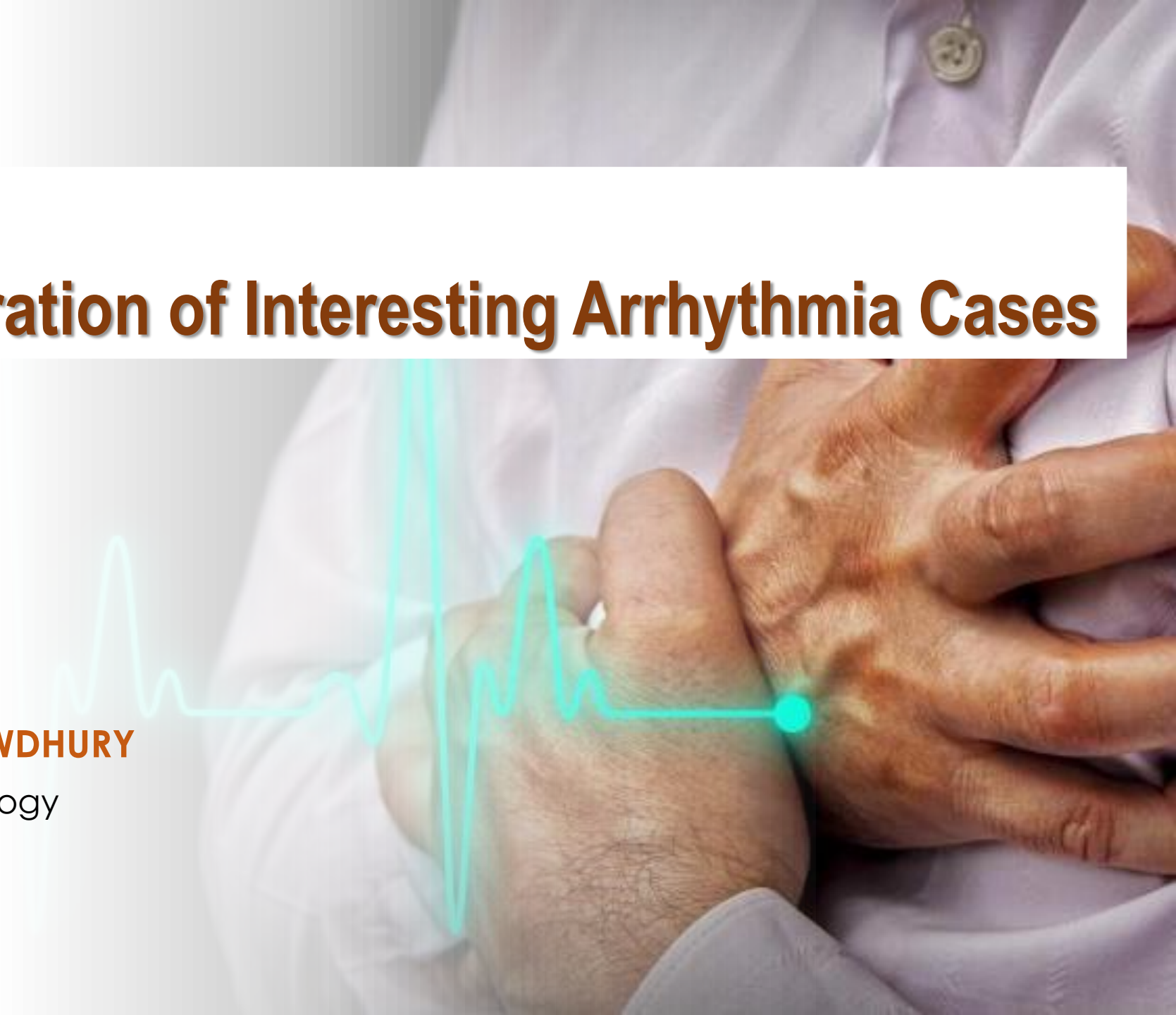
Beyond the Pulse:
An In-depth Exploration of Interesting Arrhythmia Cases



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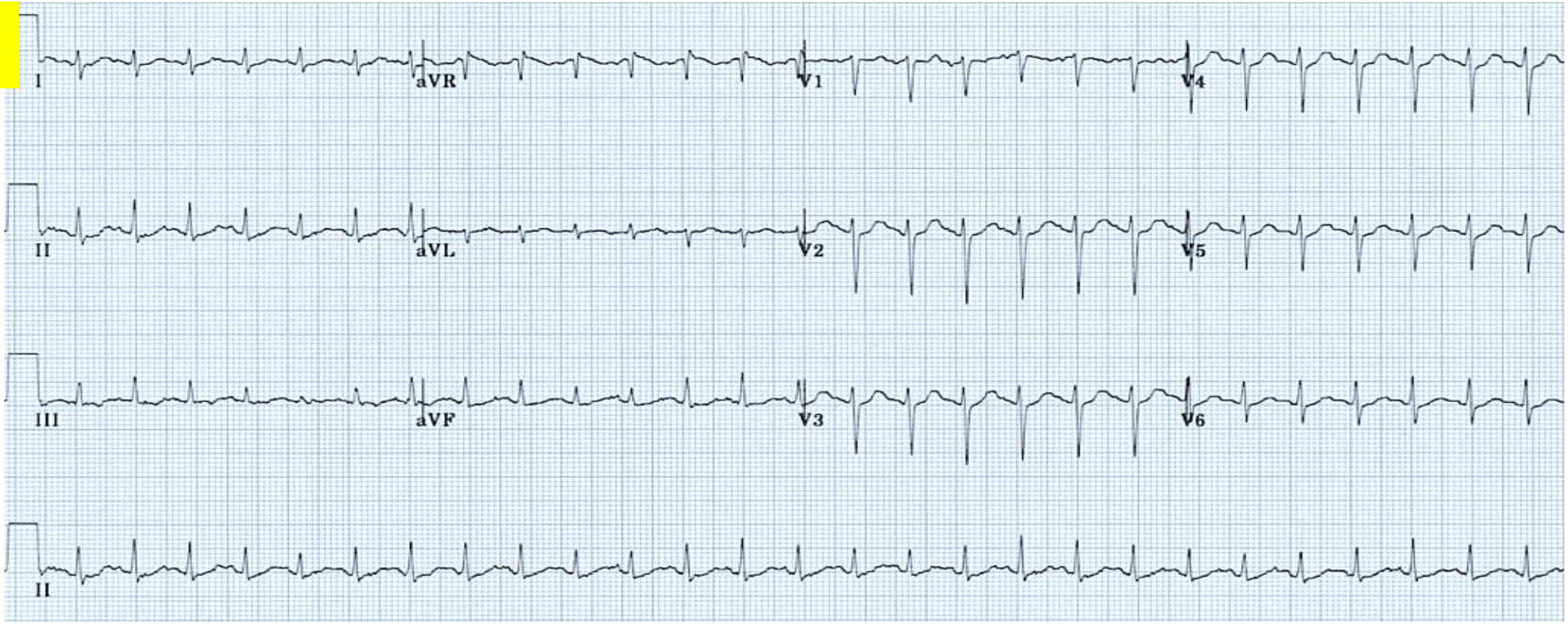
Q-1



A 19 year old young, unmarried college going girl presented with this ECG in Cardiology OPD. Her mother died last week for breast carcinoma.

1) What is your ECG diagnosis ?
2) What is the most likely cause ?
3) What are the other probable causes?
4) What will be your approach to diagnosis ?
5) What is your treatment plan ?

