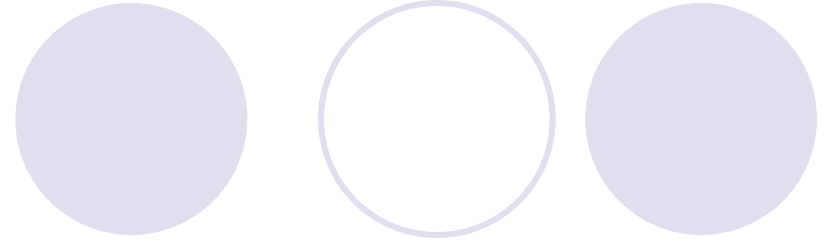
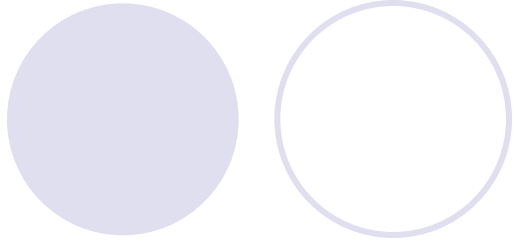




Dr. Hussein Saad, MRCP (UK)

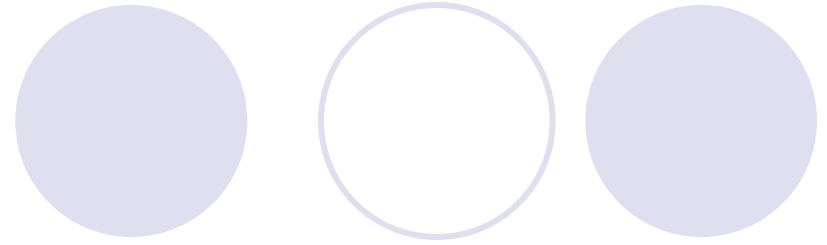
***Assistant Professor and Consultant
College of Medicine, King Saud University***

Introduction to ECG

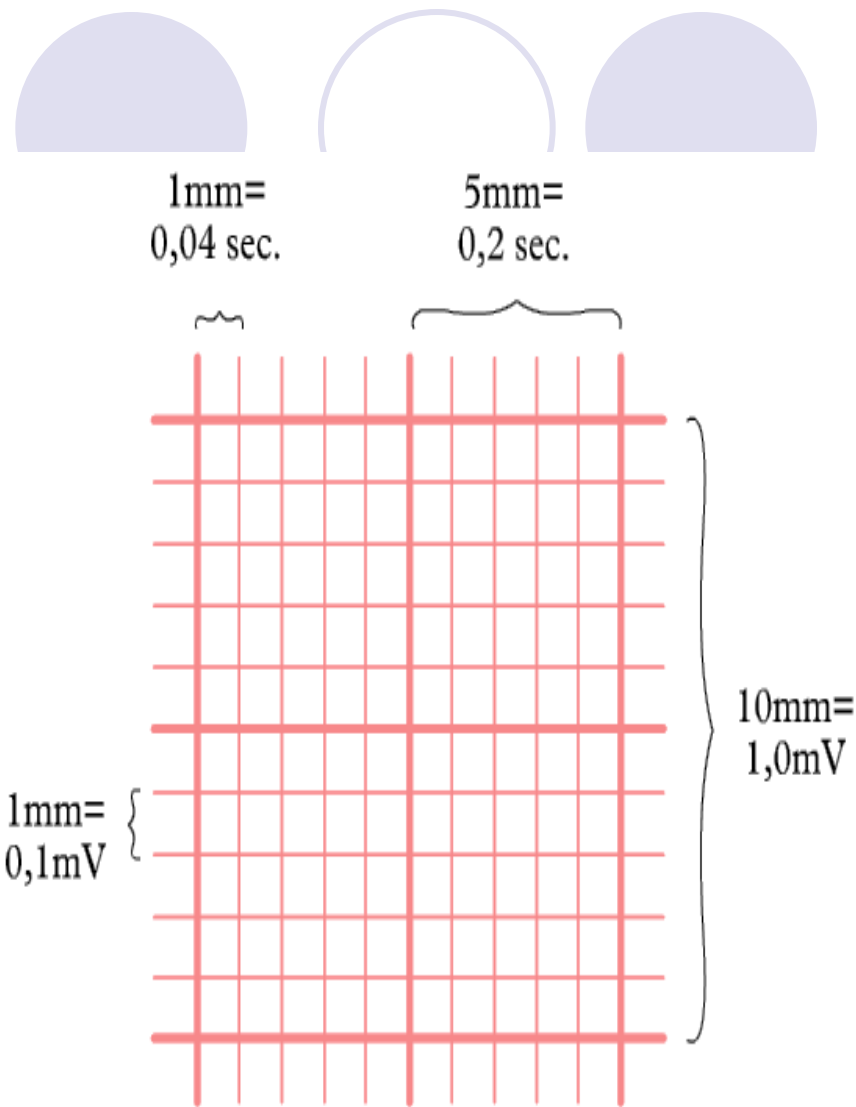
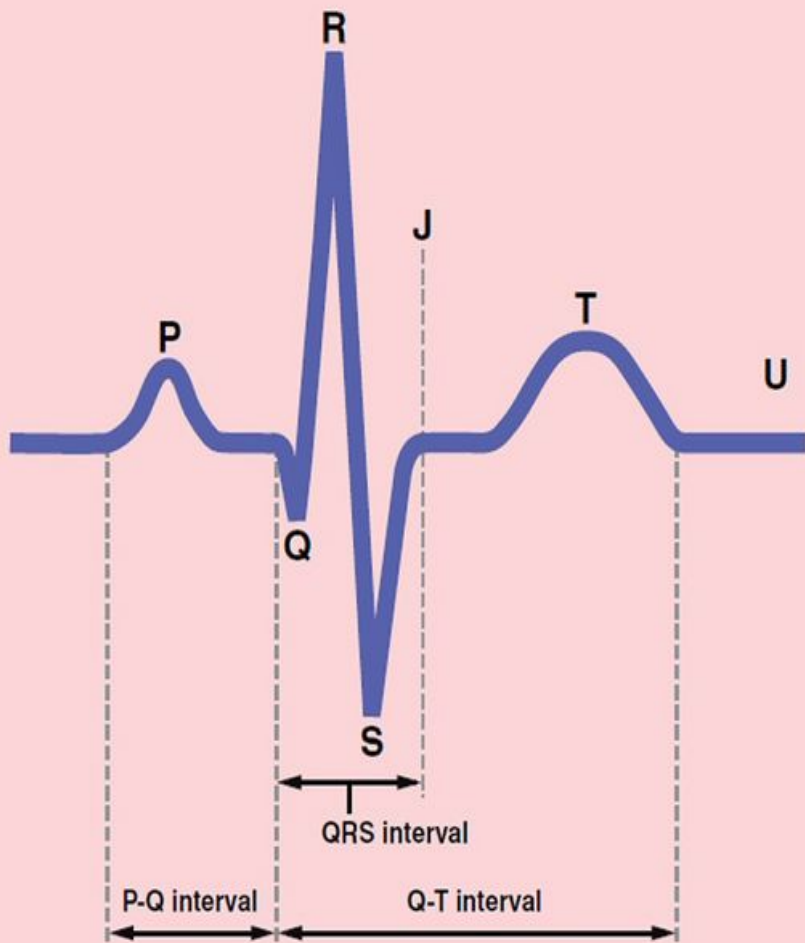


TEAM NOTE IN THIS COLOR

We hope to cover:



- Heart rate, Arrhythmia (Tachycardia, AF, Flutter, Vent. T)
- Axis deviation
- First degree heart block
- Right Bundle Branch Block (RBBB)
- Premature Ventricular Contraction (PVC)
- Premature Atrial Contraction (PAC)
- Left Ventricular Hypertension (LVH)
- Ischaemia (MI)



0.04 sec

0.2 sec

0.1 mV

1 mV

EKG Grid Box



QT interval

QRS

PR interval

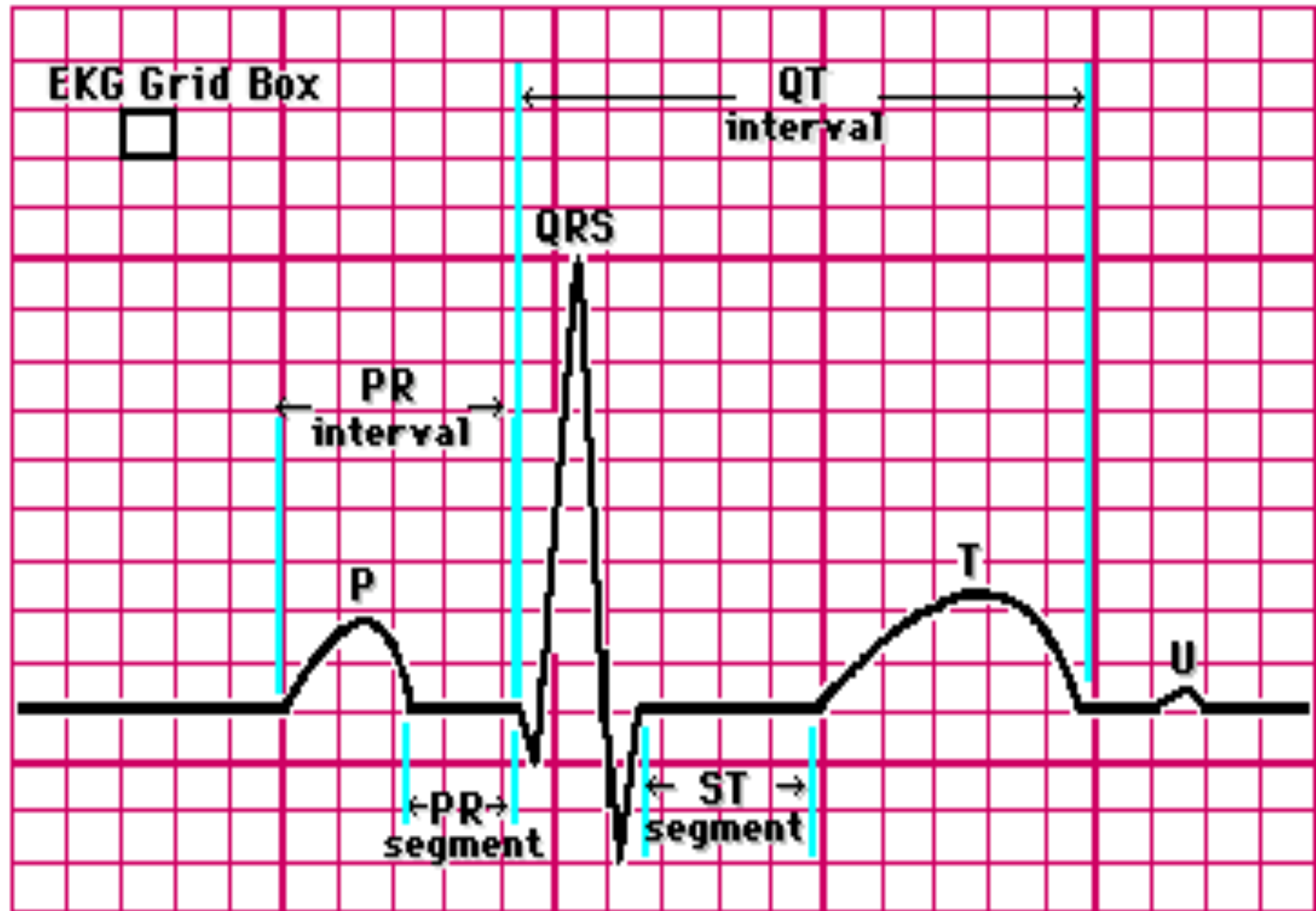
P

T

U

PR segment

ST segment



Normal P Wave

Height and Width: **2 – 2.5 mm** (0.08 to 0.10 sec)

PR Interval: **3 - 5 mm** (0.12 – 0.20 sec)

Best seen: **Leads I, II and aVF**

Normal QRS

Duration: **1 – 2.5 mm** (0.04 – 0.10 sec)

Wide QRS

Bundle Branch Block

Premature Ventricular Contractions

Ventricular Tachycardia

--Axis--

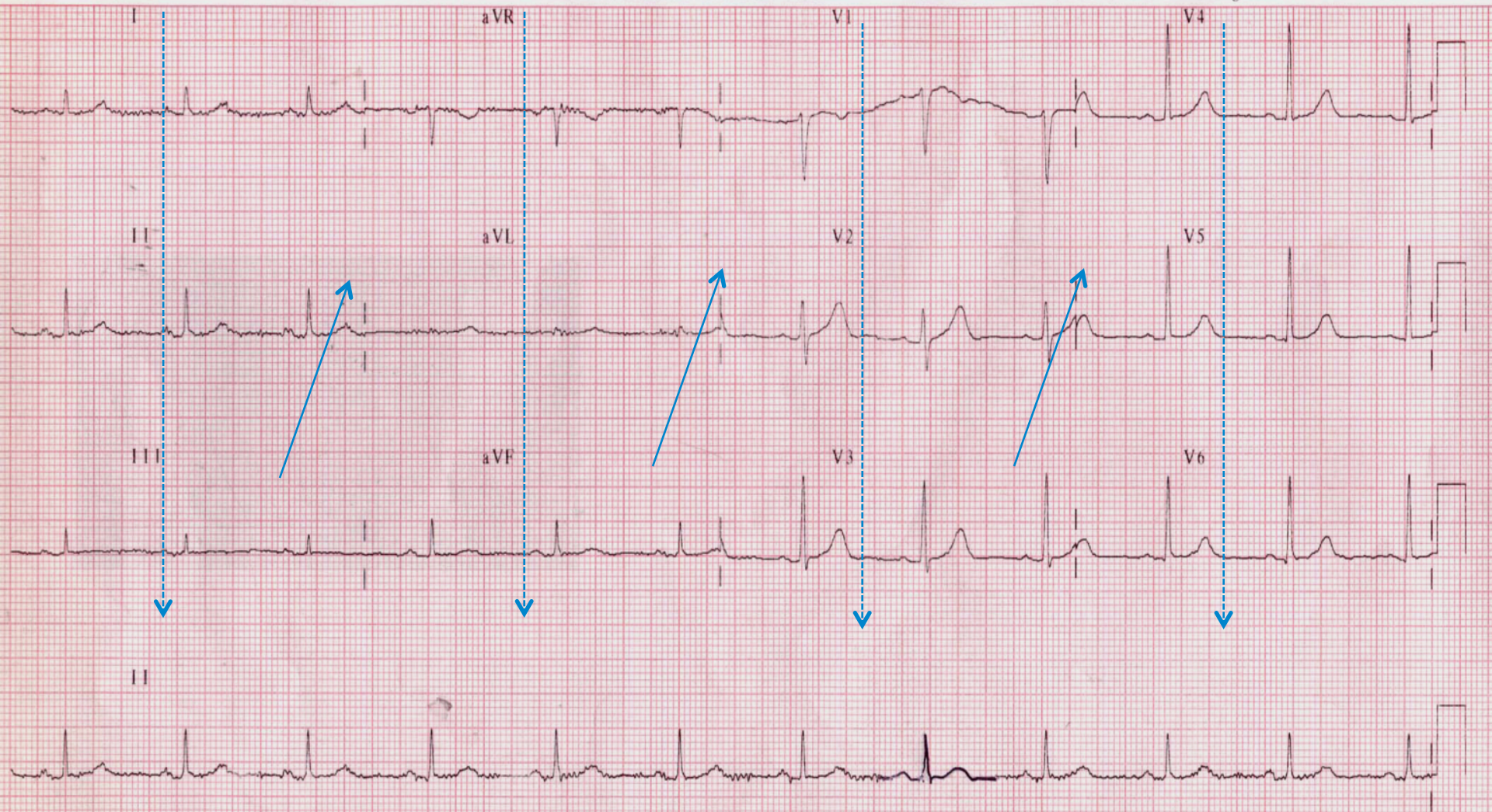
P 51
QRS 55
T 39

How to read ECG?

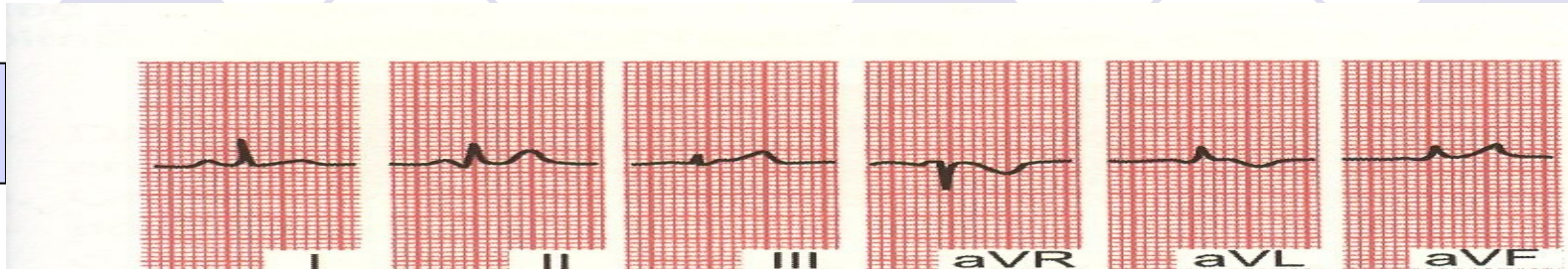
Requested by:
Dr. HUSSAIN

- OTHERWISE NORMAL ECG -

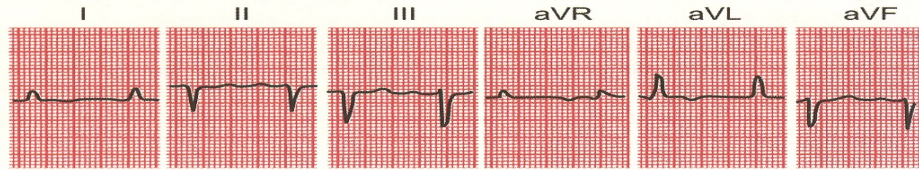
Unconfirmed diagnosis.



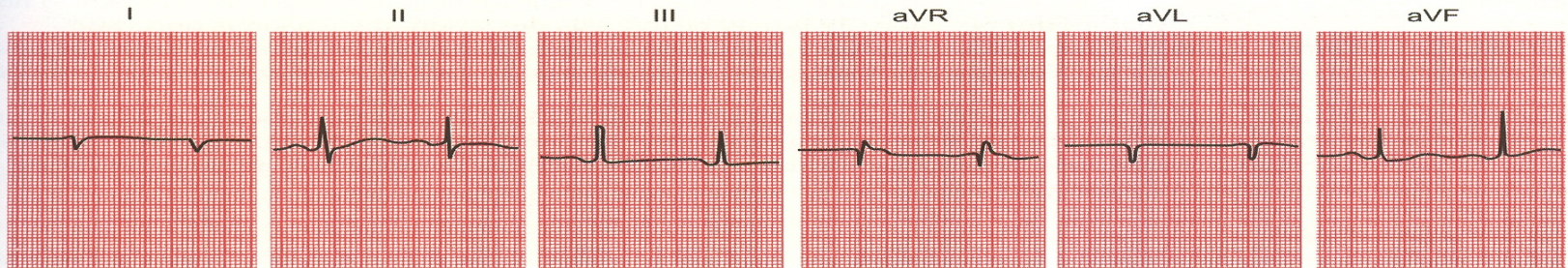
A



B

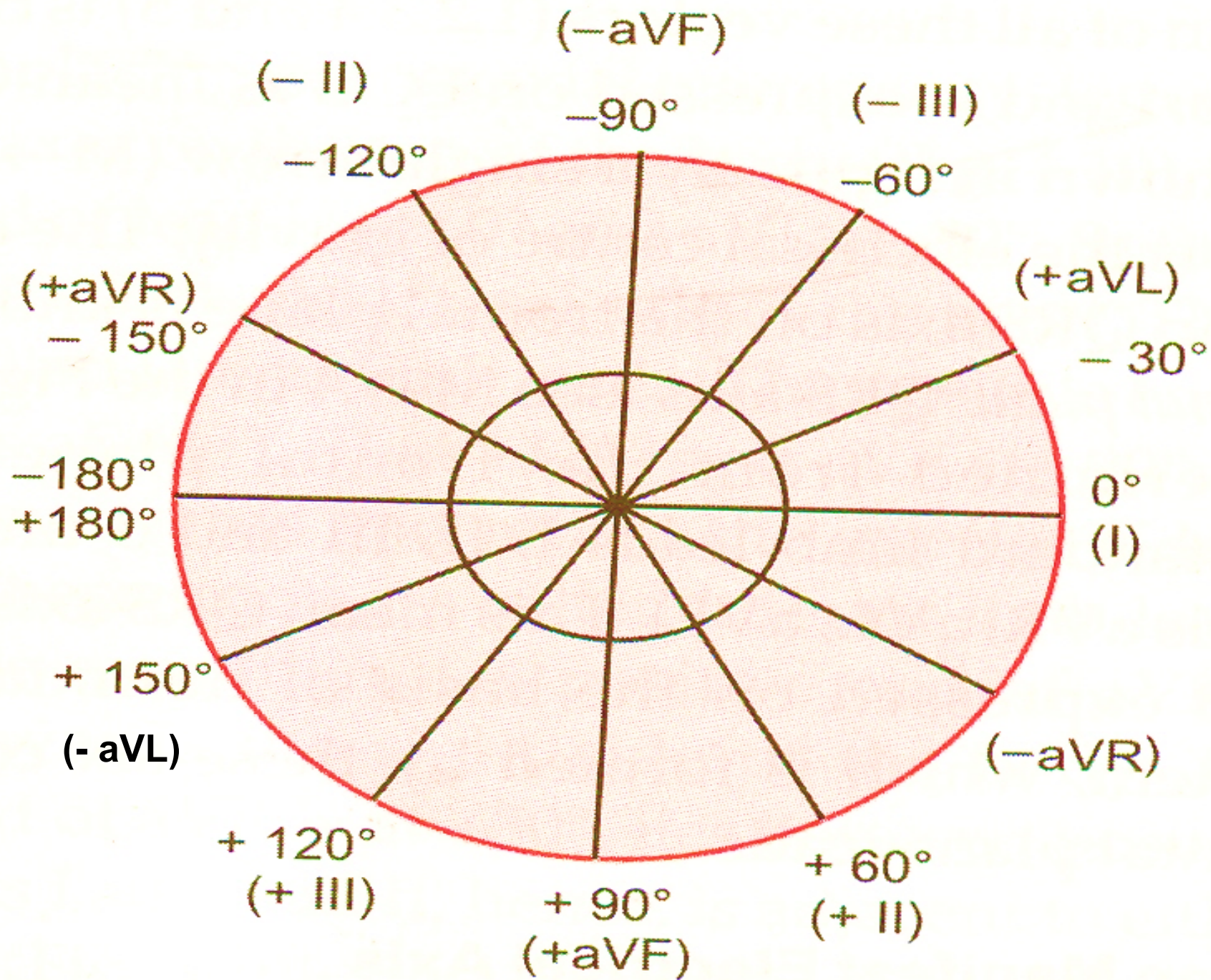


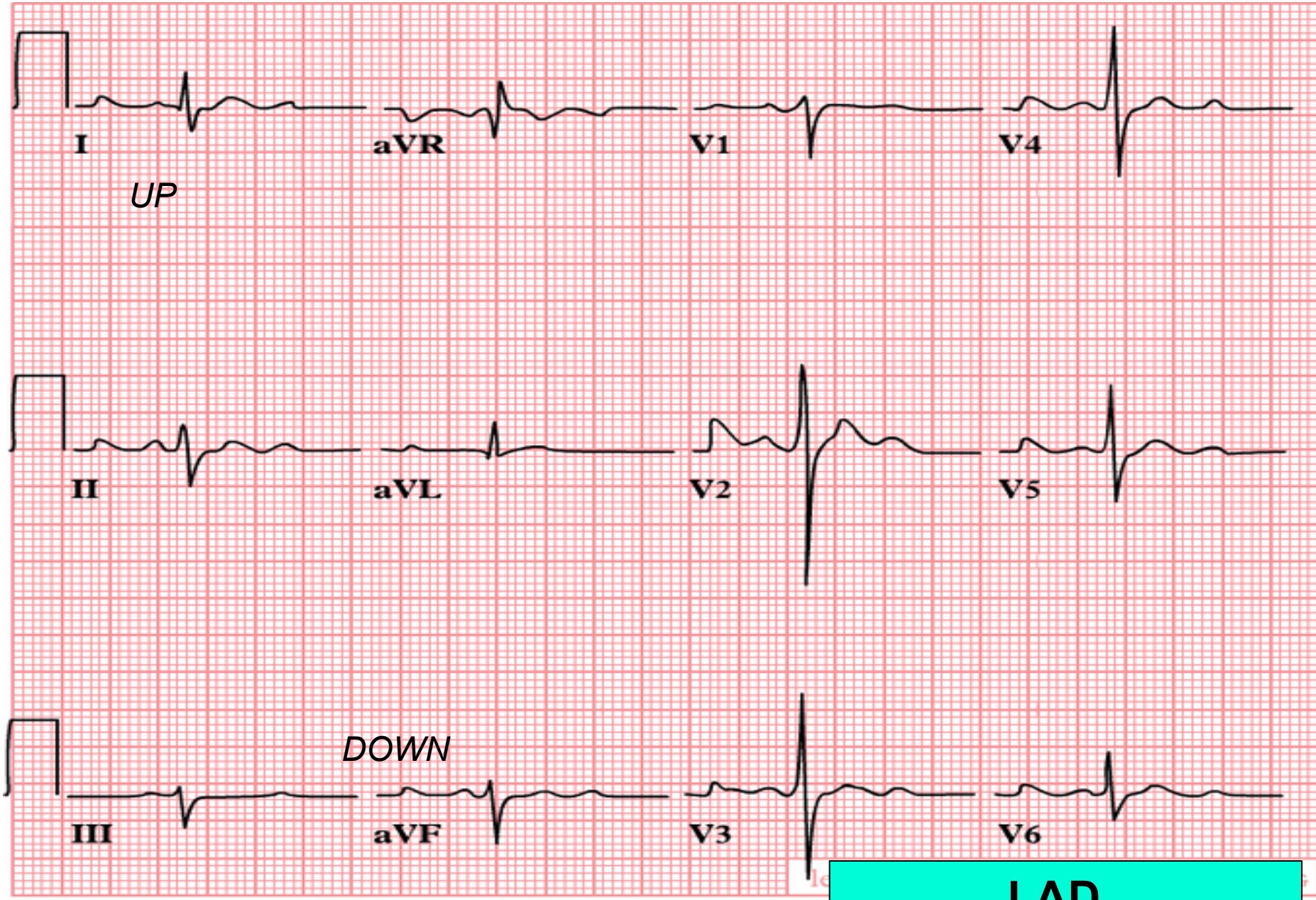
C



What is the electrical axis of the strips A, B and C?

