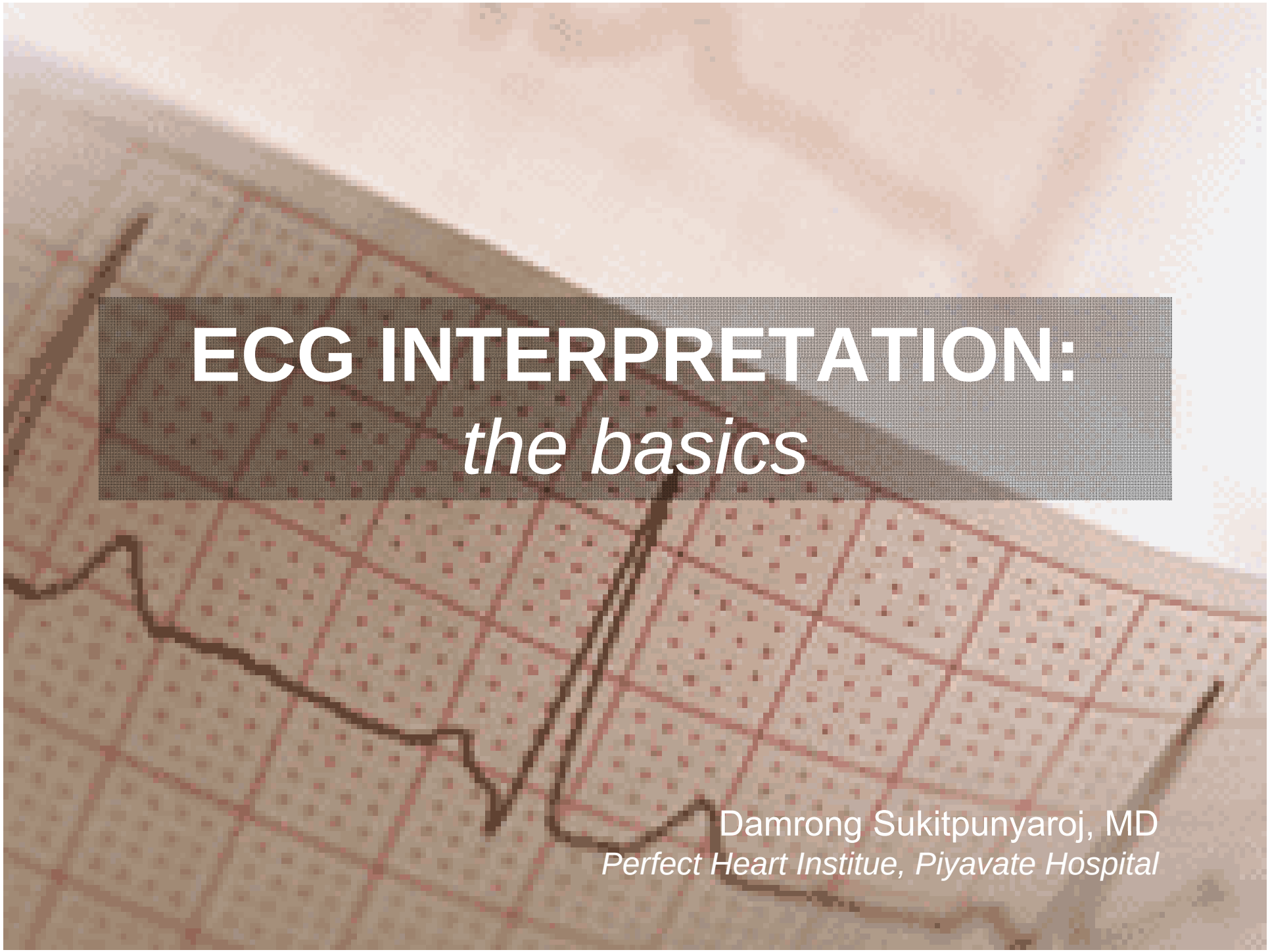

ECG INTERPRETATION:
the basics

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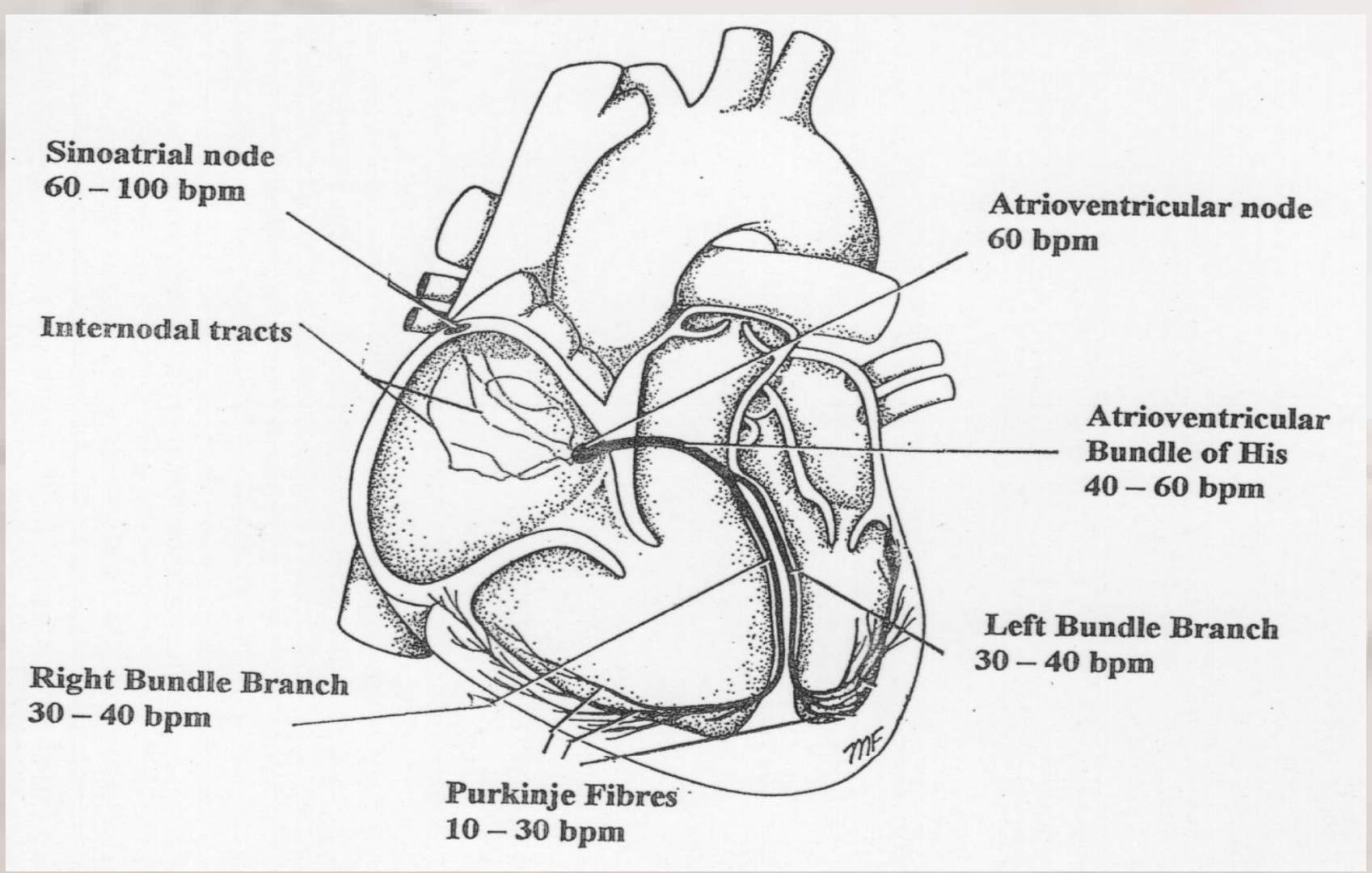
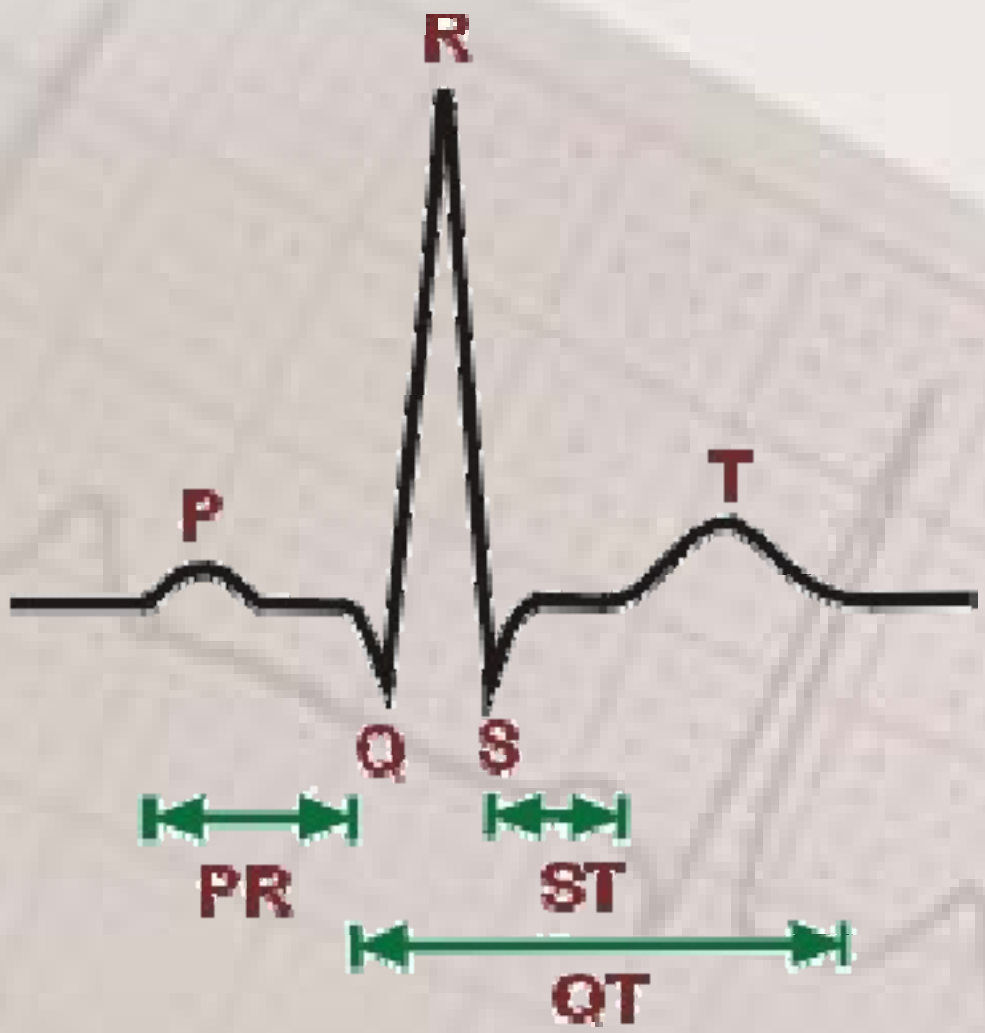
Overview

- Conduction Pathways
- Systematic Interpretation
- Common abnormalities in Critical Care
  - Supraventricular arrhythmias
  - Ventricular arrhythmias

Conduction Pathways



Conduction Pathways



P wave = atrial depolarisation.