Ans Q-1:

1) **Dx :** Sinus tachycardia

Points in favour :HR around 140 b/min, rhythm is sinus & regular, narrow QRS complex

2) **Likely cause** : Anxiety

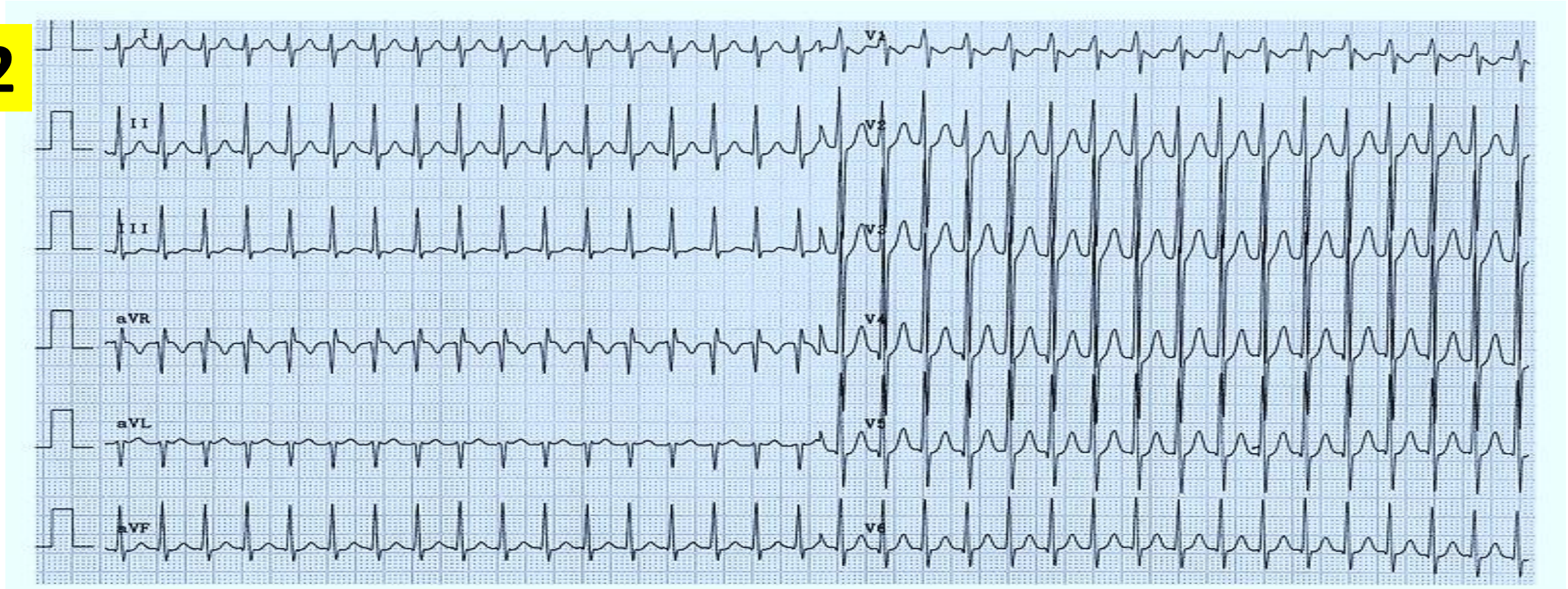
3) **Other causes :** Severe anaemia, Fever, Thyrotoxicosis, Mitral valvular heart disease

4) **Approach to Dx:**

- **History regarding** physical & mental stress, Diet , GI & Menstrual blood loss
- Relevant & meticulous **physical examination**
- **Judicious Investigations** : CBC,PBF, Serum Iron profile ,FT4 , TSH, ECHO

5) **RX plan :** Counselling, Anxiolytics, Treatment of underlying causes if present (Anaemia correction, Iron supplementation)

Q-2



A 38 years old woman presented to ED with sudden onset palpitation and her ECG showed this

1)What is your diagnosis ? Mention 4 important findings regarding your diagnosis

2) What immediate steps you will take in this patient ?

3) Name another non pharmacological measure

4) If no response what medication you could use urgently

5) Name 2 other IV drugs that are used in this case

Ans Q-2 :

1) **Dx :** SVT (AVNRT)

Points in favour of Dx: HR around 160 b/min, Absent P wave, Regular rhythm, Narrow QRS complex

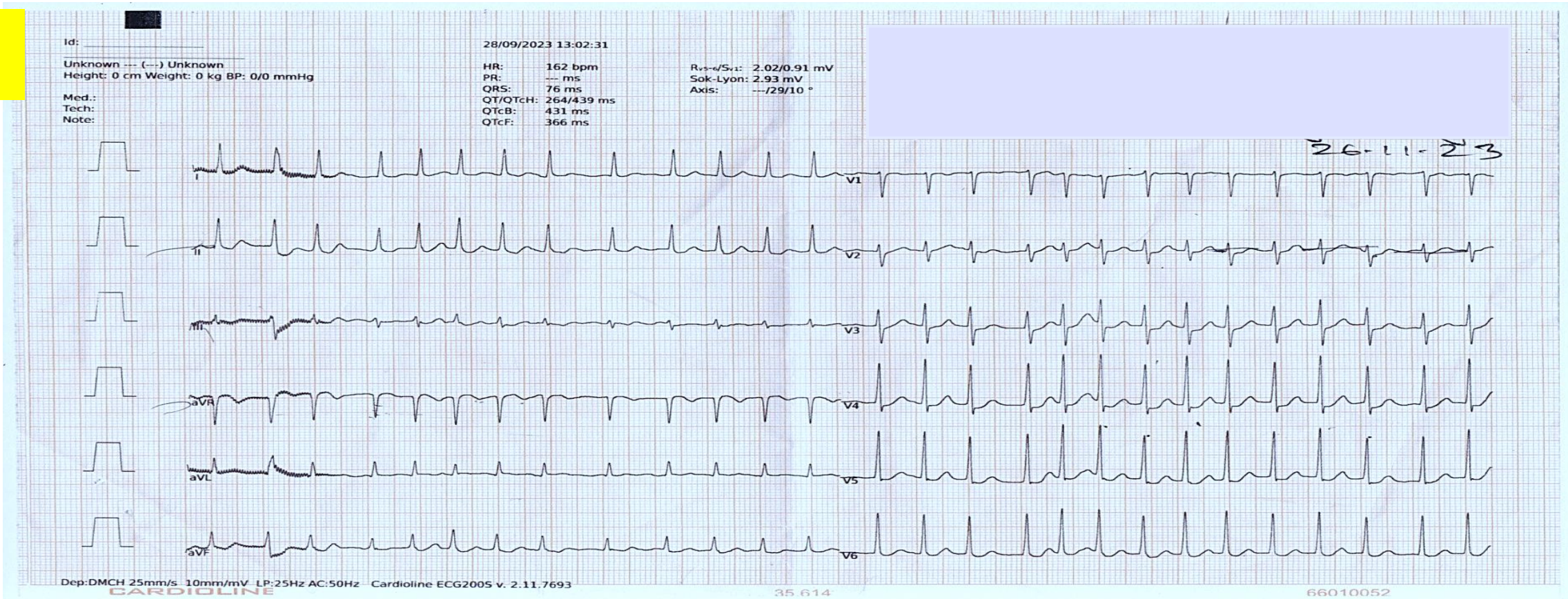
2) **Immediate measures :** Bed rest with cardiac monitor & Reassurance , IV access, Carotid sinus massage after auscultation for carotid bruit

3) **Another non pharmacological measure** :Valsalva maneuver

4)**Urgent medication:** IV adenosine with rapid saline flush (after taking H/O Bronchial asthma)

(5) **2 other IV drugs :** IV Verapamil, IV Amiodarone

Q-3



A 60 years old man presented with sudden onset palpitation & SOB for 1 day and patient gave H/O similar type of intermittent palpitation.

1) Tell the important ECG findings
2) What is your diagnosis ?
3) Name 3 important physical findings
4) List 6 underlying causes for this condition
5) What complications may arise if untreated ?

Ans Q-3:

1) **ECG findings** : HR around 120 beats/min, Rhythm is irregularly irregular, absent “P” wave, and “P” wave is replaced by fibrillatory “f” wave

