

Abnormal sinus rhythms:

Tachycardia → fast HR (greater than 100 bpm)

caused by: 1- ↑ body temperature 2- sympathetic stimulation 3- toxic conditions of the heart (not primary arrhythmia)

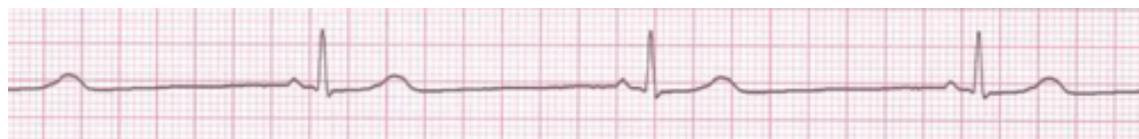
Etiology: SA node is depolarizing faster than normal, impulse is conducted normally



Bradycardia → slow HR (lower than 60 bpm)

Present in athletes + can be caused by vagal stimulation (carotid sinus syndrome)

Etiology: SA node is depolarizing slower than normal, impulse is conducted normally



Sinoatrial block → cessation of P waves / new pacemaker (AV node)

Slow rate (40-60 bpm)

Atrioventricular block → prolonged PR interval (>0.2 sec)

- Causes:**
- 1- ischemia to AV nodal or AV bundle fibers
 - 2- compression of AV bundle
 - 3- AV nodal or AV bundle inflammation
 - 4- excessive vagal stimulation

Incomplete heart block (1st degree block)

PR interval > 0.2 sec + each P is followed by QRS



Second degree incomplete block

PR interval 0.25 – 0.45 sec

Some impulses pass through AV node and some don't (dropped beats)

Atria beat is faster than ventricles

Regular irregularity

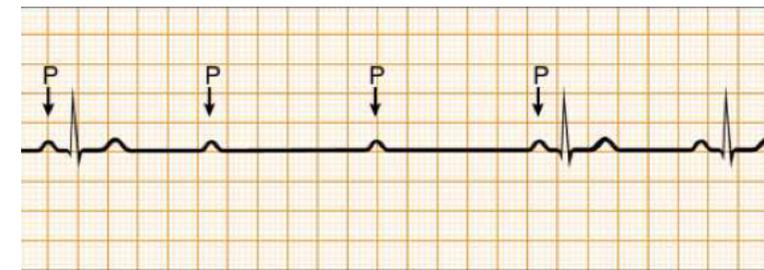
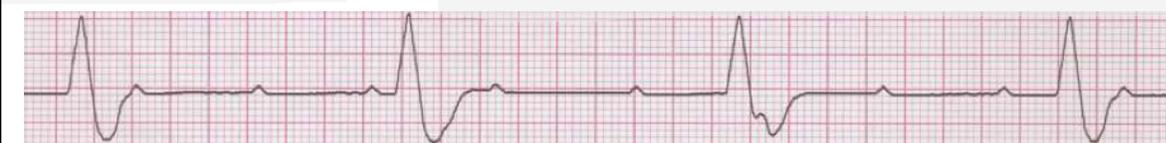


Third degree complete block

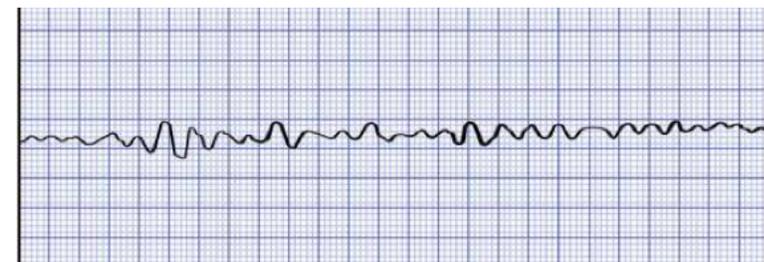
PR interval > 0.2 sec

P waves are completely dissociated from QRST complexes

Ventricles escape and AV nodal rhythm ensues (15 -40 bpm)



Arrhythmia: conduction failure at AV node



Ventricular fibrillation: no pumping action occurs

Stokes-Adams Syndrome

Electrical axis deviation:

Left shift (Prolonged QRS, high voltage)	Right shift (Prolonged QRS, high voltage)
Caused by: expiration, lying down, excess abdominal fat, short and obese	Thin and tall people
Hypertrophy of left ventricle = hypertension, aortic stenosis or aortic regurgitation	Hypertrophy of right ventricle = pulmonary hypertension, pulmonary valve stenosis, inter-ventricular septal defect
Left bundle branch block (right ventricle depolarizes faster than left ventricle)	Right bundle branch block

↑ voltage
>4mV
ventricular hypertrophy

PQ interval > 0.2 sec

heart block

enlarged QRS

hypertrophy of ventricles

Prolonged QT interval

repolarization abnormalities

elevated T wave

hyperkalemia

flat T wave

hypokalemia/ ischemia

↓ voltage

old infarcts

fluid in pericardium,
pleural effusion, emphysema