

Clinical class for under
graduates

BASIC ECG



Overview

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

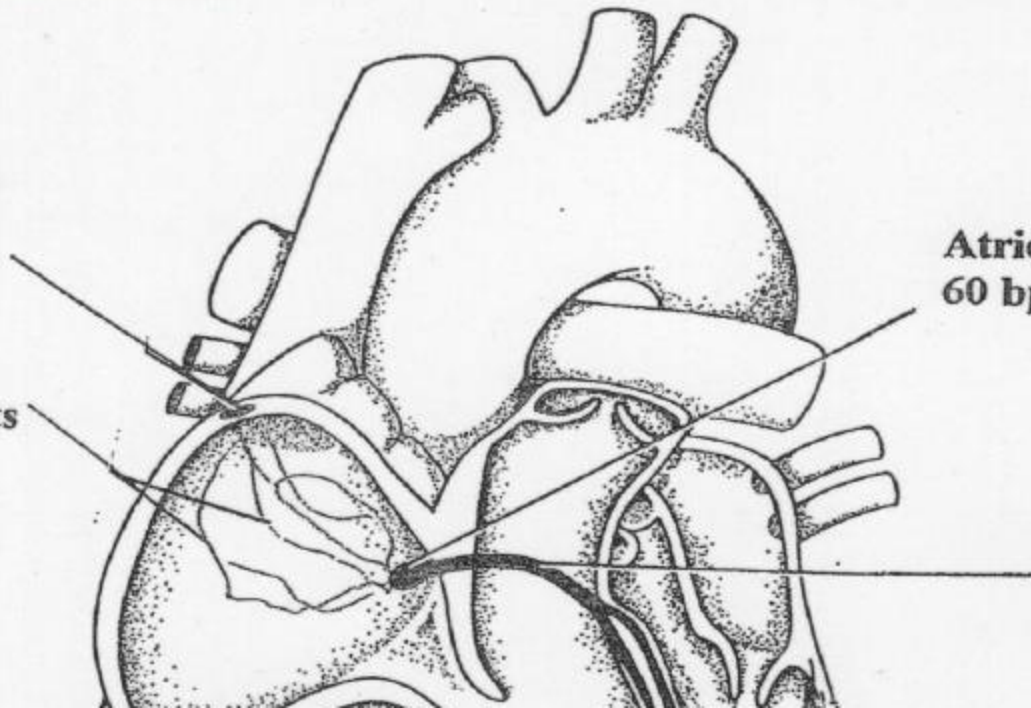
Conduction Pathways

Sinoatrial node
60 – 100 bpm

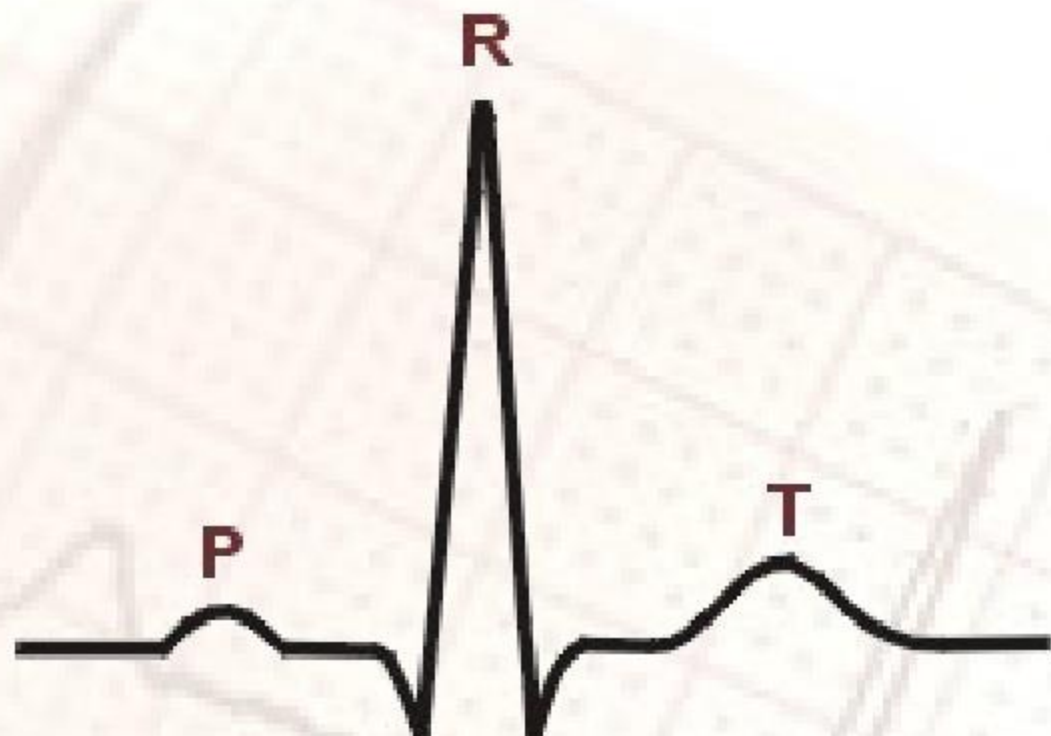
Atrioventricular node
60 bpm

Internodal tracts

**Atrioventricular
Bundle of His**
40 – 60 bpm



Conduction Pathways



P wave = atrial depolarisation.

