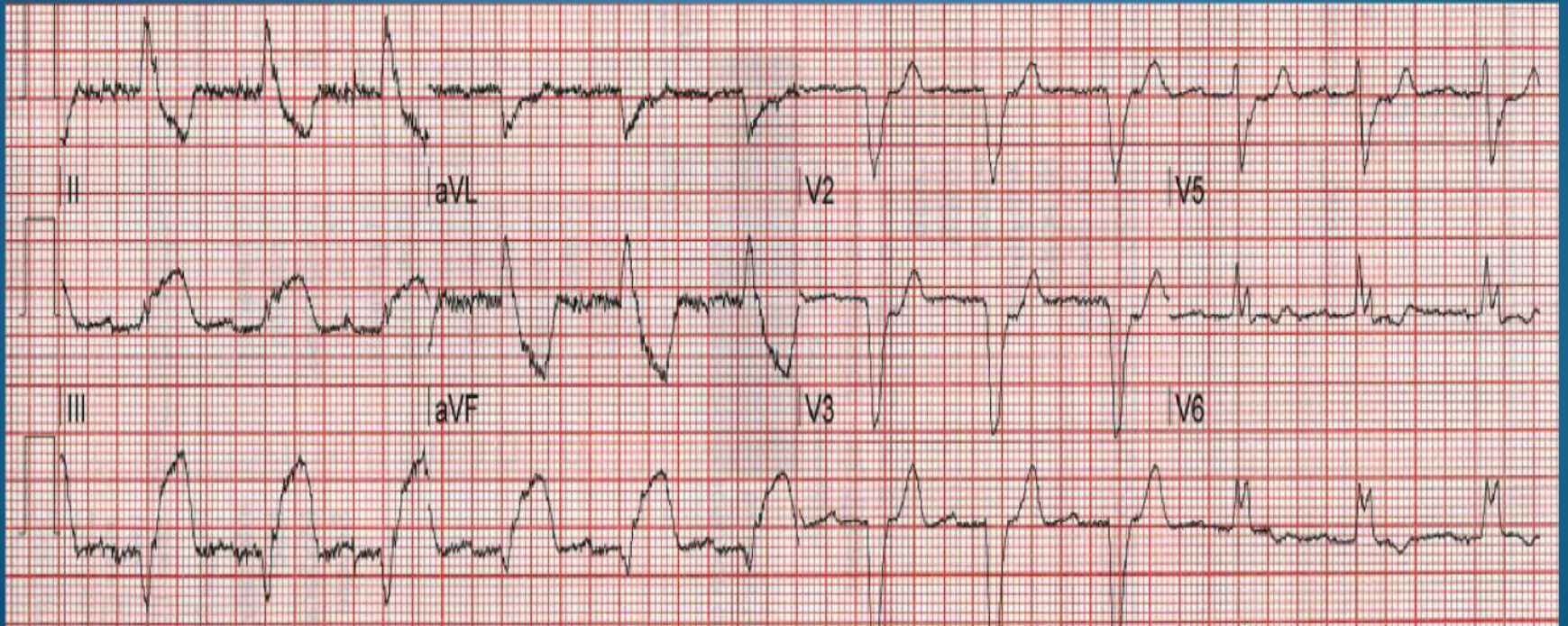
Atrioventricular Rhythms (Conduction Blocks)

Heart Block(3 degrees)

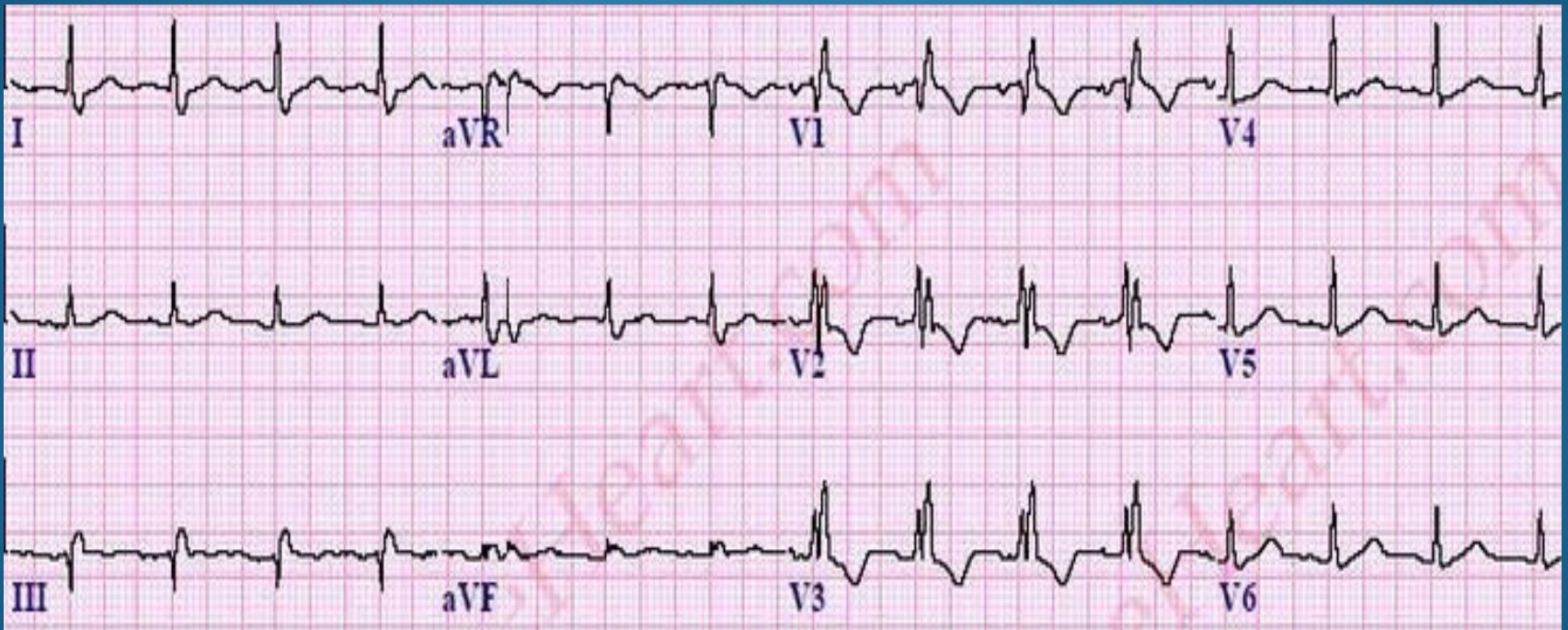
Bundle Branch Block



LBBB



RBBB



GOOD LUCK