CVS Mini-OSCE (1)

QMA Team

Infective endocarditis & Rheumatic Fever

Q: A pt presented with fever, Hx of heamturia & systolic murmur at the lower left sternal border on auscultation since 8 weeks ago:

1) what is your Dx?

Subacute Infective endocarditis

2) Mention other cardiac cause for this sign?

congenital cyanotic heart disease.

Q: Patient presented with intermittent fever of 2 wks duration, he has a Hx. of dental caries & hematurea.

On P/E there was heart murmur, otherwise the exam was unremarkable!

Mention 2 tests to confirm Dx.?

1.Blood culture.

2.Echocardiography.

Give other 3 differential diagnosis ?

Trauma

Rheumatoid arthritis , SLE

VASCULITIS

Q: A patient with history of IV drug abuse presented with fever and this abnormality :

-Identify this abnormality

Splinter hemorrhage

-What is the most suspected diagnosis ?

Infective endocarditis

-What is the most suspected cause ?

Staph aureus infection

Q:male pt has a history of heart disease and sore throat 2 weeks ago and has murmur:

1) what is your diagnosis?

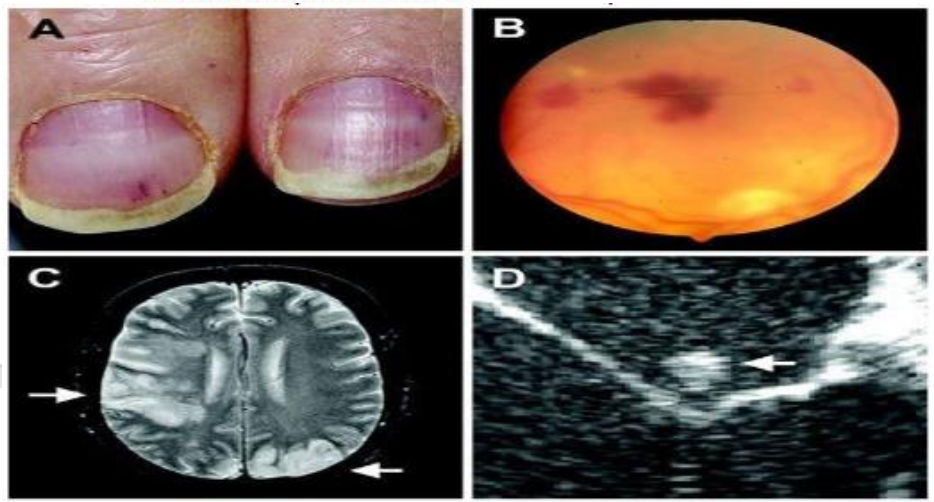
Infective endocarditis

2) Identify one of complication?

Emboli: Seen in approximately one third of patients

retinal hemorrhages

splenomegaly



Q: patient with prosthetic valves presents with prolonged fever.
Painless skin lesions seen below

- Name the skin lesions
  Jan-way lesions
- Name the underlying disease (not the same pic)
  Infective endocarditis

Q: Give 4 symptoms the patient may present with?
the patient with infective endocarditis may present with
*Fever, fatigue or failure to thrive, arthralgias, cough, chest pain,hematurea
Give 3 investigations required in this case

- Blood culture (most important)
- Echocardiogram - URIN ANLYSIS
- ECG
- ESR , CRP

Give 2 ECG abnormalities you suspect in this patient

- Atrioventricular block

-ST elevation (infarction)
What is the treatment ?
Extended Parenteral antibiotics
Surgery may be indicated

Q: Identify this abnormality

Osler's nodes

The direct cause :

vasculitis

Associated with :

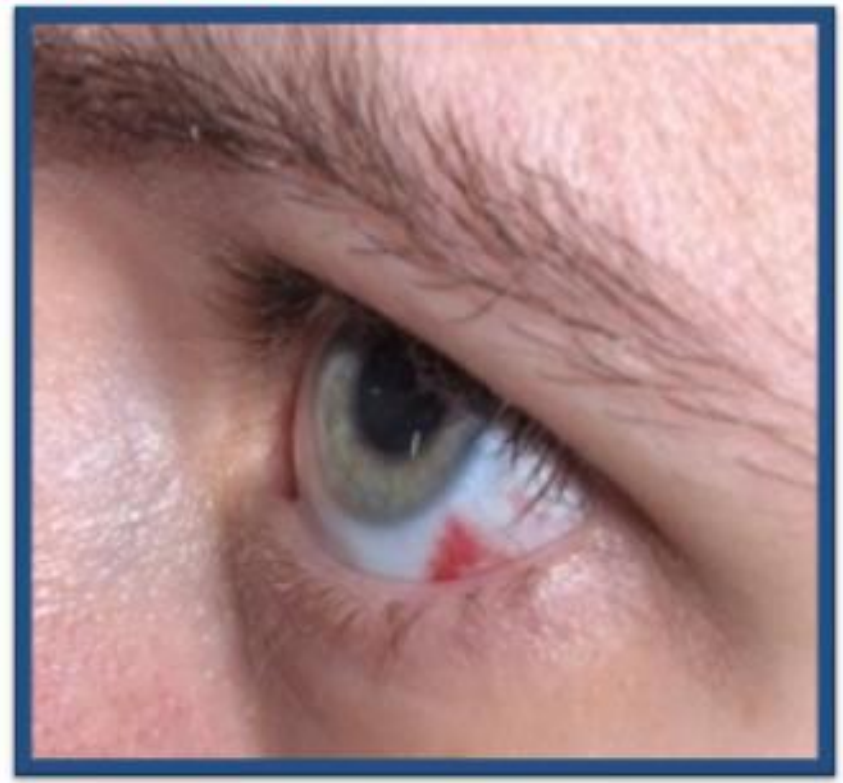
Infective endocarditis

Q: Identify this abnormality

Subconjunctival hemorrhage

3 differential diagnosis :

- Infective endocarditis
- Trauma
- hypertension



Q: Mention 3 causes of this condition.

Congenital heart disease , cystic fibrosis ,cirrhosis, chrons and UC, lung abscess, infective endocarditis

Q: Roth spots in a patient with infective endocarditis

DDX

Anima

Leukemia

A 35 year old female known case of rheumatic heart disease had a dental workup several weeks ago and is now complaining of fever, fatigue and SOB. Her physical exam reveals a murmur ……..

Some Labs were also mentioned but you won't need them to answer the question

Patient also had microscopic hematuria.

1) What is your diagnosis?

infective Endocarditis

2) Name 2 investigations to rule in your diagnosis

A. Blood Cultures B. Echocardiography (whether Transthoracic/Transesophageal it doesn't matter)

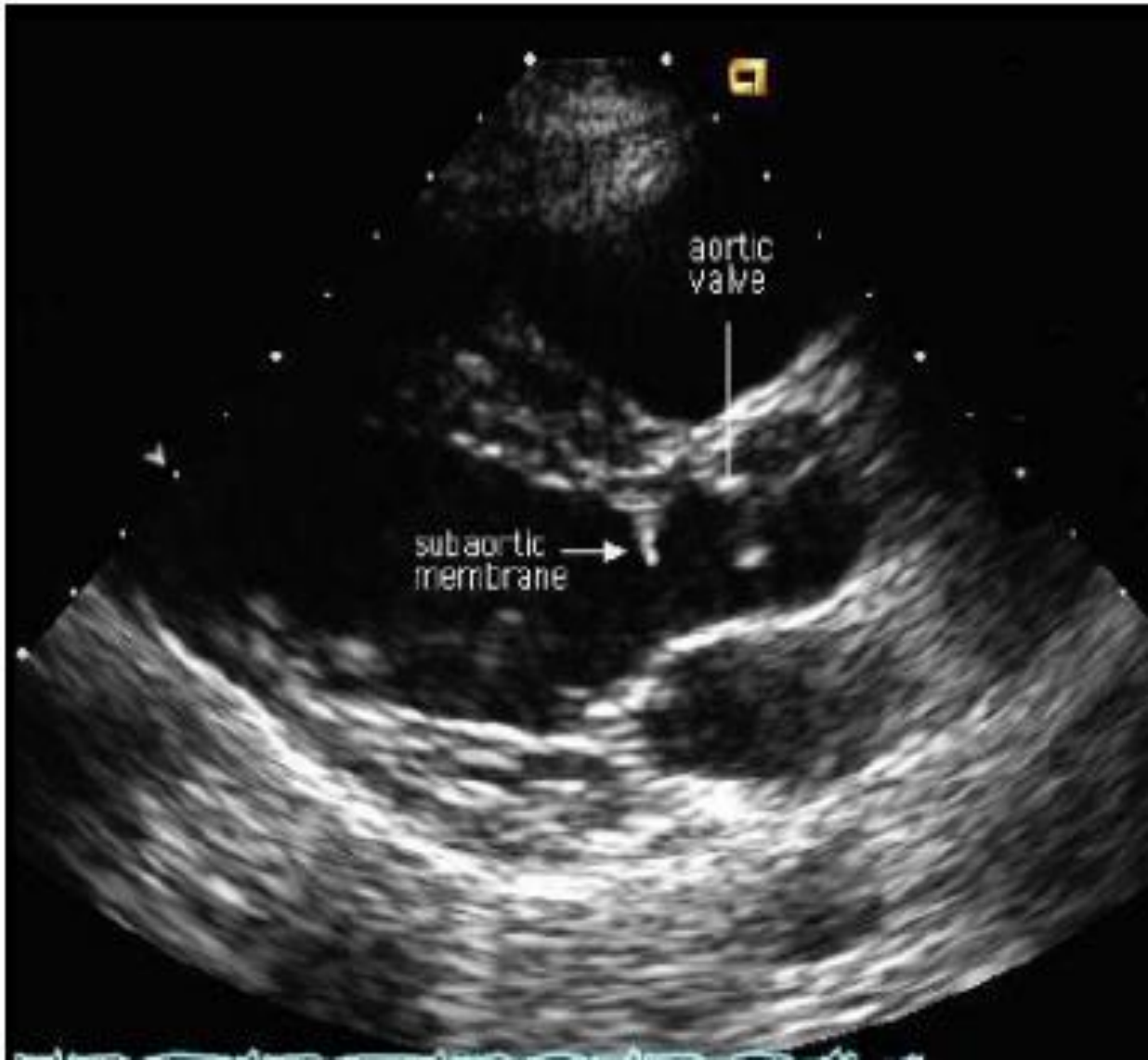
3) Name 2 physical signs seen in the patient

A. Osler's nodes B. Janeway Lesions

B. Other alternatives include: Splinter hemorrhages/Roth's spots

Q32.A 32 YO Pt with a Hx of IV drug abuse & renal dialysis, was presented with fever, malaise & endurance fatigue. Chest auscultation has revealed pan-systolic murmur. An ECHO showed the following, what is your spot Dx?

Infective endocarditis



Q:

A-What is this skin lesion?

Erythema marginatum

B-What is the diagnosis?

Rheumatic fever

Q:

A young patient with recent history of upper respiratory tract infection presented this abnormality :

Identify this abnormality

Erythema marginatum

What is the most suspected diagnosis ?

Rheumatic fever

What is the most suspected cause ?

Immune mediated delayed response to group A beta hemolytic streptococcus infection

Identify this abnormality

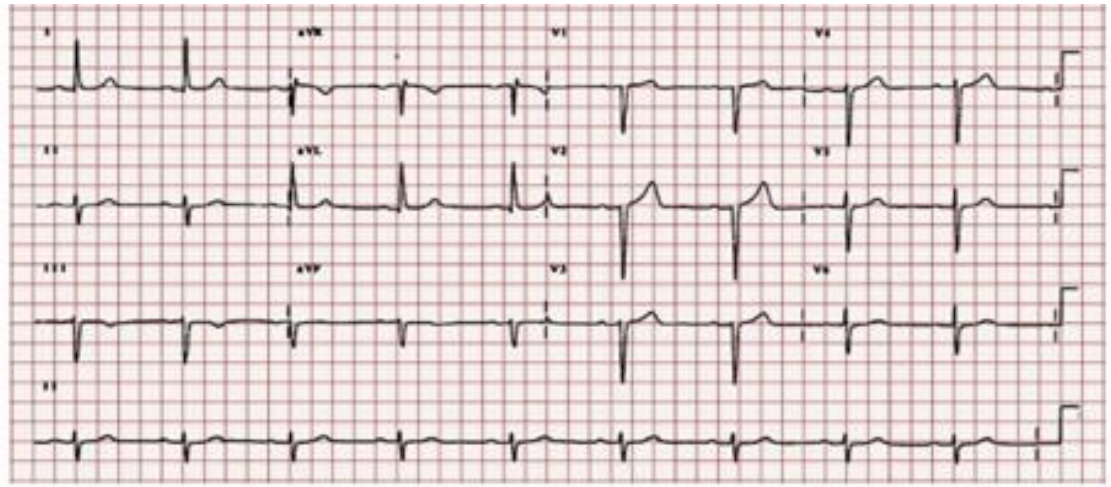
Subcutaneous nodules

Give 3 differential diagnosis

1- rheumatic fever
2- juvenile rheumatoid arthritis
3- neurofibromatosis

According to the ECG what's your diagnosis ?

First degree AV block



If this pt esr is elevated with migratory arthritis for 2 week duration and skin lesion as in pic

Answer the following

-your diagnosis ?

Rf

-How to confirm it ?

Aso titter

+ throat culture

+ direct antigen test

Recent scarlet fever

-how to treat the rash ?

No treatment but may antihistamine

Which symptom presented is NOT a sign of rheumatic fever?

A. truncal rash
B. joint tenderness
C. changes in vision
D. nausea

Which of the following factors in the patient's history and physical is LEAST relevant to the diagnosis of Rheumatic fever?

A. sore throat from 3 weeks previous
B. living in the current conditions of Flint, MI
C. the mother's history of type-2 diabetes
D. a possible genetic factor from the father who's history is unknown

According to the Jones Criteria, which of the following sets of symptoms would indicate a positive diagnosis for Rheumatic fever? Select all that apply.

A. Carditis, fever, and an elevated WBC count
B. Positive strep throat culture, arthritis, chorea
C. Recent scarlet fever, carditis, fever, arthralgia
D. Elevated C-reactive protein, carditis, fever

Drug side effects & HF

Q1 : patient with HTN on treatment presented with face swelling.

1-According to ACC/AHA staging system of HF what is the stage of hf in this patient?

Stage A

2-What is the Dx.?

Angioedema

3-What is the cause of this?

Side effect of ACEI -(Drug-induced)

4-First step in management?

Airway monitoring

Q2: 52 years old male Patient with HX of previous MI and HF, he is on different drugs, now he has elevated creatine kinase

1) What type of drugs may be the cause ?

Statin use

2) Also electrolyte of patient show hypokalemia, high HCo3 .Give 2 DDx ?

1. Metabolic alkalosis.
2. Diuretic Use.

3) What type of diuretics can be used in this patient if hypokalemia caused by drug?

potassium sparing diuretics

Q3: 30 years old male, name 2 drugs that can cause this condition.

Digoxin
Spironolactone

Q4: This patient with a prosthetic valve, developed this skin lesion.

A-What is the cause?

Warfarin overdose

B-What is the appropriate lab investigation?

INR

Q5 : this picture shows chest xray for 26 year old Patient

1)Write 3 Findings in this CXR.

1. Cardiomegaly.
2. Pulmonary infiltration.
3. Right-tracheal deviation.

2) What is the cause of these findings in this age?

Cardiomyopathy (but CHF in elderly patients)

Q7: Mention 4 causes of this condition.

Heart failure
Renal failure, Nephrotic syndrome
Liver cirrhosis
Hypo-albuminemia
Fluid overload

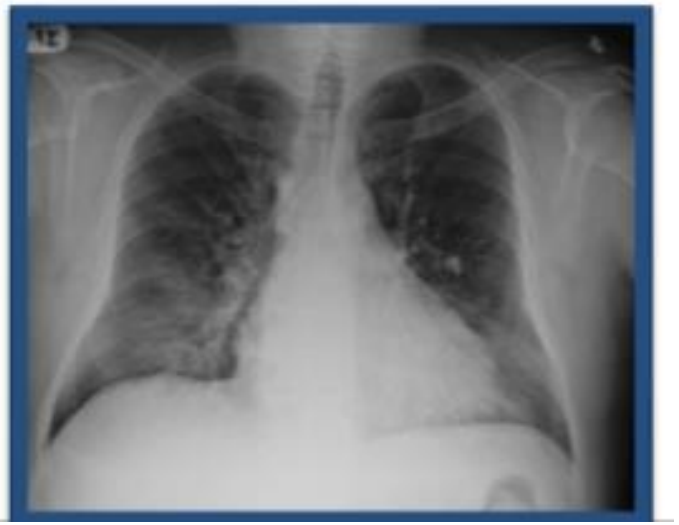
Q8: A 65 years old male complaining of SOB this is his CXR:

- Two findings in the CXR .

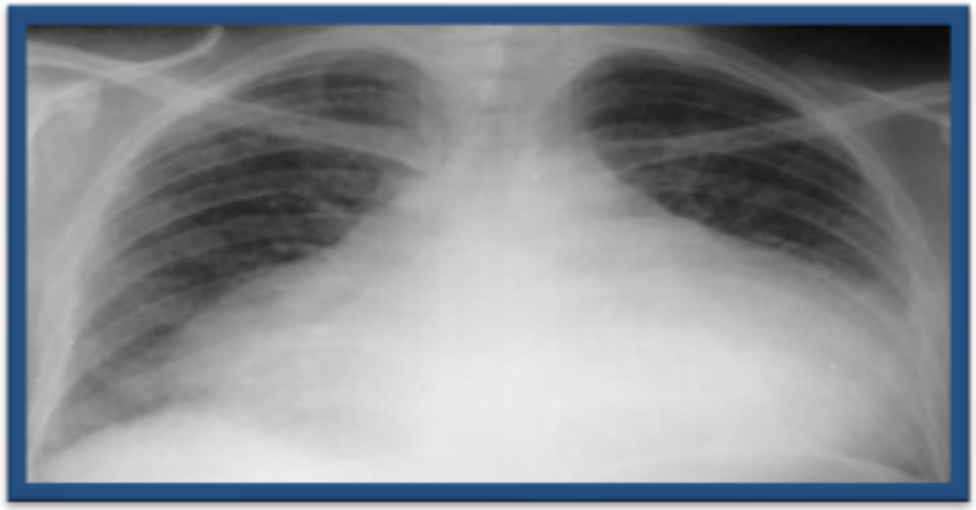
  Cardiomegaly .

  Kerly B lines
- What is your diagnosis?

  Left side heart failure



Q9 :The chest radiography of a patient Name two clinical findings on physical examination supporting the most likely diagnosis.



- Distant heart sounds
- Raised JVP
- Dilated veins
- Pulsus paradoxus

Q10: Mr.x is a known case of heart failure for 2 years presenting with increasing dyspnea and Shock (BP 80/40, and HR 130 b/m),

1) what is your diagnosis?

Sever ventricular failure

2) How to manage this patient?

Inotrops(dopamine, dobutamine, milrinone)

Mechanical circulatory support

3) What is the appropriate dose of dopamine in this case?

2-5 microgram/kg/min (this dose activate beta receptors)

Q11: Known to have HTN & IHD for long time came with SOB, orthopnea, crepitating & S3 gallop sound.

1) what is your Dx ?

acute heart failure.

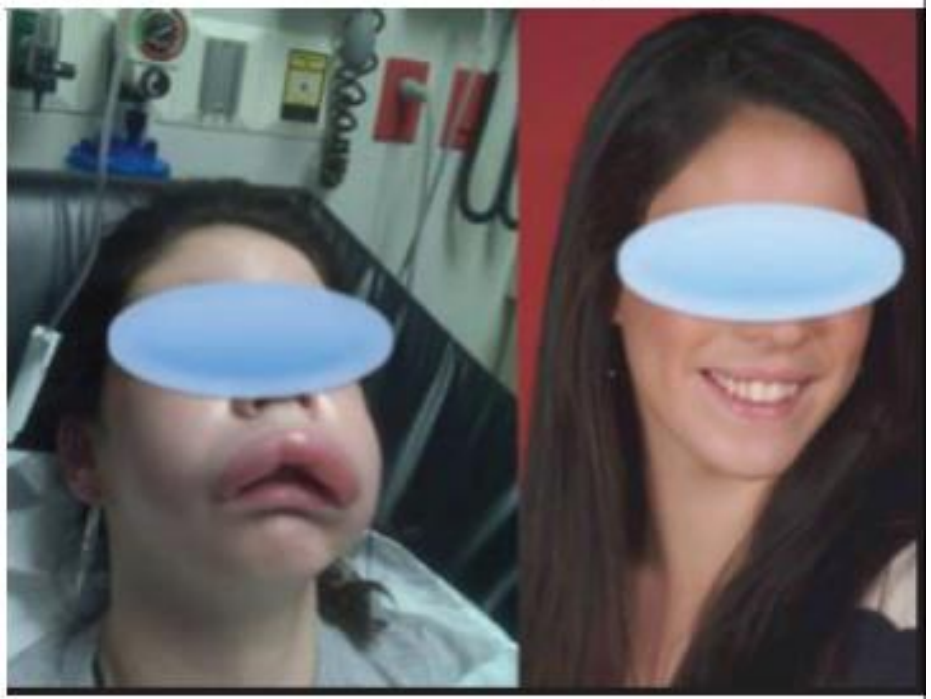
2) investigations ?

x ray & echo.

