

Interesting ECGs

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**Awarded Prestigious Master Teacher Award from CCDSI in 2022
(100 Articles and 16 e-Books on different aspects of ECG to his credit)**



❑ Interesting ECGs

Essentials

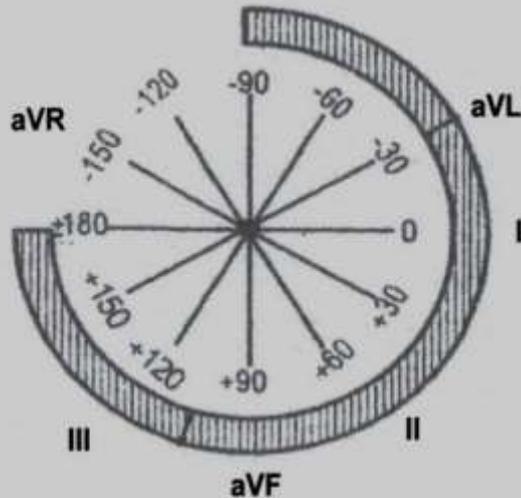
- **A concept of basics of normal ECG**
 - **A glimpse eyeview over the concerned ECG to be interpreted (3-4 times)**
 - **A methodological approach to its analysis **in collaboration with the clinical history****
-
- **Provisional impression**

Normal 12-Lead ECG

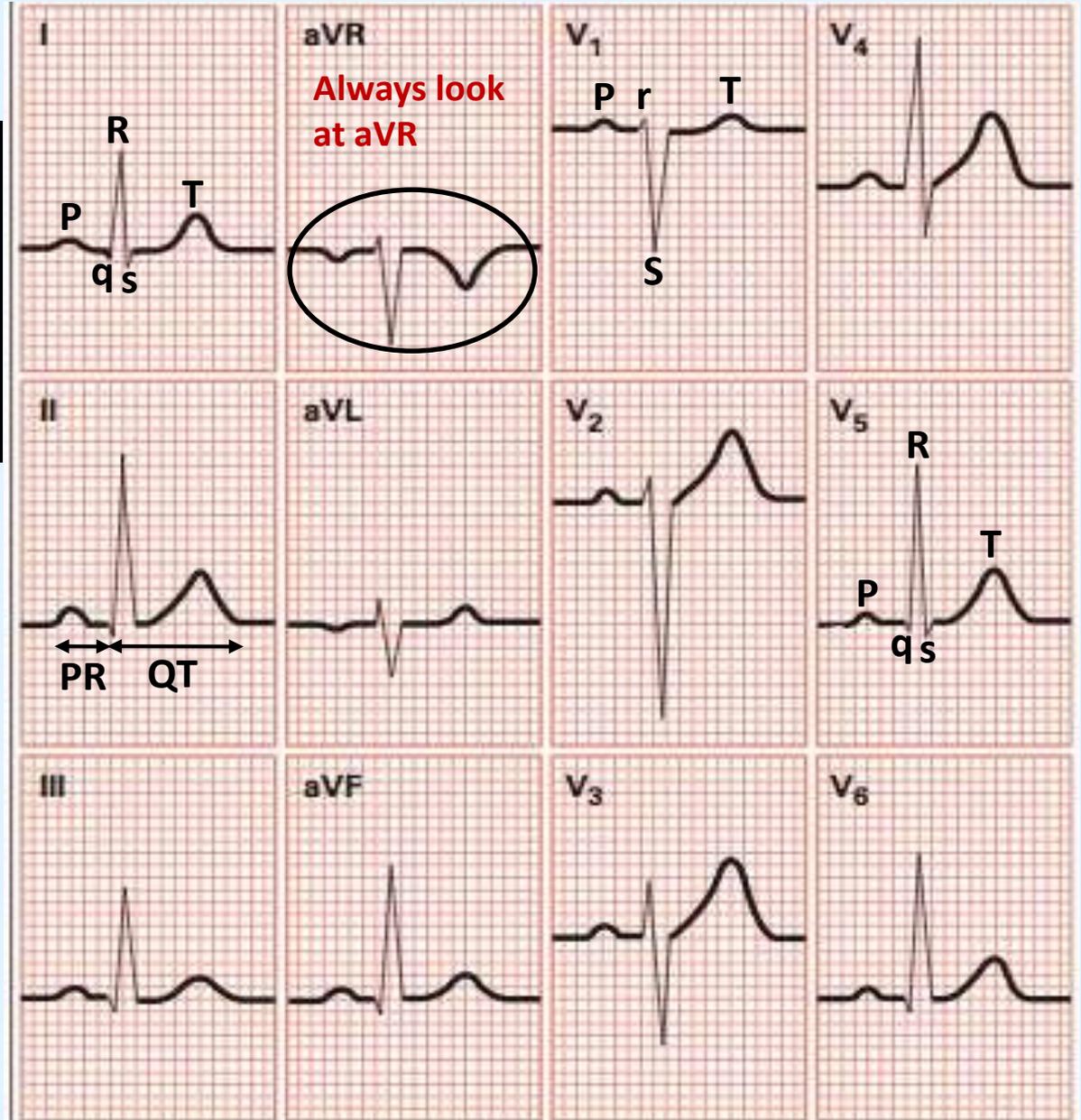
RULE OF 90°

(Electrical axis determination)

Any exploring lead placed within a range of 90° in respect to cardiac vector records positive current, at 90° equiphasic deflection or no deflection and beyond 90° negative deflection.