PR Interval = impulse from atria to ventricles.

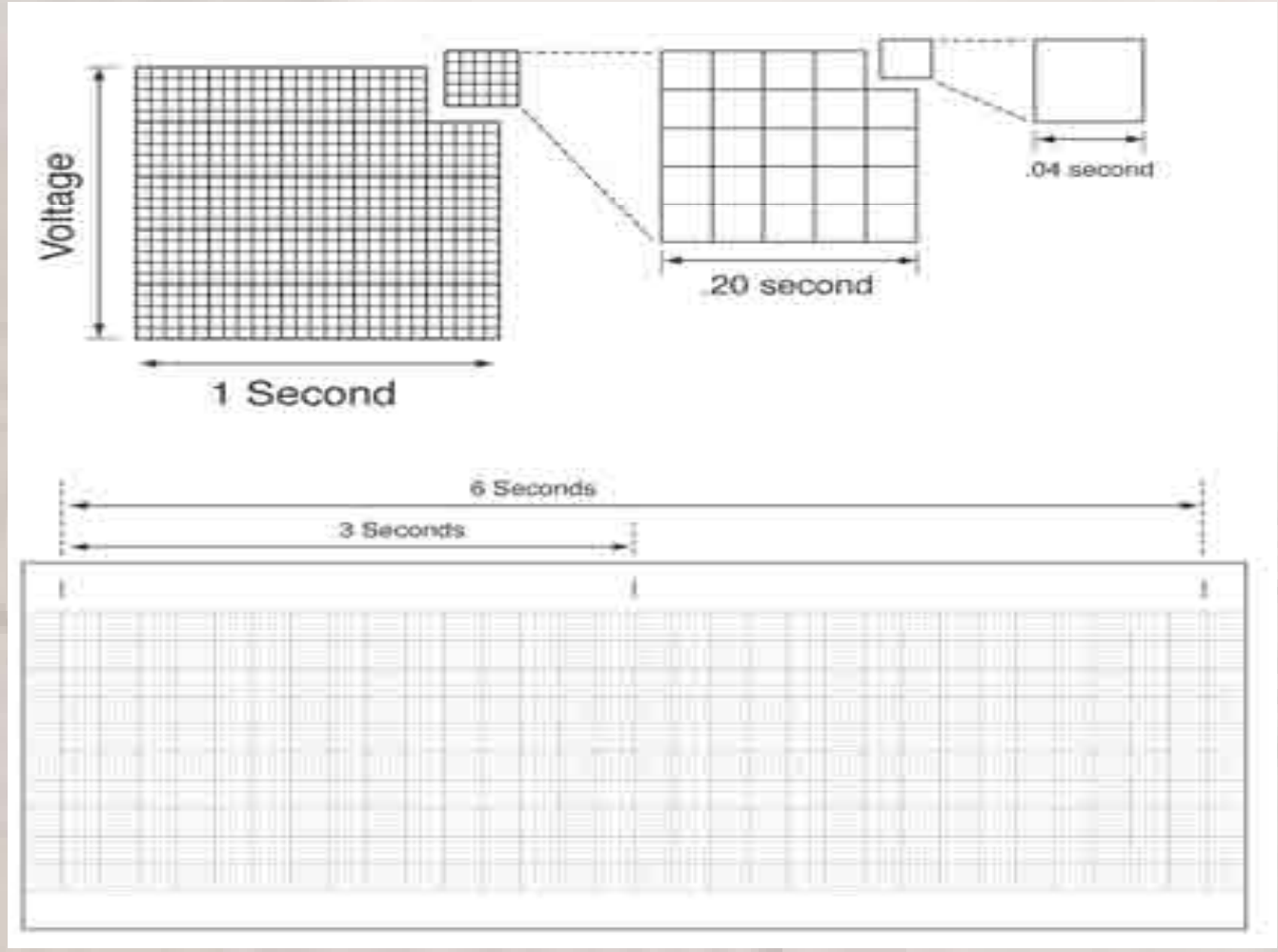
QRS complex = ventricular depolarisation.

ST segment = isoelectric - part of repolarisation.

T wave = usually same direction as QRS - ventricular repolarisation.

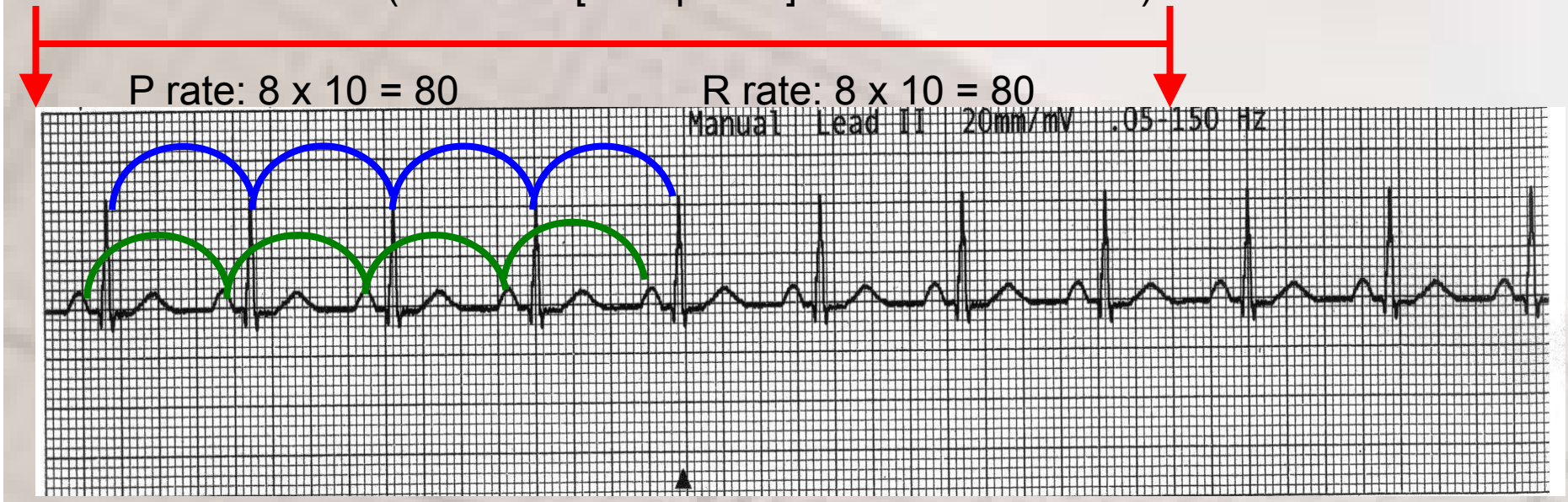
QT Interval = This interval spans the onset of depolarisation to the completion of repolarization of the ventricles.

Interpretation



Interpretation

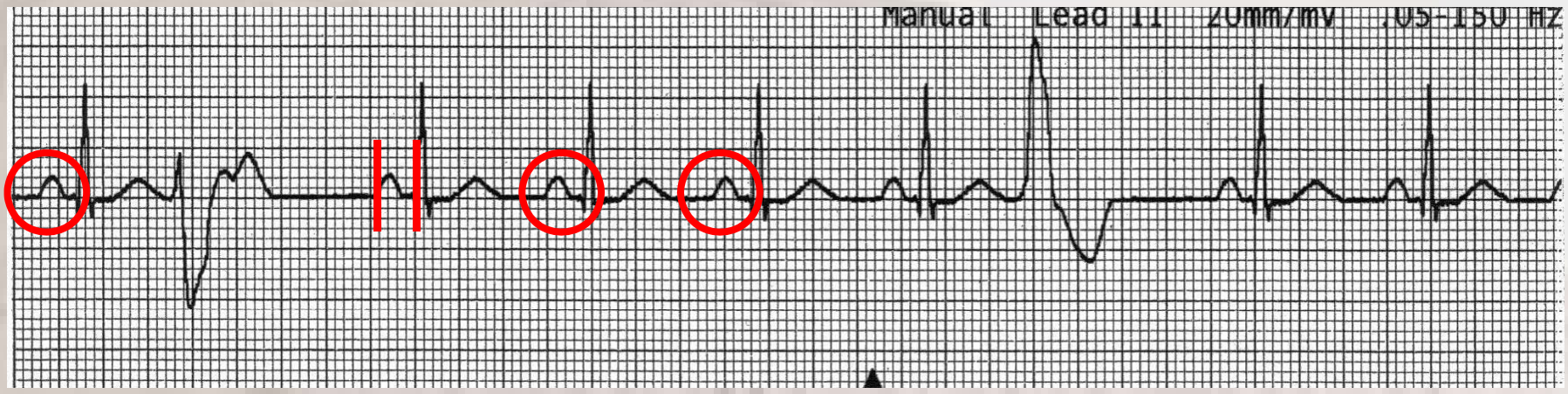
1. Rate = Number of P's (atrial) R's (ventricular) per minute (6 second [30 squares] X 10 = minute rate).



2. Rhythm = Regular or irregular. Map P-P and R-R intervals.

Interpretation

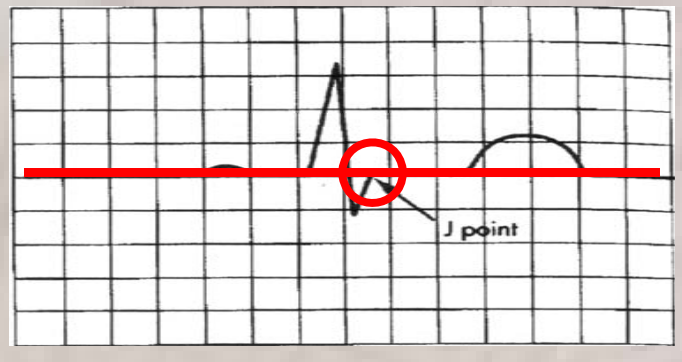
3. <u>P wave</u> = present, 1 per QRS, shape, duration, voltage.