3) 2 lines for the treatment?

Position and oxygen // Diuretics (IV lazix).

Q67.A 35 year old female patient was diagnosed with essential HTN 1 month ago , and she has been started on an anti-hypertensive drug .
She presented to the ER complaining of the following pic



1-Spot diagnosis ?
ACEI induced angioedema

2-What is the class of the antihypertensive ?
ACE-inhibitors

3-mention other side effects for this drug ?
dry cough , angioedema , flushing , myalgia
renal impairment and hyperkalemia

Q8.This pt was found unconscious in the farm

A. Ddx?

Angioedema(As adverse effect from ACEI)

B. Mention 2 drugs for management?

1-Steroids

2-epinephrine

Pericardial and valvular dx

Q1:This patient had SOB & chest pain for 2 weeks, and a normal blood pressure.

What's your diagnosis?

Pericardial effusion(enlarged cardiac silhoutte)

-What is the ECG abnormality :

Electrical alternans

-What is the next investigation you request ?

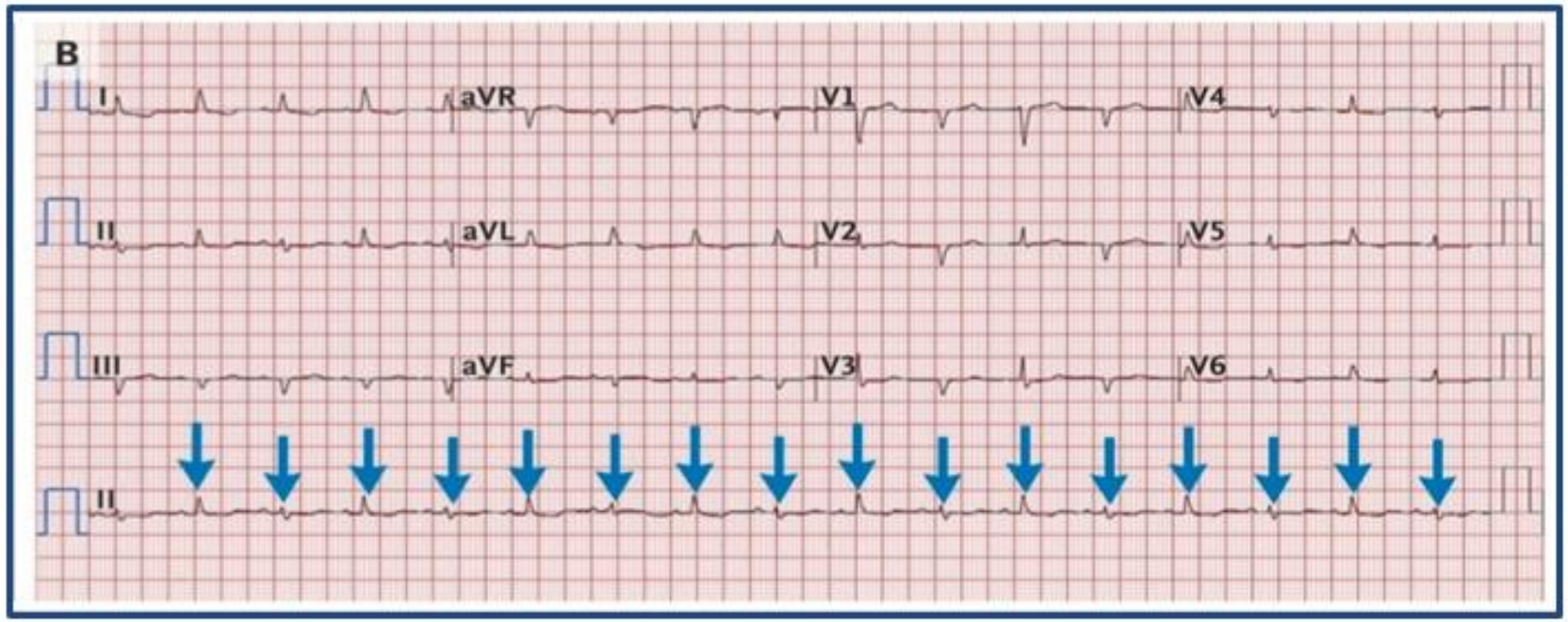
Echocardiogram

-What is the most accurate inves. ?

CT and MRI (especially in localized pockets of effusion)

-What is your diagnosis ?

Pericardial effusion



Managment

Pericardial drainge is preferable in :

-Traumatic hemopericardium

-post surgical effusion

-susp. of Bacterial or TB

Pericardiocentes is used to treat :

- Viral
- Idiopathic
- Neoplastic
- Hypothyroid
- Renal failure related tamponade

Q2:This CXR is for a pt who is a known case of chronic renal failure, presented with sudden chest pain, SOB, BP 85/60 , pulsus paradoxus, dilated neck veins and soft,distant heart sound.

What's your Dx.?

Cardiac Tamponade

What is your immediate management?

Precordiocentesis.

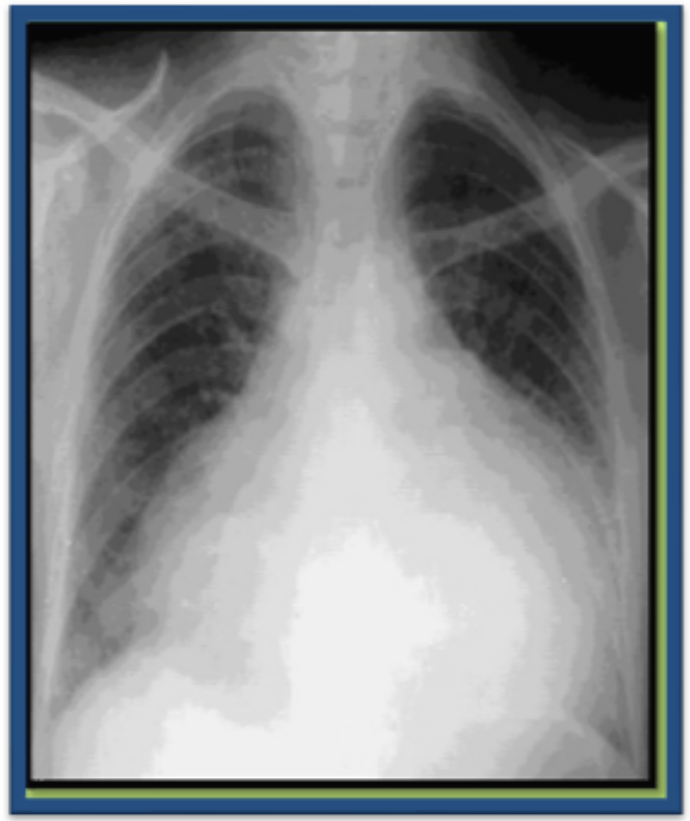
Q: 50 YO male pt presented to ER 1 hour ago complaining of chest pain, diagnosed as having acute anterior wall MI, while he's in the ER he suddenly collapse,

BP=30/0, with raised JVP.

What's your Dx.?

Cardiac Tamponade

In case of Rupture of free wall of the heart (Post MI or trauma) the tamponade develops quickly ,otherwise it develops slowly)



Q: Male patient had a sore throat 3 weeks ago, he has sever retrosternal chest pain that is reduced by leaning forward, referred to the neck and left shoulder with mild fever and tachycardia

On neck examination :

- Brisk collapse of jugular vein during diastole (prominent x and y descent)
- Kussmaul sign (a lack of normal decrease in JVD during inspiration)

On CVS auscltation : Diastolic knock heard

1) What is the diagnosis ?

Acute pericarditis

2) What is the sign you should found when you do physical exam to the pt ?

Pericardial friction rub(not always present)

3) Mention 3 investigations .

a.Echocardiogram

b.ECG

c.Chest Xray(lateral CXR shows calcification over the Rt ventricle > pathognomic for constrictive pericarditis)

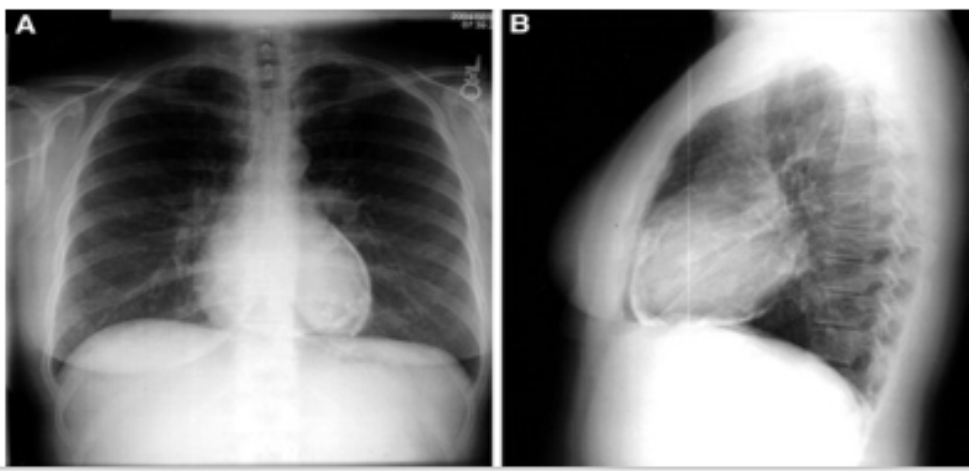
d.CT /MRI (thickened pericardium >5mm)

4) DDx of constrictive pericarditis ?

Restrictive cardiomyopathies (can be differentiated by BNP >increased in case of restr.)

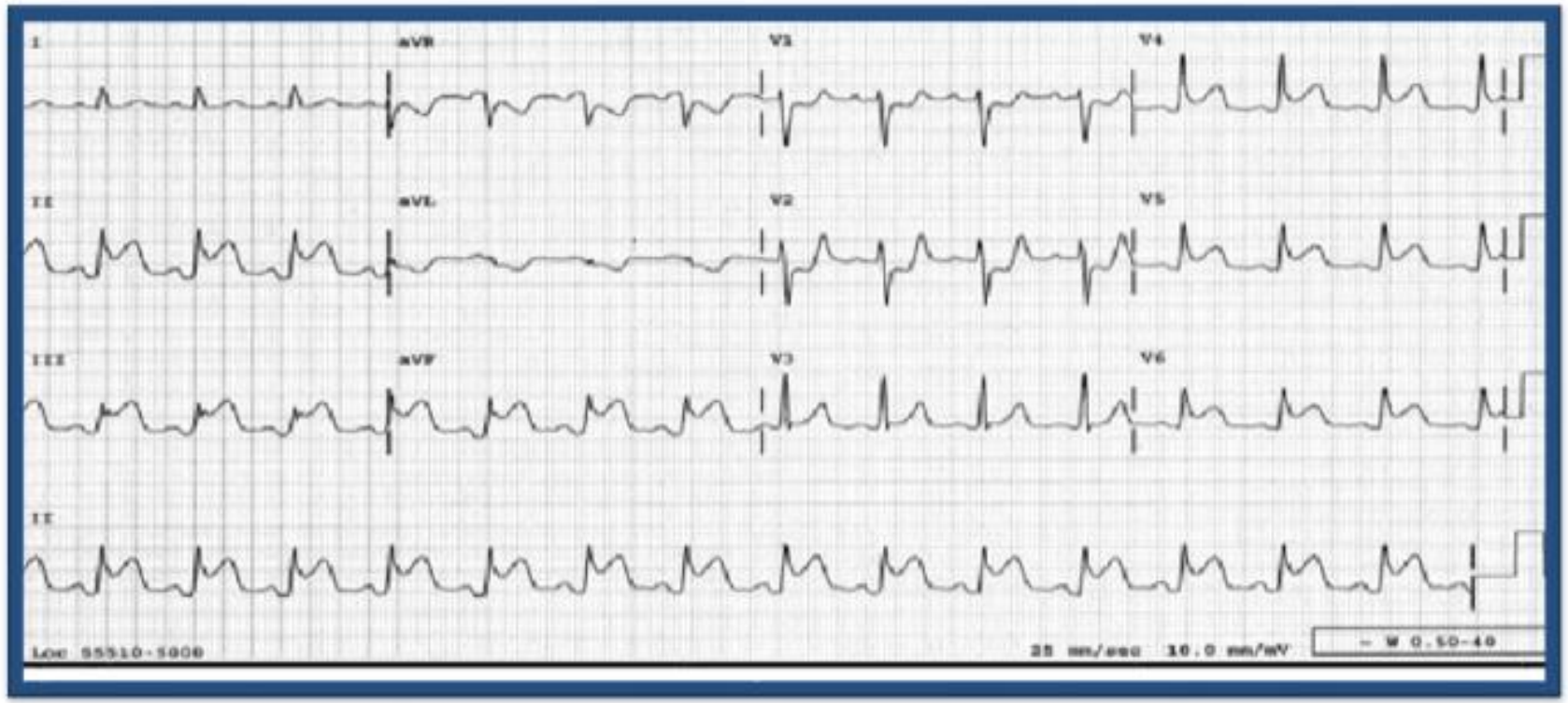
5)Treatment of pericarditis? Colchicine, Bed rest & NSAIDs.

Don't treat idiopathic pericarditis with steroids ,because the risk of relapse when stopped



Q: The pt came to the ER with chest pain of a 6-hour duration. What is the Dx. depending on his ECG?

Acute Pericarditis (diffuse cocave-up ST elevation and occasionally depressed PR segment especially in lead II)



Q:A history of myocardial infarction a week ago A murmur is heard and current ECG is shown

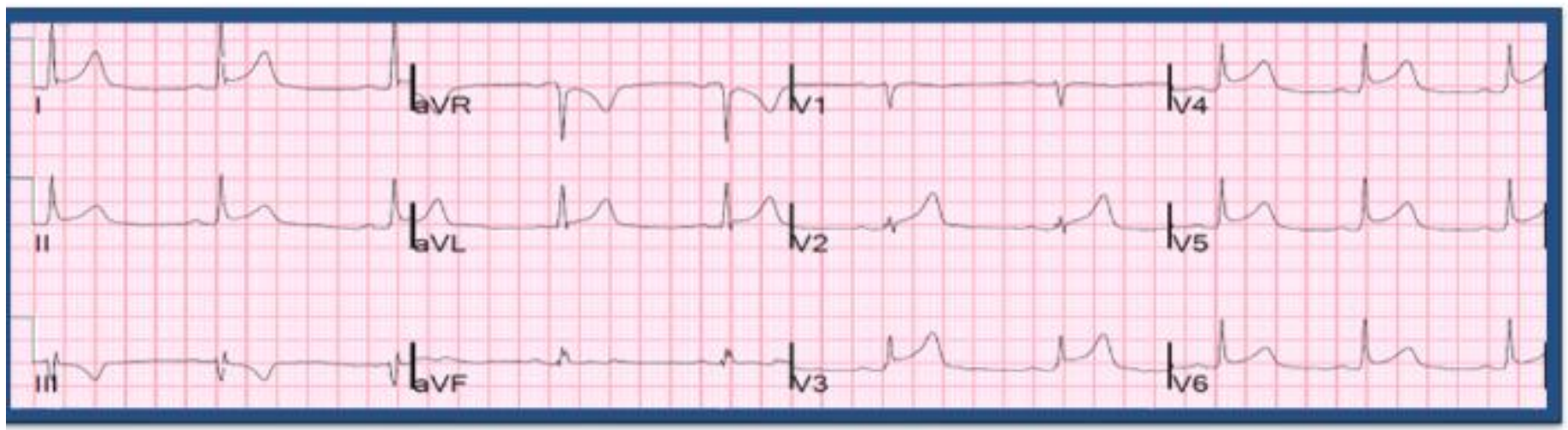
1- What is the ECG finding

Pericarditis as a post myocardial infarction complication

ST-elevation was an accepted answer

2- What is the cause of the murmur

Mitral regurgitation due to papillary muscle rupture



Q: 50 YO male, smoker, has HTN, & hyperlipidemia came to you with chest pain, effort dizziness or lightheadedness, easy fatigability, & progressive inability to exercise.

On neck examination: Parvous et tardus seen (Slowed carotid upstroke)

After Chest examination you found mid-systolic ejection murmur & you felt in left systolic thrill in left mediastinum.

1. What is Your spot Dx. ?

Aortic Stenosis

2. What is Your investigation?

Doppler Echo (very accurate in sever AS)

S&S include Classical triad of HF(LVF) ,angina, syncope with exercise

3. What are the possible Complications?

1) infective endocarditis.

2) Heart failure.

3) Cardiac arrest.

4)Coronary artery disease

4. On auscultation of the heart what is the abnomalities?

-Mid systolic ejection murmur at the (RUSB) that's radiates to the neck

-S4 gallop

-a paradoxical S2 split with sever AS

-decreased or abscent S2(Occ.)

5. What is the possible abnormality on CXR ?

LVH

6. What are The Causes?

-Congenital bicuspid valve calcification (400-70Y)

-Age related calcific degeneration of normal tricuspid valve(>75Y)

-Rheumatic heart disease (less freq.)

7.What Is the Treatment?

Aortic valve replacement(AVR)

8. Indication of AVR :

-All symptomatic pt.

-asymptomatic sever AS

30 YO pt came to the ER suffering from SOB, palpitations, sweating & productive cough with hemoptesis , irregular irregular pulse & mid-diastolic murmur heard on the apex of the heart.

1. What the cause of the murmur?

Mitral stenosis (Diastolic rumble (low flow) with opening snap)

2. Mention the cause of the SOB.

Acute pulmonary edema (Pulmonary venous HTN)

3. What caused the irregular pulse?

AF. (most common arrhythmia seen in MS)

4.What is the best diagnostic radiological test in this case?

ECHO

5. What is your management ?

-If symptomatic , or asymptomatic sever MS (<=1.5cm2 or pulmonary HTN) >> Percutanious mitral balloon valvotomy(PMV) is recommended

-All nonpregnant pt with AF due to MS should be on warfarin

Vascular Diseases

Q1:

A) What is this sign?

Xanthelasma.

B) what is the cause of it?

Hypercholesterolemia

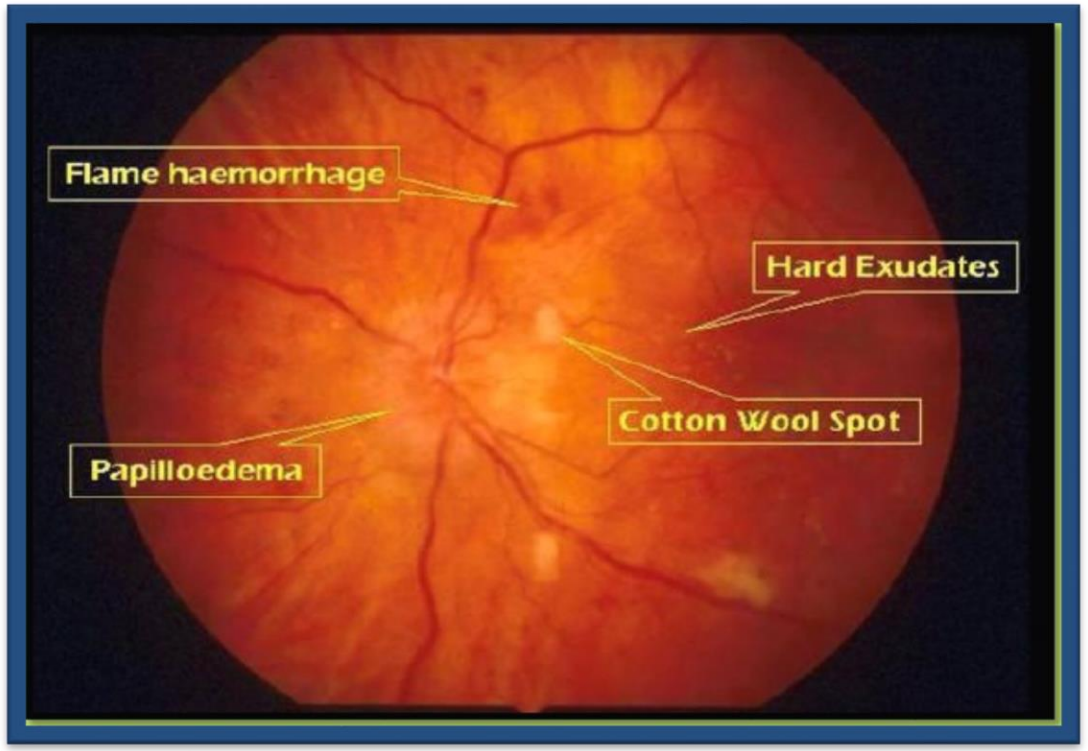
Q2: 60 YO male pt, diabetic & hypertensive. Mention pathologies seen by ophthalmoscope.

