

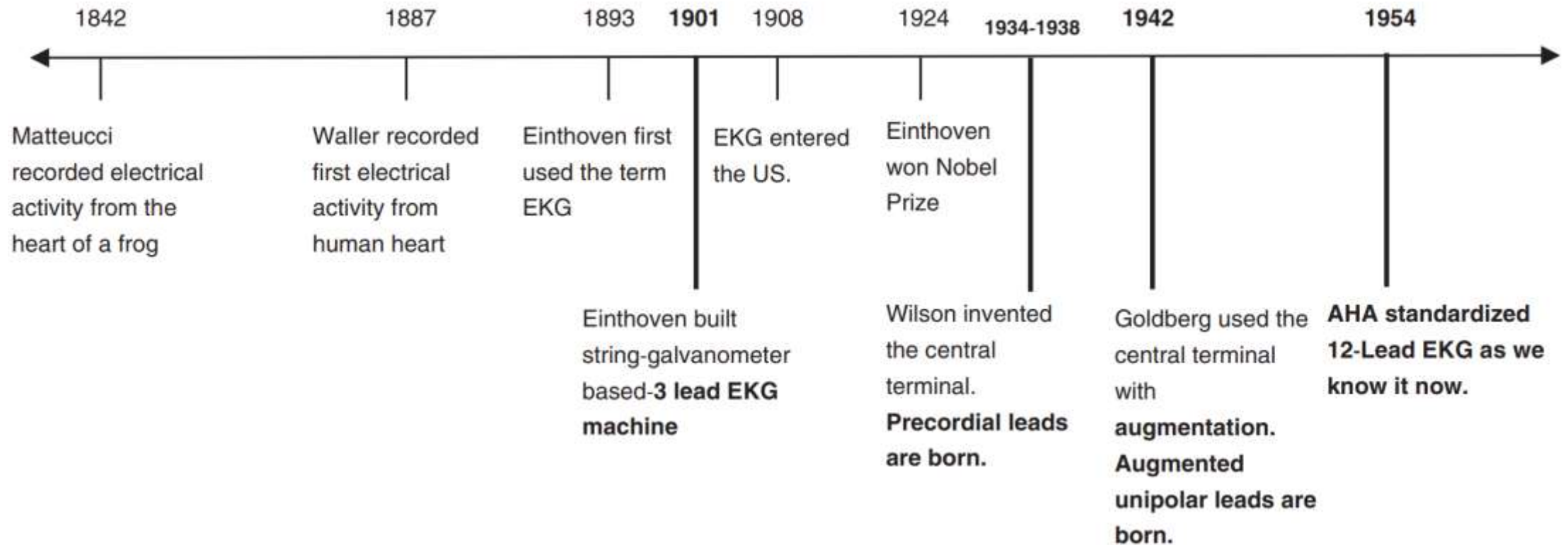
# Emergency Application of Electrocardiography



6<sup>th</sup> May 2022

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# ECG: Always Know The History



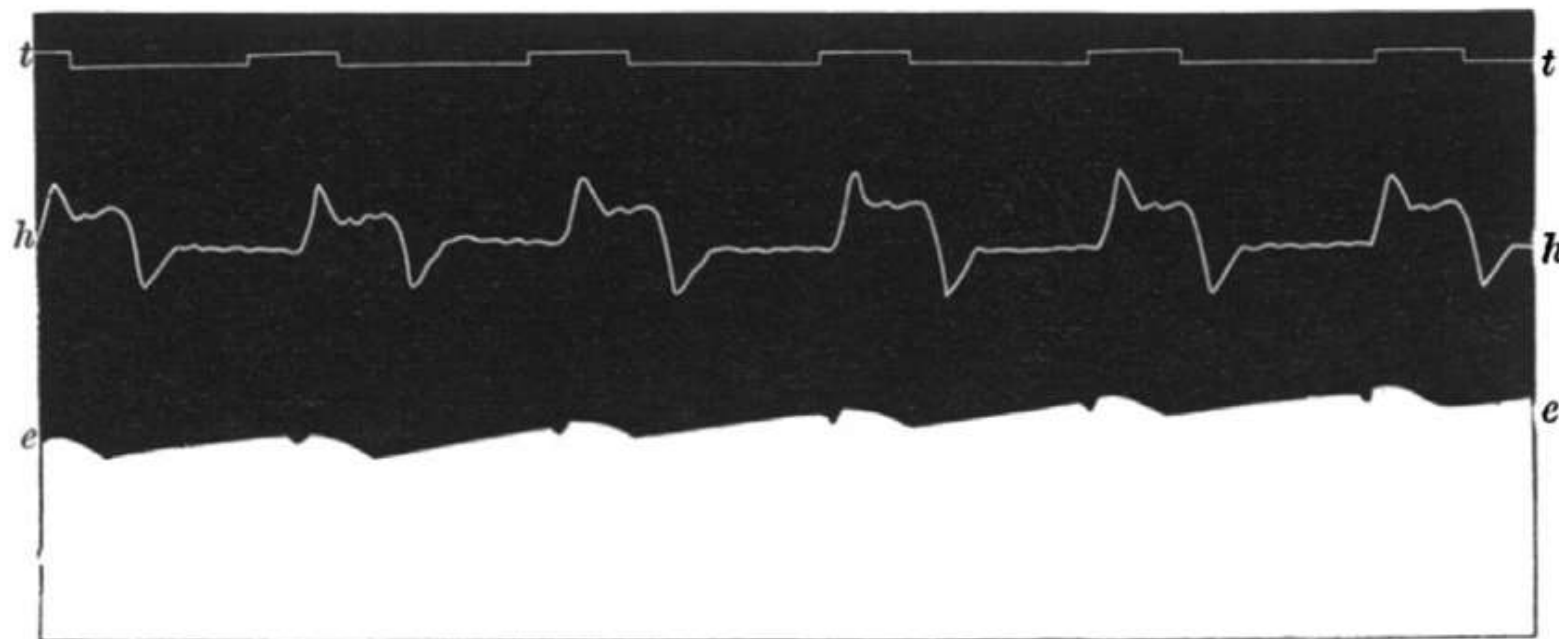
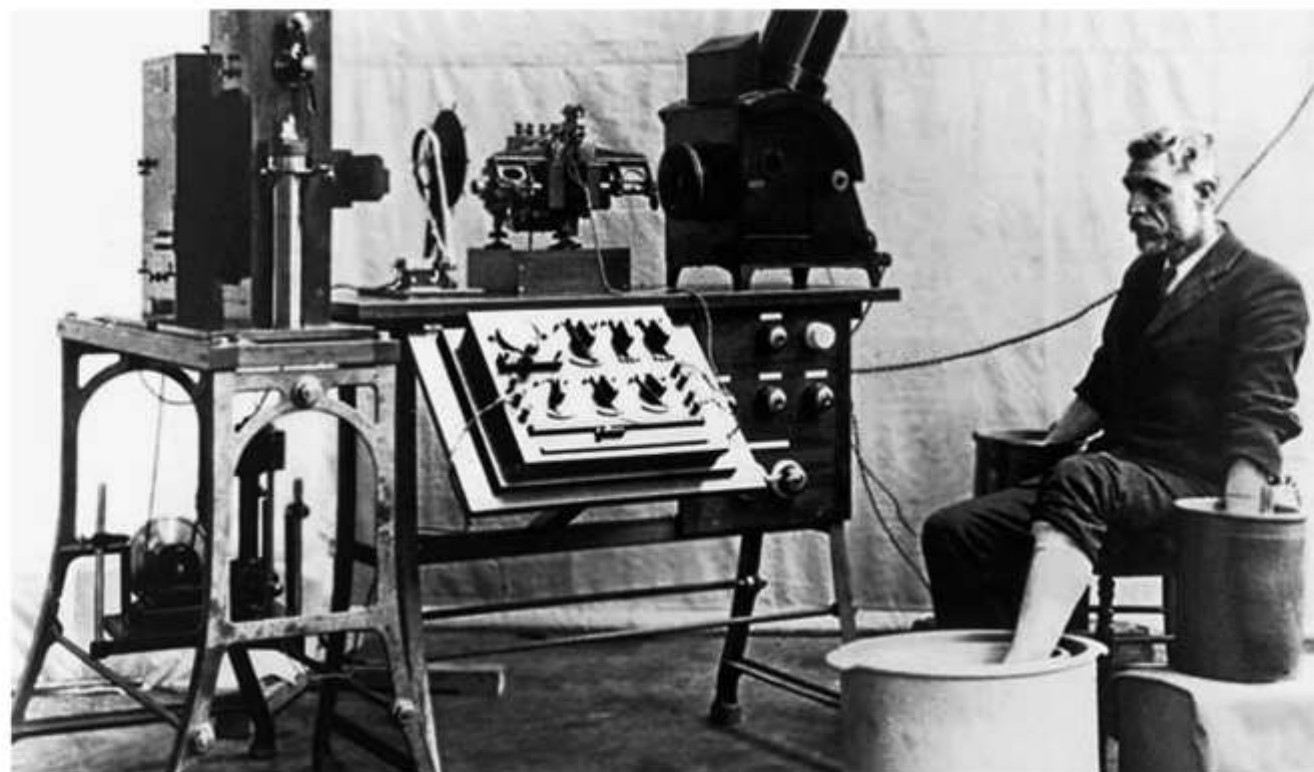


FIG. 1. Man. Heart led off to electrometer from front and back of chest (front to Hg; back to  $\text{H}_2\text{SO}_4$ ).

*e.e.* electrometer.      *h.h.* cardiograph.      *t.t.* time in seconds.