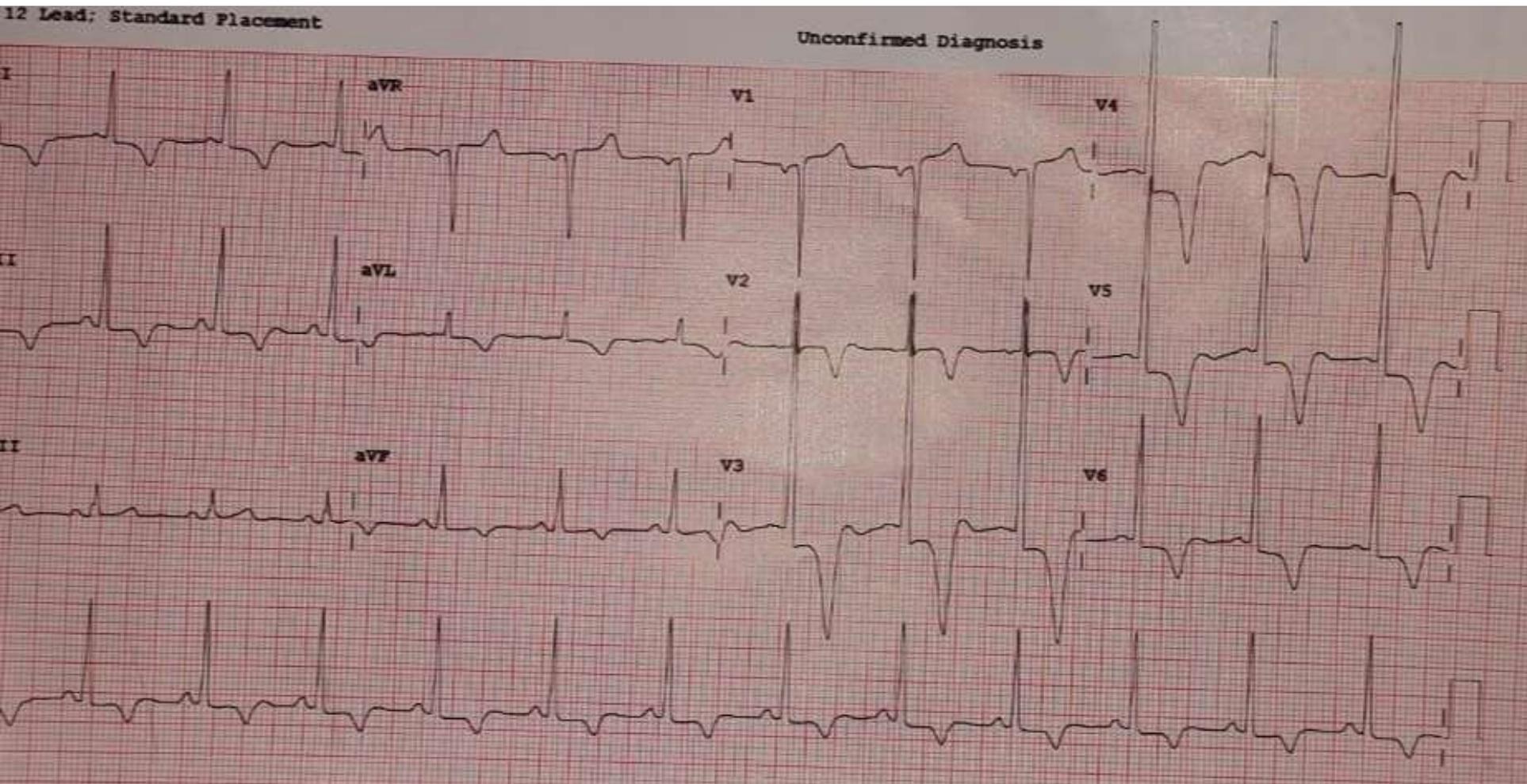


Axis on this ECG = +70°
(Normal QRS axis = -30° to +90°)

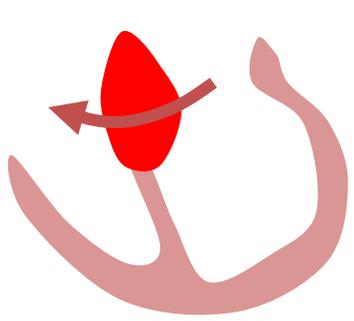


CASE -1

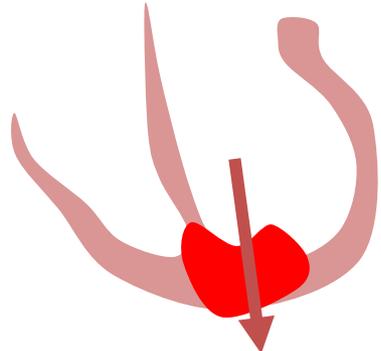
A young aged 30 years complains of chest pain on walking



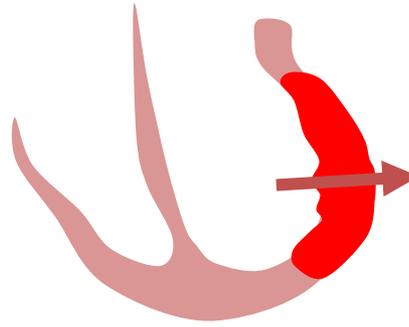
HCM (Hypertrophic element + secondary ST depression with
dragger T inversion, ↓PR interval ± other associations)



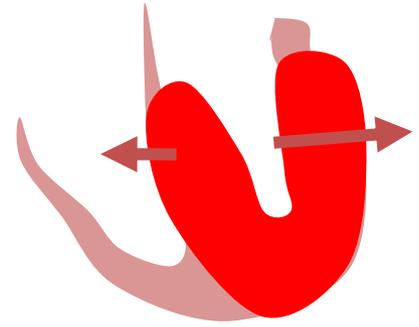
1. Isolated septal hypertrophy



2. Apical hypertrophy



3. LV free wall hypertrophy



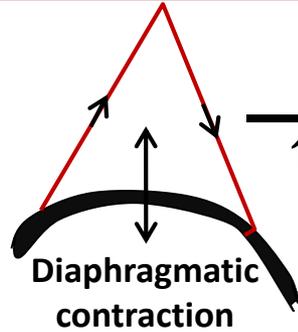
4. Combined septal and Free LV wall hypertrophy

Comments

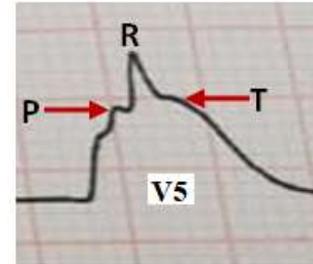
HOCM along LV free wall
(with LAE) possibly with
pre-excitation
(likely LGL syndrome)

Case – 2 ‘Spiked helmet sign’

Cardiac contraction

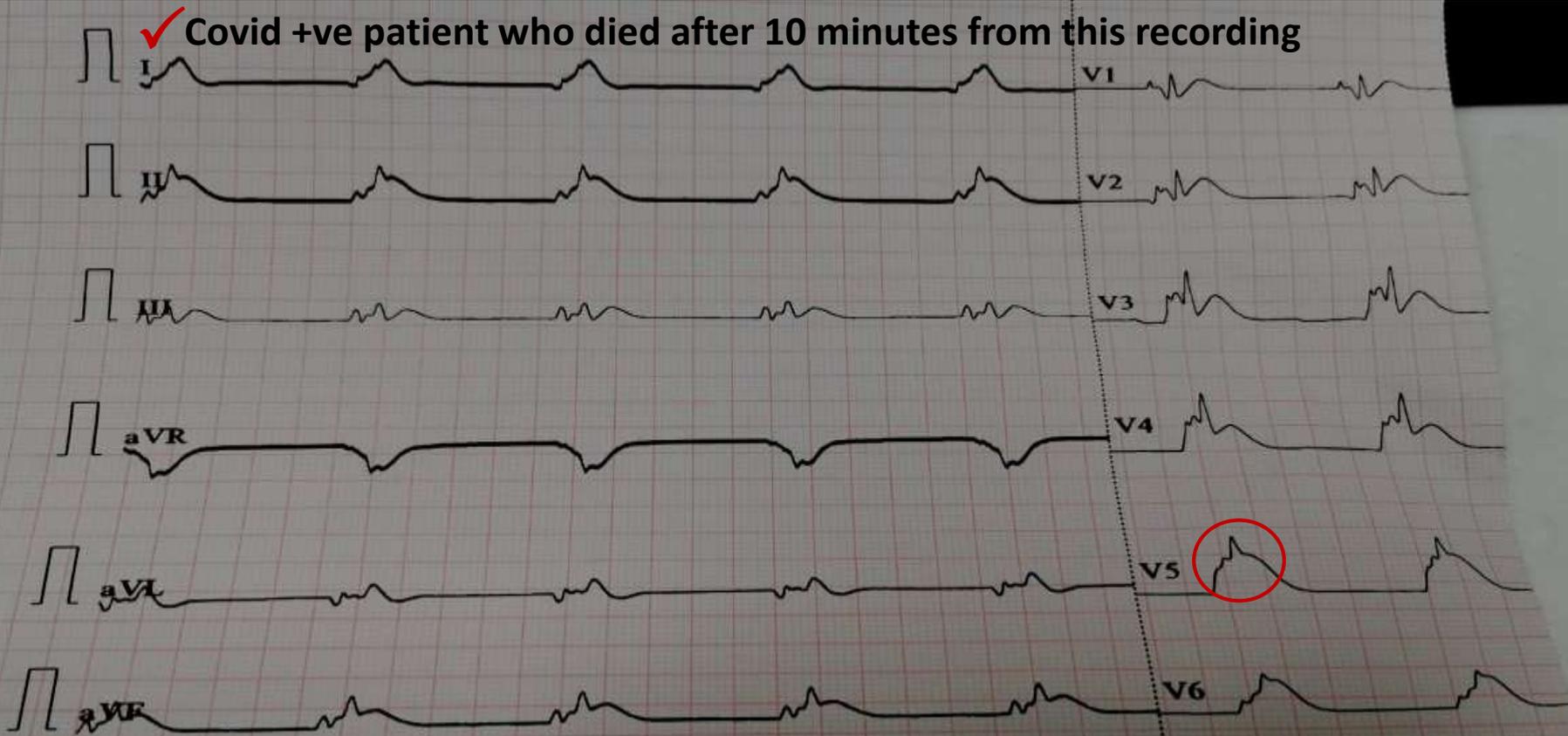


↑ Intrathroacic / intra-abdominal pressure, sepsis, respiratory distress, subarchoid haem., anoxic brain injury, etc.