1-flame shape hemorrhage.

2-hard exudate..

3-cotton wool spot

4-papilloedema



Hypertensive retinopathy

Grade 1: Arteriolar thickening, tortuosity and increased reflectiveness ('silver wiring')

Grade 2: Grade 1 plus constriction of veins at arterial crossings ('arteriovenous nipping')

Grade 3: Grade 2 plus evidence of retinal ischaemia (flame-shaped or blot haemorrhages and 'cotton wool' exudates)

Grade 4: Grade 3 plus papilloedema

This patient has hypertension, he presented with occipital headache but no visual defects.

Papilledema

Q3: A pt presented to ER with severe chest pain. On P/E he had some Marfanoid features& this was his Chest X-Ray.

1-What is your Dx?

Dissecting Aortic Aneurysm.

2-predisposing conditions?

A-Aortic atherosclerosis and hypertension

B-thoracic aortic aneurysm

C-aortic coarctation

D-previous aortic surgery

F-Marfan's syndrome

D-trauma and pregnancy

Q4:
This patient presents with sudden onset stabbing retrosternal chest pain.
1-what is your diagnosis?
Aortic Dissection.
2-This condition is further classified into:
Type A: Involving the ascending aorta
Type B:sparing the ascending aorta
3-investigation:
A- CXR: may
show broadening of the upper mediastinum and distortion of the
aortic 'knuckle', but these findings are absent in 10% of cases.
B-Transthoracic echocardiography can only image the first 3–4 cm
of the ascending aorta
C-transoesophageal echocardiography,
CT and MRI are all very useful.

4-Early mortality of acute dissection is?

1-5%/hr.

5-Initial management:

1-pain control and IV labetalol (target systolic BP < 120 mmHg)

2-Endoluminal repair with fenestration of the intimal flap or insertion of a stent-graft may be effective.

Q5: A 25-year old male with history of hypertension.

1-What is the radiological finding?

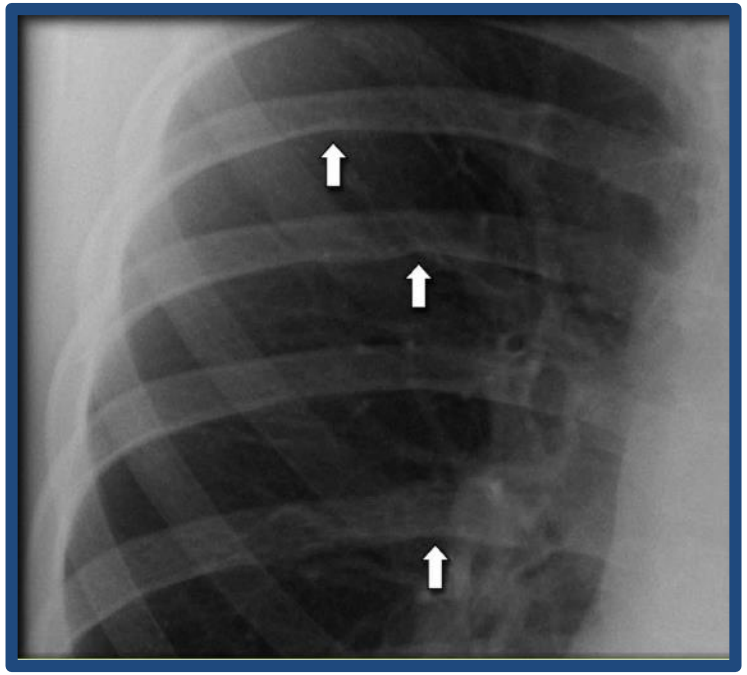
Rib notching sign .

2-indicate what :

Coarctation of the aorta

3-This condition is associated with other abnormalities, including:

bicuspid aortic valve and 'berry' aneurysms of the cerebral circulation



4-Finding:

1-BP: raised in the upper body but normal or low in the legs.

2-Femoral pulses: weak, and delayed in comparison with the radial pulse.

3-Systolic murmur: usually heard posteriorly, over the coarctation.

5-Investigation:

1-CXR: may show changes in the contour of the aorta and

notching of the under-surfaces of the ribs from collateral vessel

Development.

2-MRI: ideal for demonstrating the lesion

6-Management:

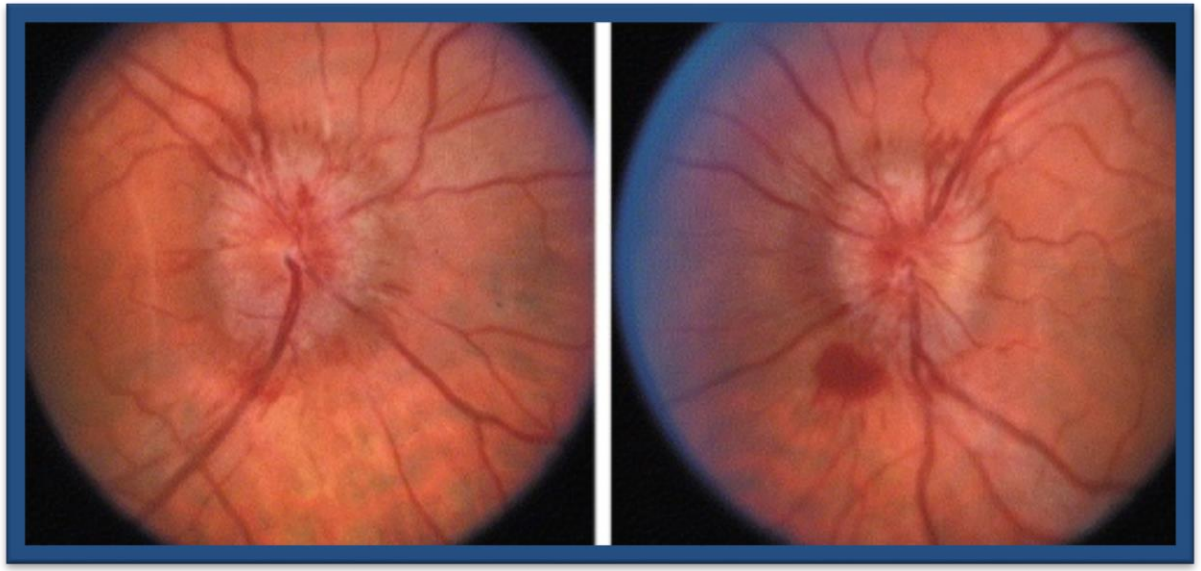
1-Surgical correction: advisable in all but the mildest cases. If this is done sufficiently early in childhood, persistent hypertension can be avoided but patients repaired in late childhood or adult life often remain hypertensive.

2-balloon dilatation.

3-Recurrence of stenosis: may be managed by balloon dilatation.

Q6:The patient is hypertensive, what sign the doctor discovered while examining this patient?
(not the same picture)
Radio-Femoral delay>> Coarctation of aorta

Q7:The patient presented with early morning headache. What is this sign and what is the underlying cause?
(not the same picture)
Papilloedema
Increased ICP



Q8:A- what are the findings?

dots and blots, neovascularization

B- mention 2 complications

vitreous hemorrhage, RD, loss of vision, decrease visual acuity

Q9:Patient with hx of long standing HTN

A- what's your finding?

LVH.

B-symptoms :

1-Effort-related symptoms (angina and breathlessness)

2-arrhythmia(may lead to sudden death)

C-signs:

1-Harsh ejection systolic murmur radiating to the neck (often with a thrill).

2-Soft second heart sound.

3-Heaving but undisplaced apex beat.

4-arterial pulse is jerky.

D-Investigations:

1- ECG :usually abnormal and may show features of LV hypertrophy or deep T-wave inversion

2-Echocardiography is usually diagnostic.

E-Management:

1-(Beta-blockers and rate limiting calcium antagonists)can help to relieve symptoms and sometimes prevent syncopal attacks but no pharmacological treatment is definitely known to improve prognosis.

2-partial surgical resection or by iatrogenic infarction of the basal septum using a catheter-delivered alcohol solution(to improve outflow obestruction).

3-ICD should be considered in patients with clinical risk factors for sudden death.

Risk factors for sudden death in hypertrophic cardiomyopathy

- A history of previous cardiac arrest or sustained VT
- Recurrent syncope
- An adverse genotype and/or family history
- Exercise-induced hypotension
- Non-sustained VT on ambulatory ECG
- Marked increase in LV wall thickness

Q12: 65 year.old male, was diagnosed with DM (for 15 years), HTN (for 10 years), he is taking atenolol and glimepiride, his blood pressure in sitting is 130/ 85, and in standing is 110/70, in the last month he developed dizziness.

1.What is the cause of the dizziness?

Postural hypotension .

2. Mention two causes for this condition in this patient

1-Side effect of bata blocker drugs

2-sympathetic degeneration (e.g. diabetes mellitus, ageing)

3.Other causes for this condition:

1-hypovolaemia (e.g. excessive diuretic therapy)

2-drug therapy (e.g. vasodilators, antidepressants)

4.Management:

1-Withdrawal of unnecessary Medication.

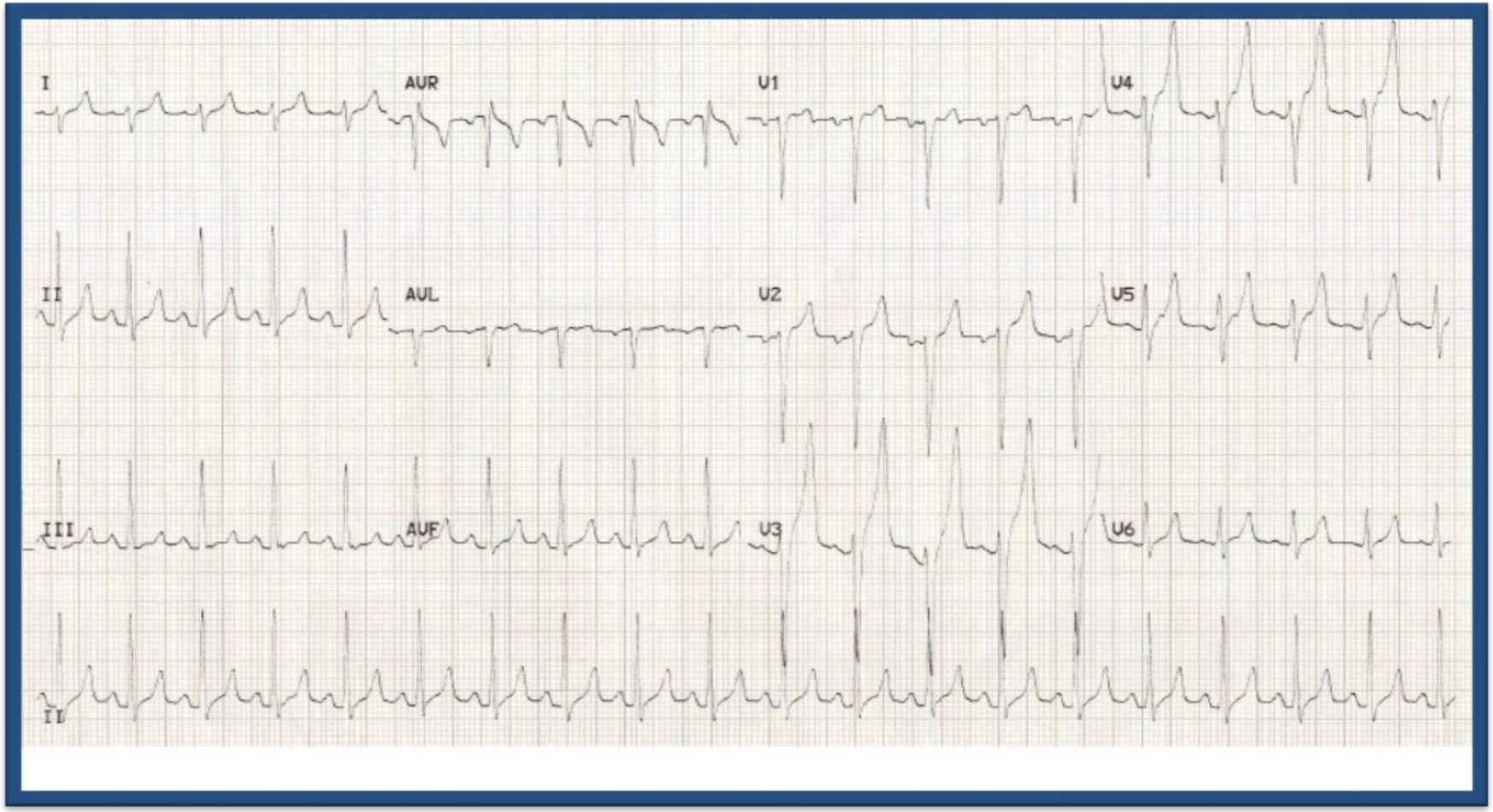
2-graduated elastic stockings.

3-in some cases, treatment with fludrocortisone may be helpful.

Potassium disorders

Q: Patient with chronic renal failure presented with chest pain, what is the biochemical test you have to do?

Serum Potassium.

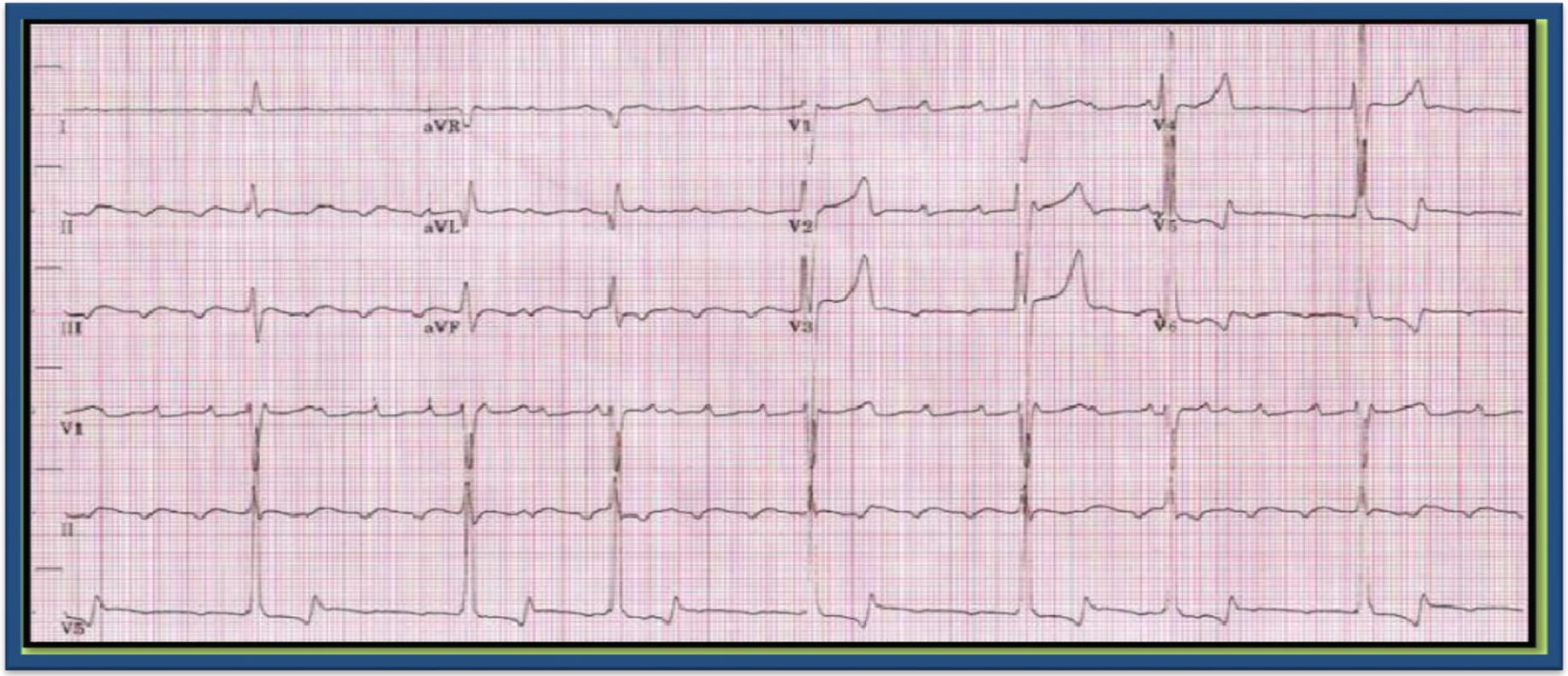


Q: This ECG is for a known case of chronic renal failure, what is your spot Dx?

Hyperkalemia

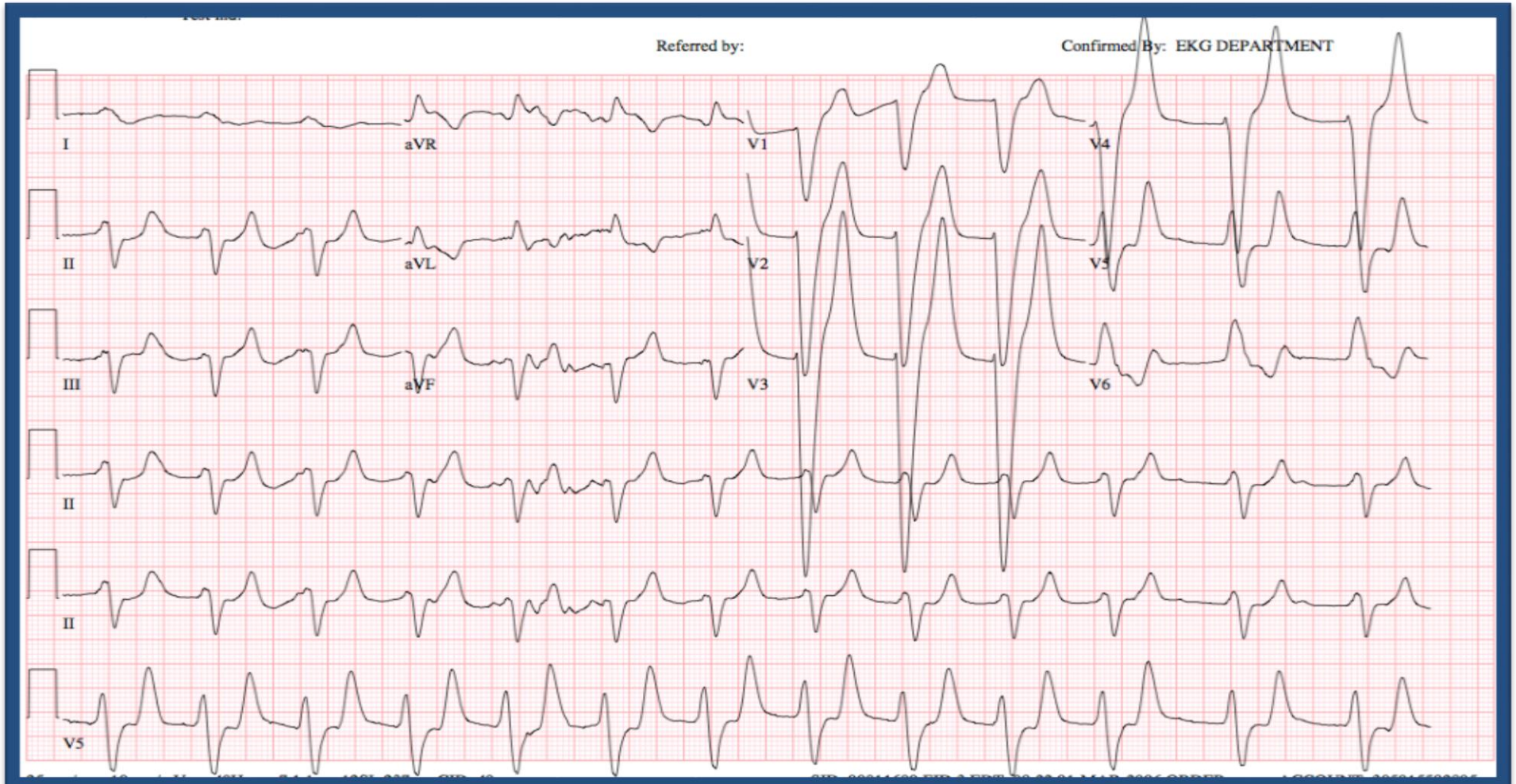
what is the most emergency ttt?