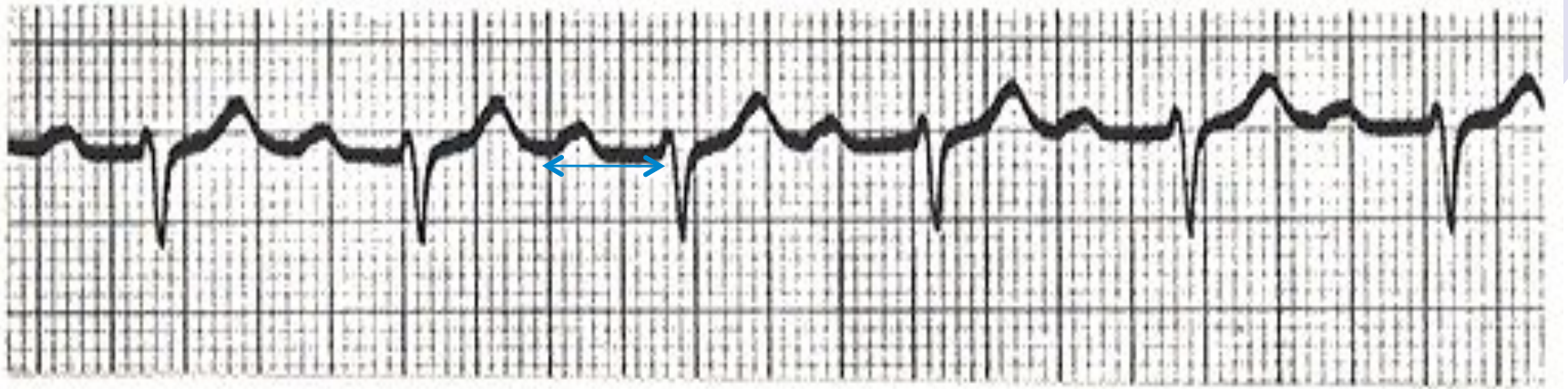
Normal axis deviation	Look at (lead 1) and (aVF)
Right axis deviation	★ UP - UP >> Normal
Left axis deviation	UP - DOWN >> Left D.
	Down - UP >> Right D.





Which type of axis deviation?

LAD



What is the main finding in this strip?

Prolonged PR interval (> 5 mm [>0.2 second])

First degree heart block



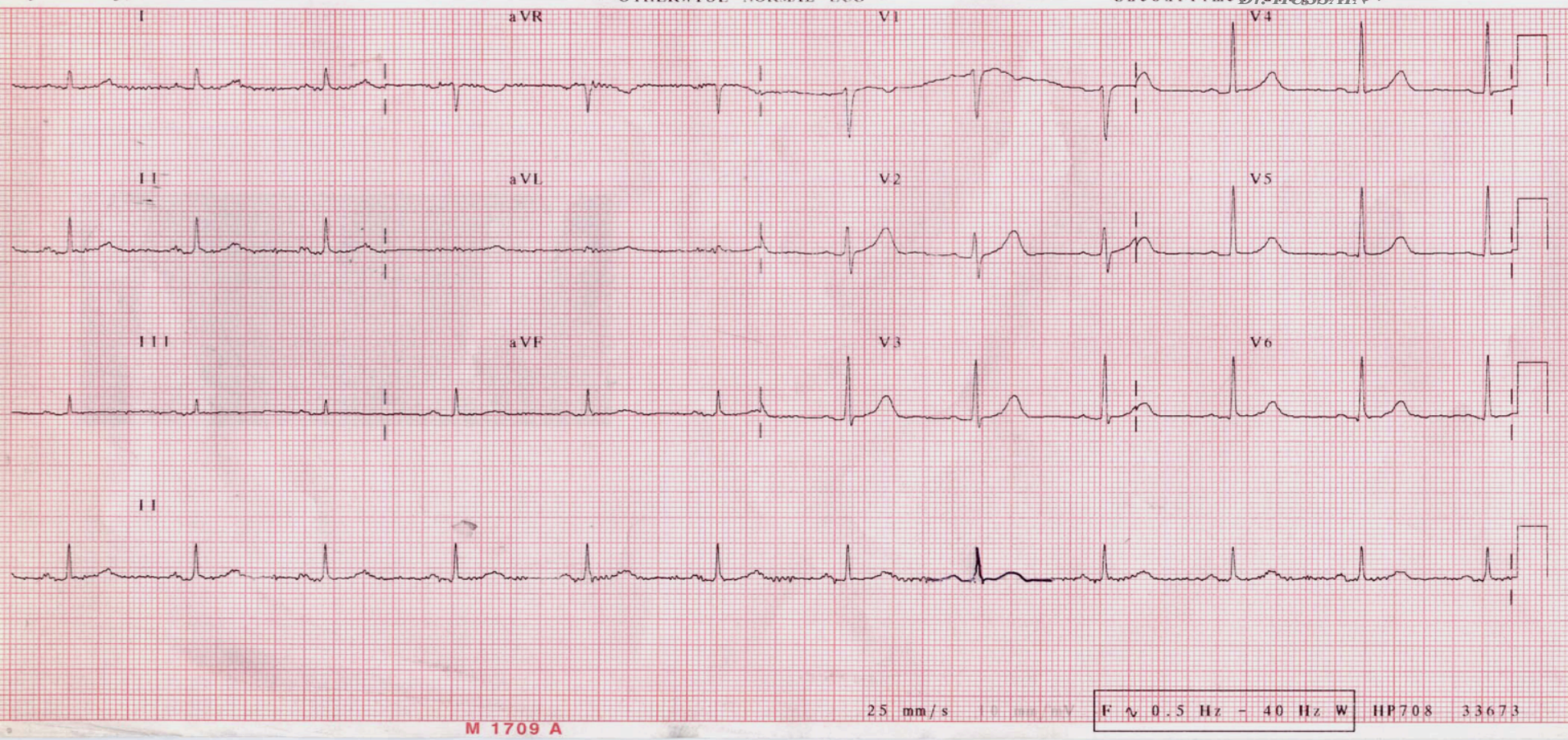
What is your diagnosis?

First degree heart block

--Axis--
P 51
QRS 55
T 39

- OTHERWISE NORMAL ECG -

Requested by:
Unconfirmed **Dr. HUSSAIN**



What is the approximate heart rate?

- a. 50 bpm
- b. 70 bpm
- c. 90 bpm
- d. 110 bpm

b

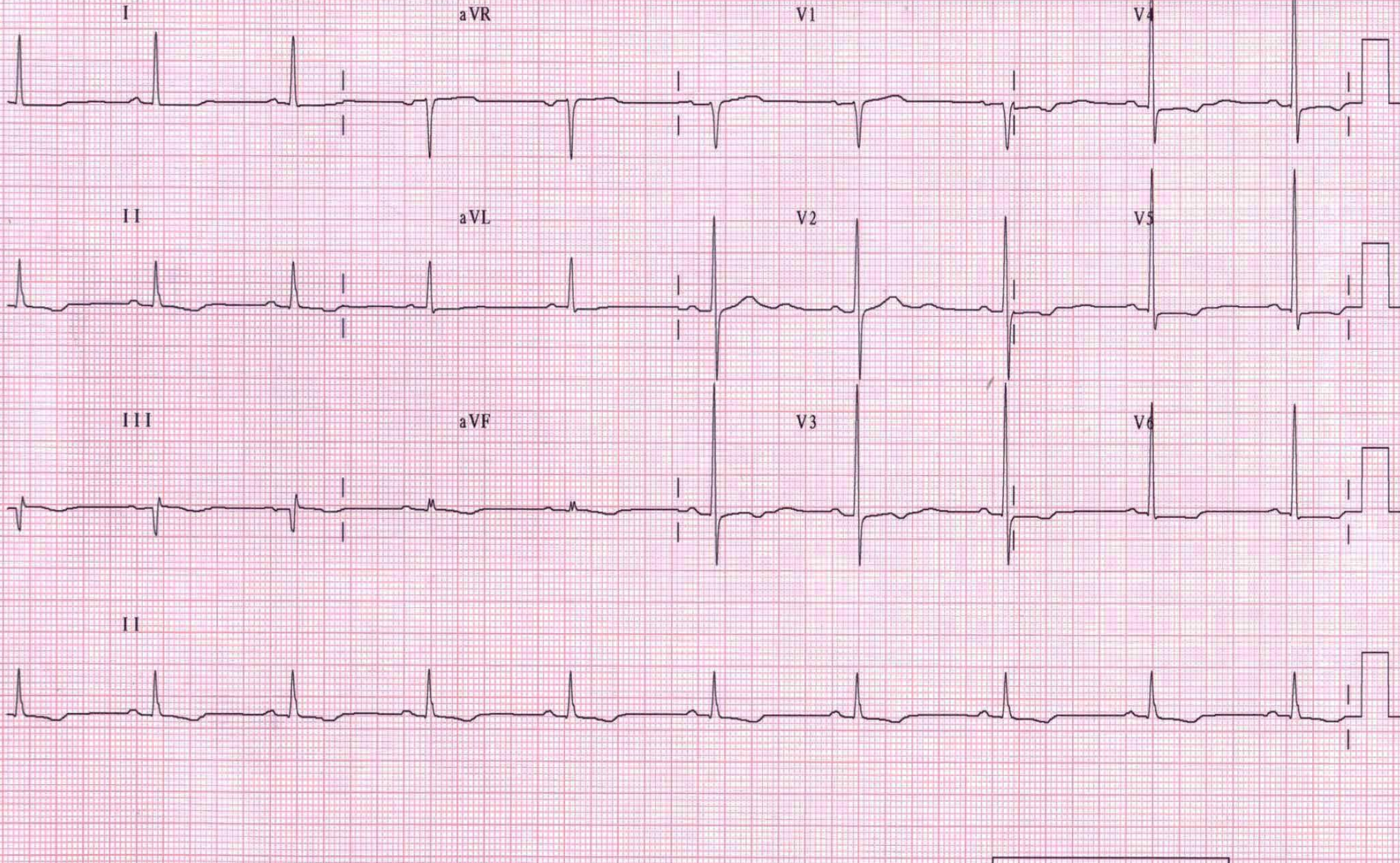
HR = 300 / Large Square

Normally 60 – 100
Less than 60 Brady
More than 100 Tachy

QRS 11
T 253

- ABNORMAL ECG -

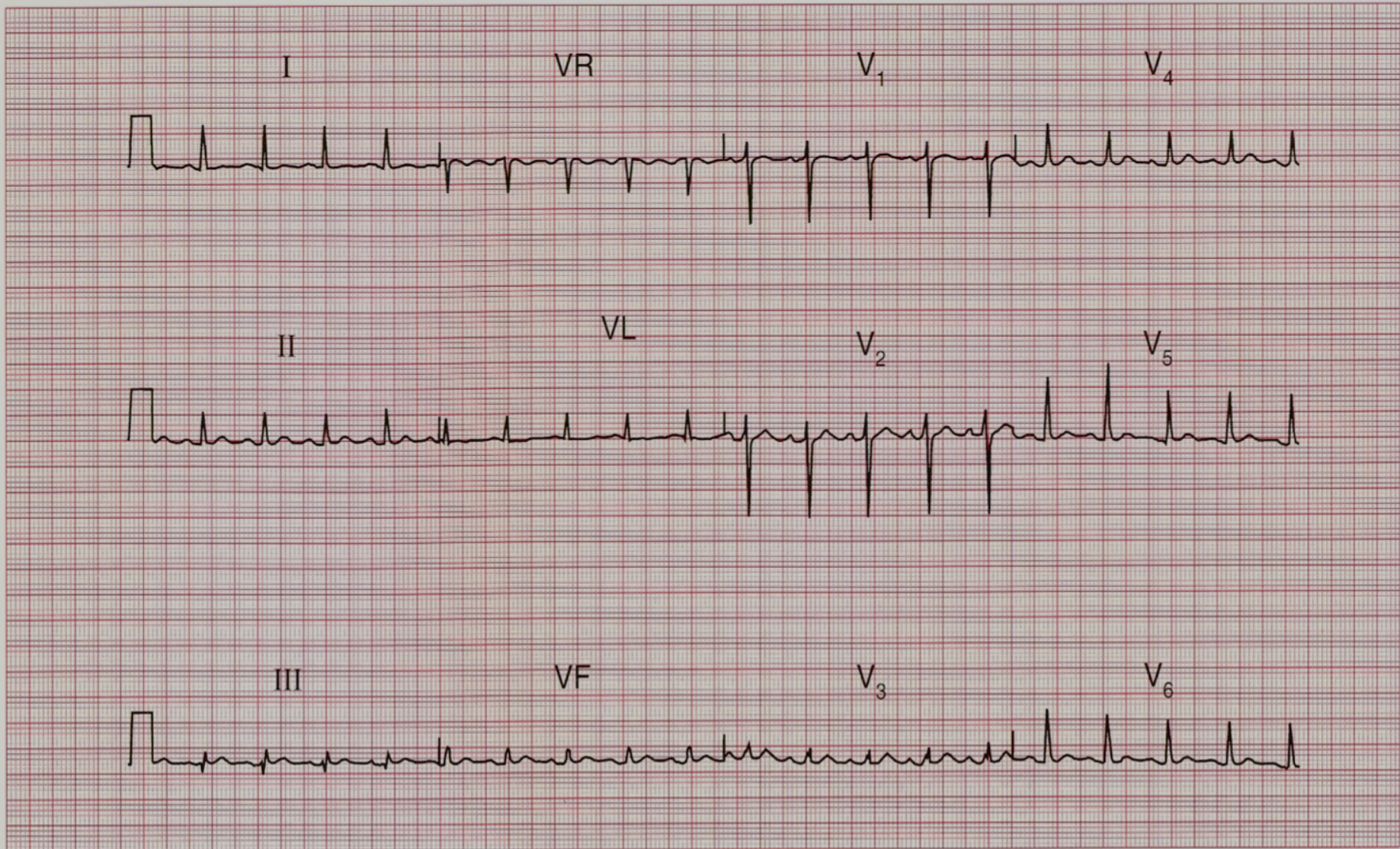
Unconfirmed. MD must review.



715270

25 mm/s 10 mm/mV F \sphericalangle 0.5 Hz - 40 Hz W HP708 50057

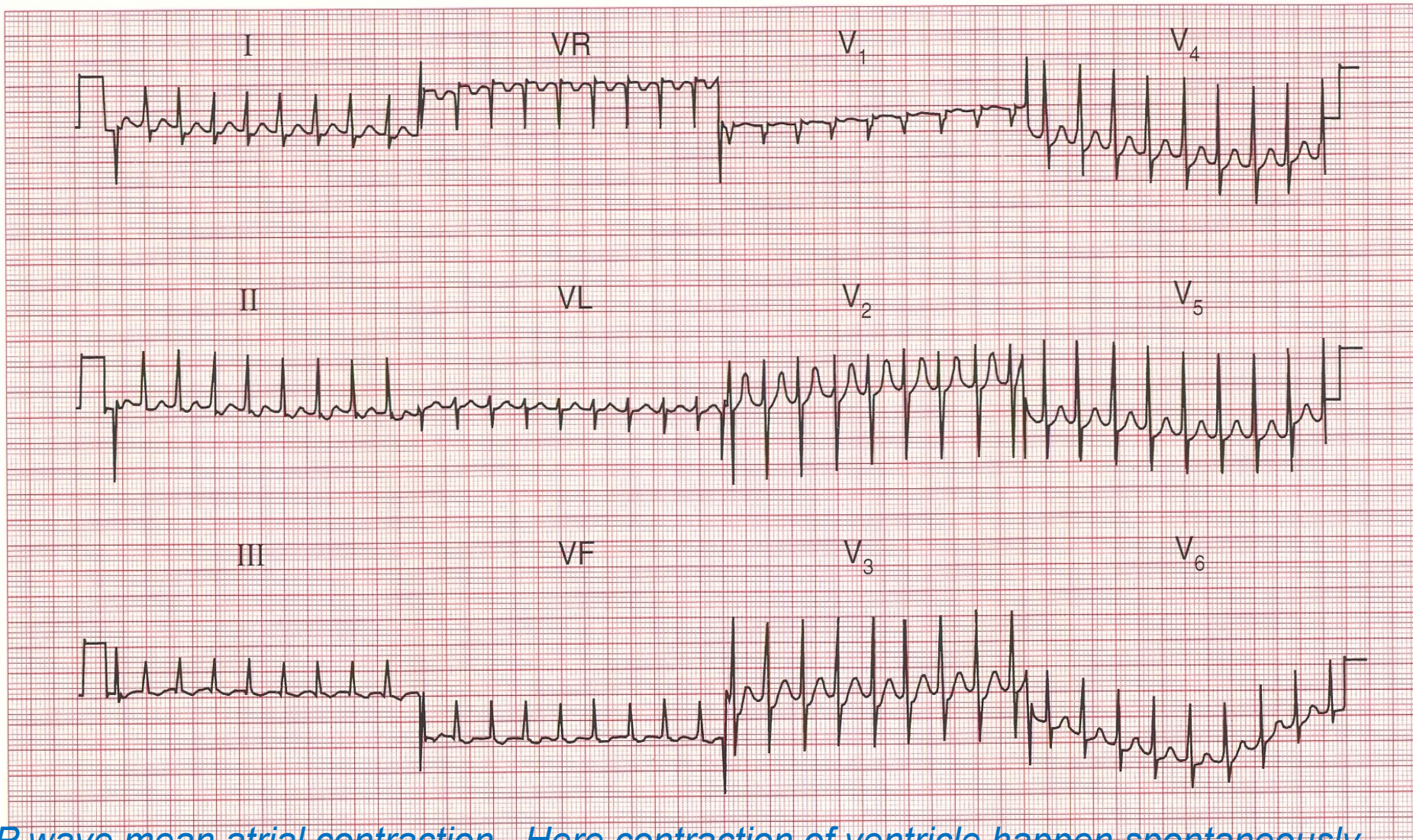
Bradycardia,



Sinus : normal Leads reading with abnormality in the rate .

ECG 43 This ECG was recorded from a 30-year-old woman who complained of palpitations. Does it help make a diagnosis?

Sinus Tachycardia



P wave mean atrial contraction , Here contraction of ventricle happen spontaneously, not from atrial . So we do not see P wave . + B,C of abnormal reading it is not Sinus

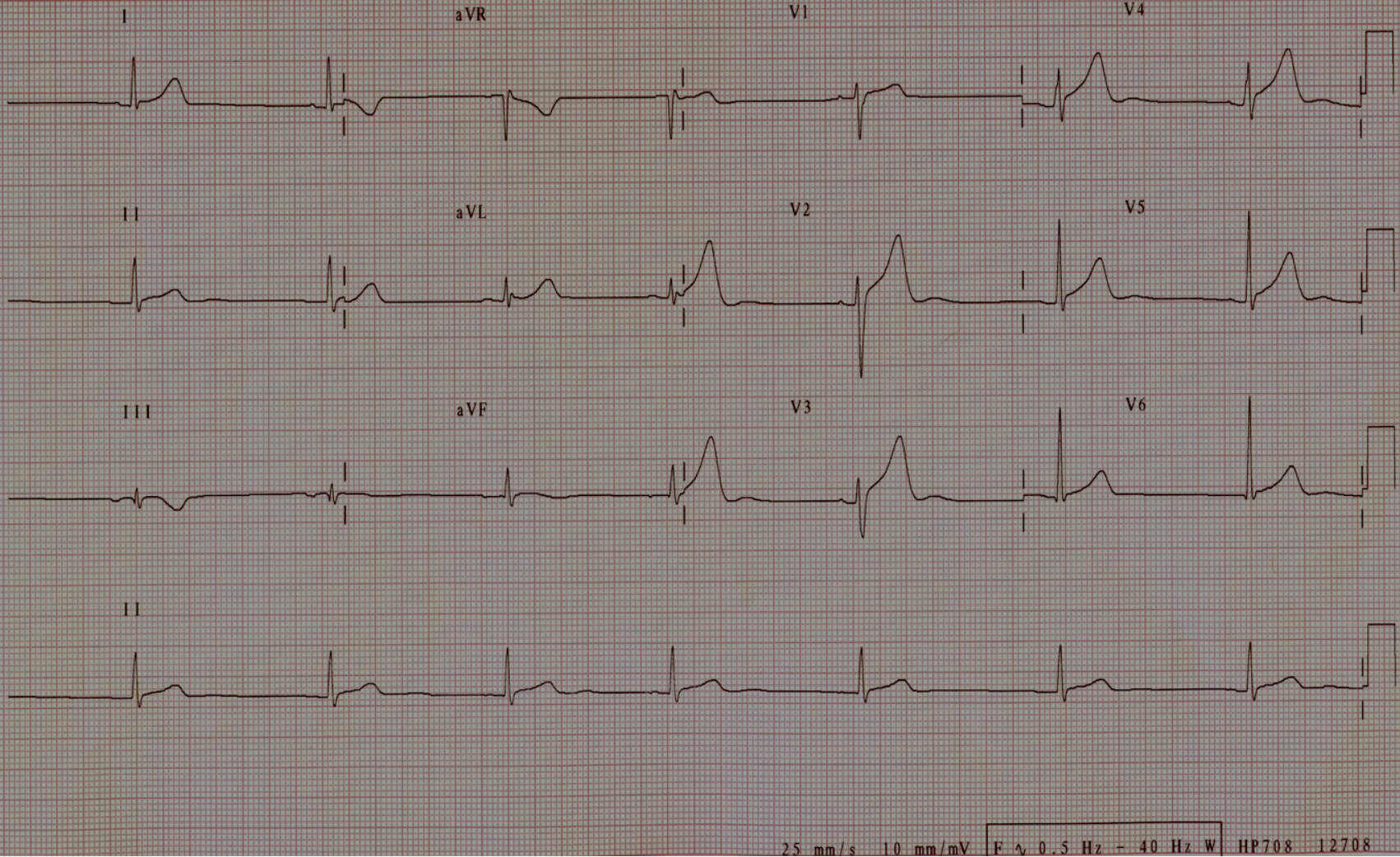
ECG 6 A 26-year-old woman, who has complained of palpitations in the past, is admitted via the A & E department with palpitations. What does the ECG show and what should you do?

Supraventricular tachycardia, no P waves

--Axis--
P -54
QRS 26
T -2

- ABNORMAL ECG -

Unconfirmed diagnosis.



25 mm/s 10 mm/mV F v 0.5 Hz - 40 Hz W HP708 12708

A 33 year-old man with sensation of chest tightness last night, where he could not sleep.

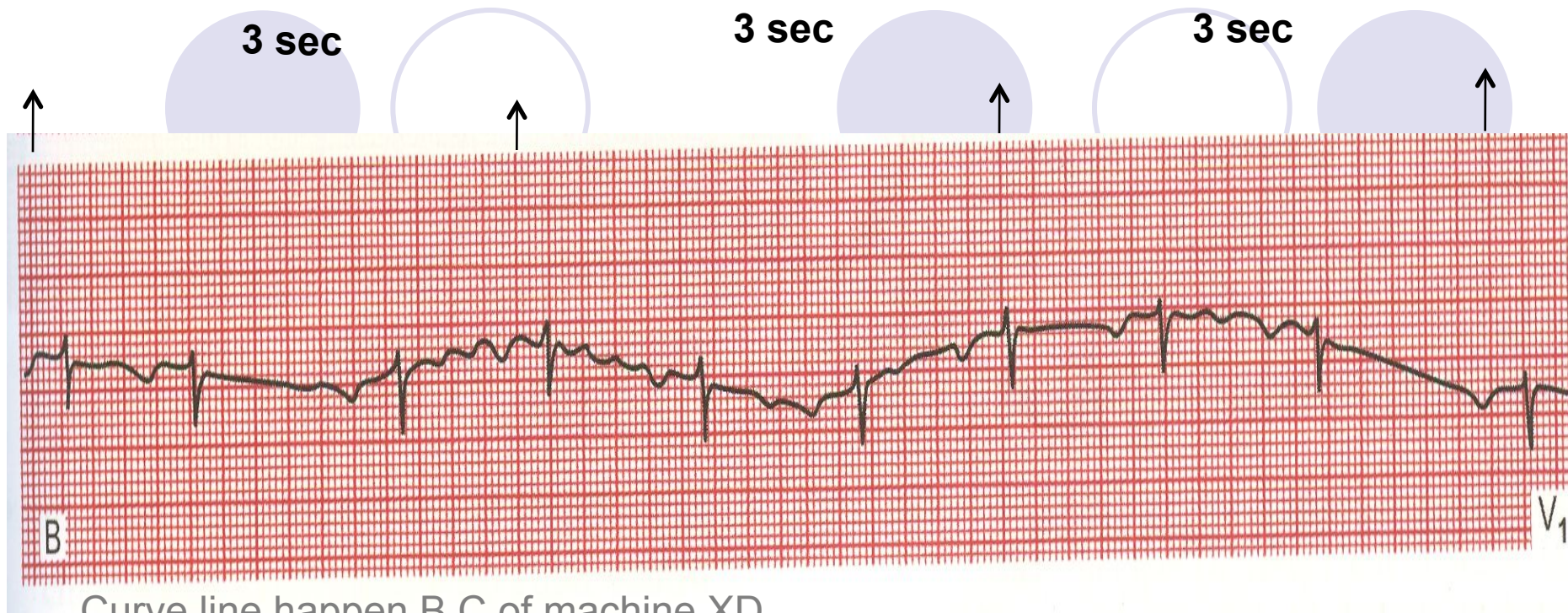
(Sinus bradycardia)



The heart rate is

- a. Fast and regular*
- b. Fast and irregular*
- c. Normal and regular*
- d. Normal and irregular*

A



What is the abnormal finding?

Atrial Fibrillation

What is the approximate heart rate?

60 – 70 bpm

Heart rate in abnormal rhythm = Numbers of R in 6 seconds × 10

• Each large square = 0.2 Scond

• So 30 Large square = 6 S



What is the diagnosis?

Atrial Fibrillation



Saw teeth pattern

- What is the abnormality in this strip?
- **Atrial flutter**



- Spontaneous conversion of atrial flutter

the attack stop in middle of the reading and back to normal



Premature ventricular , No p wave + same pattern and shape .