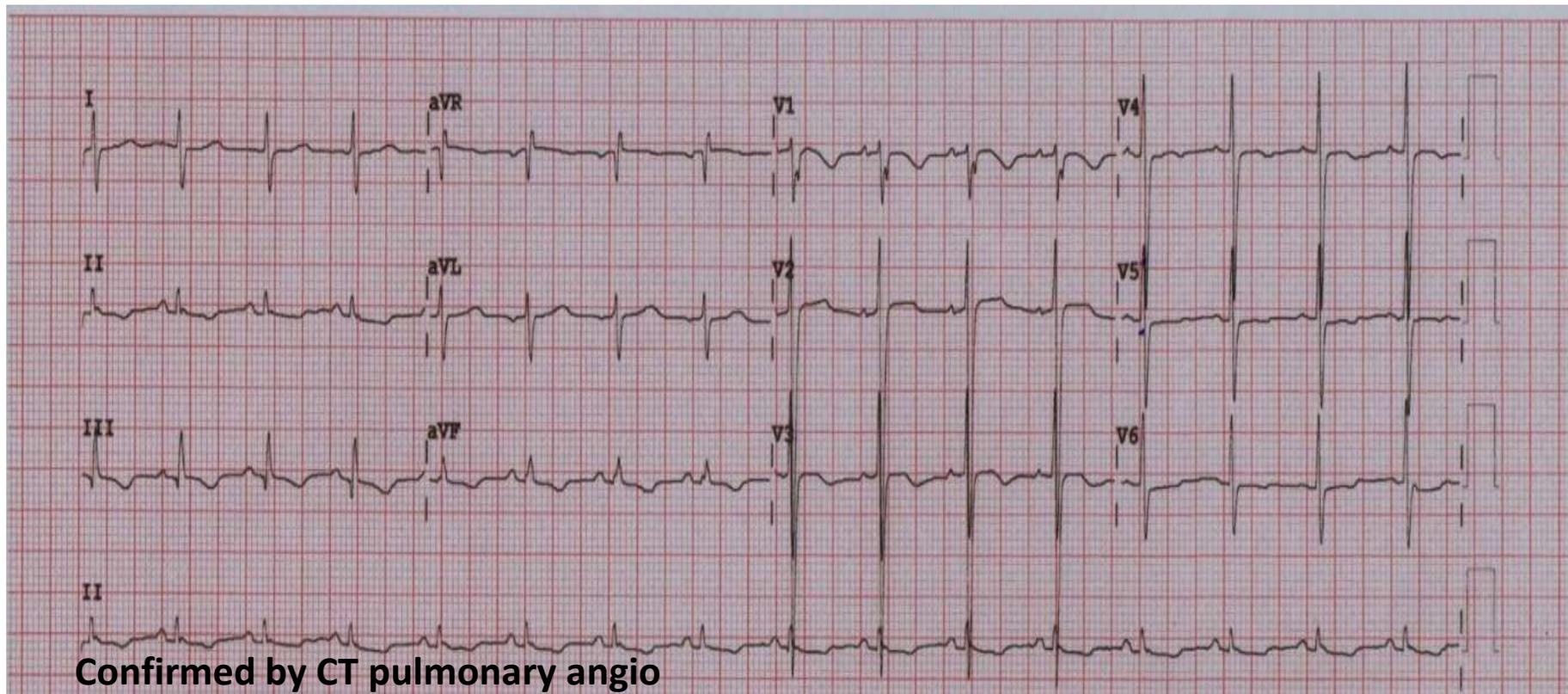
‘Spiked helmet sign’ (dome-and-spike pattern)

✓ Covid +ve patient who died after 10 minutes from this recording



Case – 3 Acute Pulmonary Embolism

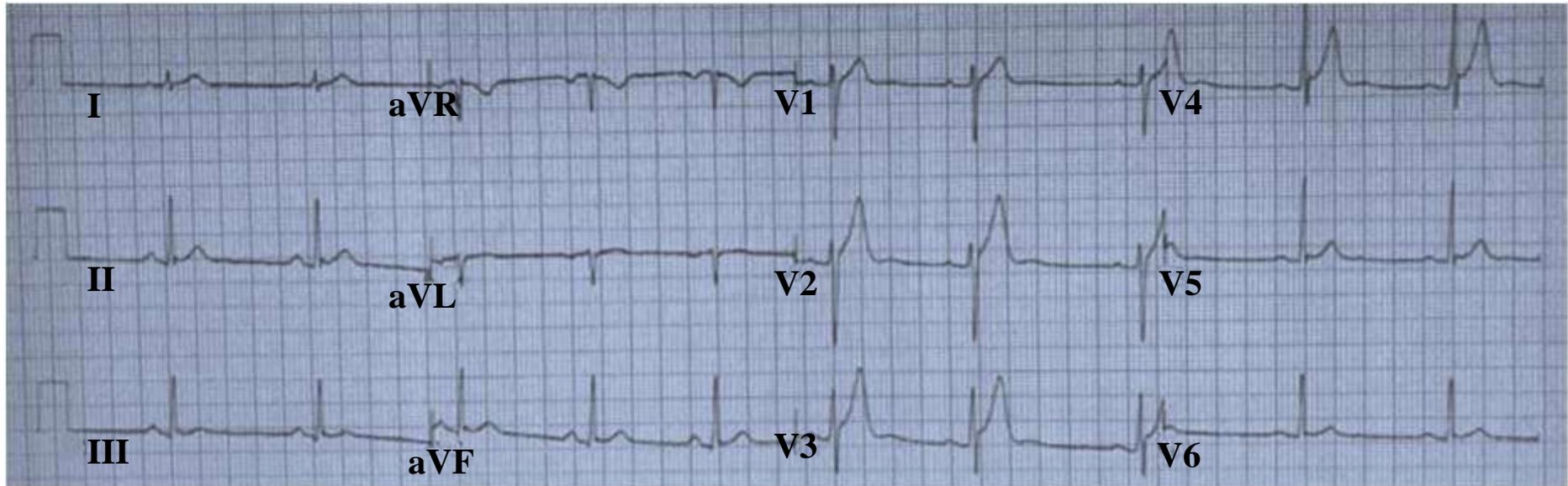
A 42 years male suddenly presented with breathlessness



- HR =100 bpm
- S_IQ_{III}T_{III} Pattern
- T_↓ over V1 -3 , also over inferior leads (II, III, aVF). Mild ST elevation in V1-3 (? RV epicardial current of injury due to stretching)
- Clockwise rotation

Case -4 Short QT syndrome

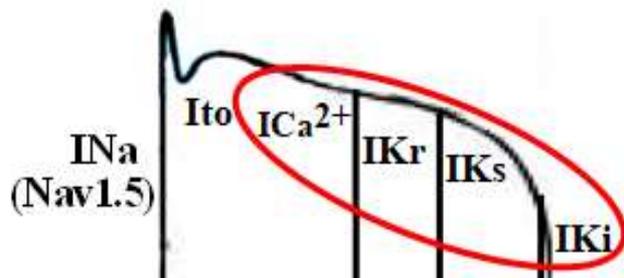
A young adult male who experienced cardiac arrest



ECG findings :