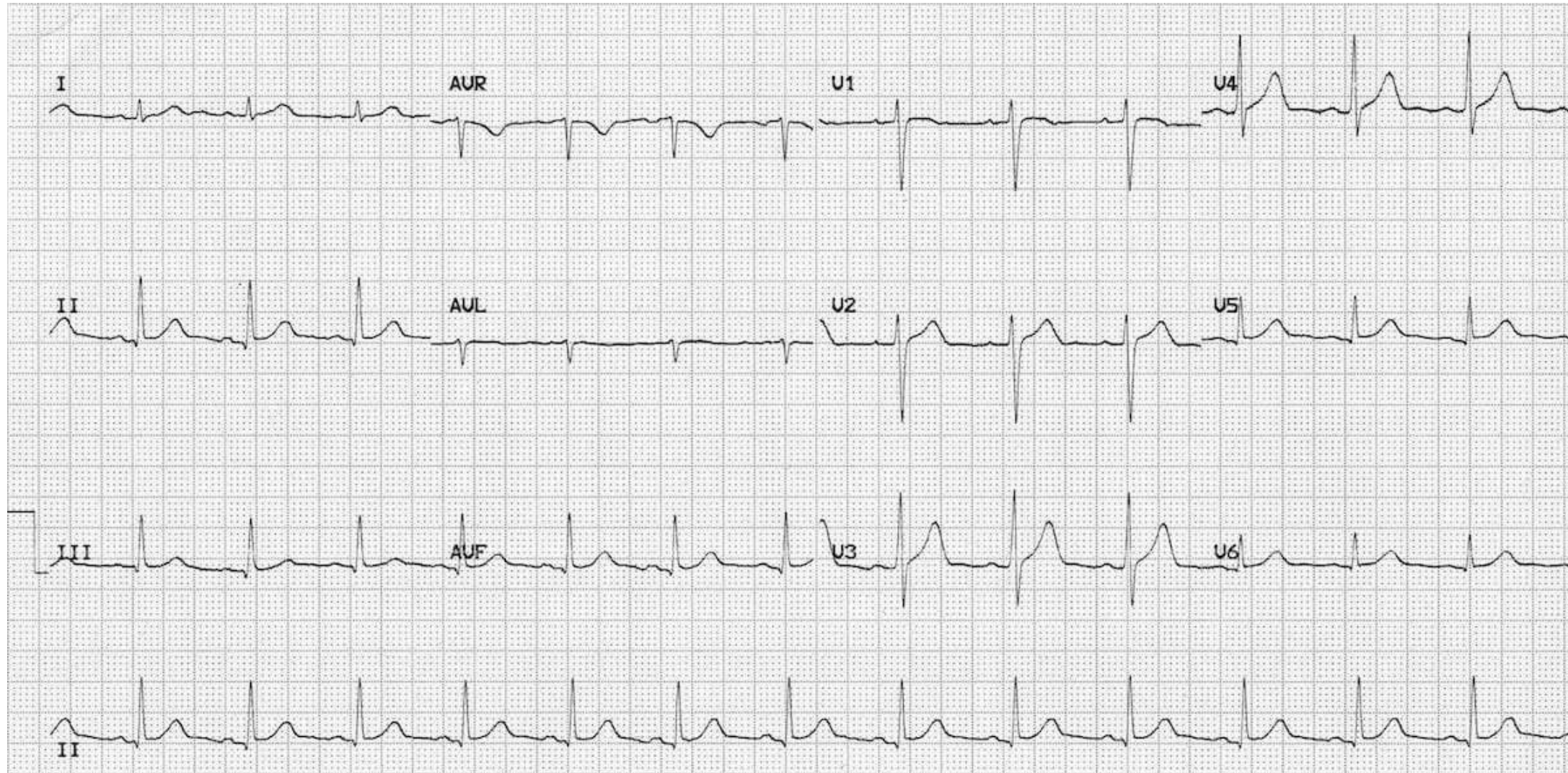
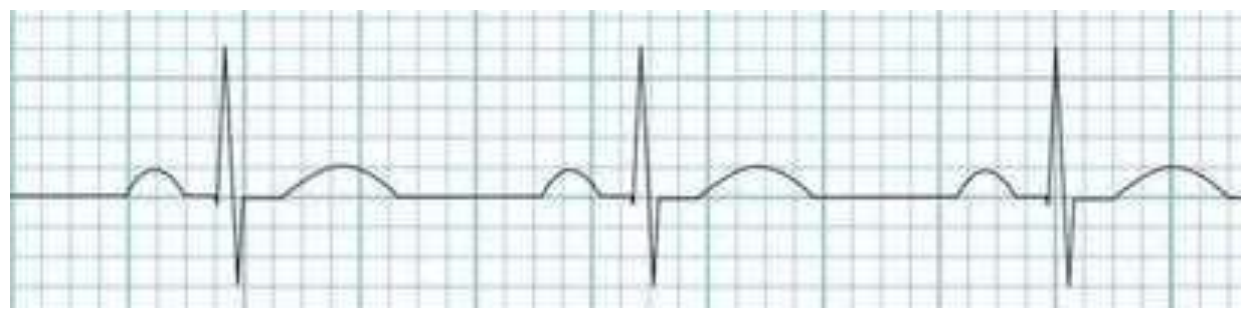
*Fig. 2.* First human electrocardiogram recorded by Augustus D. Waller of St Mary's Medical School showing simultaneous electrometer and cardiograph tracings showing an electrical activity preceding every heart beat. From



*Fig. 4.* Old string galvanometer electrocardiograph showing the big machine with the patient rinsing his extremities in the cylindrical electrodes filled with electrolyte solution.



# The Normal EKG



-Rate

-Rhythm

-ST Segments

-T waves





**The average emergency Physician:**

- Performs approx. 100 tasks per hour
- Gets interrupted every 6 minutes

**Get a Grasp of Killer ECG Patterns!**

**Deadly Diagnoses Not To Miss: Non-Ischaemic Version....**

**Deadly Diagnoses Not To Miss: Occlusion Version.....**



# RECOGNIZE

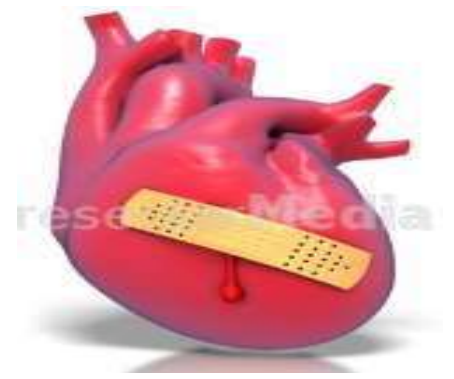


# Common Problems.....

- Chest Pain Syndromes: Myocardial Infarction, Acute PE, AD
- Arrhythmias
- Electrolyte Abnormalities
- Trauma
- Toxicities