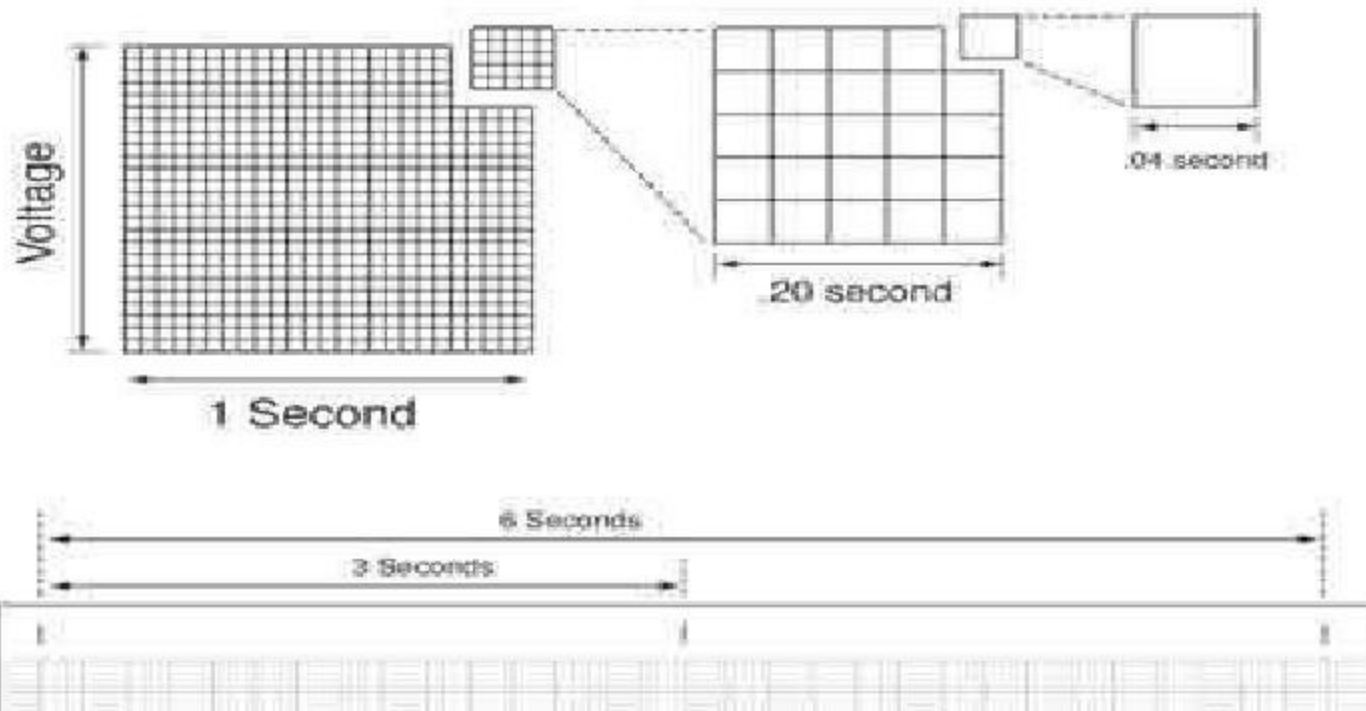
PR Interval = impulse from atria to ventricles.

QRS complex = ventricular depolarisation.

ST segment = isoelectric - part of repolarisation.

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

Interpretation

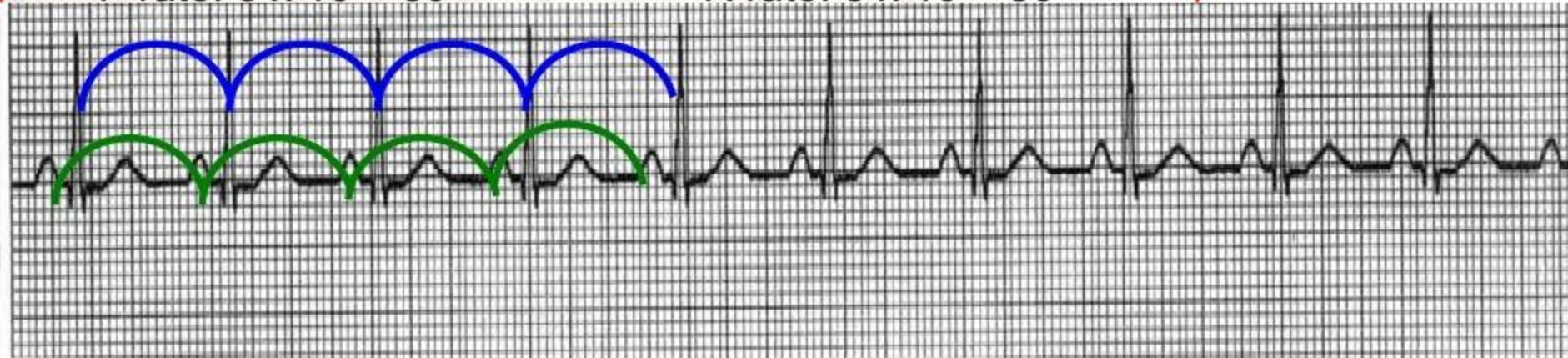


Interpretation

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

P rate: $8 \times 10 = 80$

R rate: $8 \times 10 = 80$



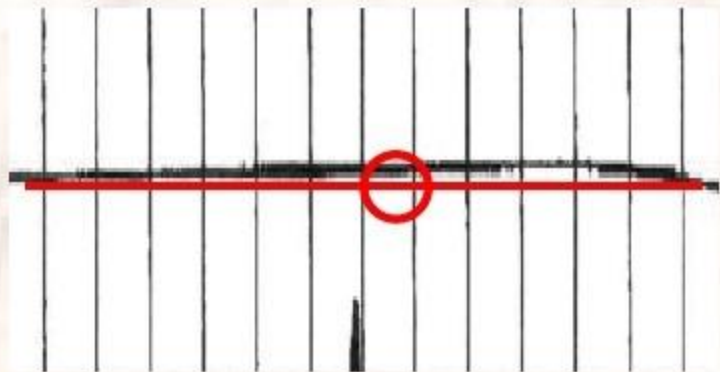
Interpretation

3. P wave = present, 1 per QRS, shape, duration, voltage.



Interpretation

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



Interpretation

7. T wave = shape, direction



Abnormalities:

Supraventricular arrhythmias

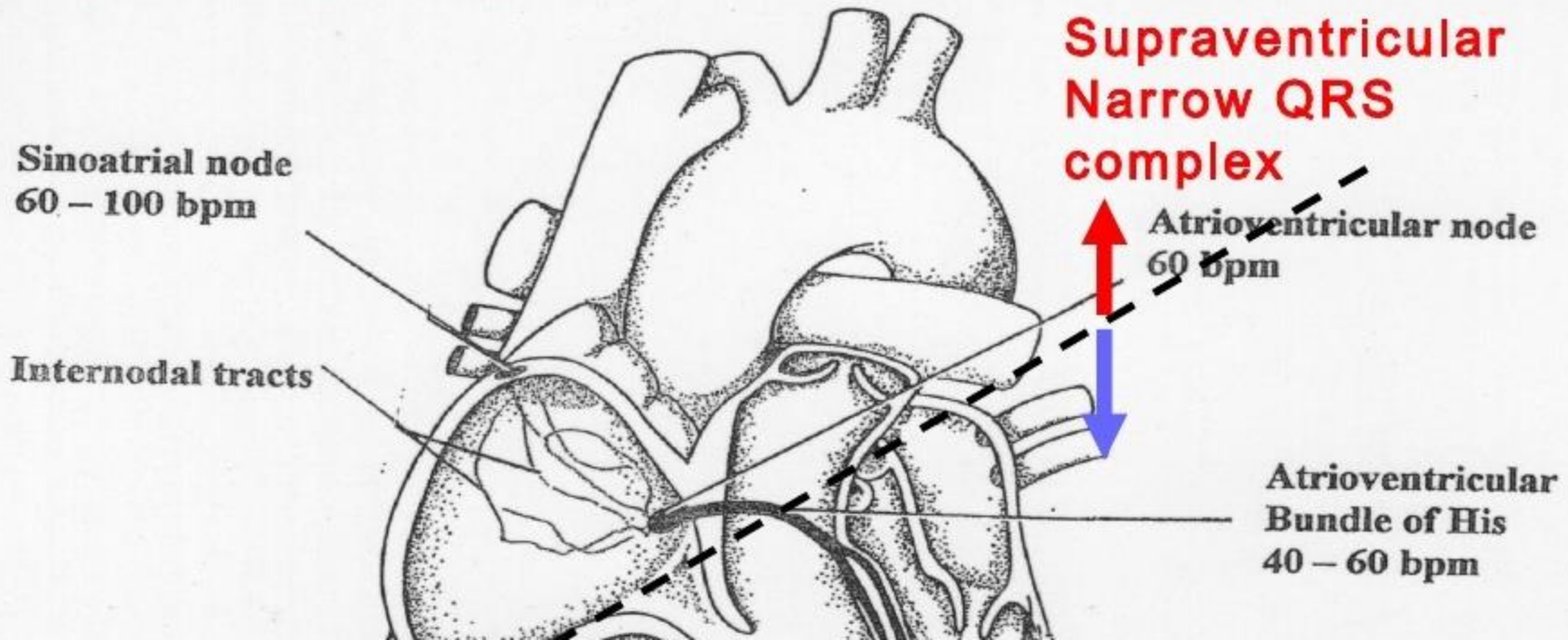
- Atrial Fibrillation
- Atrial Flutter
- Supraventricular Tachycardia (SVT)

Abnormalities:

Ventricular arrhythmias

Bundle Branch Block (BBB)

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

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

Abnormalities:

supraventricular tachycardia (SVT)

Rhythm: Regular

Rate: >100

P: not visible

P-R: not defined

QRS: narrow complex

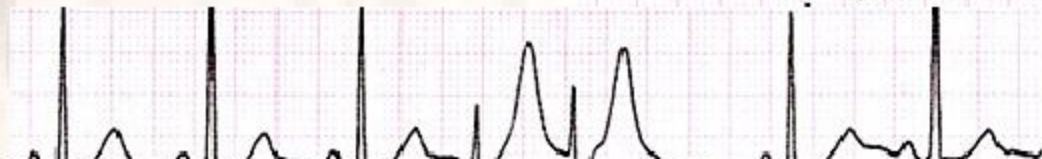
S-T: depression (sometimes)

T: normal

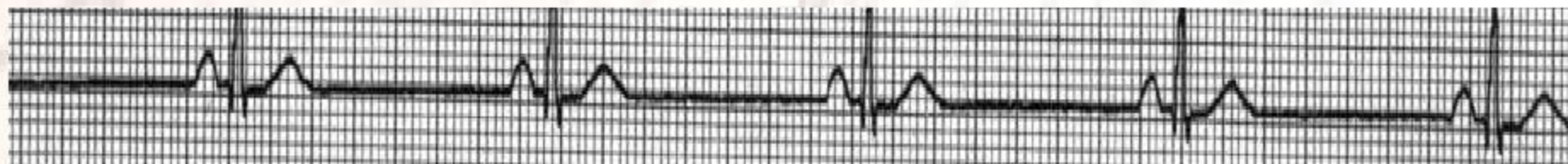
Q-T: prolonged (sometimes)

Abnormalities:

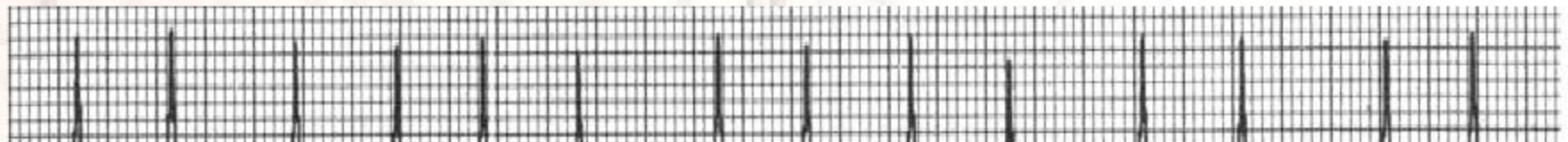
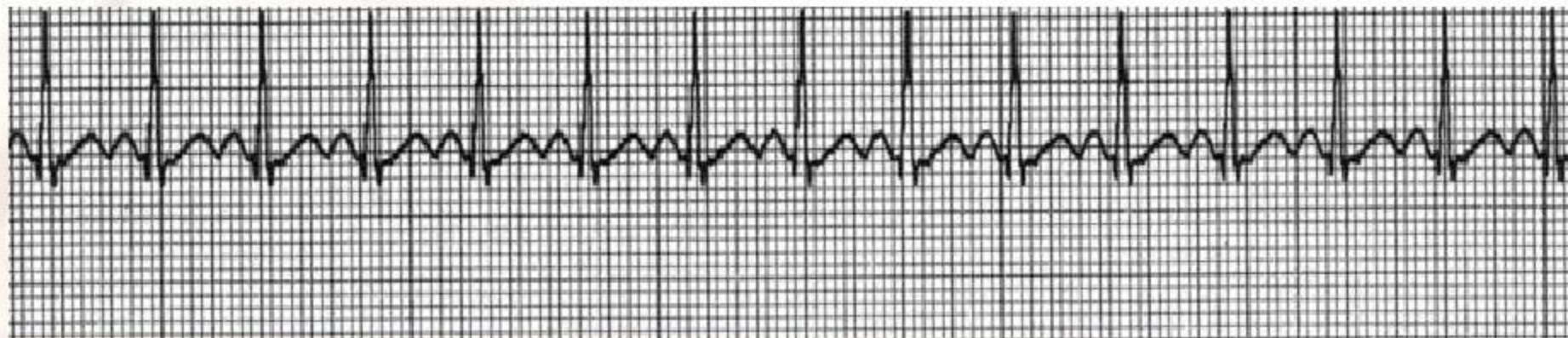
premature ventricular complexes



Examples



Examples



The background of the slide features a close-up, slightly blurred view of an ECG tracing on a standard grid. The grid lines are visible, and the dark line of the ECG trace is partially obscured by a semi-transparent grey box containing the title text.

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

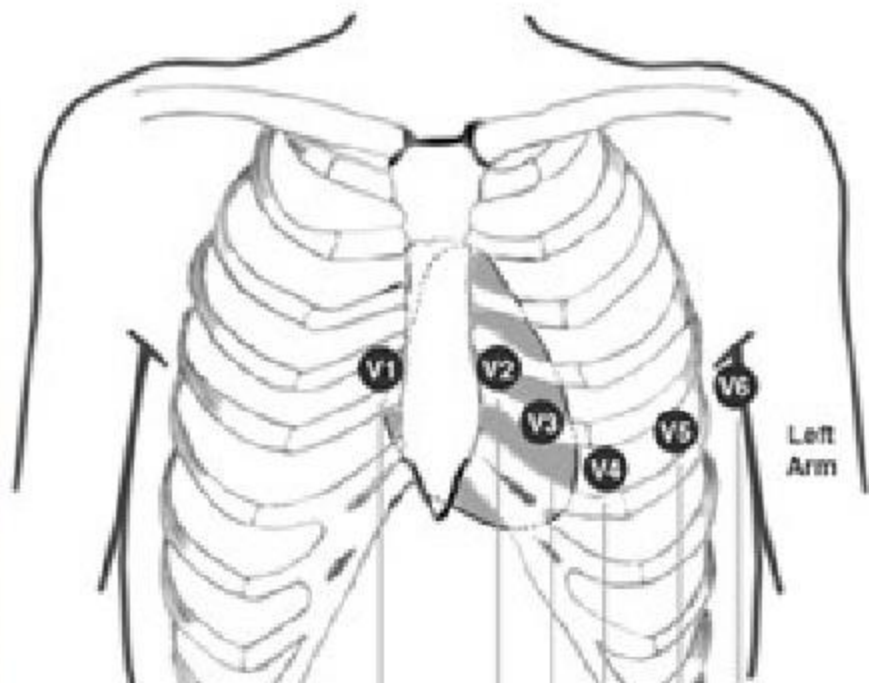
V2 = 4th ICS left sternum

V3 = midway between V2
and V4

V4 = 5th ICS midclavicular

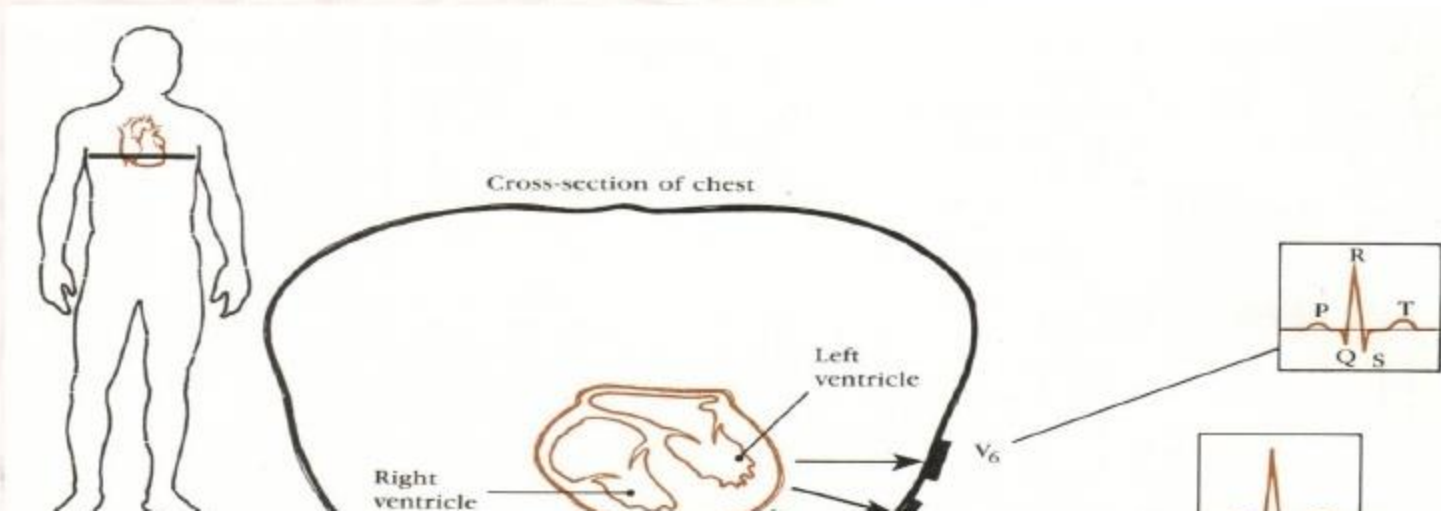
V5 = between V4 and V6
anterior auxiliary line