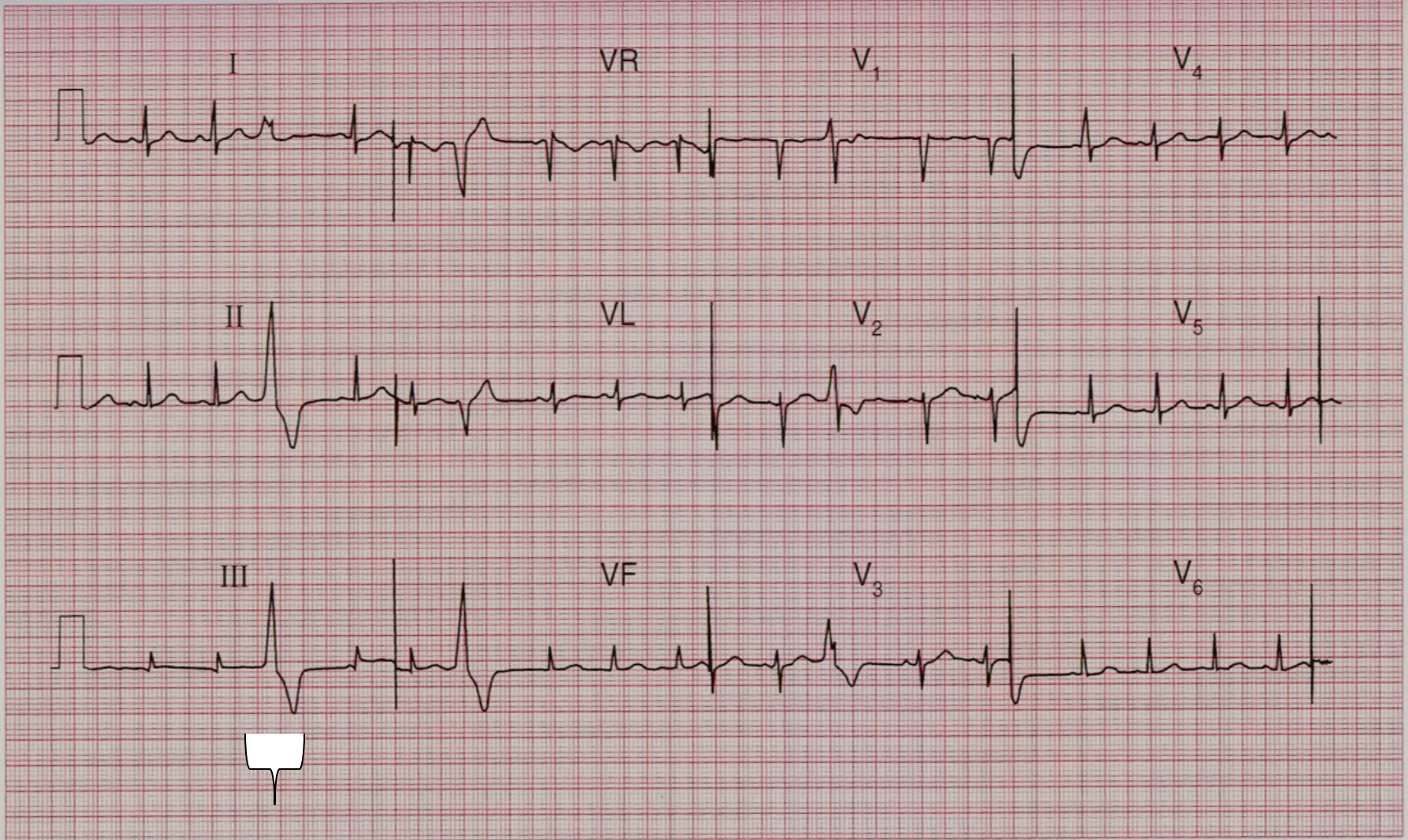
What is the diagnosis?

- (PVCs) Ventricular bigeminy



- **Multifocal PVCs** have different sites of origin, Multifomed PVCs are common in digitalis intoxication and could be normally found.

This one is irregular pattern and shape

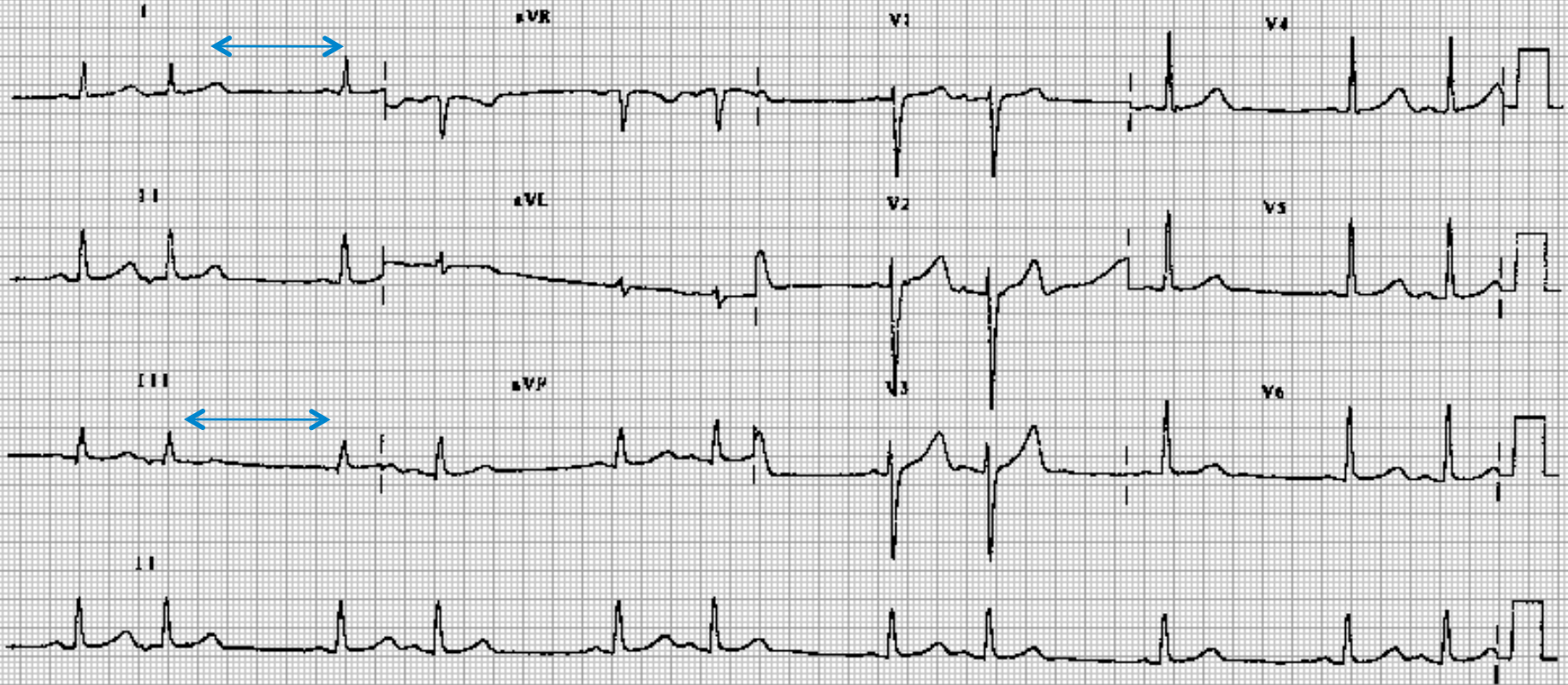


ECG 1 This ECG was recorded from a 25-year-old pregnant woman who complained of an irregular heart beat. Auscultation revealed a soft systolic murmur but her heart was otherwise normal. What does the ECG show and what would you do?

Ventricular Premature Complexes

A 60 year old man with hypertension.

Requested by:
OPD

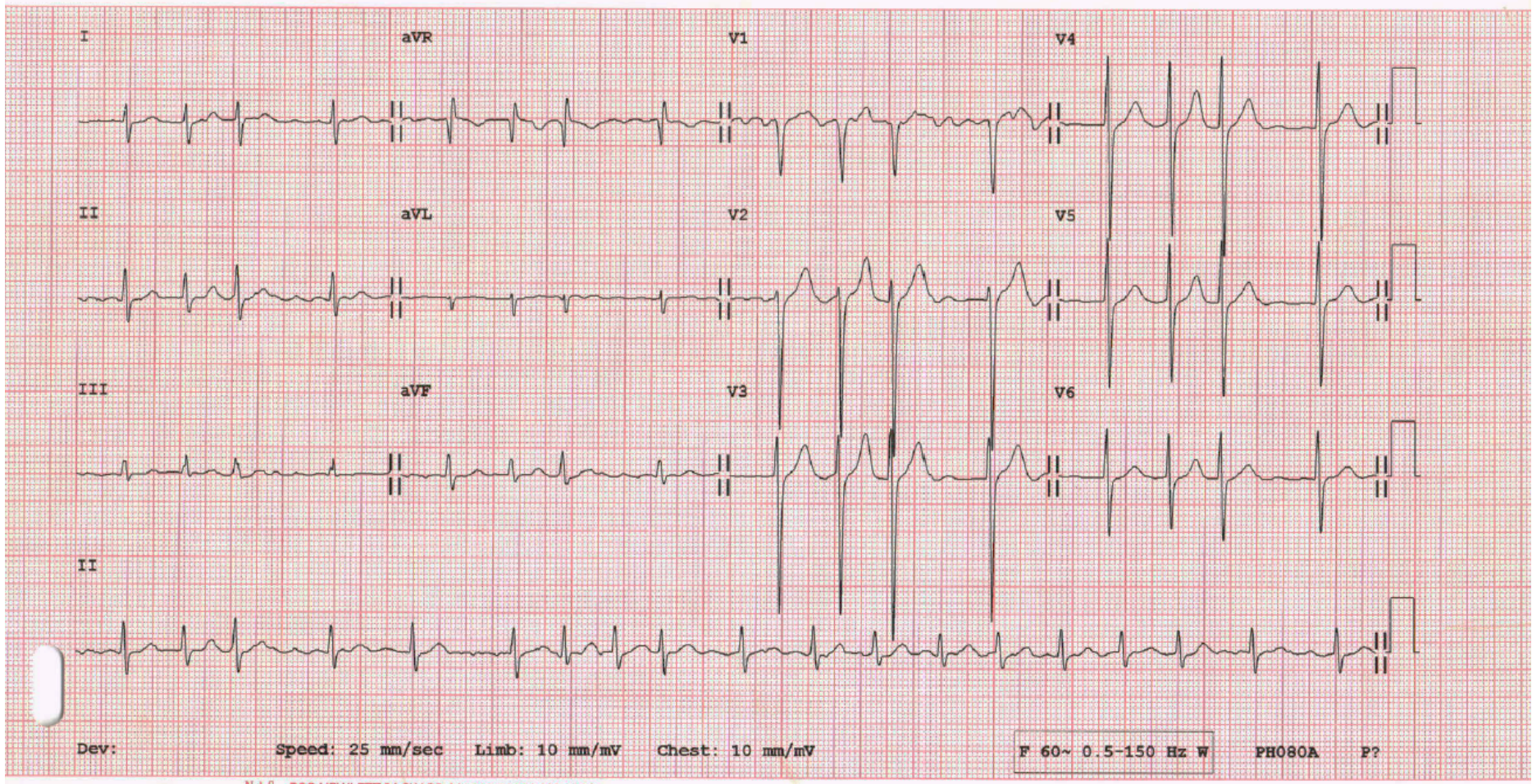


Normal pattern, an ectopic contraction of atrial lead to ventricle contraction >> another "cycle"?. HERE Allows have long Pause

25 mm/s 10 mm/mV

What is your diagnosis?
Atrial premature beats (Atrial Bigeminy)

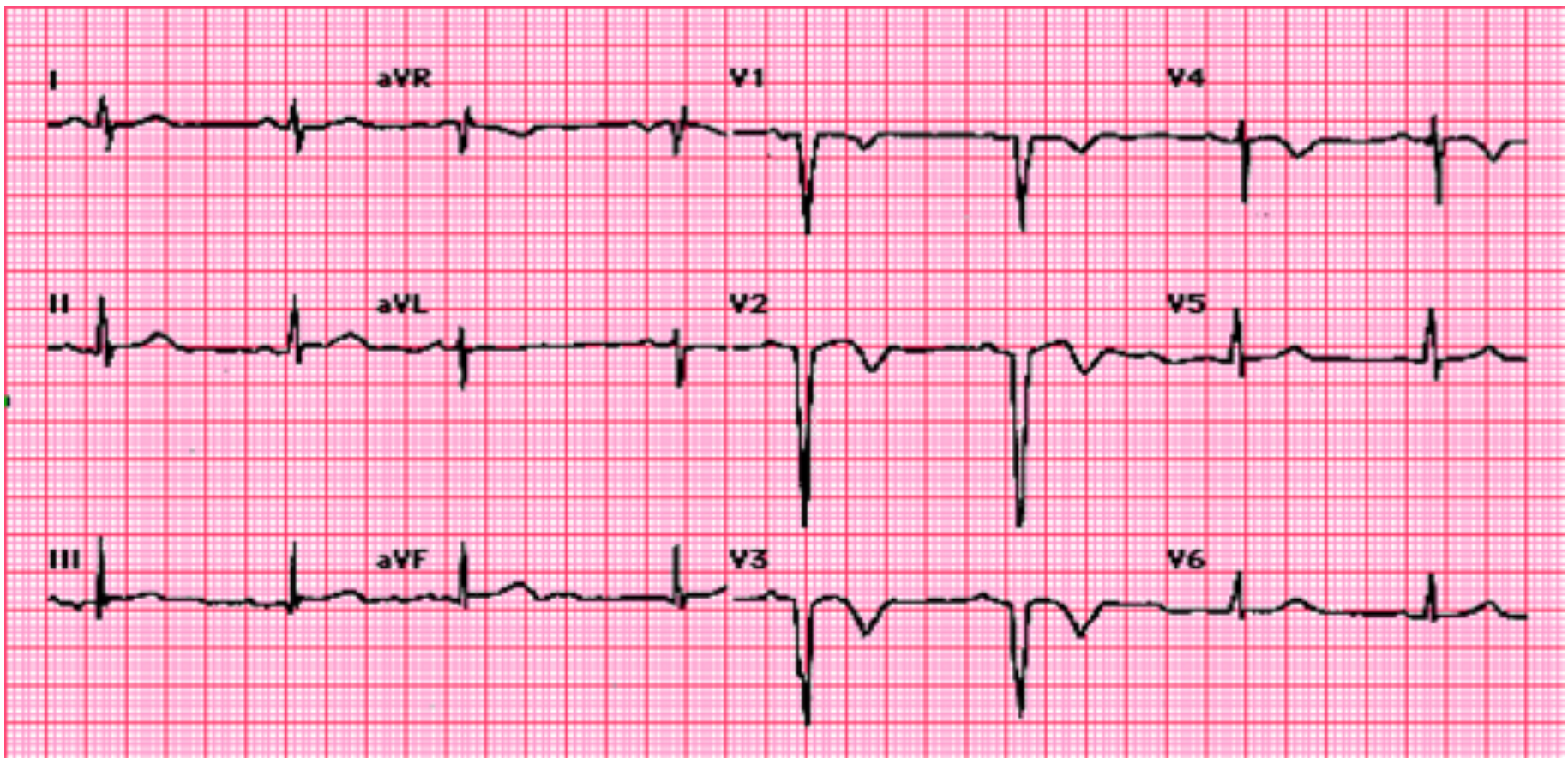
A 71-year-old man is routinely followed for hypertension.



Interpret this ECG.

What is your diagnosis?

Atrial fibrillation



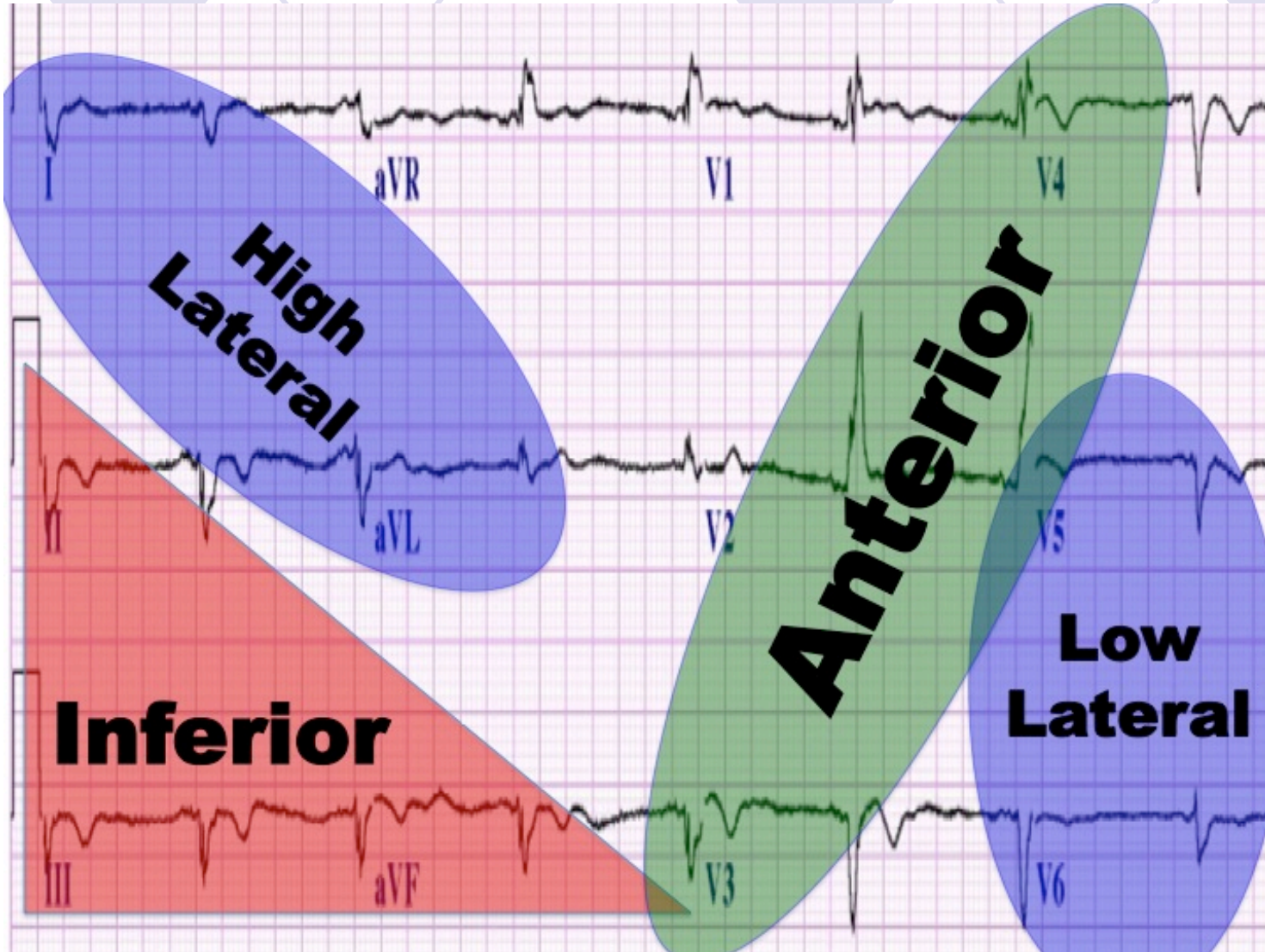
A 58-year-old man had severe substernal chest pain three days ago.

What abnormality is shown on the electrocardiogram?

- Old anterior MI (Q waves in V1 – 3)

GO NEXT
SLIDE

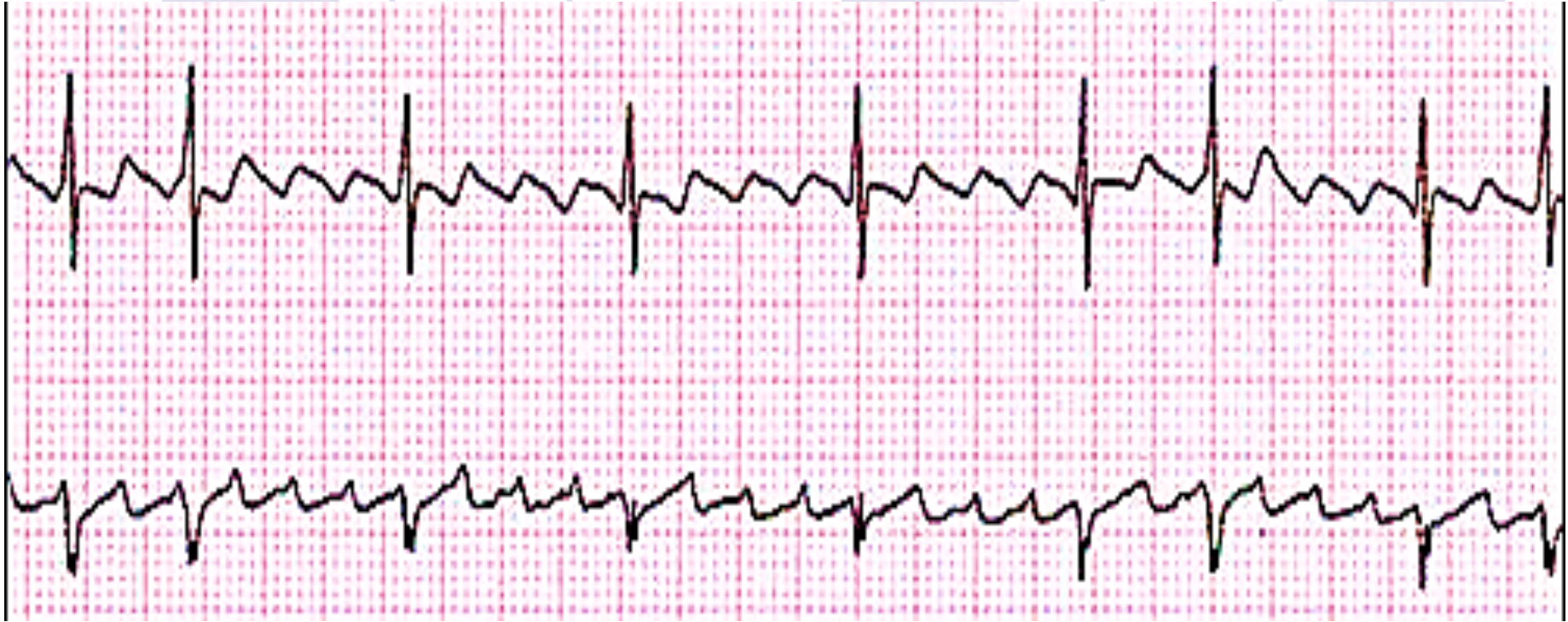
ADDED SILDE





What is your Diagnosis?

Atrial Fibrillation

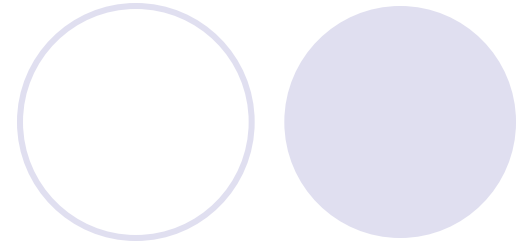


What is your diagnosis?

Atrial Flutter

- Regular atrial activity with a "clean" **saw-tooth appearance** in leads II, III, aVF,

Dominant R wave in Lead V1:



- **Right bundle branch block (RBBB)**
- **Right ventricular hypertrophy (RVH)**
- **Wolf-Parkinson-White Syndrome (WPW) type A**
- **Posterior myocardial infarction**

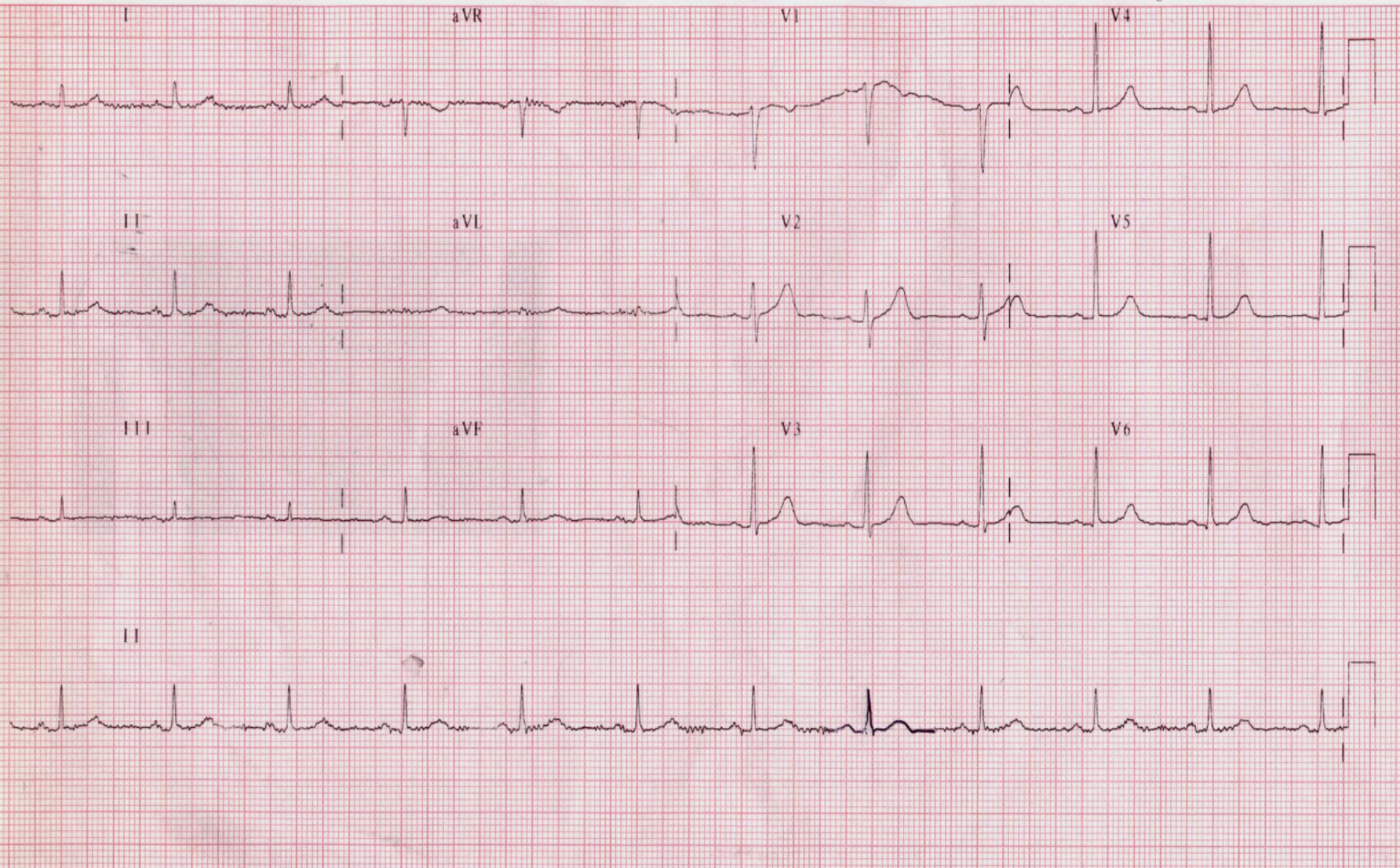
--Axis--

P 51
QRS 55
T 39

Requested by:
Dr. HUSSAIN

- OTHERWISE NORMAL ECG -

Unconfirmed diagnosis.



