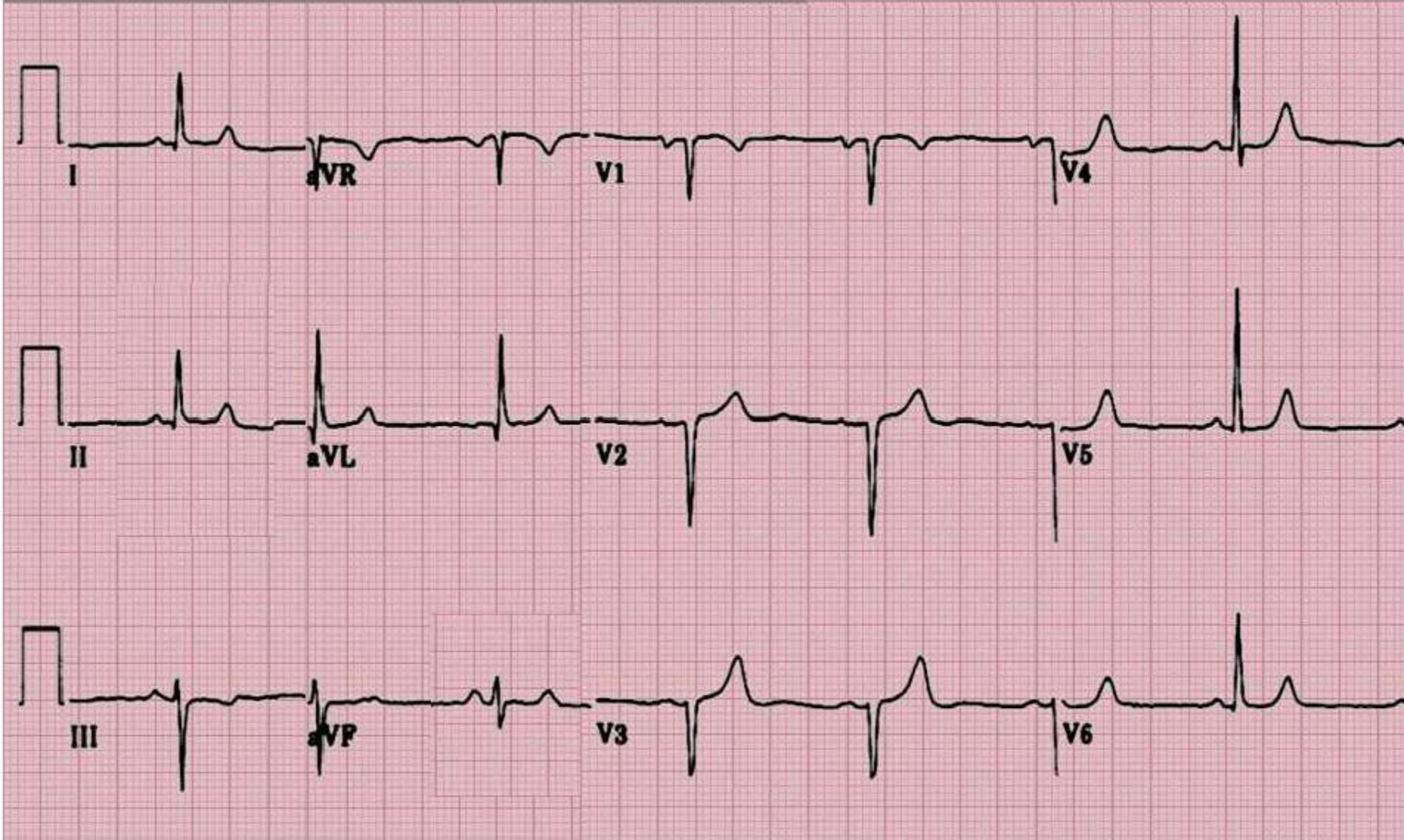


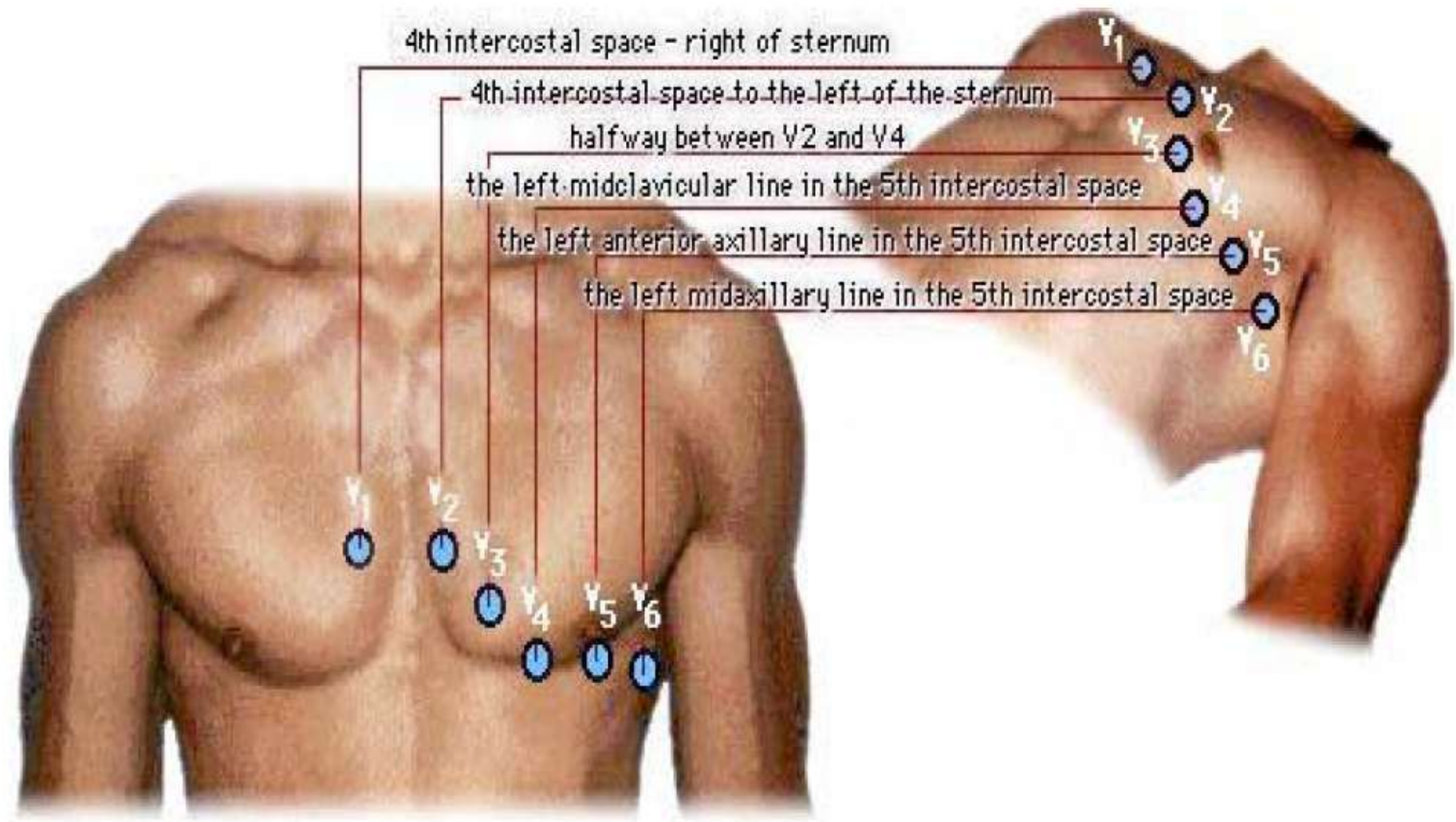
ECG Workshop

Hamid Ikram

Common Technical Pitfalls



Lead placement



4th intercostal space - right of sternum

4th intercostal space to the left of the sternum

halfway between V2 and V4

the left midclavicular line in the 5th intercostal space

the left anterior axillary line in the 5th intercostal space

the left midaxillary line in the 5th intercostal space

V1

V2

V3

V4

V5

V6

V1

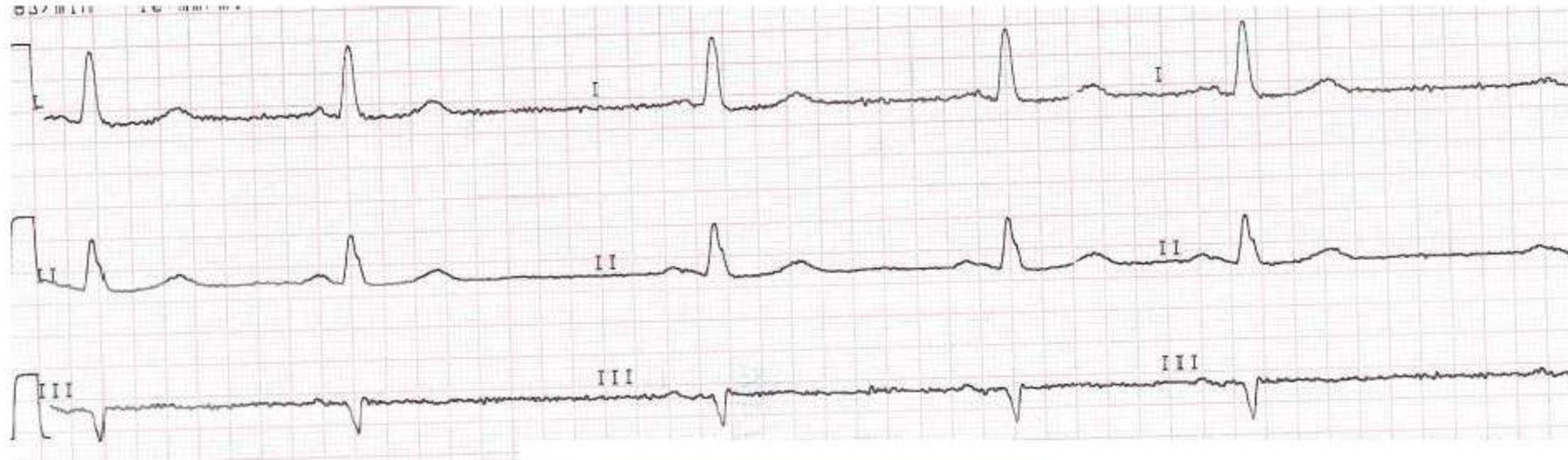
V2

V3

V4

V5

V6