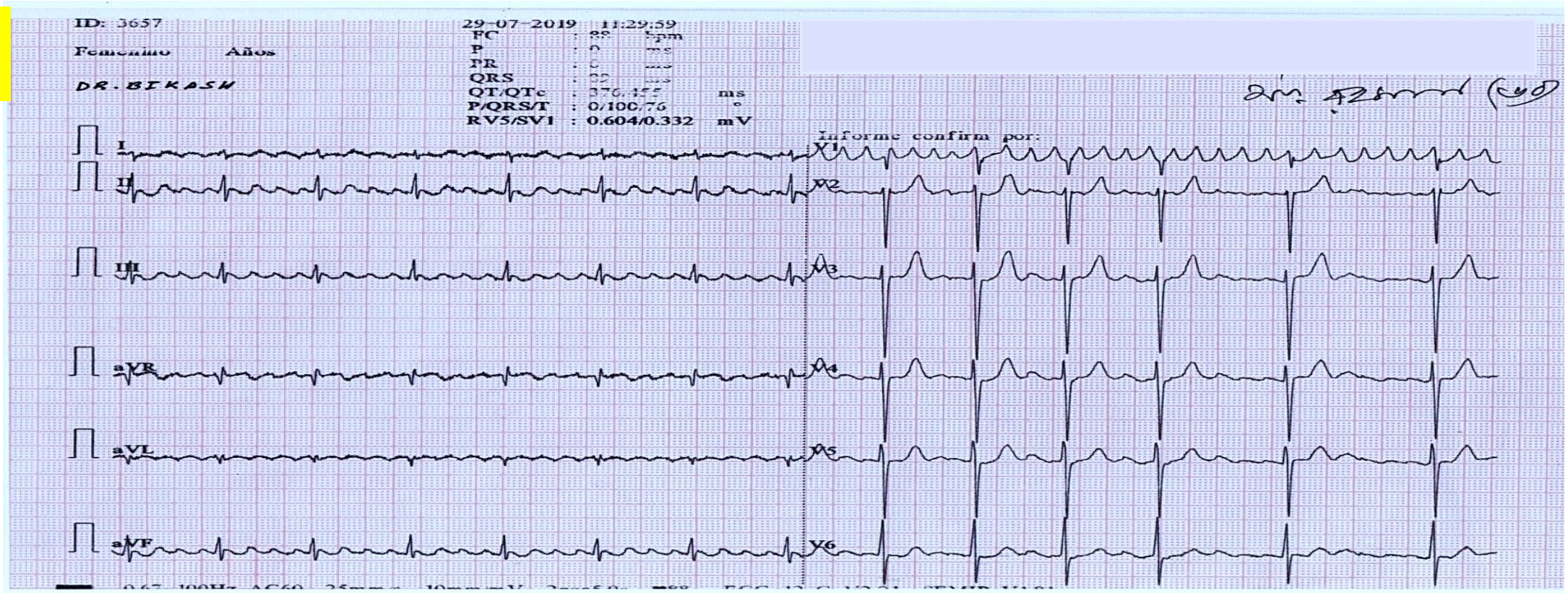
2) **Dx :** Atrial fibrillation with FVR

3) **3 Exam findings :Pulse :** irregularly irregular in rhythm & volume is variable ,**Pulse deficit** > 6, **JVP:** may be raised with absent “a” wave ,**Precordium auscultation :** variable intensity of 1st heart sound & underlying valvular lesion murmur (if any) .

4) **Causes** : Rheumatic mitral valvular disease, IHD ,Hypertensive heart disease, Thyrotoxicosis, Severe pneumonia ,Congenital heart disease , Lone AF

5) **Complications:** Heart Failure, Systemic thromboembolism, Angina, Tachycardia induced cardiomyopathy

Q-4



A 65 years old non diabetic, hypertensive woman had H/O loss of consciousness & got admitted in medicine department. Study the ECG & answer the following question

1) What are the ECG findings ?
2) What is your diagnosis ?
3) What may be the findings of arterial pulse examination of this patient ?
4) What are the other causes of irregularly irregular pulse
5) Mention the principle of management of this patient ?
6) Name 5 risk factors of stroke for this patient

Ans Q-4 :

1)**ECG findings:** HR about 80 b/ min, Absent P wave, Presence of flutter wave (saw tooth wave), Rhythm is irregular, Narrow QRS complex

2) **Diagnosis :** Atrial flutter with variable block

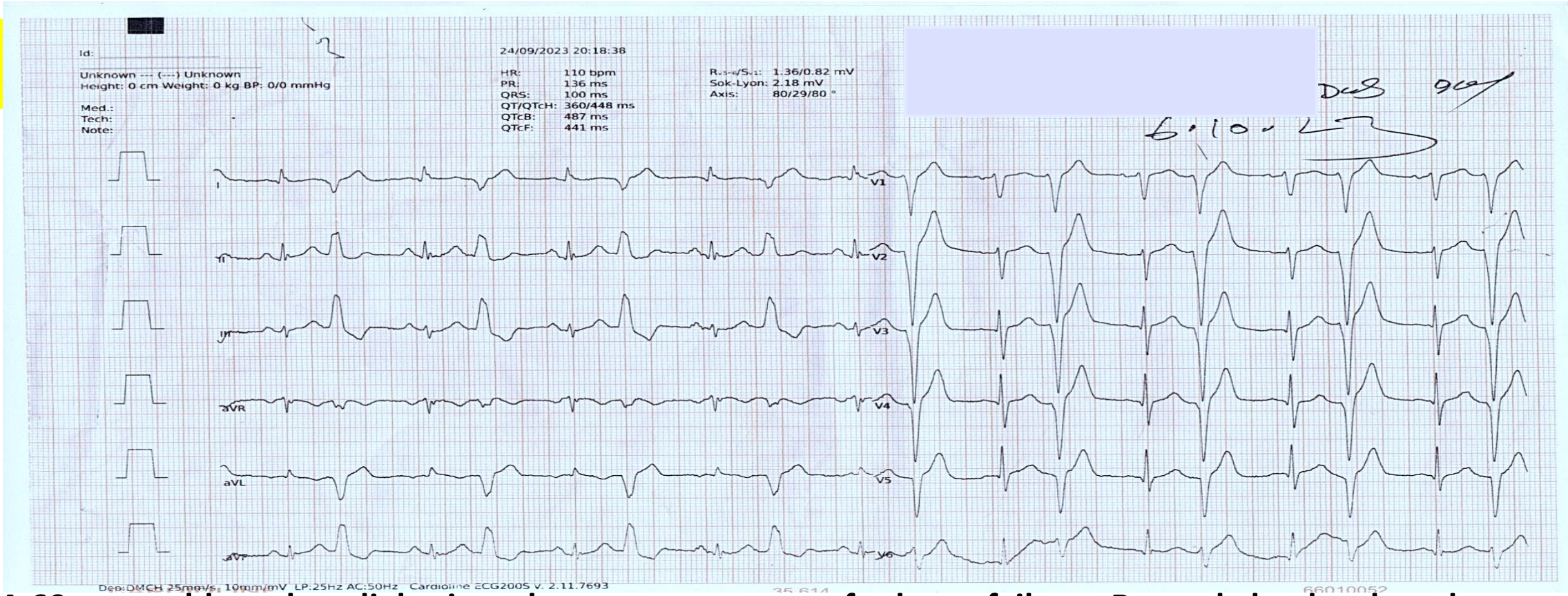
3) **Pulse character:** Irregularly irregular rhythm, volume -variable

4) **Other causes of irregularly irregular pulse :** AF, Atrial tachycardia with variable block, MAT, Frequent ventricular / atrial ectopics

5) **Rx modalities** : Rate control, Rhythm control (conversion to sinus rhythm) , Treatment of underlying cause , Prevention of thrombo-embolism.

6) **Risk factors for stroke** : CCF, Hypertension, Age > 75 years, DM, Previous stroke or TIA

Q-5



A 60 years old smoker, diabetic male was on treatment for heart failure . Recently he developed nausea and vomiting and presented with palpitation . His serum electrolytes estimation reveals: Na+ : 130 mmol/L, K+ :2.7 mmol/L ,Cl- :94 mmol/L,HCO3- 27 mmol/L

1) What is the single most important ECG finding
2) What is the likely cause for this ECG abnormality?
3) Which biochemical abnormality potentiate this drug effect ?
4) Name 2 causes of such biochemical abnormality ?
5) Give the principle of management of such cases ?