V6 = midauxillary line
lateral to V4 and V5

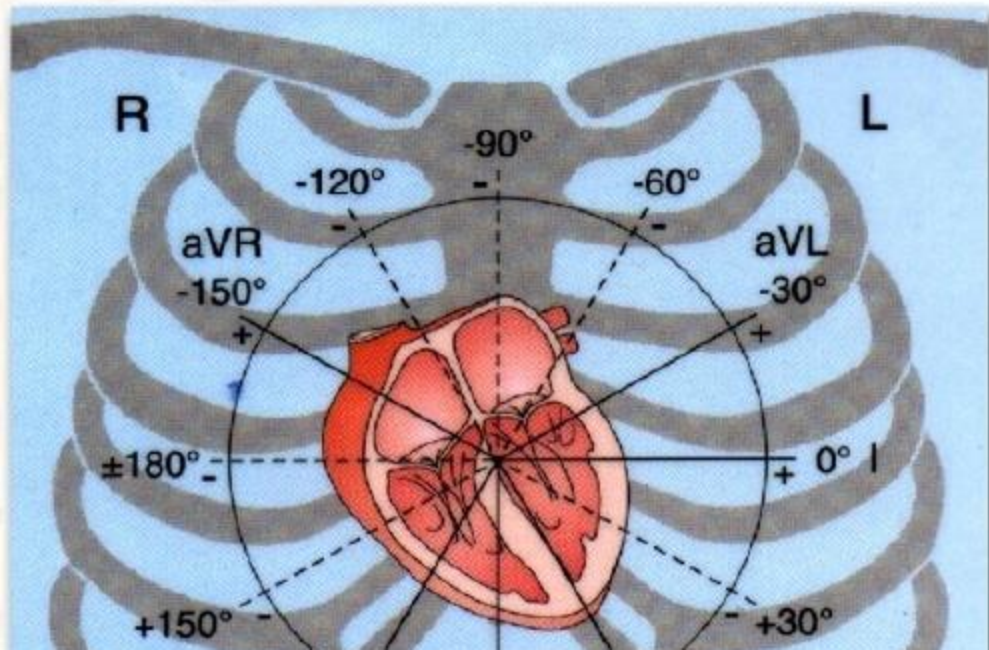


Lead Placement

- Electrical activity towards = \uparrow
- Electrical activity away = \downarrow

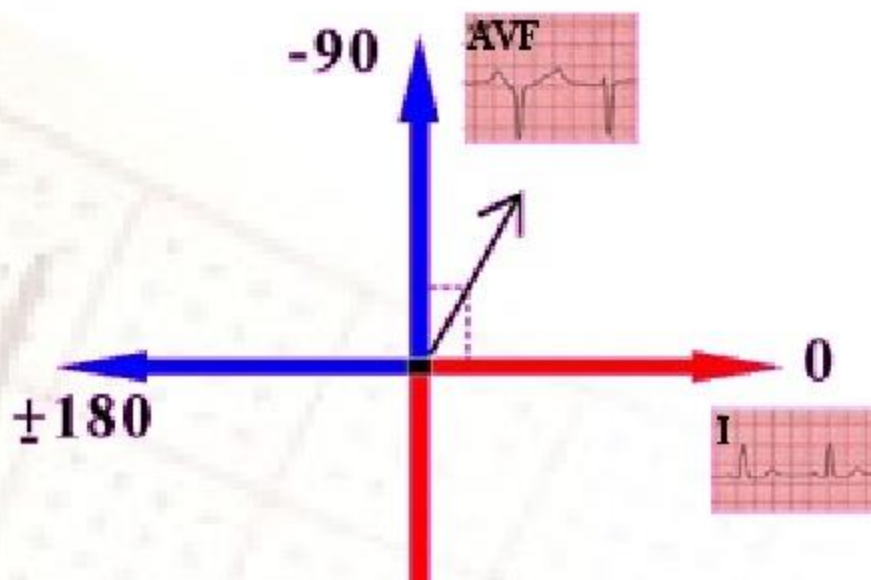


Lead Placement



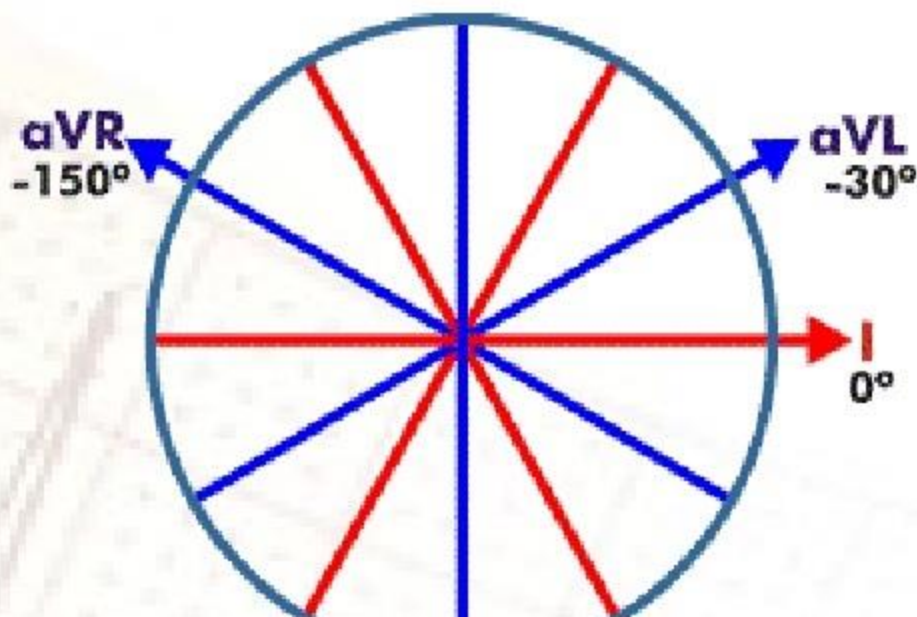
Axis

- 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)

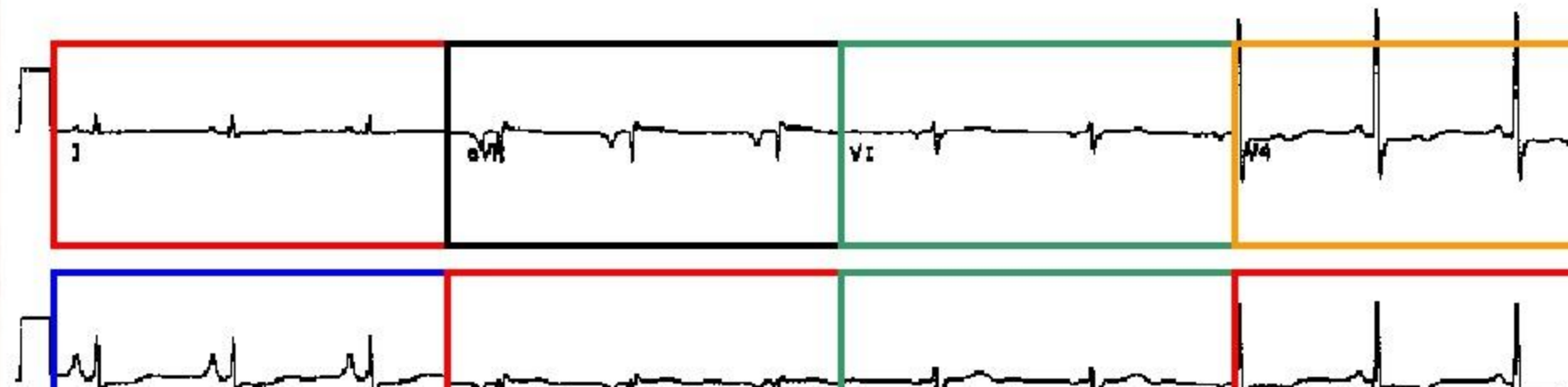