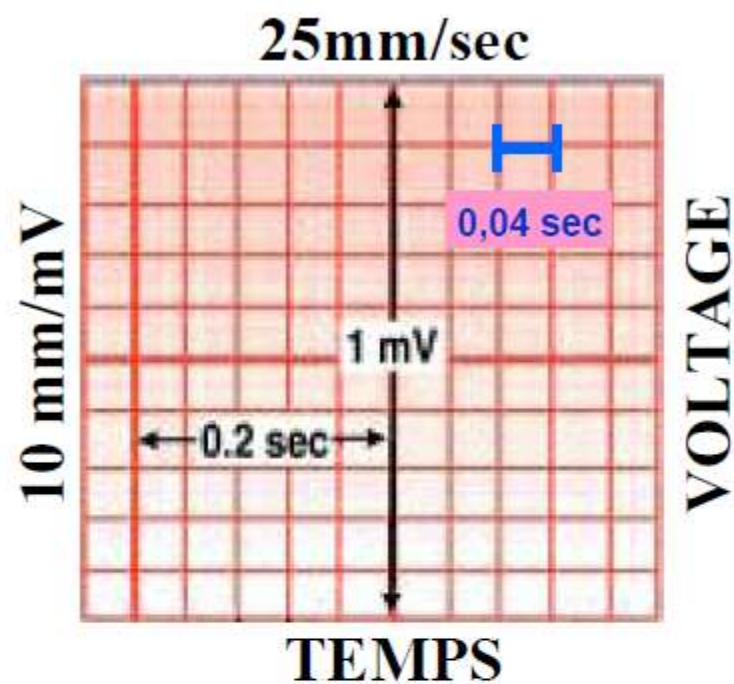
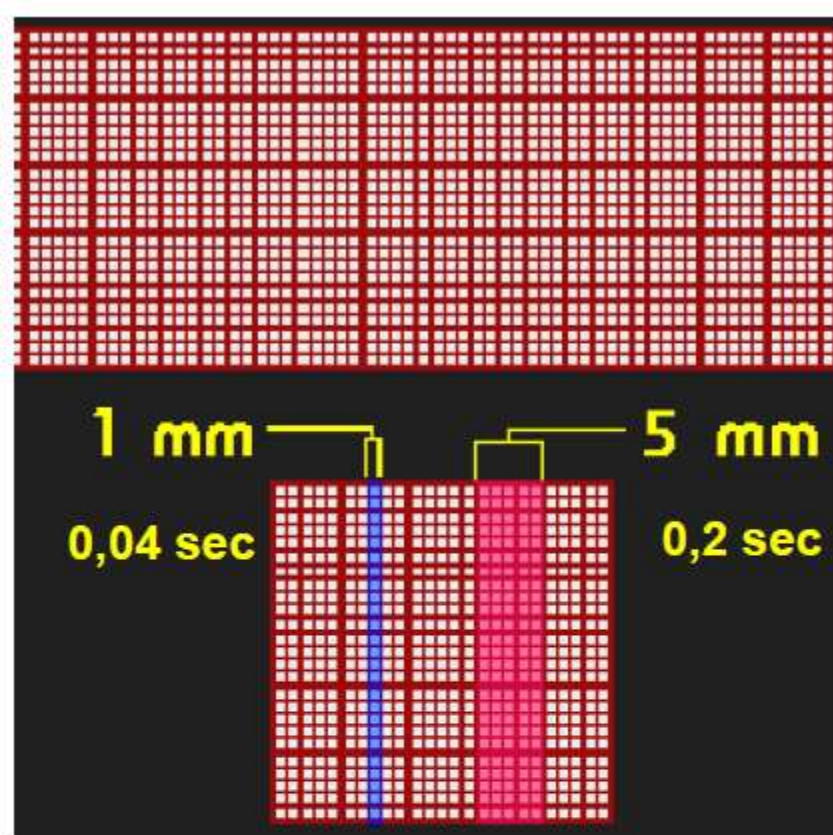


Paper Speed

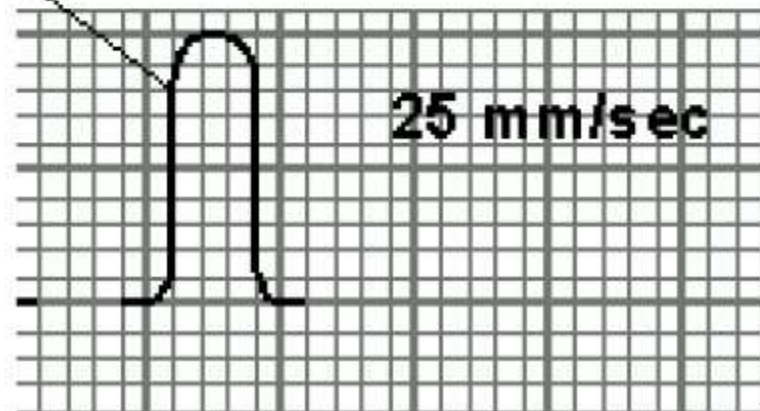


50 mm/sec

25 mm/sec



1 mV = 10 mm



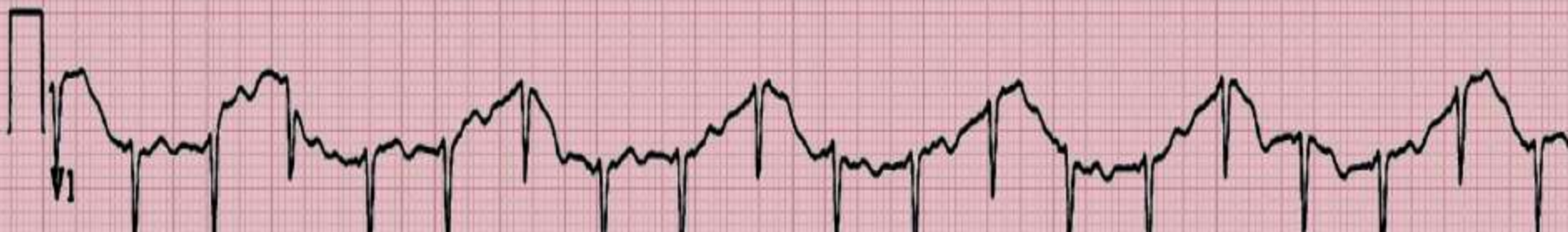
**motion
artifact**

-breathing



stop breathing

Auto mode





Lead Inversion

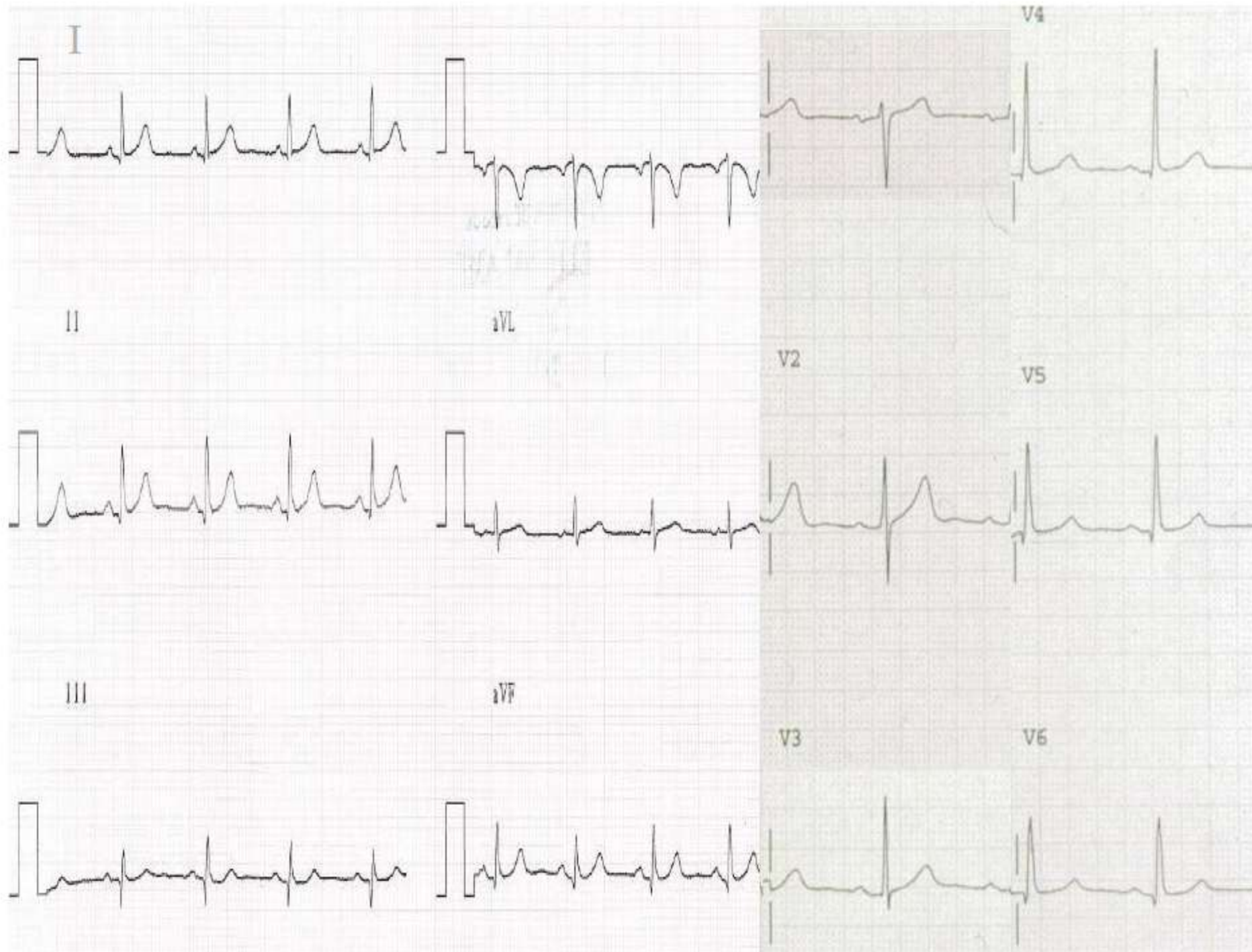
**T wave is always positive in leads I and II
may be negative in lead III.**

**T wave is always positive in precordial
leads.**

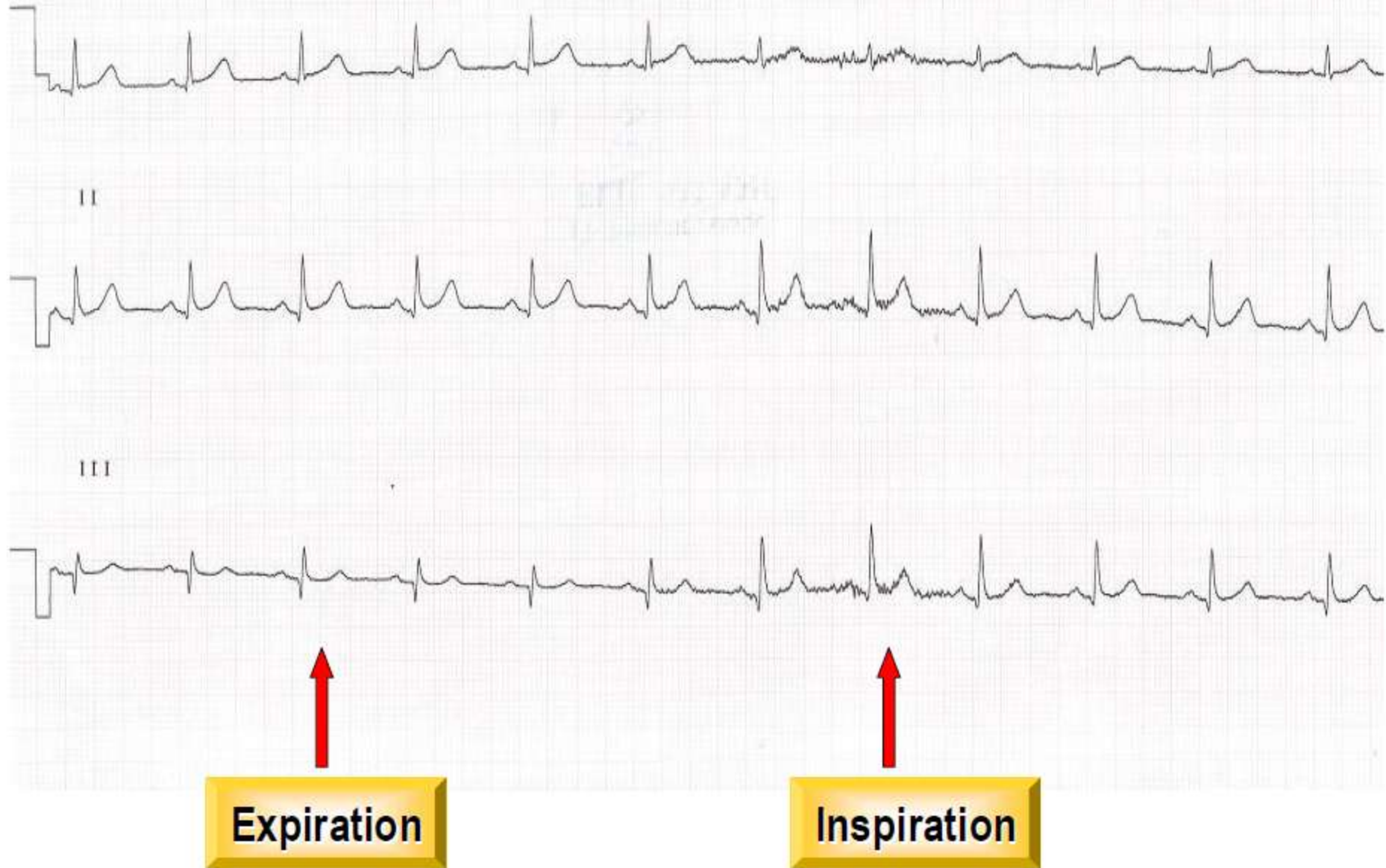
(except V1: may be negative)

Normal ECG ??