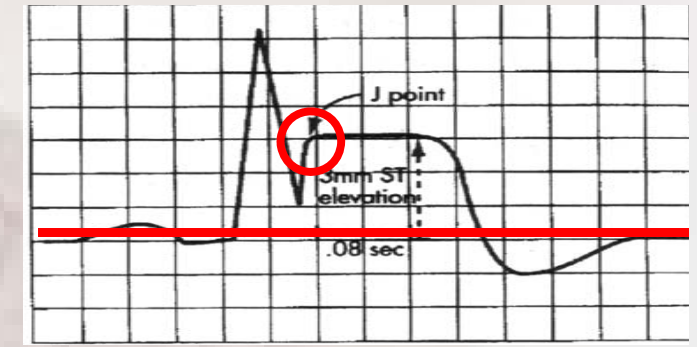


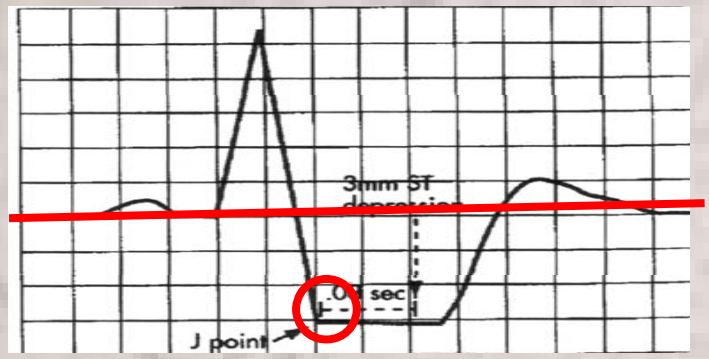
4. <u>P-R interval</u> = length (0.12 - 0.2 sec = <1 big square), isoelectric.

Interpretation

5. <u>QRS</u> = duration (0.06 - 0.10), voltage, q or Q waves



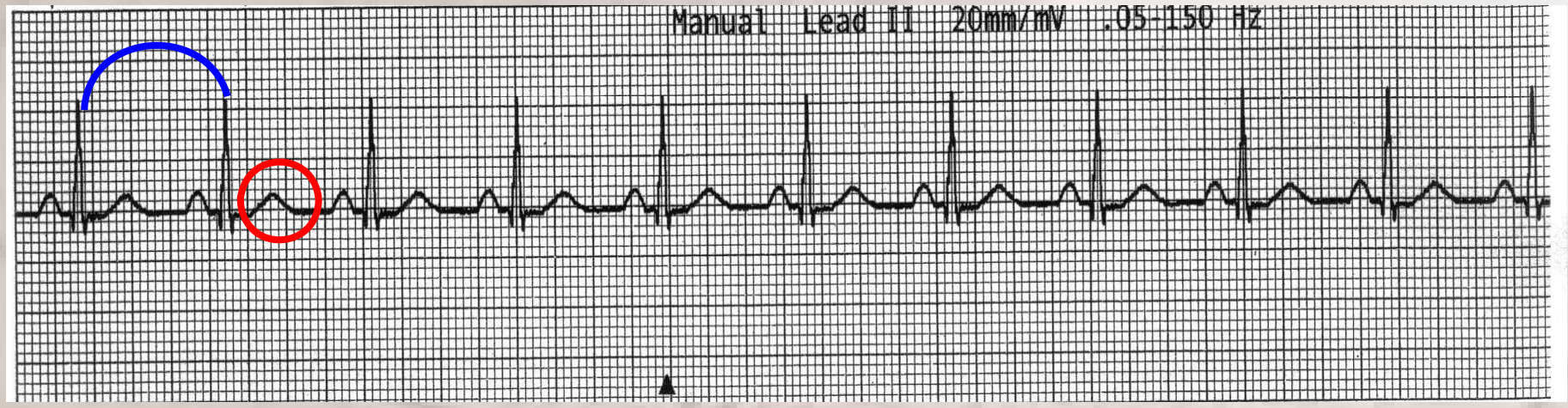




6. <u>ST Segment</u> = shape, isoelectric with PR segment

Interpretation

7. T wave = shape, direction



8. QT interval = length (R-R/2 or QT**c** <0.40 sec)

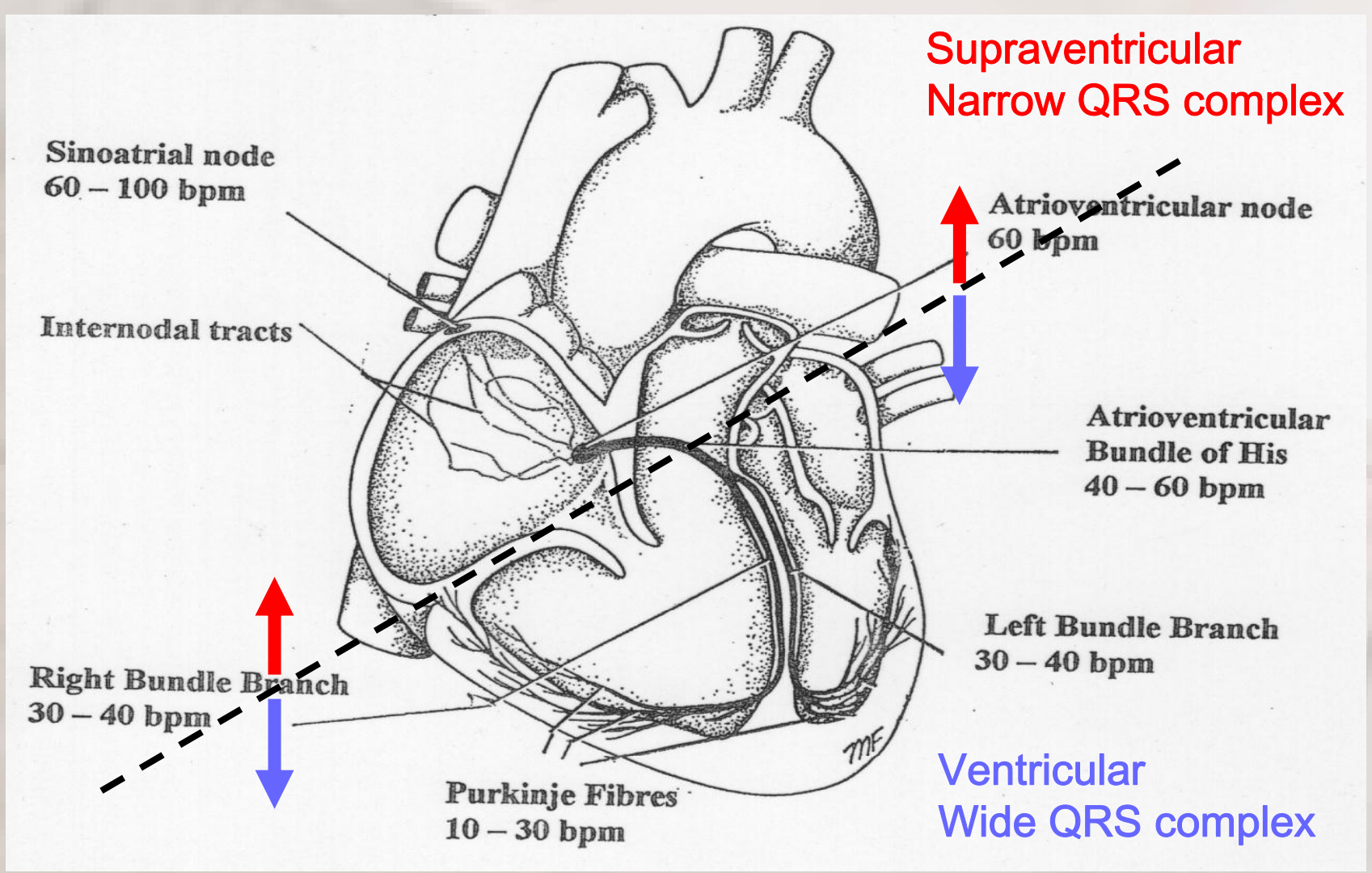
Abnormalities:
Supraventricular arrhythmias

- Atrial Fibrillation
- Atrial Flutter
- Supraventricular Tachycardia (SVT)

Abnormalities:
Ventricular arrhythmias

- Premature Ventricular Complexes (PVCs)
- Ventricular tachycardia (VT)

Conduction Pathways



Abnormalities:
atrial fibrillation

Rhythm: Irregular

Rate: A: 350 – 650; V: varies

P: poorly defined

P-R: N/A

QRS: narrow complex

S-T: normal

T: normal

Q-T: normal

Abnormalities:
atrial flutter

Rhythm: Regular / Irregular

Rate: A: 220 – 430; V: <300 (2:1, 3:1 or sometimes 4:1)

P: Saw toothed appearance

P-R: N/A

QRS: narrow complex

S-T: normal

T: normal

Q-T: normal

Abnormalities:
supraventricular tachycardia (SVT)

Rhythm: Regular

Rate: >100

P: not visible

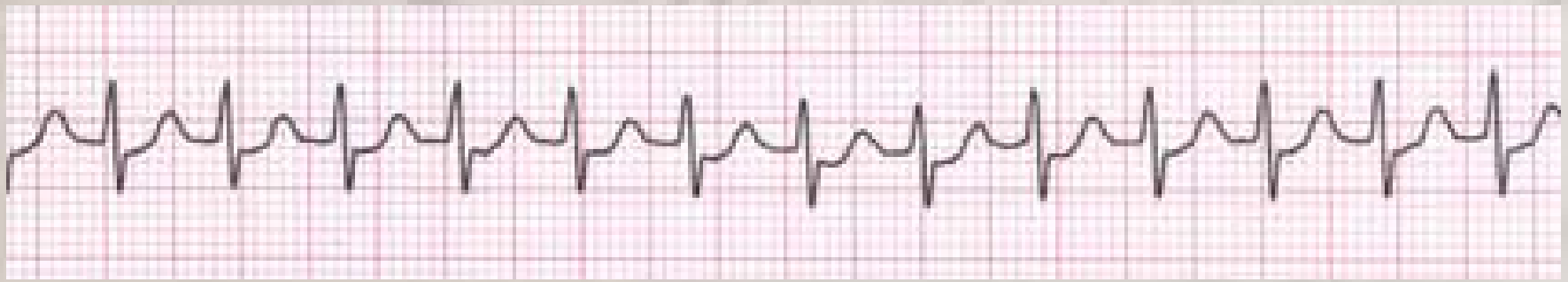
P-R: not defined

QRS: narrow complex

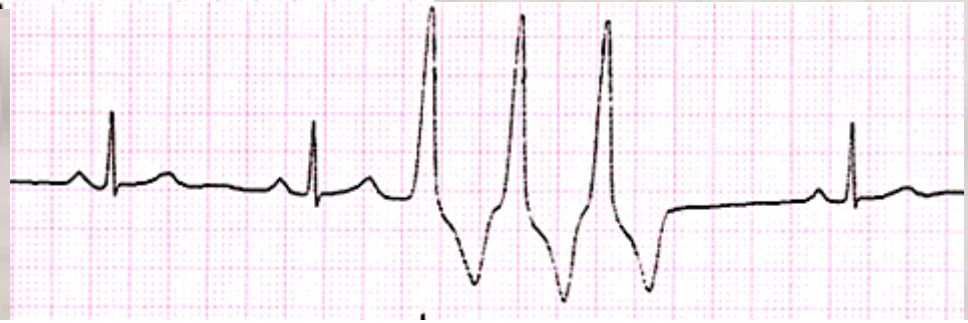
S-T: depression (sometimes)