IV calcium gluconate.



Q:The patient has HTN on ACEI. Mention 2 abnormalities in this ECG and what in the underlying cause?

Wide QRS / peaked (hyperacute) T wave, Hyperkalemia (caused by ACEI)

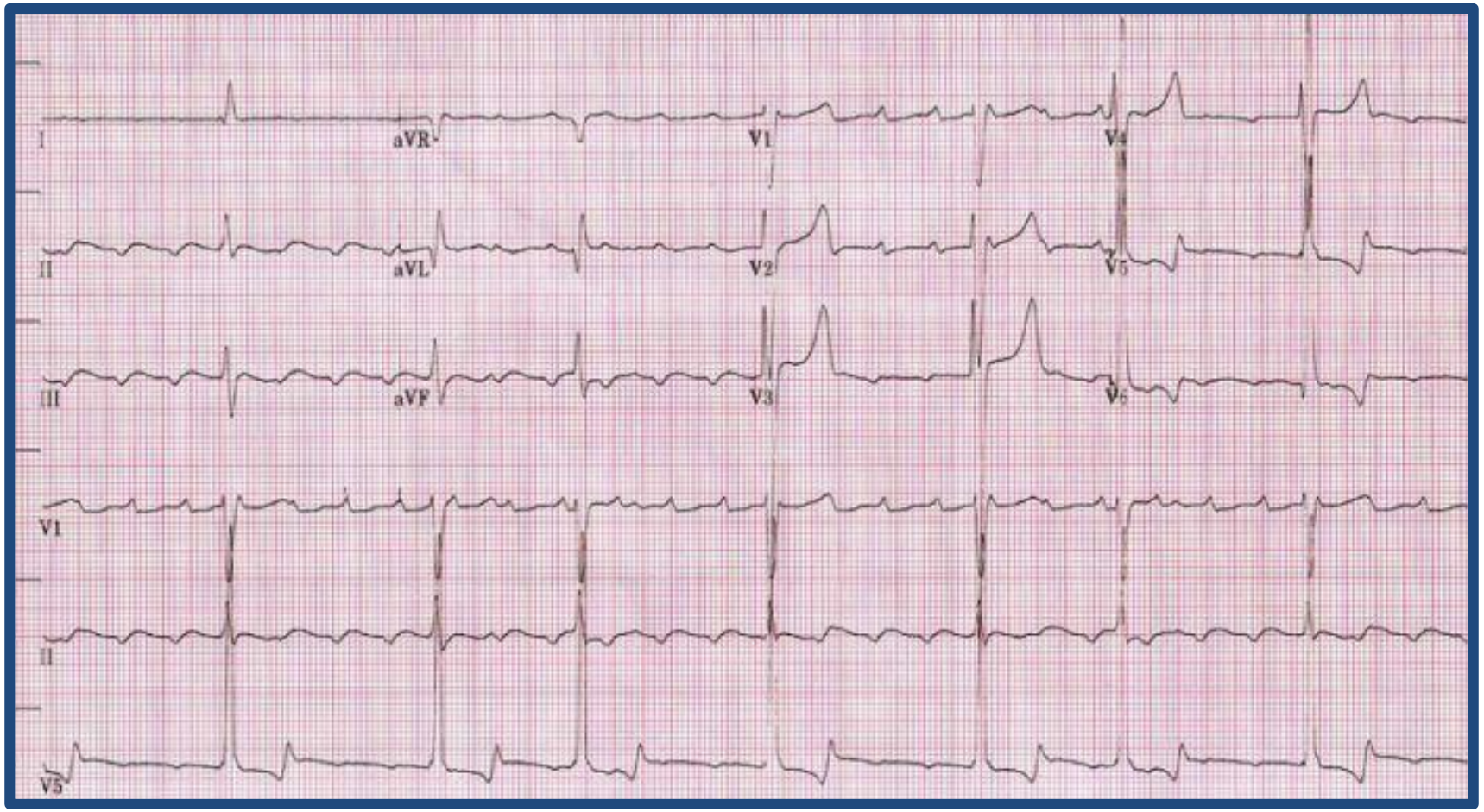


Q: This ECG is for a known case of chronic renal failure, what is your spot Dx? what is the most emergency tt?

Hyperkalemia / IV calcium gluconate.

Q: known case chronic renal failure on dialysis, what is the cause of his ECG changes ?

hyperkalemia



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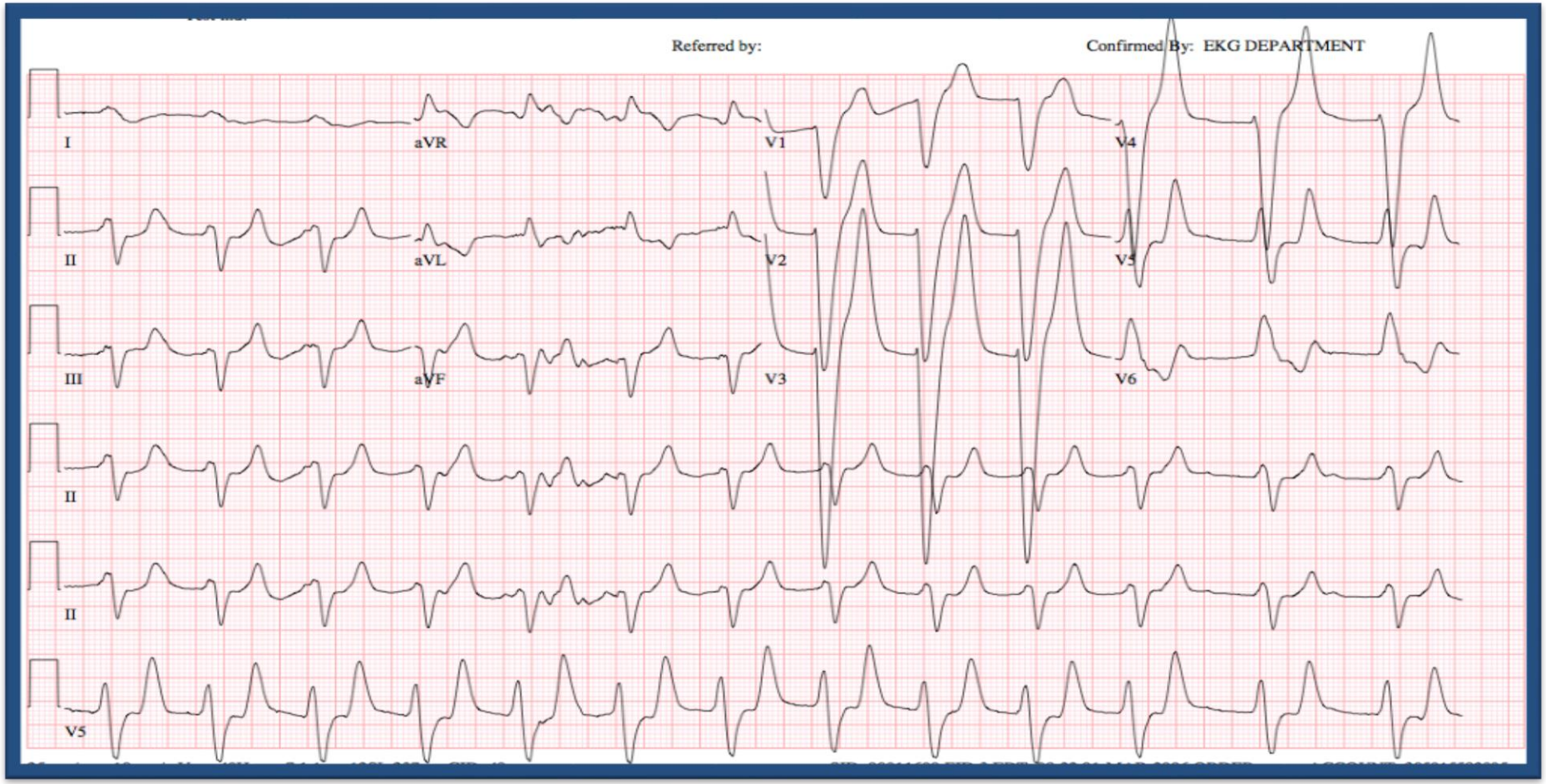


Q: 60 YO DM pt with chronic dialysis came with this EKG.

1- Give 2 abnormalities in this EKG ?

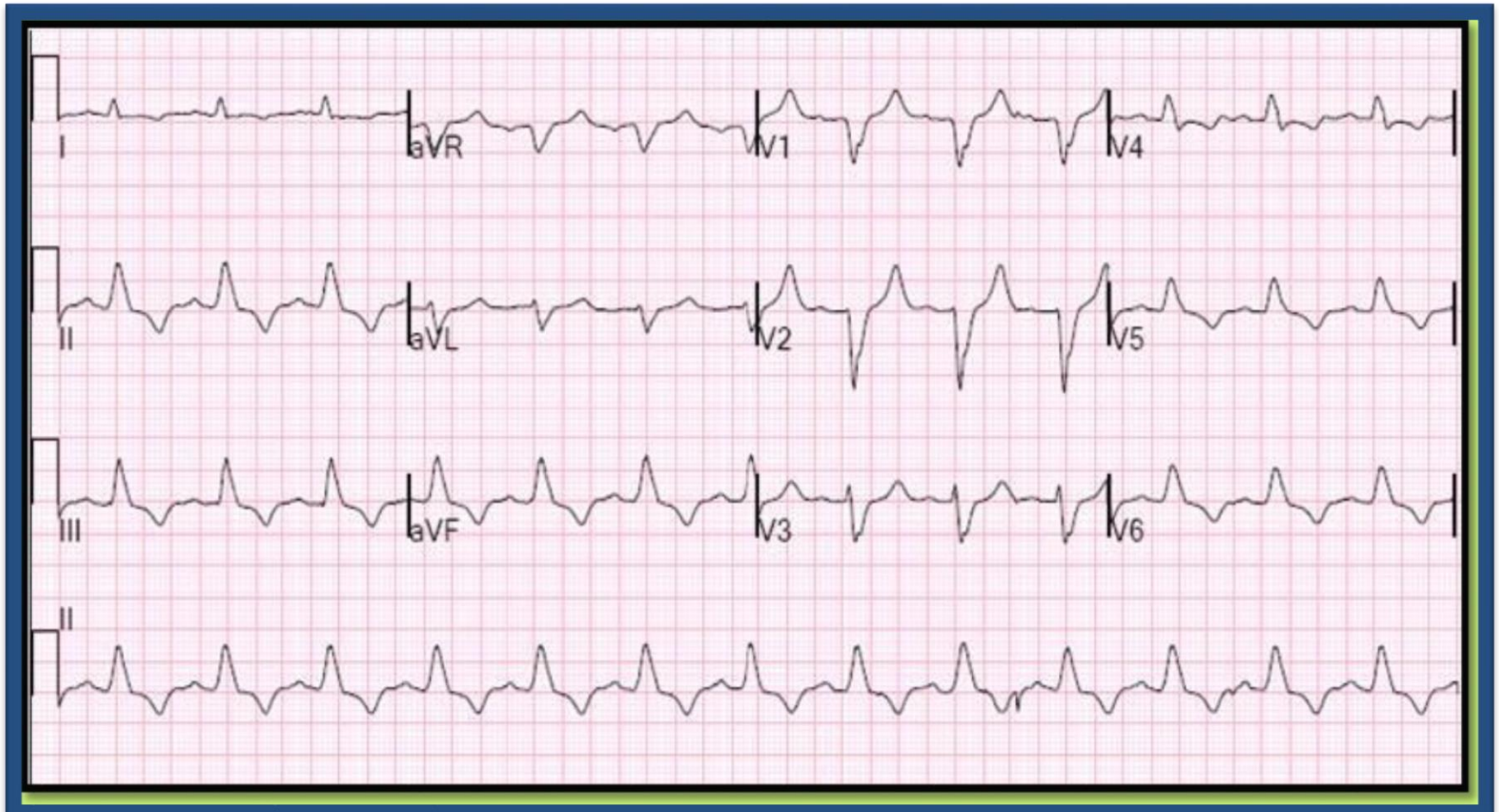
hyper acute T-waves , Wide QRS.

2- what is the cause of this EKG ?

Hyperkalemia.

3- Give 2 line of treatment.

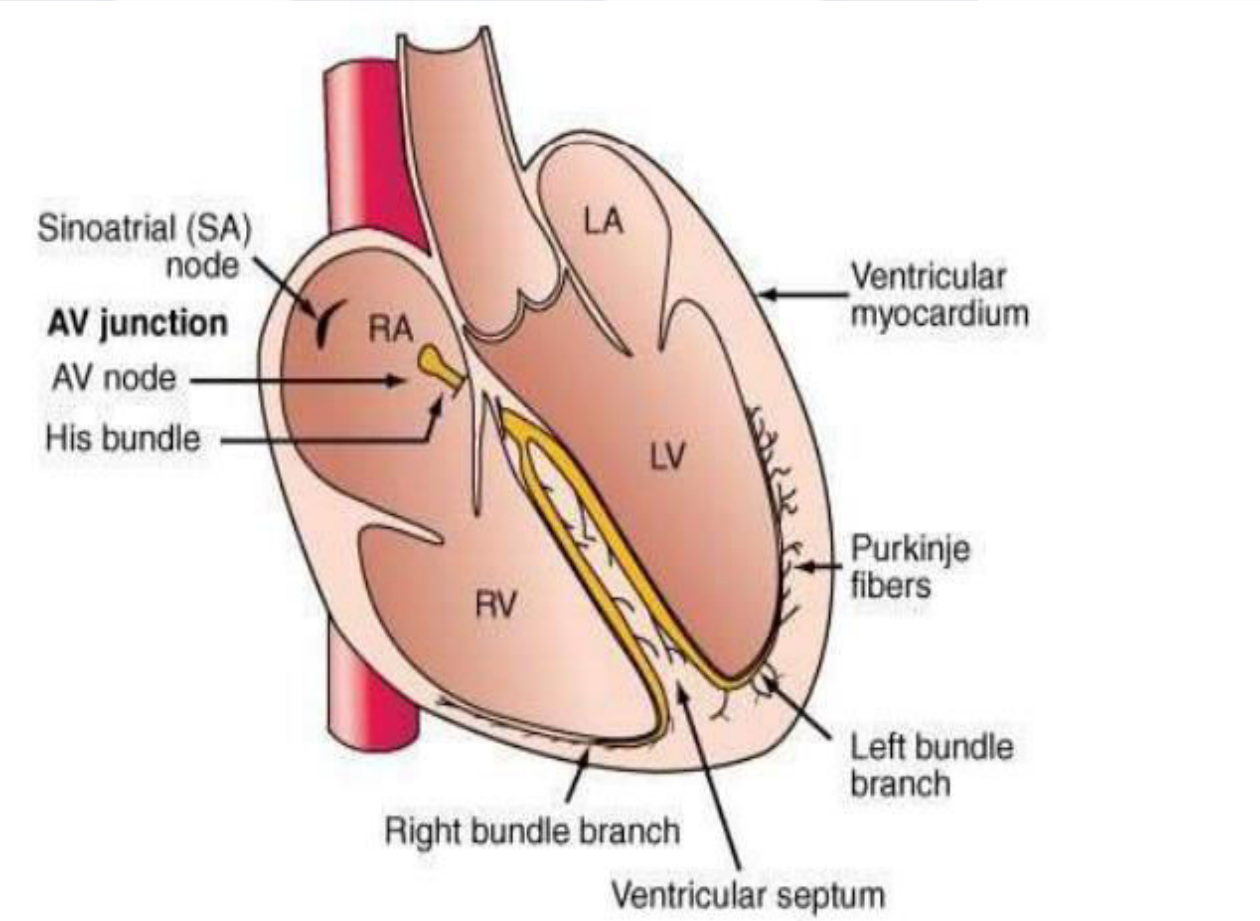
Ca gluconate , Glucose & IV insulin.

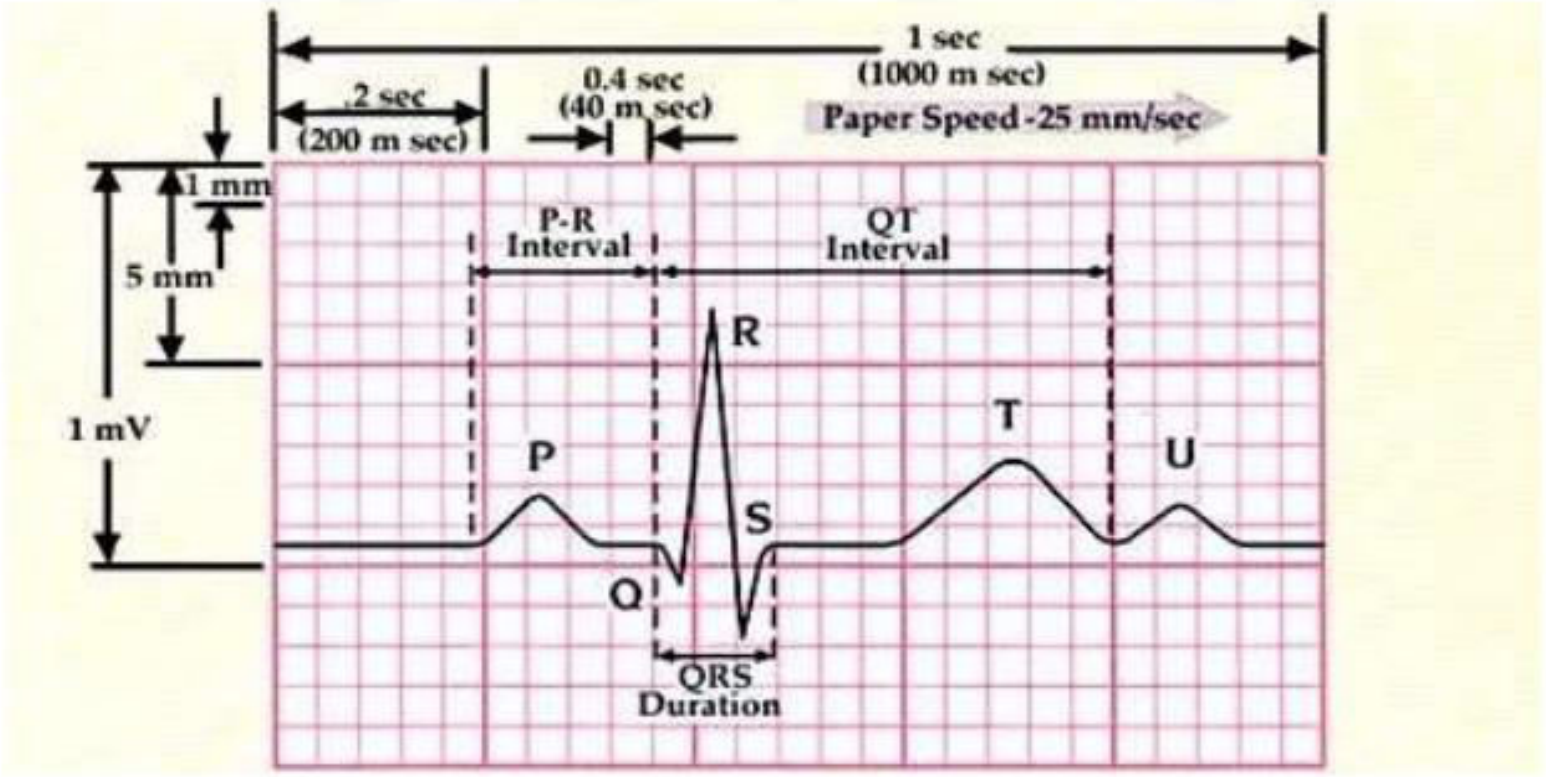


Thank You

Clinical round in Medicine

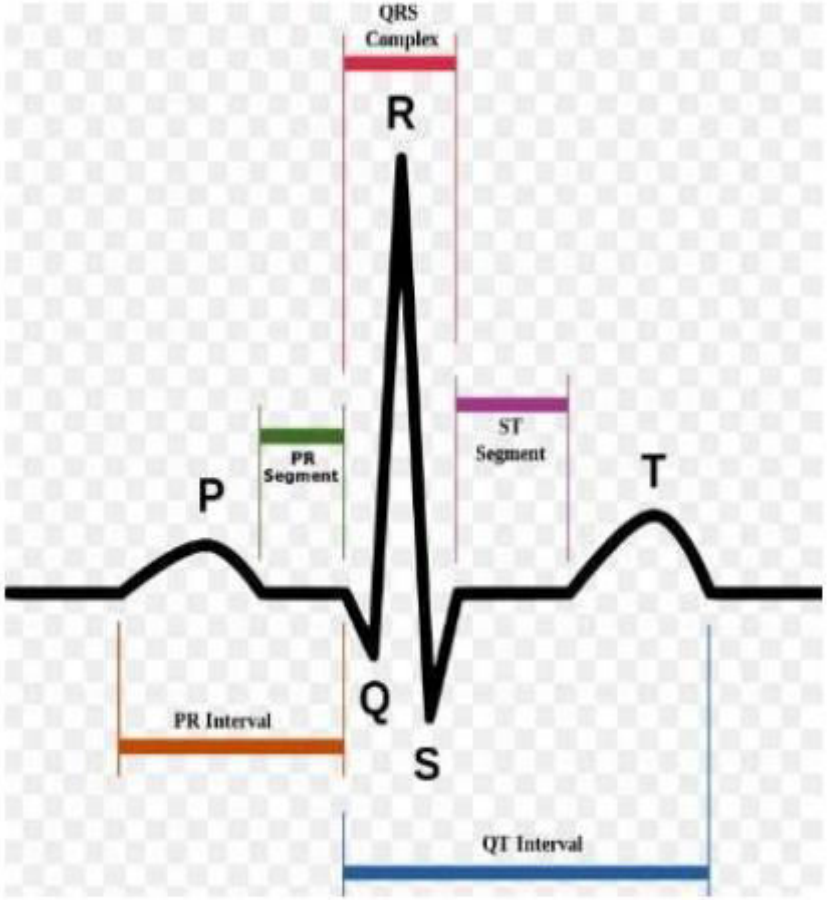
Cardiac Conduction System





- Y axis=voltage, 1 mm (small box) = 0.1 mV
- X axis=time, 1 mm (small box) = 0.04 seconds

Normal ECG trace



ECG (ELECTROCARDIOGRAPHY)

1. Each cycle of cardiac contraction and relaxation is initiated by spontaneous depolarization of **the SA node**. This event is **not seen** on the ECG.