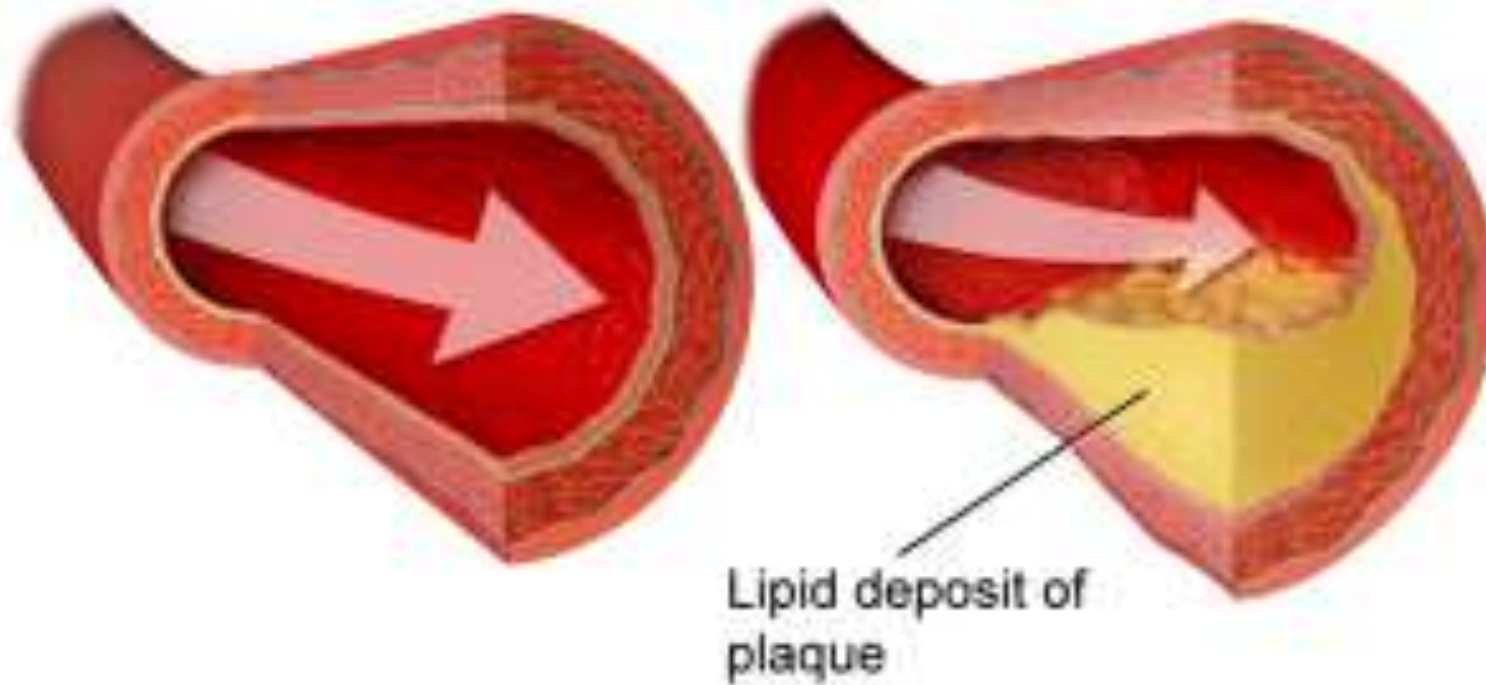


# Ischaemic: Coronary Occlusion



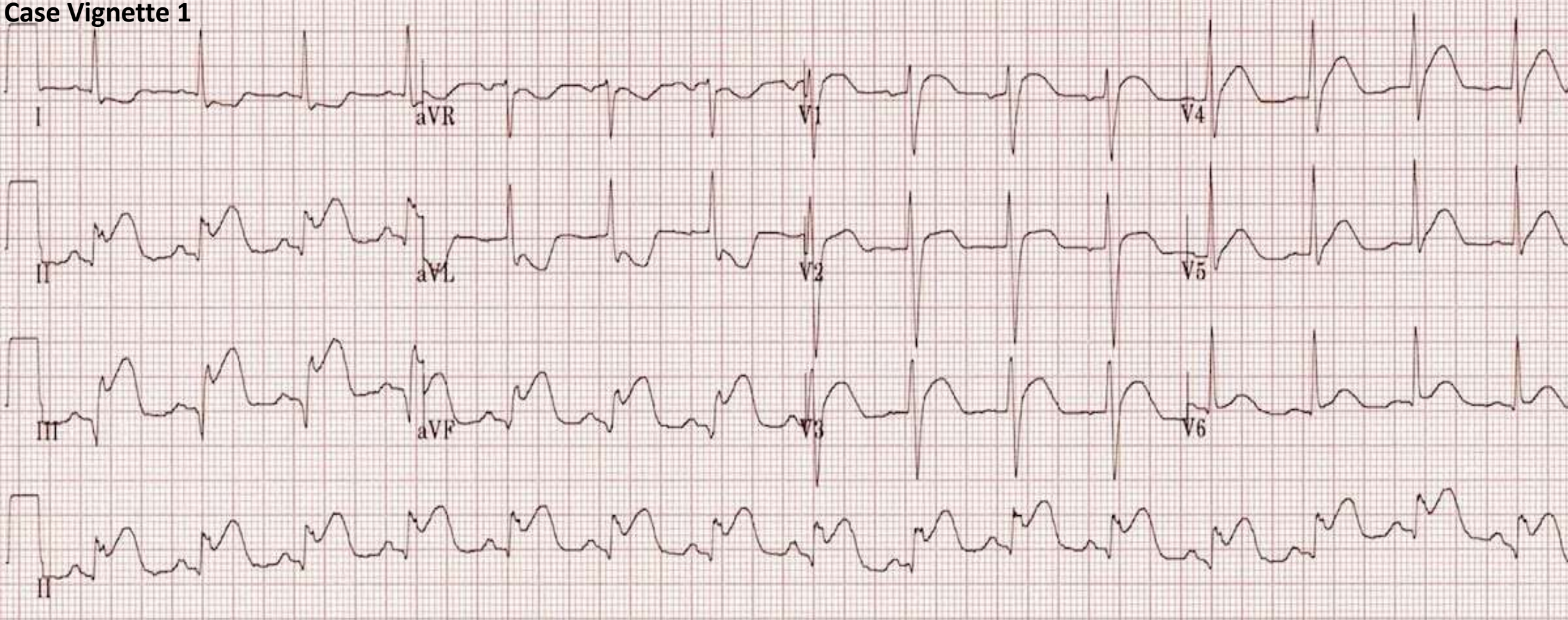
Normal Artery

Narrowing of Artery



**Coronary Artery Disease**

## Case Vignette 1



- 51 y/o female
- Obese, HTN
- 3 hrs epigastric pain
- Got IV PPI in clinic

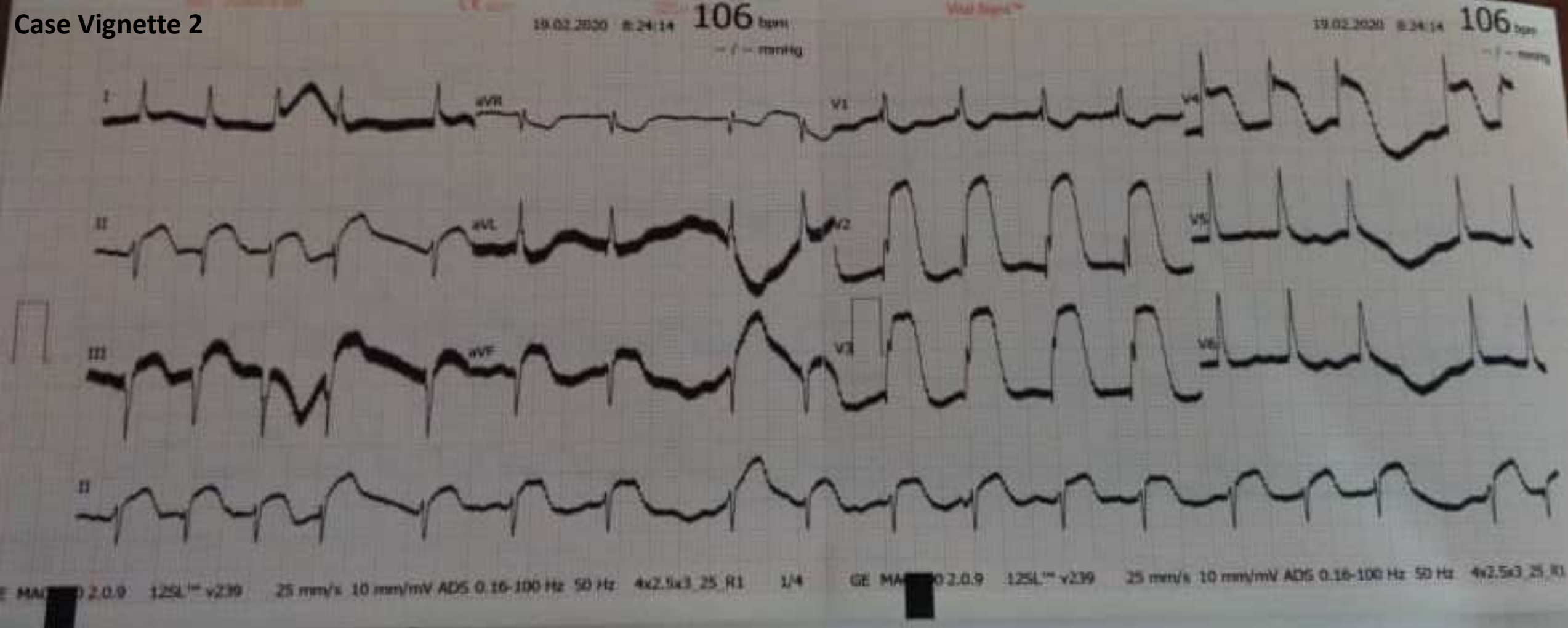
- Pain persisted with vomiting
- Developed radiation to left arm
- Referral
- ECG: 4hrs from onset of pain

### Emergency Response:

- Thrombolytic Therapy
- Primary PCI



## Case Vignette 2



42 y/o Male, no overt CV Risk factors

- 'Throat Tightness'

