

- Arrhythmia 1:

* Normal rhythm: a) origin: SA node
 b) Rate: 60-100 bpm
 c) normal pathway
 d) normal velocity

* Causes: abnorm. in rhyth. cond. sys. Such as:
 1) abnormal ryth. in pacemaker.
 2) shift of pacemaker
 3) Block of conduction in any part.
 4) generation of spontaneous impulse in any part of heart
 5) abnormal pathway.

mechanism: 1) enhanced autothy.
 2) triggered " " "
 3) re-entry.
 rhyth. disturbances → abn. in impuls formation. } or
 → " " " conduction. } both.

* Types: → Rate: tachy or Brady
 → anatomical: supraventricular or ventricular.



* Symptoms:

- 1) Asymptomatic
- 2) fatigue
- 3) palpitation.
- 4) fainting.
- 5) shortness of breath.
- 6) chest pain

* Causes:

- 1) inherited, 7) alcohol
- 2) congenital, 8) aging.
- 3) ischemia, 9) infection.
- 4) iatrogenic (خطأ طبي)
- 5) caffeine & nicotine
- 6) infiltrative disease.
- 10) electrolyte disturb.
- 11) medications.

* Diagnosis:

- 1) ECG
- 2) monitors
- 3) others

* Treatment:

- 1) pharmacological.
- 2) catheter ablation.
- 3) life style modification
- 4) implantable devices like: defibrillator, pacemaker

1) Sinus Arrhythmia: - results from alteration in [sympath.] or [parasympath.] impulses to SA node.

* Respiratory type: ↑ HR during inspiration.

* Heart Rate variability.

① SA node: ↑ speed of depol. ↑ inward move of Na⁺ & Ca²⁺
 ② AV node: ↓ delay
 ③ atria + vent. ↑ strength & speed of cont.
 ↓ HR by ↑ K⁺ perm through ACh
 * mechanism: muscarinic cholinergic recep. is coupled directly to "ACh regu. K⁺ channels by a G protein.

a) Sinus tachy:

- 1) ↑ HR > 100 in adult
- 2) normal ECG, HR ↑ (R-R interval)
- 3) causes: dehydration, anxiety, Blood loss anemia, hyperthermia, weak heart muscle, toxic conditions of heart

b) Sinus brady

- 1) ↓ HR < 60 bpm
- 2) normal ECG except HR
- 3) causes: sleep, elderly, hypo thyroidism, athletes (they've a strong heart muscle), hypothermia, carotid sinus syndrome.

c) Sinus Block

the impulse from the SA node is blocked before it enters atrial muscle.
 → may lead to atrial asystole.
 * ECG: Normal QRS, slow HR.

1) Sick sinus syndrome or SA dysfunction: impaired SA function and impulse transmission. results in a group of abnormal rhythms.

- include: either tachy or brady or [tachy-brady syndrome] alteration between them

2) Atrial Arrhythmia:

a) paroxysmal tachycardia:

- abnormalities in different portions of the heart including atria, Purkinji sys. or ventricles.
- * rapid rhythmical discharge that spreads throughout the heart
- * caused by re-entry
- * the irritable focus becomes the pacemaker because of its rapid rhythm.
- * paroxysmal \Rightarrow the HR becomes rapid in paroxysm
- * sudden, few min, sec, or longer, ends suddenly
- * can be stopped by vagal reflex, by pressing the neck in the area of carotid sinus.
- * Antiarrhythmic drugs $\left\{ \begin{array}{l} \rightarrow \text{slow conduction.} \\ \rightarrow \text{prolong refractory period.} \end{array} \right.$

c) pulse deficit:

- * contraction of heart ahead of scheduled.
- * ventricles aren't filled with blood normally.
- * \downarrow stroke volume output during contraction. (or absent)
- * weak pulse wave in peripheral arteries. $\left[\begin{array}{l} \text{can not be felt} \\ \text{in radial artery} \end{array} \right]$
- * deficit in number of radial pulses.

E) Atrial Fibrillation: (AFib)

- * usually in dilated atrium, not life threatening
- * mechanism: \downarrow atrial contractile function. \Rightarrow blood stagnate
- \Rightarrow \uparrow blood clots formation in atrial appendage.
- $\left[\begin{array}{l} \text{can dislodge and travel to the brain causing stroke} \\ \text{or other body parts.} \end{array} \right.$
- * pts are often placed on anticoagulants to reduce embolism risk.

\Rightarrow ECG: \uparrow HR, \uparrow small depol. waves spread in atria in all direction during AFib., weak waves in opposite polarity at a given time \Rightarrow they neutralize one another. Therefore:

p-waves \rightarrow No p-waves
 \rightarrow a fine, \uparrow frequency, \downarrow voltage.

normal QRS-T complex unless there is a ventricular pathology, but their timing is irregular.

B) premature contrac.

- * contraction of the heart before the time of normal contraction.
- * also called: ectopic beat, extrasystole, premature beat.
- * almost results from ectopic foci in heart, that emits abnormal impulses at odd times during cardiac rhythm.
- \Rightarrow premature Atrial con. (PAC) \Rightarrow occurs in healthy people athletes, mild toxic condition like \Rightarrow smoking, caffeine, drugs, lack of sleep, alcoholism.

D) Atrial Flutter:

- * HR: 200-350 bpm.
- * caused by re-entry.
- * $\uparrow\uparrow$ signals from atria \rightarrow don't pass to ventricle because of the long refractory periods of AV node and bundles.
- * 2-3 beats of Atria for 1 ventricular beat.
- \Rightarrow ECG: 1) P-waves \Rightarrow strong cause of the contractions of semicoordinated masses of the muscle.
- 2) QRS-T complex \Rightarrow follow p-wave only once for every 2 beats of Atria. [2:1]

Treatment: synchronized cardioversion: 1 electric shock is synch. to fire only during QRS when ventricles are refractory to stimulation. a normal rhythm often follows if the heart is capable of generating a normal rhythm.