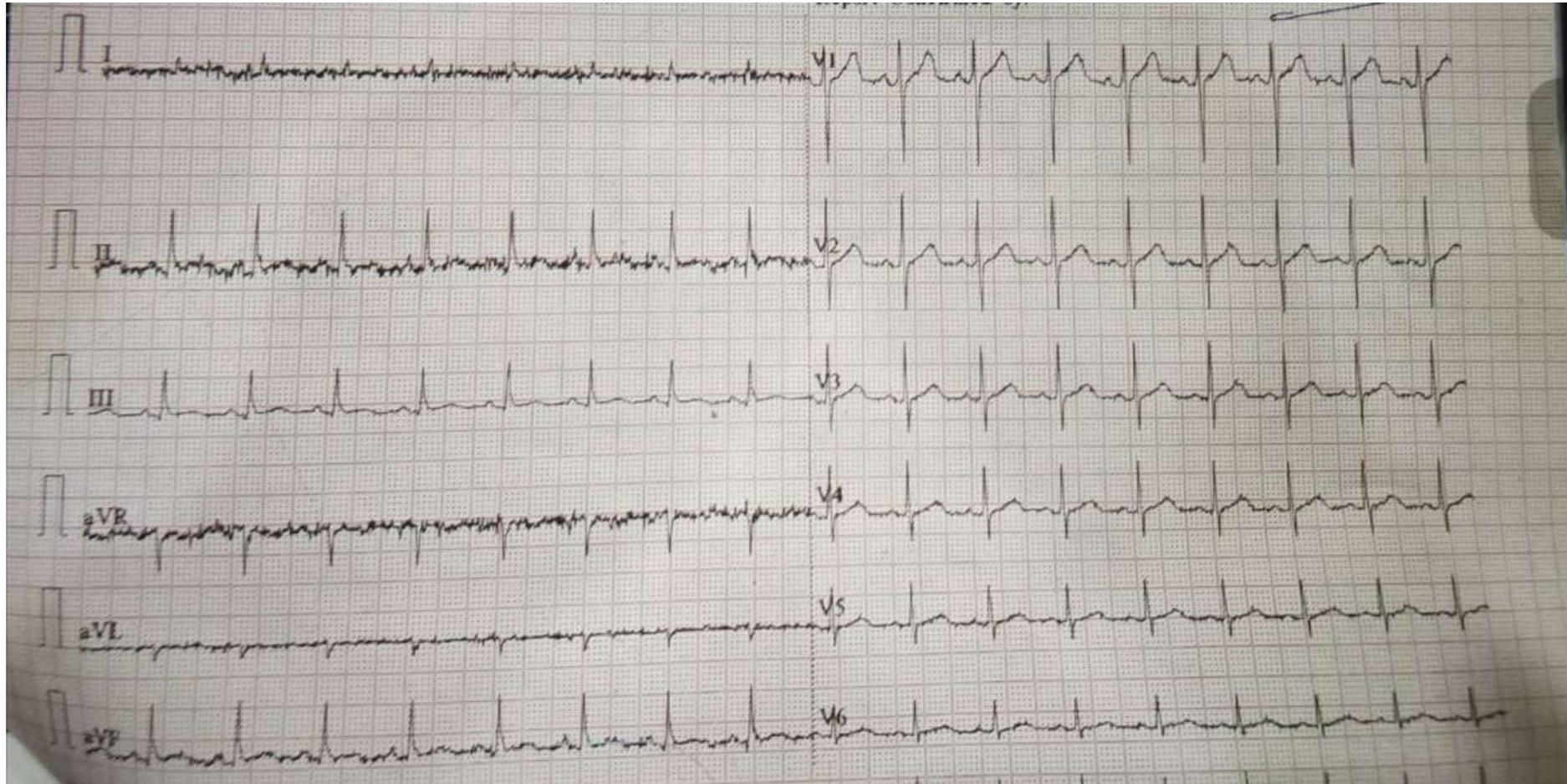
- I. QT and QTc intervals respectively : 0.32 and 0.32 s both are equal and unchanged.
- II. Tall / peaked T , best seen over precordial leads V1-V4.

Accelerated repolarization (QTc <0.36 s and 0.37 s in males and females respectively)



Case – 5 ECG with left pneumothorax

40 years male with sudden onset of breathlessness and chest pain

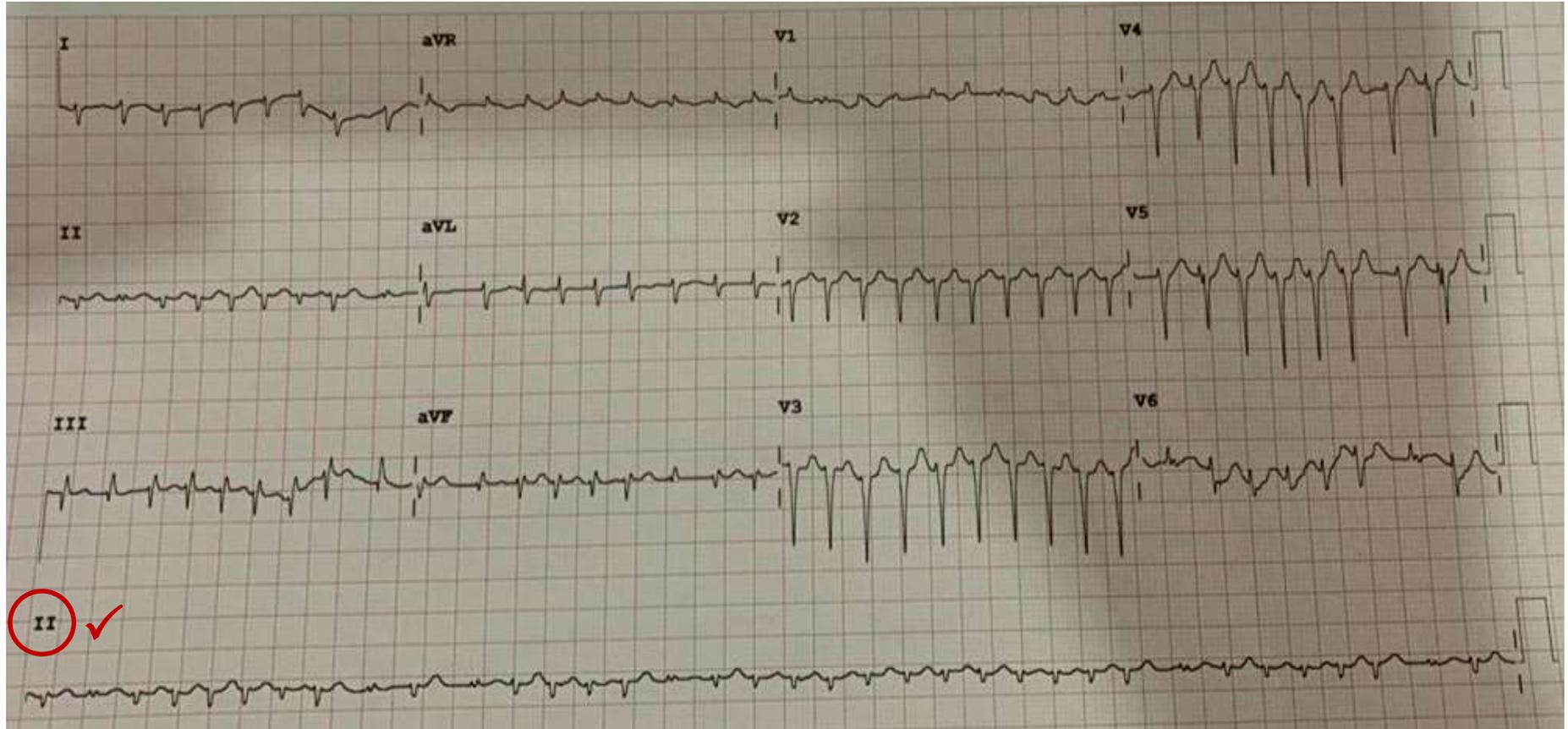


Impression :

- There is a decrease in the amplitude of R wave over V4-6 with sinus tachycardia suggests left pneumothorax.
- Chest X-ray PA view is also suggestive of Left pneumothorax