Ans Q-5 :

1) **ECG diagnosis** : PVC in the form of bigeminy

2) **Drug responsible for this effect** : Digoxin

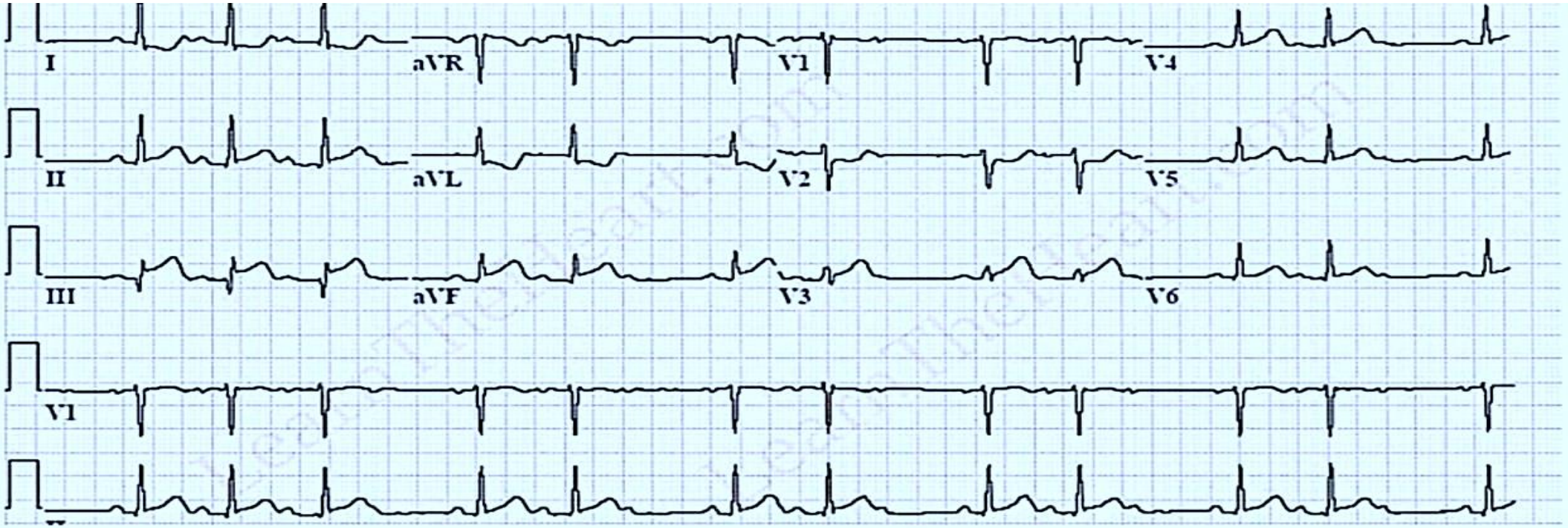
3) **Biochemical abnormality :** Hypokalemia, Hypomagnesemia

4) **2 causes of biochemical abnormality** : GI loss of K+ by Vomiting & Renal loss by Diuretics

5) **Principles of management** :

- Stop digoxin
- Stop /modify dose of diuretic
- Potassium supplementation
- Digoxin binding antibody
- Anti-emetic

Q-6



A 38 years old woman presented in CCU with SOB & epigastric pain for 6 hours

1) What are the key ECG findings ?
2) Tell the ECG diagnosis
3) Name 3 common causes of such ECG
4) What is the management plan for this patient ?

Ans Q-6:

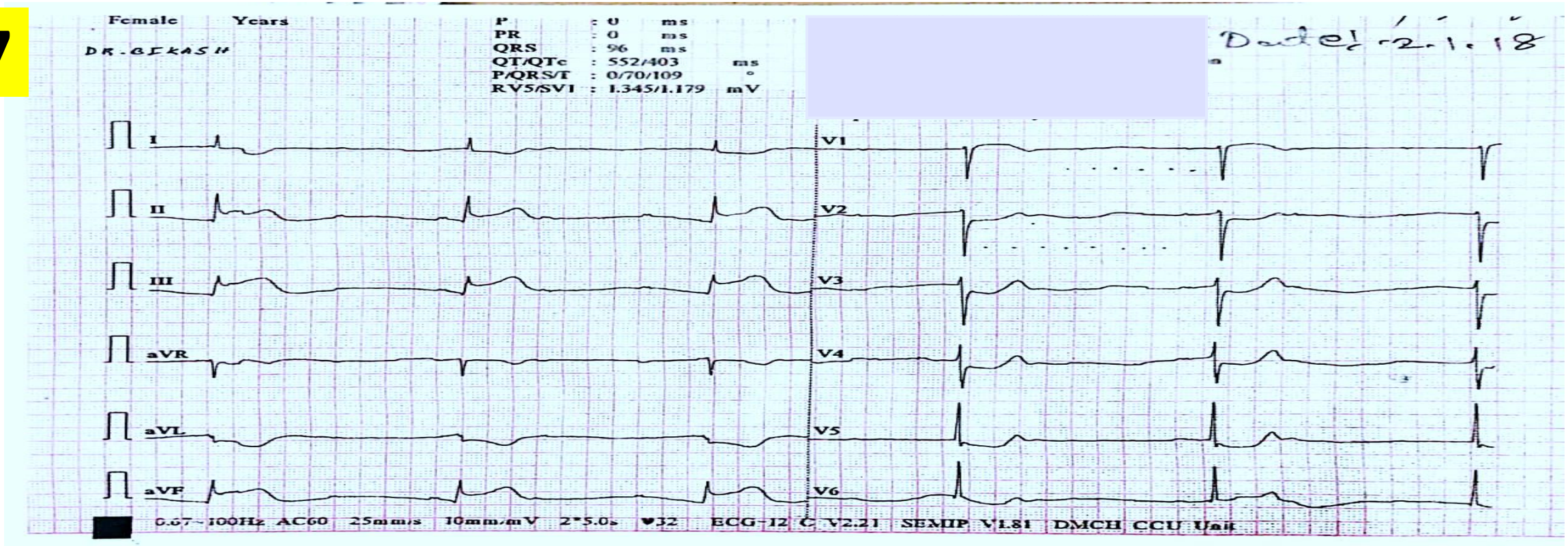
1)**ECG findings** : HR is about 110 b/min, Rhythm is sinus & Regular ,ST elevation in Lead II,III, aVF and reciprocal change in lead I & AvL , Progressive lengthening of PR interval followed by a dropped QRS complex

2) **ECG Dx:** Acute STEMI (Inferior) with Second degree AV block (Mobitz type-1)

3) **Causes :** IHD , Degenerative ,Drugs (Beta blocker , Rate limiting CCB ,Digoxin), Increased vagal tone

4) **Mx Plan :** Admission in CCU, Bed rest with cardiac monitor, IV channel opening, O2 inhalation (if needed), Loading dose of antiplatelets & atorvastatin ,IV Pethidine & antiemetic, Reperfusion therapy by Fibrinolytic / Primary PCI (if feasible)

Q-7



A 50 years old man presented with severe central chest pain for 4 hours

1) Write 5 important ECG findings
2) What is your diagnosis ?
3) What further investigations will you do ?
4) Mention 5 Clinical signs
5) Give the principles of management of this patient

Ans Q-7 :

1) **ECG findings :**Severe bradycardia (HR about 25 b/min), complete AV dissociation, R-R interval fixed , P-P interval fixed, ST elevation in lead –II,III & aVF, Reciprocal change in lead-I, aVL, V5 & V6 . ST elevation in lead V1 & ST depression in lead V2.

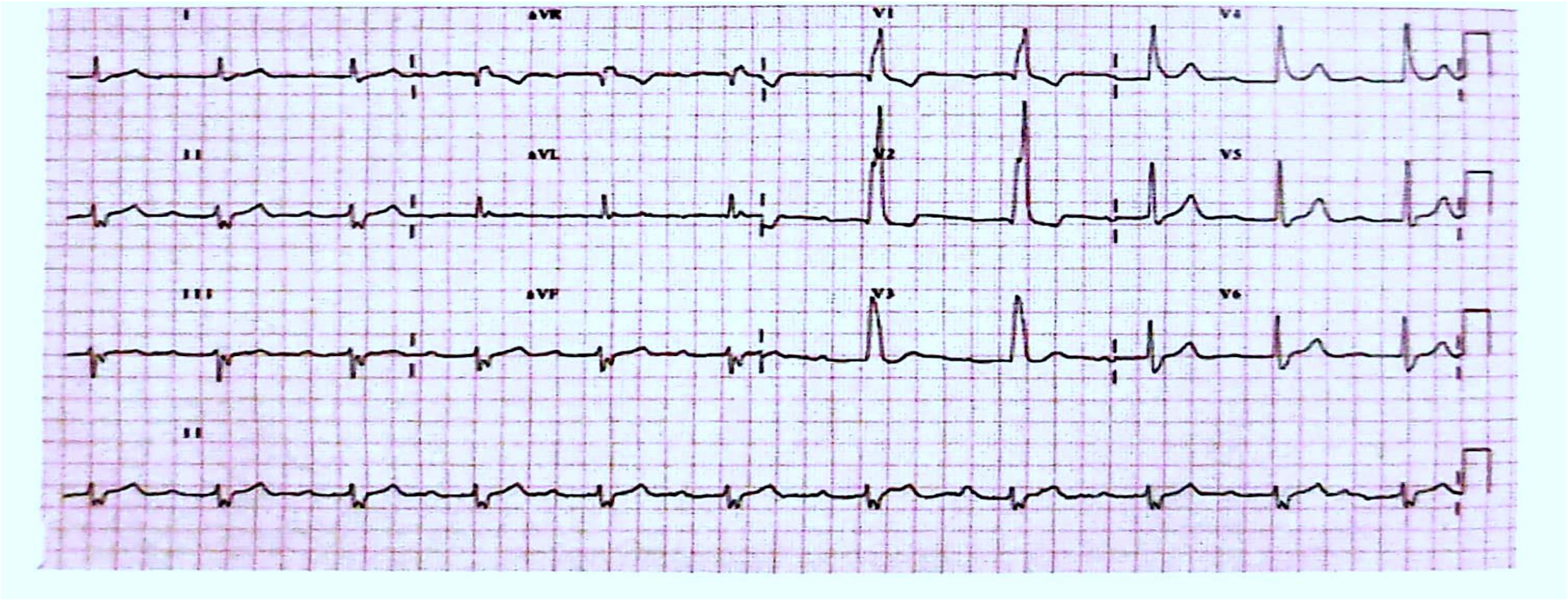
2) **ECG Dx:** Acute ST elevation MI (Inferior) with severe bradycardia due to CHB with possible RVI