- aVR - no mans land
- aVL - lateral wall

Chest Leads (unipolar)

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

Lead Placement

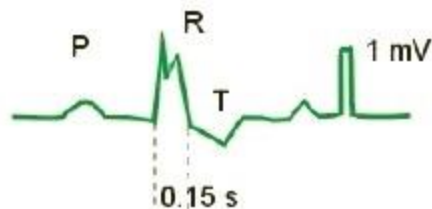
No-mans land, inferior, lateral, anterior, septal,



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

Left bundle branch block



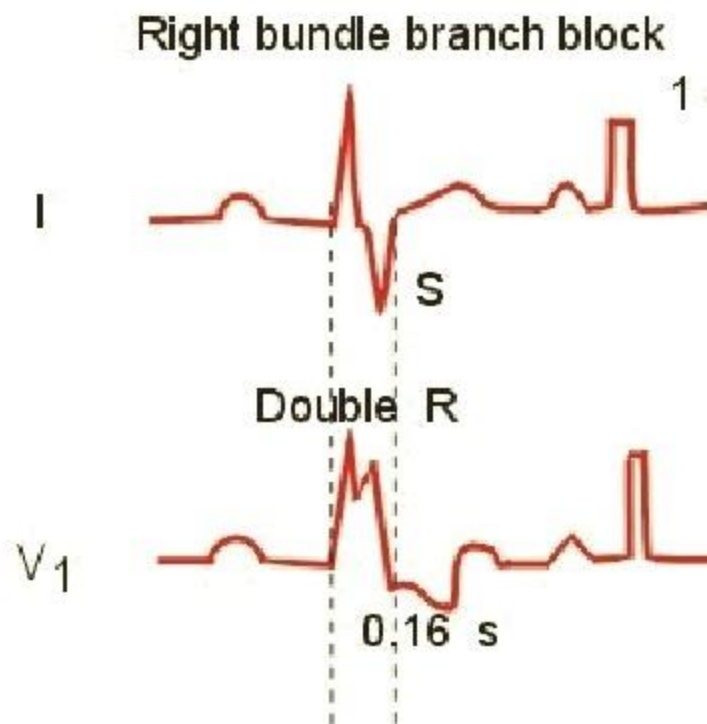
Right bundle branch block



Abnormalities:

right bundle branch blocks

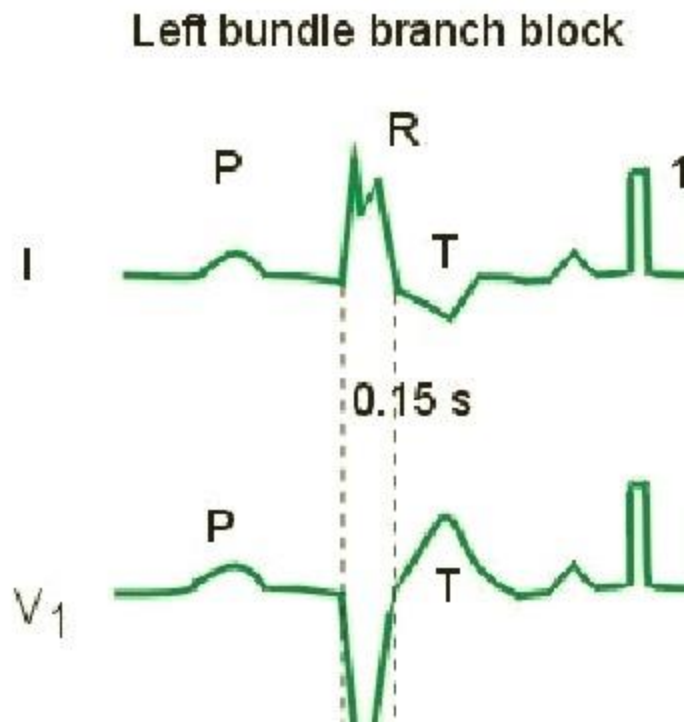
- Indicates conduction problems in the right side of the heart
- May be normal in healthy people
- R wave in V1, ie two R waves in V1
- Q wave in V6



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

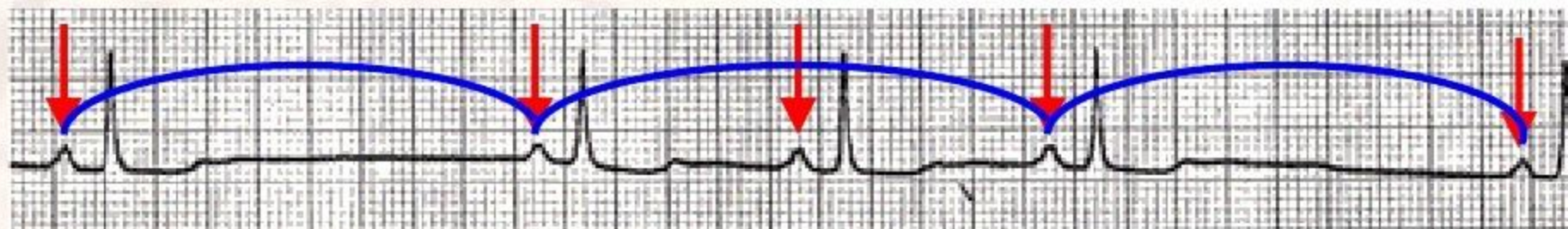


Abnormalities: *heart block*

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

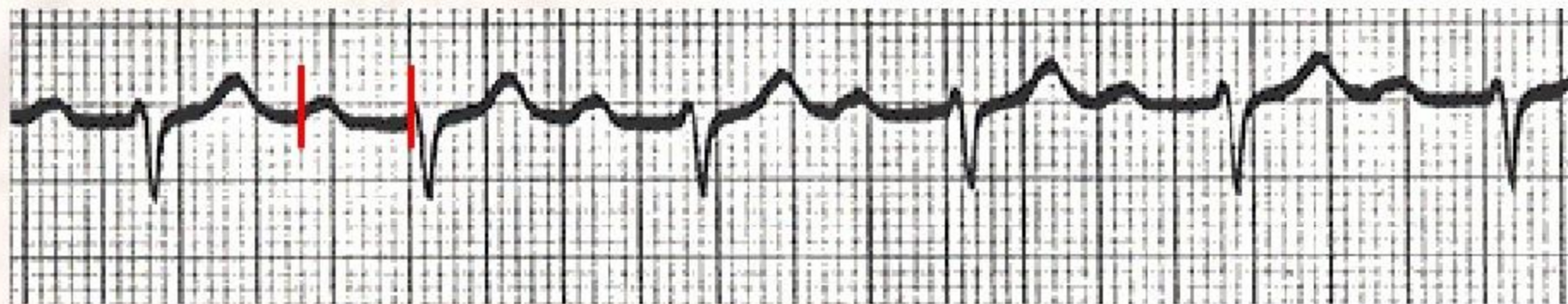
Abnormalities:

heart block – SA block



Abnormalities:

heart block – 1st degree AV



Abnormalities:

heart block – 2nd degree AV

Wenkeback

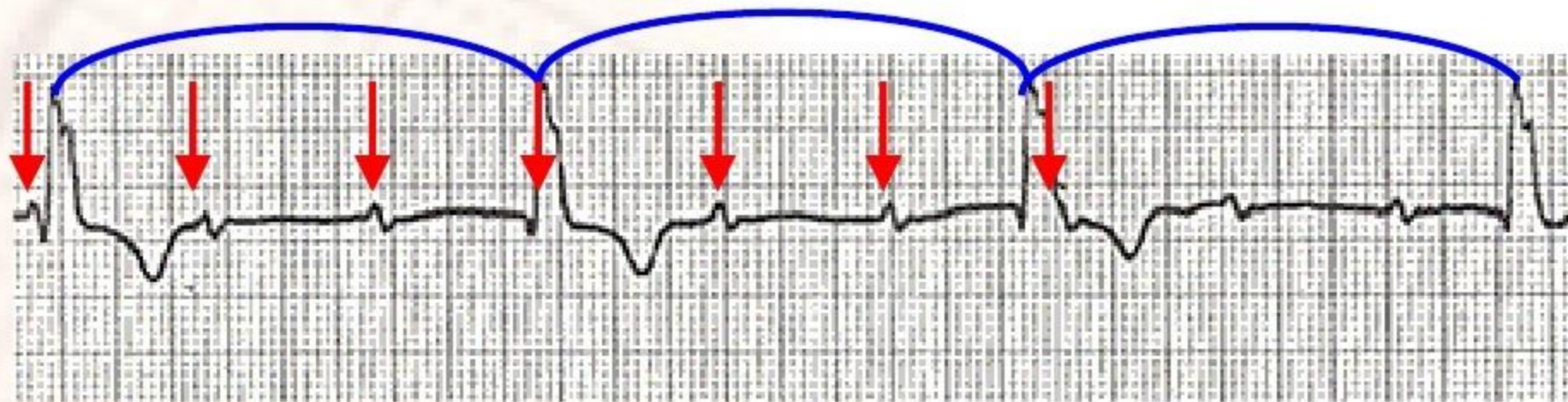


Mobitz




Abnormalities:

heart block – 3rd degree AV



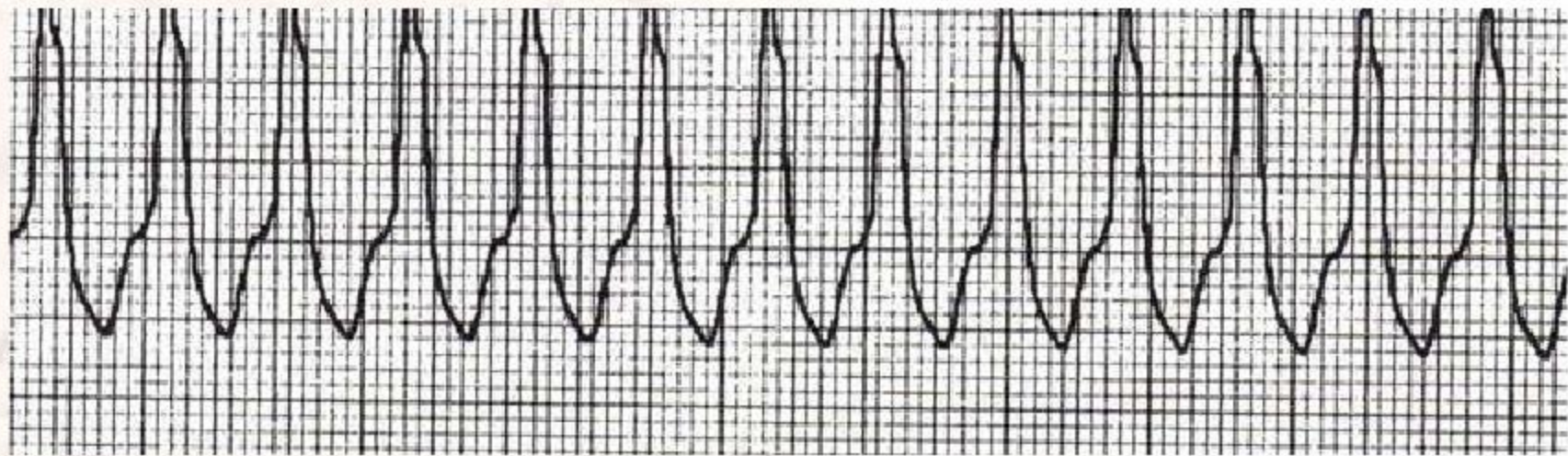
Abnormalities:

life threatening arrhythmias

- Ventricular Tachycardia
 - Ventricular Fibrillation
 - Asystole
- 
- The background of the slide features a faint, light-colored ECG tracing on a grid. The tracing shows a regular rhythm with narrow QRS complexes, which is characteristic of ventricular tachycardia. The heart rate is significantly elevated compared to a normal sinus rhythm.

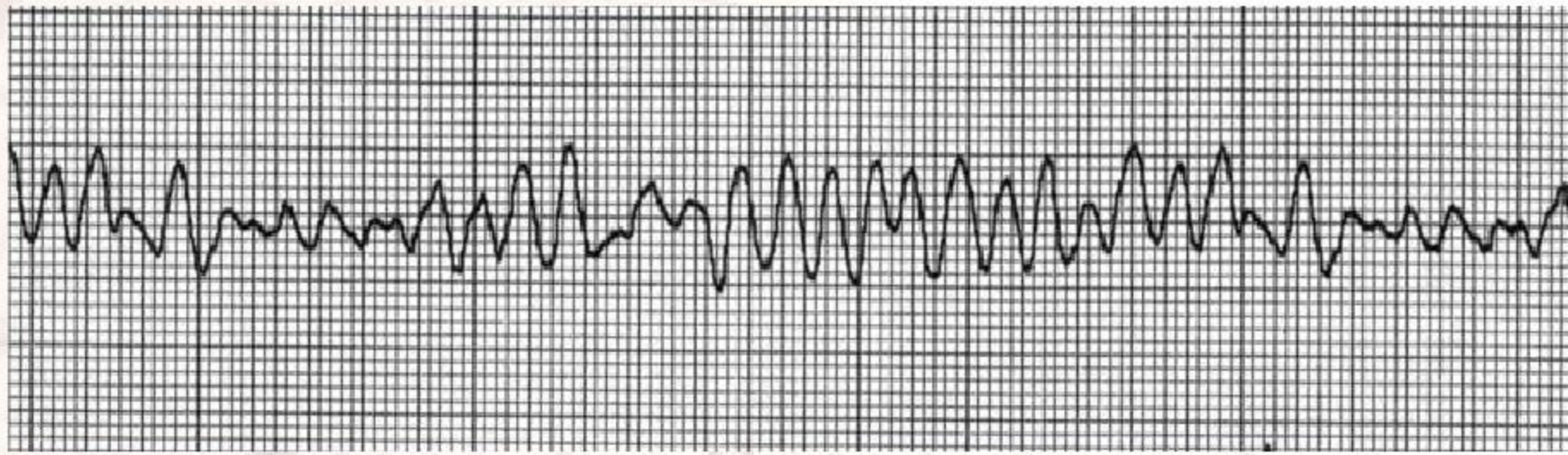
Abnormalities:

life threatening arrhythmias - VT



Abnormalities:

life threatening arrhythmias - VF



Abnormalities: *life threatening arrhythmias – Asystole*