M 1709 A

25 mm/s

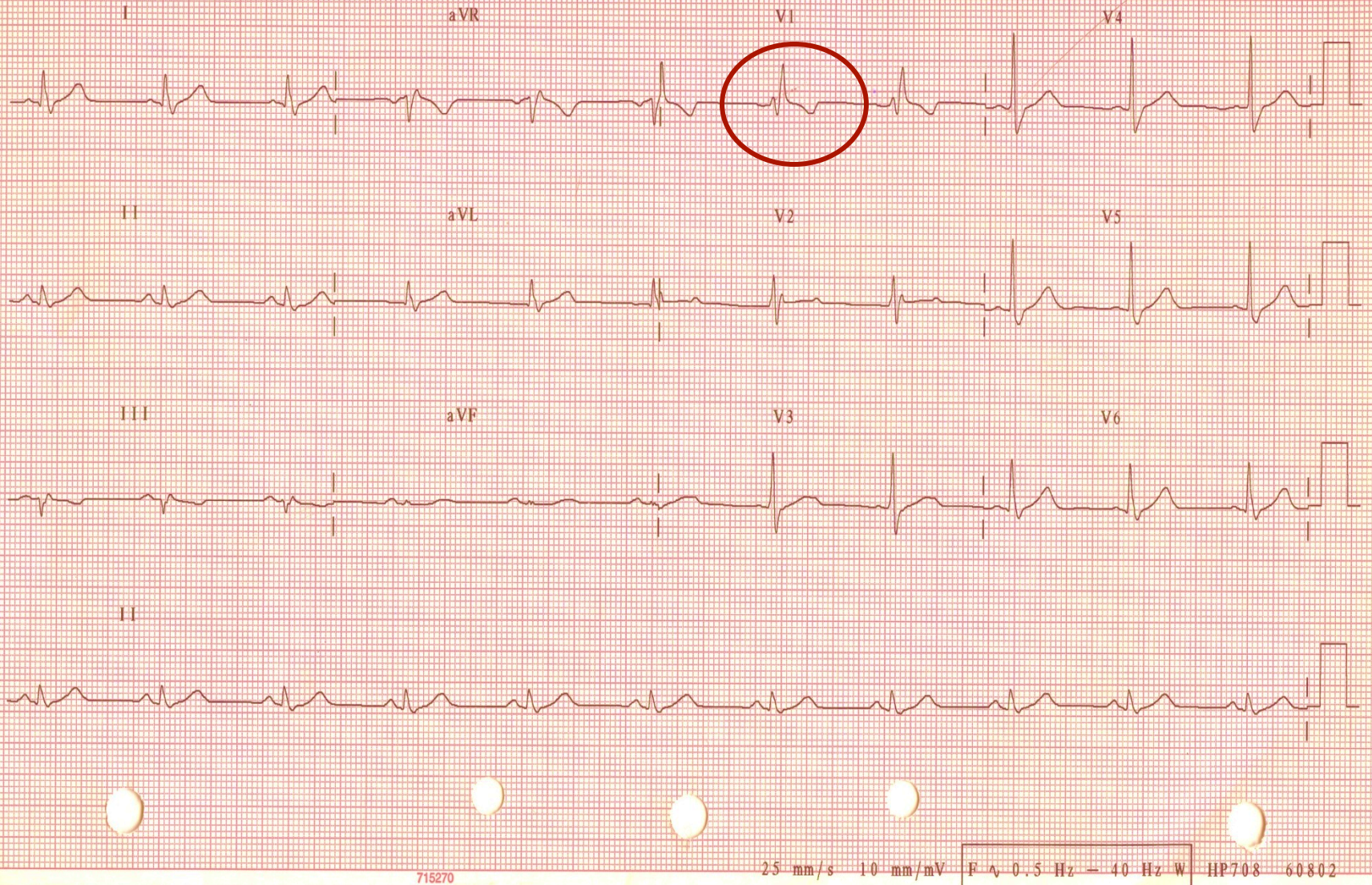
F 0.5 Hz - 40 Hz W

HP708 33673

QRS 16
T 17

- ABNORMAL ECG -

Unconfirmed. MD must review.



A 42 year old man presents with 2 months H/O non specific chest pain.

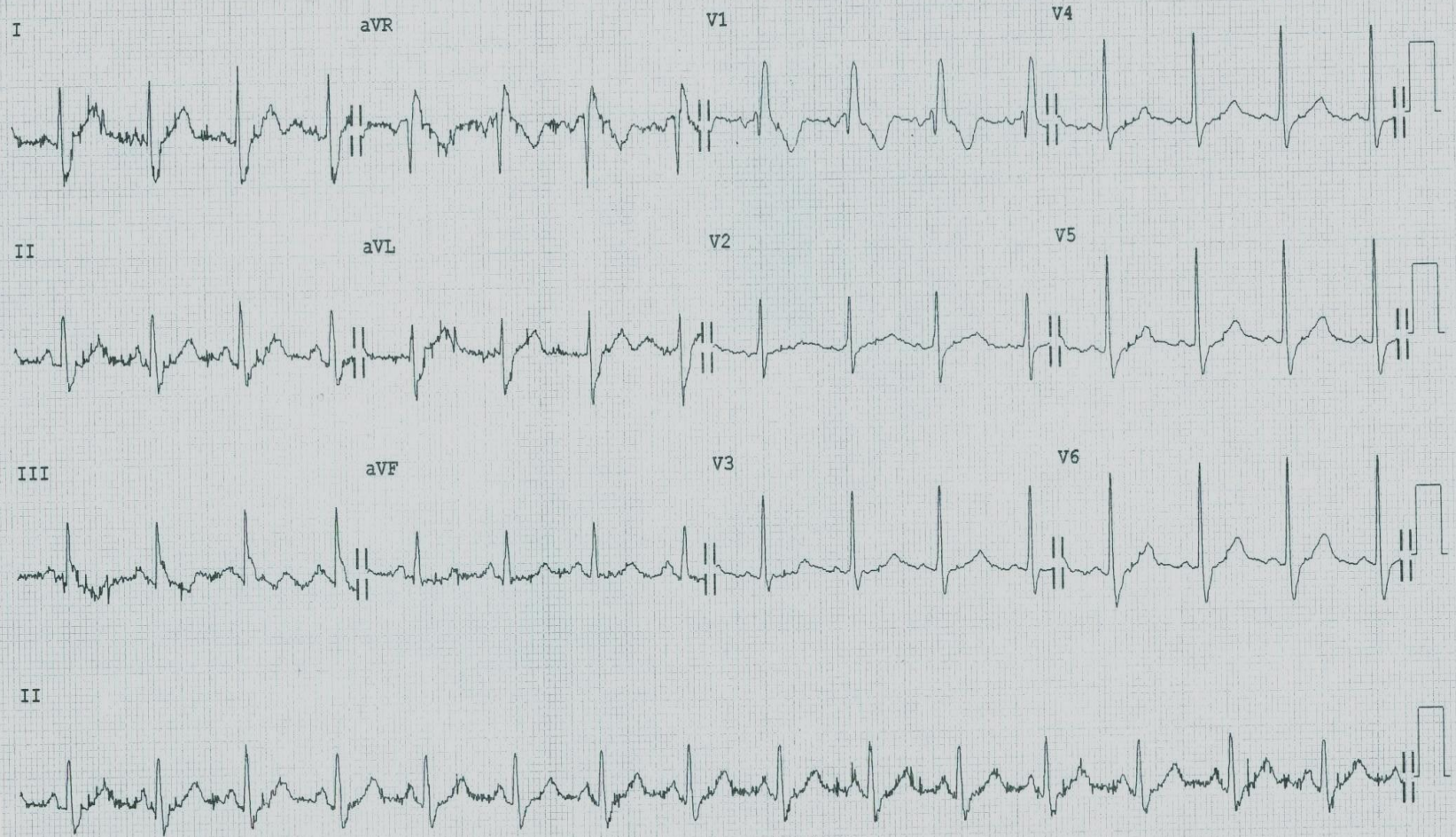
What is your diagnosis?

RBBB

I QRS 124
T 7

- ABNORMAL ECG -

Unconfirmed Diagnosis



Dev:

Speed: 25 mm/sec Limb: 10 mm/mV Chest: 10 mm/mV

F 60~ 0.5-150 Hz W

PH80A

P?

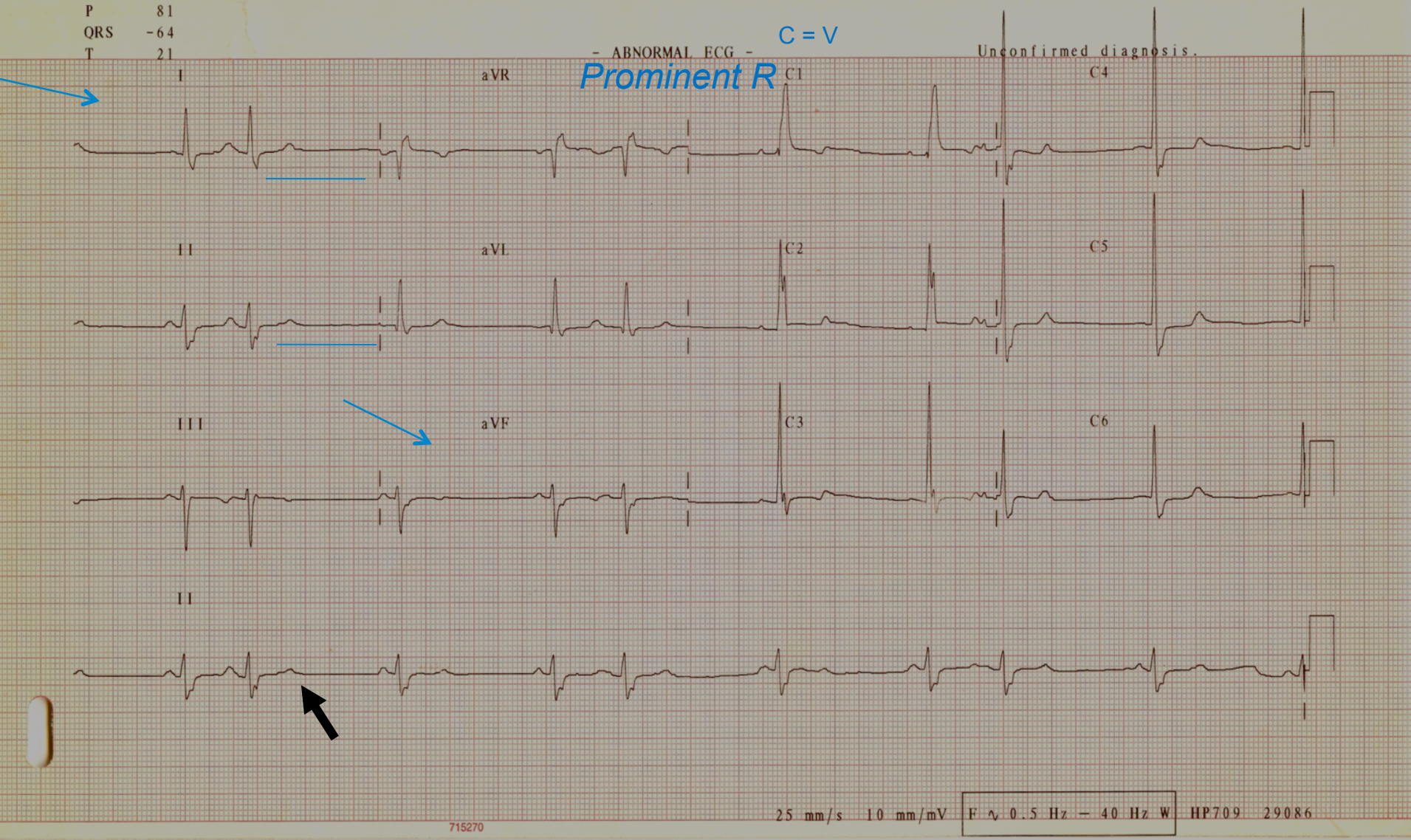
What is your diagnosis?
RBBB

--Axis--
P 81
QRS -64
T 21

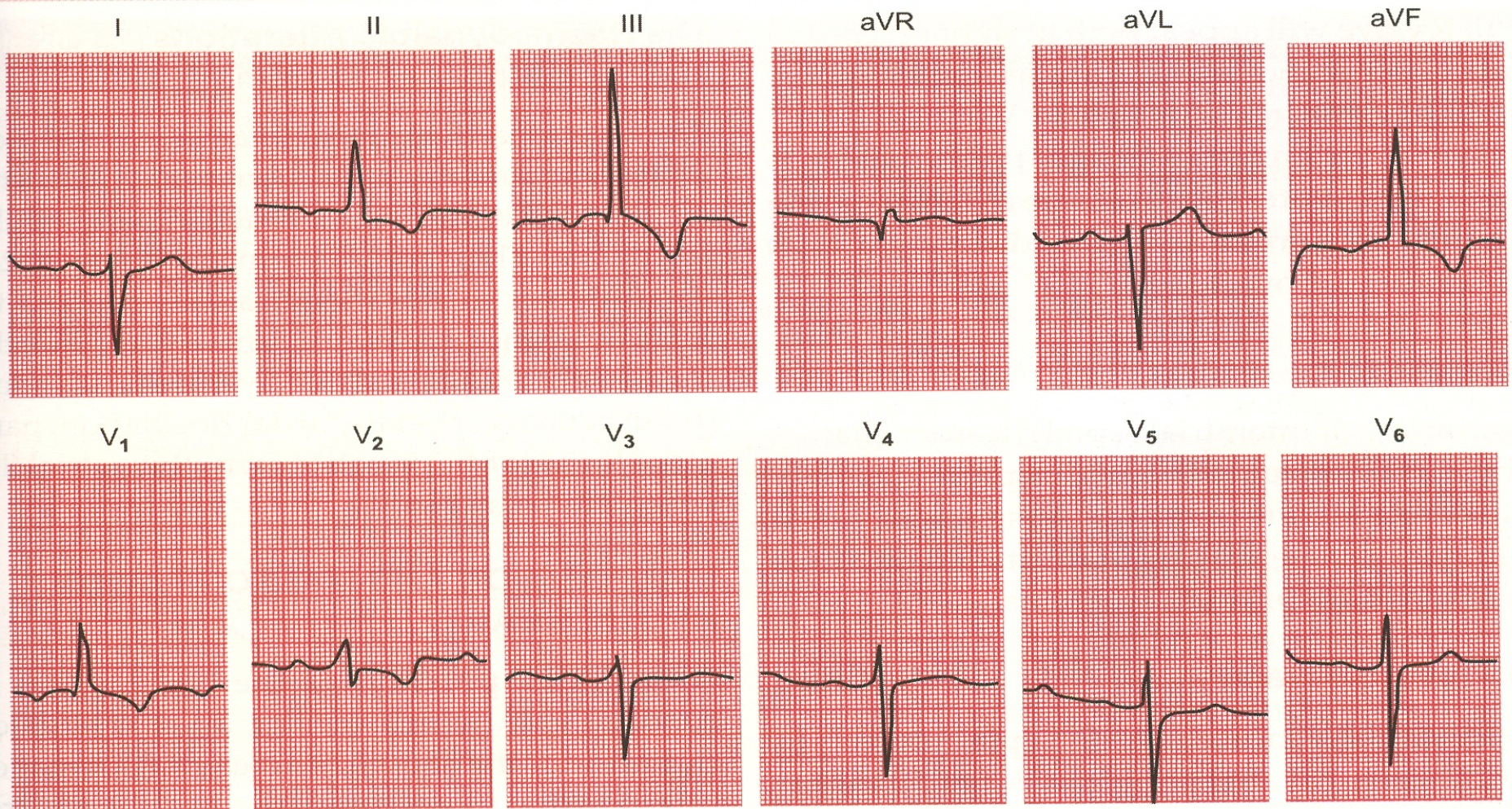
DRRABIUL

- ABNORMAL ECG -
Prominent R C = V

Unconfirmed diagnosis.



A 85 year-old man with weakness and fatigue
Sinus bradycardia, LAD, RBBB and Atrial premature beats



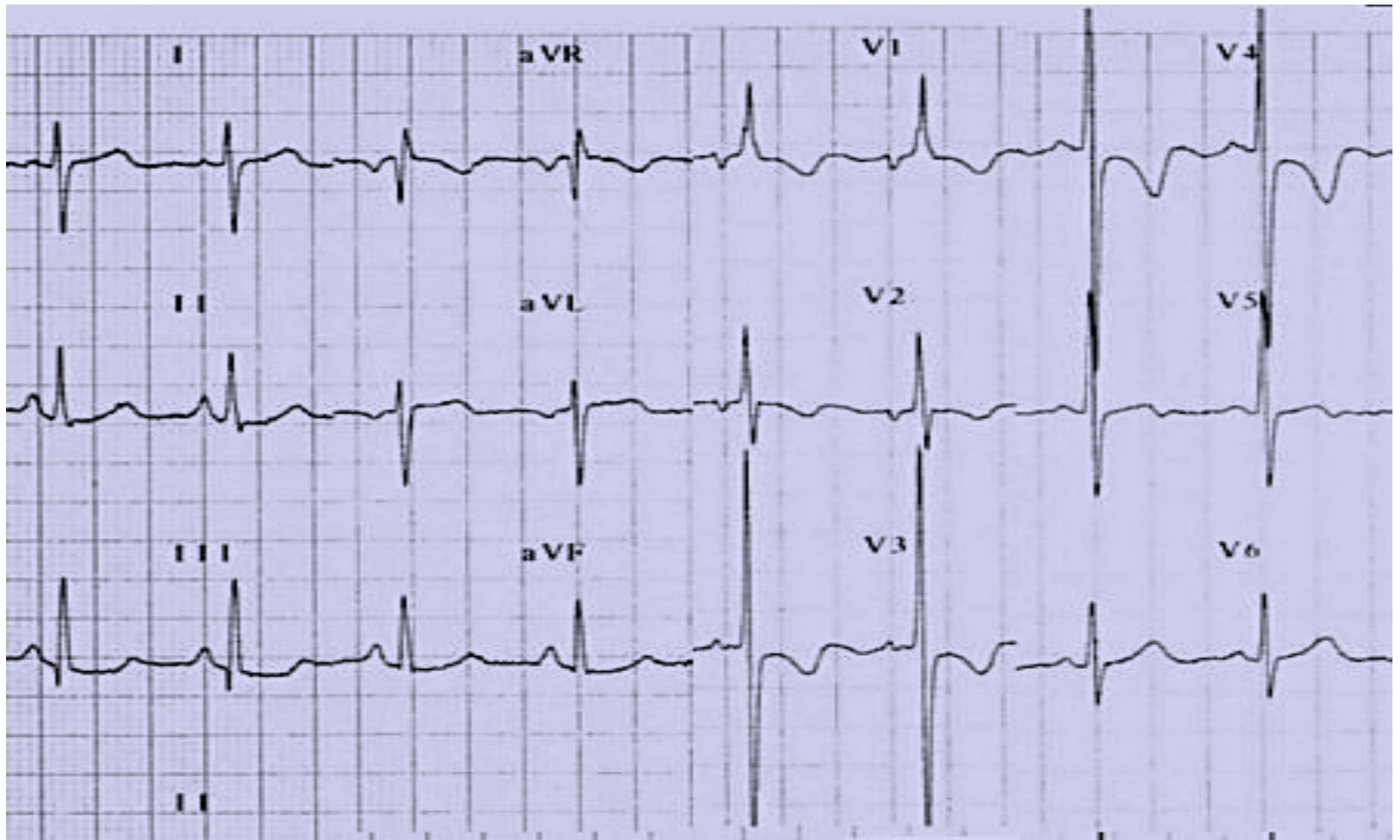
A 24 year-old man with systolic murmur.

Right ventricular hypertrophy : ■ **RAD**

■ **Dominant R wave in V1**

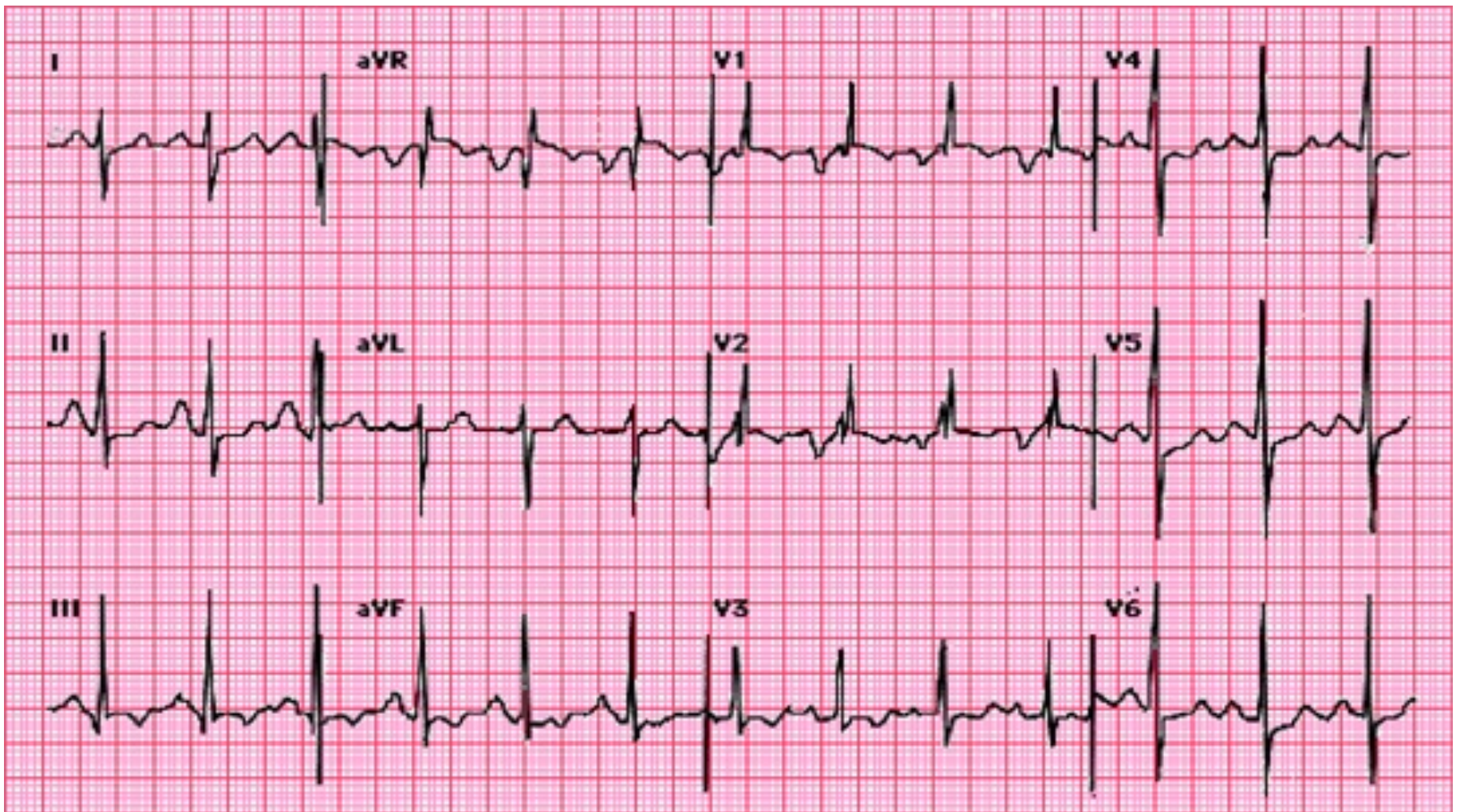
■ **RV Strain (T wave inversion in right chest leads**

Strain = Ischemia ??



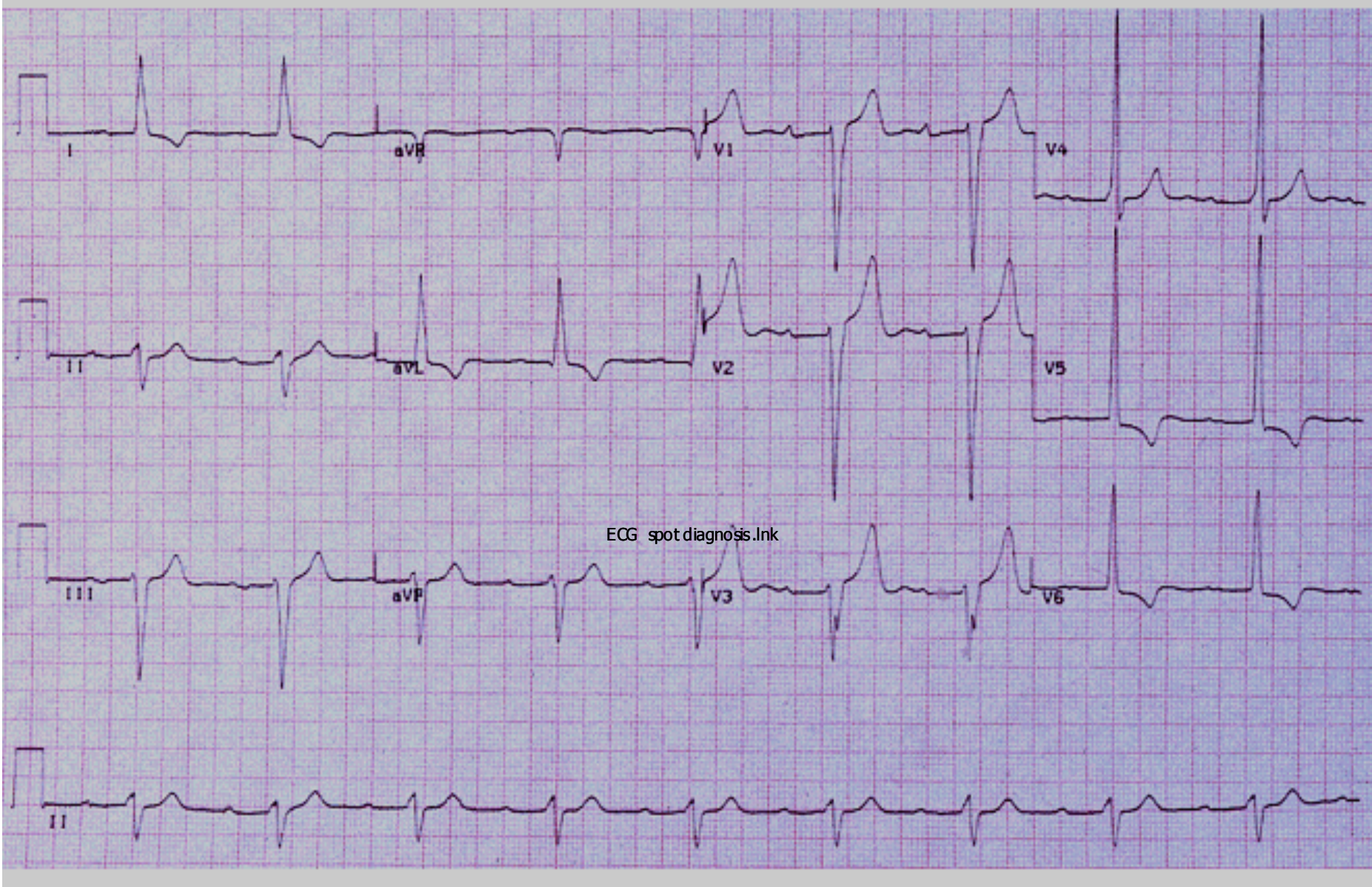
Interpret this ECG

RVH (RAD, Dominant R in V1, inverted T waves in V1 – V4, Left atria enlargement in V1)



A patient with cardiac murmur, what are the abnormal findings?