3) **Further investigations :** Rt sided ECG, Posterior ECG, Trop-I, CBC, RBS, Serum creatinine, Serum electrolytes ,Lipid profile ,ECHO

4) **Clinical signs: Pulse :** High volume, regular pulse with bradycardia ,**BP :** Wide pulse pressure ;Hypotension if RVI, **JVP :** Cannon wave, **Precordium auscultation:** variable intensity of S1, **Lung base :** clear (if RVI present)

5) **Mx Principles :** Admission in CCU, IV channel opening, IV Pethidine ,IV anti-emetic, Loading dose of antiplatelet & atorvastatin, Reperfusion therapy / PPCI (if feasible),IV atropine ,IV Fluid challenge therapy, TPM

Q-8



A 78 years old man came to cardiology OPD having recurrent dizziness & H/O of single attack of syncopal attack . Study the ECG & answer the following questions

1) Name 3 important findings
2) What is your complete diagnosis ?
3) What may be the most common etiology for this patient ?
4) What is the definite treatment ?

Ans Q-8 :

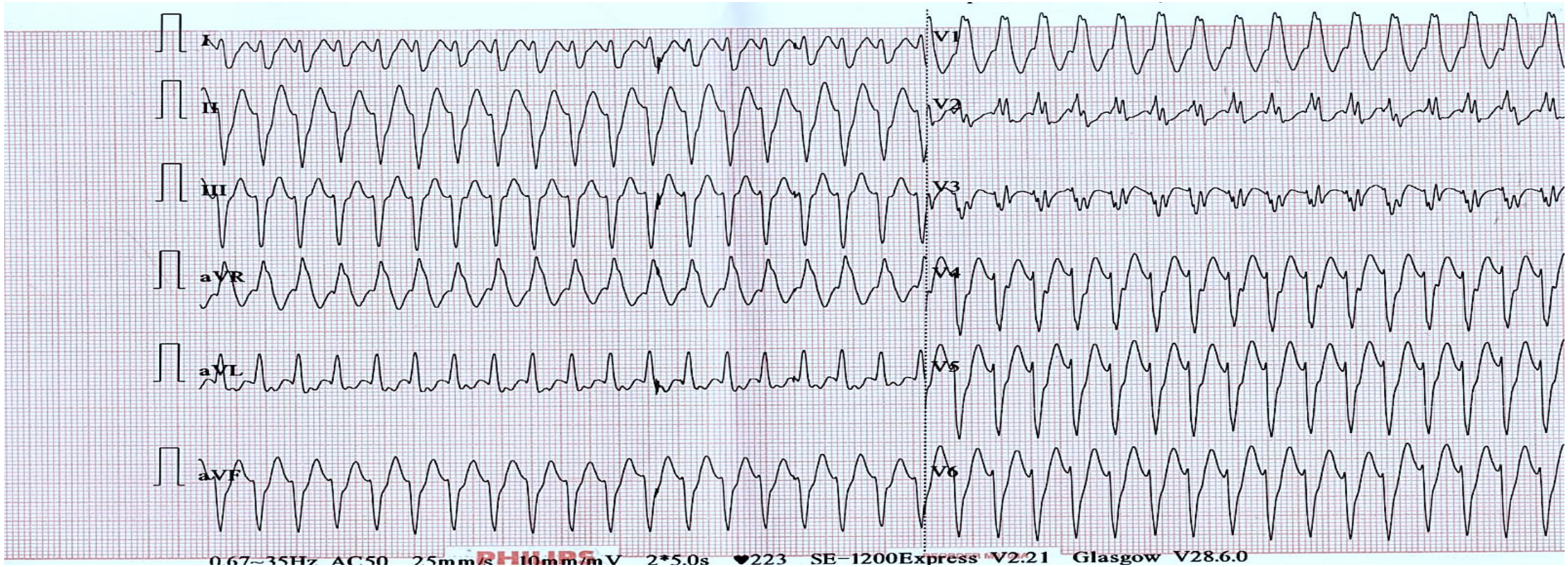
1) **3 important findings** : RBBB, Left axis deviation (left anterior hemiblock) and First degree AV block

2) **Diagnosis:** Tri-fascicular block

3) **Etiology** : Most likely degenerative

4) **Definitive Rx** : Dual chamber PPM implantation

Q-9



A 70 years old man complaints of severe central chest pain, a few minutes later he became extremely breathless & collapsed

1) What are the ECG findings ?
2) What is the ECG diagnosis ?
3) Name 2 differentials for this ECG
4) What should be the immediate management for this patient ?
5) Give 4 common non-structural causes of this type of ECG
6) Give outline of subsequent long term management

Ans Q-9

1) **ECG findings :** HR about 150 b/min, absent P wave, Rhythm is regular, Wide QRS complex, Concordance QRS complex in precordial leads

2) **ECG diagnosis:** Ventricular tachycardia (VT)

3) **2 Differentials :** SVT with Bundle branch block , SVT with aberrant conduction (WPW)

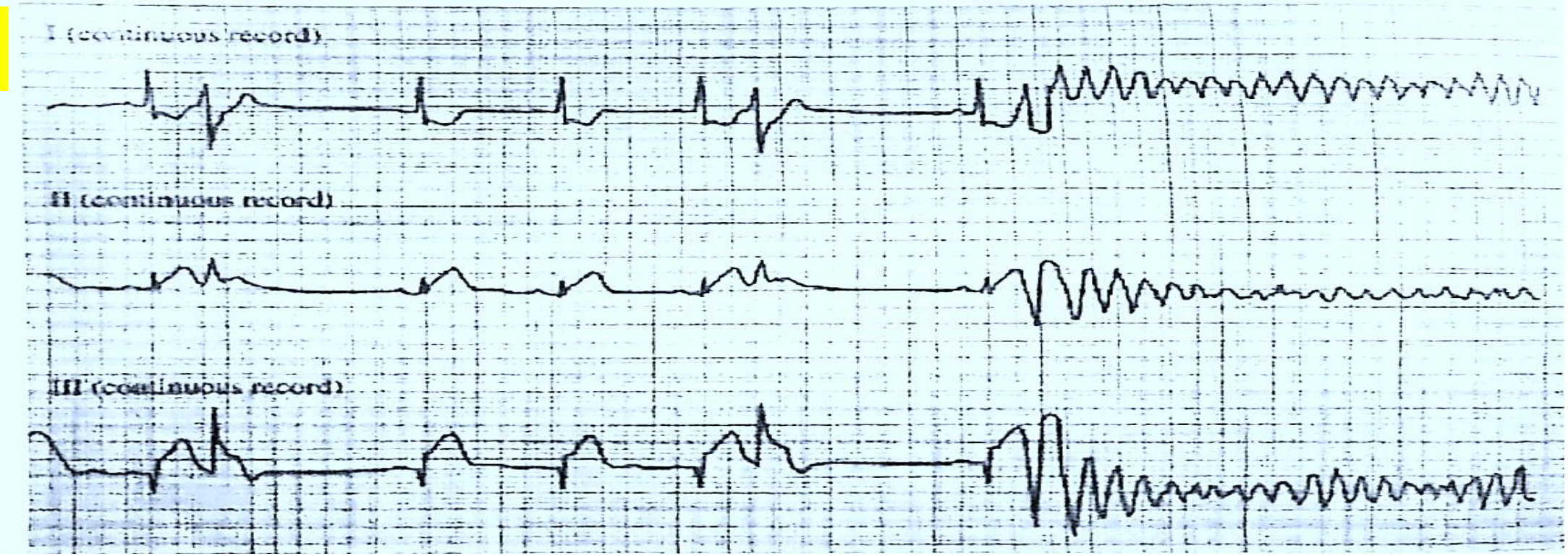
4) **Immediate Mx:** Immediate CPR followed by DC cardioversion and Repeat ECG after cardioversion, Blood is sent immediately for (for Trop-I, serum electrolytes , serum Ca2+, Mg2+, RBS, ABG, serum creatinine, NT-pro BNP), Rx of underlying causes.

