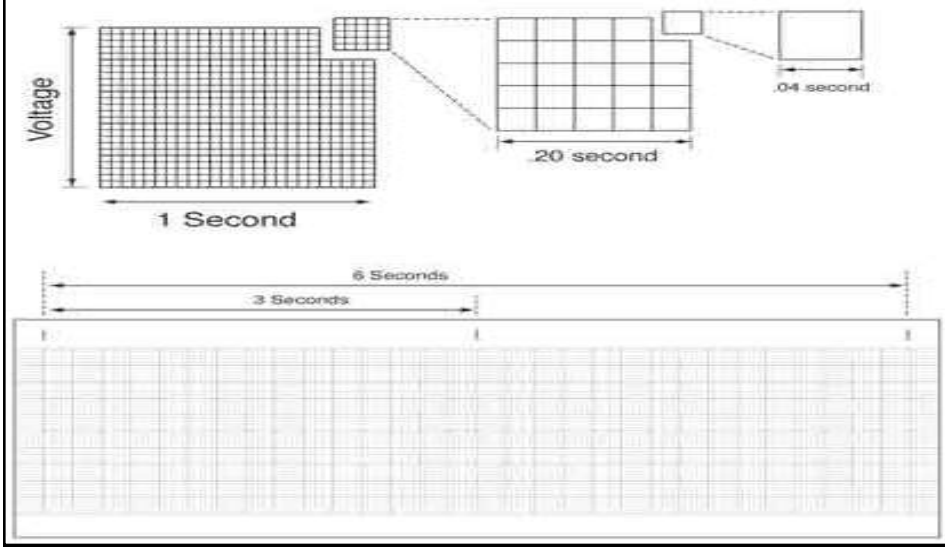
Interpreting an ECG rhythm strip: An 8 step method

BY:
AYMAN MABROUK ELNAGGAR
S.N Cath lab Saudi German Hospital

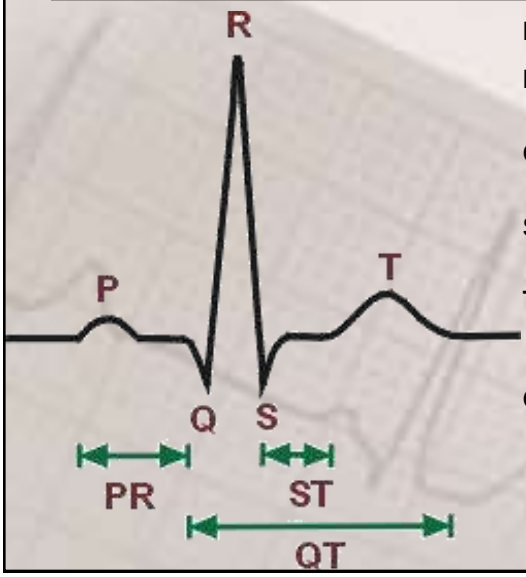
Overview

- **Systematic Interpretation**
- **Common abnormalities in Critical Care**
  - Supraventricular arrhythmias
  - Ventricular arrhythmias
- **Examples**

Overview



Overview



P wave = atrial depolarisation.

PR Interval = impulse from atria to ventricles.