- **75 y W**
- **elective cholecystectomy**
- **pre op ECG**

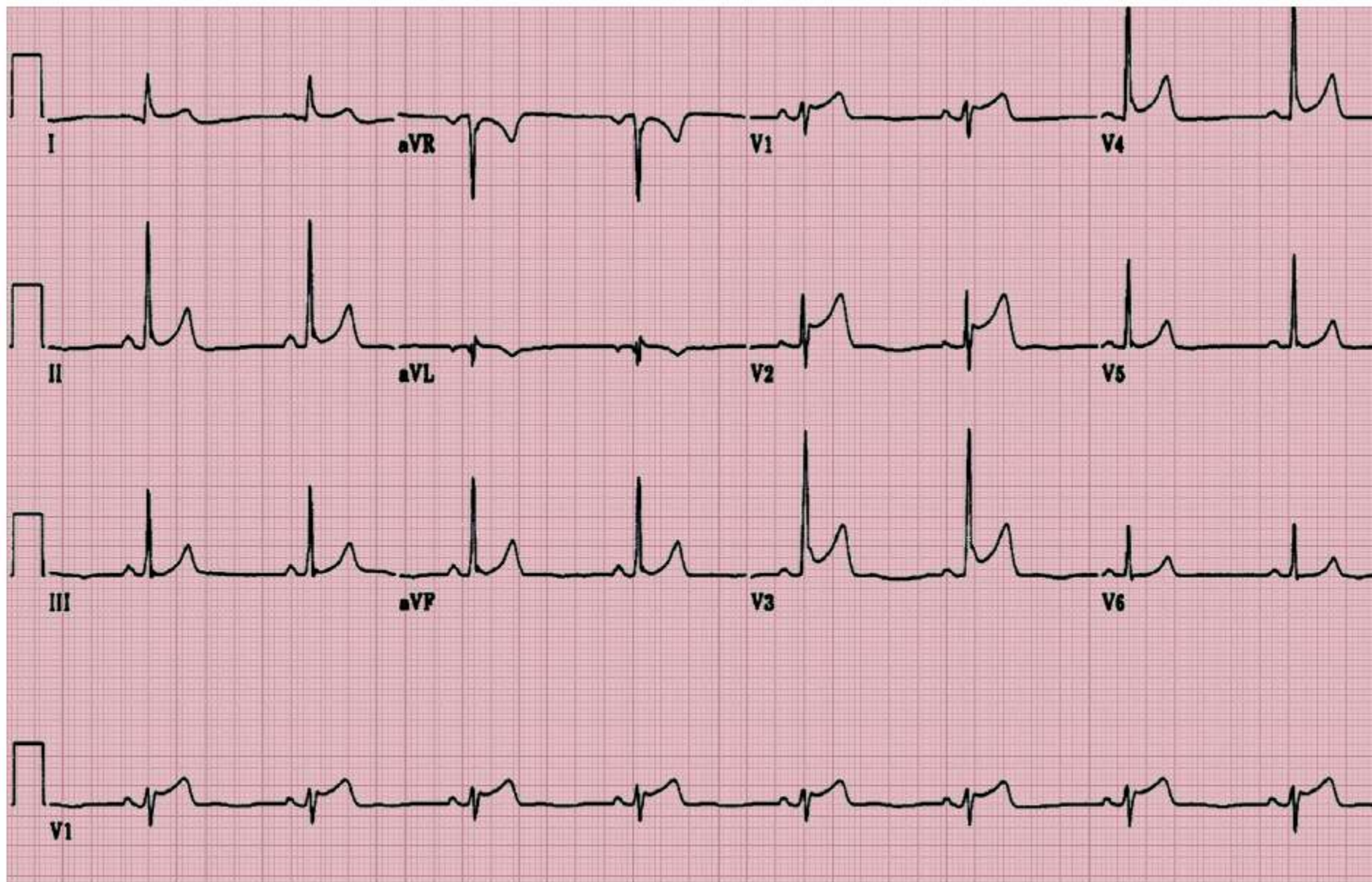


Positional Q waves (septal Q waves) often disappears with change in heart orientation associated with deep inspiration



Normal ECG ??

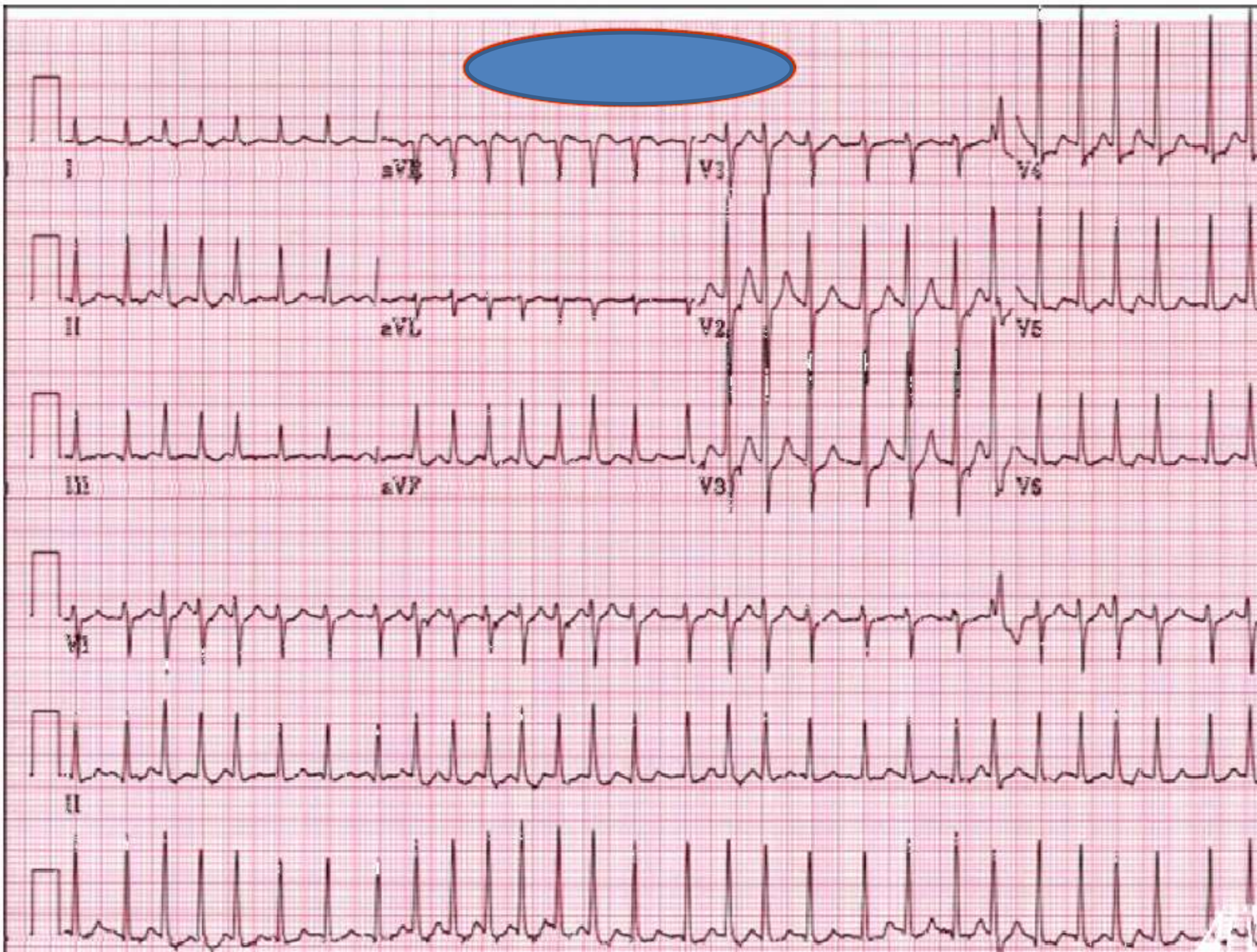
- **33 y M**
- **ER**
- **chest pain x 3 hours**



“Early Repolarisation Syndrome”

“High take-off ST segment”

Tachycardia



Tachycardia (HR > 100/min)