T: normal

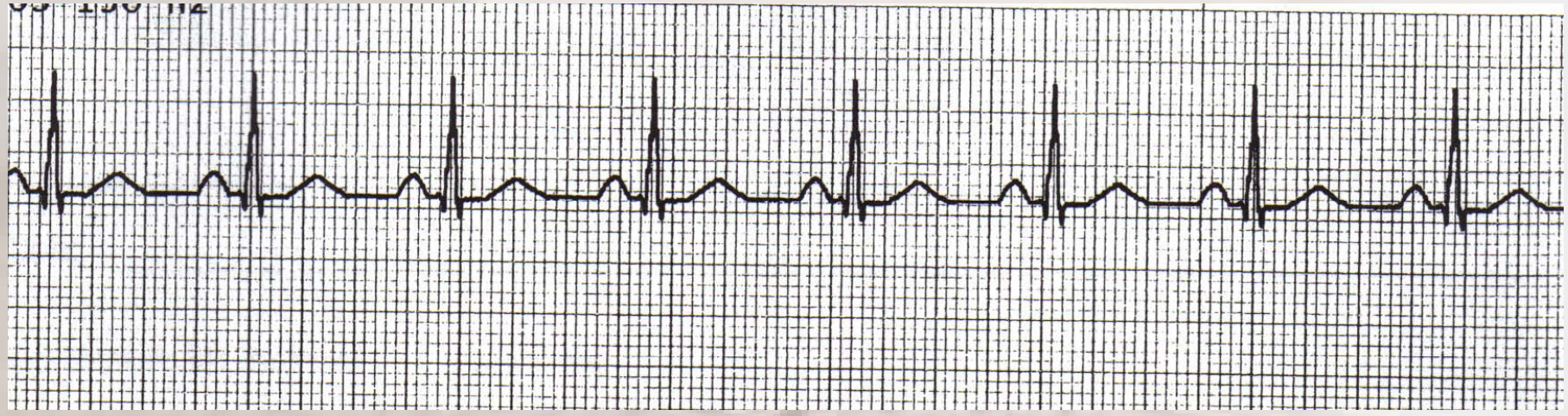
Q-T: prolonged (sometimes)

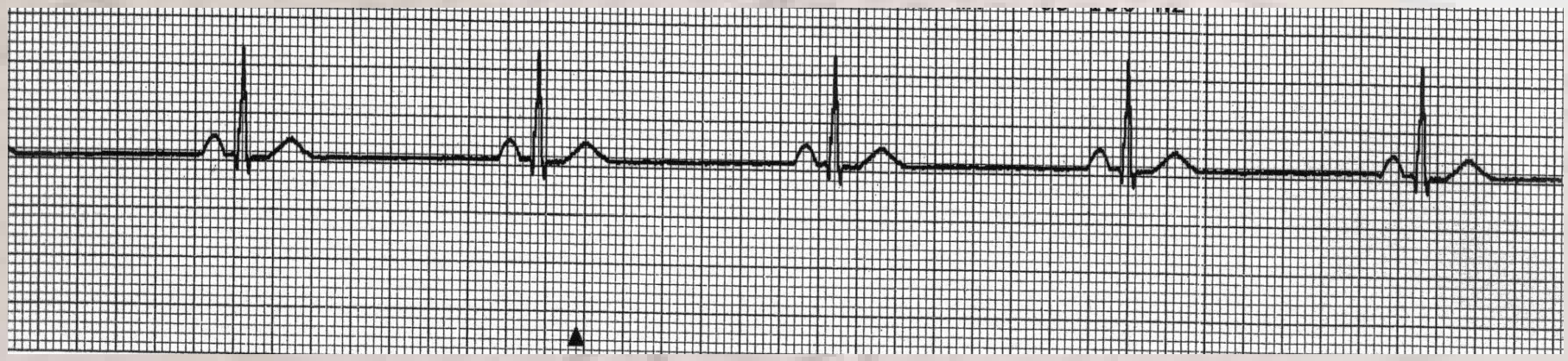


Abnormalities:
premature ventricular complexes

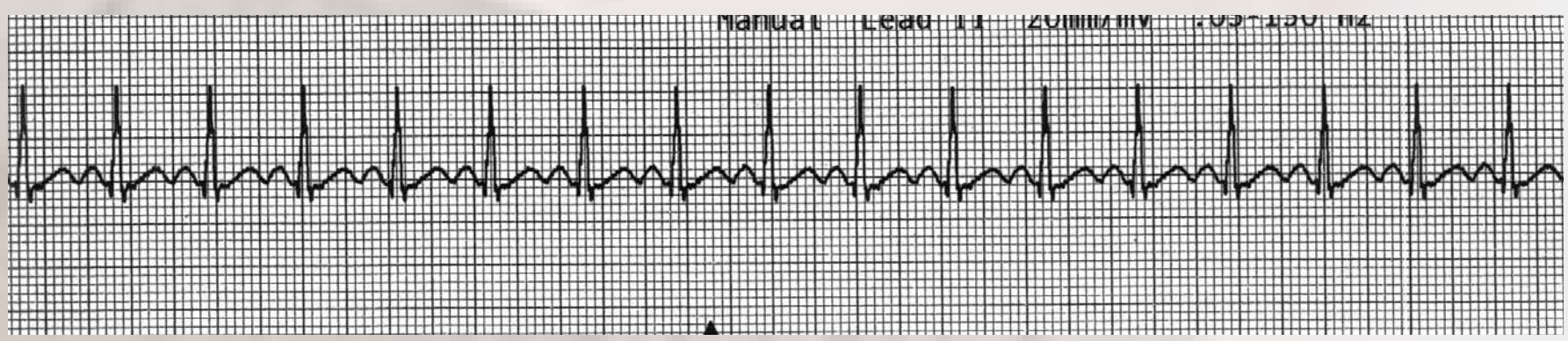


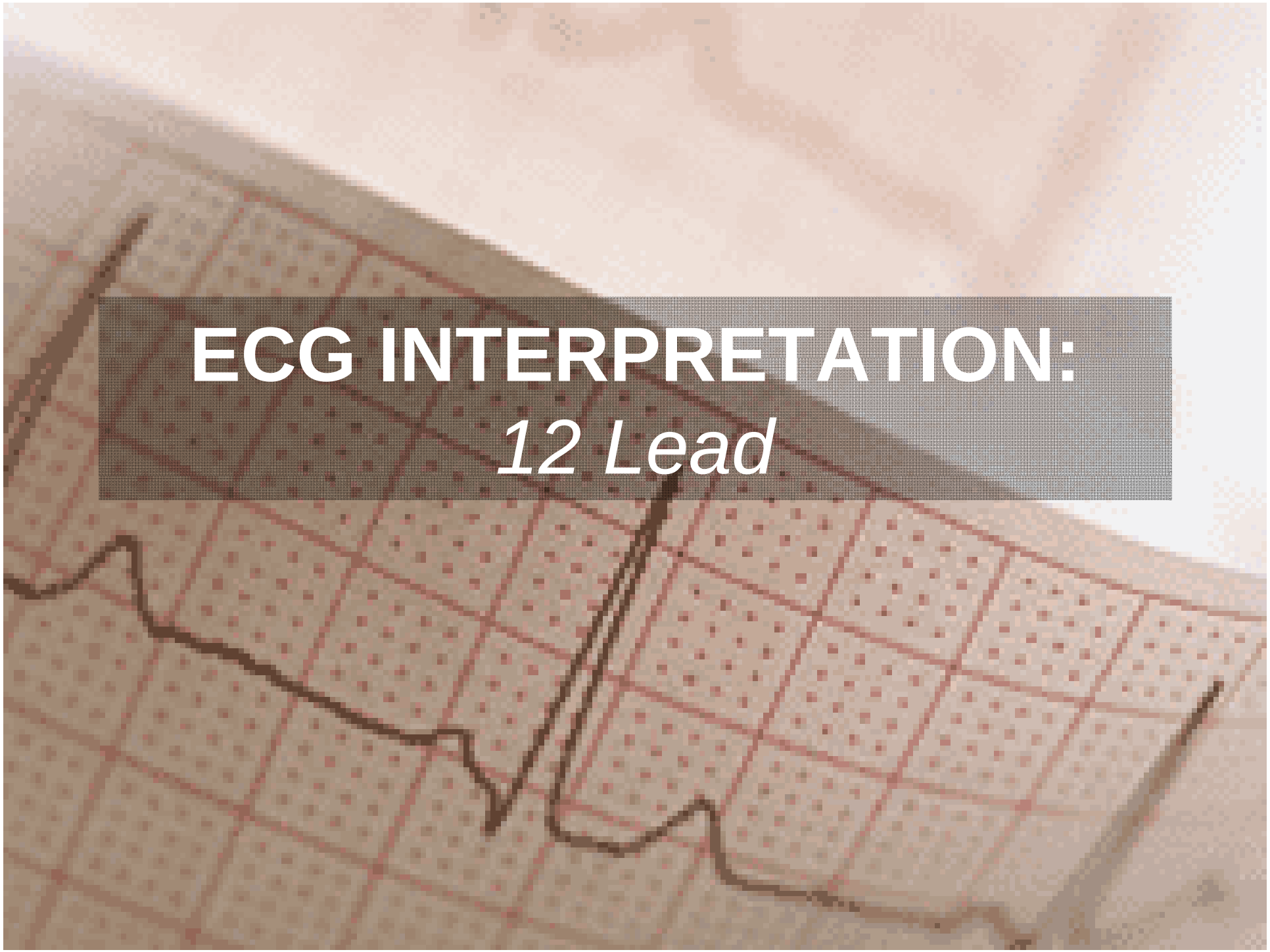
Examples





Examples




ECG INTERPRETATION:
12 Lead

Overview

- Lead Placement
- Axis
- Common abnormalities in Critical Care
  - Heart block
  - Bundle branch blocks
  - Life threatening arrhythmias