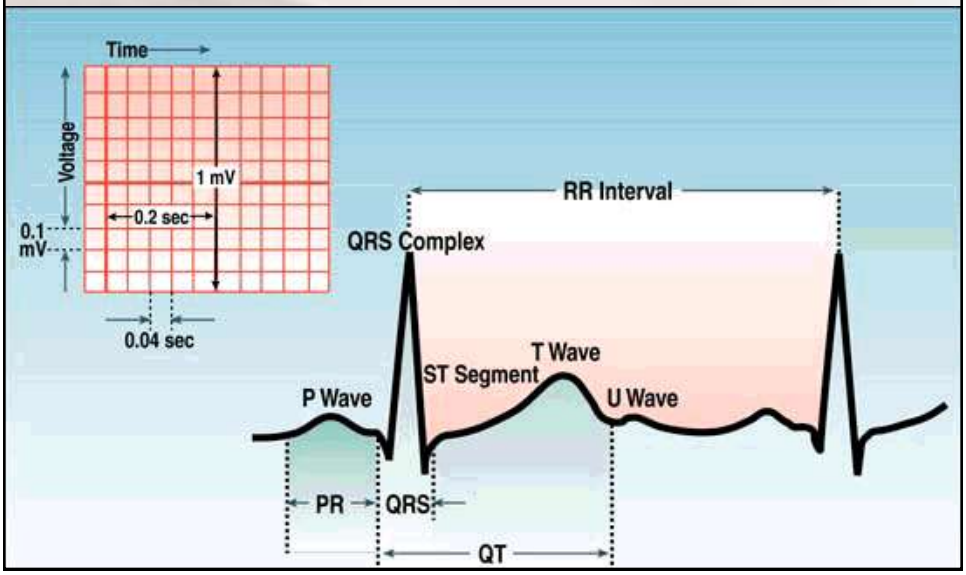
QRS complex = ventricular depolarisation.

ST segment = isoelectric - part of repolarisation.

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

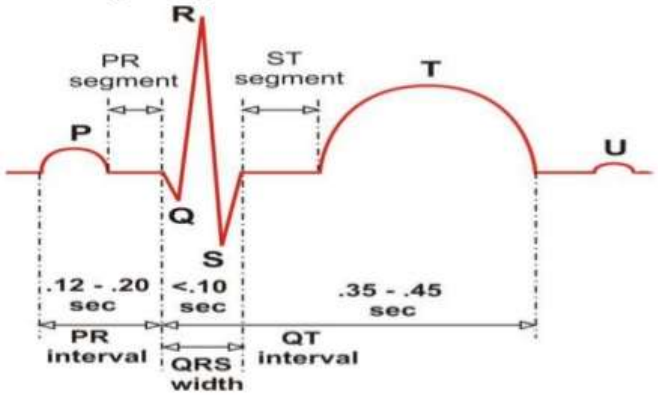
QT Interval = This interval spans the onset of depolarisation to the completion of repolarization of the ventricles.

Overview

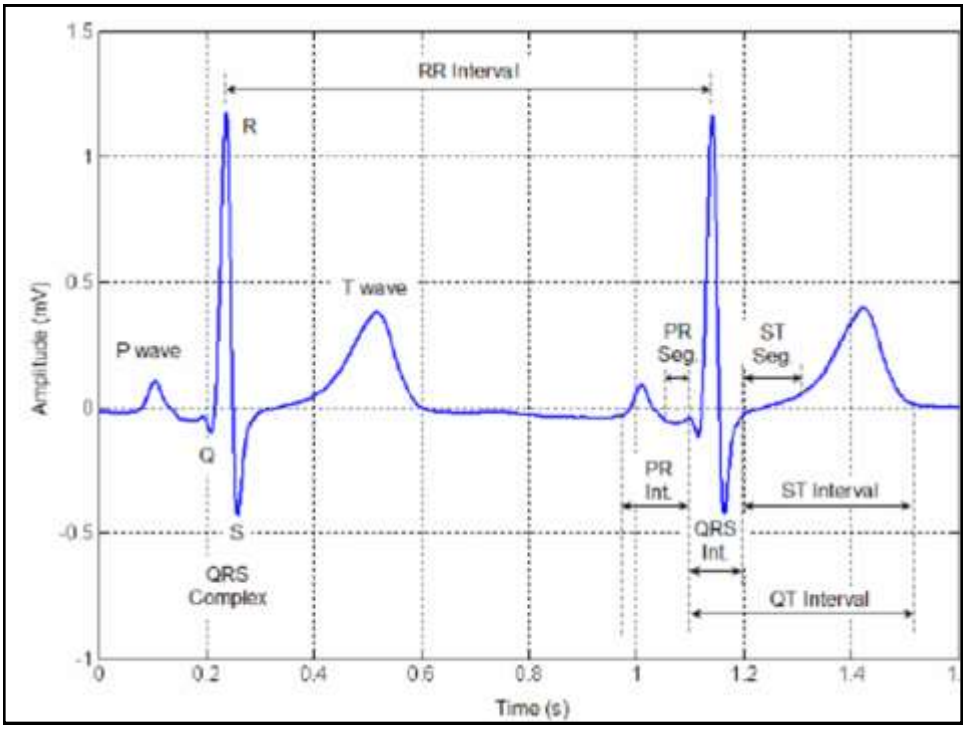


What differentiates a segment from an interval?