- Sweating

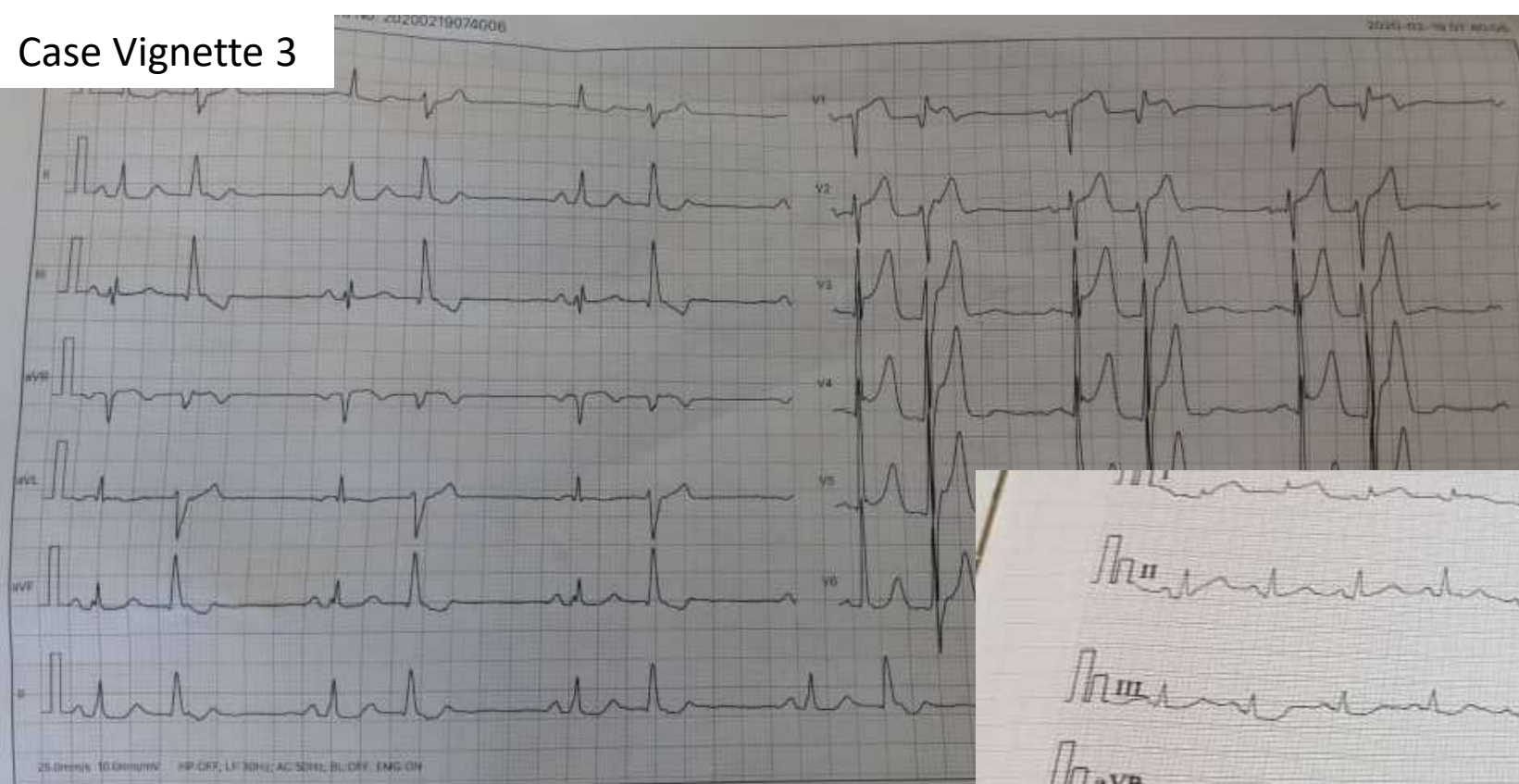
EKG 6 hrs from onset of symptoms

### Emergency Response:

- Thrombolytic Therapy
- Primary PCI

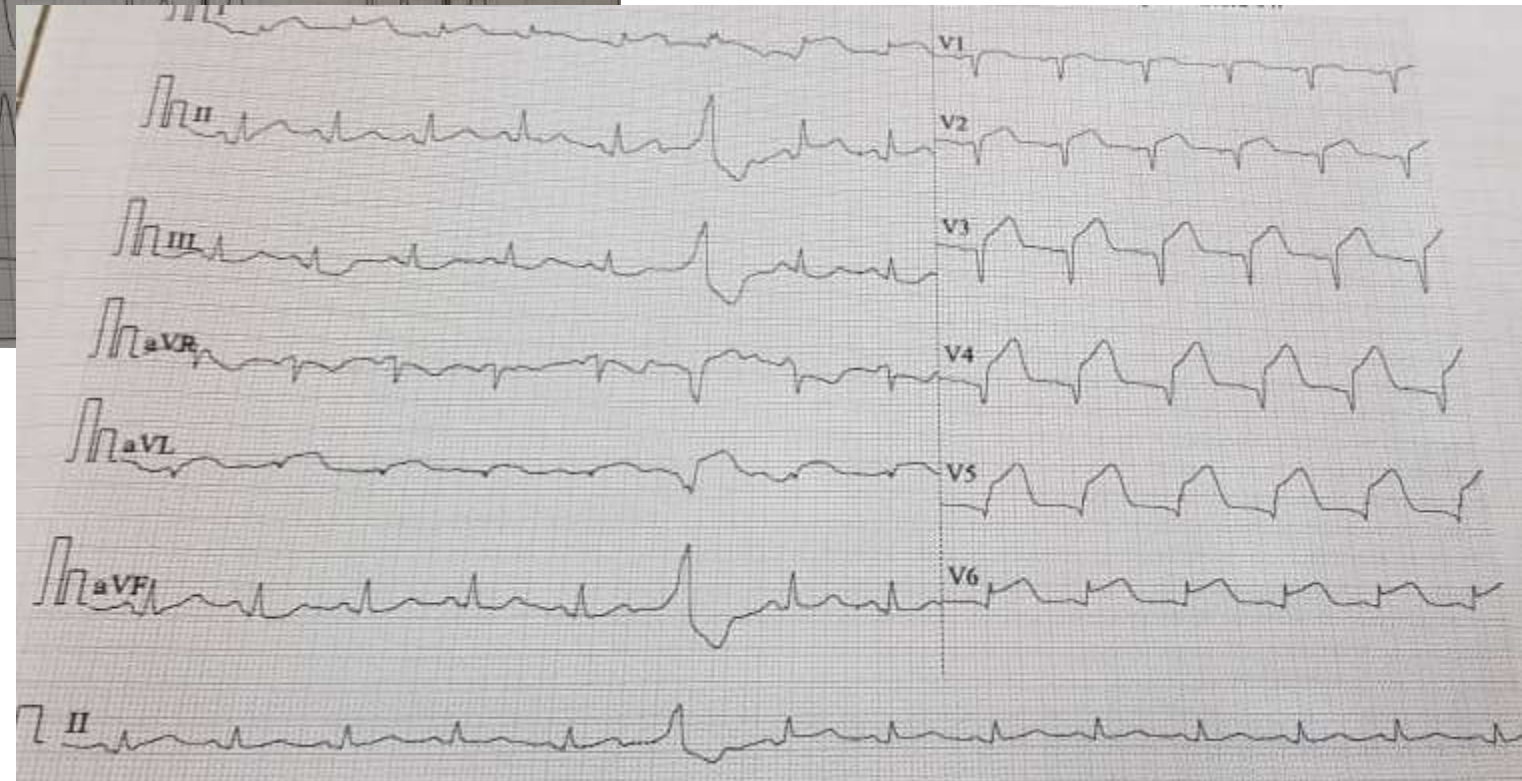


### Case Vignette 3

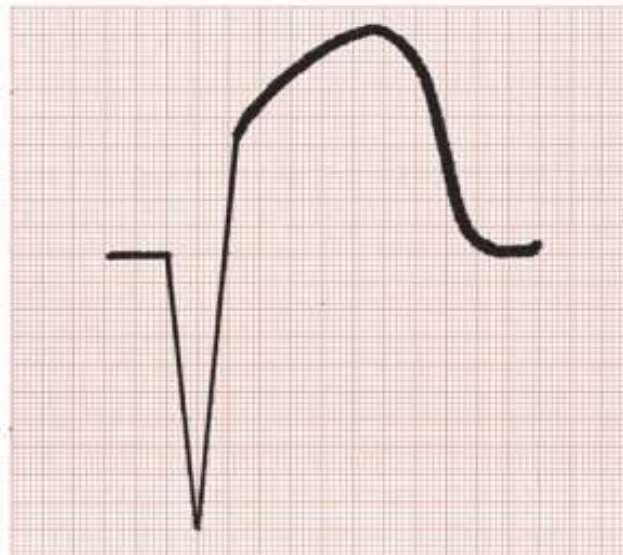
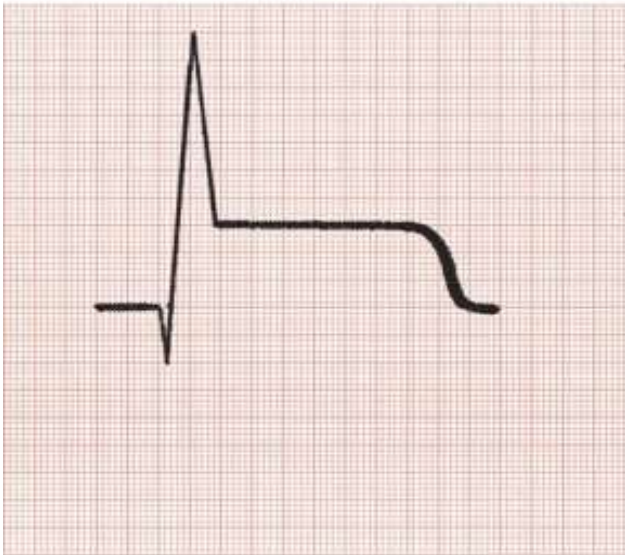
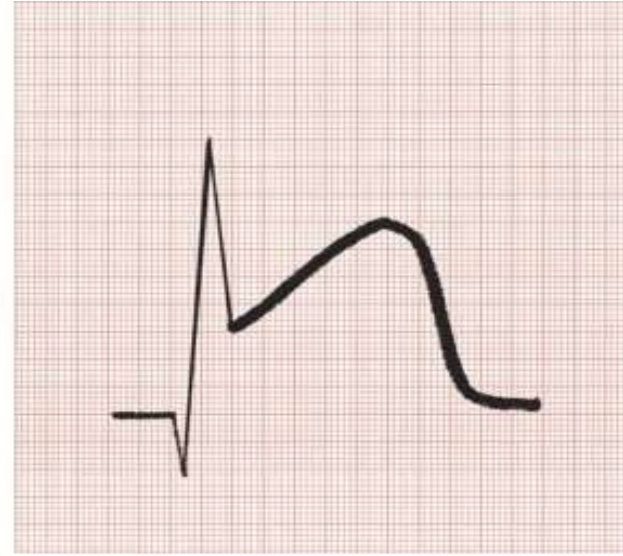
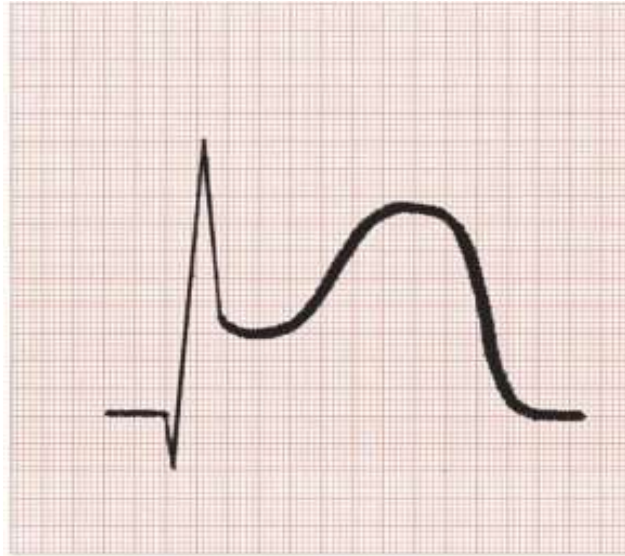


45 y/o Asian male, no traditional CV risk factors. 30mins of squeezing sensation retrosternal. ECG done in clinic. Got analgesics and went home.

12hrs later: SOB, Sweating. O/E: Cold & clammy peripheries, Unrecordable BP, Wet Chest – Killip Class IV



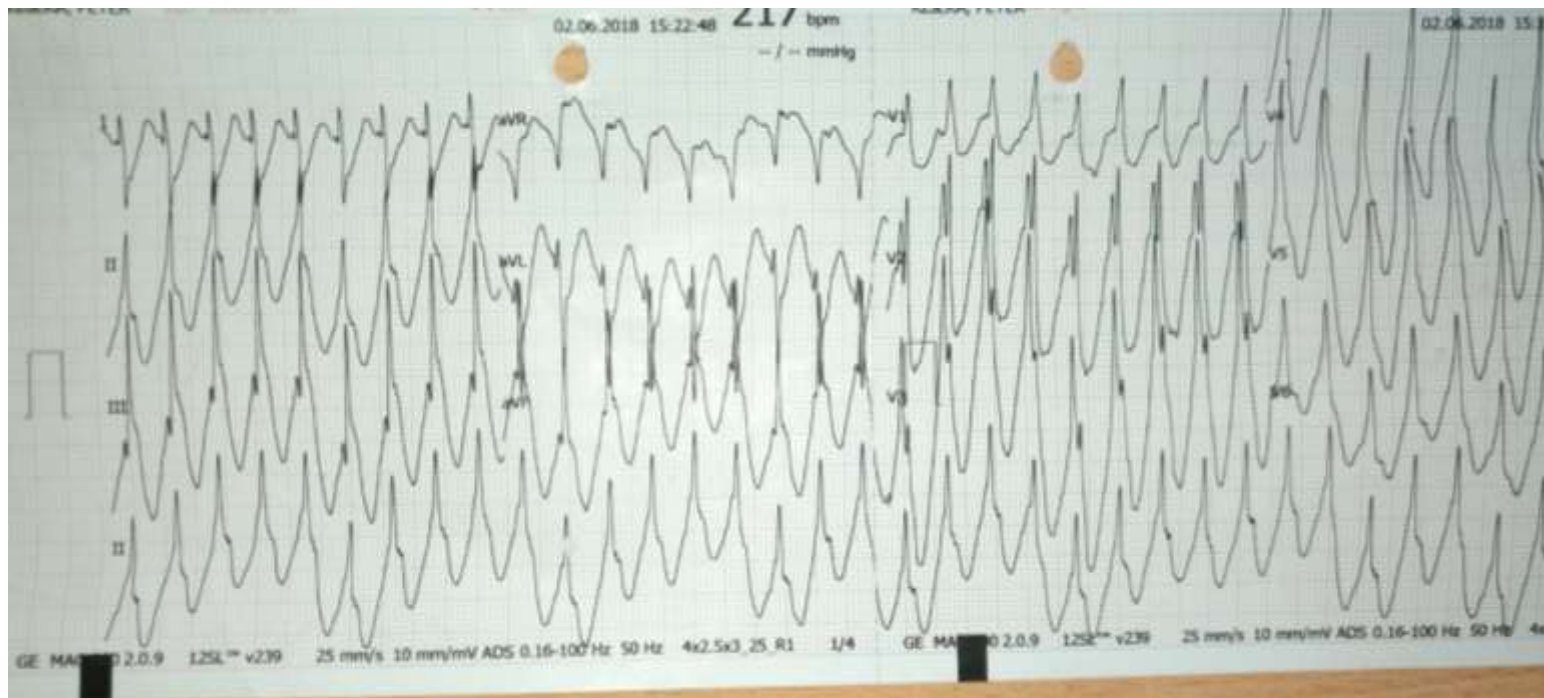
# Variable Shapes Of ST Segment Elevations in AMI



