

Cardiac arrhythmias

- It is a disturbance of the electrical rhythm of the heart, usually underlying heart disease but also normal heart. Bradycardia $\rightarrow$ < 60 /min.
Tachycardia > 100 beats/min.

Vagal nerve $\rightarrow$ $\downarrow$ Heart Beat

Sympathetic nerve $\rightarrow$ $\uparrow$ Heart rate by catecholamines.

Tachycardia $\rightarrow$

1) Increased automaticity $\rightarrow$ Ectopic, by sympathetic

2) Reentry circuit $\rightarrow$

3) Triggered activity $\rightarrow$ Early depolarization before repolarization occurs.

Bradycardia

1) Decreased automaticity $\rightarrow$ Athlete's

2) Conduction block

Classified

- 1) Supraventricular $\rightarrow$ Narrow QRS complex
- 2) Ventricular $\rightarrow$ Broad QRS complex

Sinus Arrhythmia

- Cyclic alteration of the heart rate with respiration, $\uparrow$ during inspiration and $\downarrow$ during expiration.

- It is normally present in human, if absent, there is diabetic neuropathy, peripheral nerve disease or increased sympathetic drive.

Sinus Bradycardia

- More common in athletes, and while sleeping.
- Causes $\rightarrow$ MI, Sick sinus syndrome, Hypothyroidism, Hypothermia, $\uparrow$ Intracranial pressure, Drugs.
- Usually asymptomatic, may occur with MI.
- If persistent, pacemaker should be placed.

Sinus tachycardia

- Usually due to an increased sympathetic activity with exercise, pregnancy, emotion, Anemia, Heart failure, Thyrotoxicosis.

Sick sinus Syndrome (Sinoatrial disease)

- Most often in old age.
- Caused by fibrotic degenerative changes or ischemia of SA nodes.
- C/F $\rightarrow$ Palpitation, dizzy spells, syncope, due to intermittent tachycardia, bradycardia.
- On patient with no atrial or ventricular activity.

Features $\rightarrow$ Sinus bradycardia,
Sinus block.

Parenchymal atrial fibrillation

Parenchymal ~~atrioventricular~~ tachycardia.

Atrioventricular block.

Treatment $\rightarrow$ Permanent pacemaker.

Atrial ectopic beats

- Missed heart beat sensation or abnormally strong beat.
- ECG $\rightarrow$ P wave has different morphology due to different site, Normal QRS complex.

Atrial tachycardia - Abnormal P wave

$\rightarrow$ Increased automaticity, due to sinoatrial disease.

Atrial Fibrillation

Quivering of

- Most common type of cardiac arrhythmia.

Causes

- 1) Coronary heart disease
- 2) valve Rheumatic Mitral valve disease
- 3) Hypertension
- 4) Hyperthyroidism
- 5) Alcohol, Diabetes, obesity
- 6) Congenital heart disease
- 7) Cardiomyopathy
- 8) Chest Infection
- 9) Pulmonary disease on embolism
- 10) Pericardial disease

Pathogenesis

Risk Factors

↓
Stressed atrium

↓
Tissue Heterogeneity

Some cells conduct faster
Some cells conduct slower (↓ Refractory period)

Multiple wavelet theory
↓
Automatic Focus theory (Pulmonary Vessels on diseased atrium)

Multiple Re-entrant circuit

Automatic firing

↓
Arrhythmia

↓
"Irregularly Irregular Pulse"

↓
Blood stagnation

Classification

Paroxysmal AF ~ (< 1 week).

↓
Persistent AF - (> 1 week to months)

↓
Permanent AF -
≥ 12 months.

without self terminating

↳ Holter monitor

Clinical Features

- Palpitation, Fatigue, Dizziness, weakness,

due to low cardiac output.

- Irregularly irregular pulse (100-175 bpm)

Investigate

- ECG → No P waves, but baseline shows

irregular fibrillation waves.

Normal QRS complex but irregular.

- Echocardiography → other disease

- Thyroid disease should be excluded.

Complications:

Blood stagnation → clots → stroke.

Treatment

- Pacemaker

- Rhythm control.

- Rate control. Thromboprophylaxis.

Atrial Flutter

- Large re-entry circuit around tricuspid.

- Atrial rate is 300/min.

- ECG → Saw tooth flutter waves.

Narrow QRS complex

2:1, 3:1, 4:1 AV block:

↓

Atrial
beat

↓
Ventricular
beat

→ Prolonged tachycardia.

↳ ventricle decompensate

↳ Heart failure

→ thrombosis

Two-Ventricular block

First degree AV Block $\rightarrow$ Prolonged PR interval

Second degree AV Block - Type I - TPR, Escape beat
Type II $\rightarrow$ Intermittent dropped beat

Third degree AV Block $\rightarrow$ Signal blocked completely.

- Discrete of AV Node $\rightarrow$ No signal

C/F

Stokes Adams attacks (Recurrent syncope)

- Sudden loss of consciousness that occurs without any warning and results in collapse

- A brief apnoeic seizure (due to cerebral ischaemia)

if prolonged apnoea

- Pallor, death like appearance during attack

- When the heart starts to beat there is characteristic flush

- In distinction to Epilepsy there is rapid recovery.

- D/O occurs in sinoatrial disease, and neurocardiogenic syncope.

Bundle Branch Block

Right and left Bundle Branch Block

$\downarrow$

Right ventricular hypertrophy

Hypertension, C.I.D.,
Cardiomyopathy

CAD, Congenital

ECG $\rightarrow$ Prolonged Broaden QRS complex

- If there is block after the left bundle

into anterior and posterior fascicle it

is called hemiblock $\rightarrow$ no QRS complex broaden.