5) **4 common non-structural causes:**

   - Long QT syndrome
   - Short QT syndrome
   - Brugada Syndrome
   - CPVT

6) **Subsequent Rx outline:** Revascularization, Anti-ischemic GDMT, Heart-faiure treatment by fantastic four drugs , ICD in selected cases.

Q-10



A 60 years old man who had come to the CCU for 2 hours of typical chest pain, then he collapsed while his ECG was being recorded

1) What are the important findings in this ECG ?
2) What would you do immediately ?
3) Outline the management protocol after recovery to sinus rhythm

Ans-Q:10

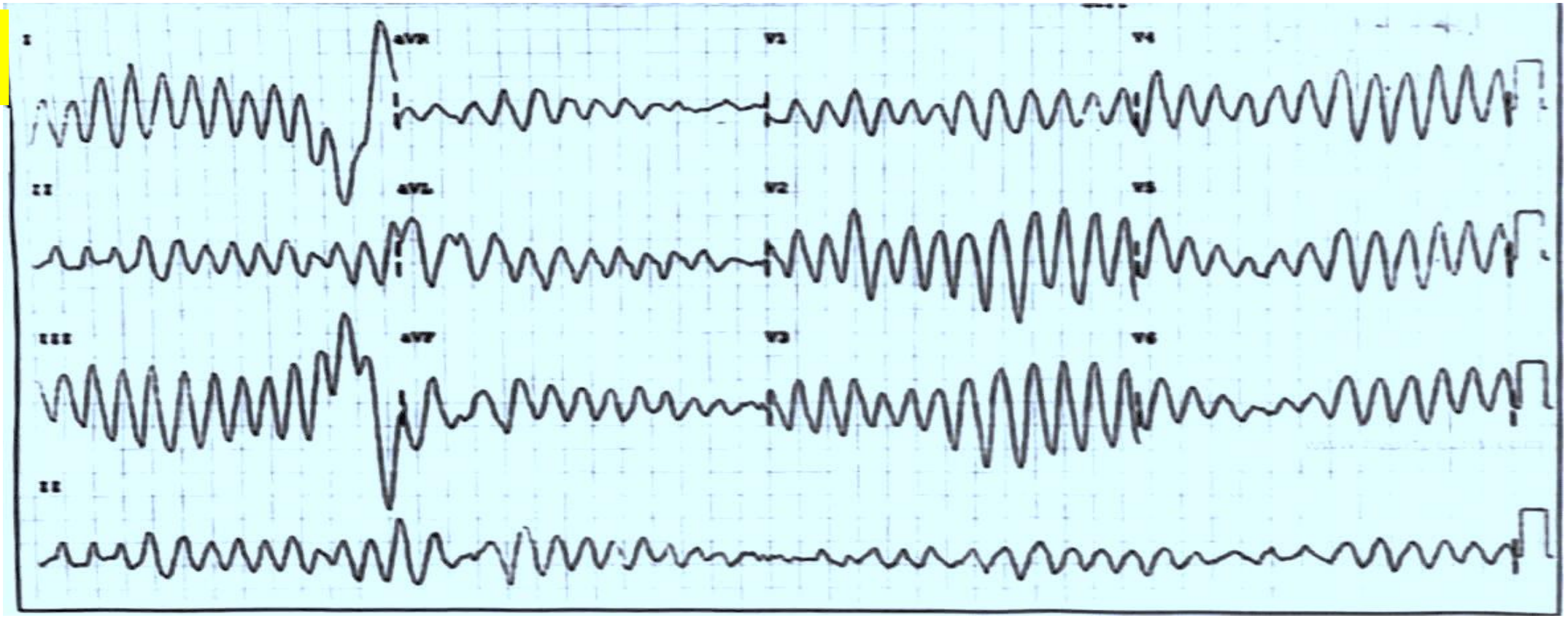
1) **ECG findings :**

- Sinus rhythm with ventricular extra systoles
- The third extra systole occurs on the peak of the preceding sinus beat
- After three or four beats of ventricular tachycardia ventricular fibrillation develops
- In the sinus beats there is a Q wave in lead III, raised ST segments in leads II & III, and ST segment depression & T wave inversion in lead I

2) **Immediate measure** : CPR followed by Defibrillation

3) **Mx Protocol** : O2 inhalation, IV morphine with IV antiemetic, Loading dose of antiplatelet & atorvastatin, Betablocker , Nitrate, Lignocaine(±), Treatment of underlying etiology, Revascularization , ICD if indicated.

Q-11



A 42 years male smoker ,hypertensive patient suddenly become collapsed at his office . When patient had arrived at CCU ,he was unconscious and one of his colleague said that patient had H/O heart attack 2 months back.

1) What is your diagnosis ?
2) Give the points in favour of your diagnosis
3) Mention important causes
4) Mention the immediate treatment strategy of this patient

Ans-Q:11

1) **Diagnosis:** Torsades de pointes

2) **Points in favour:** Ventricular rate > 100 b/min, QRS complex are broad (> 120 ms), twisting of QRS around the base line, Absence of P wave.

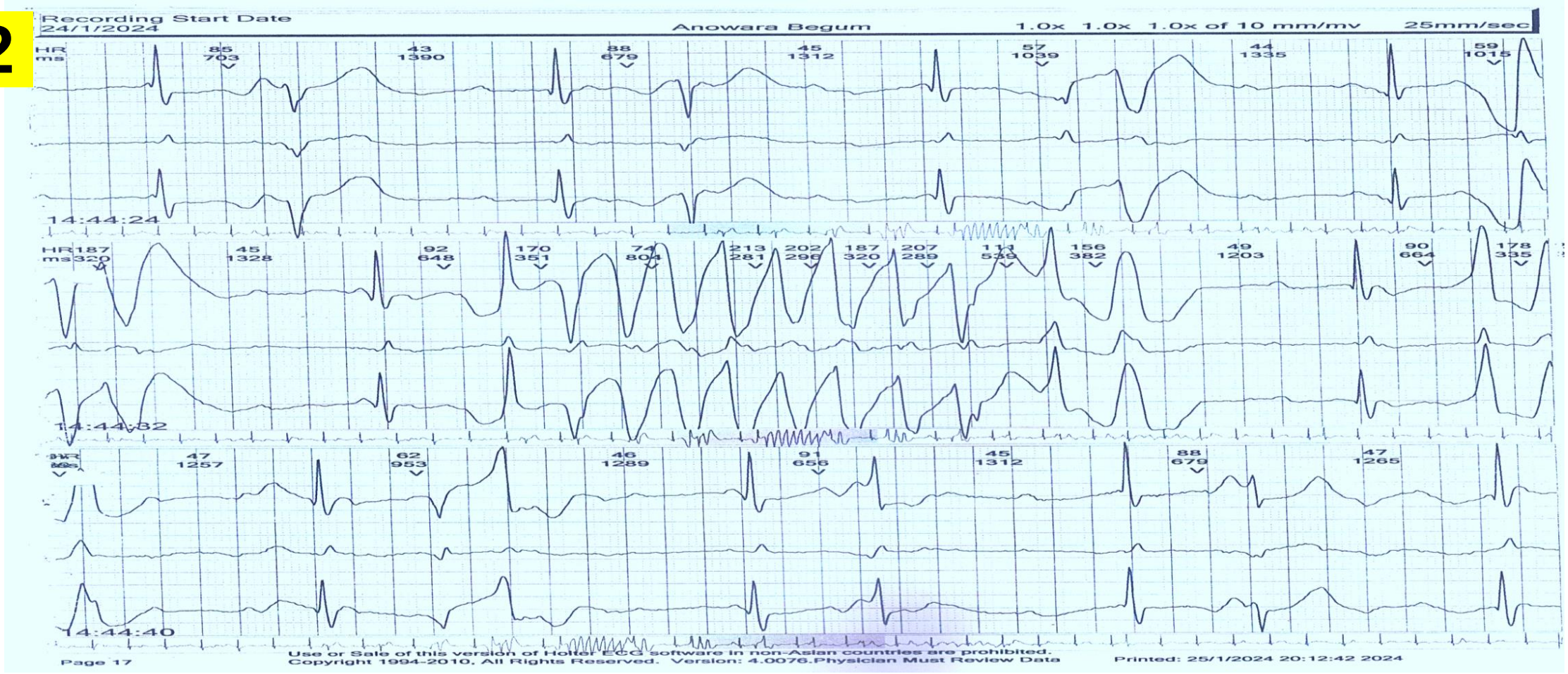
3) **Important causes :**

- Electrolytes imbalance (Hypokalemia, Hypomagnesemia)
- Drugs causing Long QT (Antipsychotic drugs)
- Channelopathy (Brugada syndrome, Long/Short QT syndrome)
- IHD