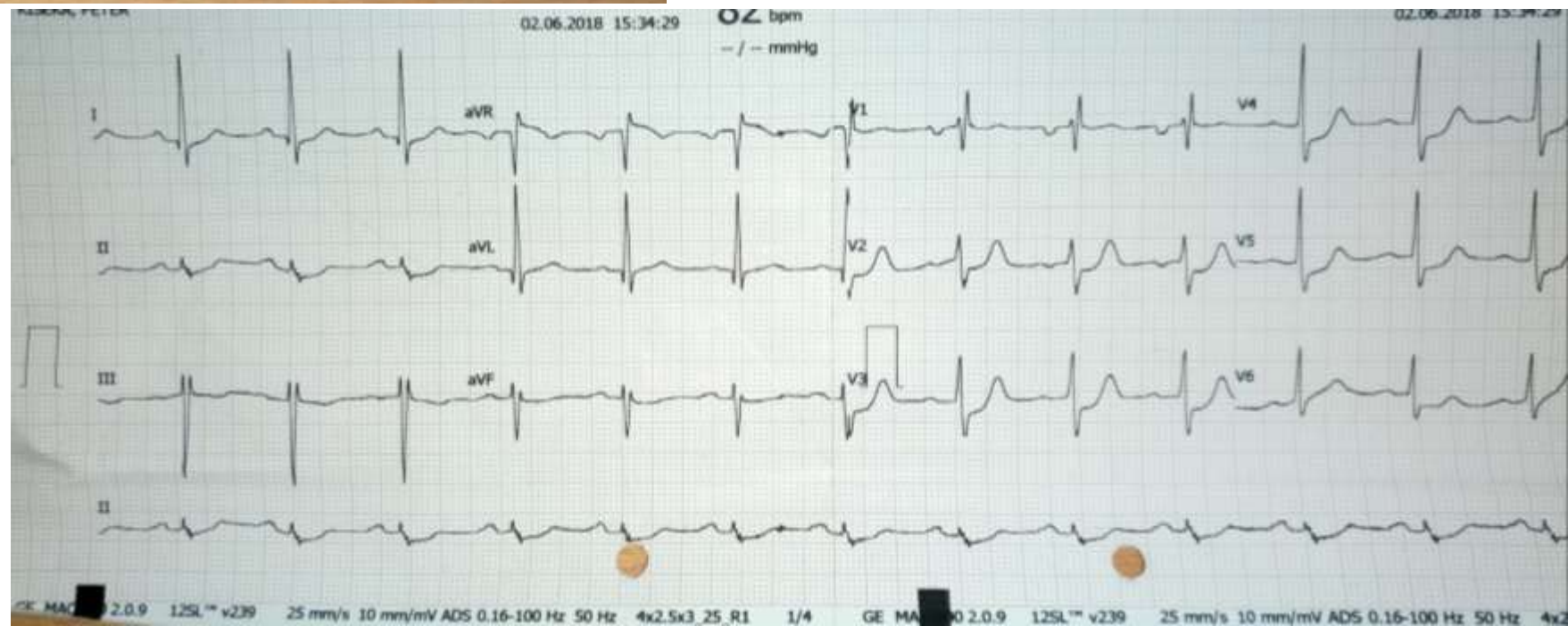


# Cardiac Arrhythmias: Tachys & Bradys





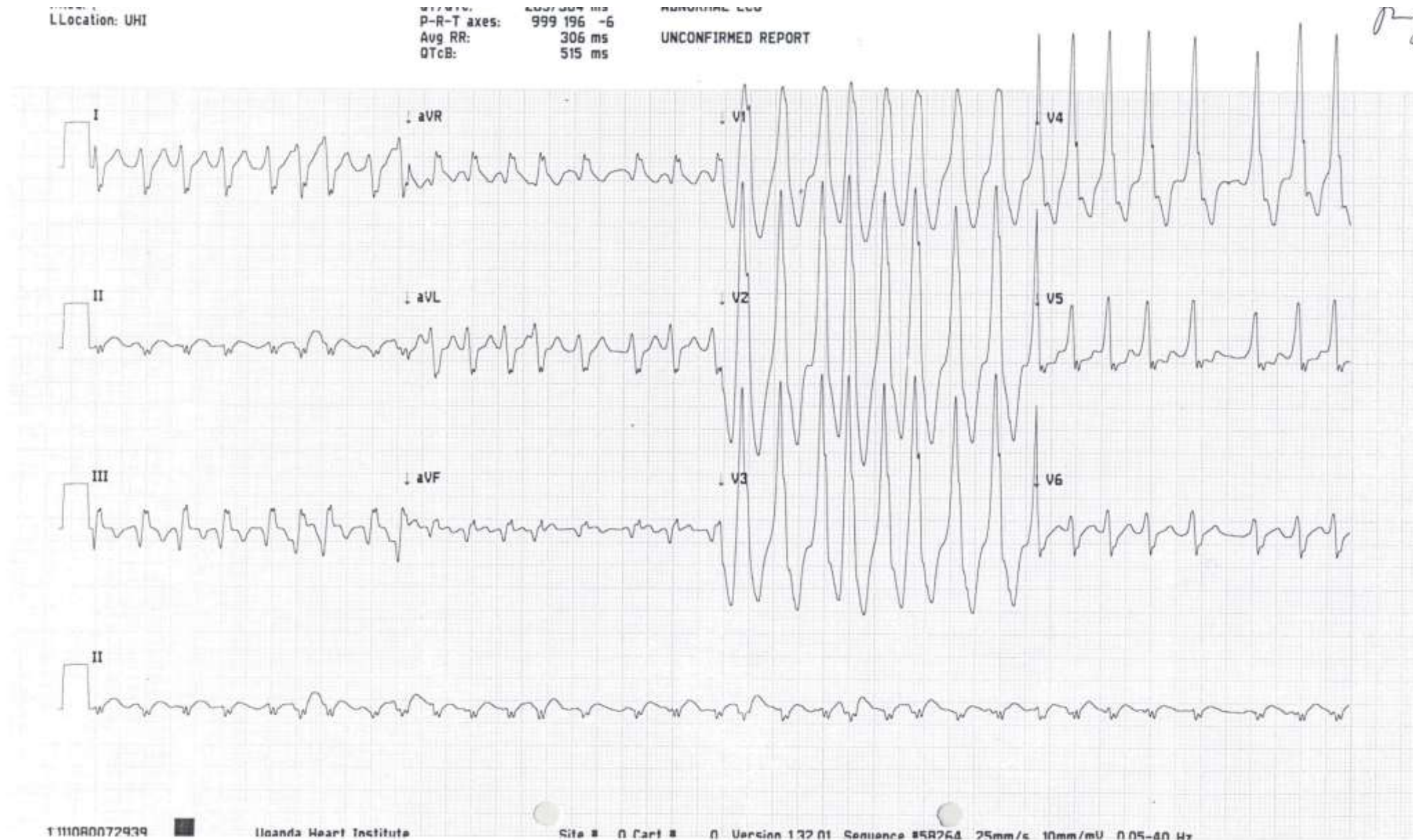
- 62y/o Male, known dyslipidemia & HTN  
On Rx.
- C/O Palpitations while in office, shortly followed  
by collapse.
- On Arrival: Cold & clammy, HR >200bpm,  
BP 70/40mmHg



42 y/o Male, 12hrs of palpitations. Known to have "an ECG abnormality".