- Right ventricular hypertrophy and marked left atrial abnormality
- Tall R in V1, RAD, negative p wave in V1, P pulmonale in lead II
- RBBB (rsR) **Mitral Stenosis**



Hypertension >> left ventricle hypertrophy

A 54 year-old man for routine follow up of hypertension

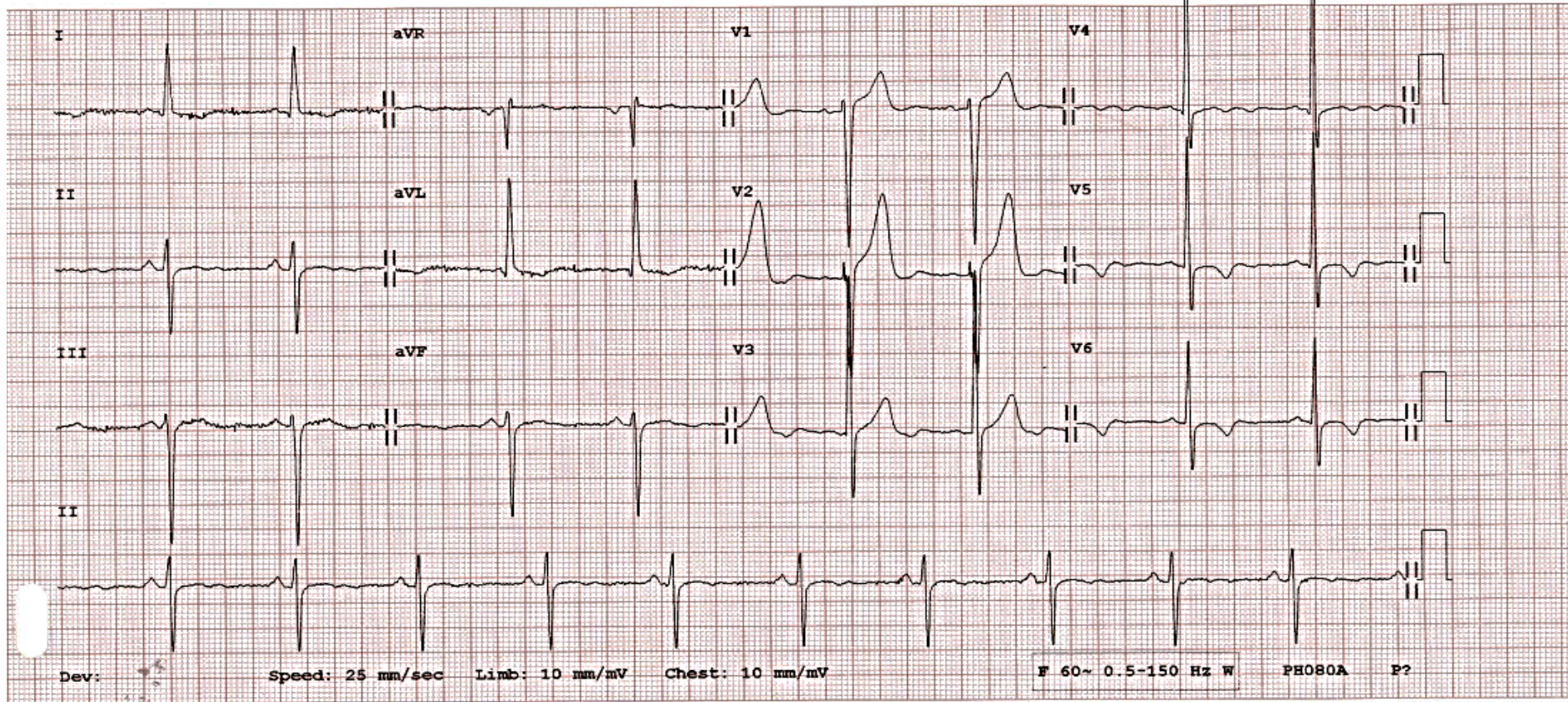
LAD, First degree heart block, LVH and left ventricular strain

A 54-year-old man is booked recently for control of hypertension.

QRS -46
T 135

- ABNORMAL ECG -

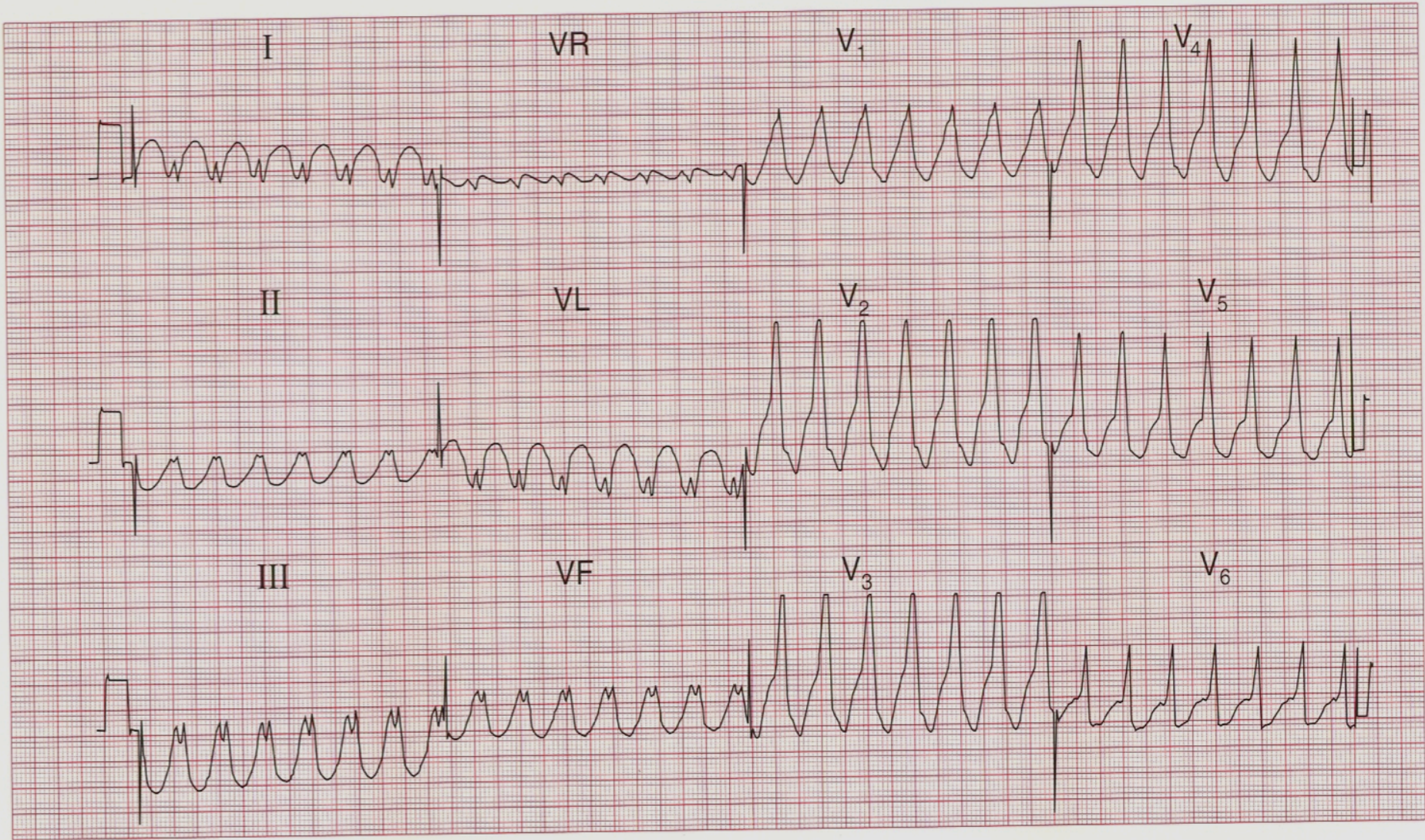
Unconfirmed Diagnosis



Interpret this ECG.

LAD, LVH and anterolateral ischaemic changes (T waves inverted in I, aVL, V4-V6)

Is this patient in need for further assessment.



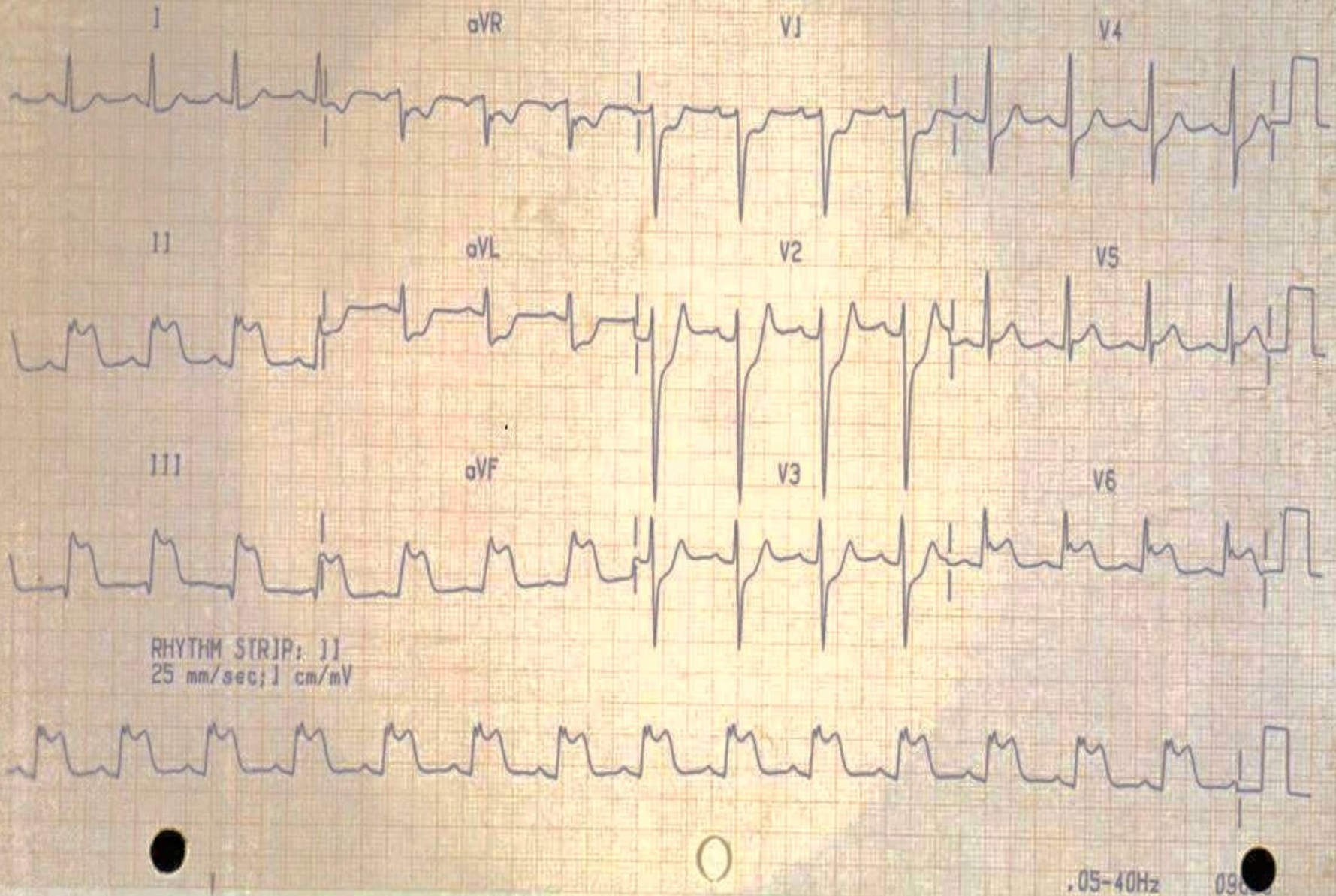
ECG 60 A 60-year-old man complained of severe central chest pain, and a few minutes later became extremely breathless and collapsed. He was brought to the A & E department where his heart rate was found to be 150/min, his blood pressure was unrecordable and he had signs of left ventricular failure.

Ventricular Tachycardia

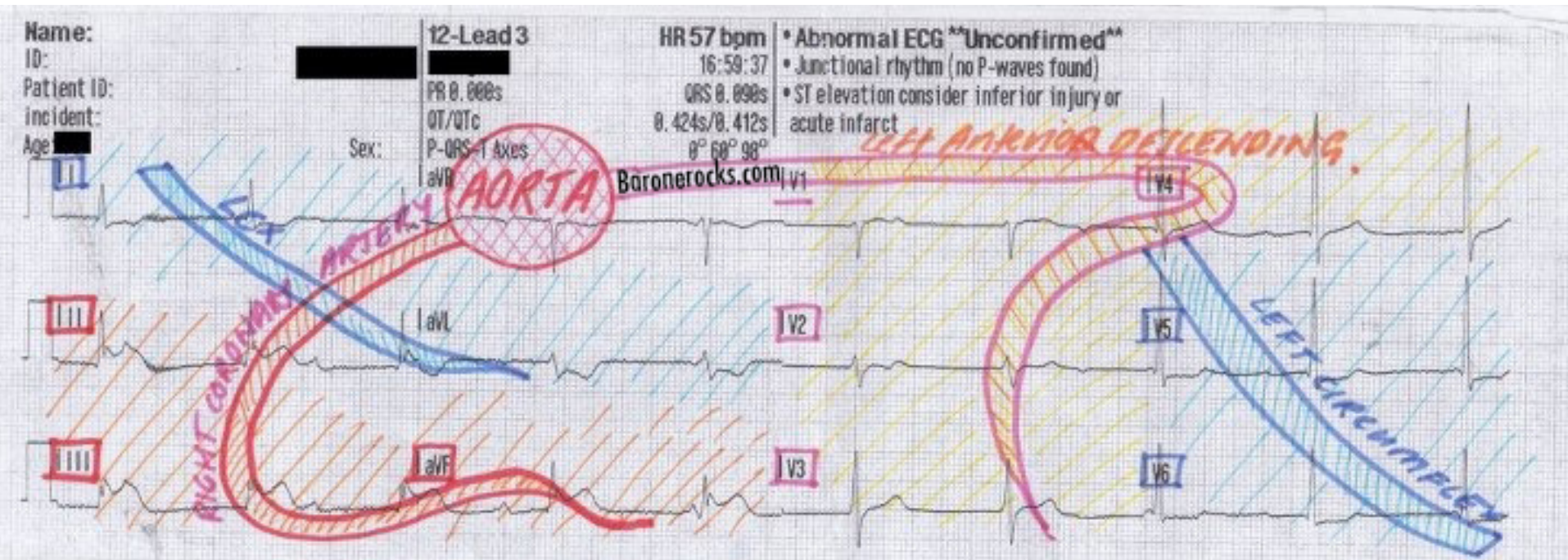
What is the most likely occluded coronary artery?

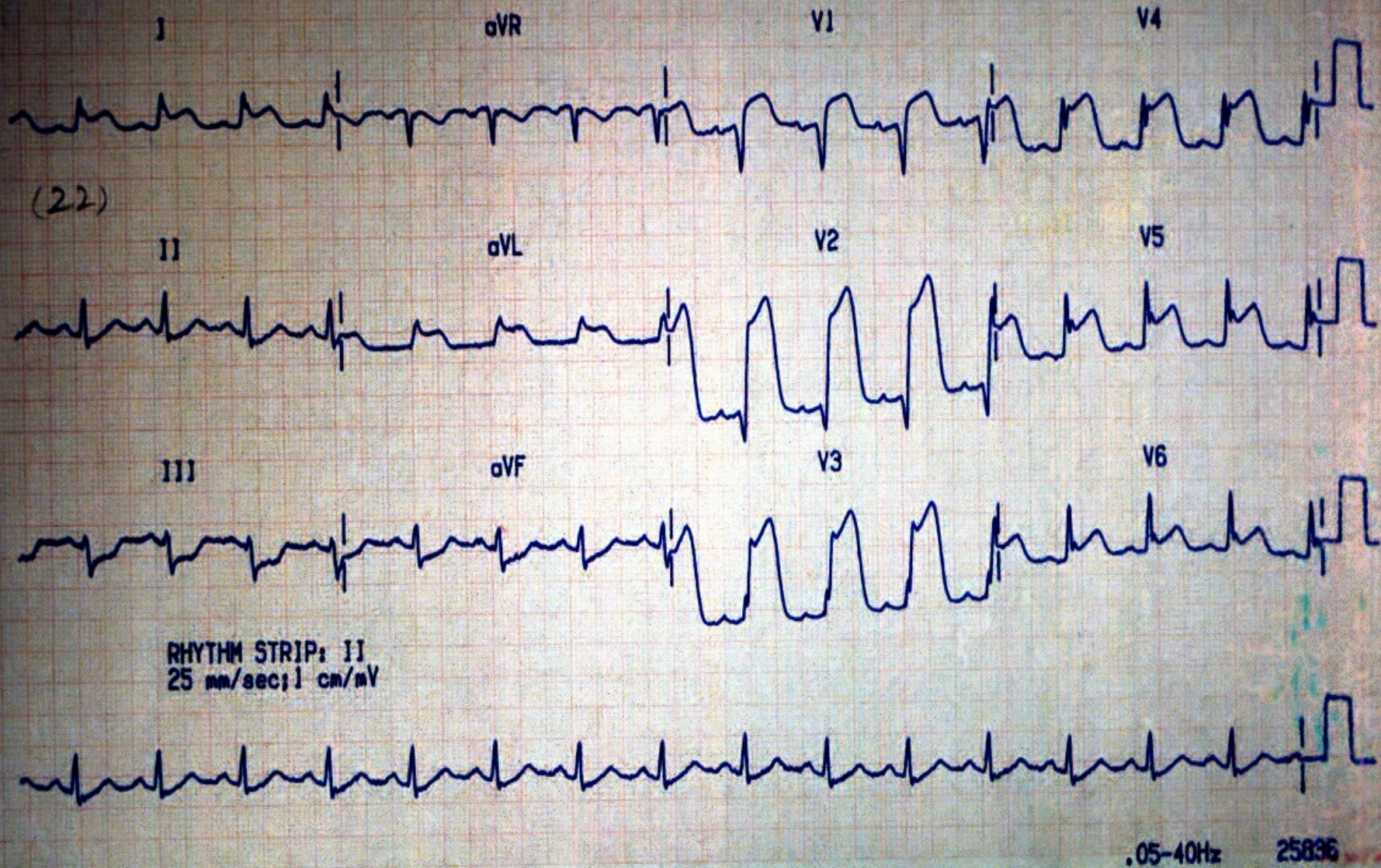
NEXT slide

Right Coronary Artery (Acute Inferior MI)



ADDED SLIDE





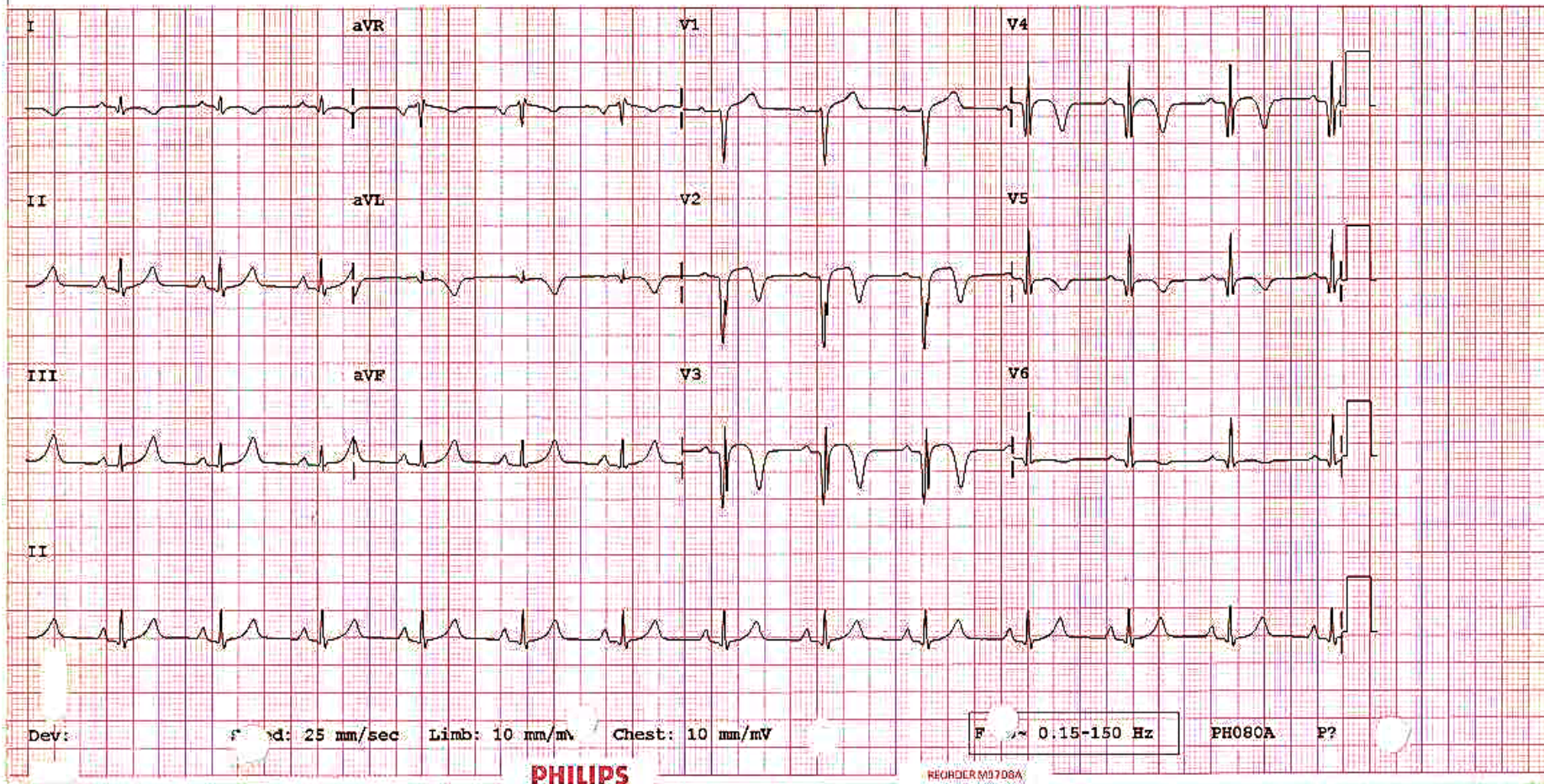
What is the most likely occluded coronary artery?

Left Coronary Artery (Acute Anterior MI)

QRS 82
T 104

- ABNORMAL ECG -

Requested by: DRHERSI
Unconfirmed Diagnosis



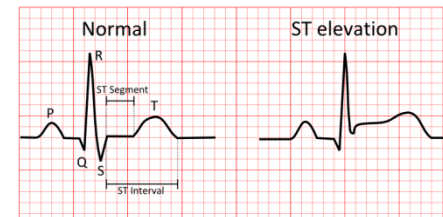
A 65 year old admitted because of acute chest pain . This ECG was taken on second day of admission.

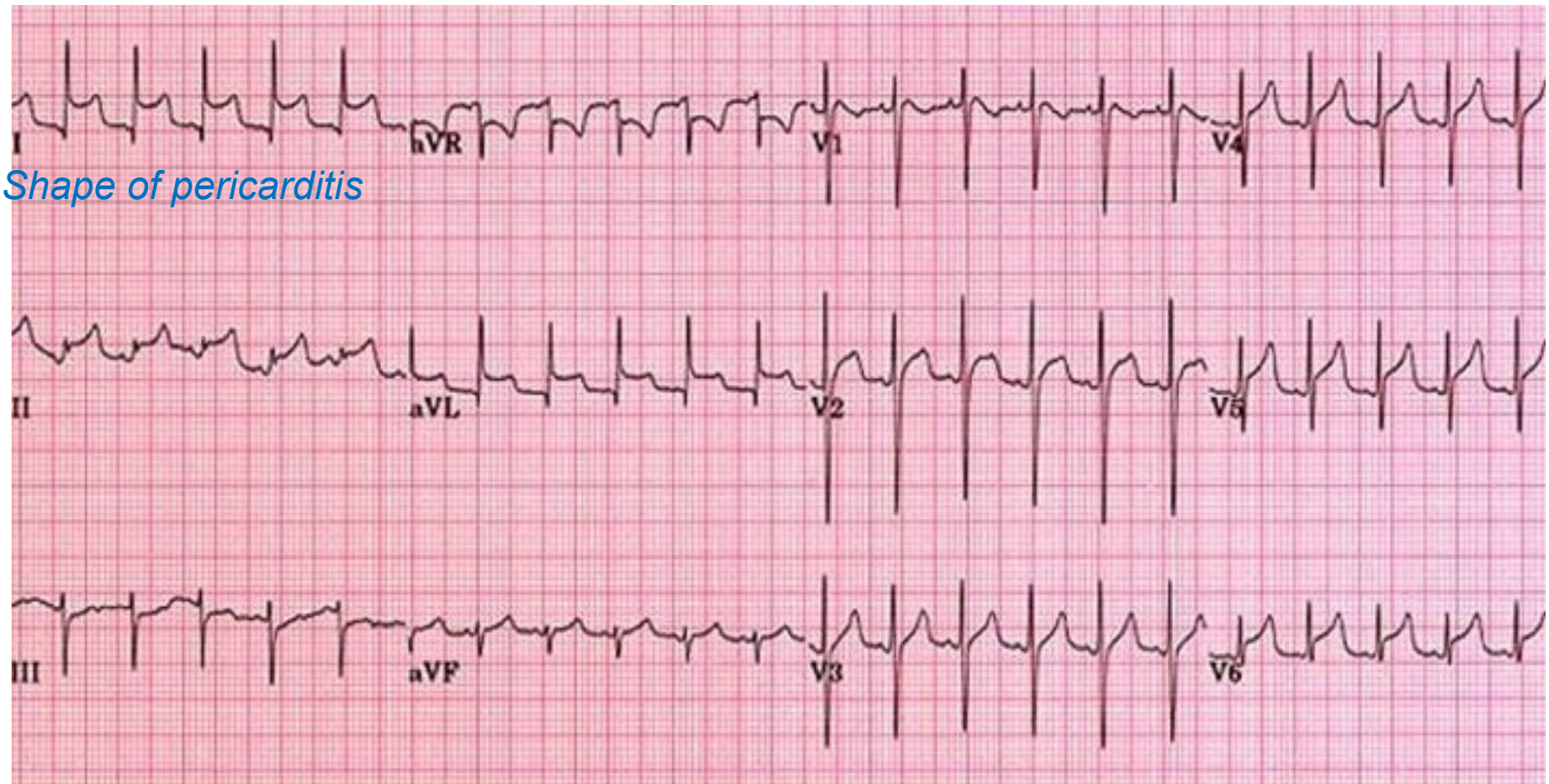
What are the findings?

ST elevations V1 – V4, T wave inversions V2 – V6, Lead I and aVL Q waves V1 – V5

What is your diagnosis?