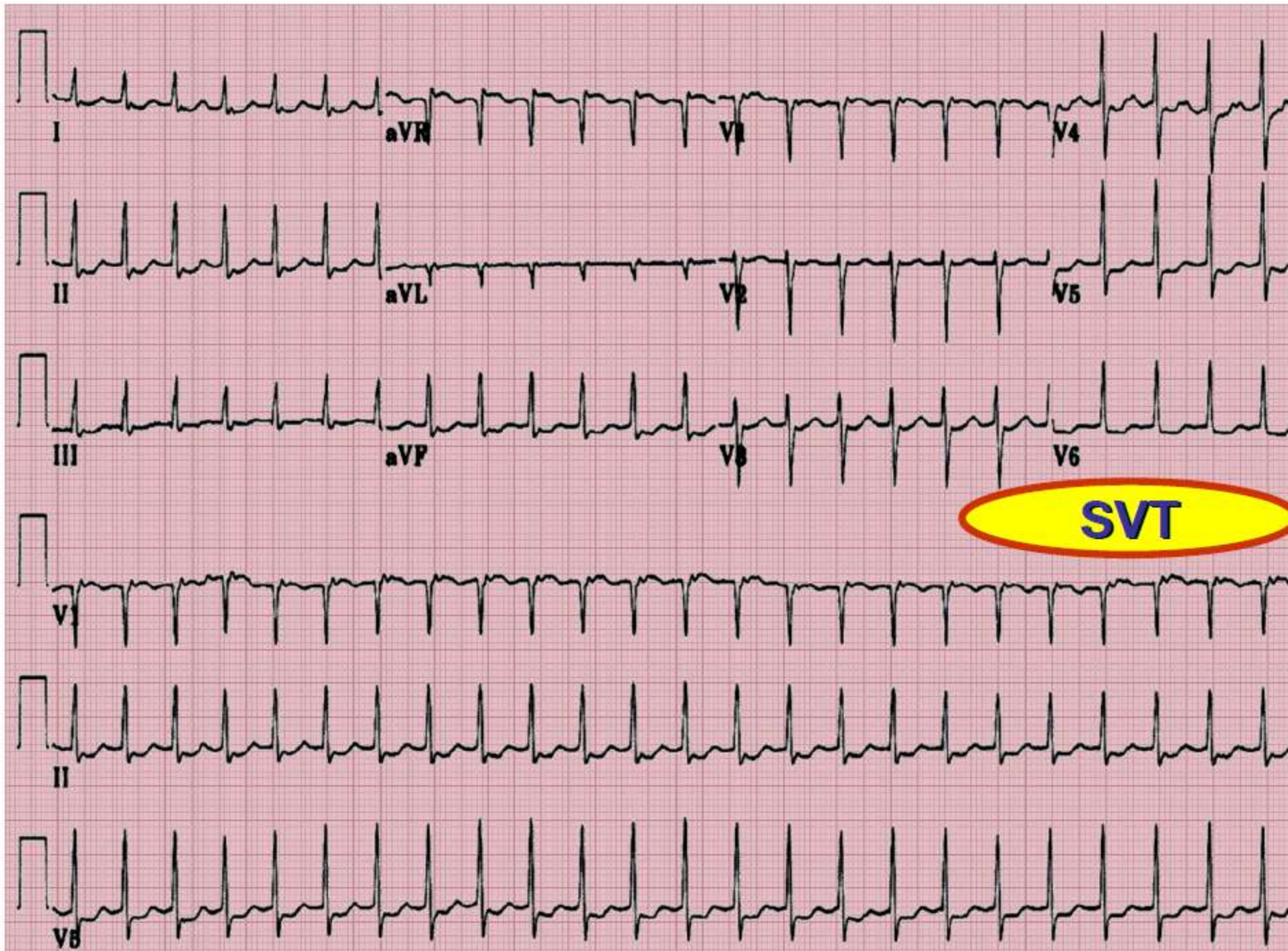
```
graph TD; A["Tachycardia (HR > 100/min)"] --> B["Irregular"]; A --> C["Regular"]; B --> D(["Atrial Fibrillation"]);
```

The diagram is a flowchart starting with a dark red box at the top containing the text 'Tachycardia (HR > 100/min)'. Two teal arrows point downwards from this box to two light blue boxes: 'Irregular' on the left and 'Regular' on the right. A third teal arrow points downwards from the 'Irregular' box to a yellow oval with a red border containing the text 'Atrial Fibrillation'.

Irregular

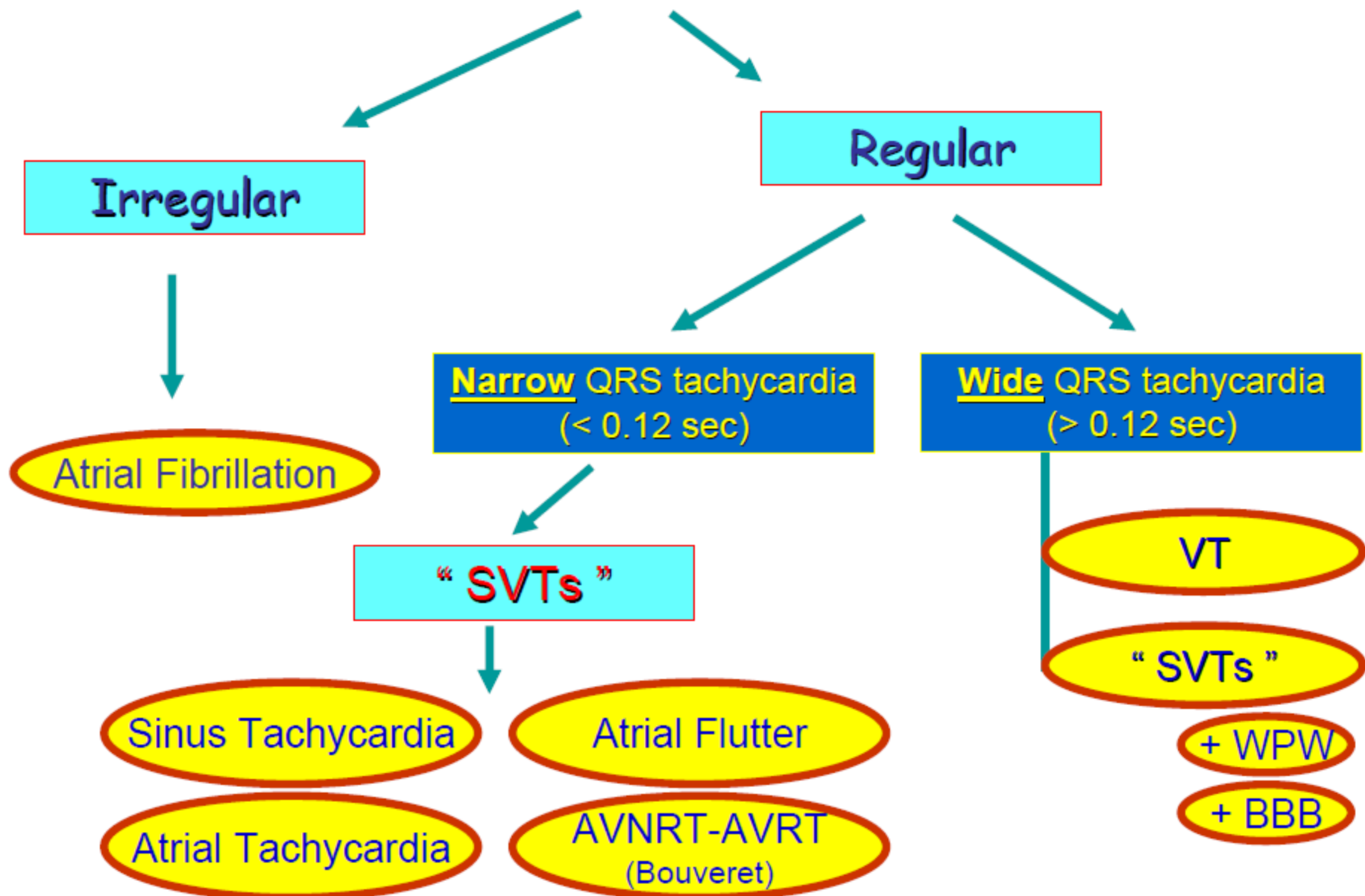
Regular

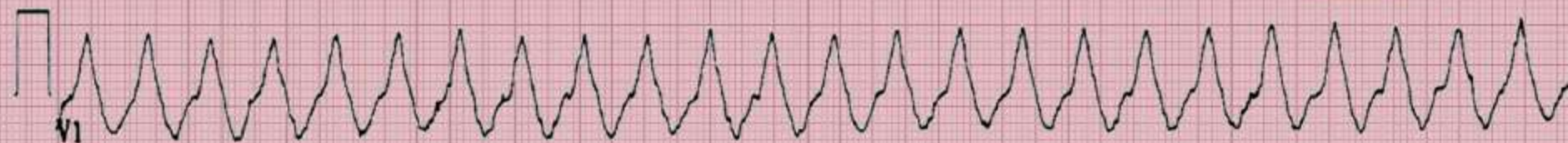
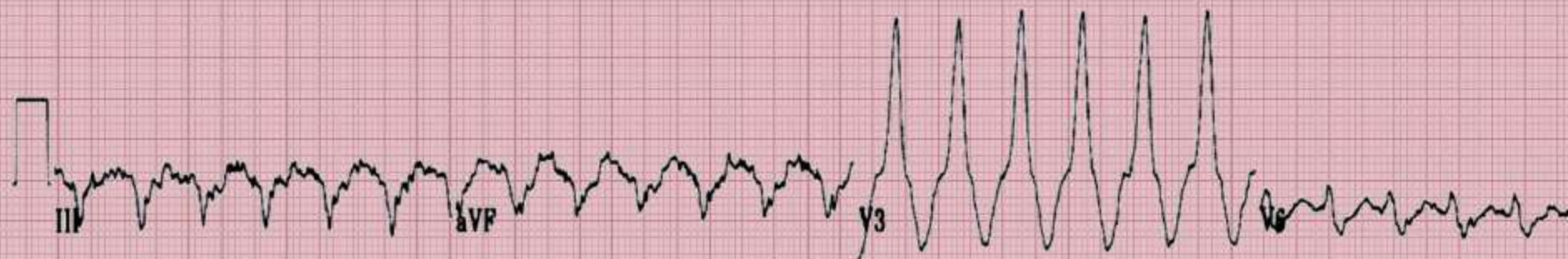
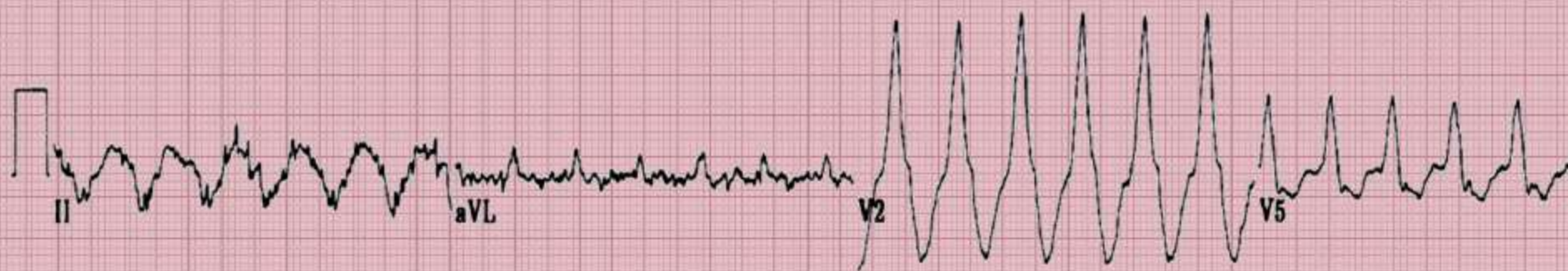
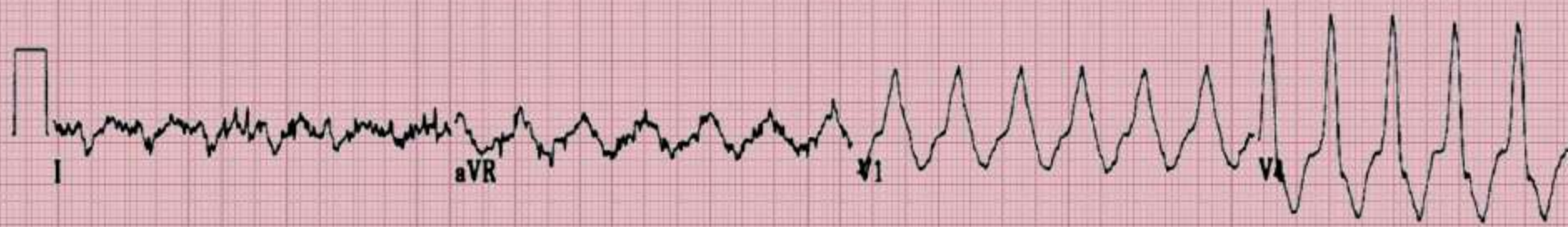
Atrial Fibrillation



SVT

Tachycardia (HR > 100/min)