2. The **P wave records** atrial depolarization and contraction. The first part of the **P wave reflects right atrial activity**; the second part **reflects left atrial activity**.

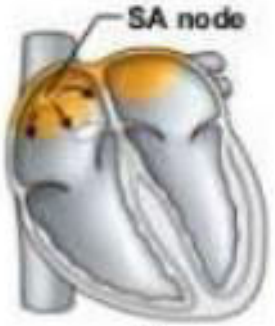
3. There **is a brief pause** when the electrical current reaches the **AV** node and the EKG falls silent **(the PR segment).**

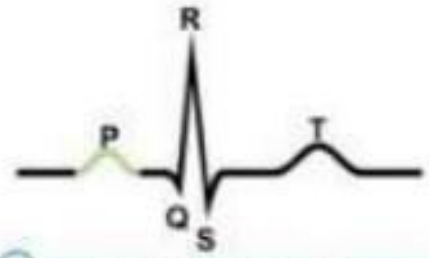
4. The **wave** of depolarization then spreads **along the ventricular conducting system** (**bundle of His**, **bundle branches**, and **Purkinje fibers**) and out into the ventricular myocardium. The first part of the ventricles to be depolarized is the **interventricular septum.** Ventricular **depolarization** generates the **QRS complex.**

5. The T wave **records ventricular repolarization**. Atrial repolarization is not seen.

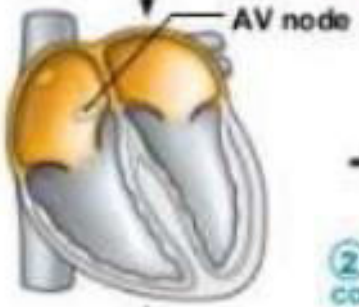
Summary

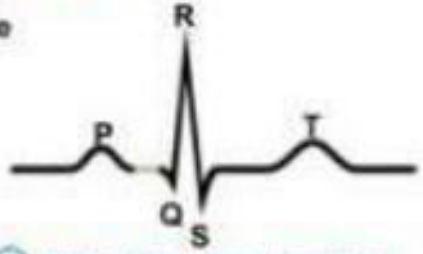
- **P wave** relates to **atrial depolarization** (normal time length **2.5 small squares** on ECG trace).
- **QRS complex** relates to **ventricular depolarization** (normal time length **0.12sec = 3** small squares on ECG trace).
- **T wave** relates to **ventricular repolarization** (no strict criteria for width but need to look at ST segment for changes – myocardial ischemia or infarction).
- **PR interval** (measured from beginning of P wave to beginning of QRS complex) should be between **0.12-0.20** sec (equivalent to 3-5 small squares). Represents **time taken for atrial depolarization and pass message to ventricles** (involves **SA node, atrial tissue and AV node).**



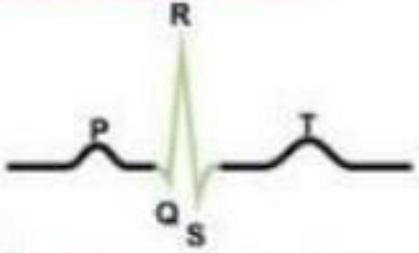


① Atrial depolarization, initiated by the SA node, causes the P wave.

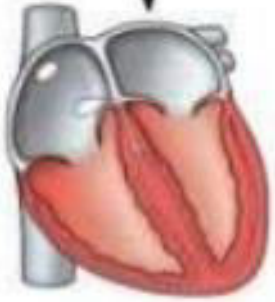




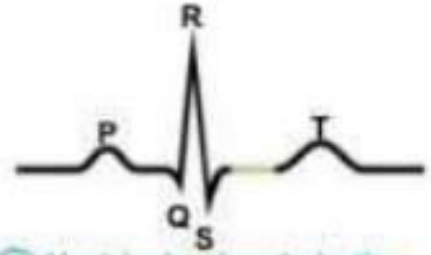
② With atrial depolarization complete, the impulse is delayed at the AV node.



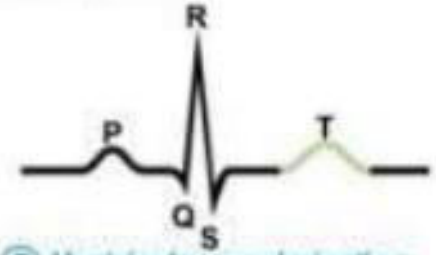
③ Ventricular depolarization begins at apex, causing the QRS complex. Atrial repolarization occurs.



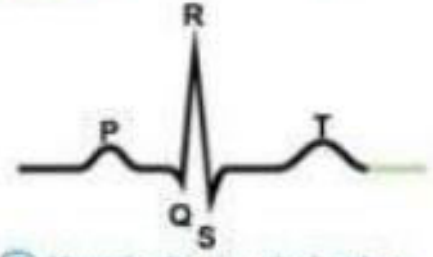
Depolarization Repolarization



④ Ventricular depolarization is complete.

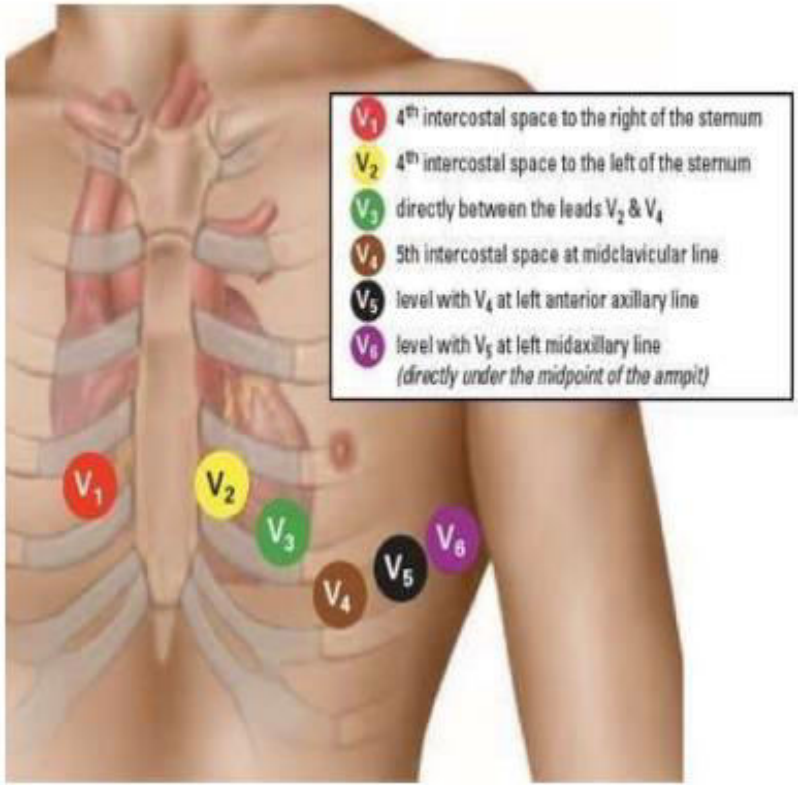


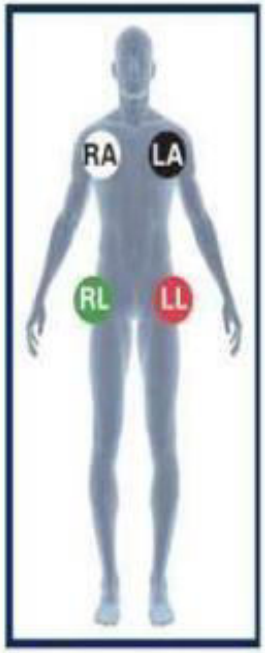
⑤ Ventricular repolarization begins at apex, causing the T wave.

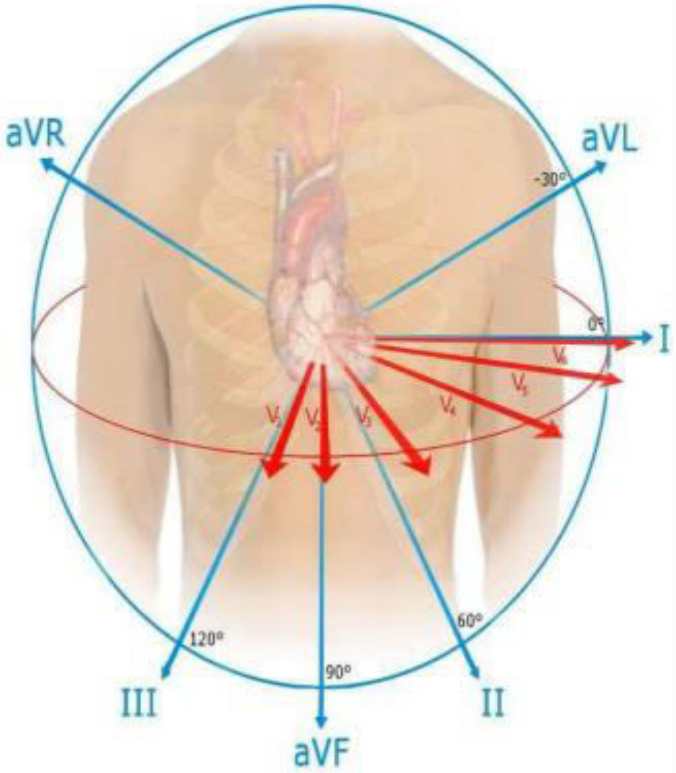


⑥ Ventricular repolarization is complete.

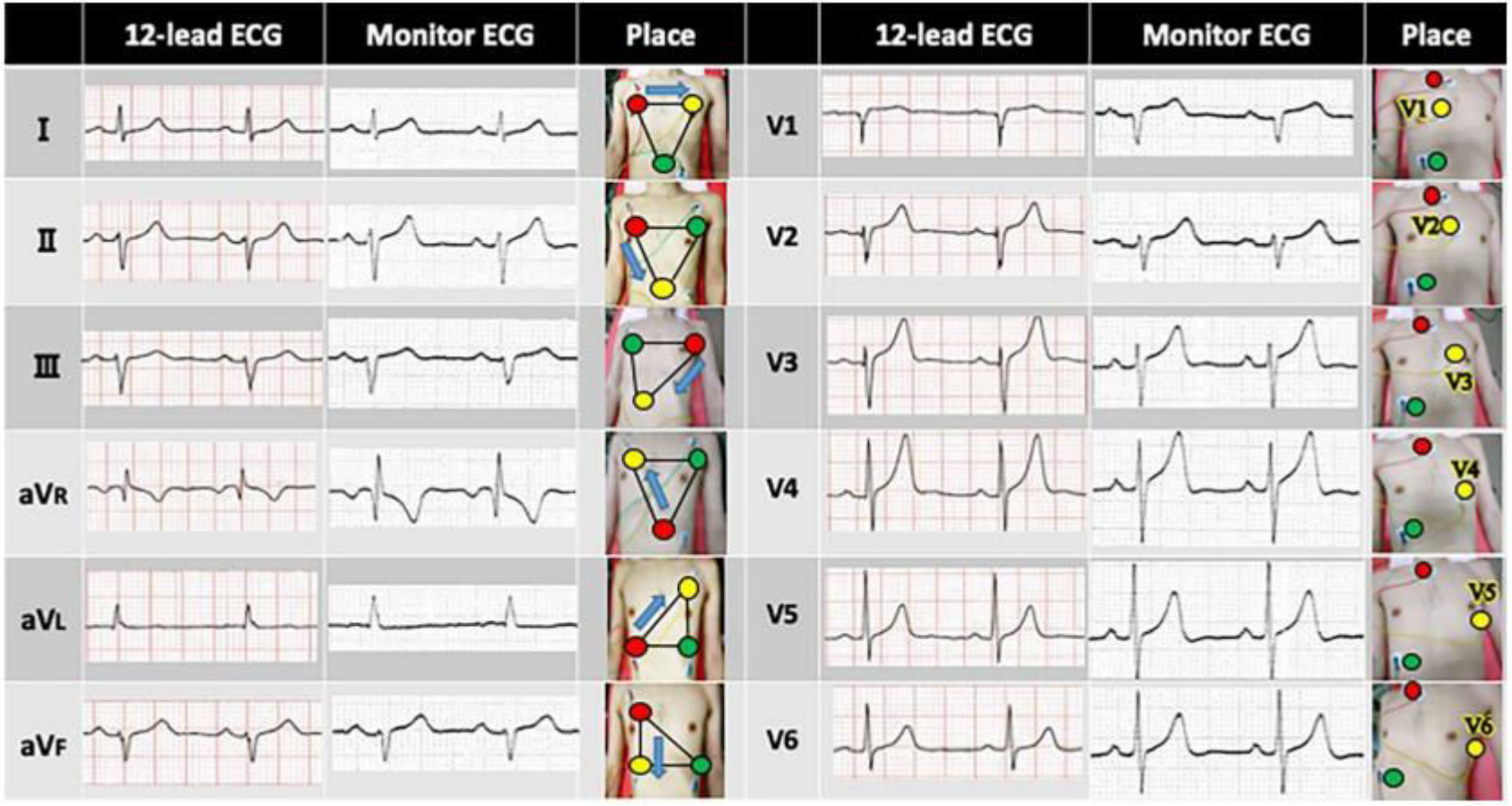
ECG Leads & Its Places







Leads with Each specific ECG



Stepwise Approach to looking at an ECG

1) Check RATE – normal, fast (tachycardia) or slow (bradycardia)?

2) Check Rhythm – sinus or not?

Sinus rhythm has **a P wave followed by a QRS complex and every QRS complex has a preceding P wave.**

3) Check Axis – normal or not?

If the QRS in Leads I and aVF are positive, the axis is normal.

4) Check Intervals – long or short?

- PR interval: prolonged in heart blocks, short in Wolff Parkinson White (WPW).

- QRS interval: prolonged and wide - ventricular , bundle branch block.

- QT interval: prolonged with certain drugs – potentially dangerous.

5) Check for Ischemia or Infarction?

ST segment depression or elevation, Q waves or T wave inversion.

1- RATE

Normal, fast (tachycardia) or slow (bradycardia).

- If R-R interval regular , Dividing 300 by the number of big boxes between R waves.

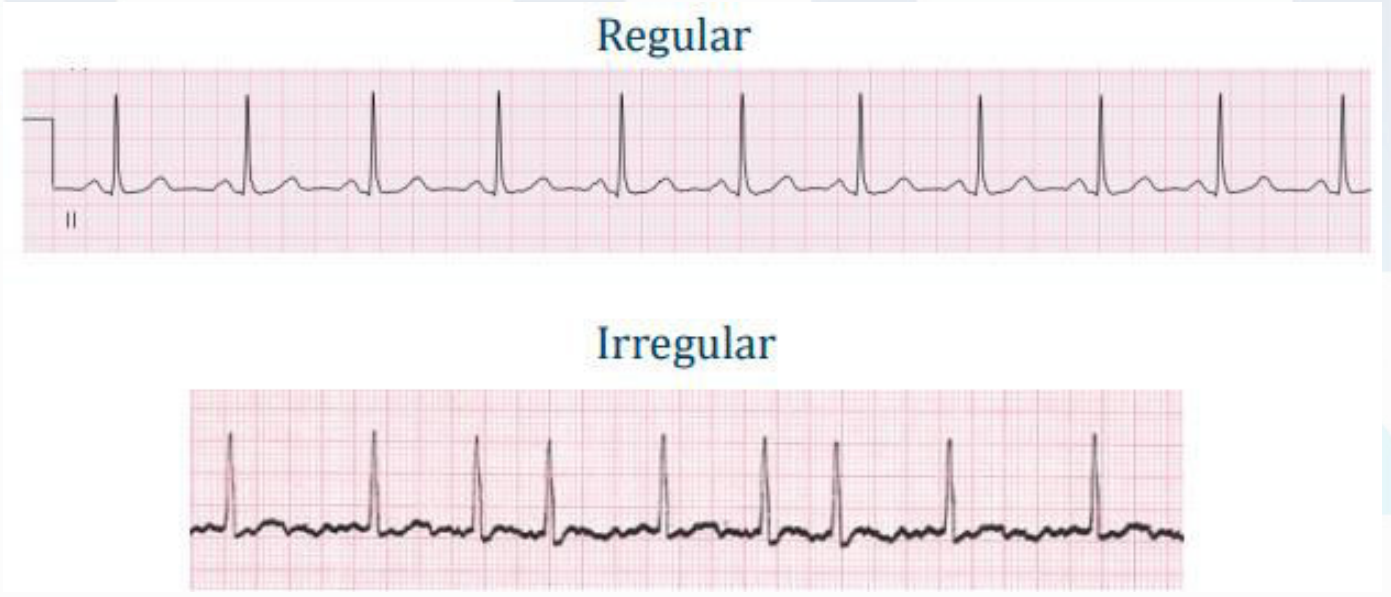
2- Rhythm

A- Sinus rhythm has **a P wave followed by a QRS complex and every QRS complex has a preceding P wave.**

2- Rhythm

B- Regular or Irregular

- **Distance between QRS complexes (R-R intervals)**



Rhythm

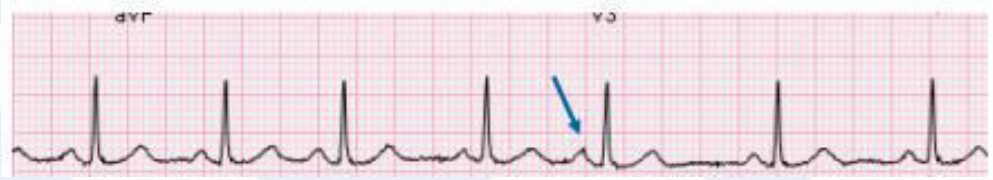
A- P waves present, regular rhythm

- Sinus rhythm
- Rare: atrial tachycardia, atrial rhythm

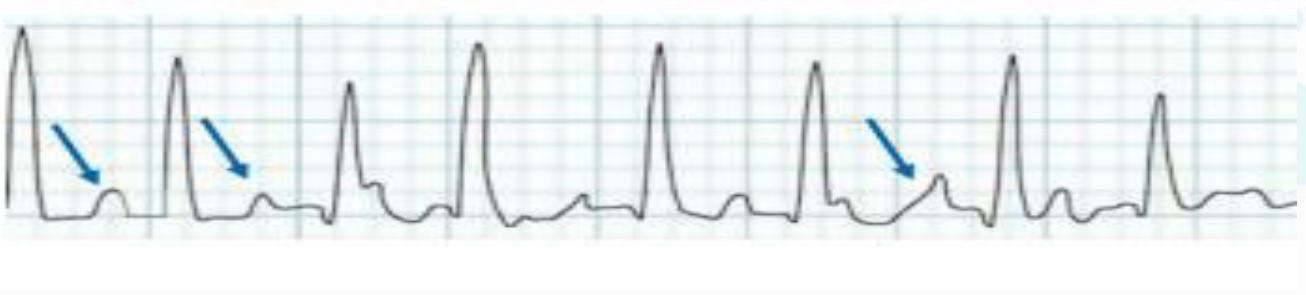
Rhythm

B- P waves present, irregular rhythm

- Sinus rhythm with PACs



- Multifocal atrial tachycardia



Rhythm

C- No p waves, irregular rhythm

- Atrial fibrillation – irregularly irregular
- Atrial flutter with variable block

Atrial Fibrillation

- **ECG findings** : **"Undulating baseline" f wave** , no discernible **p-waves**, **irregular R-R** interval
- **Causes**

- **Heart disease**: CAD, MI, HTN, mitral regurge, Pericarditis, rheumatic disease.
- **Pulmonary disease :** including PE
- **Endocrine** : Hyperthyroidism, hypothyroidism or Pheo
- Excessive **alcohol** intake "holiday heart syndrome"

- **Treatment:**

AV nodal blockers or **synchronized cardioversion** if **unstable**.
CHA2DS2-VASc score to determine **anticoagulation.**

Clinical Management of Atrial Fibrillation

- **Urgent referral / admission?**

- New onset AF **(within last 48 hours)** may be candidate for **cardioversion** (**if below age of 60 years) .**

- **Unstable and needs stabilization** (low or high BP,severe Pneumonia) .