- A segment is a straight line connecting two waves.
- An interval encompasses at least one wave plus the connecting straight line.

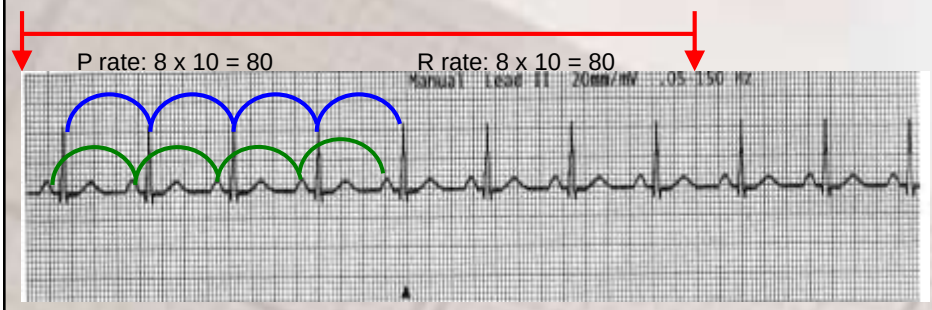


14



Interpretation: 8 steps

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



2. **<u>Rhythm</u>** = Regular or irregular. Map P-P and R-R intervals.

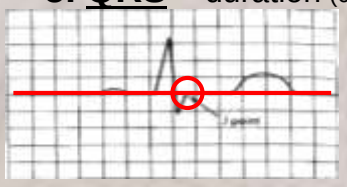
Interpretation

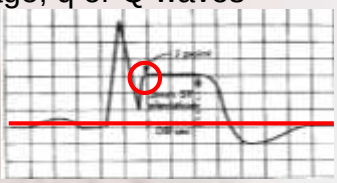
3. <u>P wave</u> = present, 1 per QRS, shape, duration, voltage.

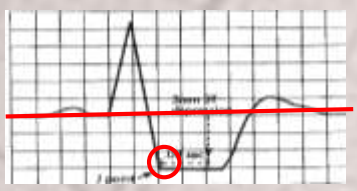
4. <u>P-R interval</u> = length (0.12 - 0.2 sec = <1 big square), isoelectric.

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. <u>T wave</u> = shape, direction

8. <u>QT interval</u> = 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 (PACs)

Abnormalities:
atrial fibrillation

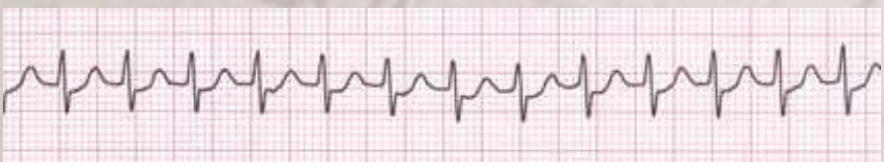
Rhythm: Irregular
Rate: A: 350 – 650; V: varies
P: poorly defined
P-R: N/A
QRS: narrow complex
S-T: normal
T: normal
Q-T: normal

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

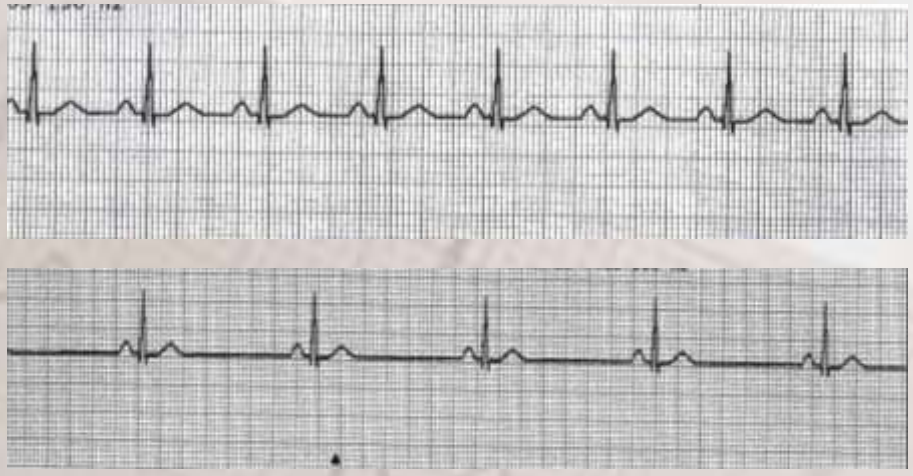
Abnormalities:
supraventricular tachycardia (SVT)