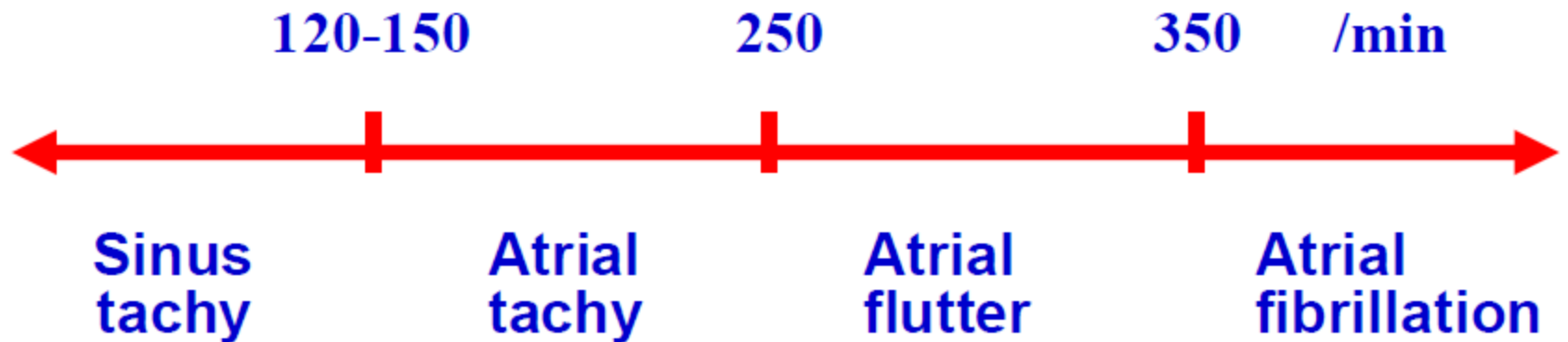


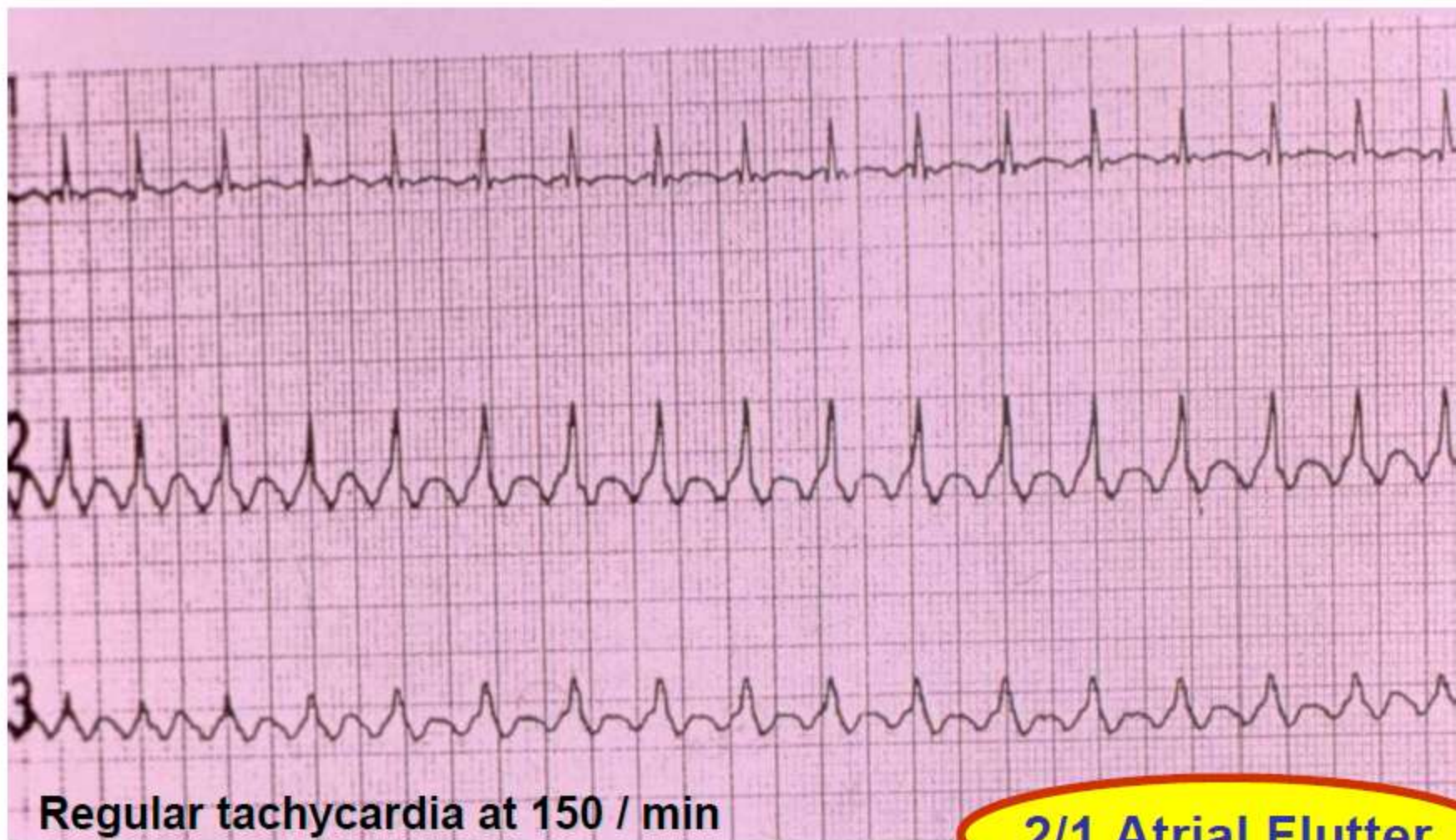
VT

Analyze P wave

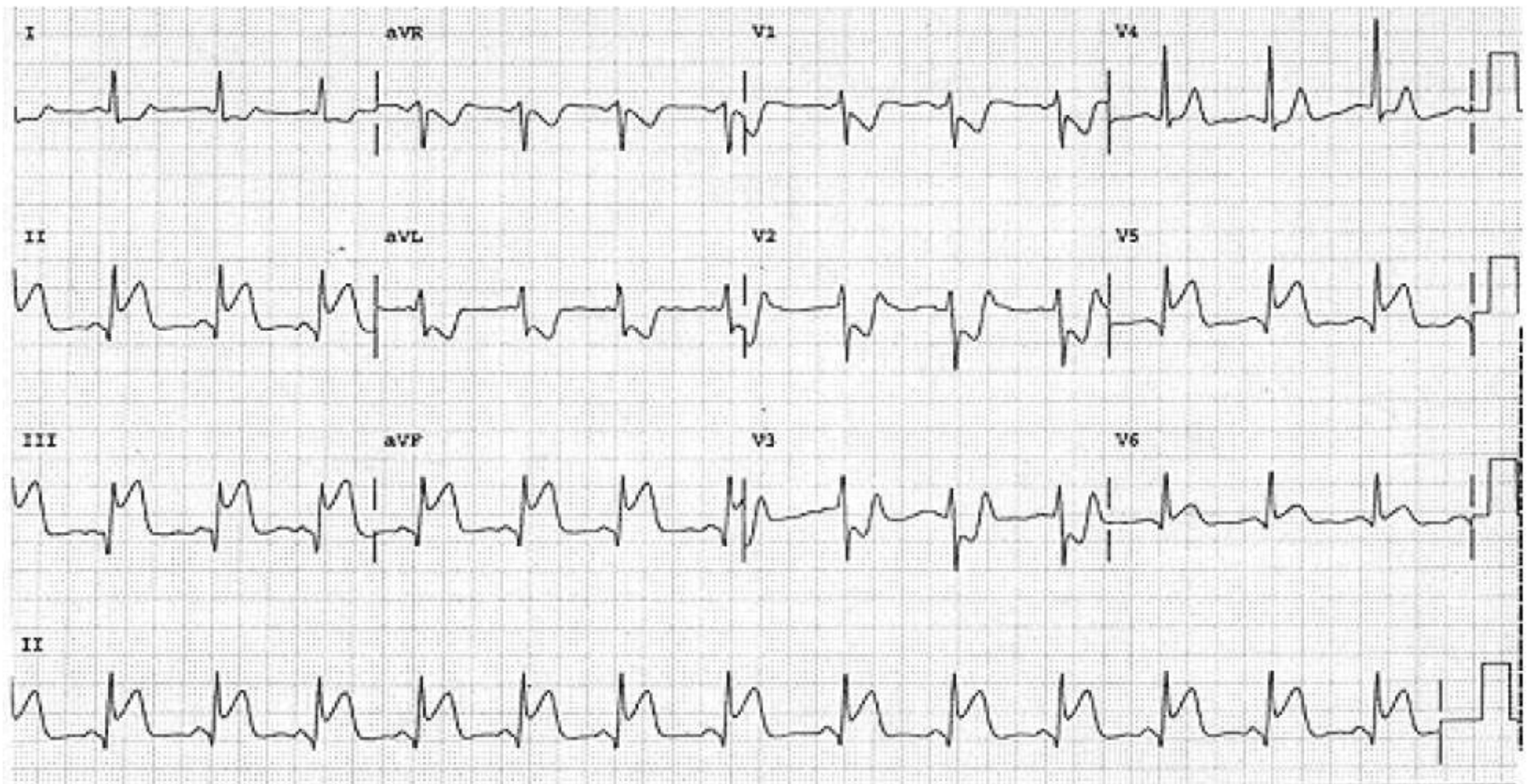
- Morphology
- Timing
- Rate

“P” wave rate





ECG in CAD



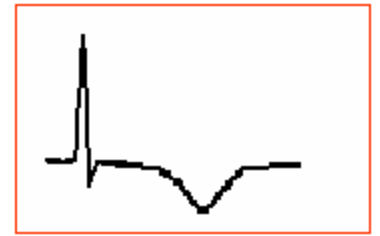
ECG in CAD

- type of ischemic changes

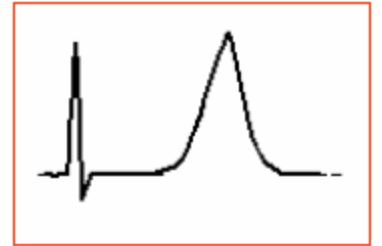
<u>Ischemia :</u>	reversible	repolarisation abnormalities	T wave changes	1/ inverted T wave 2/ Peaked T wave
<u>Injury :</u>	reversible	repolarisation abnormalities	ST changes	1/ elevated ST 2/ depressed ST
<u>Infarction:</u>	irreversible	depolarization abnormalities	Q wave	