Lead Placement

V1 = 4th ICS right sternum

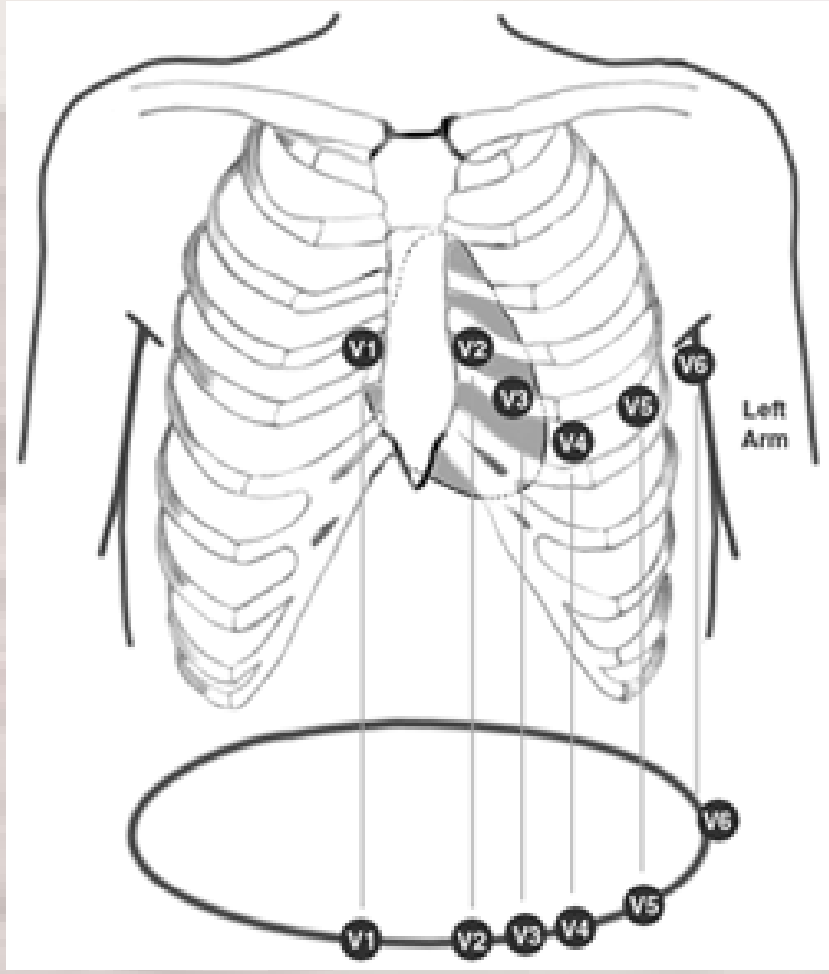
V2 = 4th ICS left sternum

V3 = midway between V2 and V4

V4 = 5th ICS midclavicular

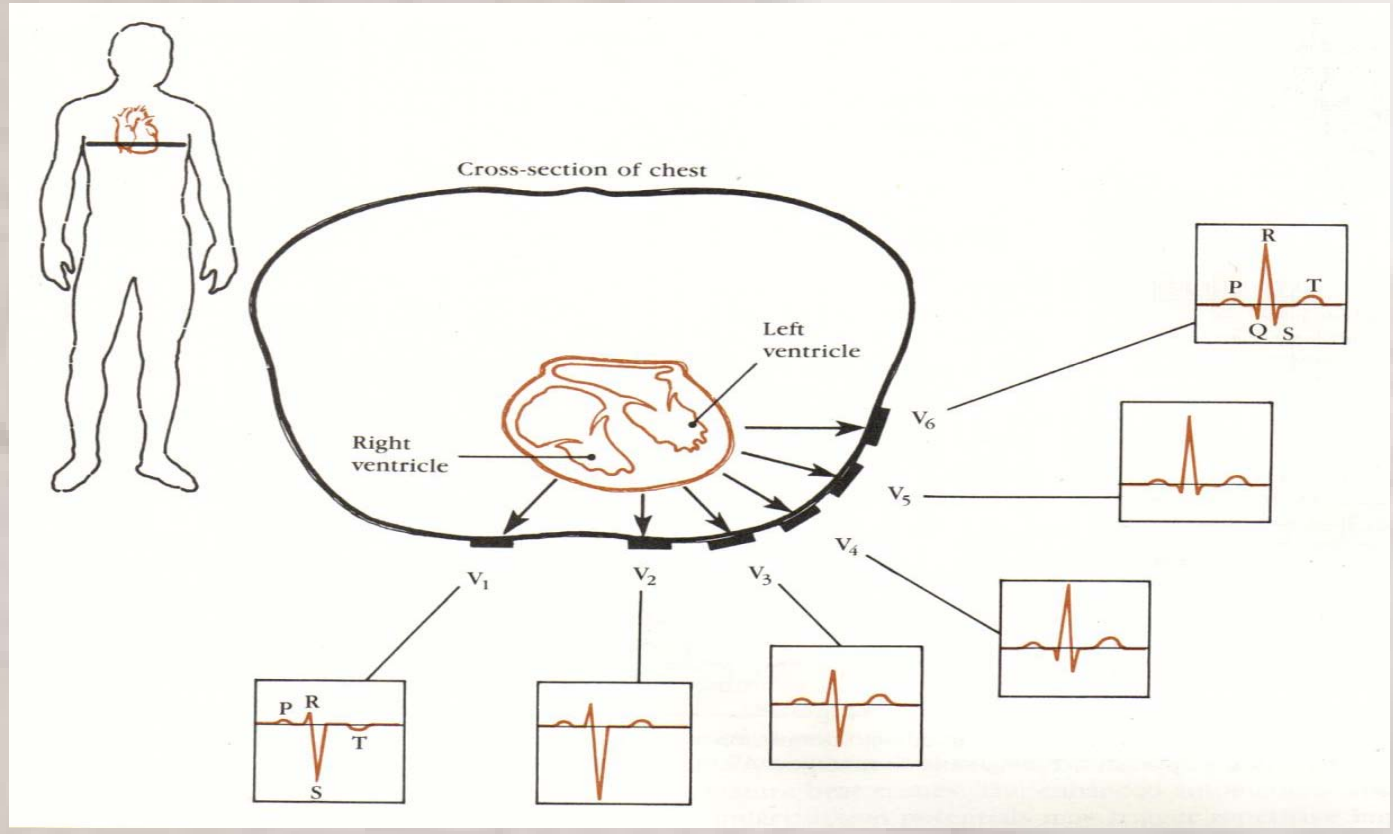
V5 = between V4 and V6 anterior auxiliary line

V6 = midauxillary line lateral to V4 and V5

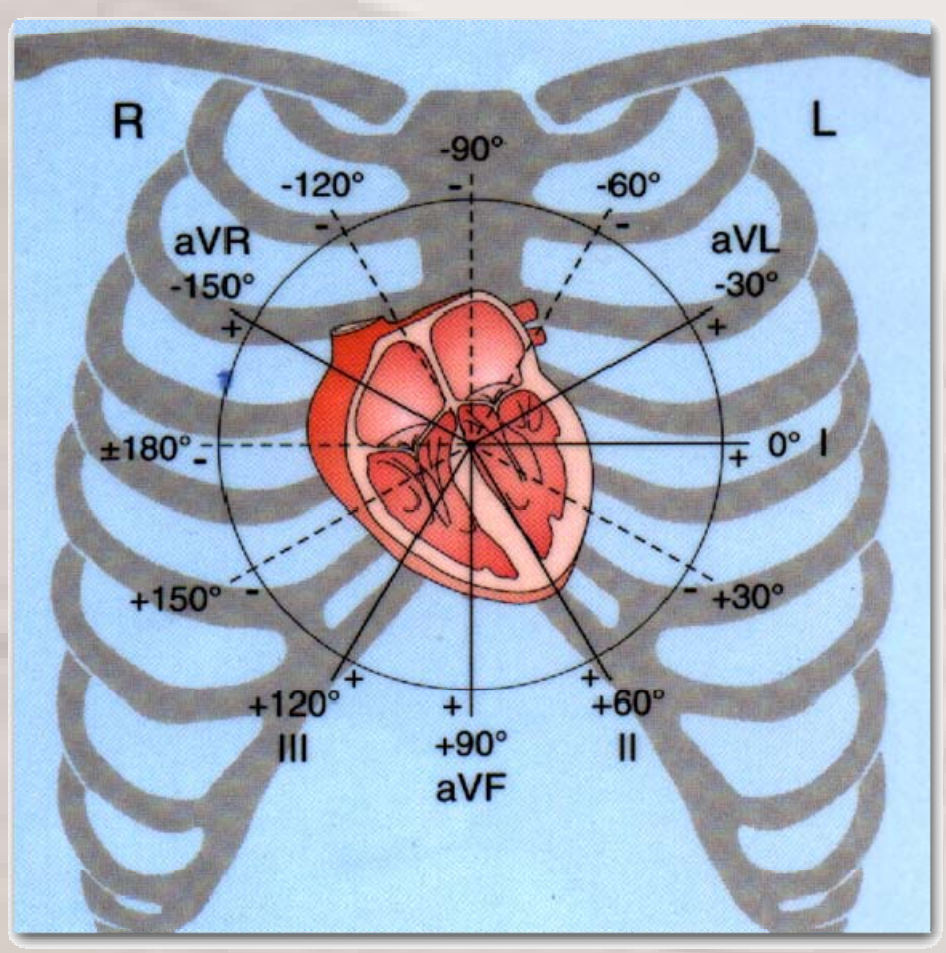


Lead Placement

- Electrical activity towards = ↑
- Electrical activity away = ↓



Lead Placement

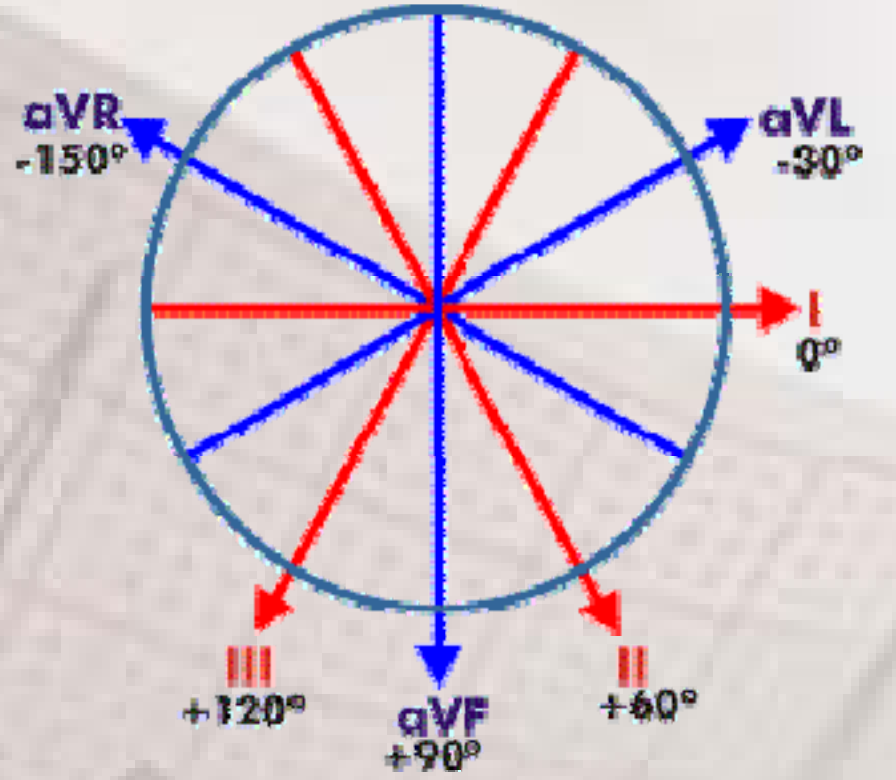


Axis

- The direction of an ECG waveform in the frontal plane measured in degrees
- Represents the flow of the majority of electrical activity
- Normally the QRS complex is measured