- **Rate control**

Start **Bisoprolol 2.5mg** and titrate up every 2/52 to target pulse (60-80bpm)

- **Anti-coagulation?**

Meet criteria through CHADS2 or **CHA2DS2VASc score**

Start **warfarin OR NOAC?**

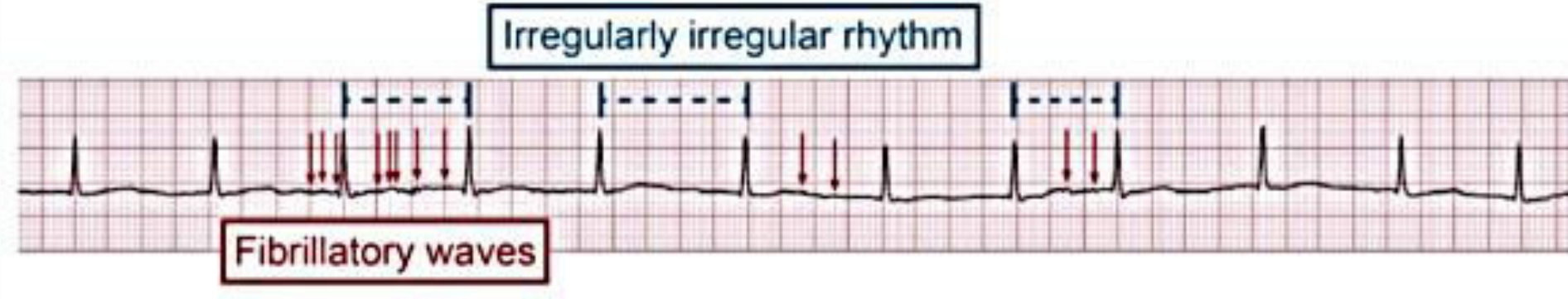

Irregularly irregular rhythm
Fibrillatory waves

Table 1| **CHADS2 and CHA2DS2-VASc scores for calculating annual risk of stroke[23]**

Item	$CHADS_2$ score	CHA_2DS_2-VASc
Congestive heart failure	1	1
Hypertension	1	1
Age ≥75 years	1	2
Diabetes	1	1
Stroke, transient ischaemic attack, or thromboembolism	2	2
Vascular disease (myocardial infarction, peripheral arterial disease)	—	1
Age 65-74 years	—	1
Sex (female)	—	1
Maximum score	6	9

- When CHADS score is 1 or less, use **aspirin.**
- When CHADS score is 2 or more, use a **NOAC or warfarin.**

Case Scenario

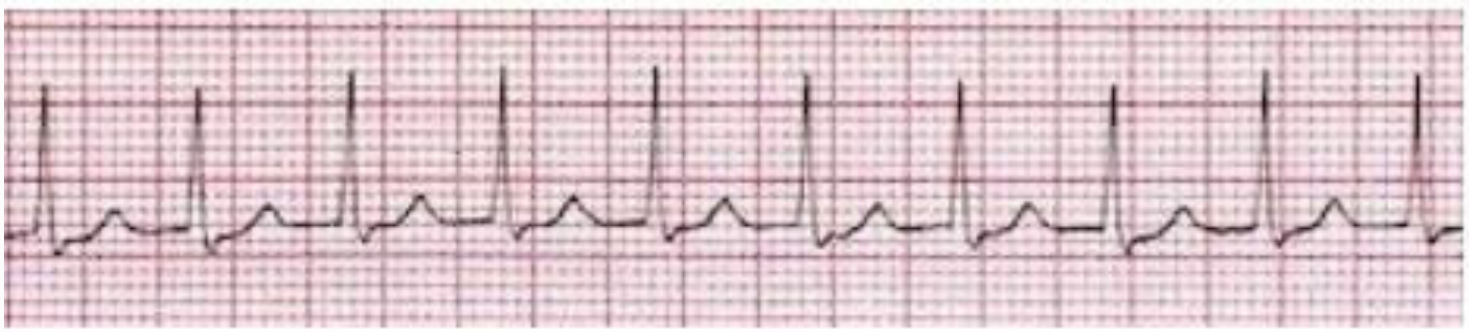
76 year old Mohammed Salah starts with new palpitations 1 month ago. He is a known hypertensive and last BP reading was 170/100 mmHg and he admits he is not compliant with his medications. He had a CVA in 2012 and takes regular Aspirin. He also has Chronic Hepatitis C and his last LFTs showed raised ALT and AST (over 3 times normal levels).

- **What is his CHADS2 score?**
- **Would you anticoagulated this man?**

Rhythm

D- No p waves, regular rhythm

- Supraventricular tachycardias (SVTs)

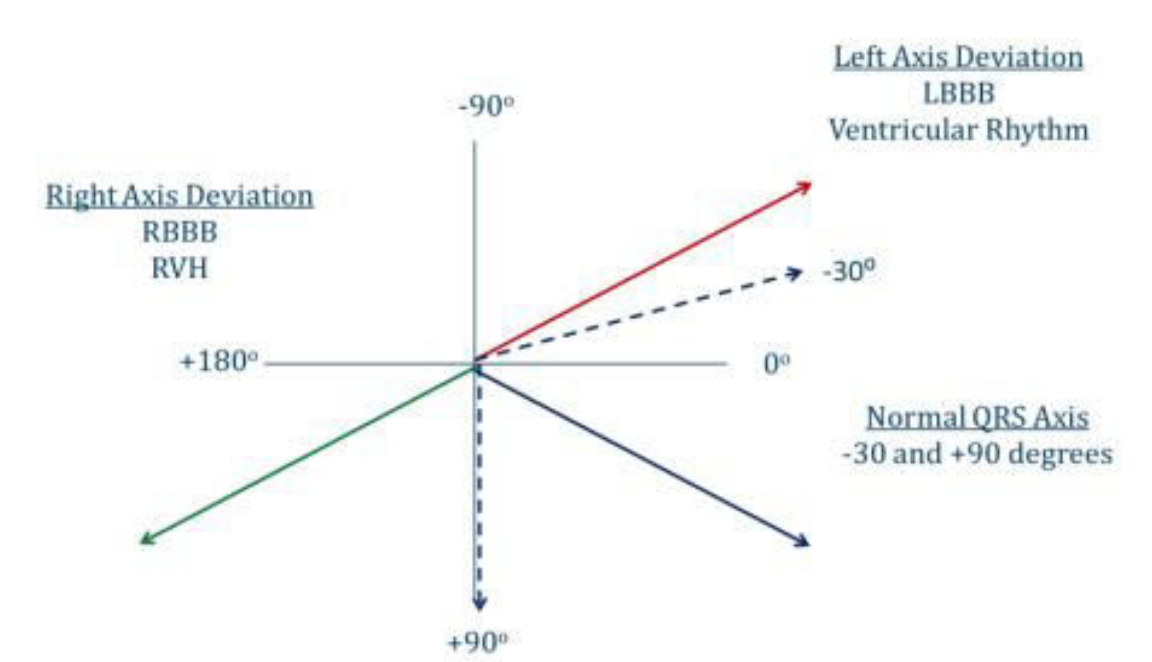


- Ventricular tachycardia

3- Axis

Check Axis – normal or not?

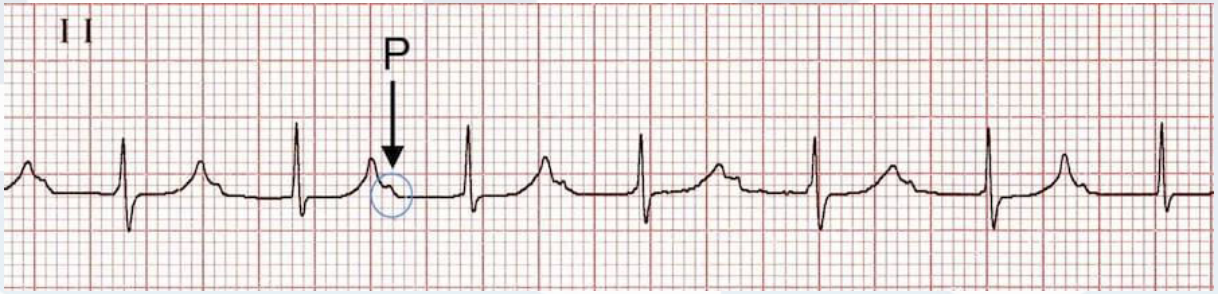
If the QRS in Leads I and aVF are positive, the axis is normal.



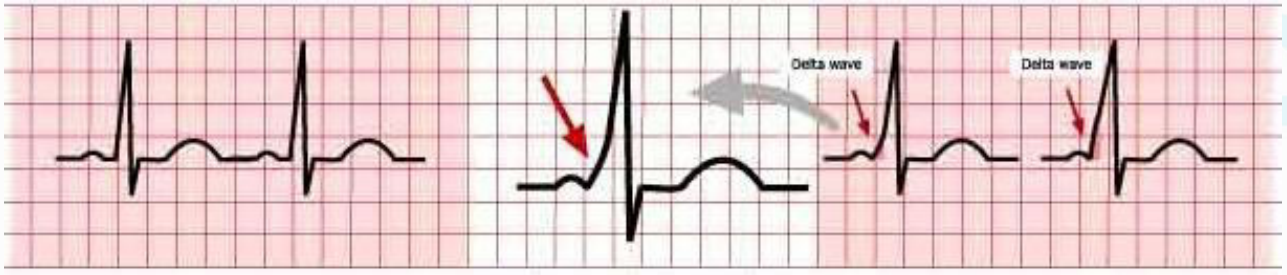
4- Look at Intervals

1- PR interval:

- Prolonged in heart blocks.



- Short in Wolff Parkinson White (WPW)



Look at Intervals

2- QRS Interval: Wide or narrow

A- Narrow QRS (< 120 ms; 3 small boxes) NORMAL

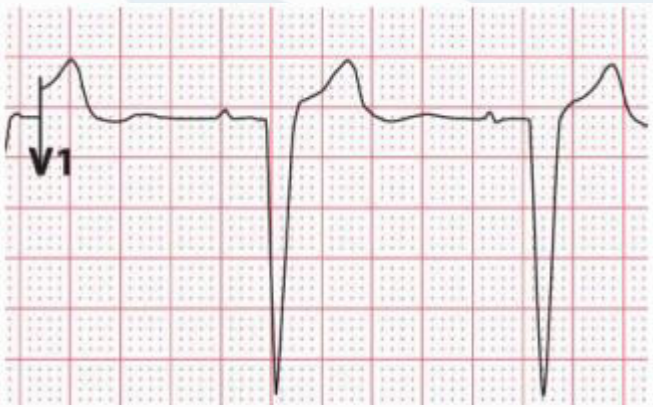
- His-Purkinje system works
- No bundle branch blocks present

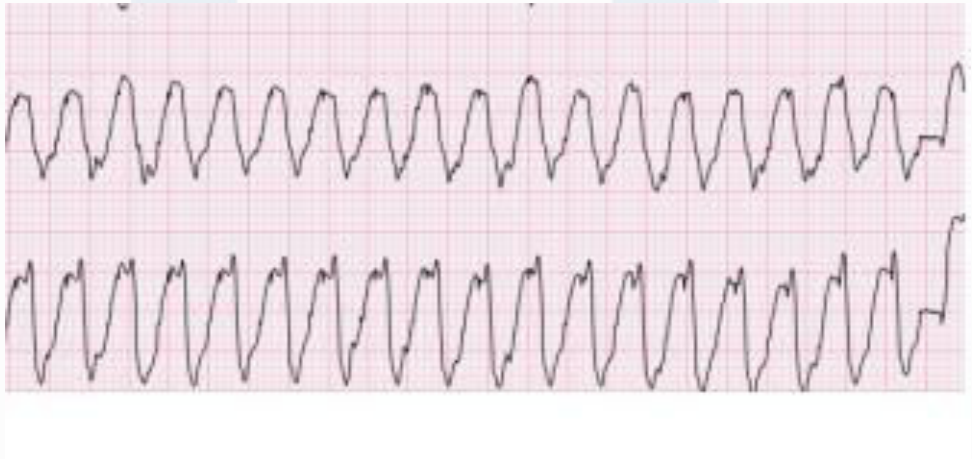
Look at Intervals

2- QRS Interval: Wide or narrow

B- Wide QRS

- Most likely a bundle branch block
- Ventricular rhythm (i.e. tachycardia)

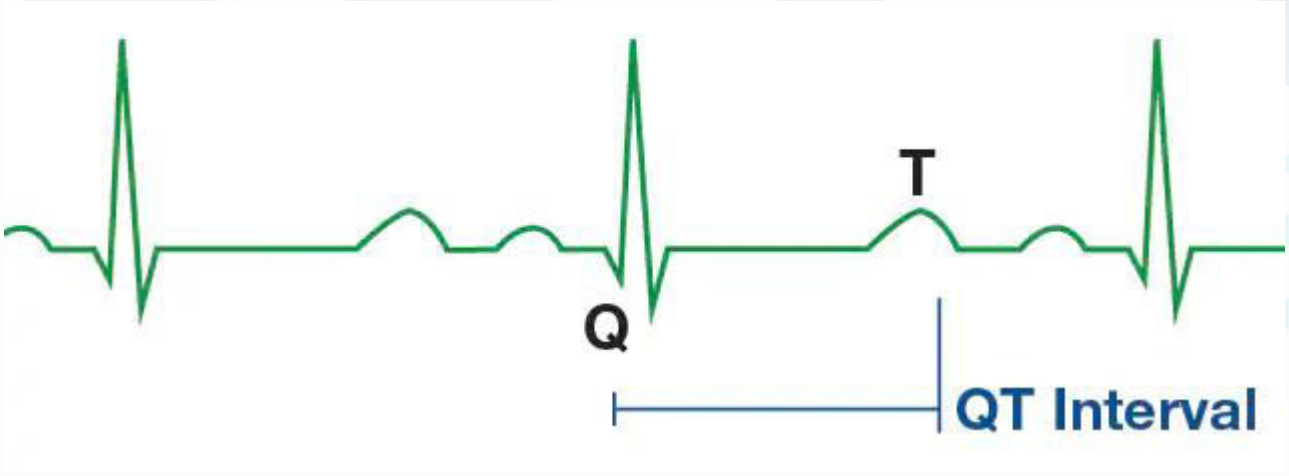




Look at Intervals

3- QT Interval: (normal < 1/2 R-R interval)

- **Prolonged** with ↓ **Ca .**
- **Shortened** with ↑ **Ca .**
- Can lead to (VT) **torsades de pointes.**



5- Check for Ischaemia or Infarction?

- **ST segments**

1- T wave abnormalities

• Inverted: ischemia • Peaked: Early ischemia, hyperkalemia (↑K) • Flat/U waves: hypokalemia (↓K)

2- ST Segment

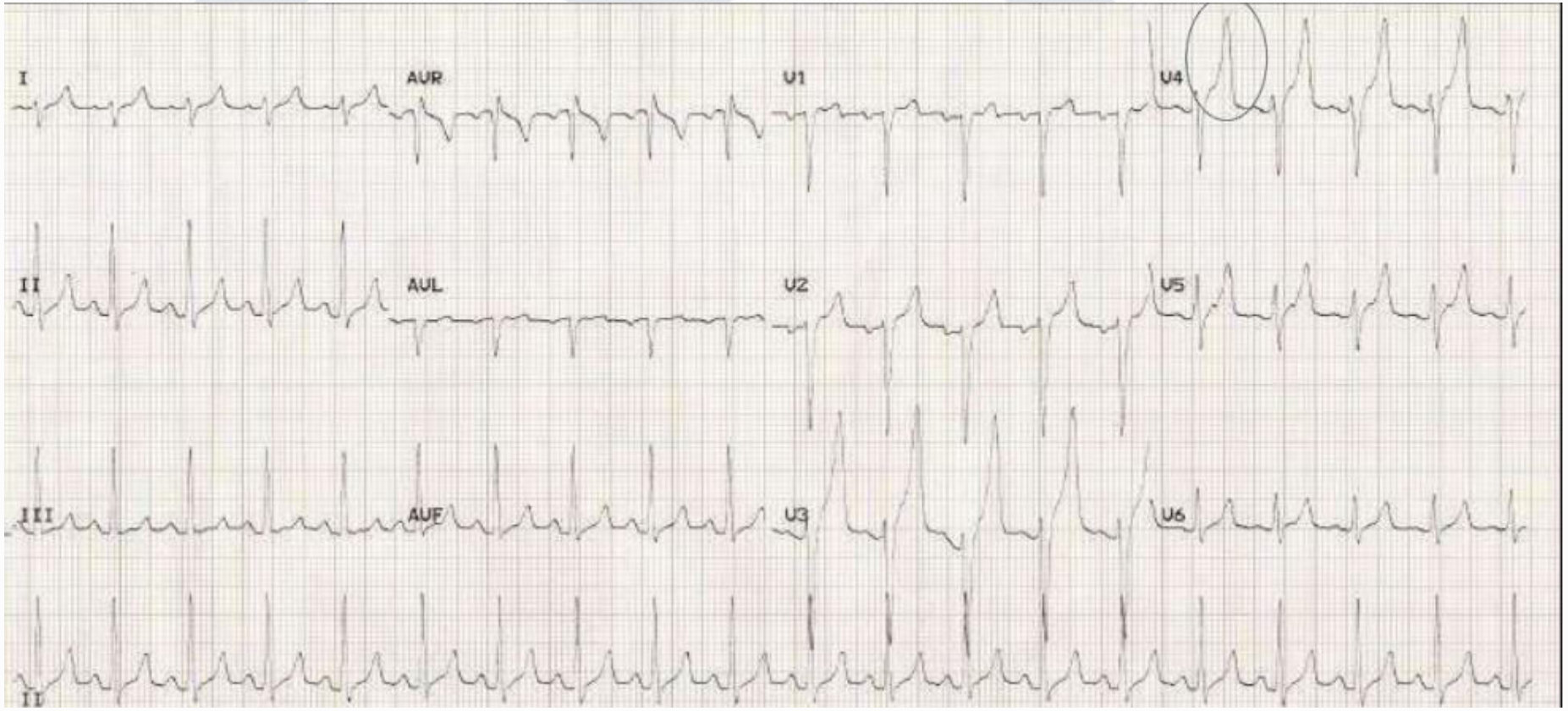
ST depression

• Subendocardial ischemia • Common in UA/NSTEMI

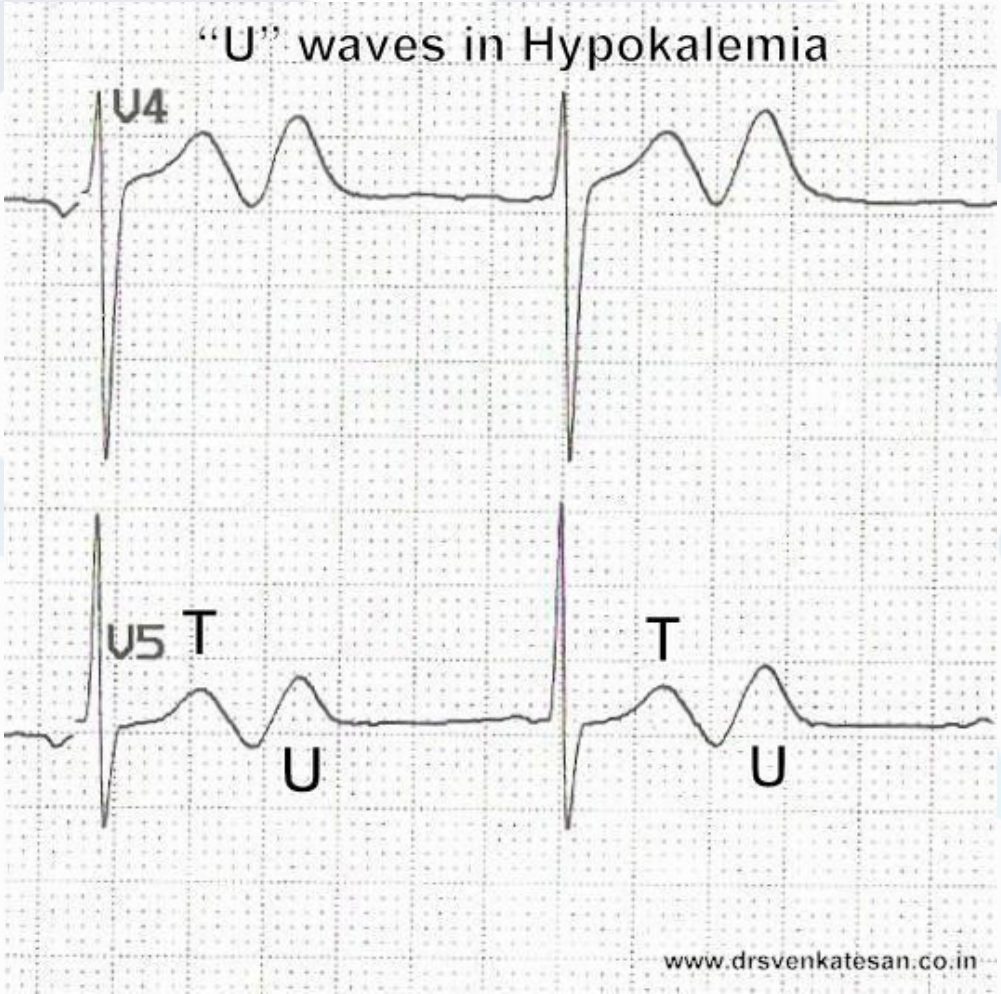
ST elevation

• Transmural ischemia • STEMI

Peaked T wave: hyperkalemia (↑K)