Acute anterior MI



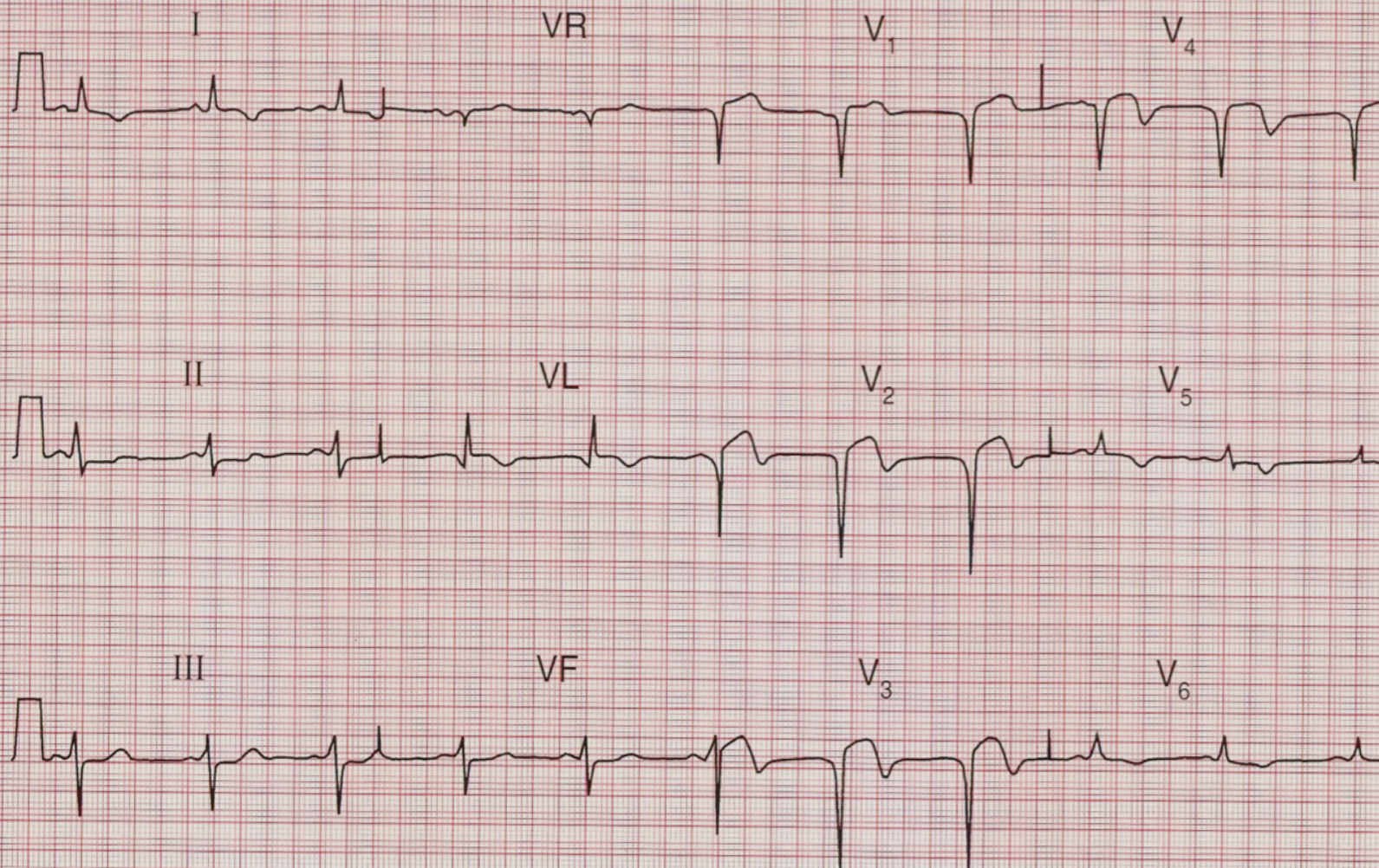


Shape of pericarditis

This 29 year old male presents in the ER complaining of severe pleuritic chest pain over the left precordium. Physical examination reveals a friction rub over the left precordium. An ECG is performed:

What is your diagnosis?

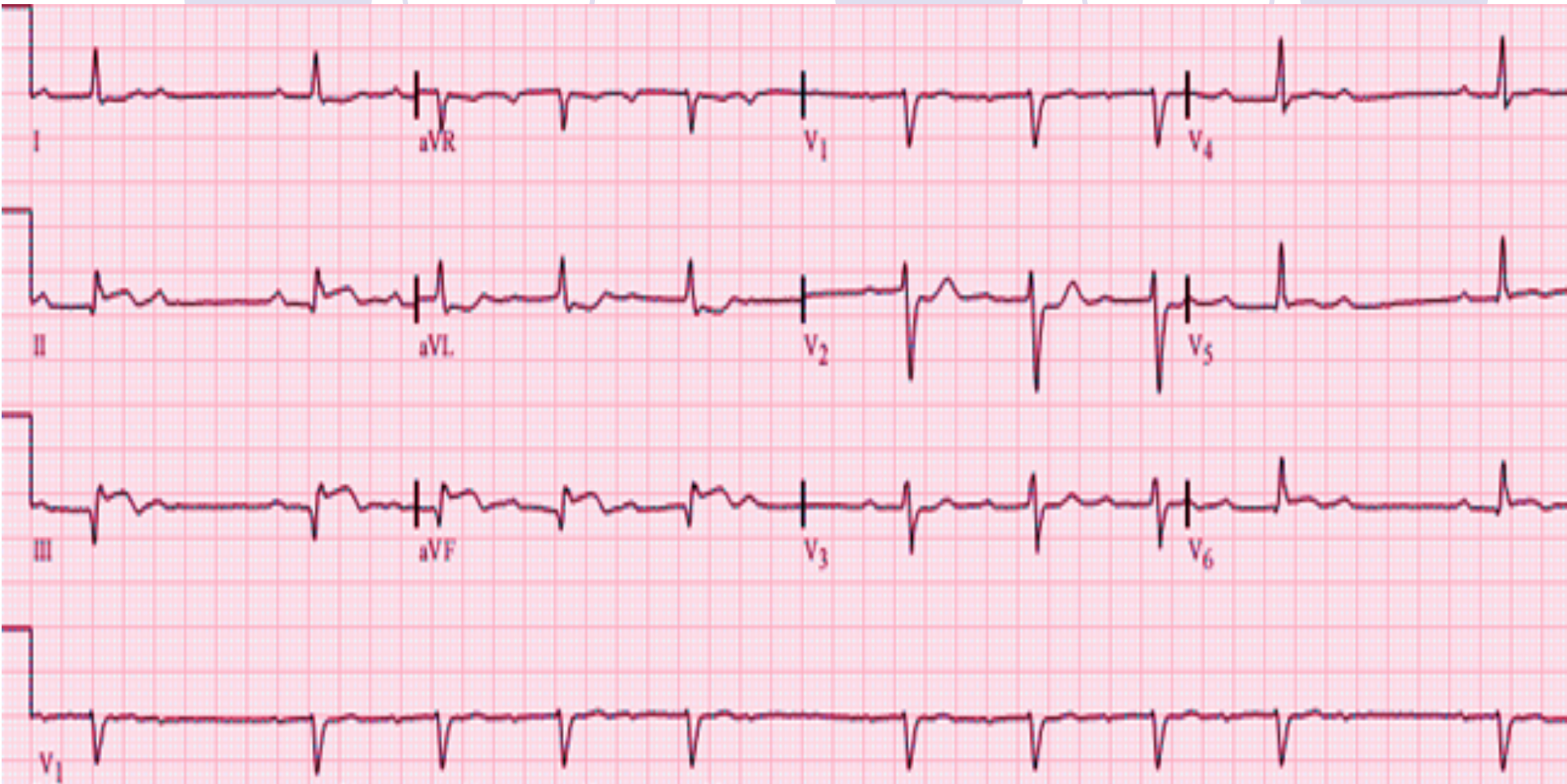
Acute pericarditis



ECG 4 A 50-year-old man is seen in the A & E department with severe central chest pain which has been present for 18 h. What does this ECG show?

Acute anterior MI

A 56-year-old man presents with 2 hours H/O epigastric pain.



What is your diagnosis?

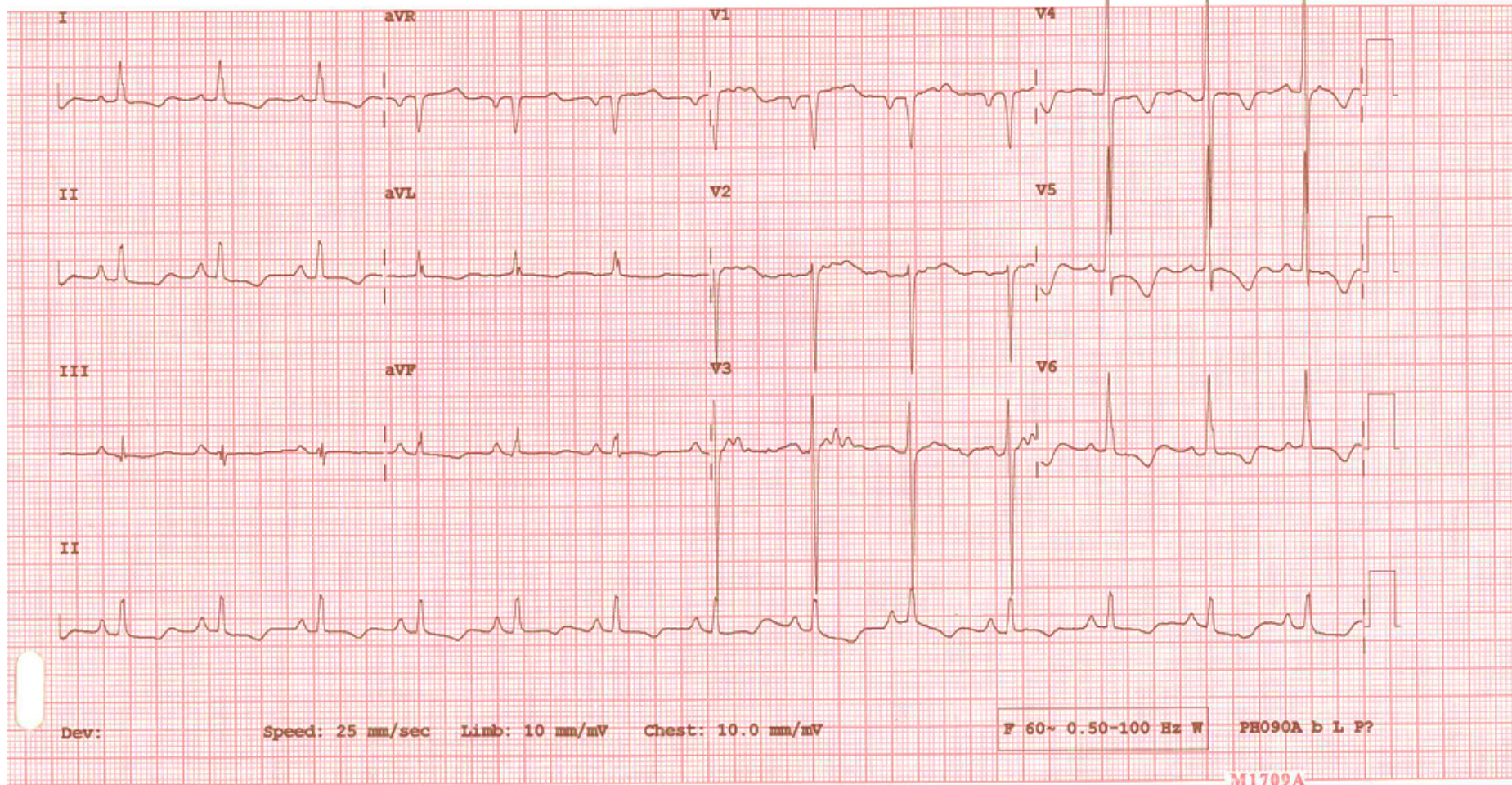
- Acute inferior MI
- AF

P 65
QRS 30
T 203

- ABNORMAL ECG -

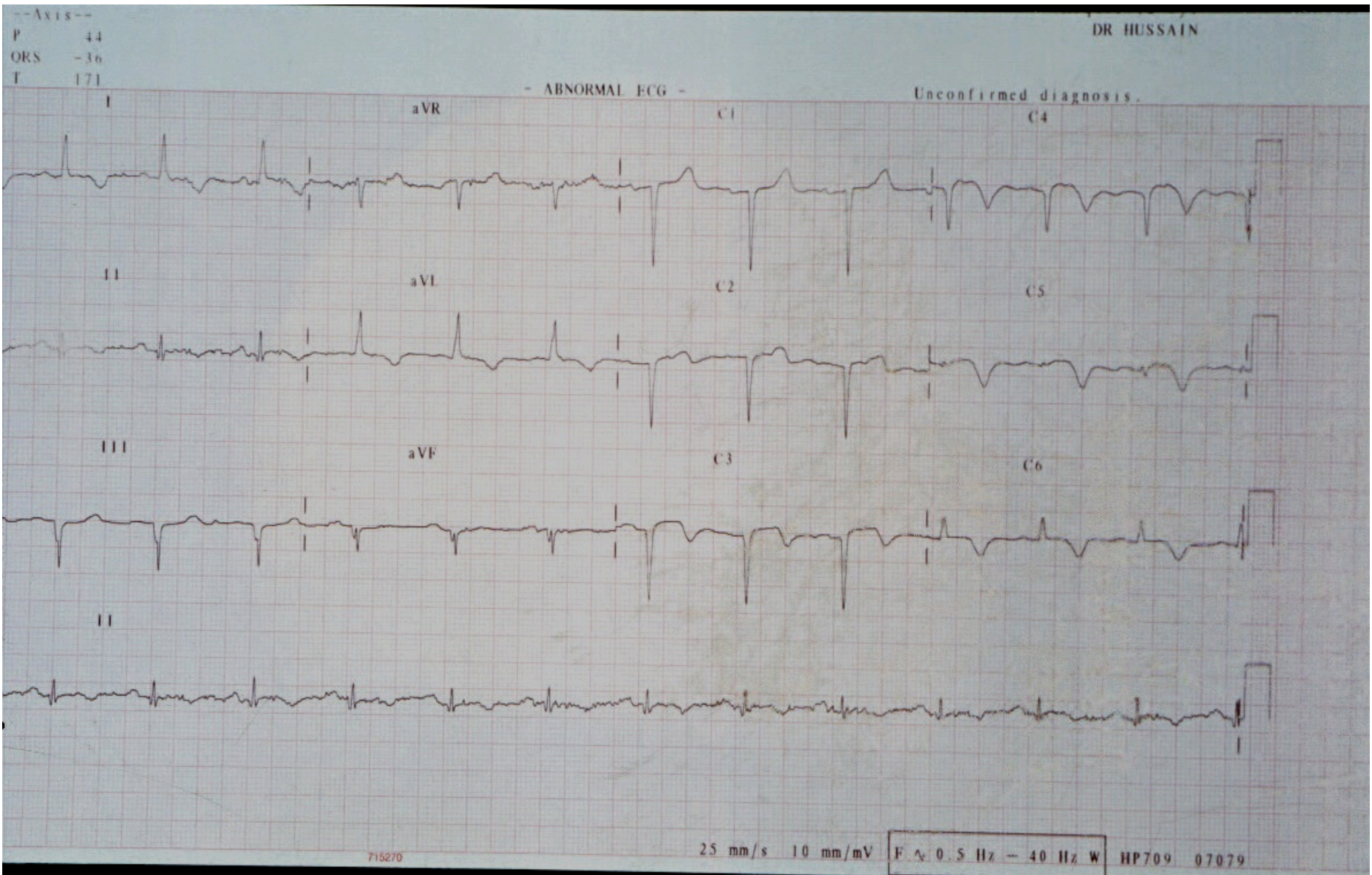
Nationality: SAUDI Sex: M

Unconfirmed Diagnosis

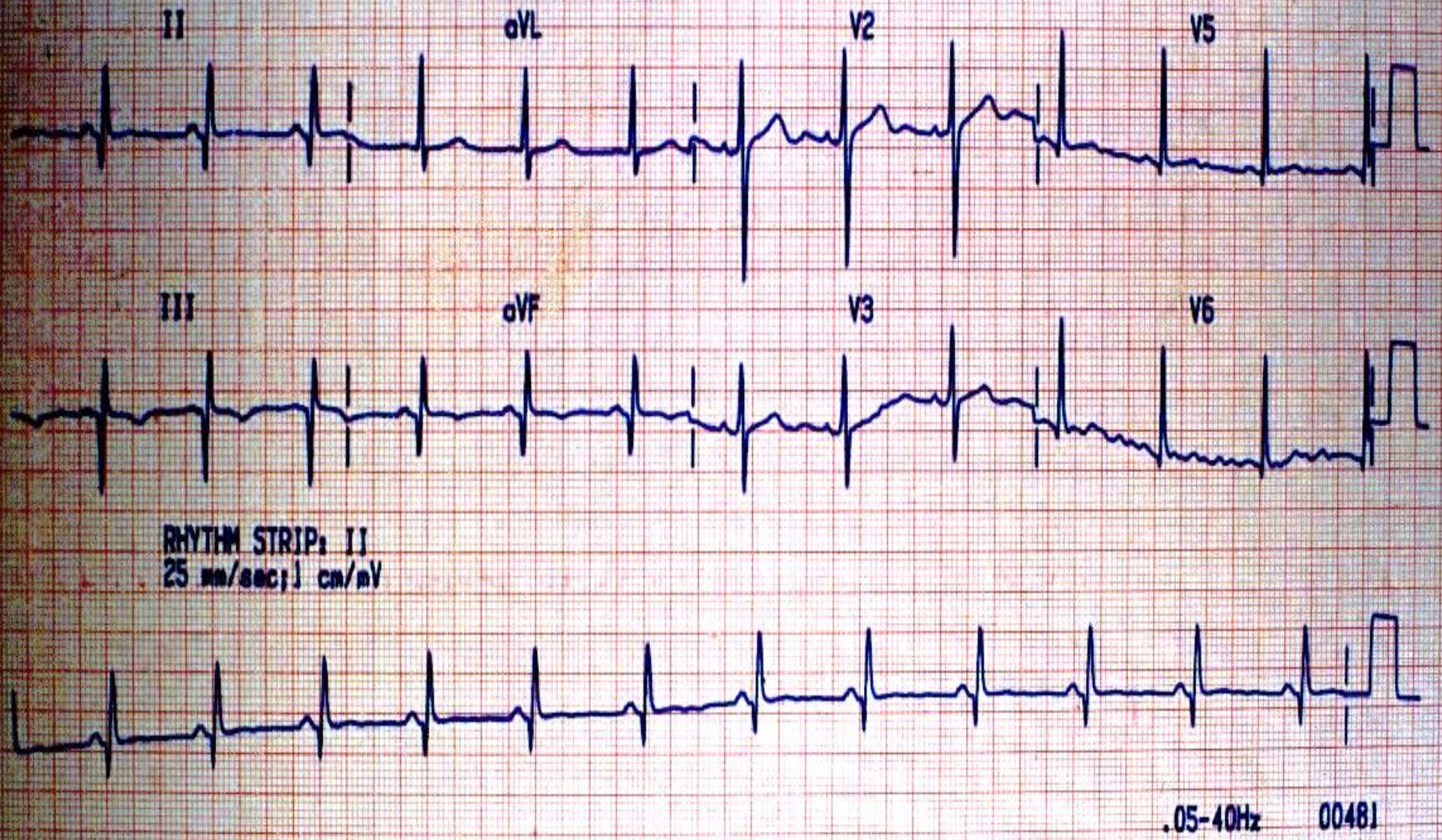


A 55-year-old man recently booked because of epilepsy and his BP found to be 198 / 112..

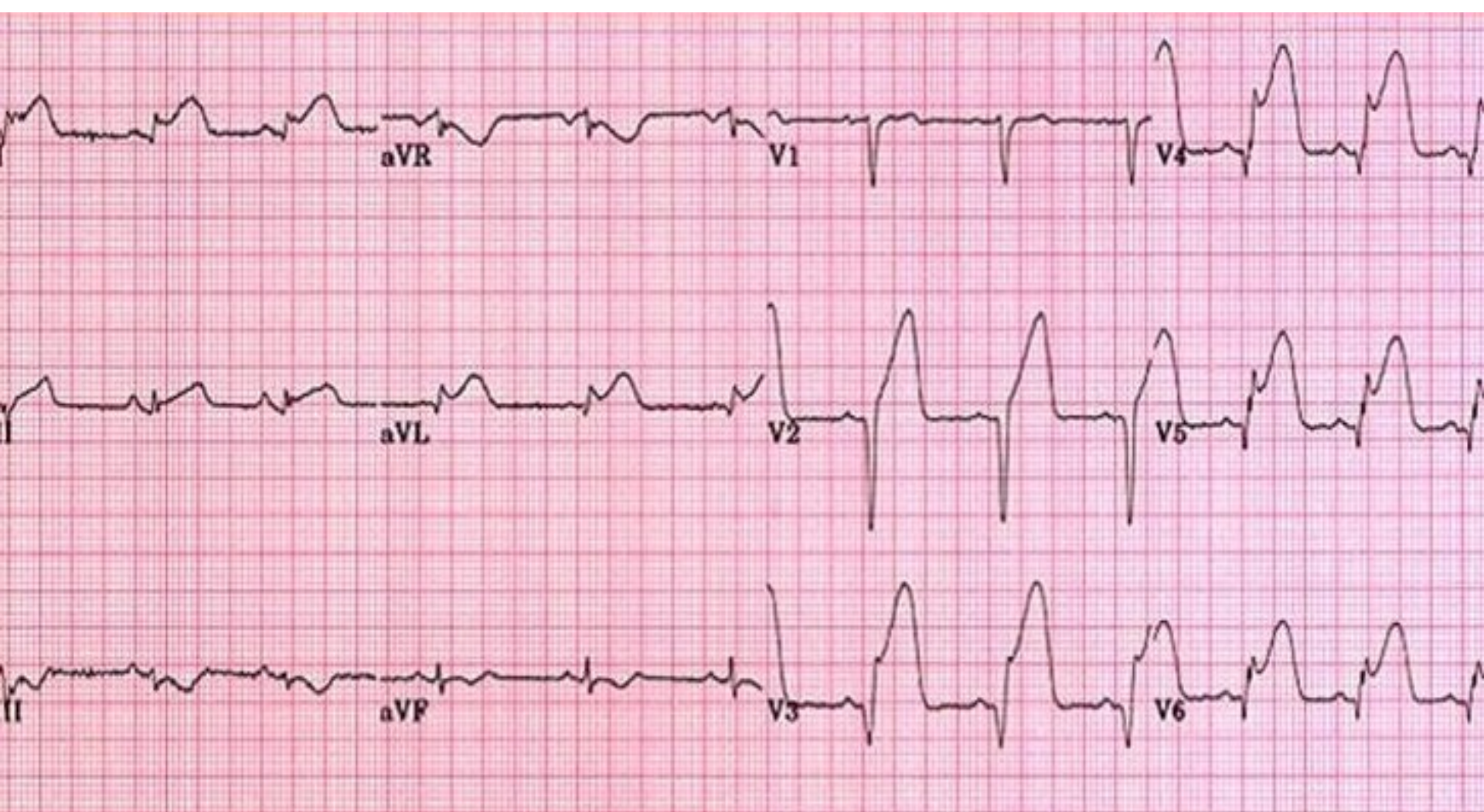
What are the findings?



A 58 year-old man, known diabetic for routine follow up and unremarkable PMH
LAD, Old inferior MI and Anterior MI of uncertain age



What is your diagnosis?
Old inferior MI



A 74 year old man presents to emergency room with chest pain of 2 hours duration.

What is your diagnosis?

- A. Acute anterior MI** <Not sure
- C. Acute pericarditis**

- B. Acute inferior MI**
- D. Acute posterior MI**

QTc 358

Requested by:
DR OSAMA

--Axis--

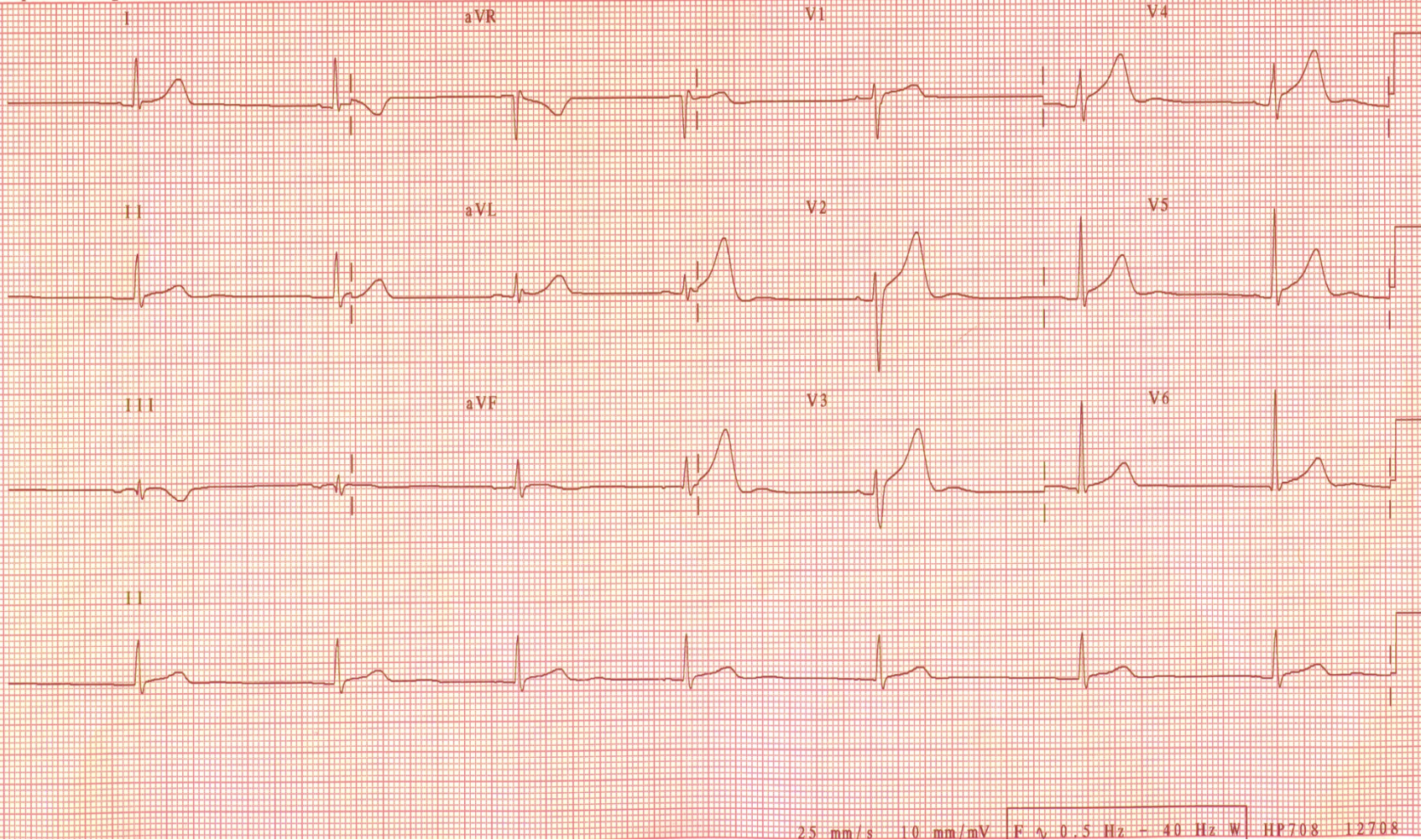
P -54

QRS 26

T -2

- ABNORMAL ECG -

Unconfirmed diagnosis.