Case-6 DCMP

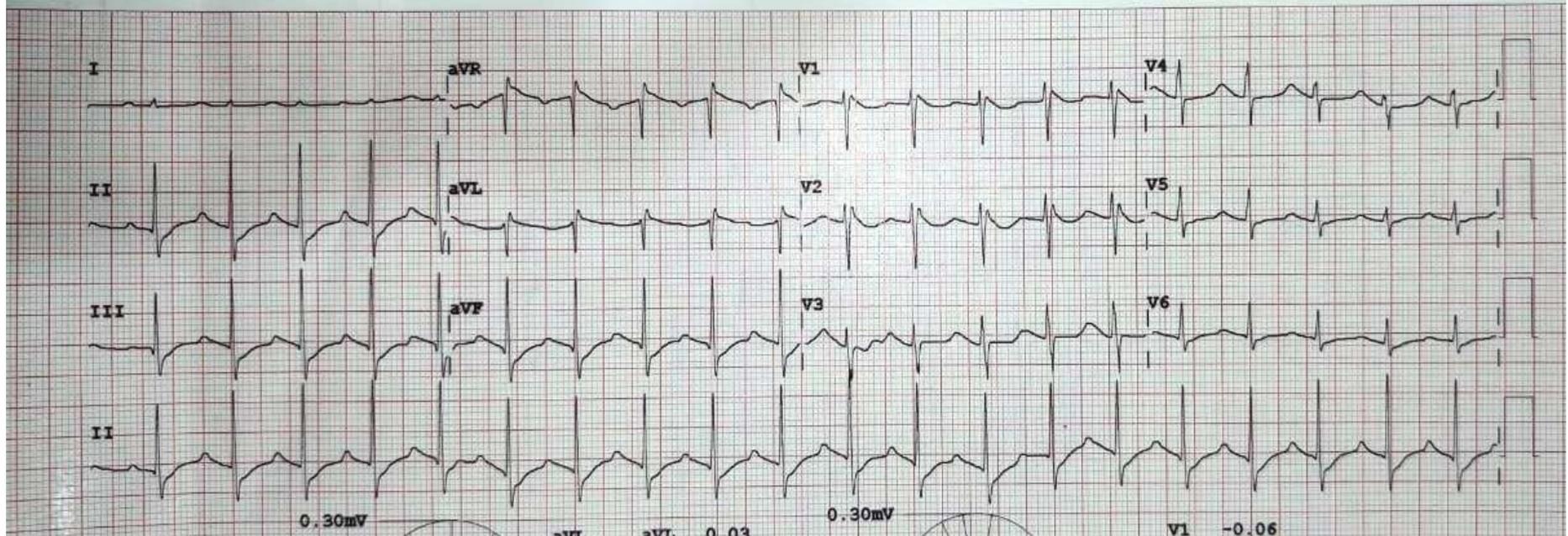
Middle aged lady presenting with breathlessness (Globular cardiomegaly on radiology)



- Low voltage QRS in limb leads
- Poor R-wave progression in chest leads.
- Atrial fibrillation with fast ventricular rate (250 bpm) (please see the rhythm lead II : rhythm is irregularly irregular)
- North-west axis + 170° (anatomical distortion of His bundle and its branches)

Case -7 Hypokalemia

A Young male presented with Quadriparesis and respiratory arrest.



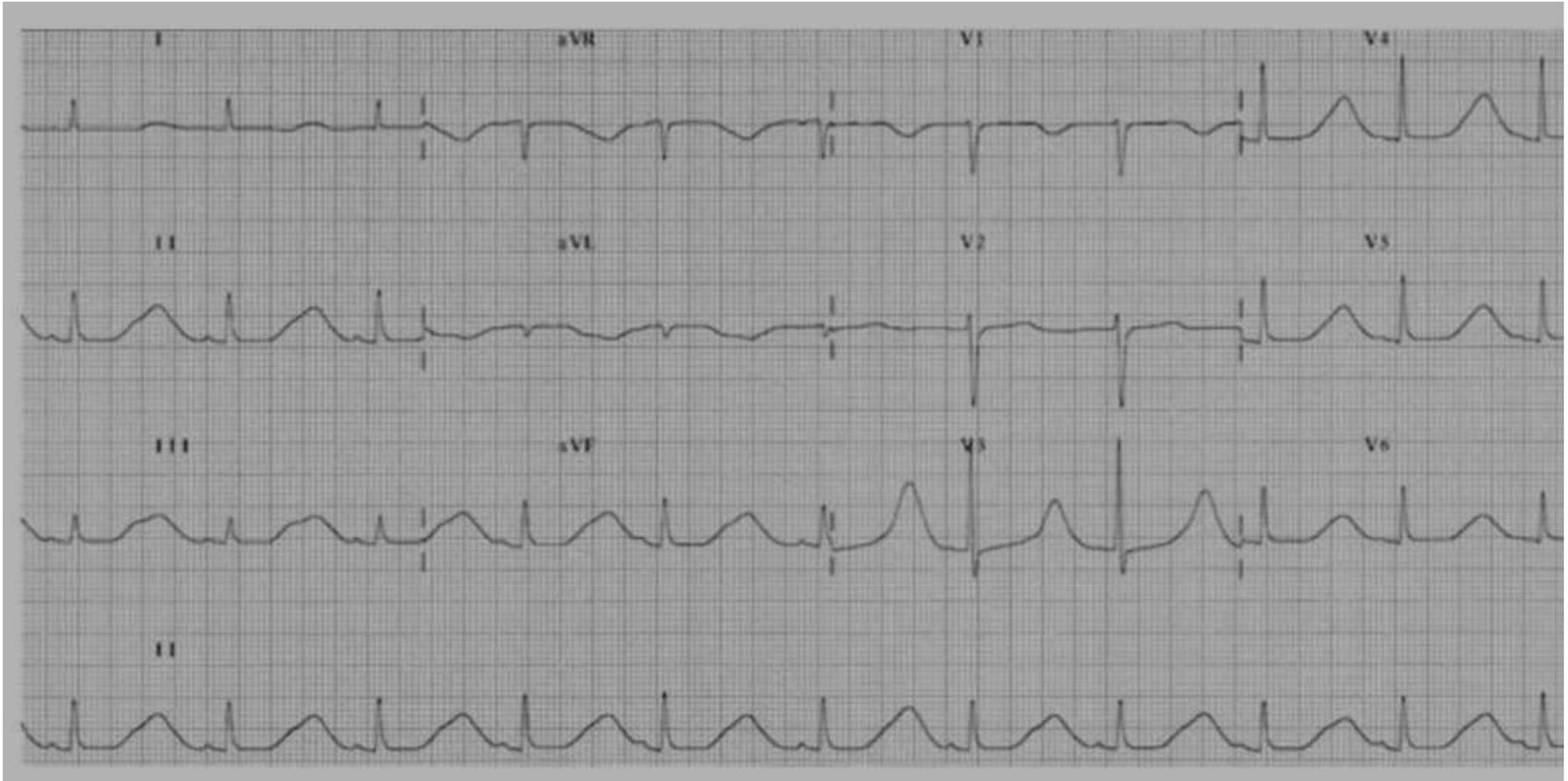
- QTc interval = 520ms
- T wave with somewhat low amplitude , merging with prominent U-wave
- A slight depression of ST segment

Investigation

- Serum Potassium = 1.81 mEq/L
- Serum magnesium = 1.63 mg/dL (Normal value = 1.70-2.20 mg/dL)