4) **Immediate Mx :**

- CPR followed by DC cardioversion
- Blood sent for K+, Mg2+, Trop-I, NT-Pro BNP
- IV Magnesium sulphate
- Withdrawal of offending drugs
- Isoprenaline/ Atrial over drive pacing

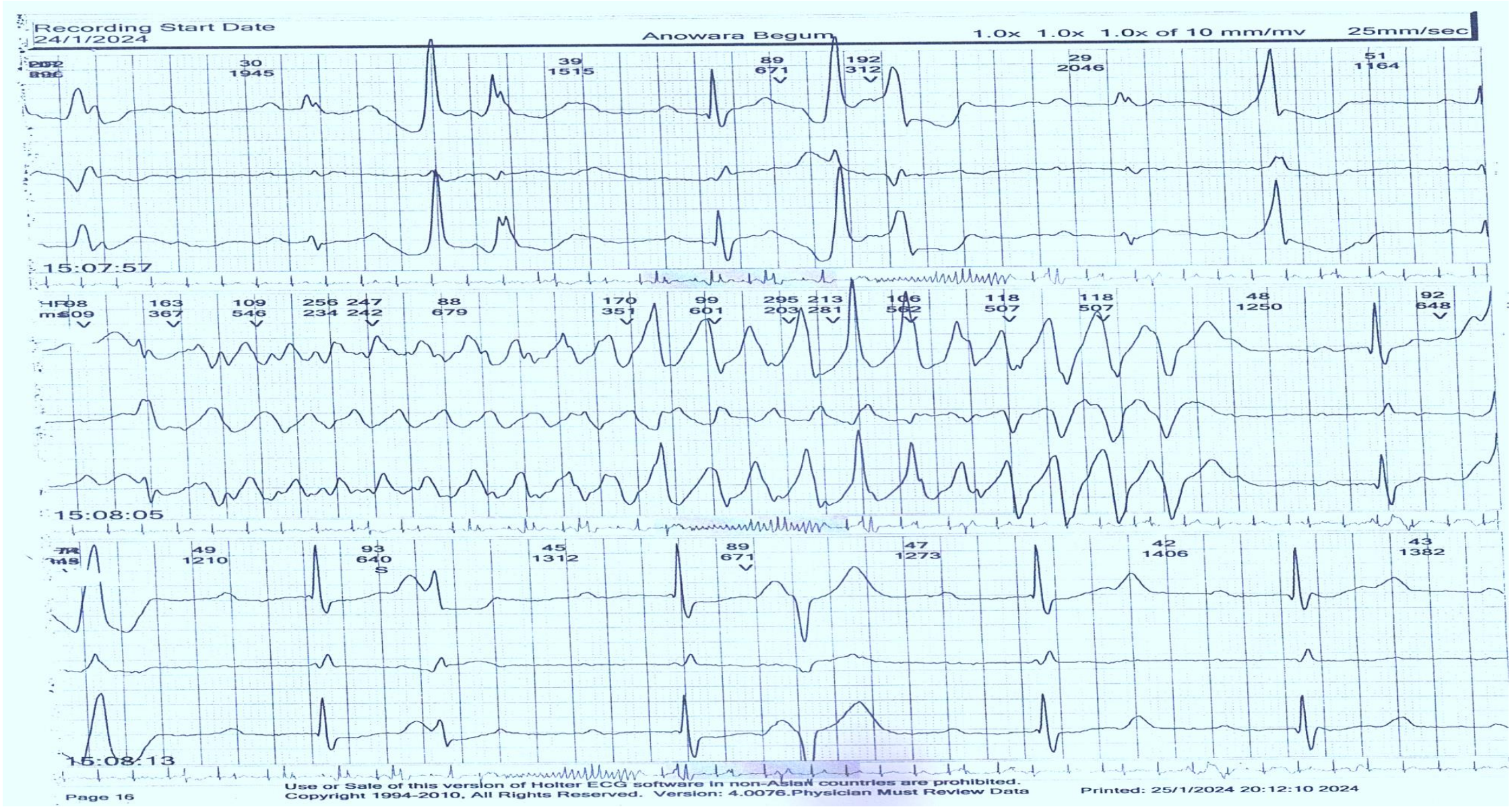
Q-12



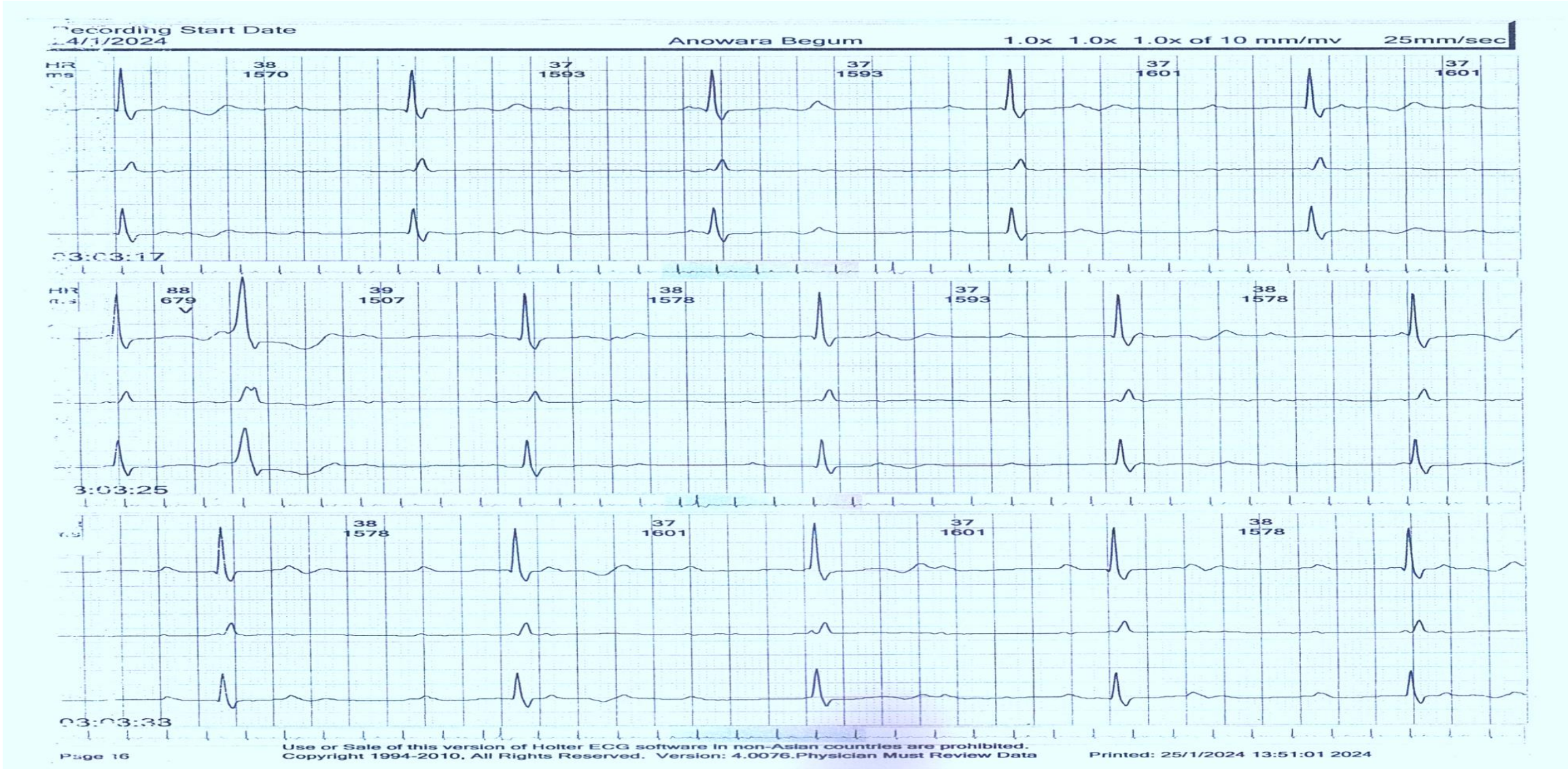
A 72 years old non-diabetic & non hypertensive female had H/O intermittent palpitation associated with dizziness for last 6 months ,on clinical & biochemical evaluation there was no abnormality ,Here is the 24 hours Holter ECG

1) Mention the important significant ECG findings
2) What is your diagnosis ?
3) What is the definitive treatment ?