Ischemia

Inverted T wave



Peaked T wave



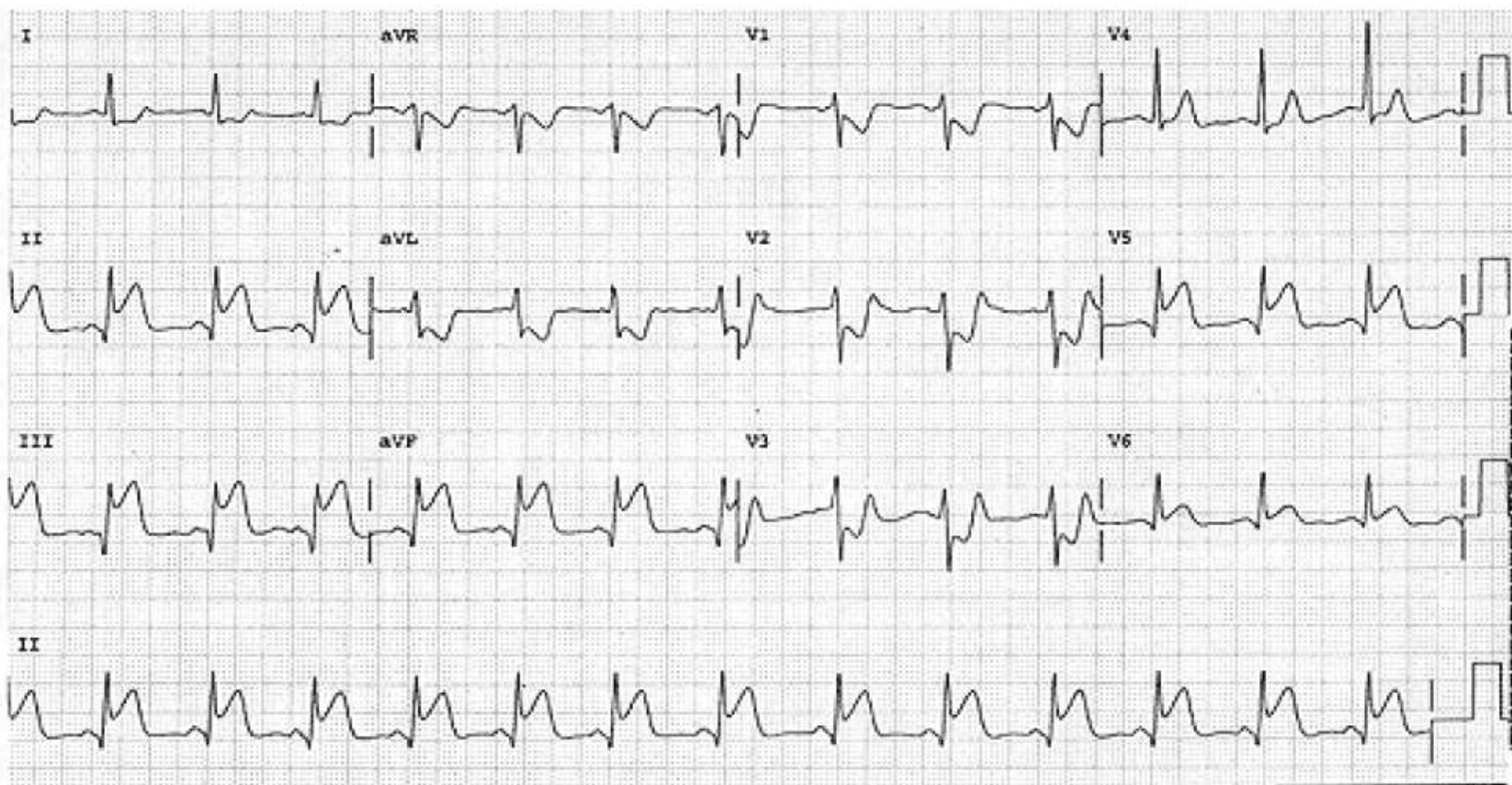
Injury

Elevated ST



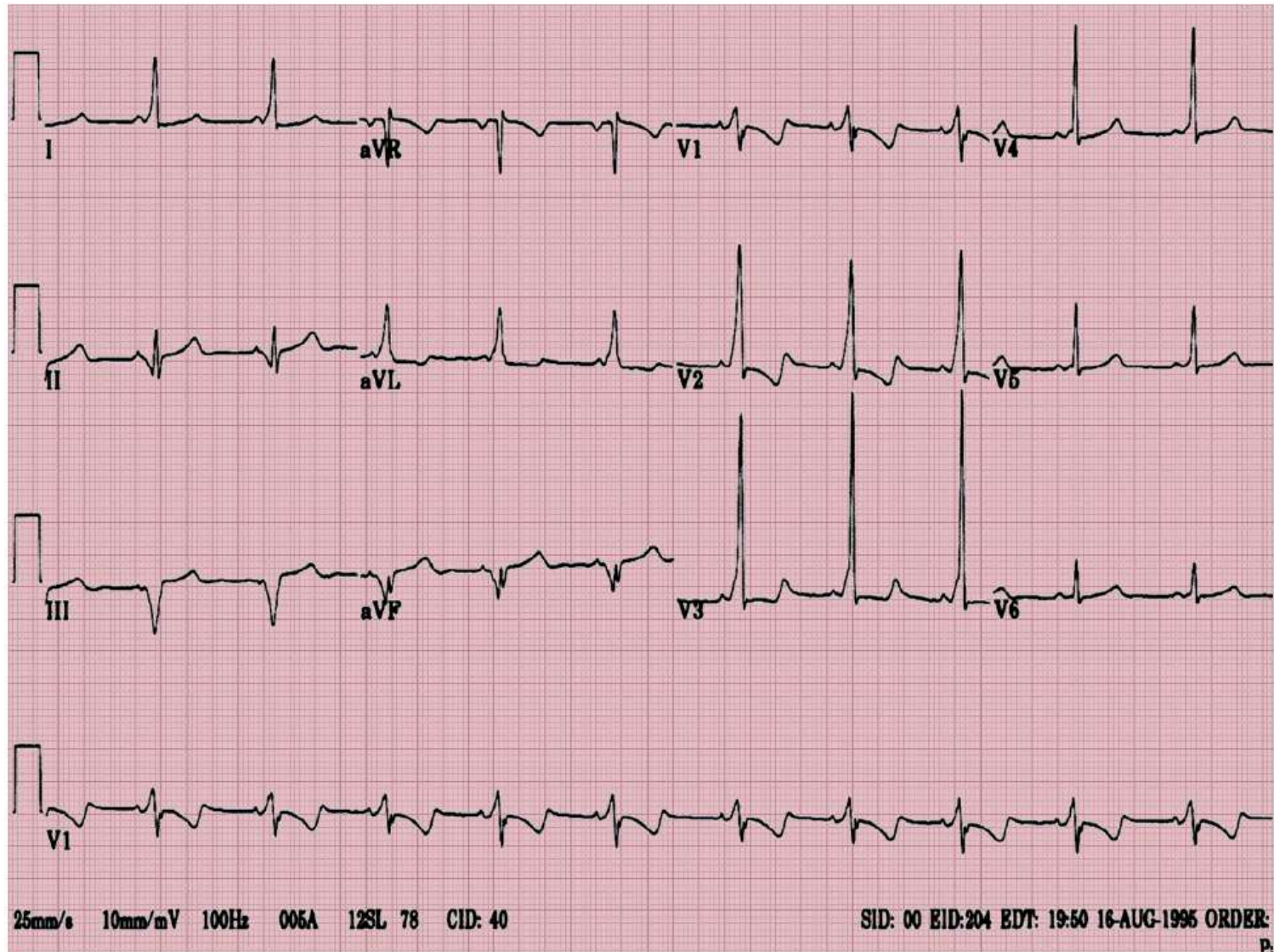
Depressed ST



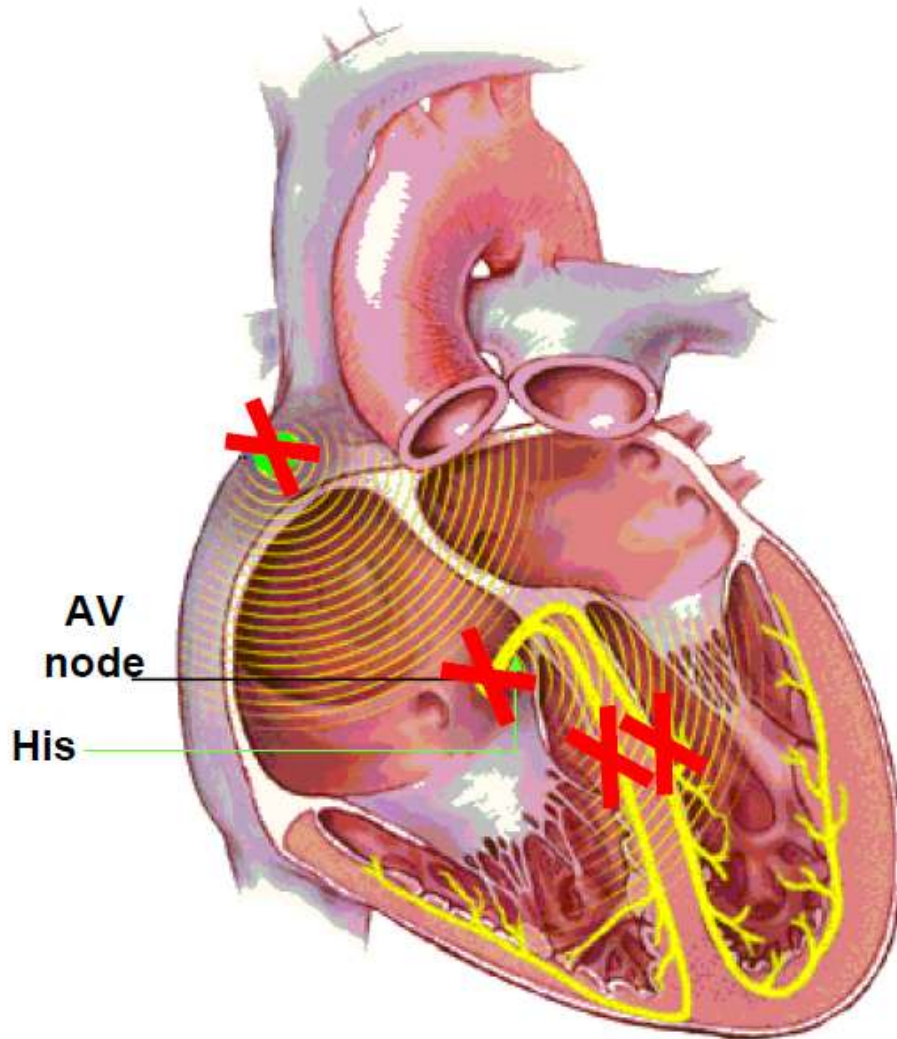




What is this ?