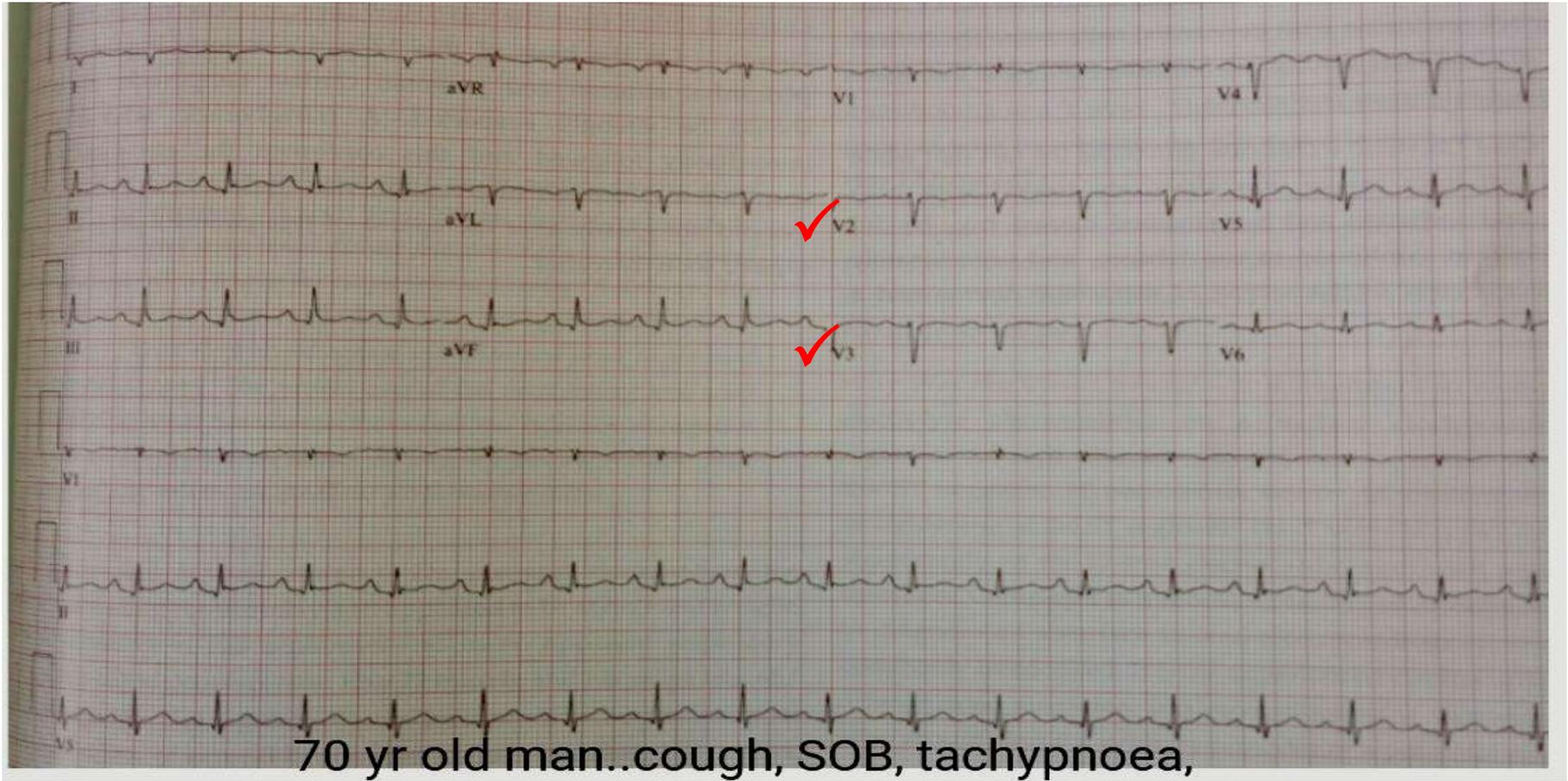
Case-8 Hypocalcaemia

45 years Female with recurrent seizures since 1 day



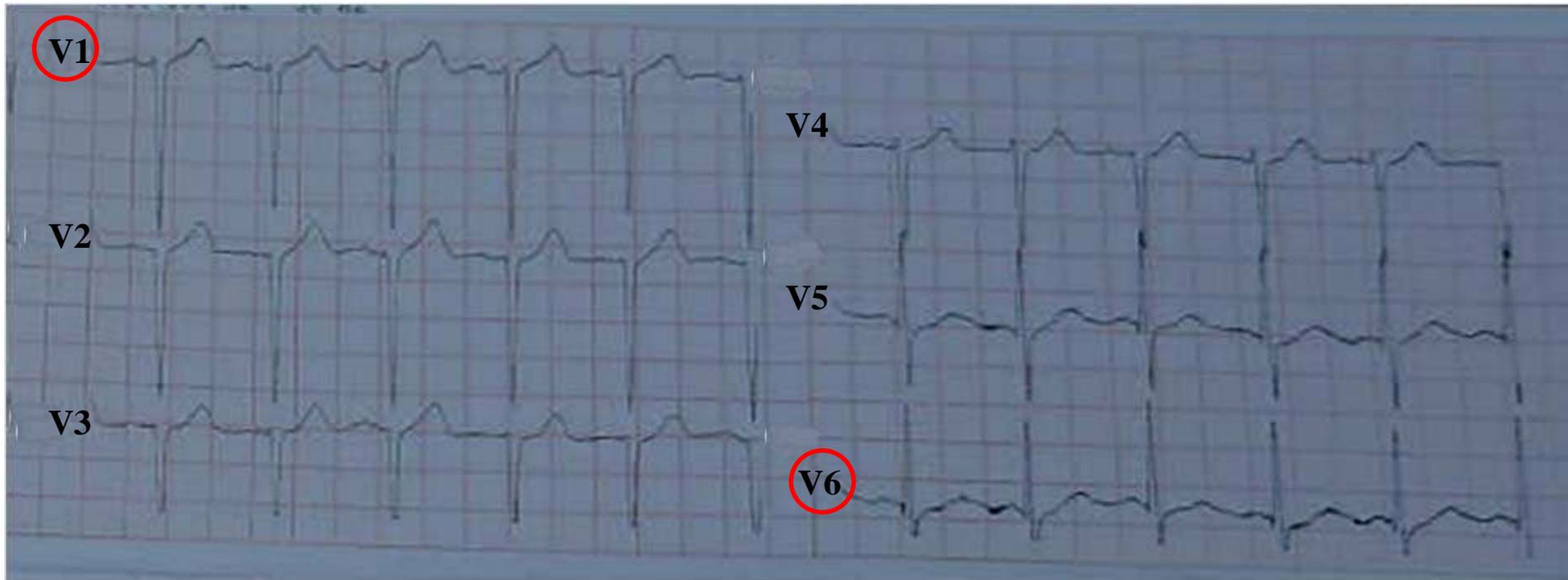
- Prolonged QT interval (exceeding half of the RR interval).
- Serum calcium = 7.5 mg/dL , Albumin = 4.5 gm/mL , Phosphate = 8.5 mg/dL (Normal range 3.4 to 4.5 mg/dl) , Serum PTH = 3pg/ml (Normal value in adult : 10-69 pg/ml) , Normal Vit. D.
- Bilateral basal ganglia calcification on CT brain. Final impression = Primary hypoparathyroidism

Case -9 Pericardial effusion



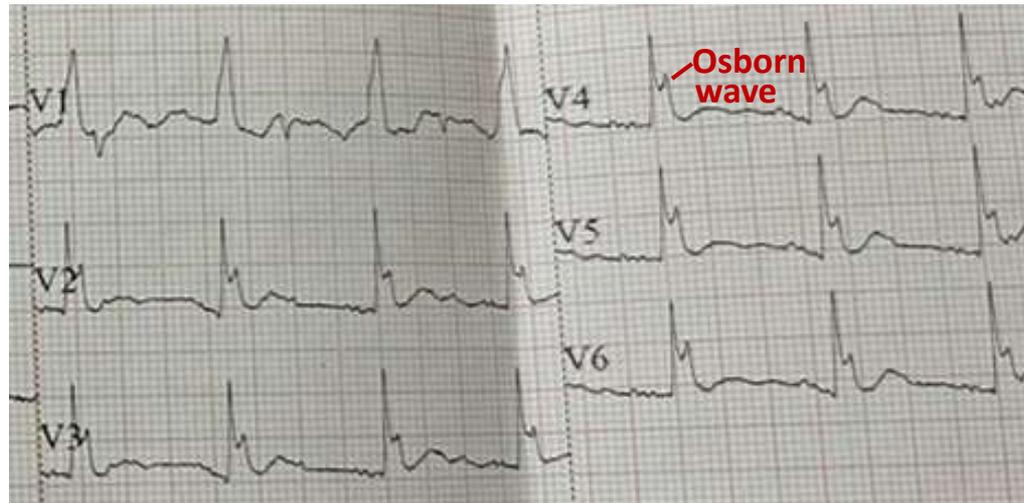
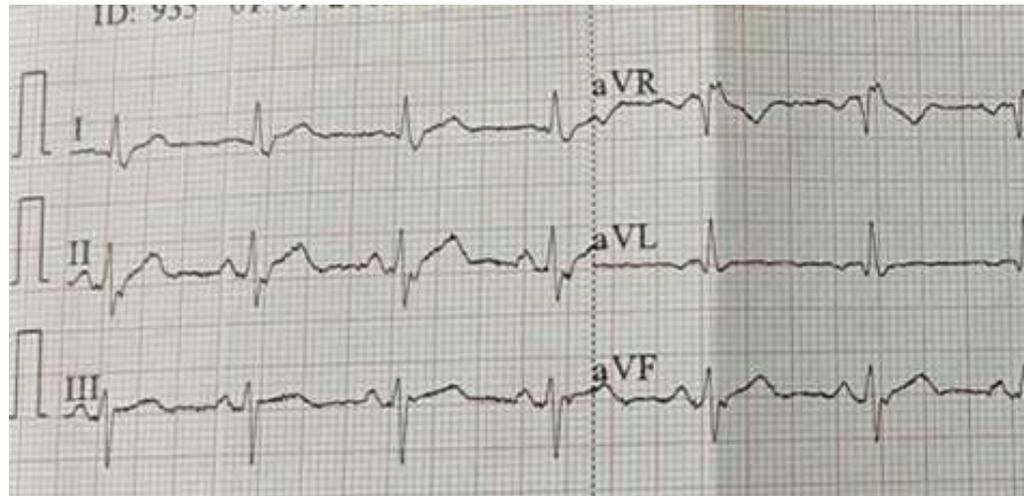
- Triad of Sinus tachycardia (here Heart Rate = 111 bpm) , Electrical alternans , most obvious over precordial leads V2-3 and low voltage over both the plane.
- Cardiac echo showed the presence of Pericardial effusion.