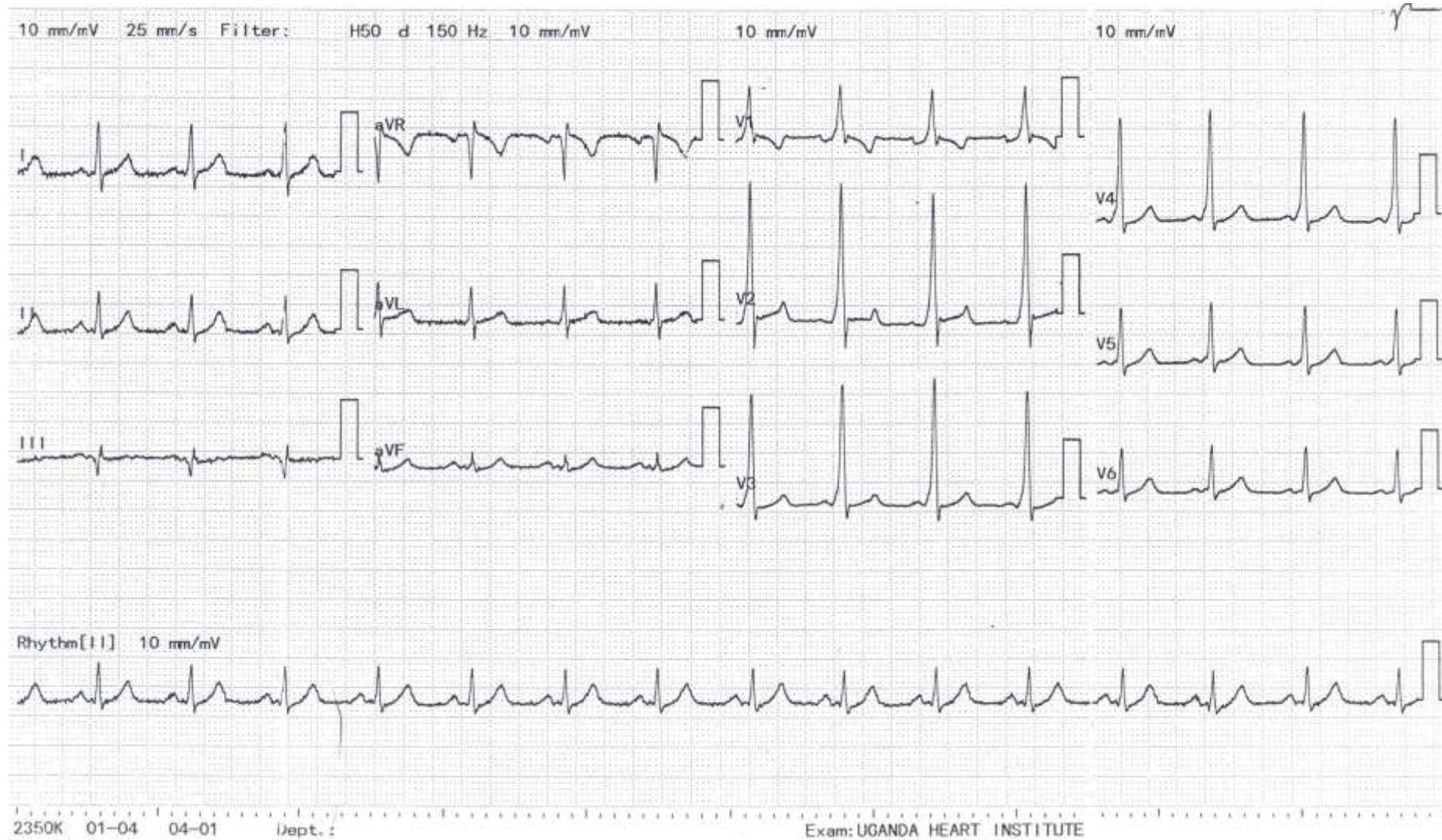
Sweaty, BP 90/45mmHg

E/M DC-version



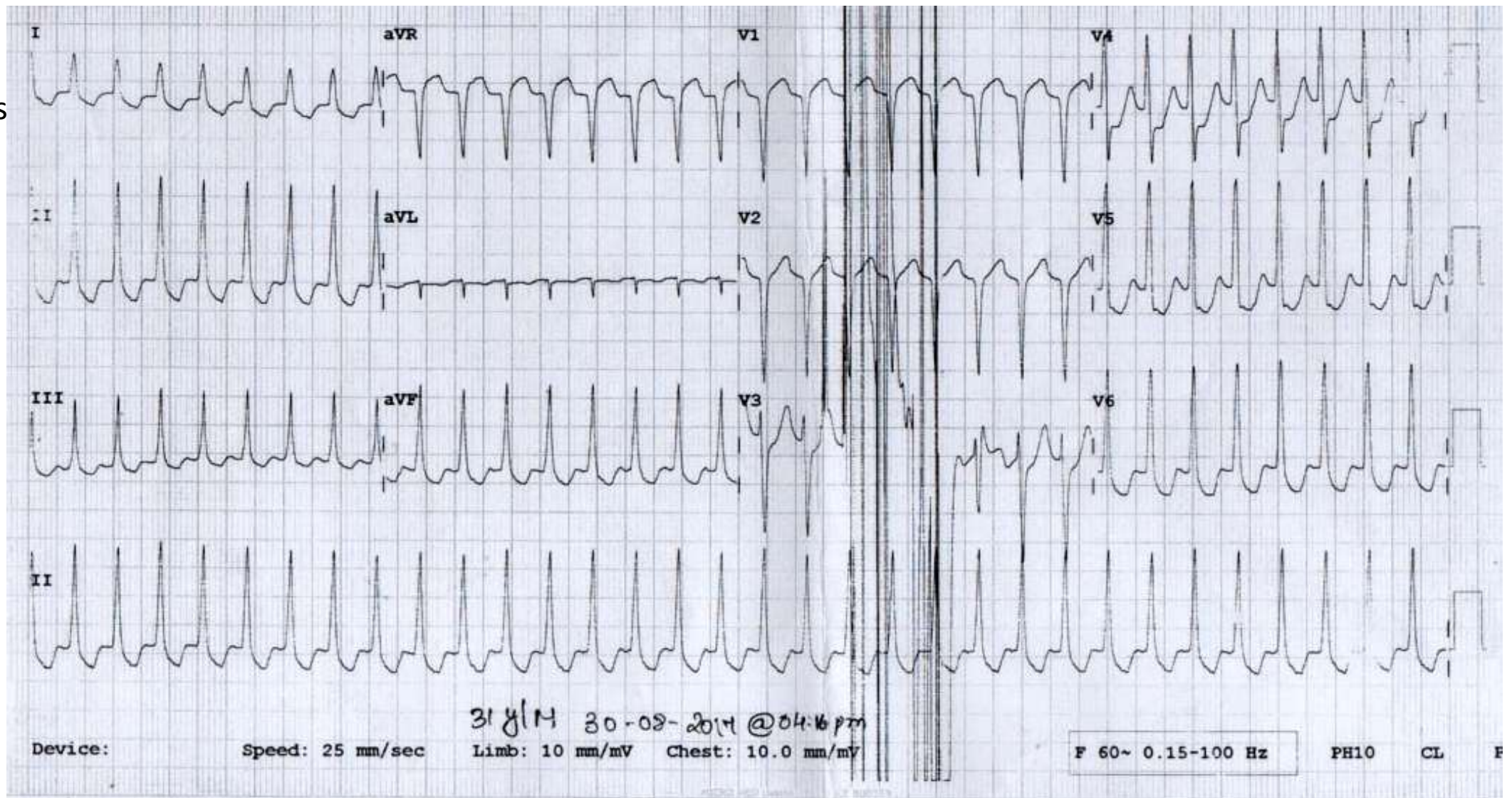


# Post DC-Cardioversion





31y/o Male,  
Index episode  
of palpitations  
during a job  
interview



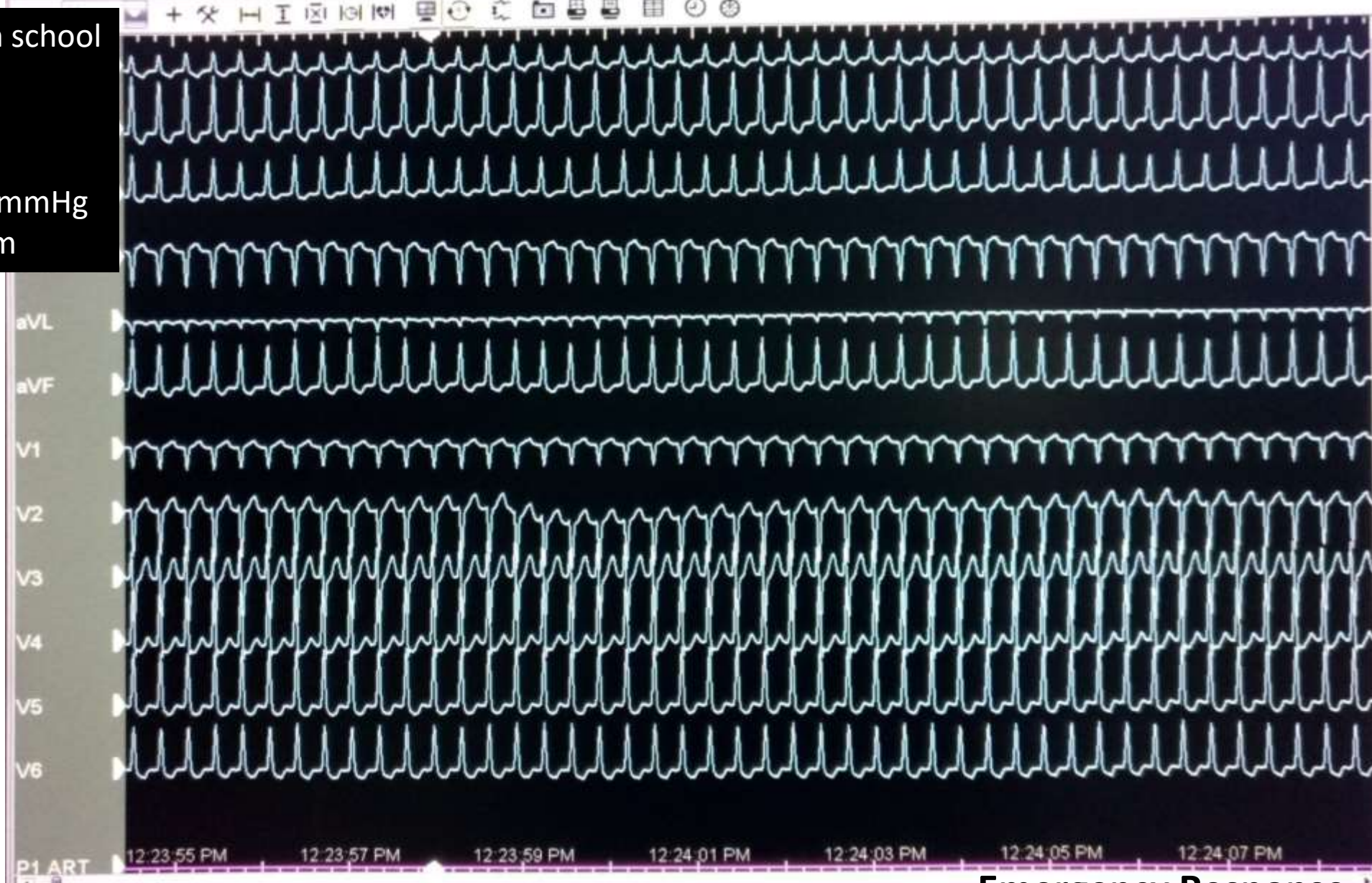
Regular Narrow Complex Tachycardia

**Emergency Response:**  
-Vagal Maneuver: Terminated



17y/o female from school  
C/O Palpitations,  
Pre-Syncope

Arrival: BP 107/73mmHg  
HR 220bpm



Regular Narrow Complex Tachycardia

**Emergency Response:**

- Vagal Maneuver: Unsuccessful
- IV Adenosine: Unsuccessful

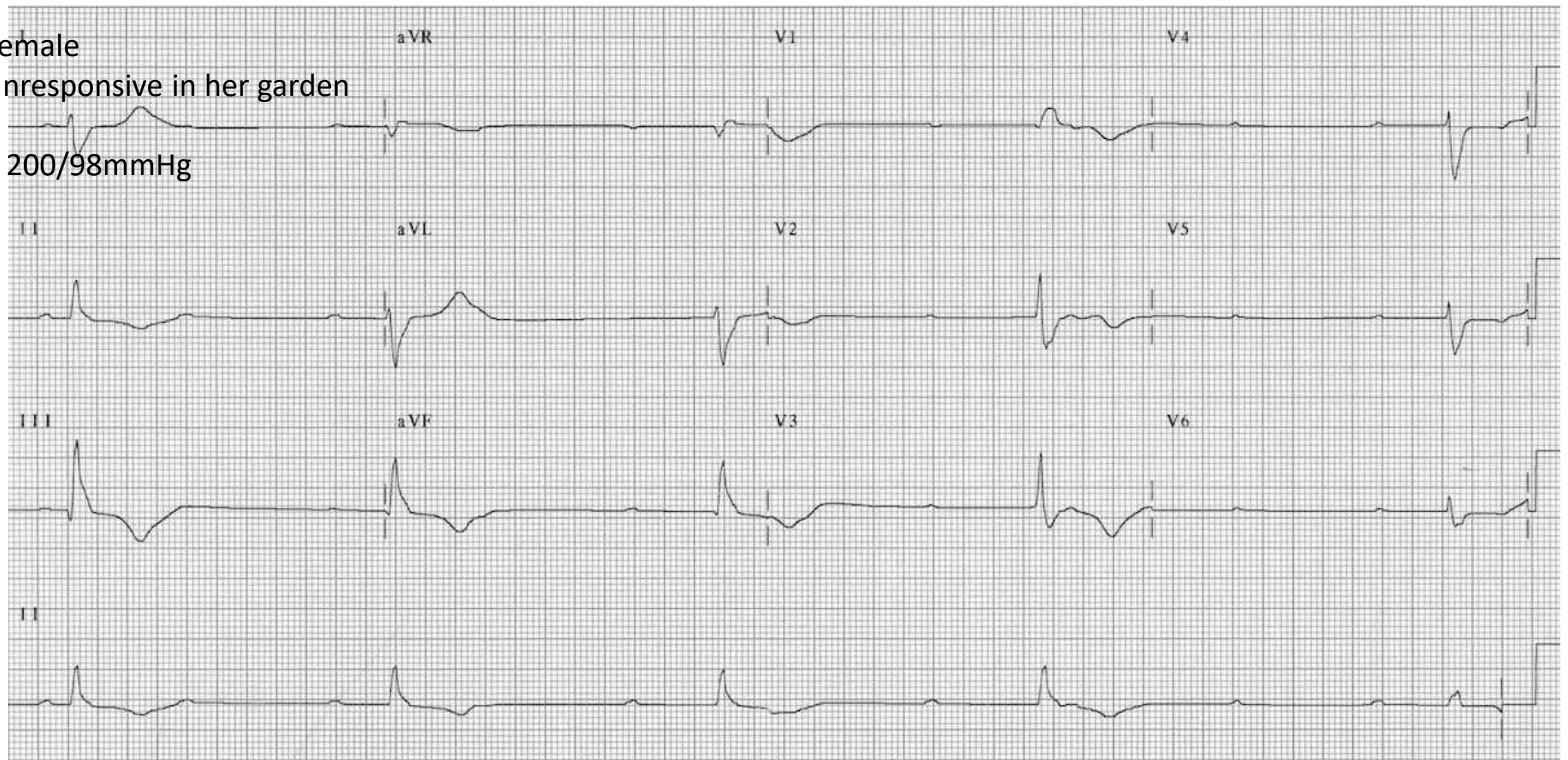
**Emergency Response:**

- BP dropped to 70/50mmHg
- DC Cardioversion

75 y/o Female

Found Unresponsive in her garden

A&E: BP 200/98mmHg



- Severe Bradycardia
- Complete AV Dissociation
- ?Reversible Causes

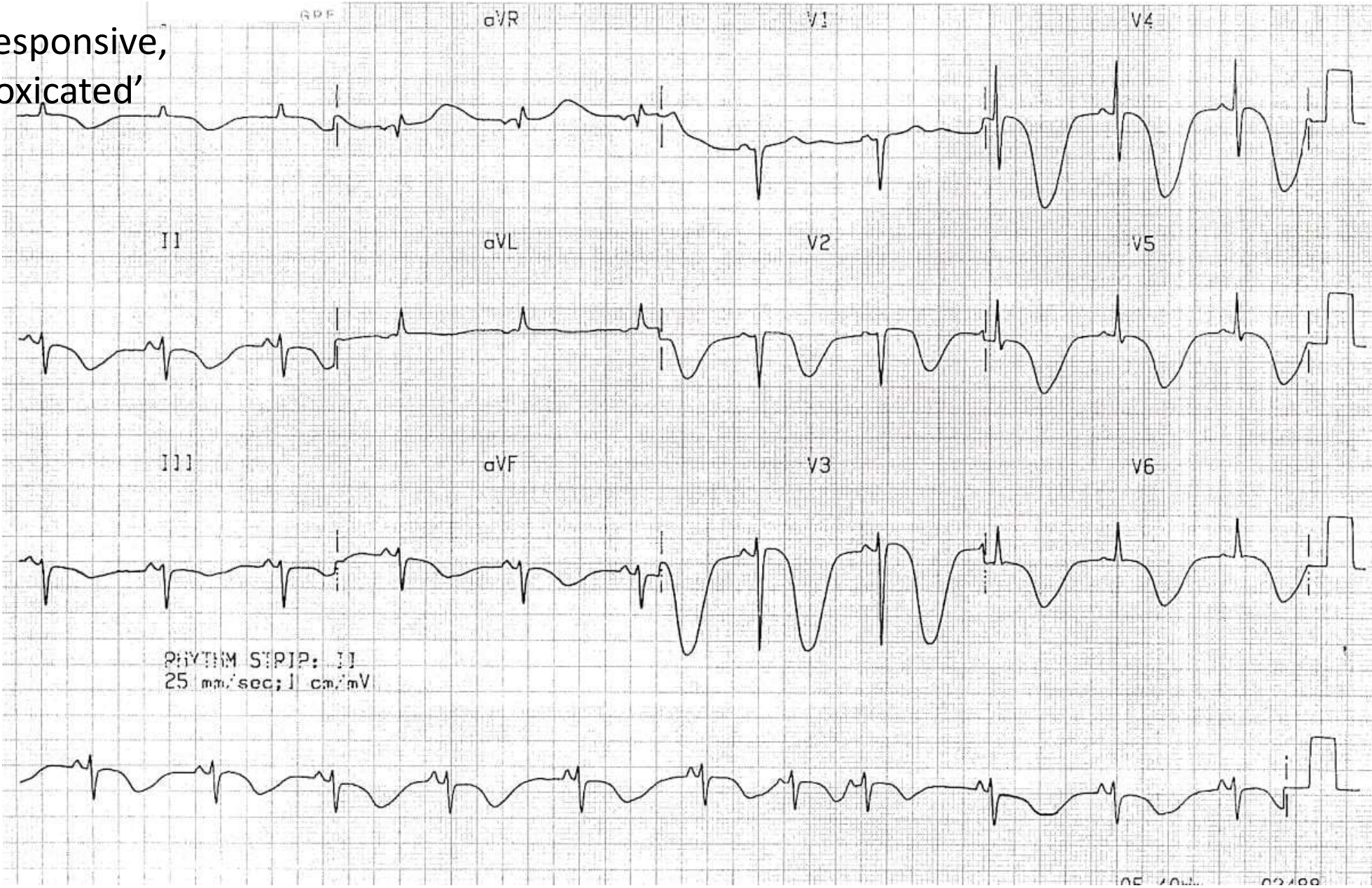
### Emergency Response:

Temporary Cardiac Pacing

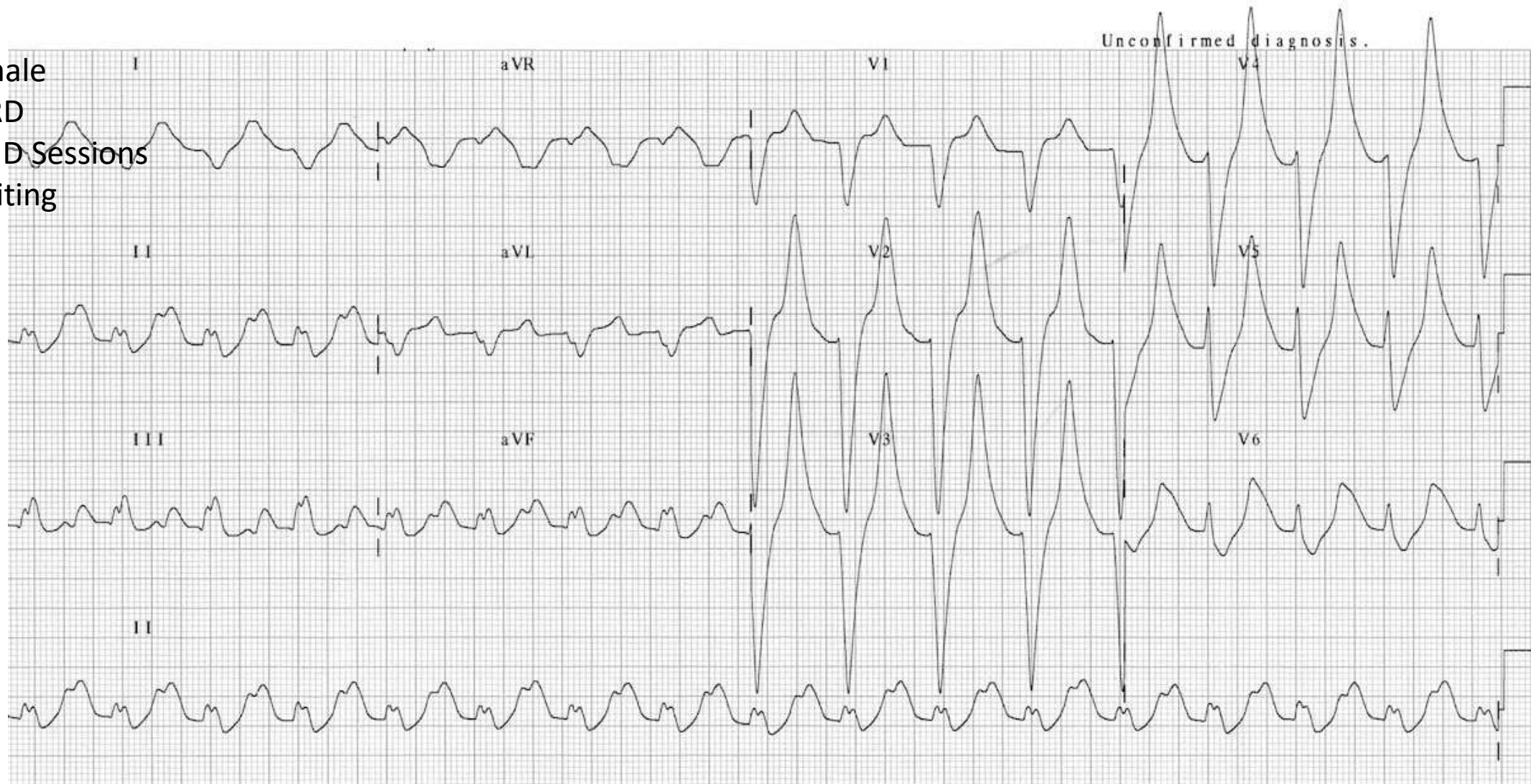
Address (any) reversible cause



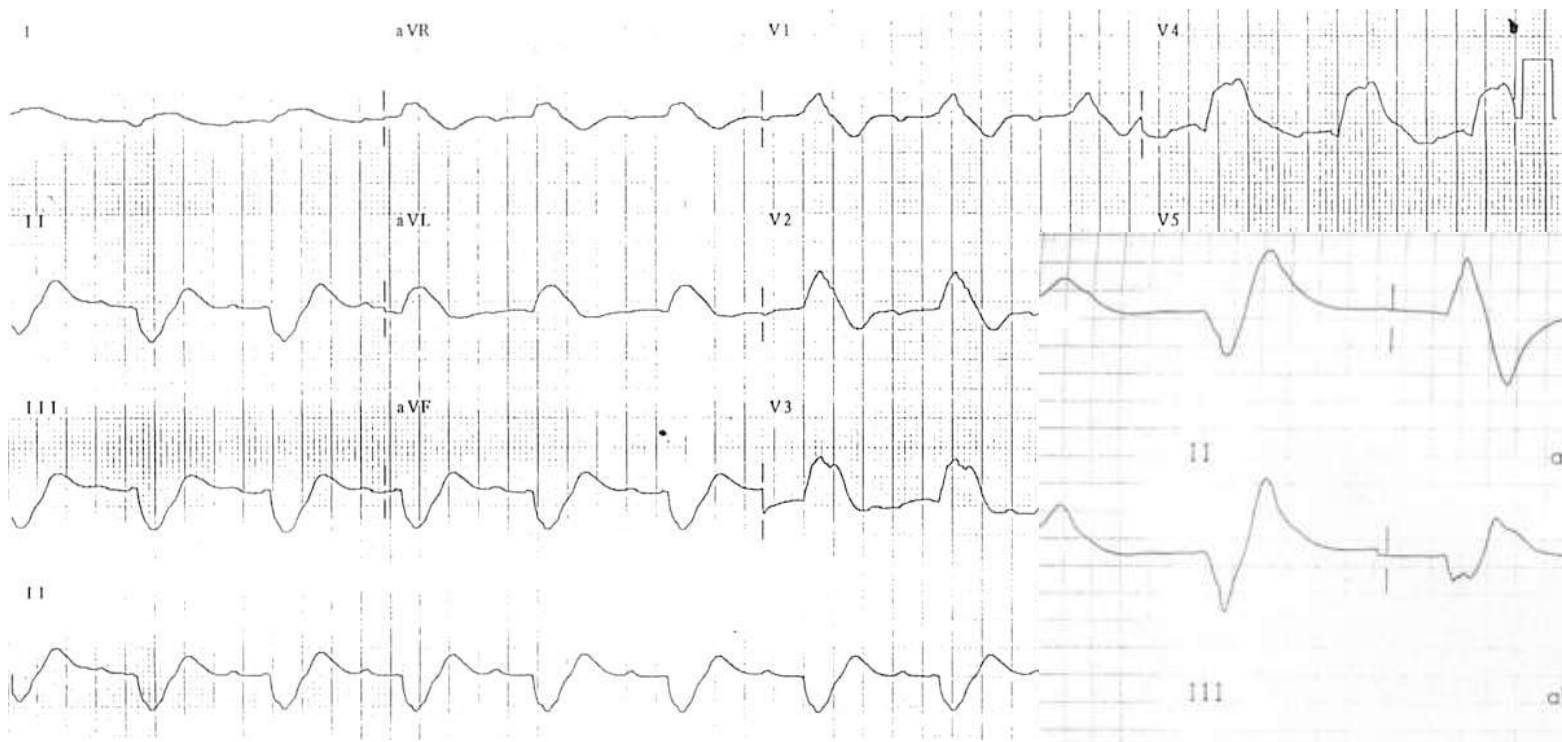
25 y/o Male found unresponsive,  
Apparently 'alcohol intoxicated'



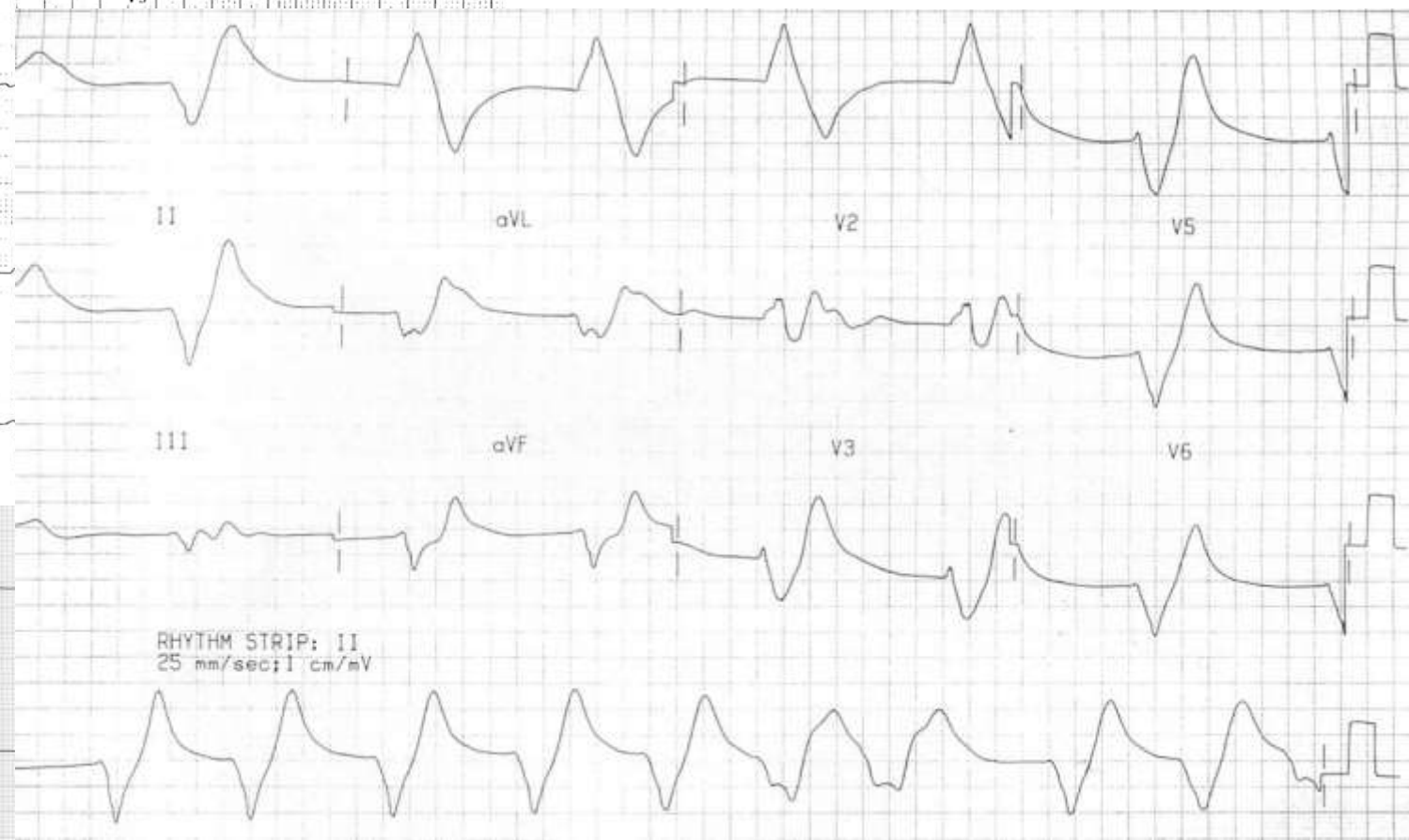
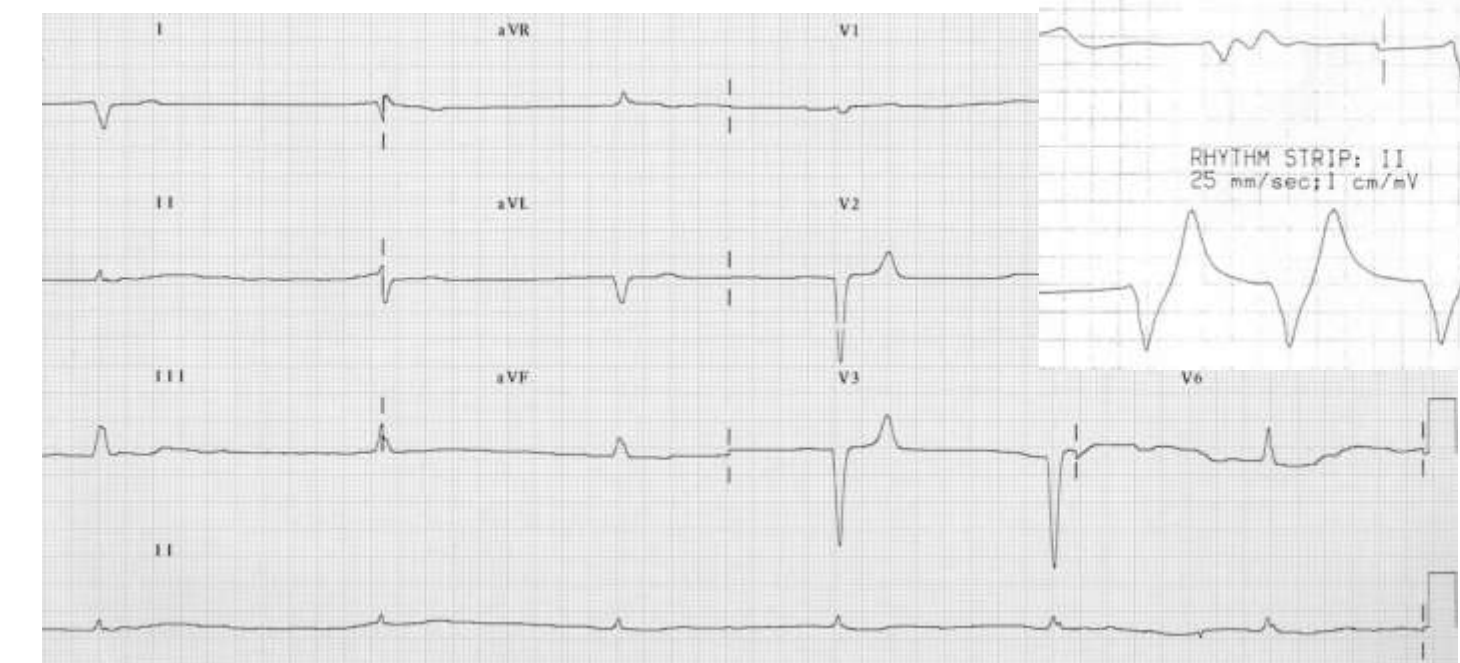
45 y/o Female  
Known ESRD  
Missed 2 HD Sessions  
GBW, Vomiting