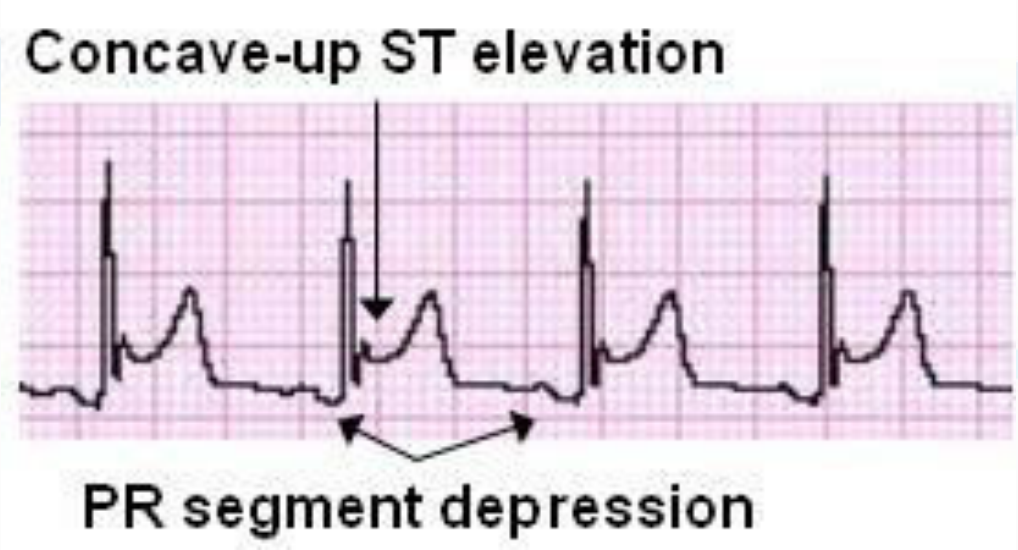


Flat/U waves: hypokalemia (↓K)

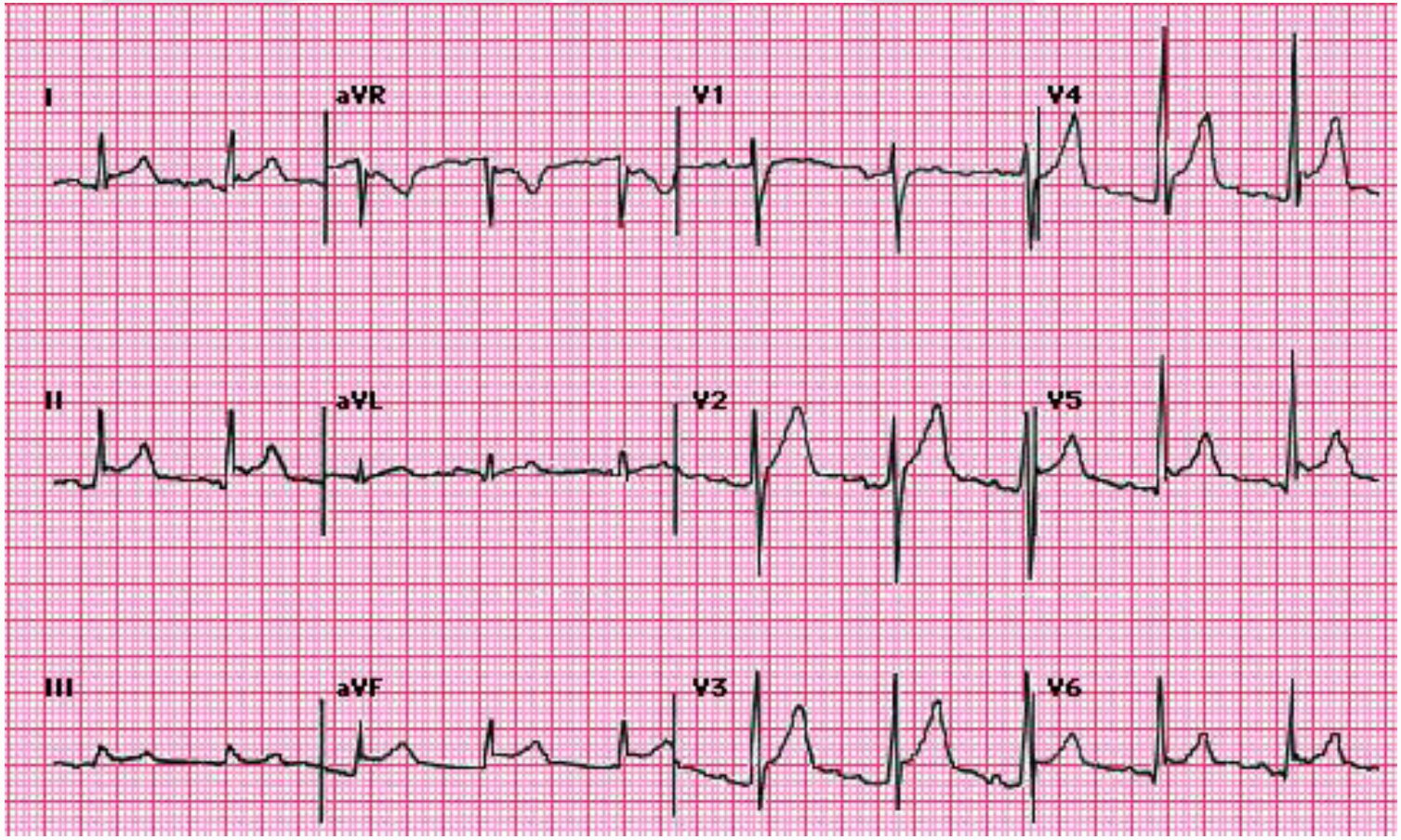


Acute Pericarditis

- Typical ECG findings include **diffuse concave-upward ST-segment elevation and, occasionally, PR-segment depression.**



Acute Pericarditis



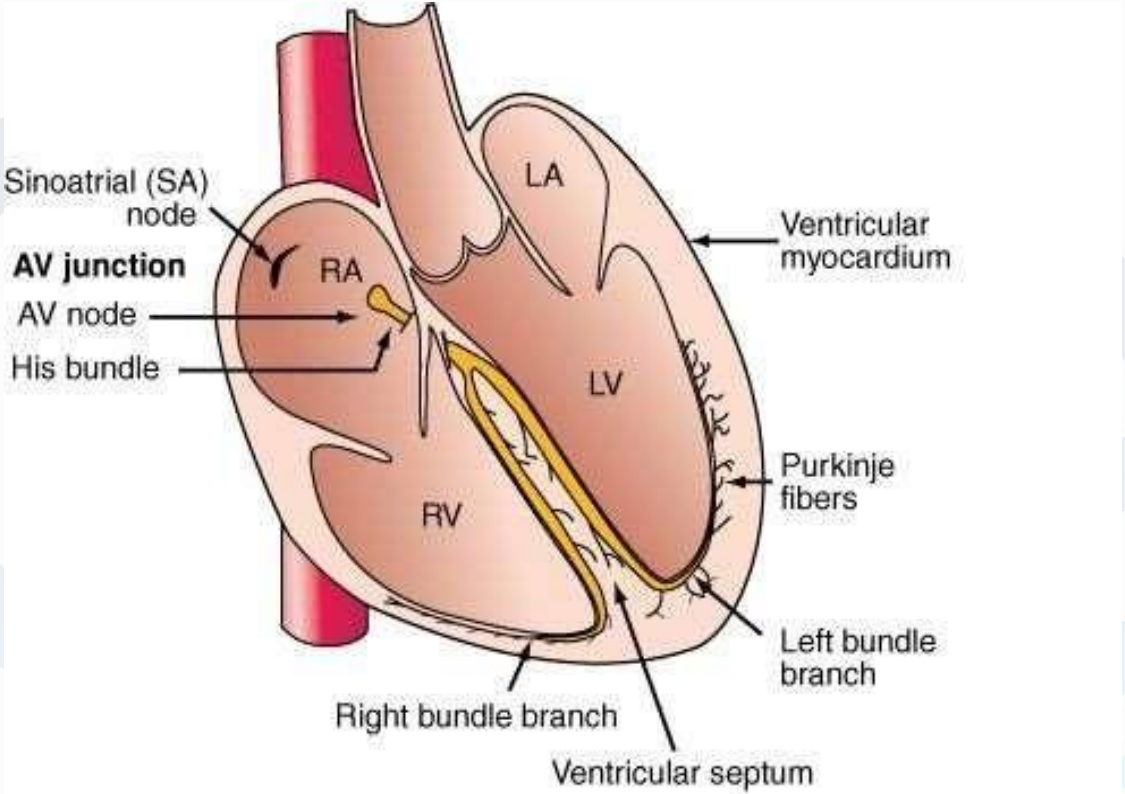
PAC Premature Atrial Contraction

PVC (Premature Ventricular Contraction)

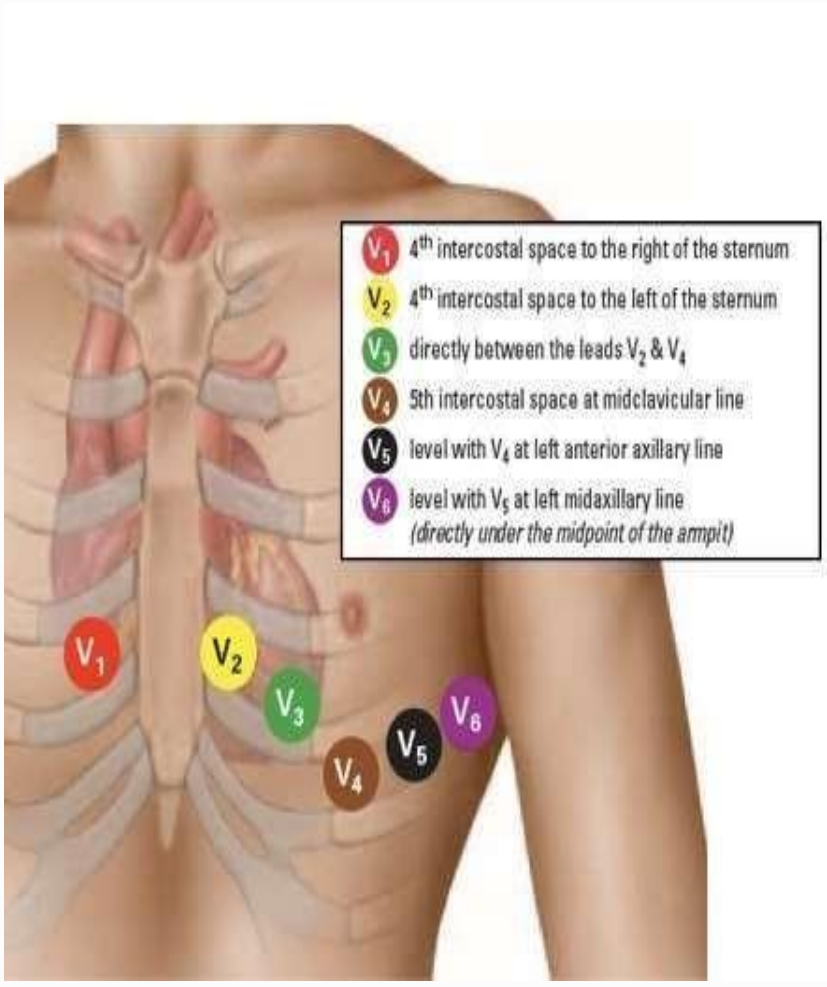
Thank you

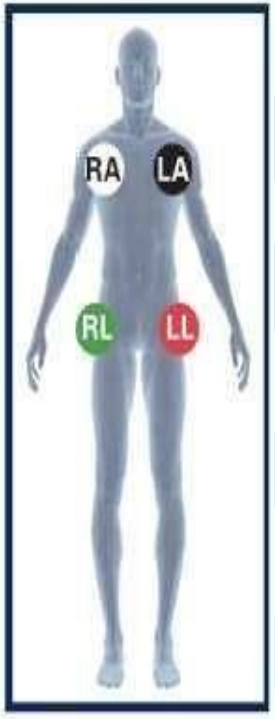
ECG Mini Osce

Dr.Abdullah Alwikhyan

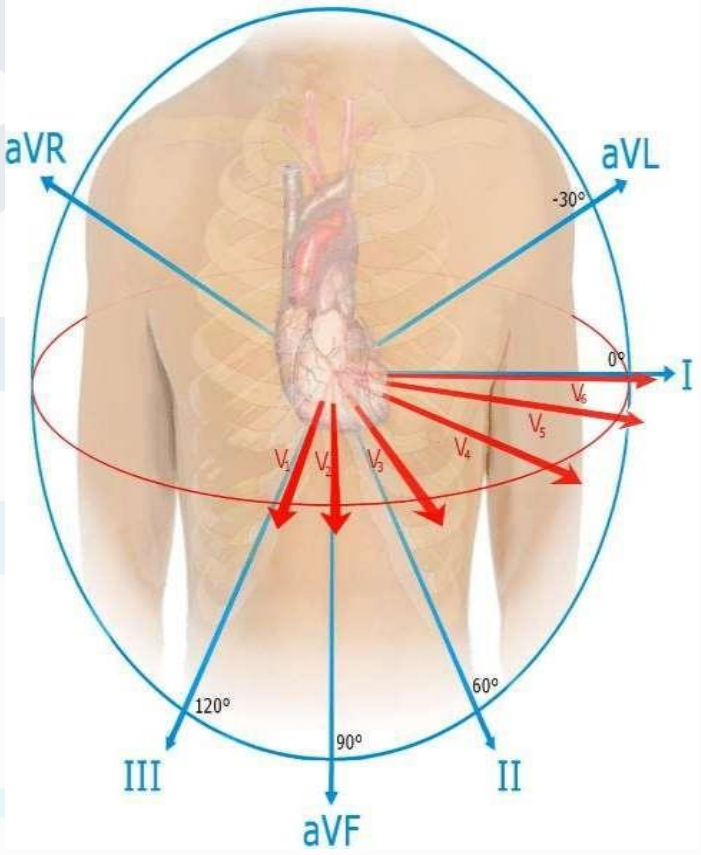


Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: http://www.accessmedicine.com





RA Right Arm
LA Left Arm
LL Left Leg
RL Right Leg



ECG (EKG) ELECTROCARDIOGRAPHY

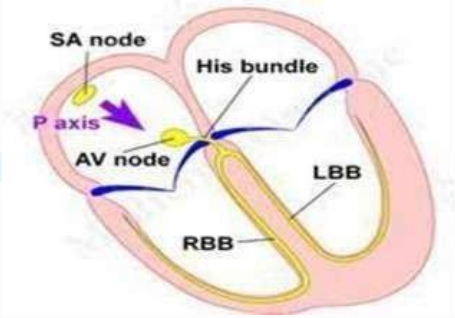
1. Each cycle of cardiac contraction and relaxation is initiated by spontaneous depolarization of the SA node. This event is not seen on the EKG.

2.The P wave records atrial depolarization and contraction. The first part of the P wave reflects right atrial activity; the second part reflects left atrial activity.

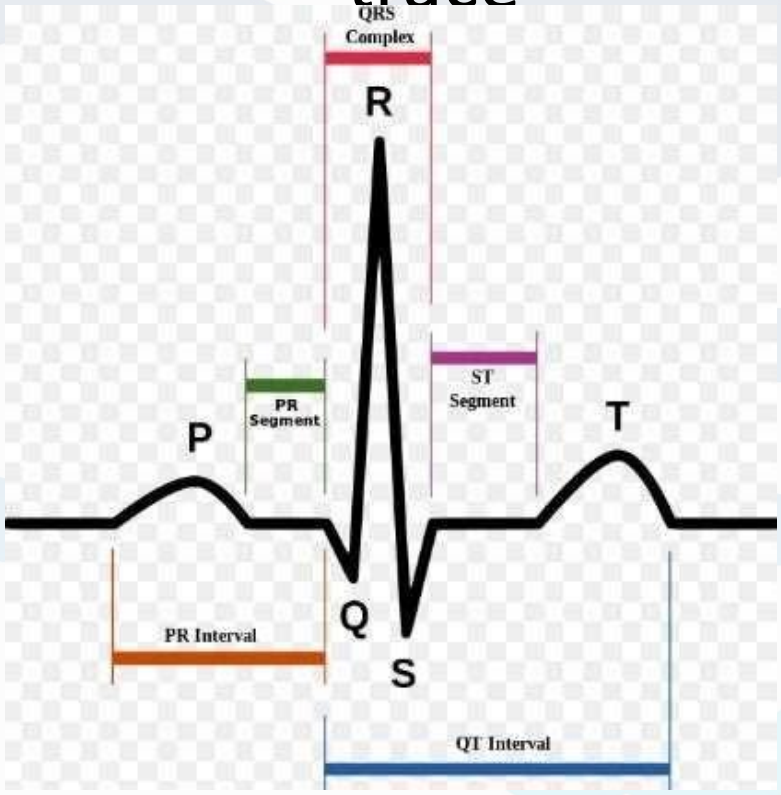
3.There is a brief pause when the electrical current reaches the AV node and the EKG falls silent (the PR segment).