Case -10 Loss of precordial T-wave balance (upright T-wave in V1 is larger than that in V6) : HYPERACUTE T-WAVE



- History suggestive of acute CAD
- This finding (T in V1 > T in V6) indicates a high likelihood of coronary artery disease, and when new implies acute ischemia

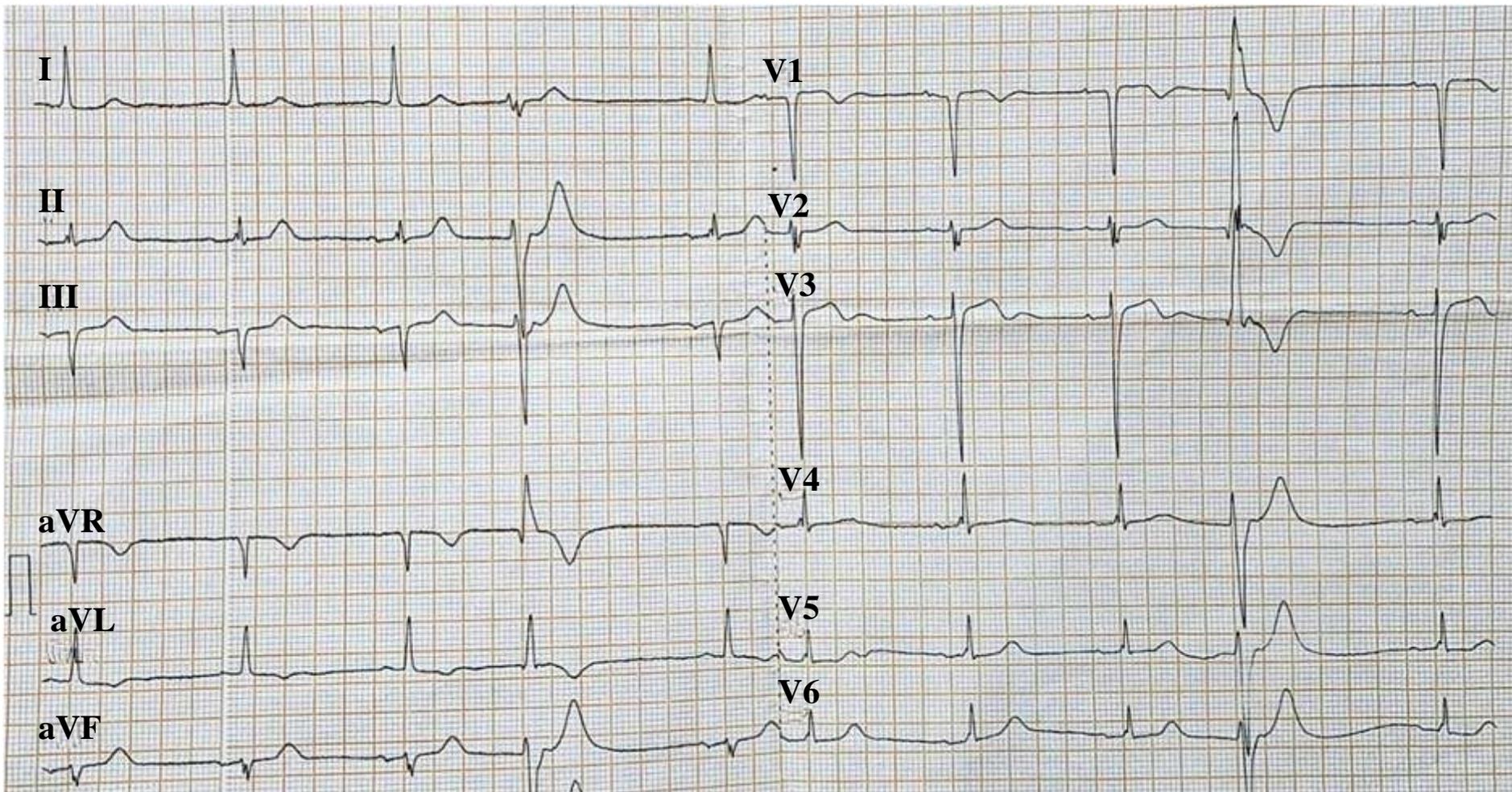
Case-11 Osborn wave



Osborn waves in the setting of underlying RBBB (seen in hypothermia , hypercalcaemia and other miscellaneous causes as well)

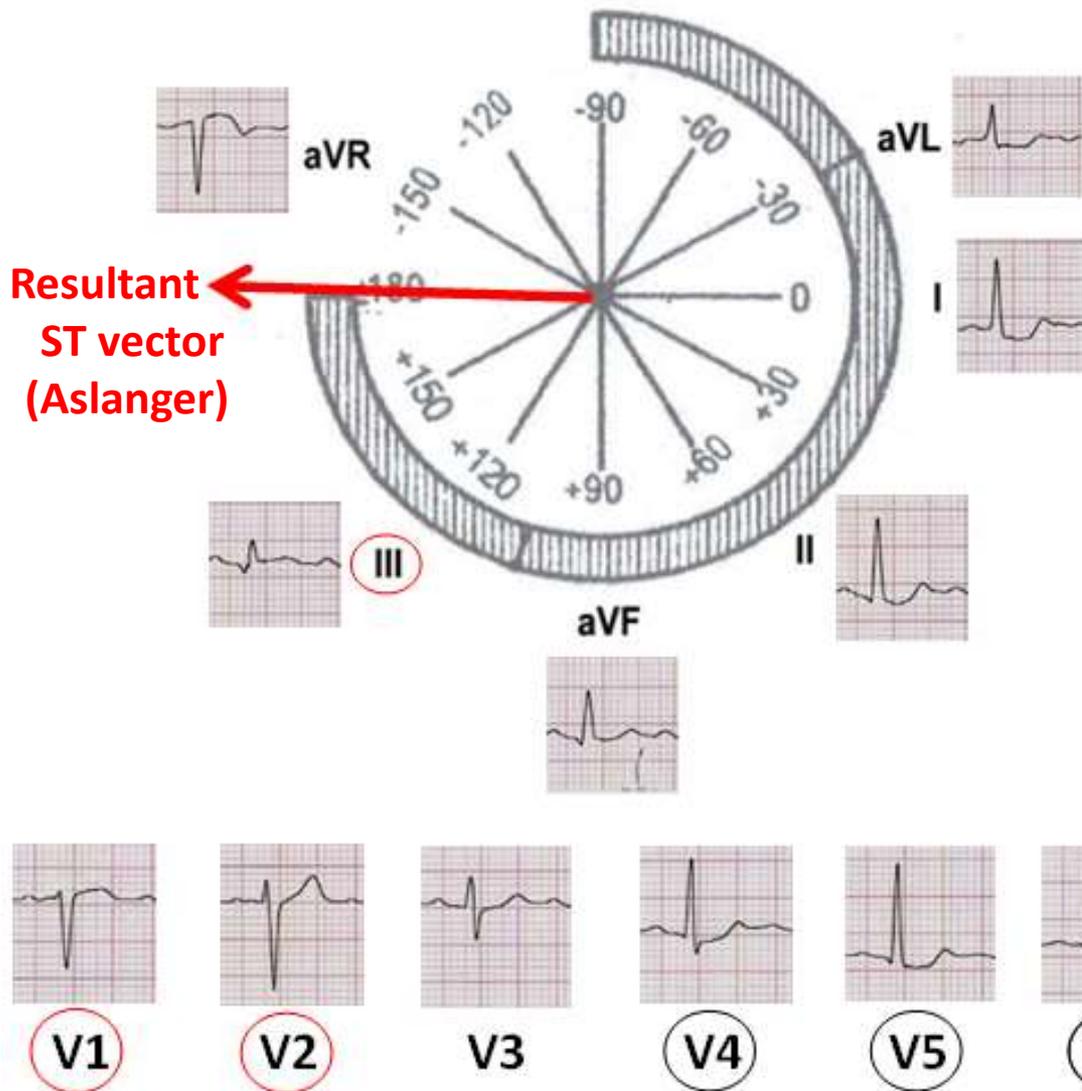
Although controversial , a notable propensity to herald ventricular fibrillation so never be ignored