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

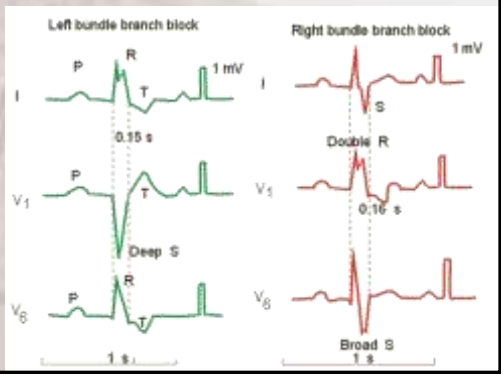
Examples



Examples

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

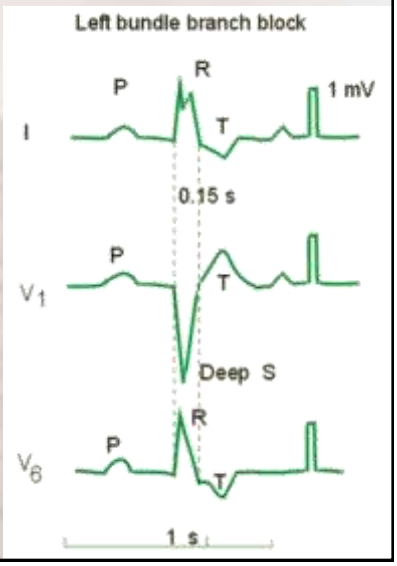


Abnormalities:
right bundle branch blocks

- 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

The Heart Block Poem

by the Princeton Surgical Group & nursesLabs

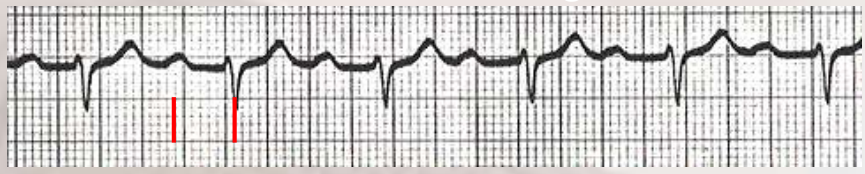
If the **R** is far from **P**,
then you have a **FIRST DEGREE**.

Longer, longer, longer, drop!
Then you have a **WENKEBACH**.

If some **P**s don't get through,
then you have **MOBITZ II**.

If **P**s and **Q**s don't agree,
then you have a **THIRD DEGREE**.

Abnormalities:
heart block – 1st degree AV

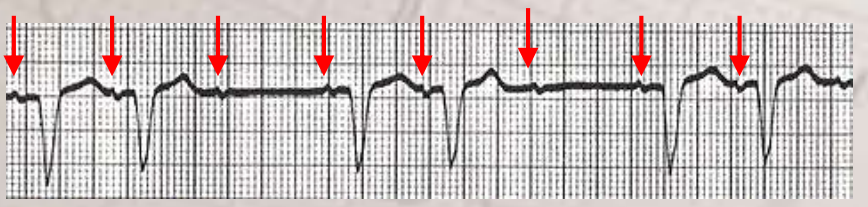


Rhythm: Regular
Rate: <100
P: visible
P-R: prolonged >0.04 s
QRS: normal
S-T: normal
T: normal
Q-T: normal