Heart blocks and WPW



- Sinus dysfunction

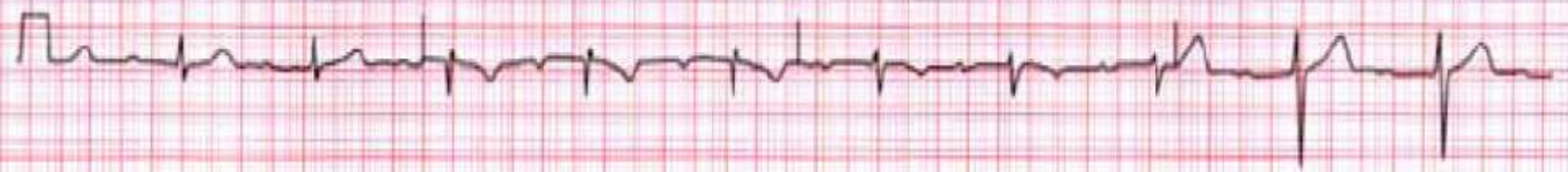
- AV Block

I

VR

V₁

V₄

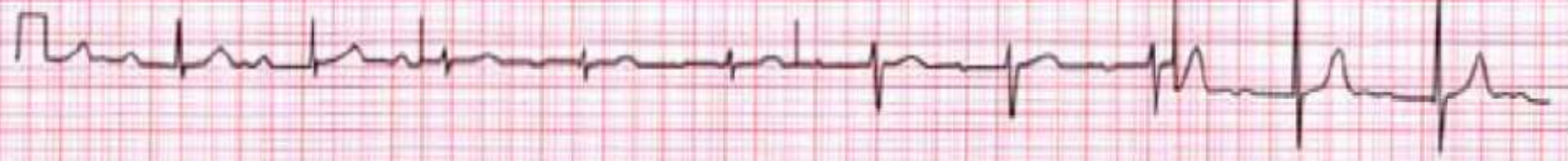


II

L

V₂

V₅



III

VF

V₃

V₆





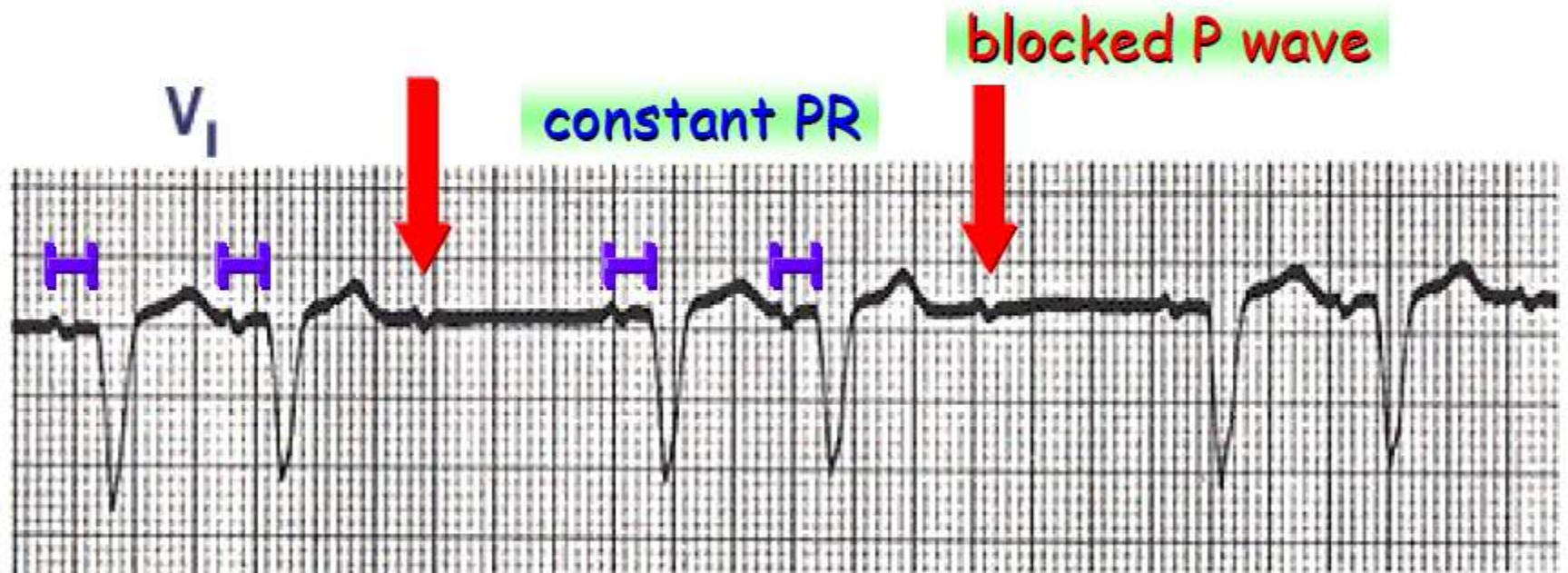
Left Anterior Fascicular Block (LAFB)-KH

Frank G. Tarone, M.D.

LAFB is the most common of the intraventricular conduction defects. It is recognized by 1) left axis deviation, 2) rS complexes in II, III, aVF, and 3) small q in I and/or aVL.

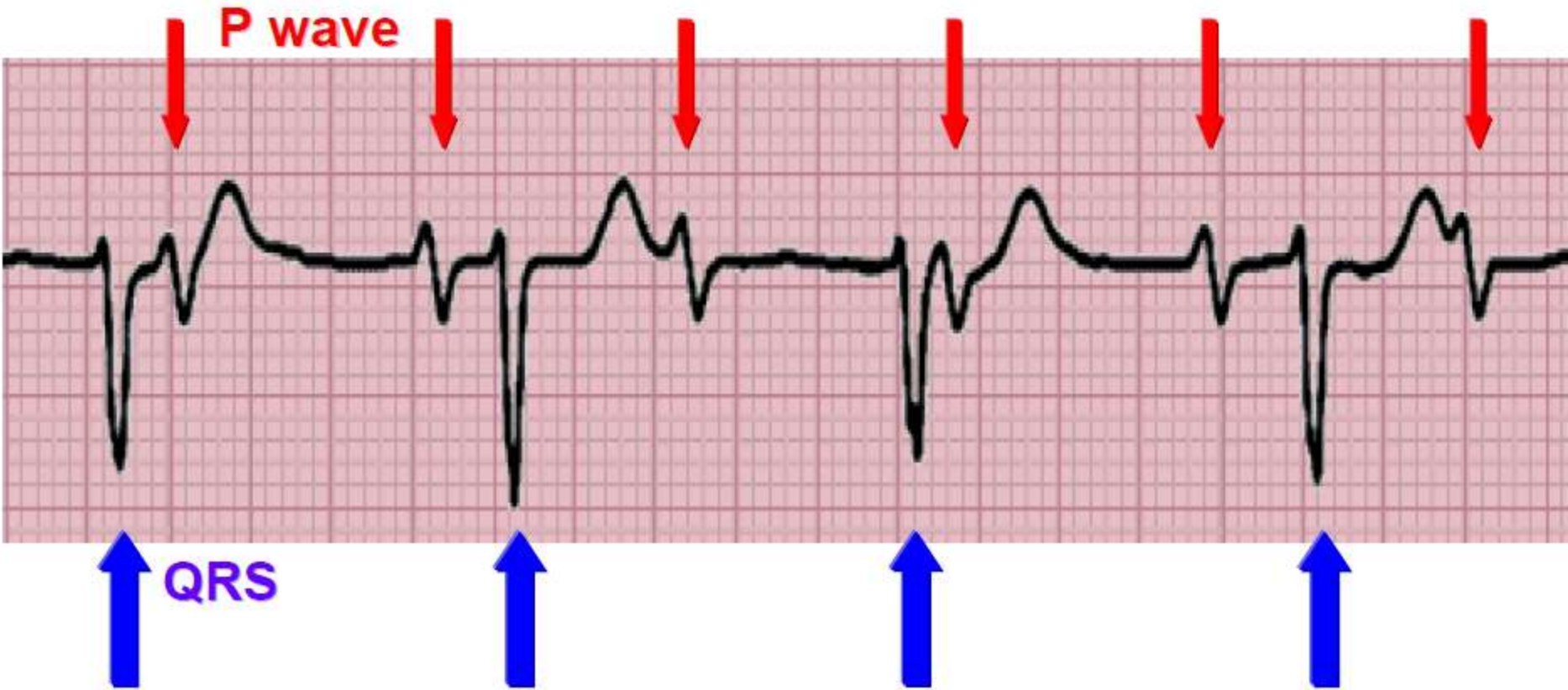


Mobitz 2 AV block



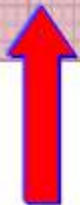
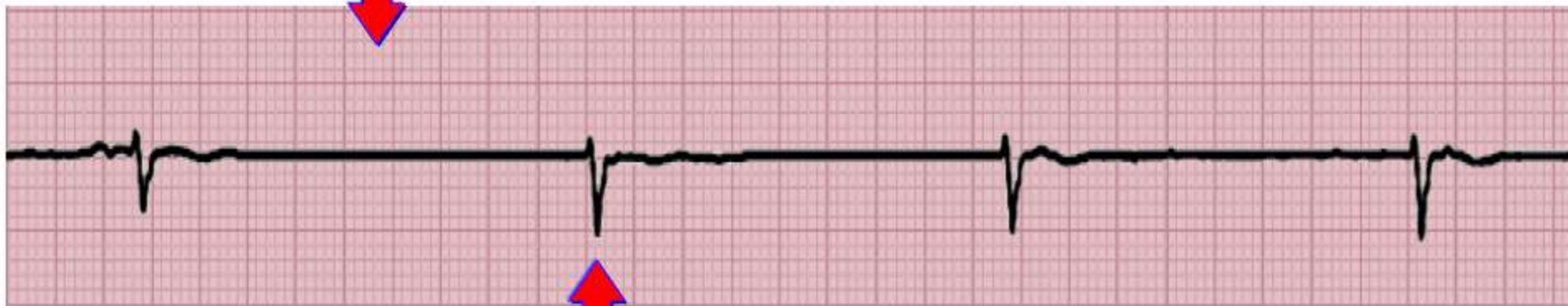
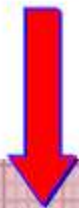
Complete AV block