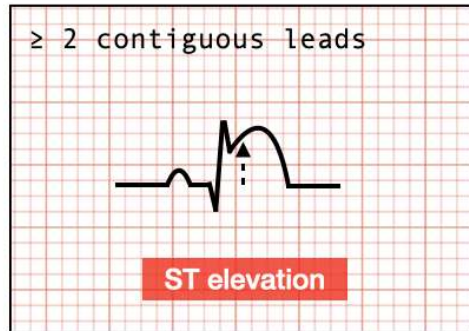
Seed  
GLOBAL HEALTH



RHYTHM STRIP: II  
25 mm/sec; 1 cm/mV

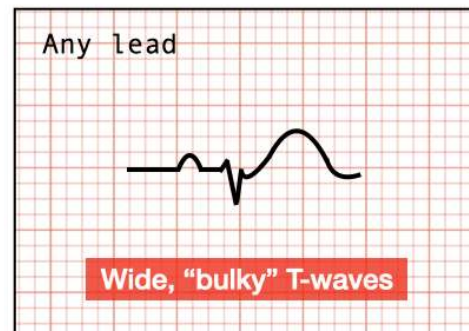


# Patterns – Summary Sheet - Ischaemic



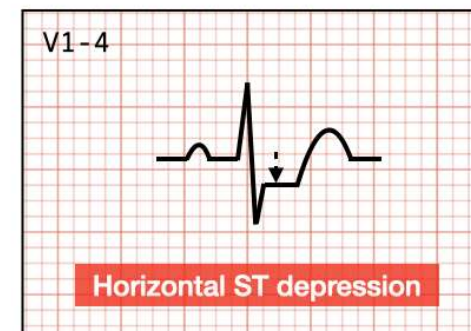
**V2-3:** ≥ 2.5 mm ST elevation in males under 40, ≥ 2 mm in males over 40, ≥ 1.5 mm in females  
**Other leads:** ≥ 1 mm ST elevation

**Traditional STEMI**



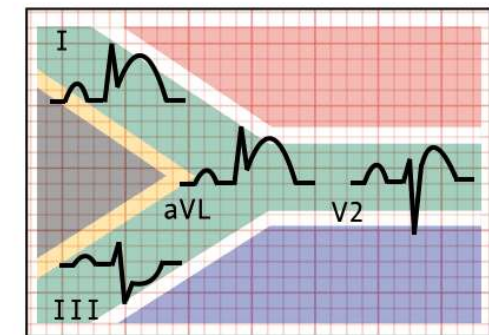
Measure in proportion to preceding QRS complex.  
**Area under curve** is more useful than height

**Hyperacute T-waves**

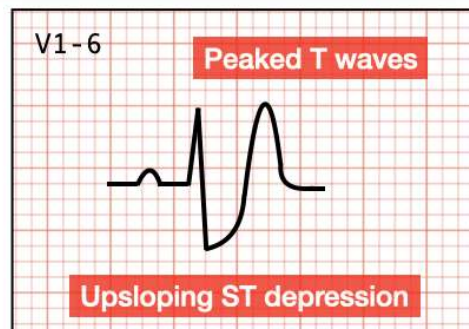


ST depression maximal in V1-4 without progression to V5-6

**Posterior OMI**

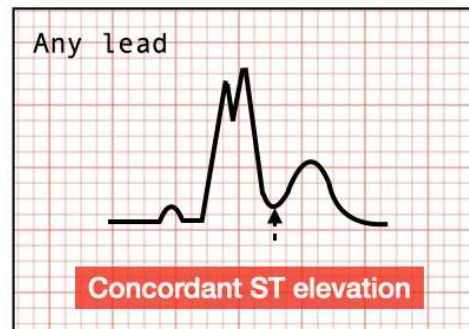


**High Lateral OMI**



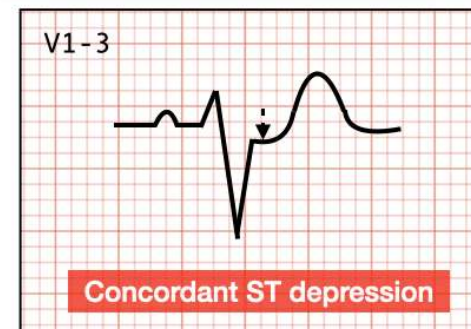
Anterior STEMI equivalent seen in 2% of acute LAD occlusions

**De Winter T-wave**



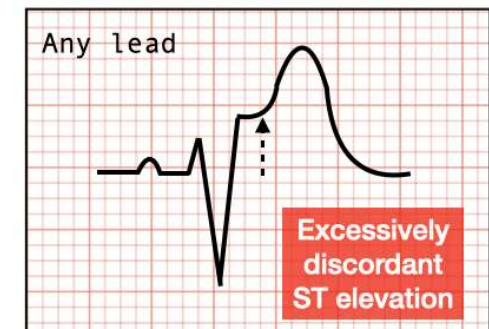
≥ 1 mm in any lead in LBBB or ventricular paced rhythm

**Sgarbossa 1**



≥ 1 mm in ≥1 lead of V1-3 in LBBB or ventricular paced rhythm

**Sgarbossa 2**

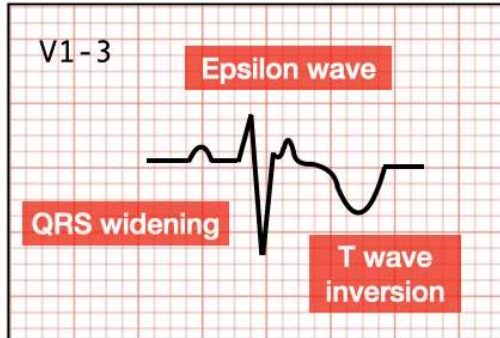


≥ 25% of depth of preceding S-wave in any lead in LBBB or ventricular paced rhythm

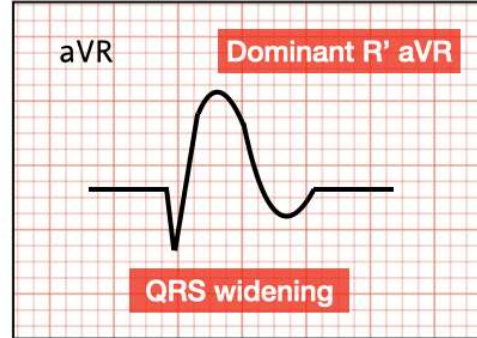
**Sgarbossa 3**



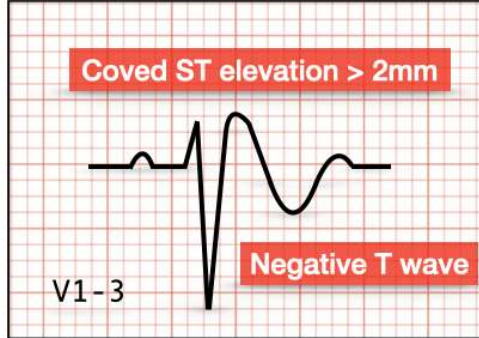
# Summary Sheet – Non-Ischaemic



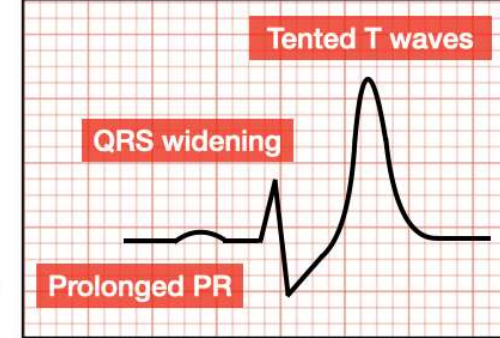
**Arrhythmogenic Right Ventricular Dysplasia**



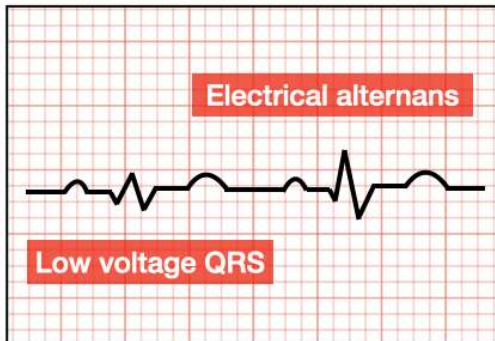
**Sodium channel blockade**



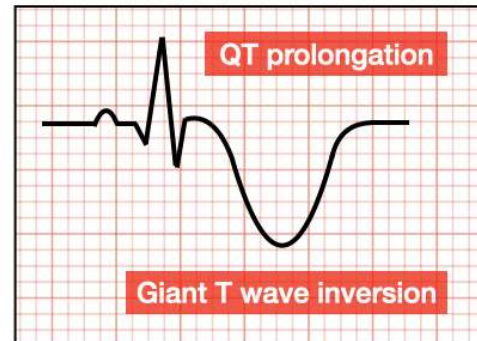
**Brugada Syndrome**



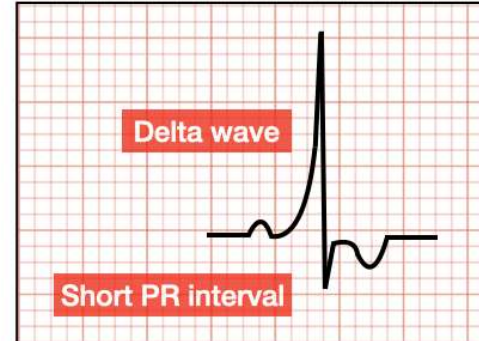
**Hyperkalaemia**



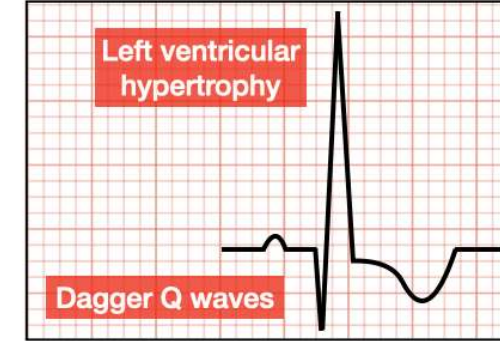
**Massive pericardial effusion**



**Intracranial haemorrhage**



**Wolff-Parkinson-White Syndrome**



**Hypertrophic Cardiomyopathy**



Thank you for Attending