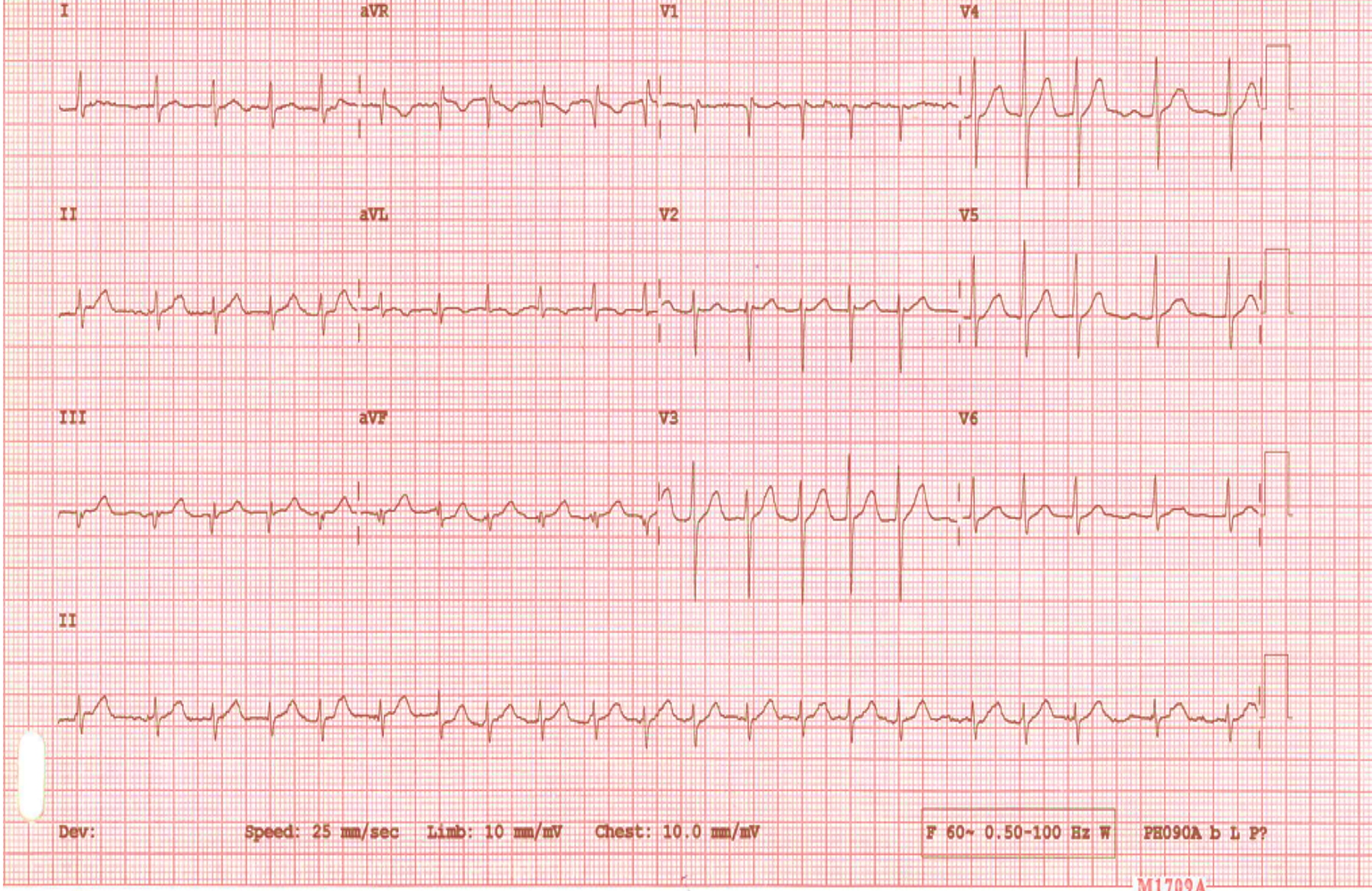


25 mm/s 10 mm/mV Fv 0.5 Hz - 40 Hz W HP708 12708

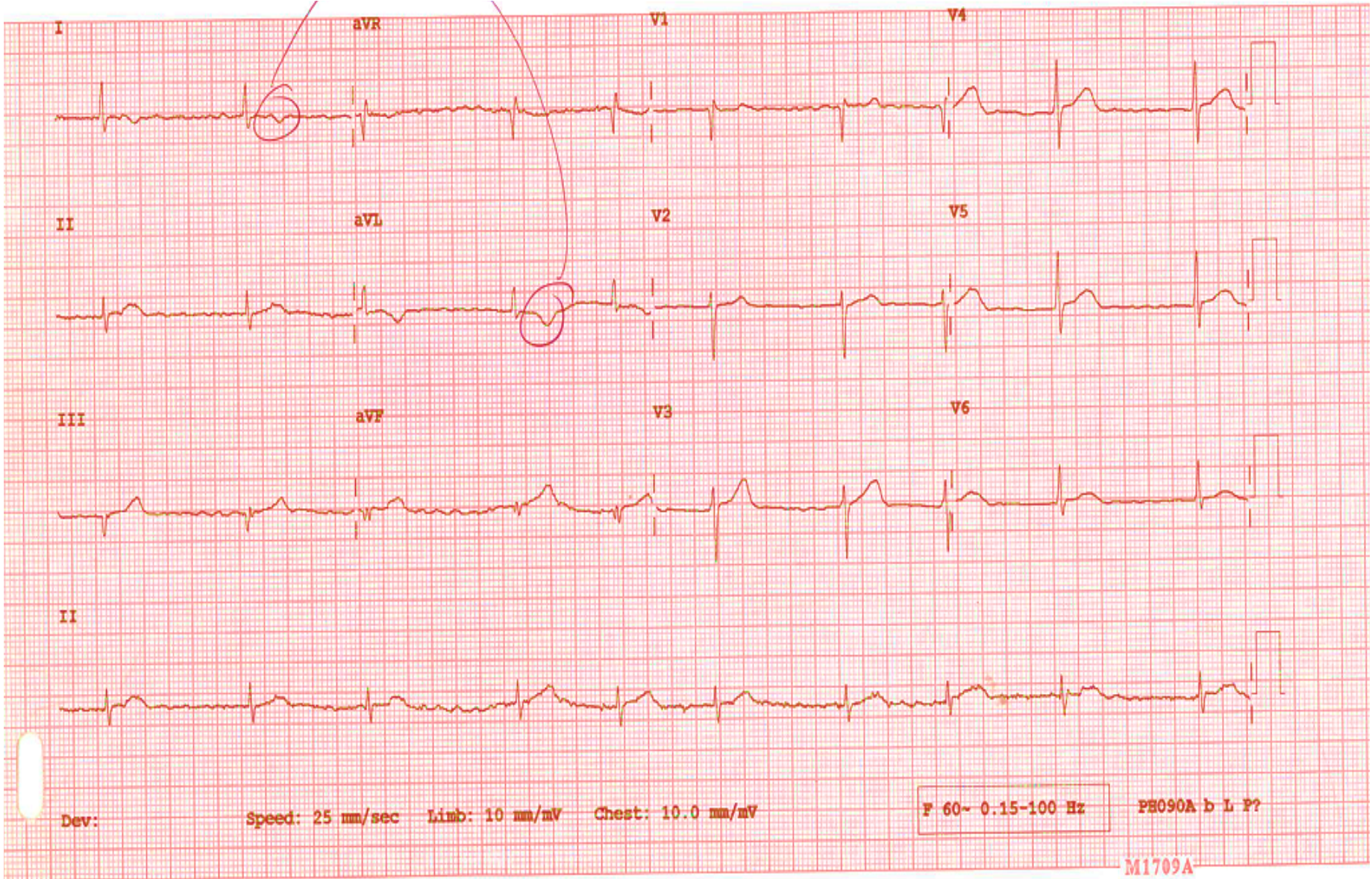
A 33 year-old man with sensation of chest tightness last night, where he could not sleep.

What are the findings?

Bradycardia

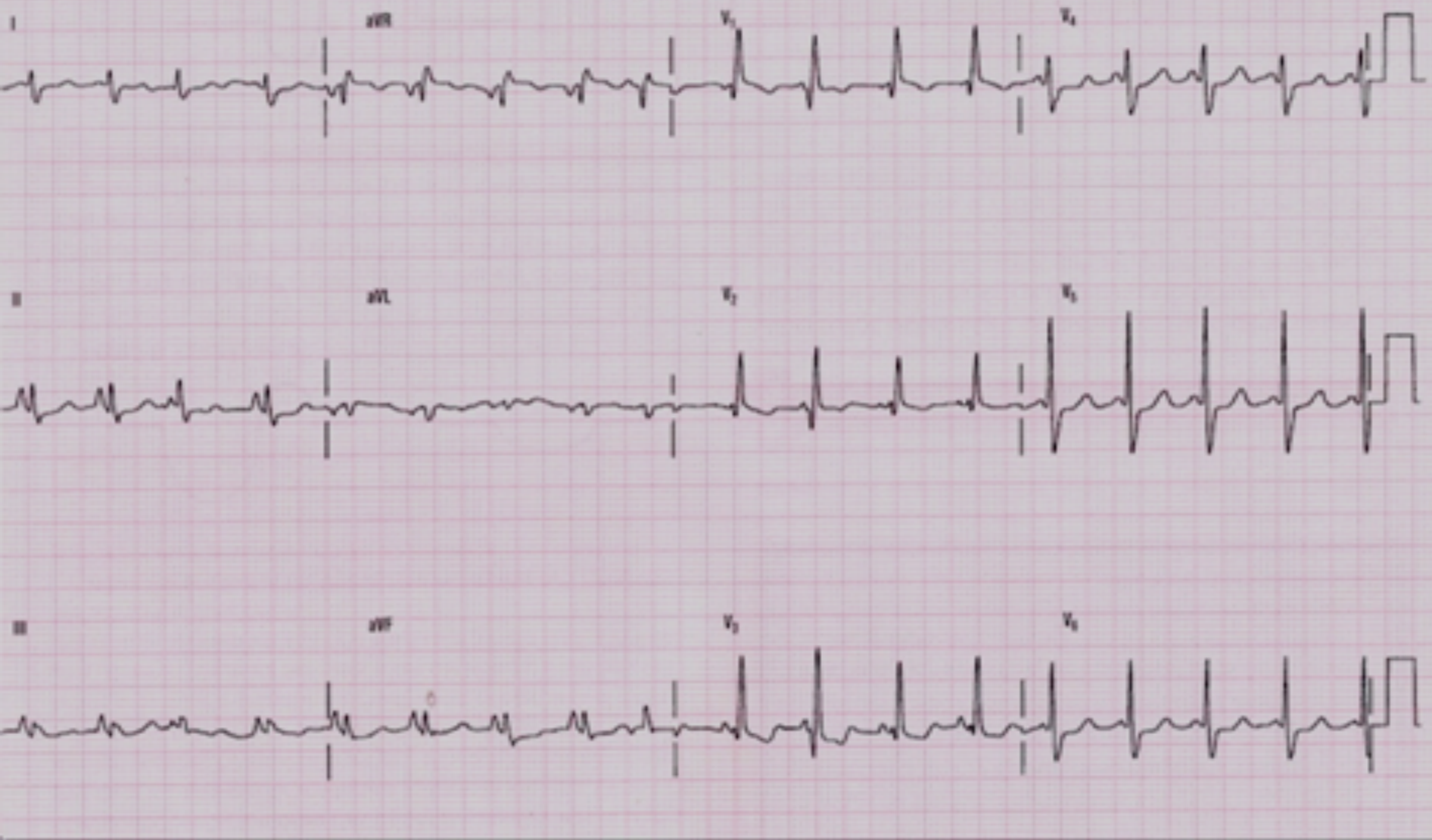


Fast Atrial Fibrillation (1)

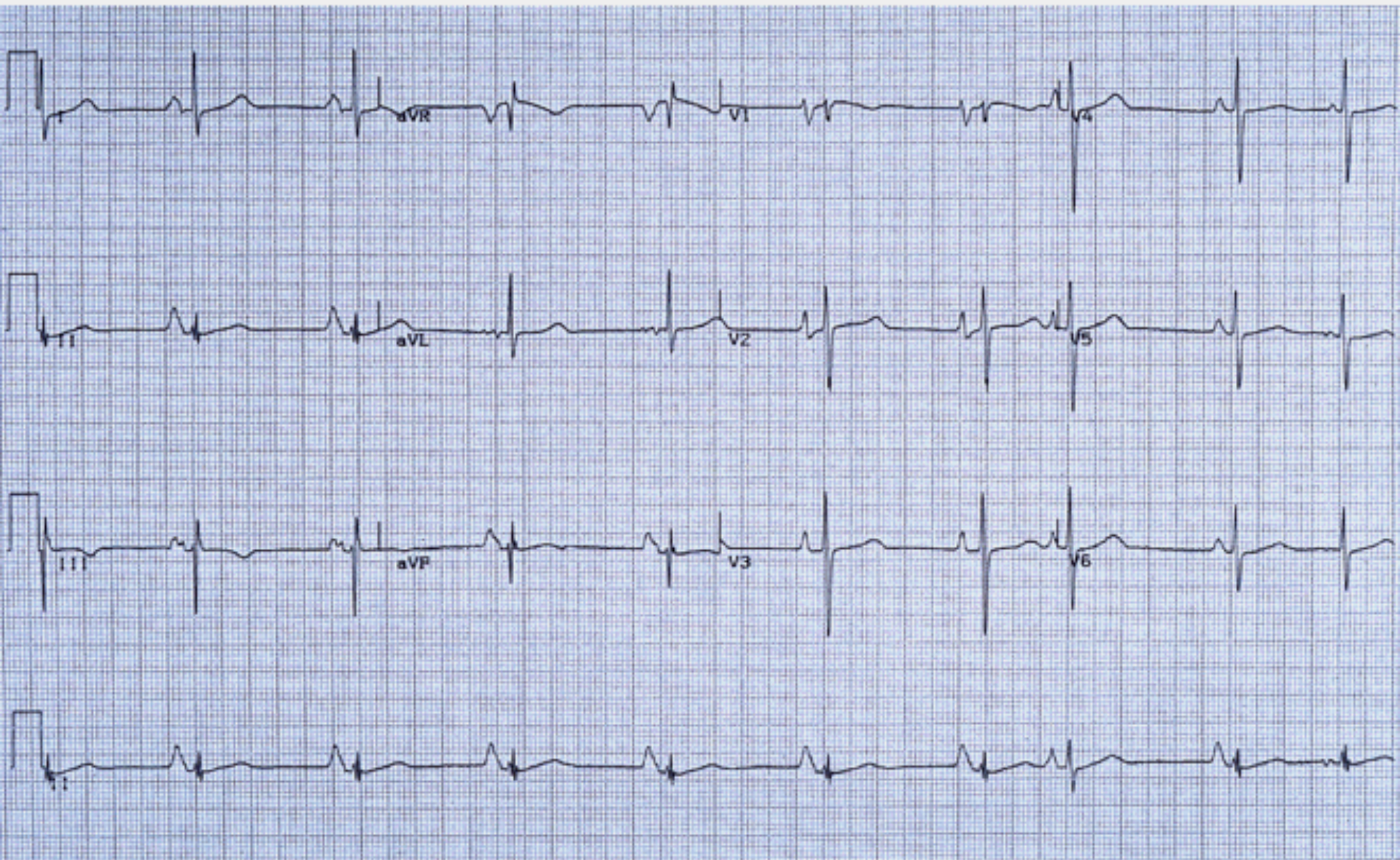


AF (same patient after start of B Blocker) Rate 60 / min

(2)



A 37 year-old with interstitial lung disease. What are the findings?
RAD, P pulmonale and Right Ventricular hypertrophy



Mention three findings in this ECG.

1- P pulmonale (RAH)

2- P mitrale (LAH)

3- Sinus Bradycardia

**NEXT
SLIDE**

ADDED SLIDE

Condition

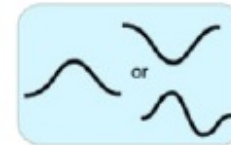
P Wave Morphology

Normal Sinus Rhythm

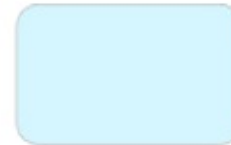
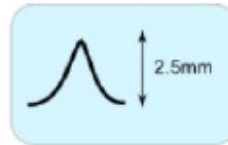
Lead II



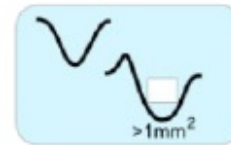
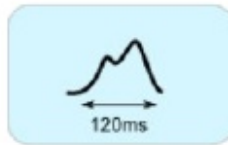
Lead V1

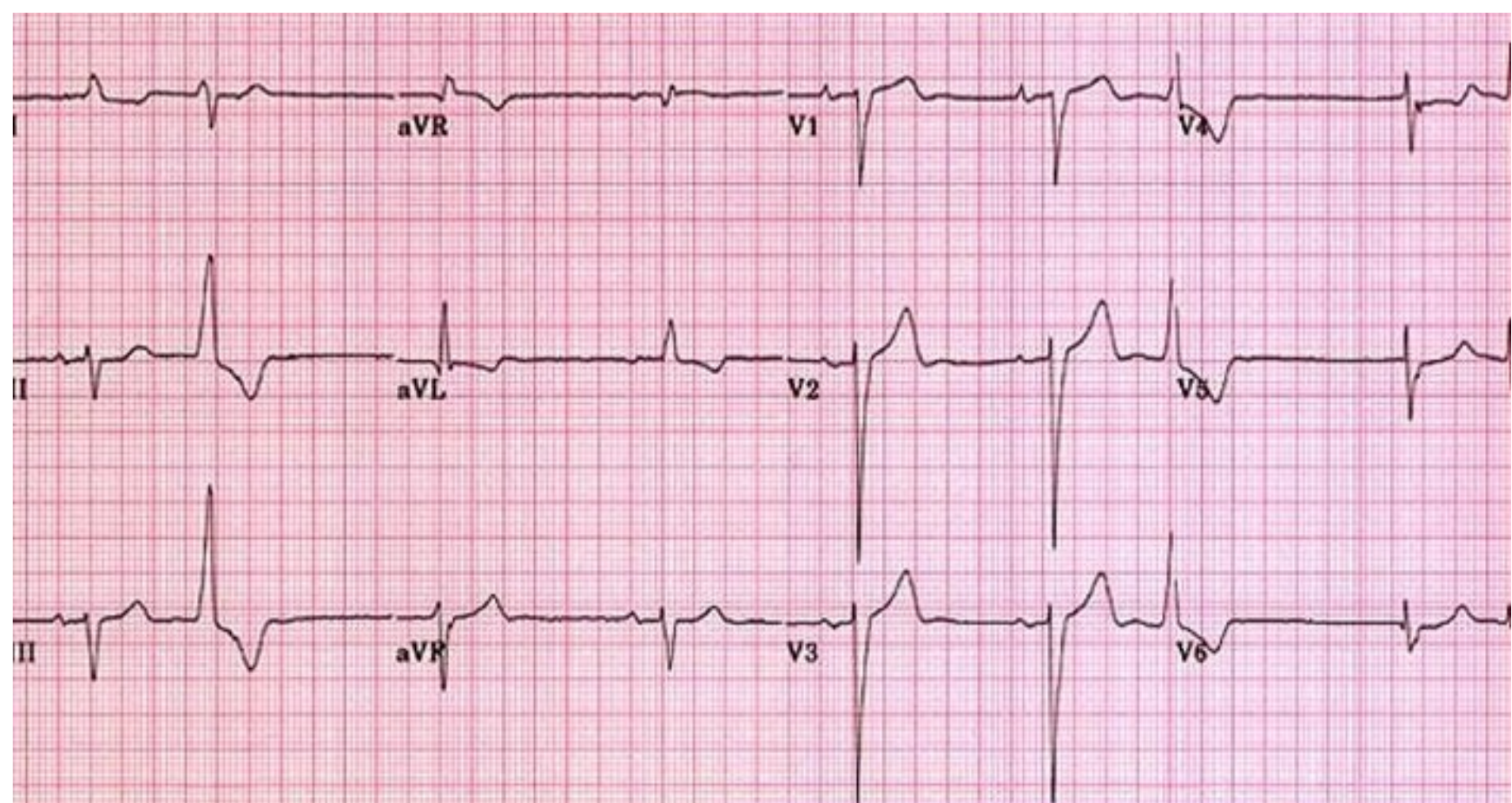


Right atrial enlargement
(= **P Pulmonale**)



Left Atrial Enlargement
(= **P Mitrale**)





A 37 year old lady feels that her heart is bounding.

An ECG, was done which reveals that this lady has:

A. First degree heart block

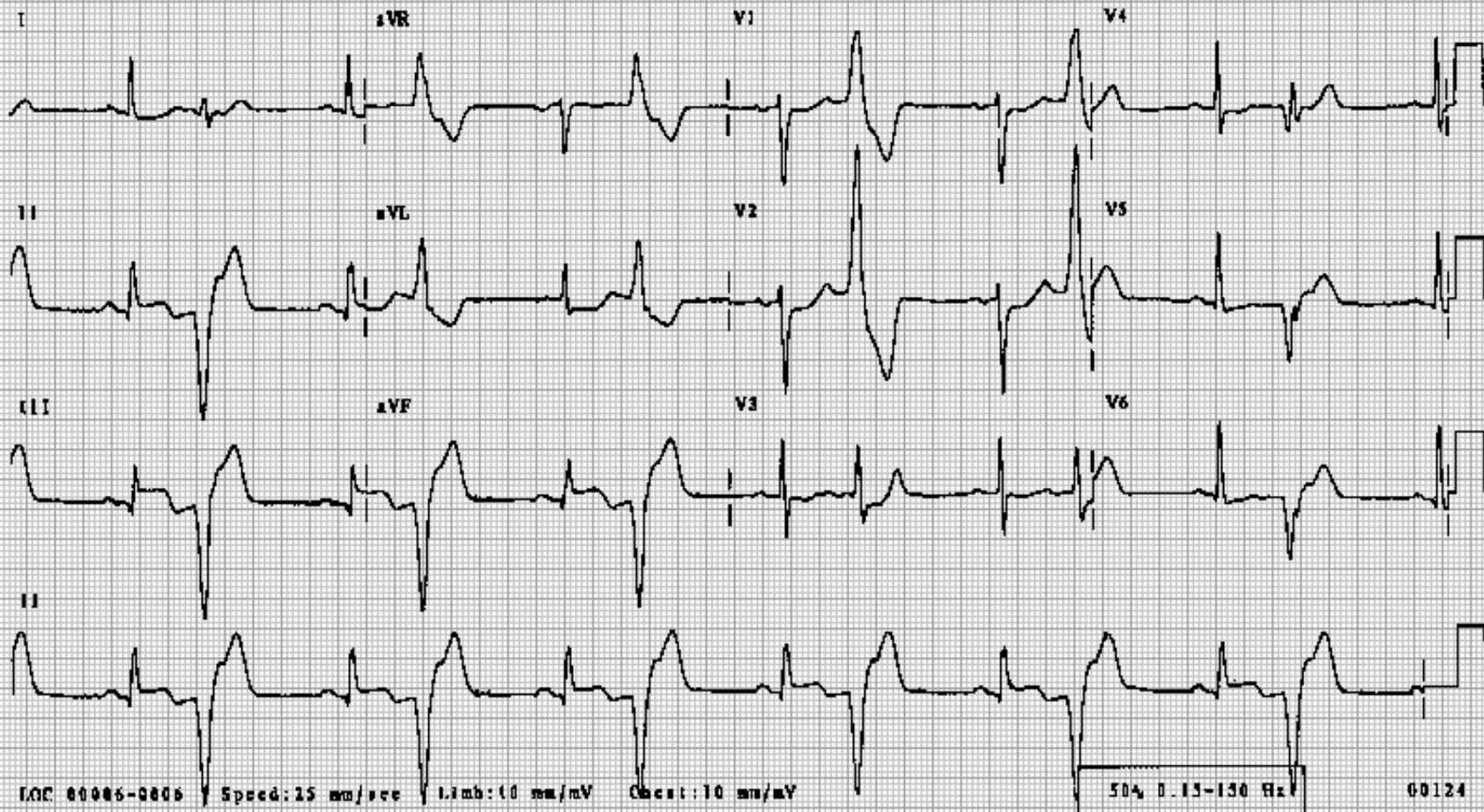
C. Premature ventricular contractions

B. Premature atrial contractions

D. Right bundle branch block

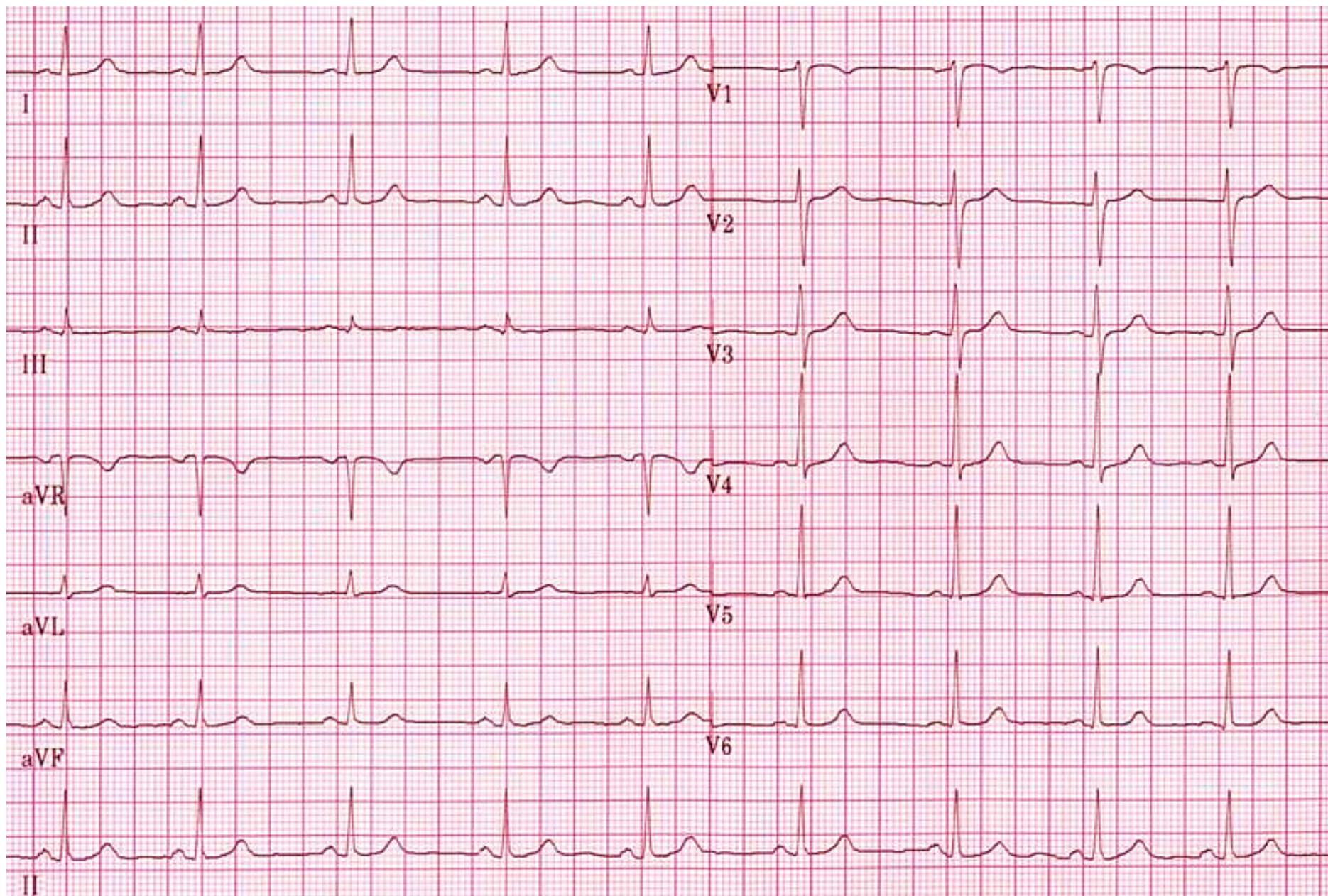
C

A 50 year old man with chest pain for 24 hours

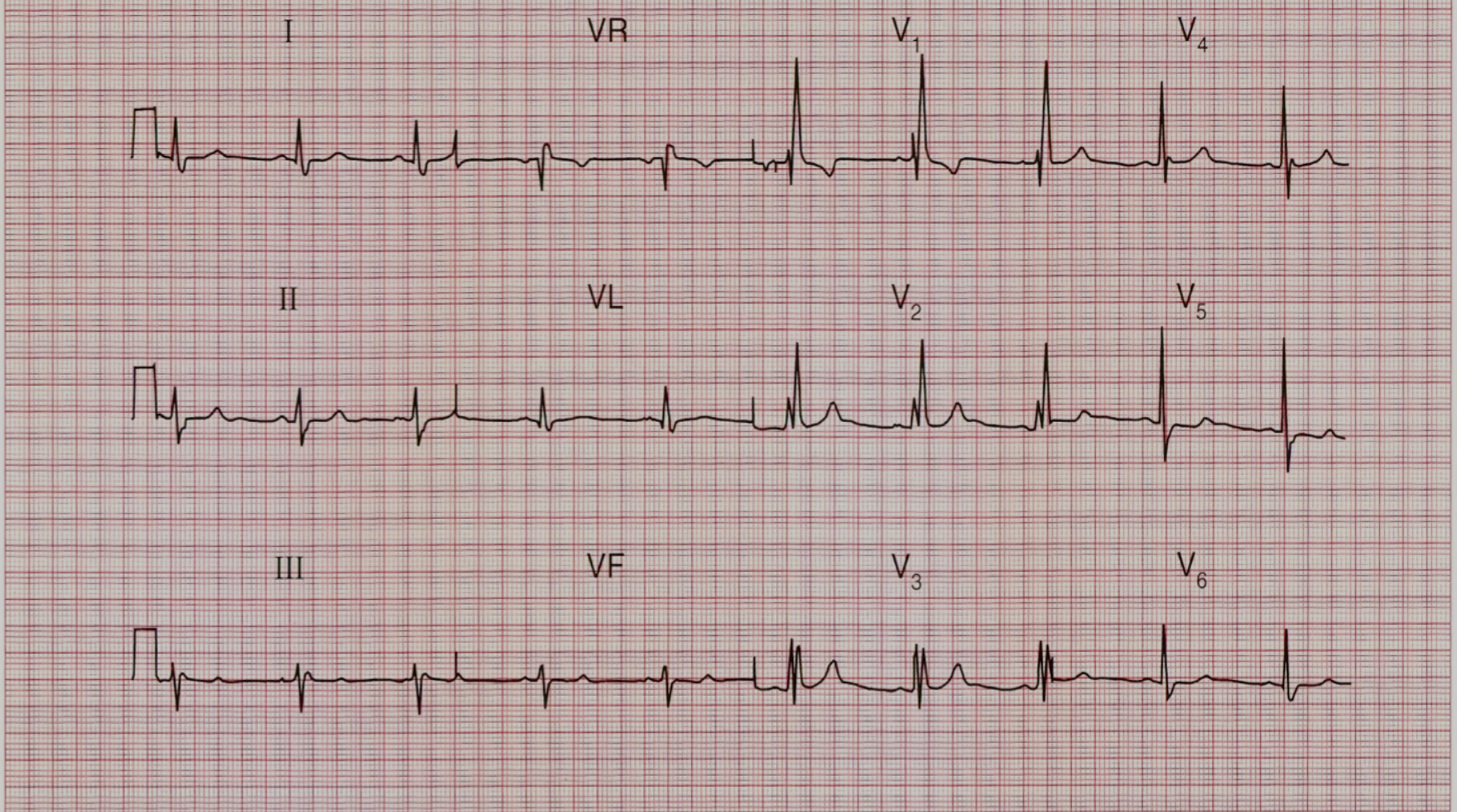


What is your diagnosis?

Premature ventricular contraction (Ventricular Bigeminy)



Normal ECG

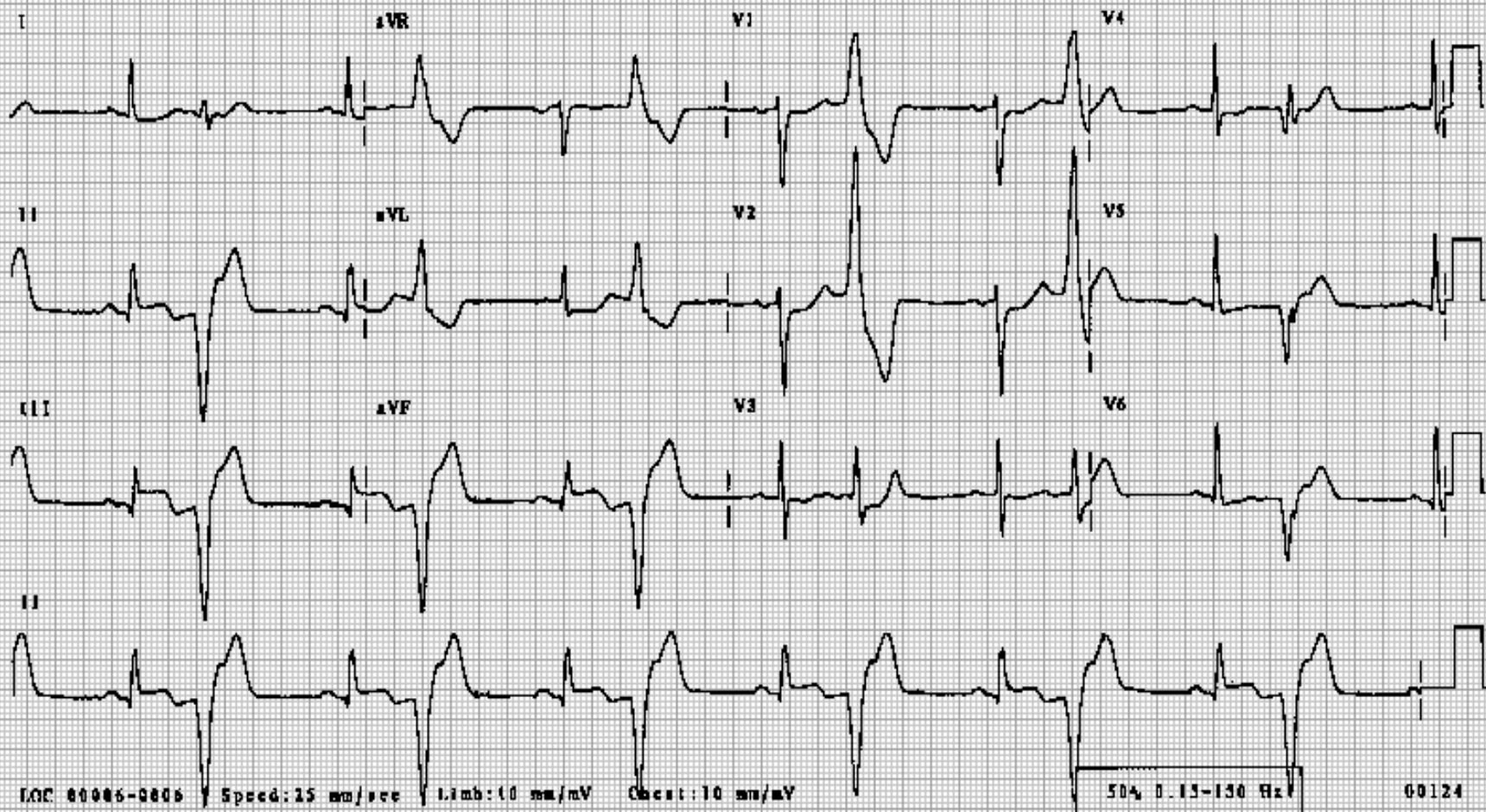


ECG 26

A 15-year-old boy was referred to the out-patient department because of a heart murmur. He had no symptoms. What does this ECG show and what physical signs would you look for?

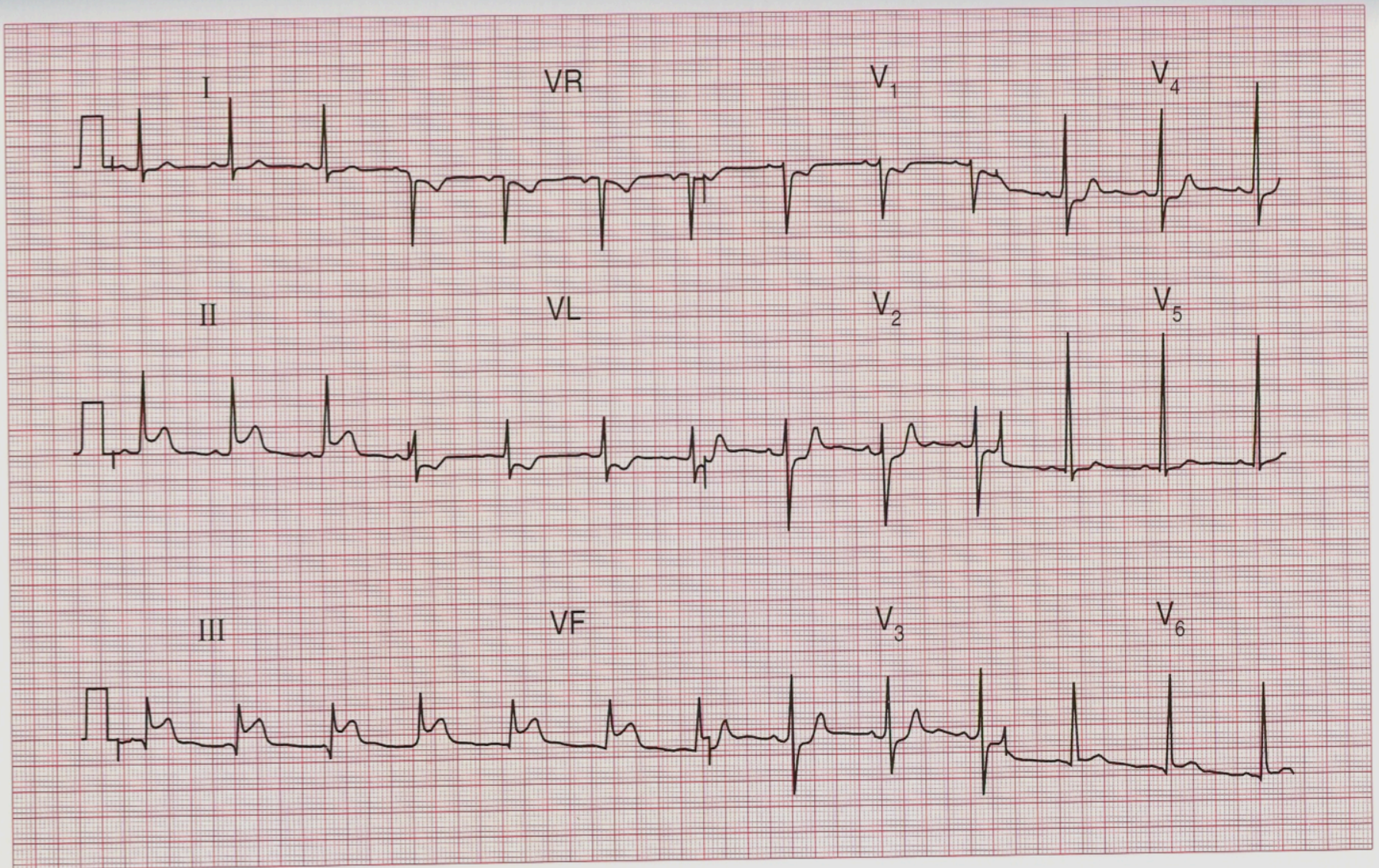
RBBB, in need for Echocardiography to R/O cong. HD like ASD

A 50 year old man with chest pain for 24 hours



What is your diagnosis?

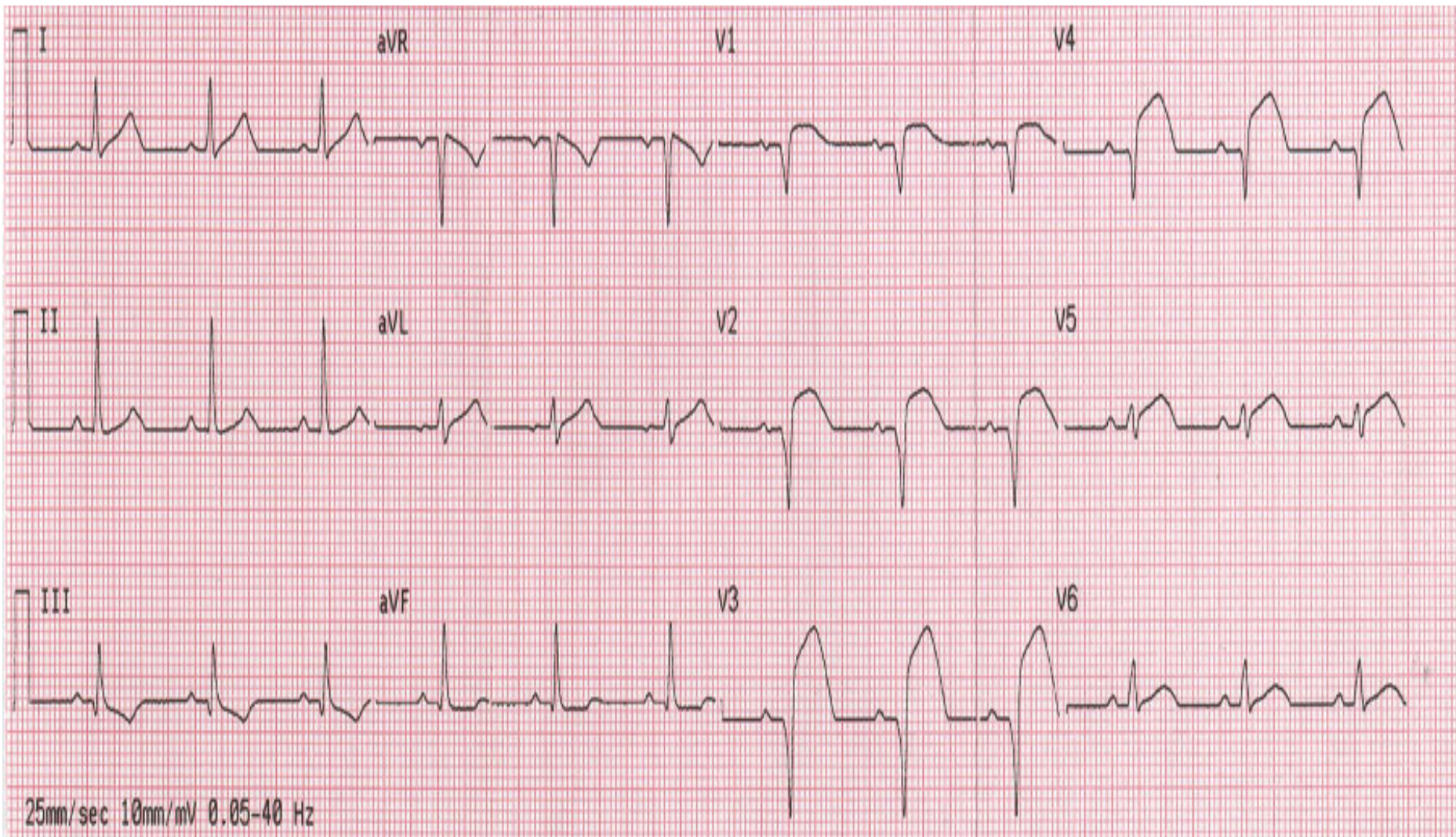
Premature ventricular contraction (Ventricular Bigeminy)



ECG 14

A 50-year-old man is admitted to hospital as an emergency, having had chest pain characteristic of a myocardial infarction for 4 h. Apart from the features associated with pain there are no abnormal physical findings. What does this ECG show

Acute inferior MI



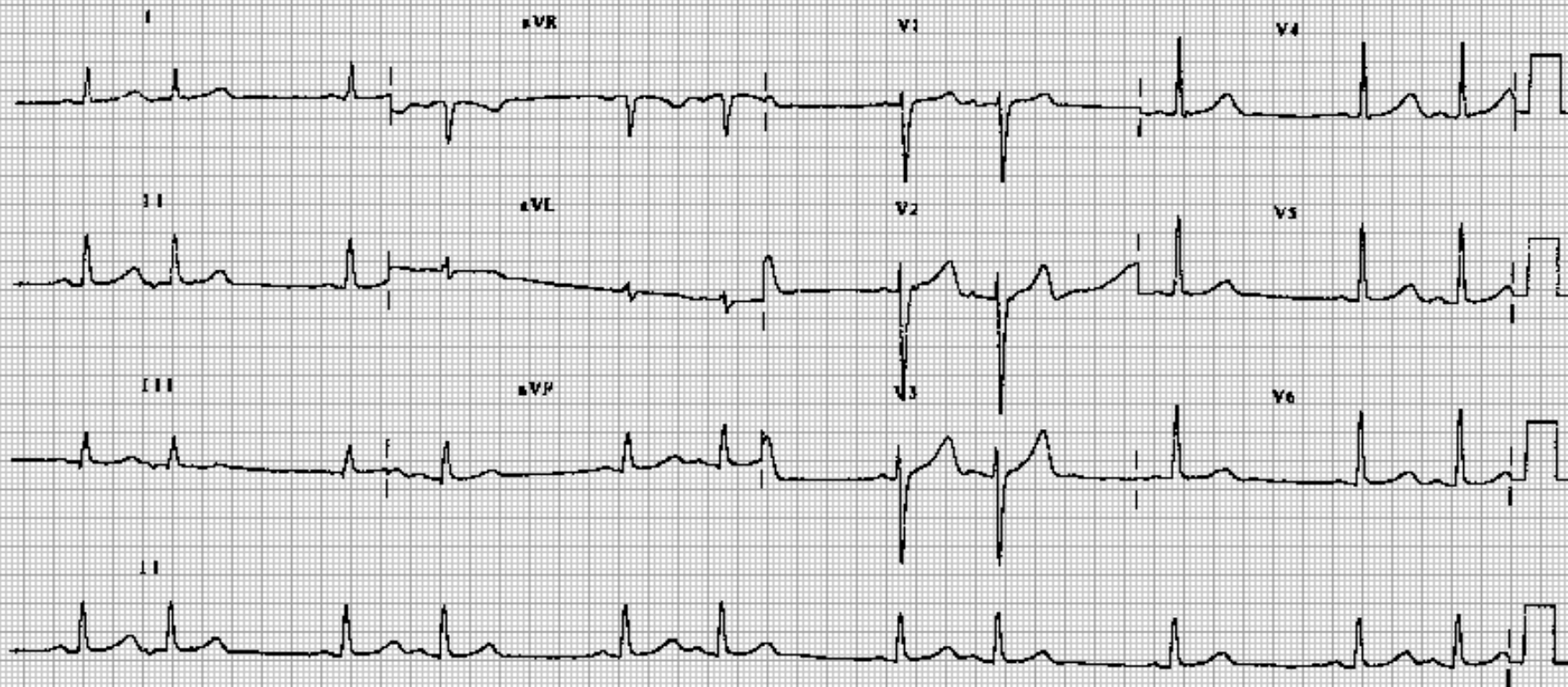
A 61 year old man with acute chest pain.

What is your diagnosis?

Anterior MI

A 60 year old man with hypertension.

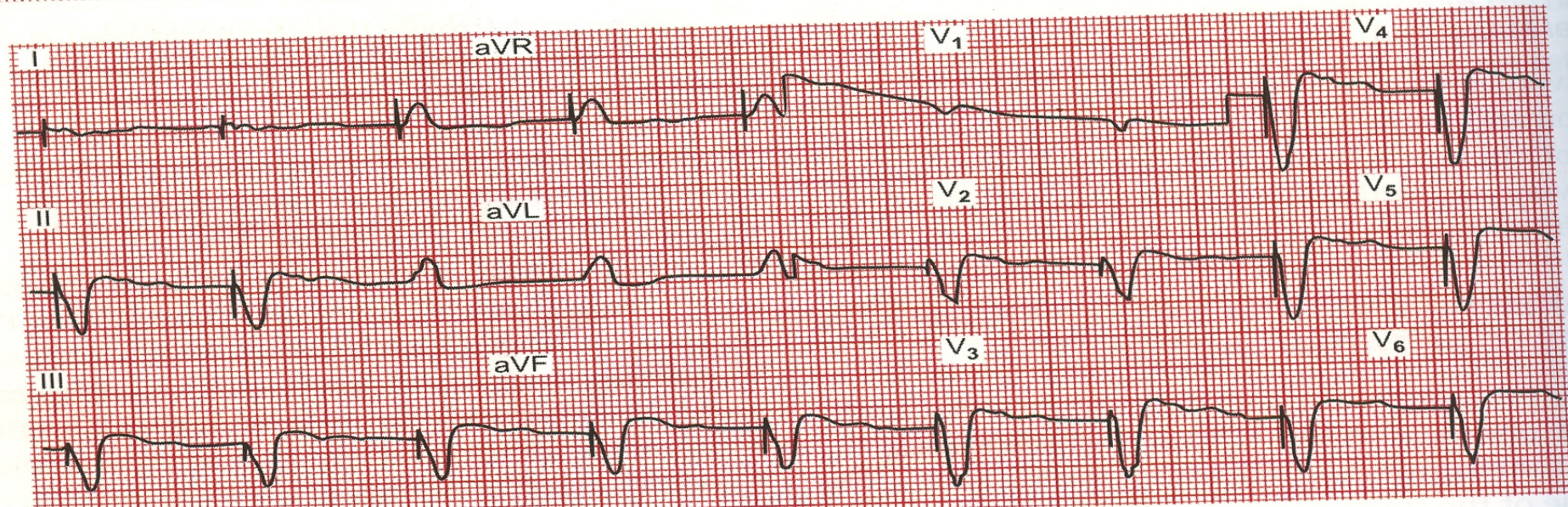
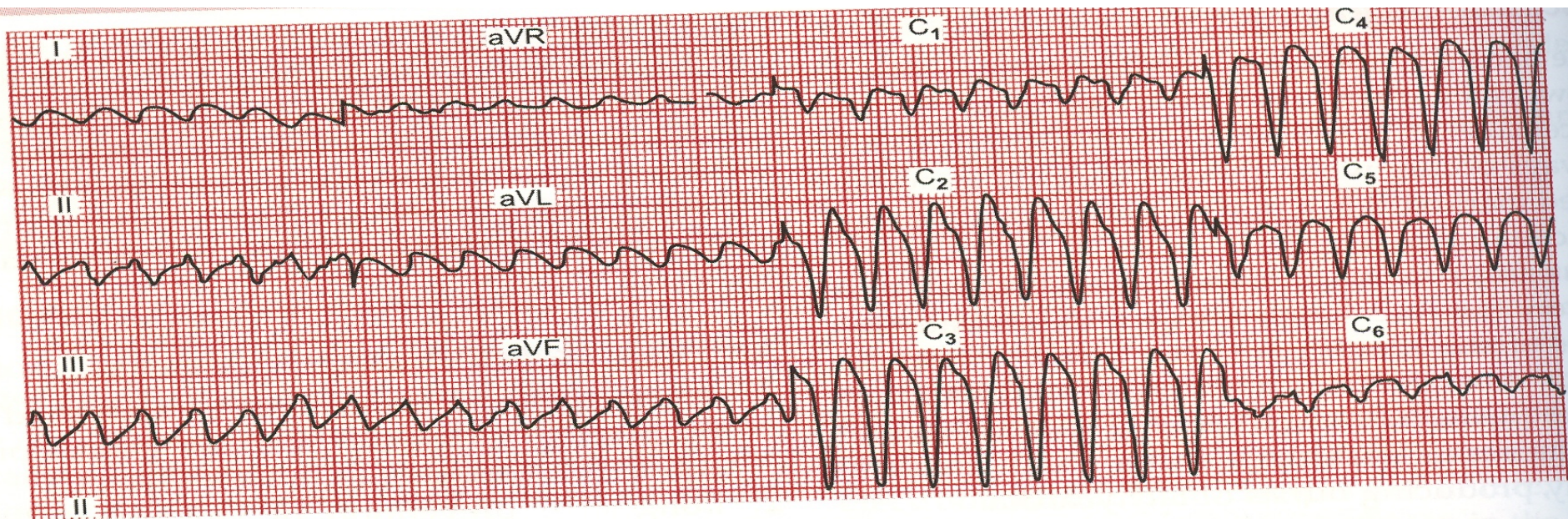
Requested by:
OPD



25 mm/s 10 mm/mV

What is your diagnosis?

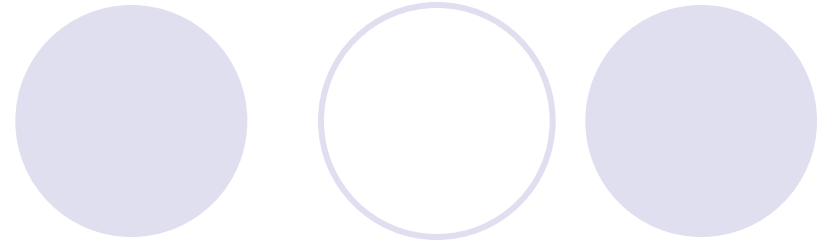
Atrial premature beats (Atrial Bigeminy)



ECG 156

A Ventricular Tachycardia in a patient with demand pacemaker.

DONE BY:



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