AV dissociation



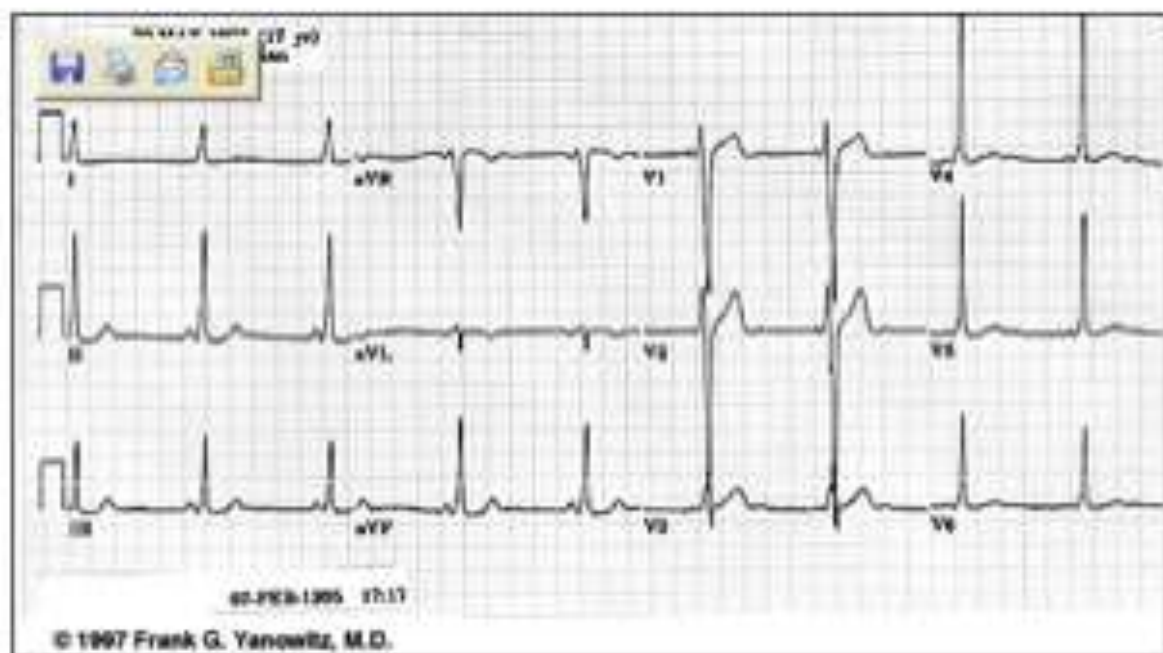
Sinus dysfunction

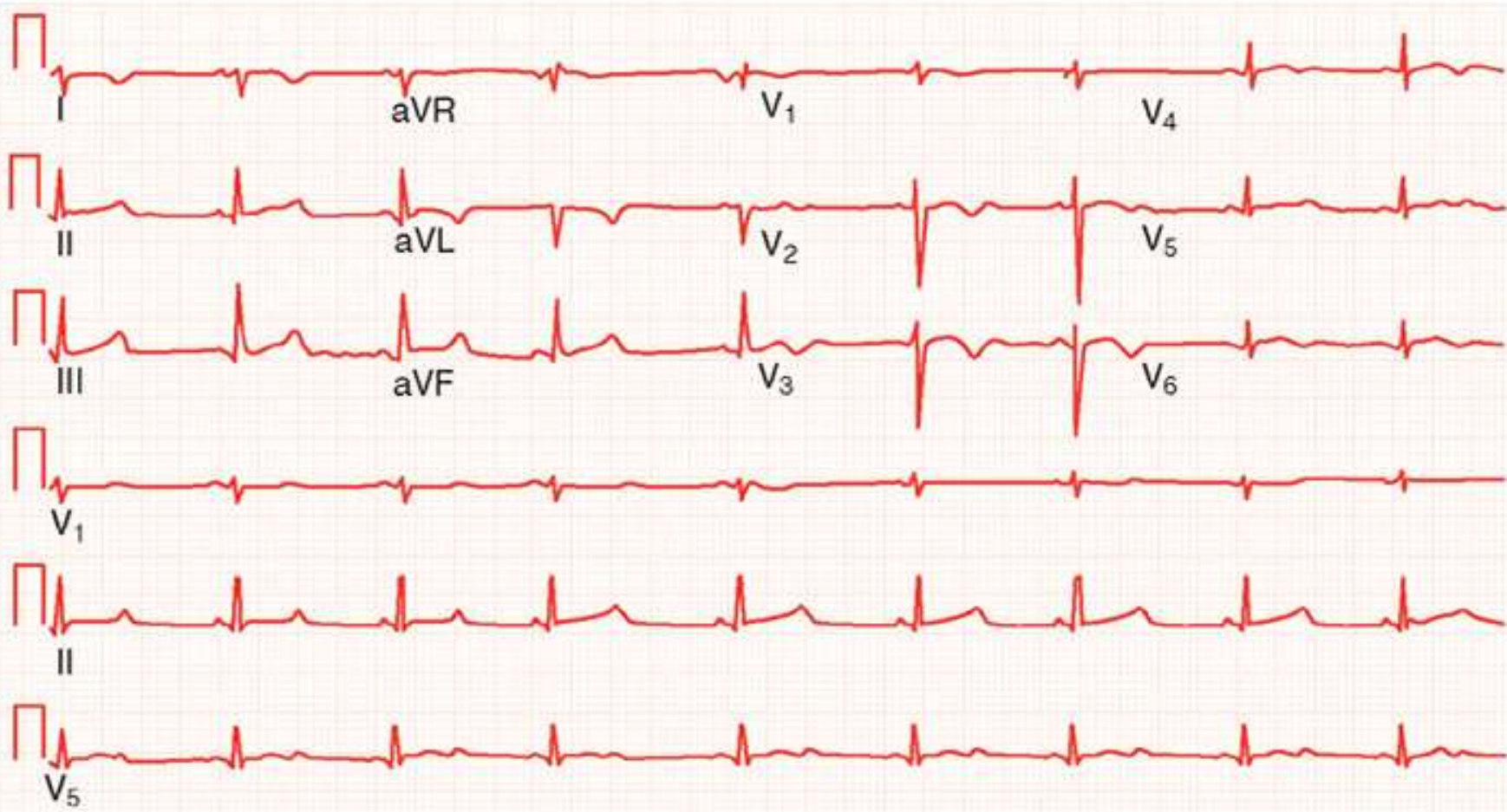
sinus arrest



junctional escape rhythm

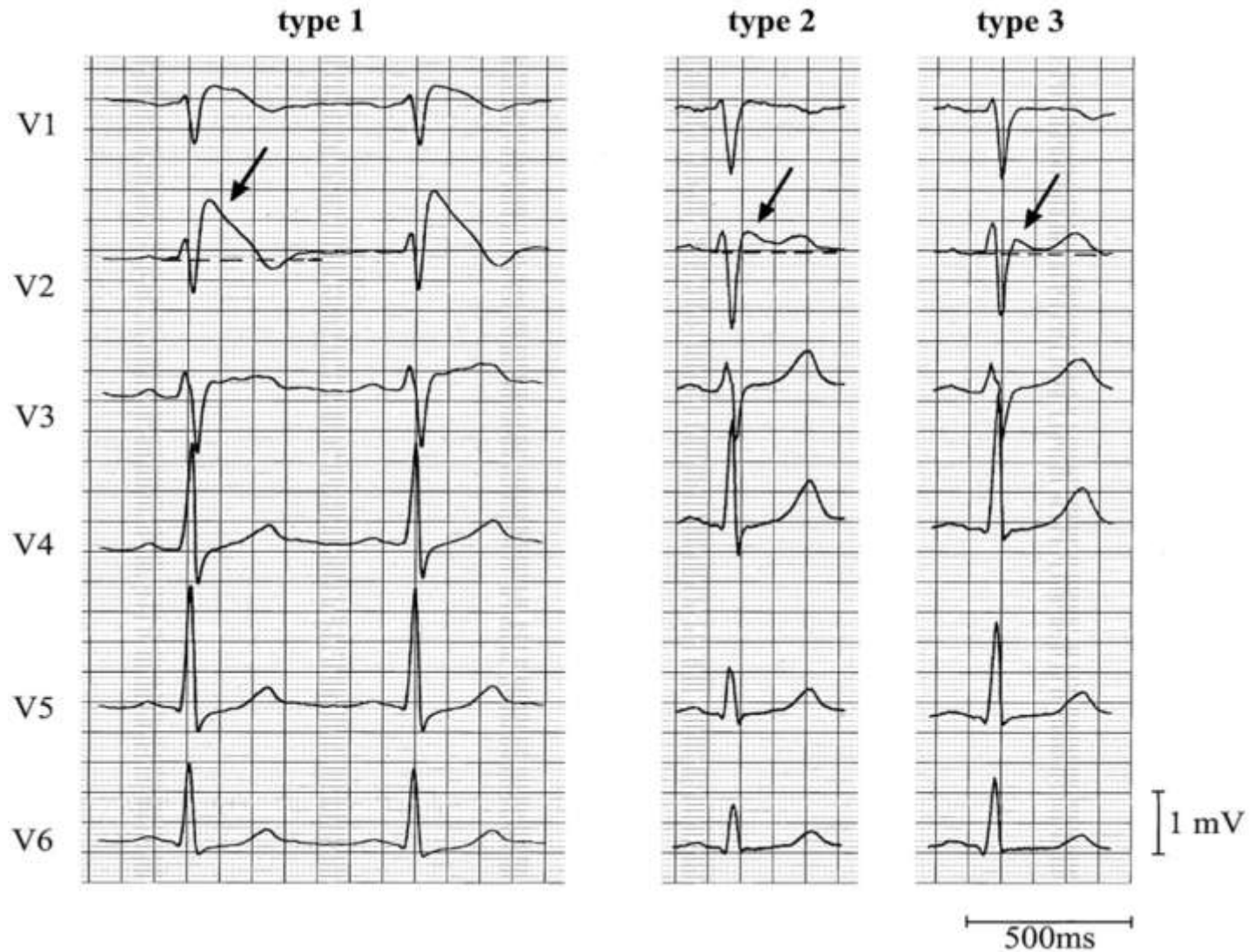
WPW

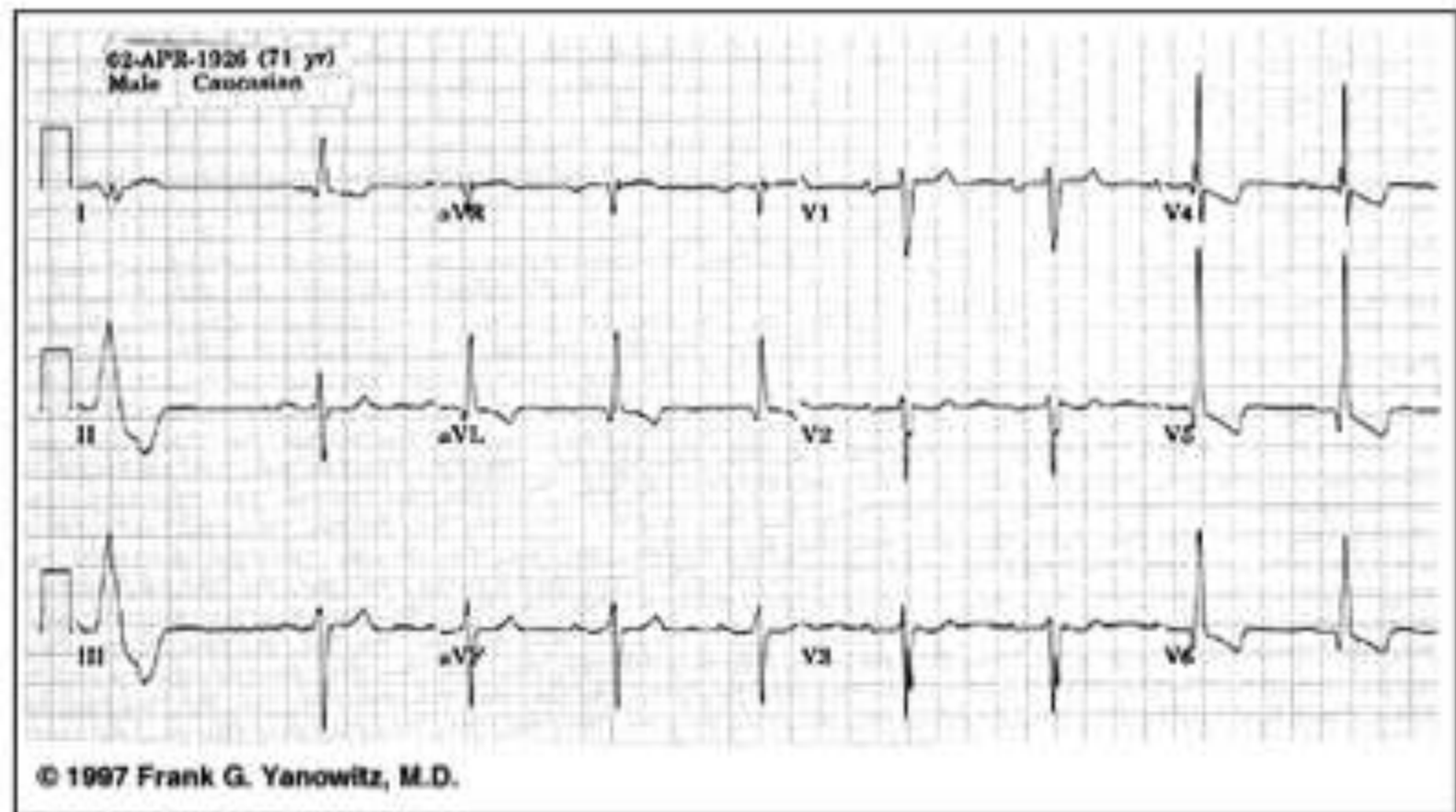




25 mm/s 10 mm/mV 100Hz 005C 12SL 229 CID: 25

Brugada Syndrome





LVH: Strain pattern + Left Atrial Enlargement-KH