Axis

- Each lead has its own axis



Lead Placement

Standard Leads (bipolar)

- I - lateral wall
- II - inferior wall
- III - inferior wall

Augmented leads (unipolar)

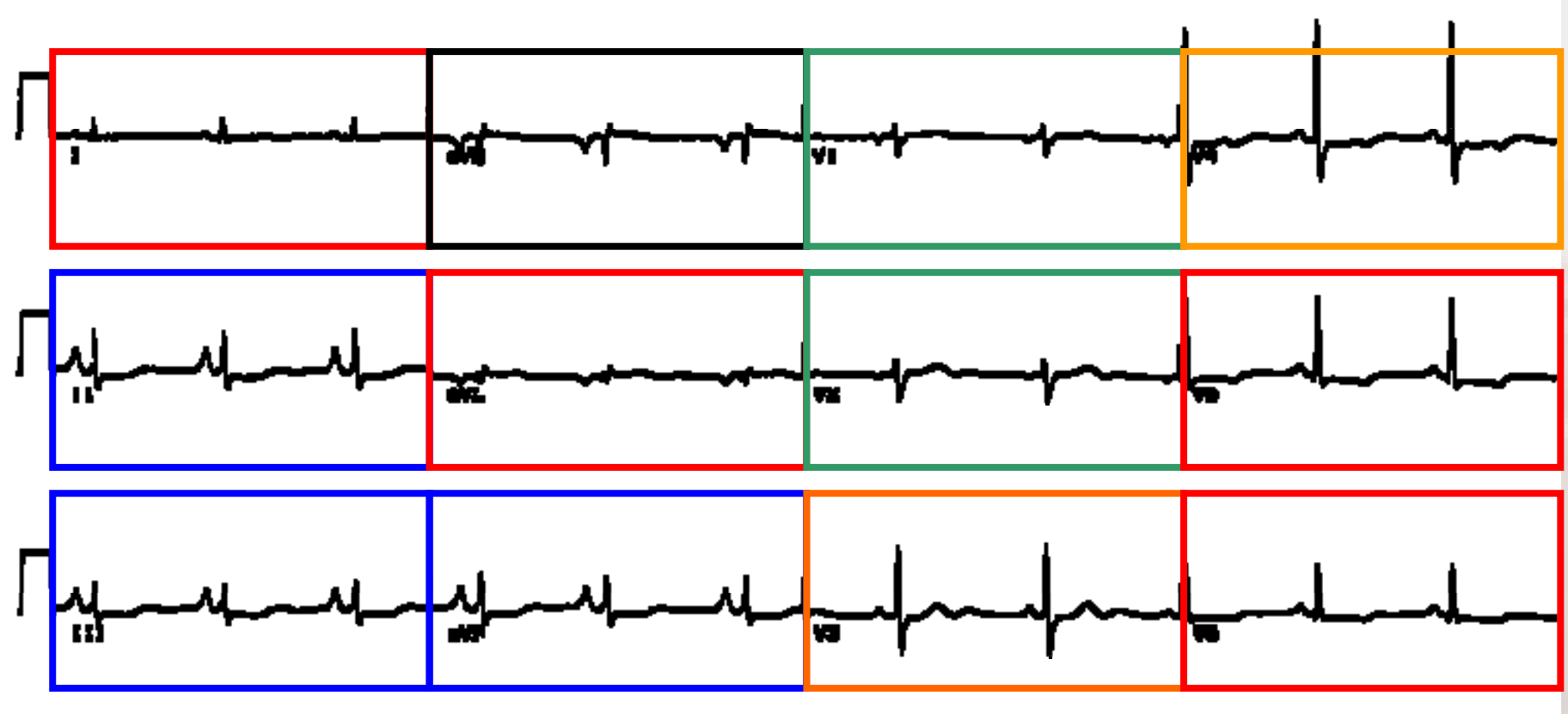
- aVR - no mans land
- aVL - lateral wall
- aVF - inferior wall

Chest Leads (unipolar)

- V1 - septal wall
- V2 - septal wall
- V3 - anterior wall
- V4 - anterior wall
- V5 - lateral wall
- V6 - lateral wall

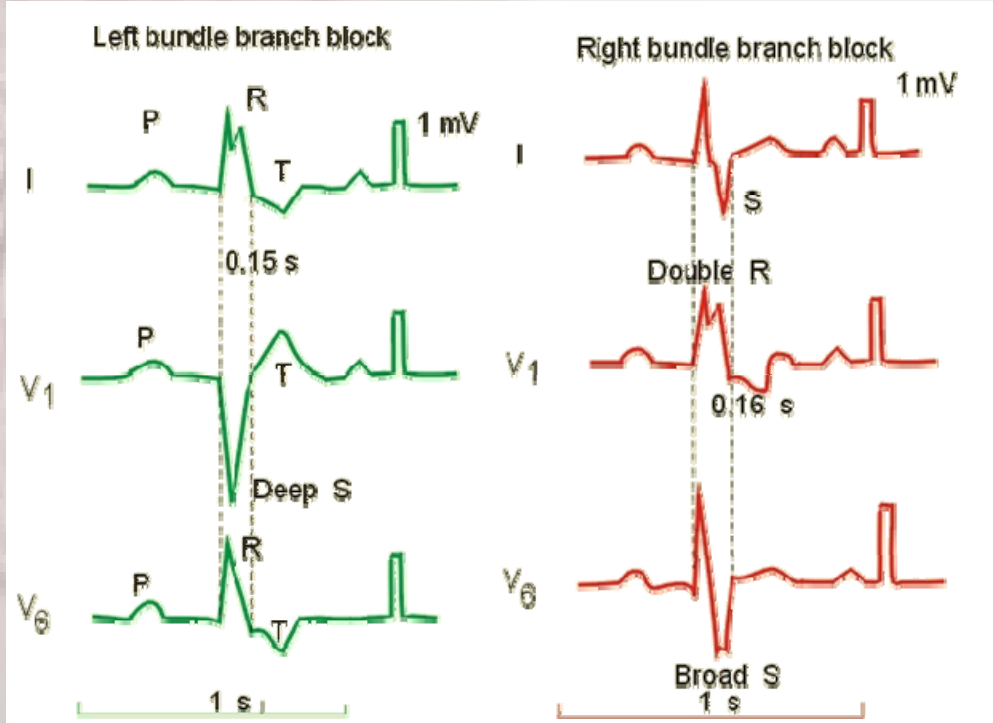
Lead Placement

No-mans land, inferior, lateral, anterior, septal,



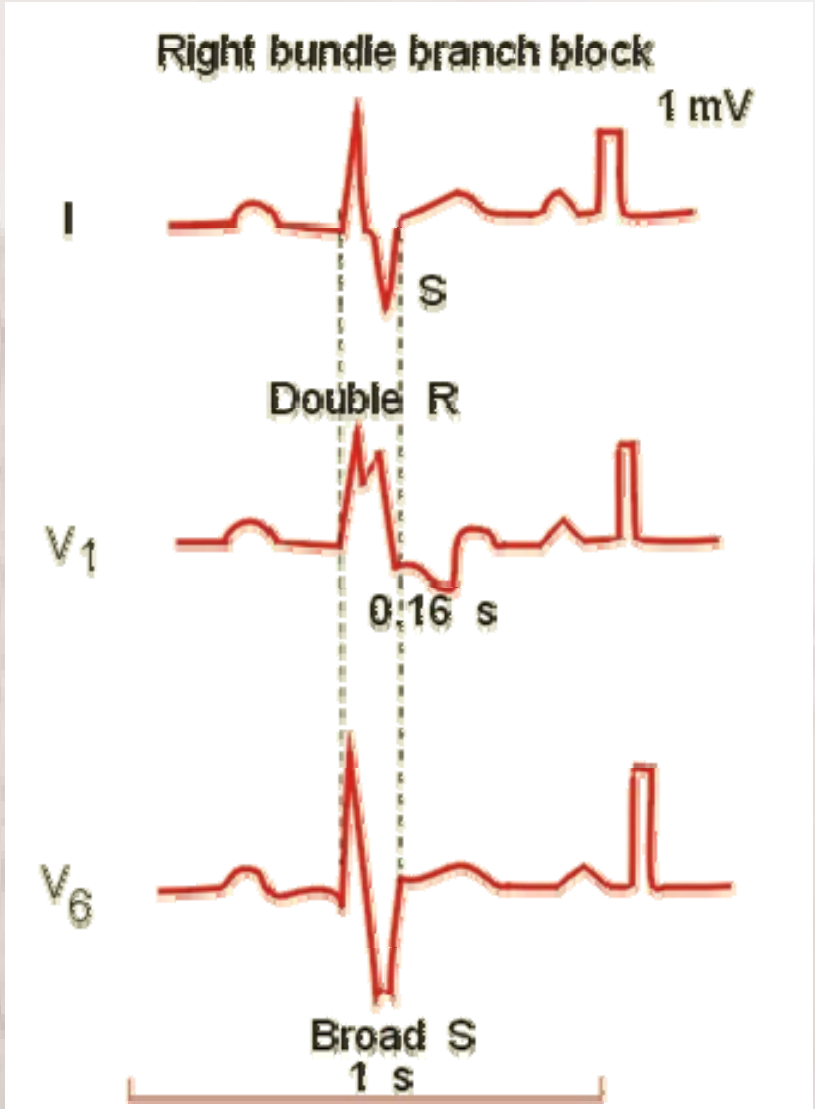
Abnormalities:
bundle branch blocks

- QRS widened, greater than 0.12 secs
- Change in axis
- Difficult to interpret ECG
- Right or Left
- Normal P wave
- Followed by a T wave



