

we look at lead II

نبدأ بـ ECG
وَأَجْزَائِهِ

Arrhythmias

Imagine the heart as a team of synchronized runners on a track.
The SA node is the coach firing the starting gun.
Arrhythmias happen when:
1. The coach fires the gun too fast or too slow
2. Someone else fires the gun
3. The track is blocked
4. The runners take abnormal shortcuts
5. Random people jump onto the track (ectopic beats)
ECG Lab Slides

Tachycardias (>100/min)

Sinus Tachy

↑ Symp. Tone
(Your Heart is healthy but over-caffeinated!)

Fever
Anxiety
Sympathetic surge
Thyrotoxicosis
Hypovolemia
Exercise
Anemia
Recent pain
Temp. ↑



R-R > 100

Not sinus Tachy.

Atrial problems
(supravent. tachy.)
(Narrow complex tachy.)

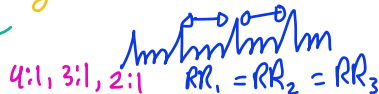
① Atrial fibrillation

Disorganized electrical impulse originating at roots of pulm. veins
*No p-wave
*irregular irregular QRS (Risk of stroke)



② Atrial flutter

Re-entry circuit at the Right atrium
identical, consecutive atrial depol. causing "sawtooth" appearance of p-wave



(Regular)

ventricular problems
(wide complex tachy.)

↳ V. fib

*fatal within 1-3 min

*caused by:

- Sudden electrical shock of the Heart
- Ischemia of Heart muscle → conducting system
- Other forms of Arrhythmias

خارج الحاج

Multifocal
↳ voltage decays rapidly
(Bag of worms)

(<60) Brady.

Sinus Brady

(Trained athlete's Heart)

↓ Slow, relaxed, efficient

Sleep
Low temp.
Overdose (BB)
Well-trained athletes
Endocrine: Hypothy.

PR interval = المسافة في
AV-block
ischemia, compression
myocard or calcifications,
inflamm., vagal stim.

1st degree
PR > 0.2 sec.

تأخر في

Passive before QRS

*caused by:

↳ CAD

↳ rheumatic carditis

↳ Digoxin toxicity

↳ Electrolyte distur.

حارس بطيء بطيء

بعض شوية شوية

2nd degree

↳ Type I

(Wenckebach)

(Mobitz I)

longer, longer, Drop

*AV node gets tired → delays more each beat → eventually fails

starts again ← Rest

↳ Type II

*Fixed PR interval

asudden dropped QRS

*Dangerous → Can progress to complete block

3rd degree (complete)

Atria & vent. beat independ.

no common

Regular P-P

" R-R

no relation bet. them

(Imagine two clocks on the wall ticking at diff. rates - neither affects the other)

"First is prolonged, Second drops, Third is gone"

MI & Angina ECG

Look at the ST segment FIRST

ST Elevation MI ما هو تعريف MI

- ① ≥ 2 contiguous leads
- ② Limb leads: ≥ 1 mm
- ③ chest leads: ≥ 2 mm

Mnemonic for MI territories

Ant. MI $\rightarrow$ LAD: V_1-V_4

Lateral MI $\rightarrow$ LCX: I, aVL, V_5, V_6

Inferior MI $\rightarrow$ RCA: II, III, aVF

process of MI on ECG

- ① ST elevation (min-hours)
 - ② Twave inversion (hours)
 - ③ pathological Q wave (≥ 24 hours)
- > 0.04 sec
or
 > 2 mm deep
- ongoing or prior MI

Angina
ST dep.
or T change
ONLY during pain
+ Normalizes after pain stops

HIGH-YIELD SUMMARY FOR YOUR STUDENTS

Condition	Key ECG Feature	Easy Mnemonic
Sinus tachycardia	HR > 100 , normal P	FAST HEART
Sinus bradycardia	HR < 60	SLOWER
AF	No P + Irregularly irregular	"IRREGULAR + NO P"
Aflutter	Sawtooth P waves	"SAWTOOTH"
VF	Chaotic baseline	"Bag of worms"
1° AV block	PR > 0.20	"First is LONG"
Wenckebach	Progressive PR $\rightarrow$ drop	"Longer, longer, drop"
Mobitz II	Fixed PR + random drop	"Fixed drop"
3° AV block	P & QRS independent	"Gone connection"
STEMI	ST elevation	Contiguous leads
Pathological Q	> 0.04 sec & > 2 mm	Old MI

Step-by-Step: What Happens in MI

1 — Ischemic myocardial cells lose their resting negativity

Healthy cells: inside is negative

Injured cells: inside becomes less negative

$\rightarrow$ This difference creates an injury current.

2 — During diastole (rest), current flows from healthy $\rightarrow$ injured tissue

This pulls the baseline (TP segment) downward.

3 — During systole (ST segment), both tissues are depolarized

No current flows $\rightarrow$ ST segment stays in its "true" position.

4 — Result on ECG

Because baseline dropped, the ST segment looks elevated.

💡 So ST elevation = injury pattern of the myocardium.

SUPER SIMPLE ANALOGY FOR STUDENTS

Imagine you place a table on uneven ground:

- The table is actually straight
- But the ground under one side is lower
- So the table *appears* tilted up

The ST segment is the table.

The lowered baseline is the injured myocardium.

That's why it LOOKS elevated.