Case -12 Pre-excitation with Mahaim pathway



- Normal PR interval with minimal ventricular pre-excitation (delta wave)
- rS pattern over lead III. Atypical LBBB
- Presence of Q wave over PVC in V1-3 = The residual impact of old MI in proximal LAD (history of chest pain a few months back)

Case – 14 Aslanger pattern on ECG



- ST \uparrow only in lead III as evidence of inferior MI
- ST \uparrow in V1>V2
- **Concomitant ST \downarrow in any of V4-V6, with a positive/terminally positive T-wave**

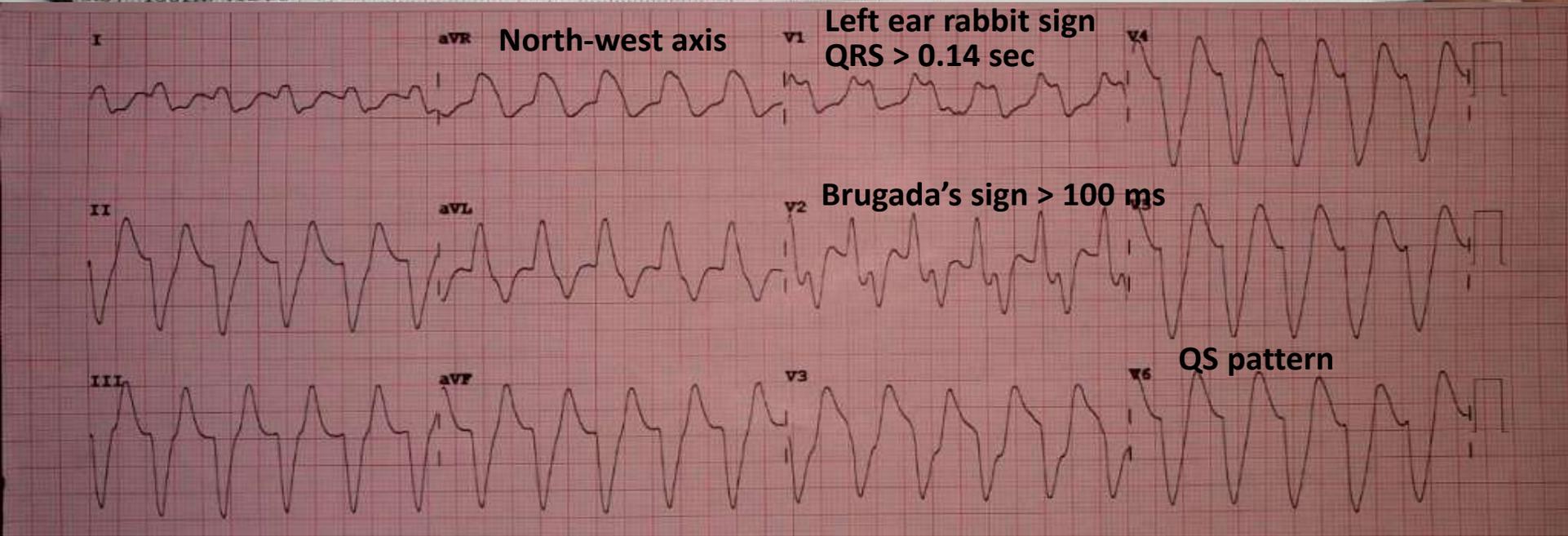
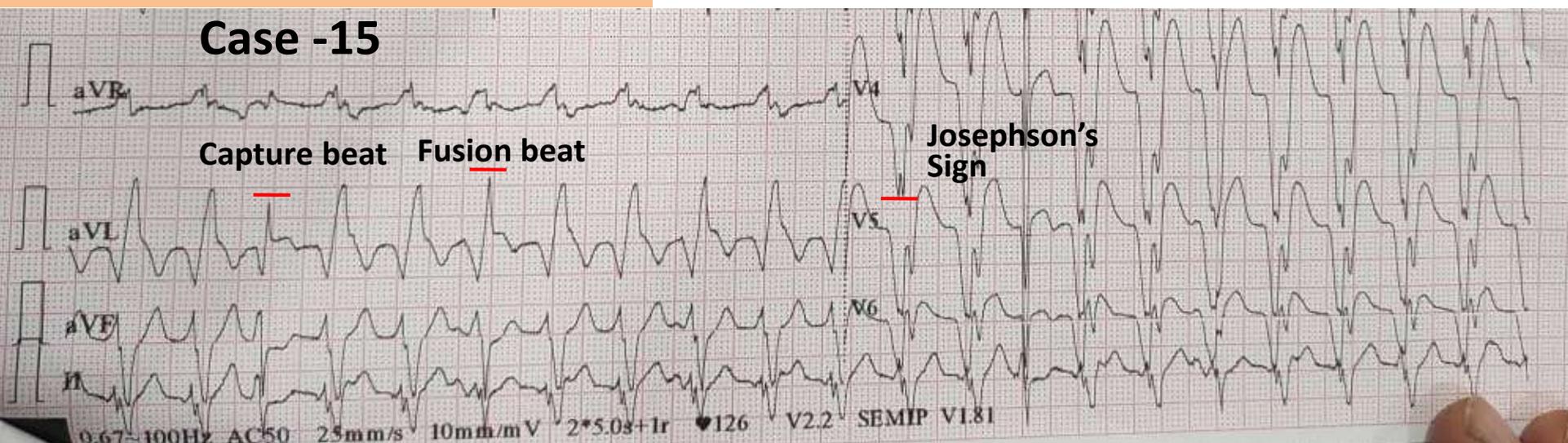
Resultant ST vector (Aslanger)

There are two ST vector forces – one from inferior occlusive MI and the other from subendocardial ischemia. The resultant average ST vector is directed rightwards, as indicated by **red arrow**, causing ST elevation in leads III and aVR.

Ventricular tachycardia - VT

AV dissociation with faster ventricular rate (ventricular origin)

Case -15



NB : +Ve or -Ve concordance throughout the chest lead , i.e. with leads V1-6 so entirely positive (R) or entirely negative (QRS complexes) , with no RS complexes seen

Thanks