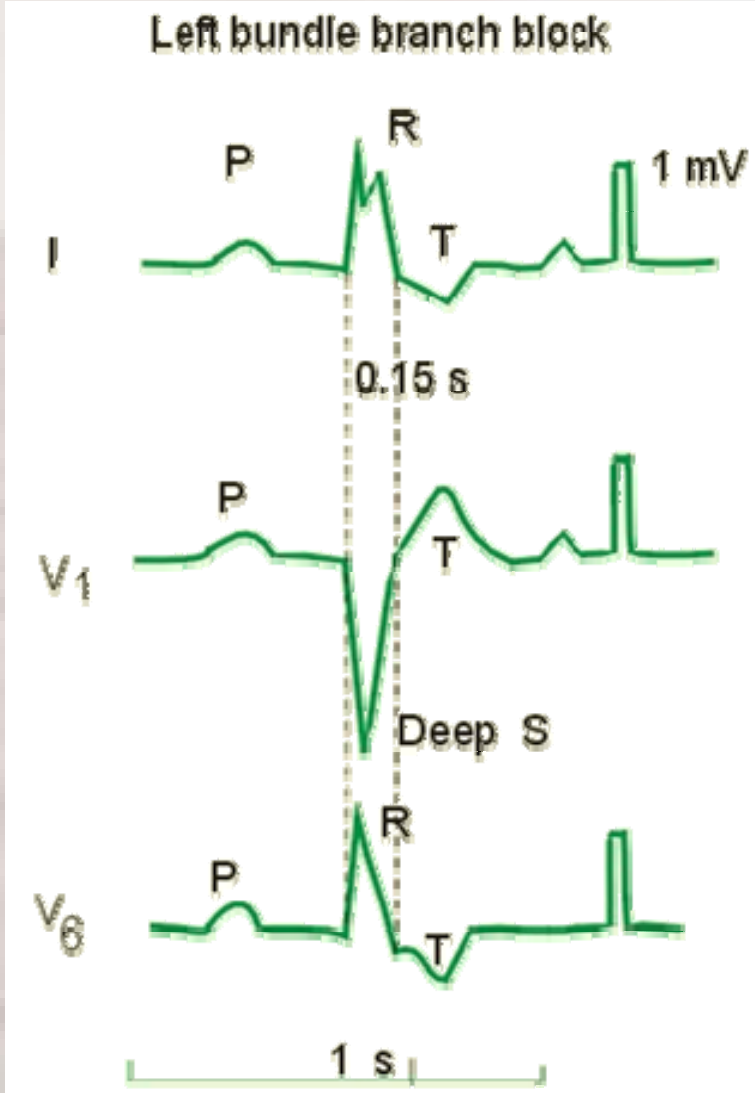
Abnormalities:
right bundle branch blocks

- Indicates conduction problems in the right side of the heart
- May be normal in healthy people
- R wave in V1, ie two R waves in V1
- Q wave in V6
- Lead V1 cats ears



Abnormalities:
left bundle branch blocks

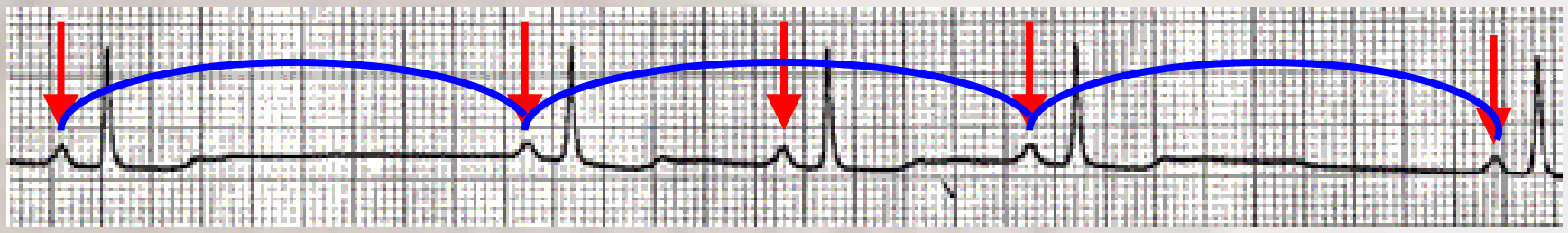
- Always indicates heart disease, usually of the left side of the heart
- Hard to interpret an ECG with LBBB
- Lead V1 Q wave and an S wave
- Lead V6 an R wave followed by another R wave
- Lead V6 Rabbit ears



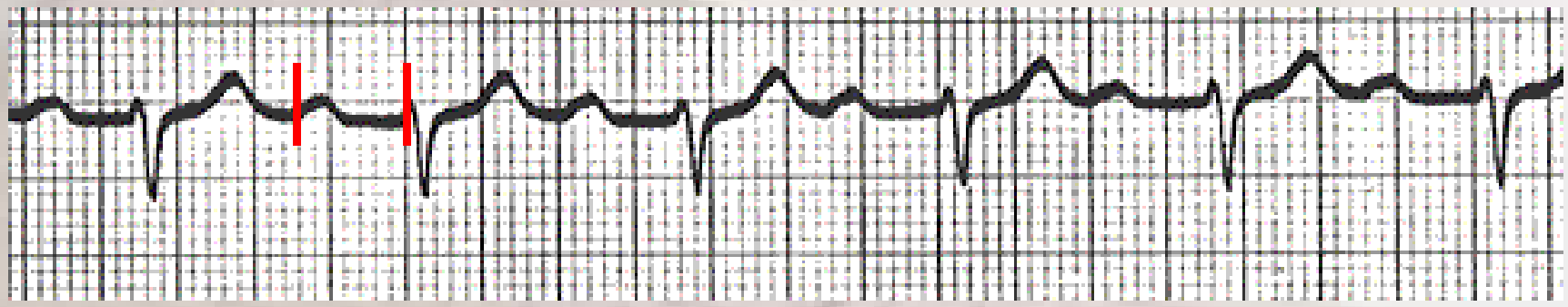
Abnormalities:
heart block

- SA block (exit block)
- 1st degree AV block
- 2nd degree AV block
  - Wenckeback (type I)
  - Mobitz (type II)
- 3rd degree AV block