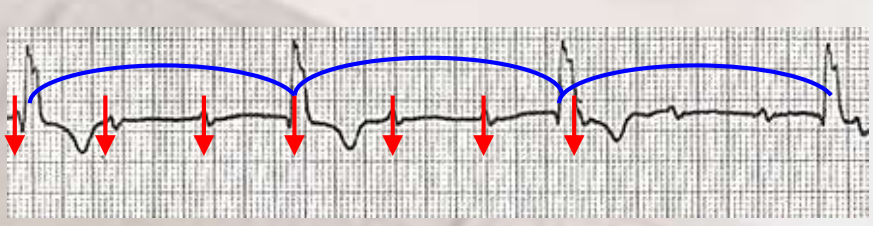
Abnormalities:
heart block – 2nd degree AV

Mobitiz I (Wenkeback)

Mobitz II



Abnormalities:
heart block – 3rd degree AV



If the **R** is far from **P**,
then you have a **FIRST DEGREE**.

Longer, longer, longer, drop!
Then you have a **WENKEBACH**.

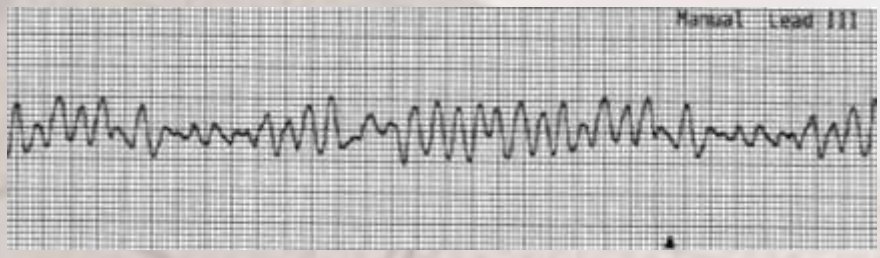
If some **P**s don't get through,
then you have **MOBITZ II**.

Abnormalities:
life threatening arrhythmias

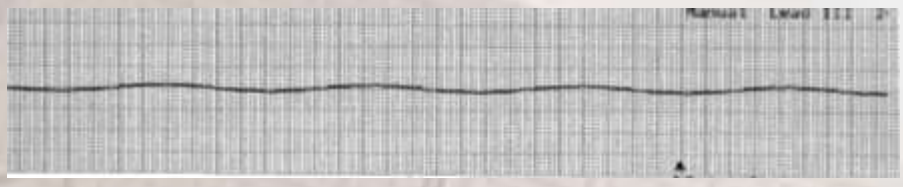
- Ventricular Tachycardia
- Ventricular Fibrillation
- Asystole

Abnormalities:
life threatening arrhythmias - VT

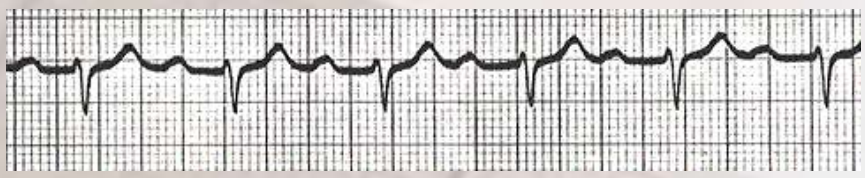
Abnormalities:
life threatening arrhythmias - VF

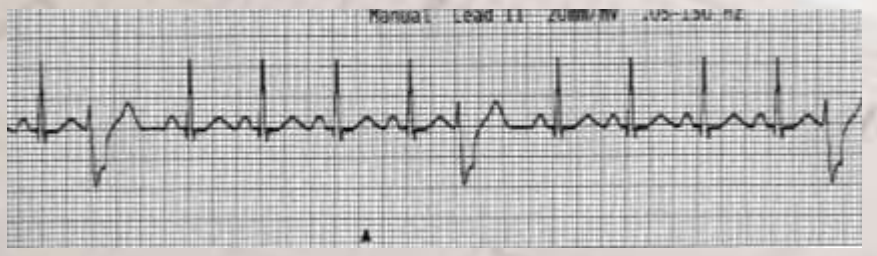


Abnormalities:
life threatening arrhythmias – Asystole



Examples





Examples