Q-12 (Contd…) Holter ECG



Q-12 (Contd…) Holter ECG



Ans –Q:12

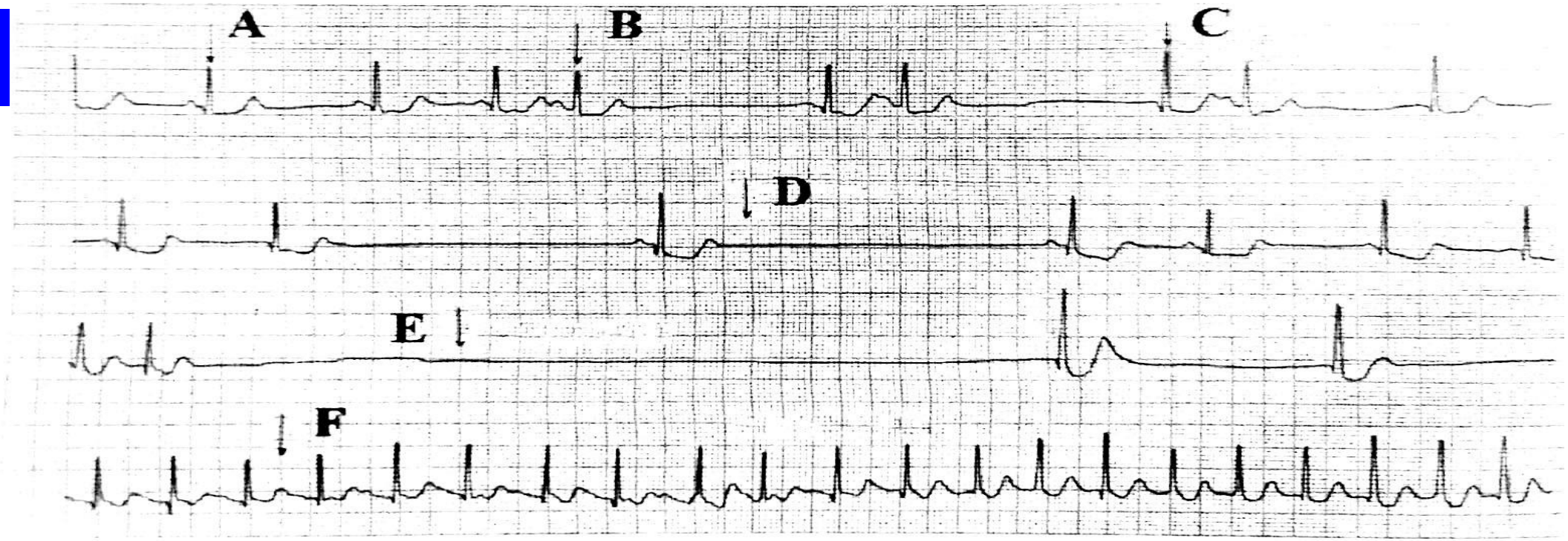
1) **Findings in Holter ECG :**

2) **Diagnosis :** Bradycardia induced Torsades de pointes

3) **Definitive Rx:** Dual chamber PPM implantation

Thank You

Q-13



A 60 years old non diabetic & non hypertensive male presented in Cardiology OPD with H/O recurrent loss of consciousness. Study the tracing from 24 hours ambulatory ECG monitoring & answer the following question.

1) What are the rhythms indicated by A to F
2) What is the likely diagnosis?
3) Name 4 common underlying causes
4) What is the definitive treatment to improve symptoms ?
5) Name the conditions where single chamber PPM is used

Ans-Q:13

1) **Rhythm indicated** : **A**- Sinus rhythm , **B**-Atrial ectopics , **C-** Junctional beats ,**D**-Sinus bradycardia , **E**-Sinus arrest , **F**- Atrial fibrillation

2) **Dx:** Sinus node dysfunction /SSS

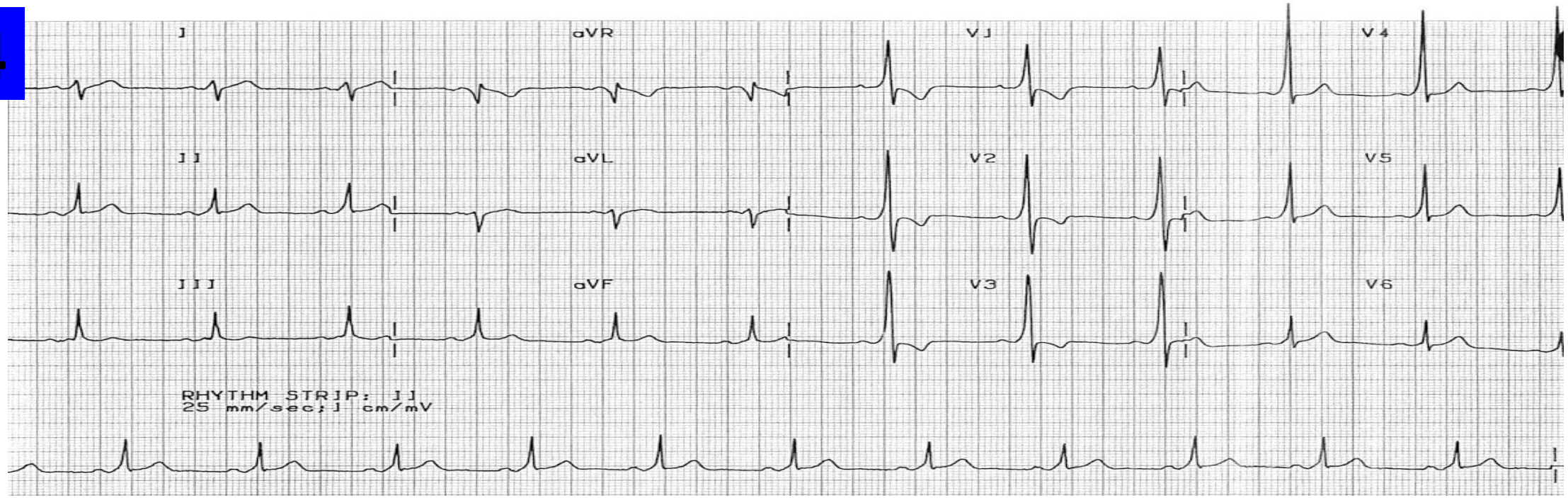
3) **Causes :** Fibrosis, Degenerative changes , Ischemia of SA node , Drugs (e.g:-Beta blocker)

4) **Definitive treatment :** Dual chamber PPM implantation

5) **Single chamber PPM used :**

- AF with severe bradycardia
- AF with complete heart block
- SA node dysfunction with normal AV node

Q-14



A 32 years old male presented at medicine OPD with recurrent attack of palpitation . His father died at the age of 50 years with unknown cause & he is worried about himself.

1) Identify the important ECG findings
2) What is your diagnosis ?
3) Name the drugs contraindicated in this case
4) What congenital disease is usually associated with this condition ?
5) How will you confirm the diagnosis & what will be the best management strategy for this patient ?

Ans-Q:14

1) **ECG findings :** Short PR interval, Delta wave and Tall R wave in lead V1

2) **Dx :** WPW Type-A ECG

3) **Drugs contraindicated :** Beta blocker, Rate limiting CCB, Digoxin, Adenosine

4) **Congenital disease may be associated** : Ebstein's anomaly

5) **Confirmatory investigation:** EP Study**,**

Best Mx Strategy : RF Catheter ablation of by pass tract