Abnormalities:
heart block – SA block

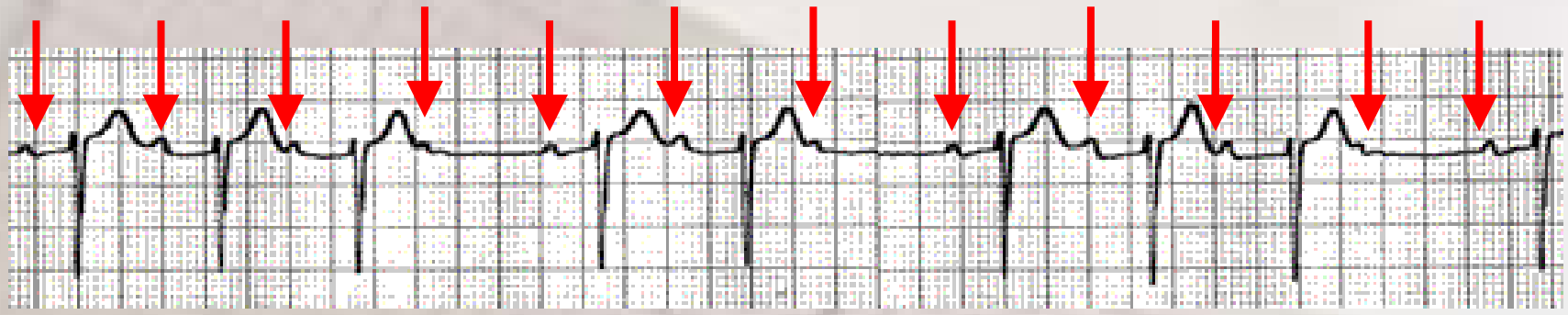


Abnormalities:
heart block – 1st degree AV

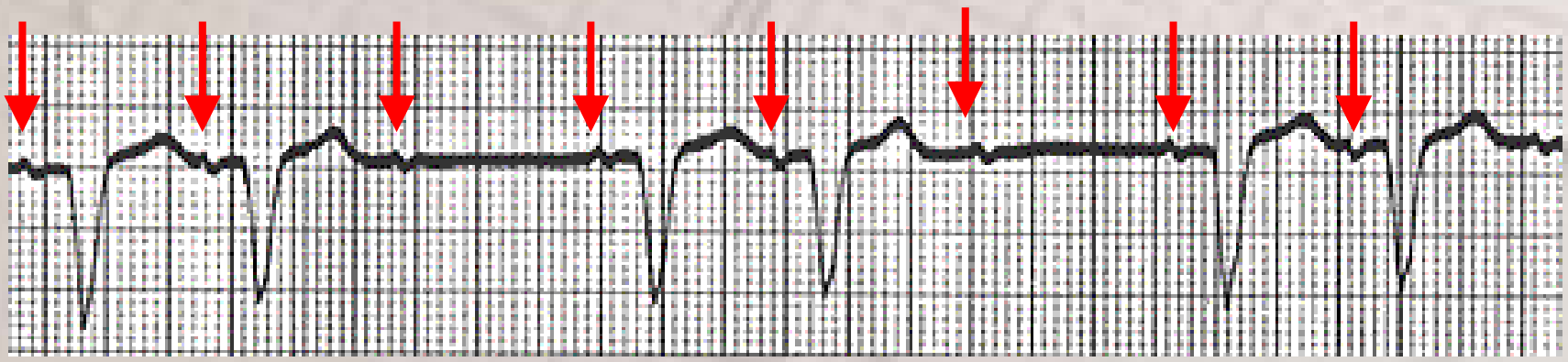


Abnormalities:
heart block – 2nd degree AV

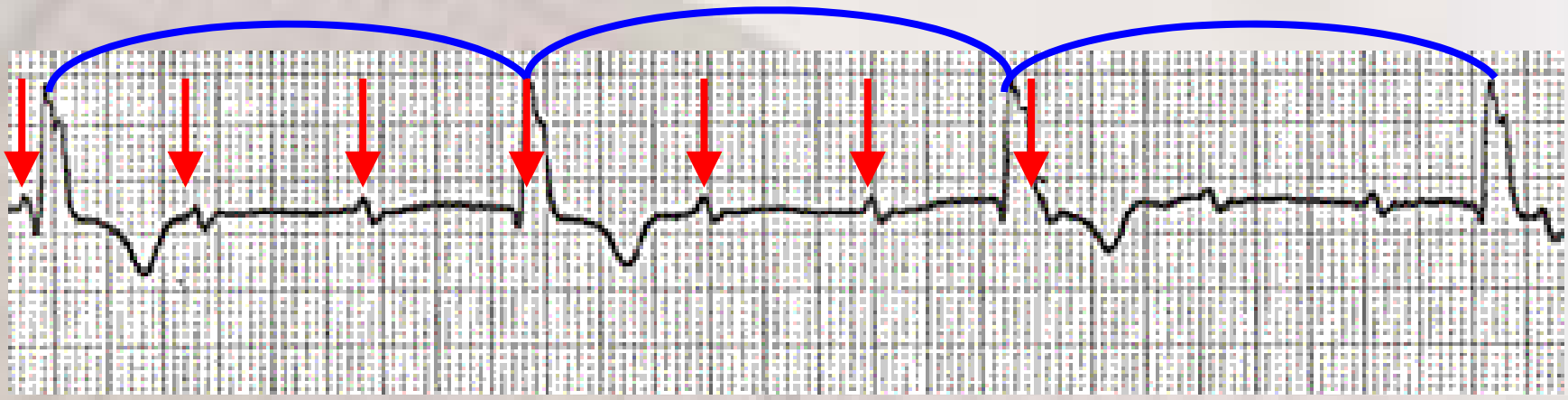
Wenkeback



Mobitz



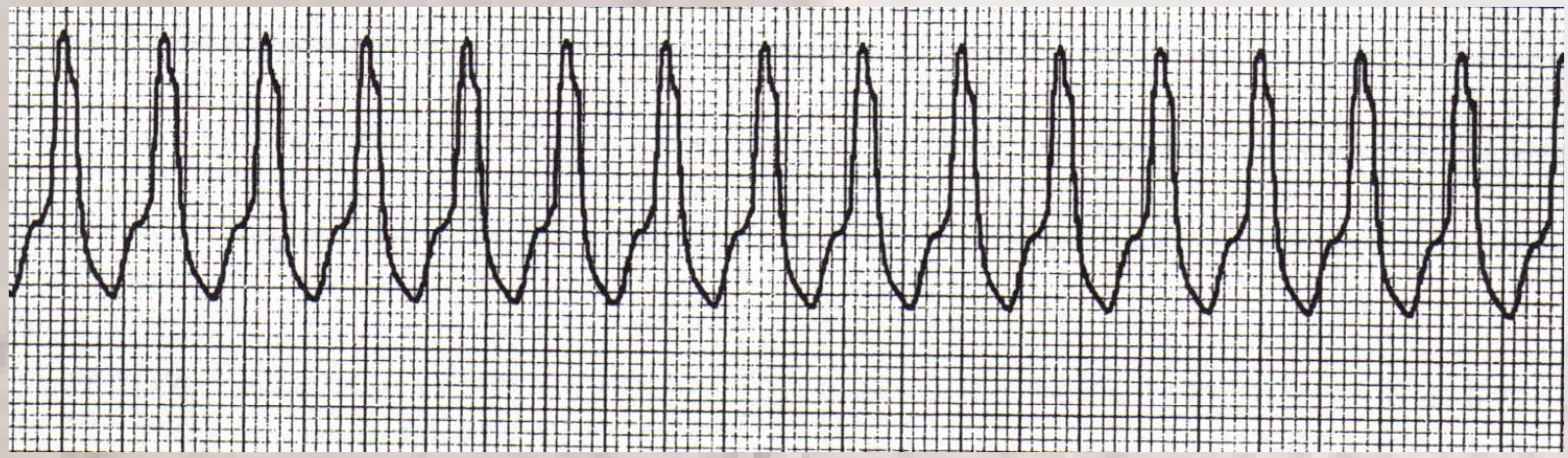
Abnormalities:
heart block – 3rd degree AV



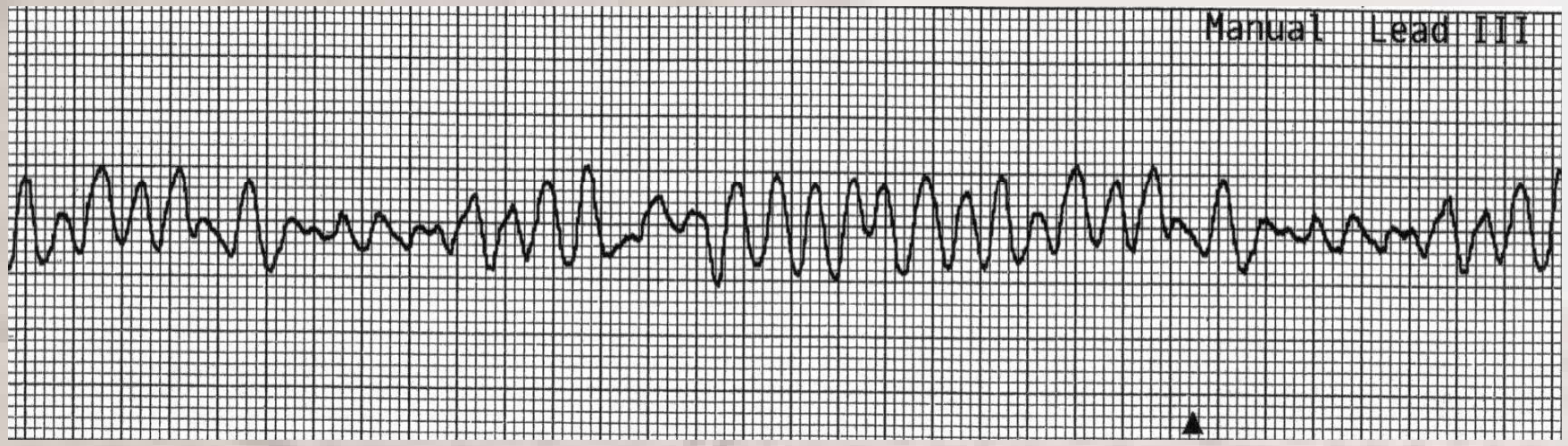
Abnormalities:
life threatening arrhythmias

- Ventricular Tachycardia
- Ventricular Fibrillation
- Asystole

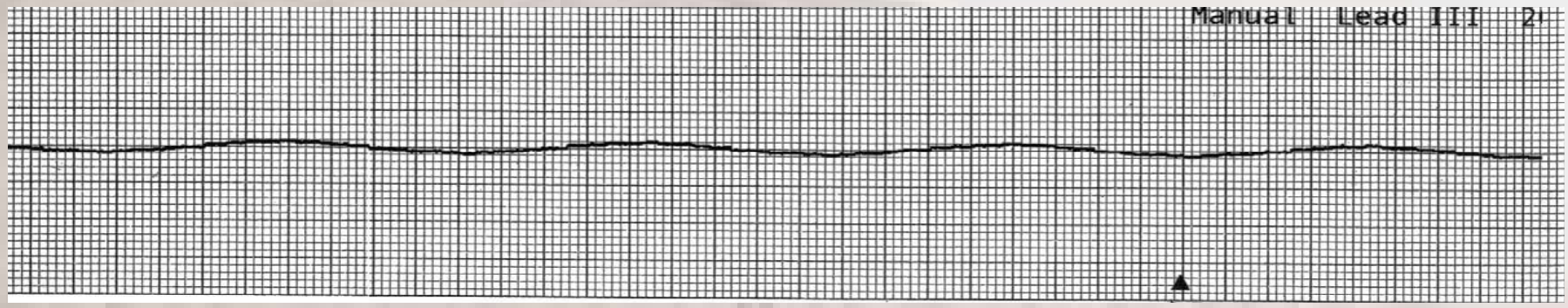
Abnormalities:
life threatening arrhythmias - VT



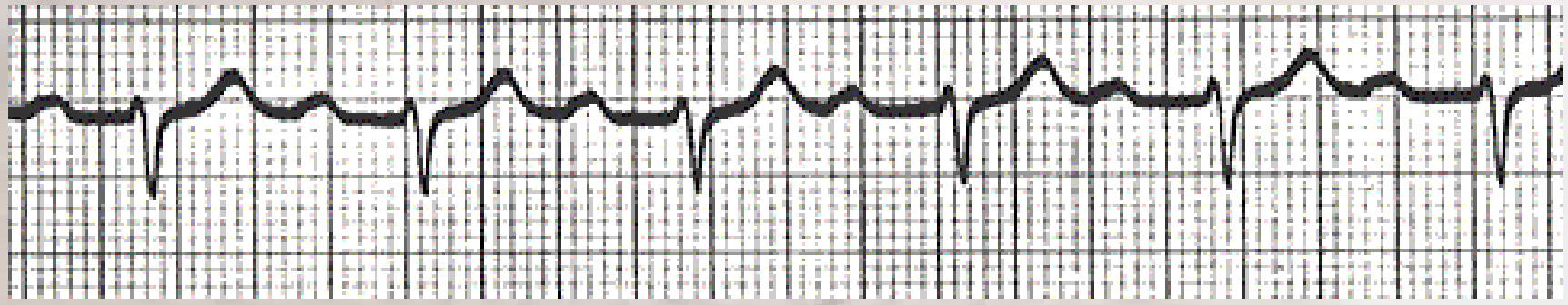
Abnormalities:
life threatening arrhythmias - VF

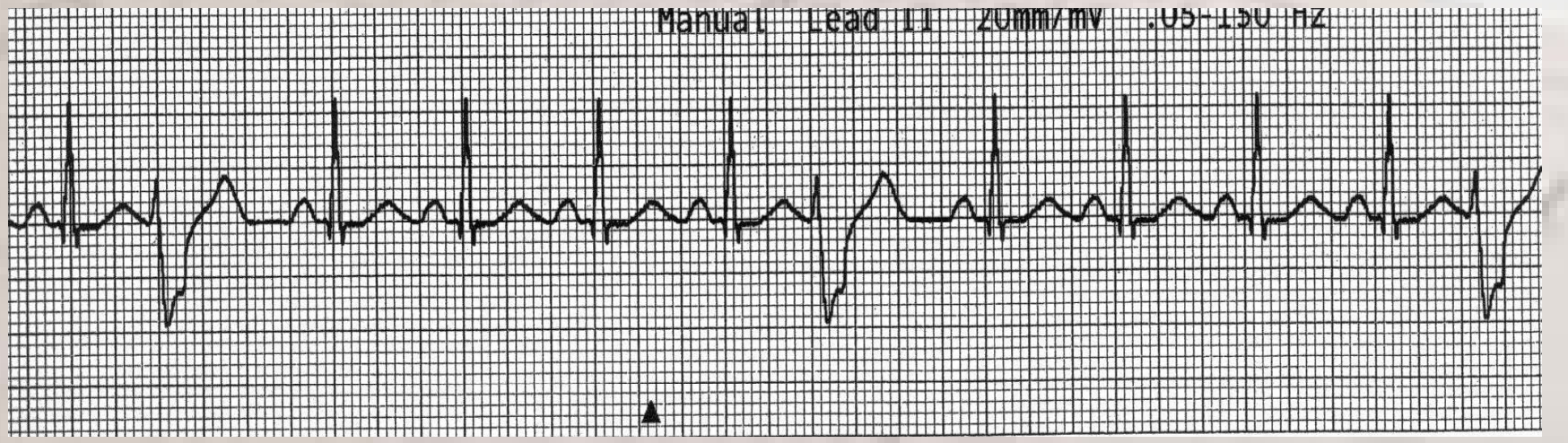


Abnormalities:
life threatening arrhythmias – Asystole



Examples





Examples