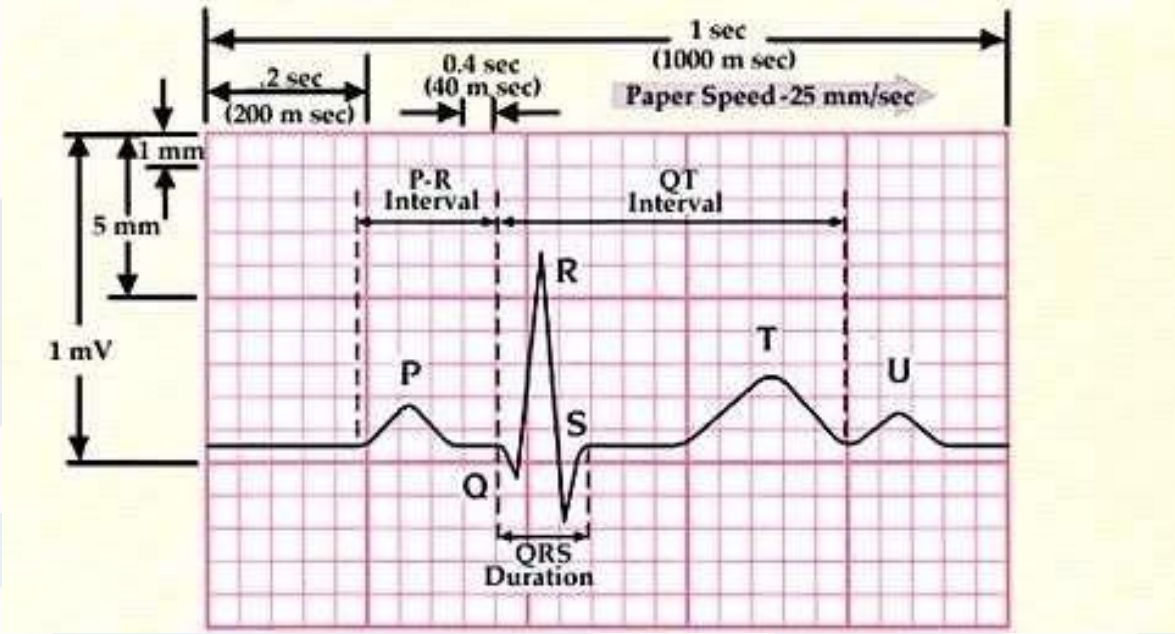
4.The wave of depolarization then spreads along the ventricular conducting system (bundle of His, bundle branches, and Purkinje fibers) and out into the ventricular myocardium. The first part of the ventricles to be depolarized is the interventricular septum. Ventricular depolarization generates the QRS complex.

5. The T wave records ventricular repolarization. Atrial repolarization is not seen.



Normal ECG trace





- Y axis=voltage, 1 mm (small box) = 0.1 mV
- X axis=time, 1 mm (small box) = 0.04 seconds

Summary

- **P wave** relates to atrial depolarisation

(normal time length 2.5 small squares on ECG trace)

- **QRS complex** relates to ventricular depolarisation

(normal time length 0.12sec = 3 small squares on ECG trace)

- **T wave** relates to ventricular repolarisation

(no strict criteria for width but need to look at ST segment for changes – myocardial ischaemia or infarction)

- **PR interval** (measured from beginning of P wave to beginning of QRS complex) should be between 0.12-0.20 sec (equivalent to 3-5 small squares).

  Represents time taken for atrial depolarisation and pass message to ventricles (involves SA node, atrial tissue and AV node)

Stepwise Approach to looking at an ECG

1) Check rate – normal, fast (tachycardia) or slow (bradycardia)?

Calculate the heart rate by dividing 300 by the number of big boxes between R waves

2) Check rhythm – sinus or not?

Sinus rhythm has a P wave followed by a QRS complex and every QRS complex has a preceding P wave

3) Check axis – normal or not?

If the QRS in Leads I and aVF are positive, the axis is normal

4) Check Intervals – long or short?

PR interval	**prolonged in heart blocks, short in Wolff Parkinson White**
QRS interval	**(WPW) prolonged and wide - ventricular bundle branch block**
QT interval	**prolonged with certain drugs – potentially dangerous**

5) Check for ischaemia or infarction?

ST segment depression or elevation, Q waves or T wave inversion

6) Check for left ventricular hypertrophy

ECG Clinical Presentations

1- **Palpitation** , Dizziness , Sudden loss of consciousness "Collapse" .

2- **Chest Pain**

3- Fatigue , General weakness & **CKD Pts.**

4- **Hx of Immobilization recent surgery** , Sudden onset chest pain & SOB .

1 .Palpitation → Arrhythmias

Look at P wave

1 - Look At P wave

A- P wave Present

→ Look At Regularity

1. Regular → Does every P followed By Narrow QRS ?

If yes : Look at **PR Interval :**

- **Short → WBW**
- **Normal → Check Rate → Sinus Tachy or Brady**
- **Prolonged → H.block type 1**

If no :

- **Dropped Beat ? → Type 2 HB Mobitz 2**
- **Wide QRS in Specific leads → BBB**

Q1:

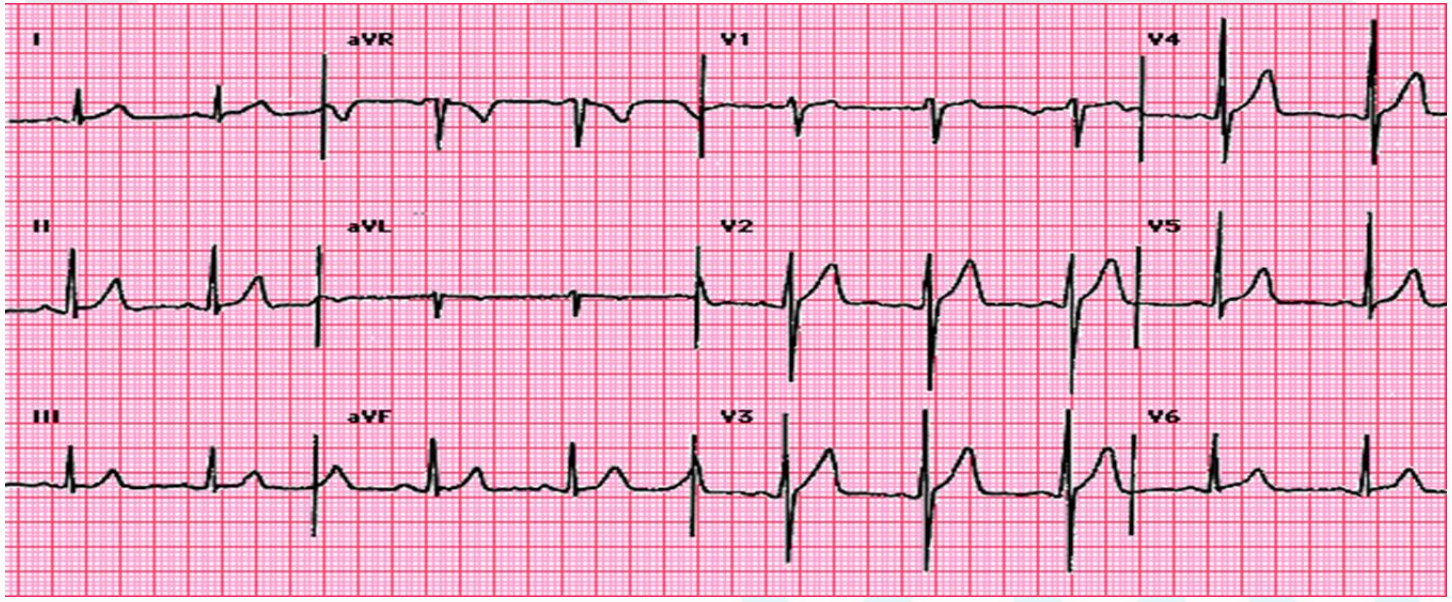
This young patient is a smoker, presented with inflammatory, submammary chest pain, what's your interpretation of this ECG?

Normal ECG

Q2:

This is an ECG for a 22 YO male ,presented for a regular check-up.What is your interpretation?

Normal ECG



Q3:

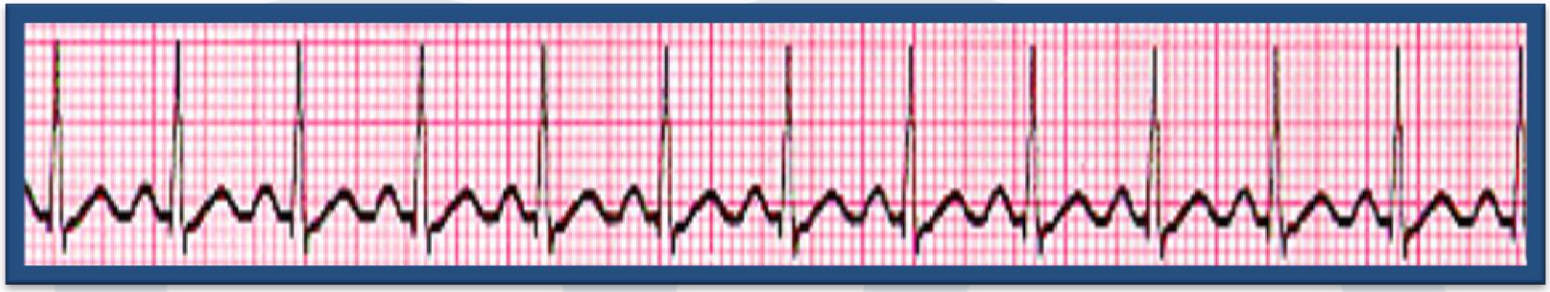
A 35 year old female patient complaining of a retrosternal chest pain that is relieved when she stands up, what's your interpretation of this ECG?

Normal ECG

1-Sinus Bradycardia

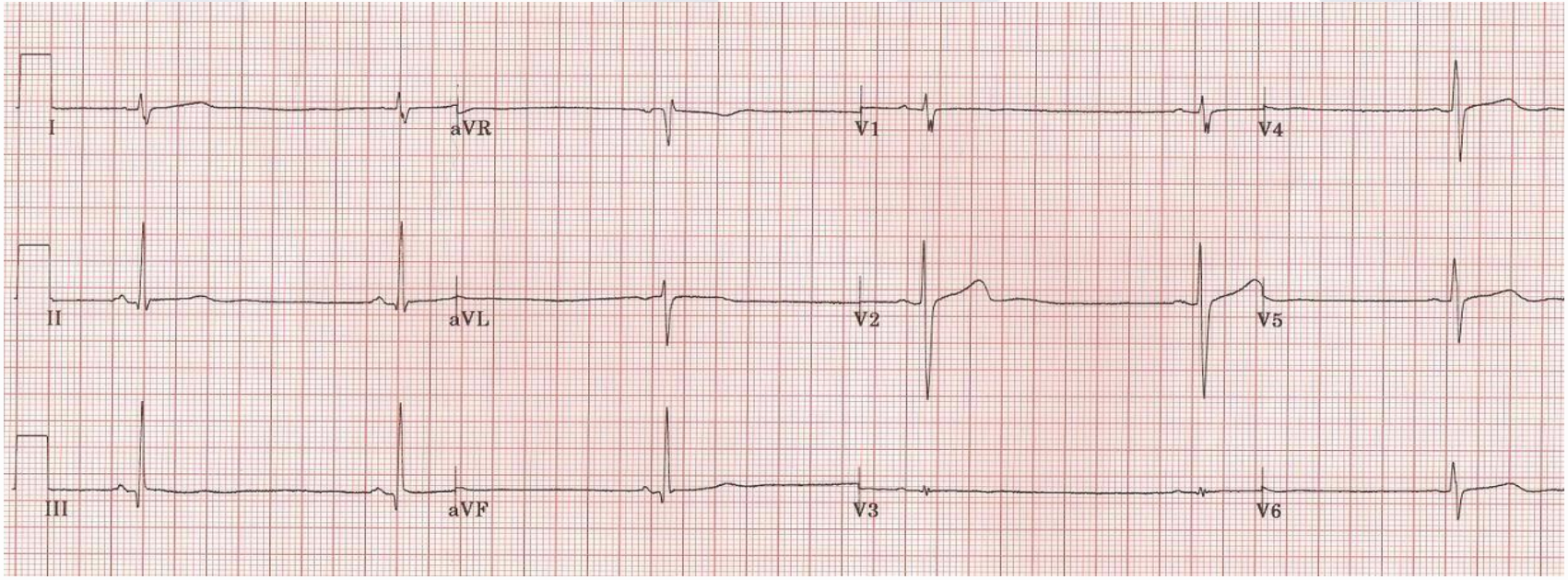
30 bpm	Rate
regular	Regularity
normal	P waves?
0.12 s	PR interval?
0.10 s	QRS duration?
Sinus Bradycardia	Interpretation

2- Sinus Tachycardia



130 bpm	Rate
regular	Regularity
normal	P waves
0.16 s	PR interval
0.08 s	QRS duration
Sinus Tachycardia	Interpretation

Q:49 this patient is on anti-hypertensive drugs with impotence, mention the abnormality here and what is the cause ?



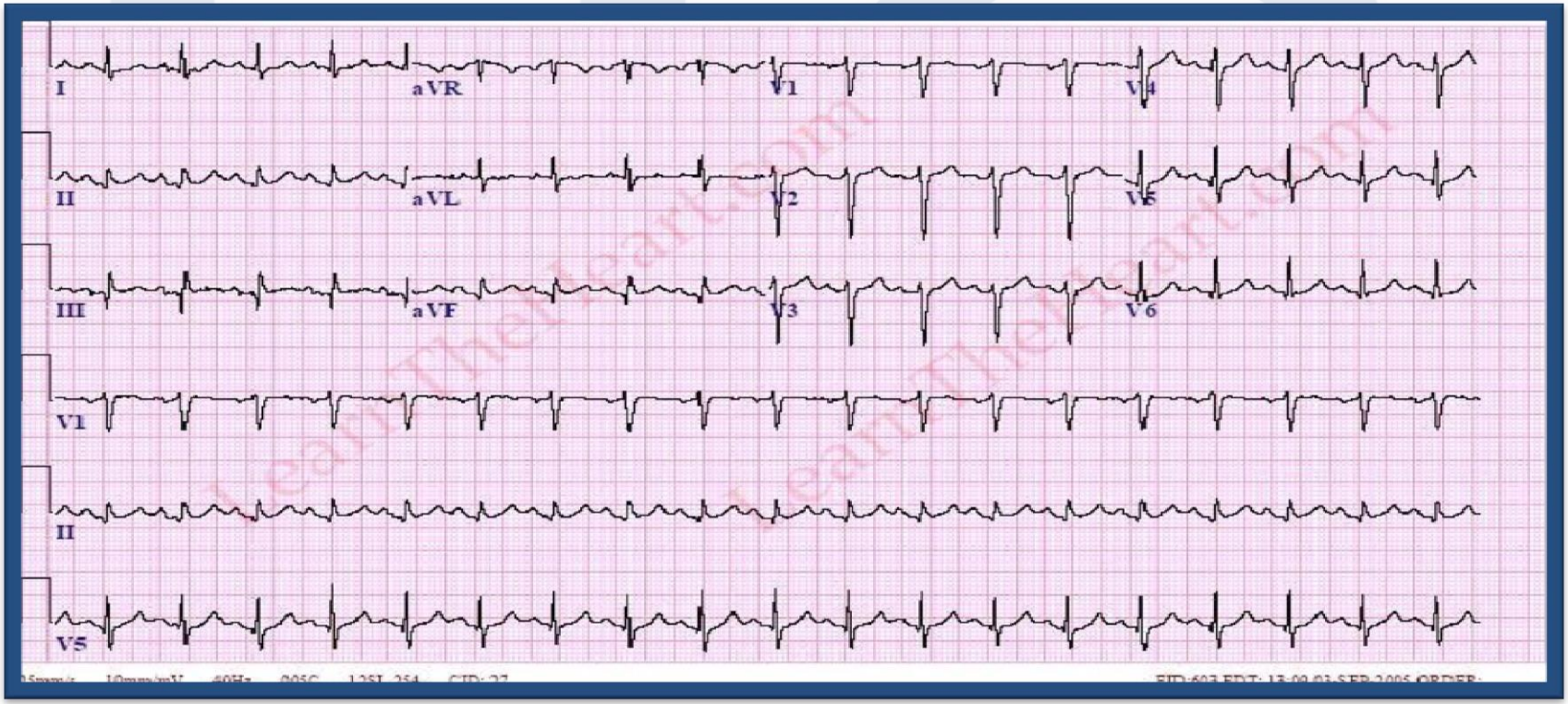
Sinus bradycardia & Beta-blockers

Q: What Is The Dx .

Sinus Tachycardia .

Give 3 Causes .

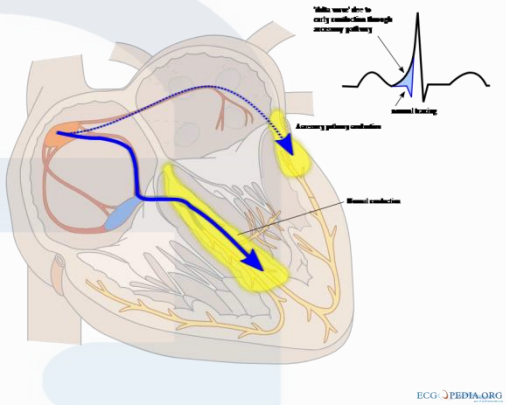
- Pain
- Fever
- Anxiety
- Dehydration
- Malignant hyperthermia



3- Wolff-Parkinson-White syndrome (WPW),

- In **an accessory pathway conducts depolarization directly from the atria to the ventricles without traversing the atrioventricular (AV) node.**

- Finding on ECG : narrow complex tachycardia, short PR interval and delta wave



Acute treatment
• Hemodynamically unstable patients require immediate electrical cardioversion

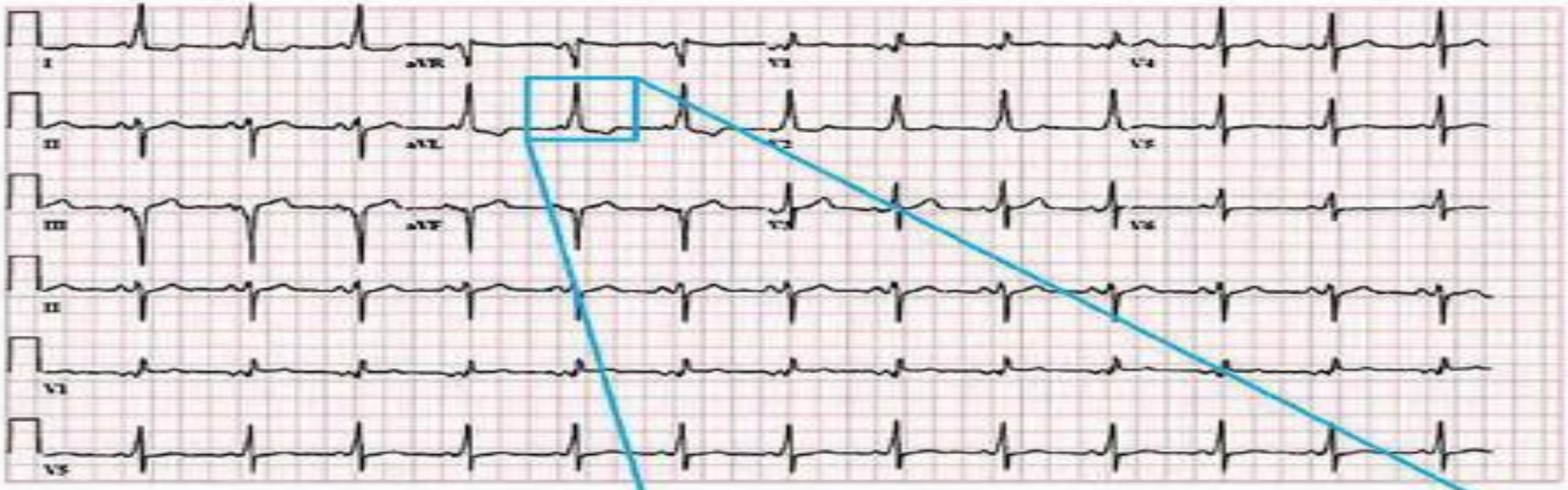
• For stable patients, **radiofrequency catheter ablation**

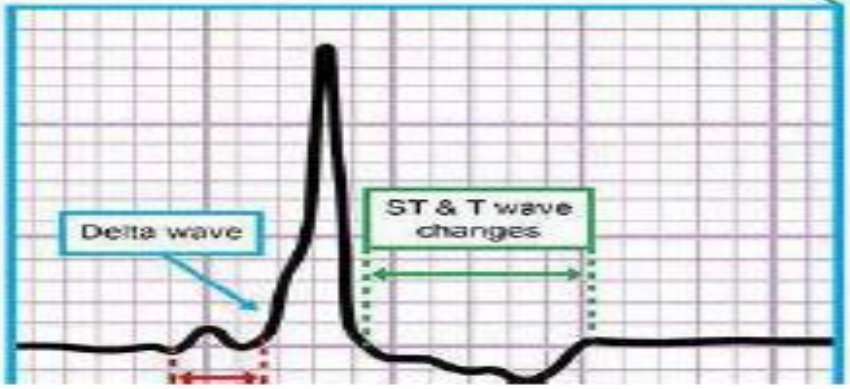
medical treatment : **procainamide or quinidine**

Wolff-Parkinson-White syndrome

Preexcitation of the ventricles via an abnormal bypass tract

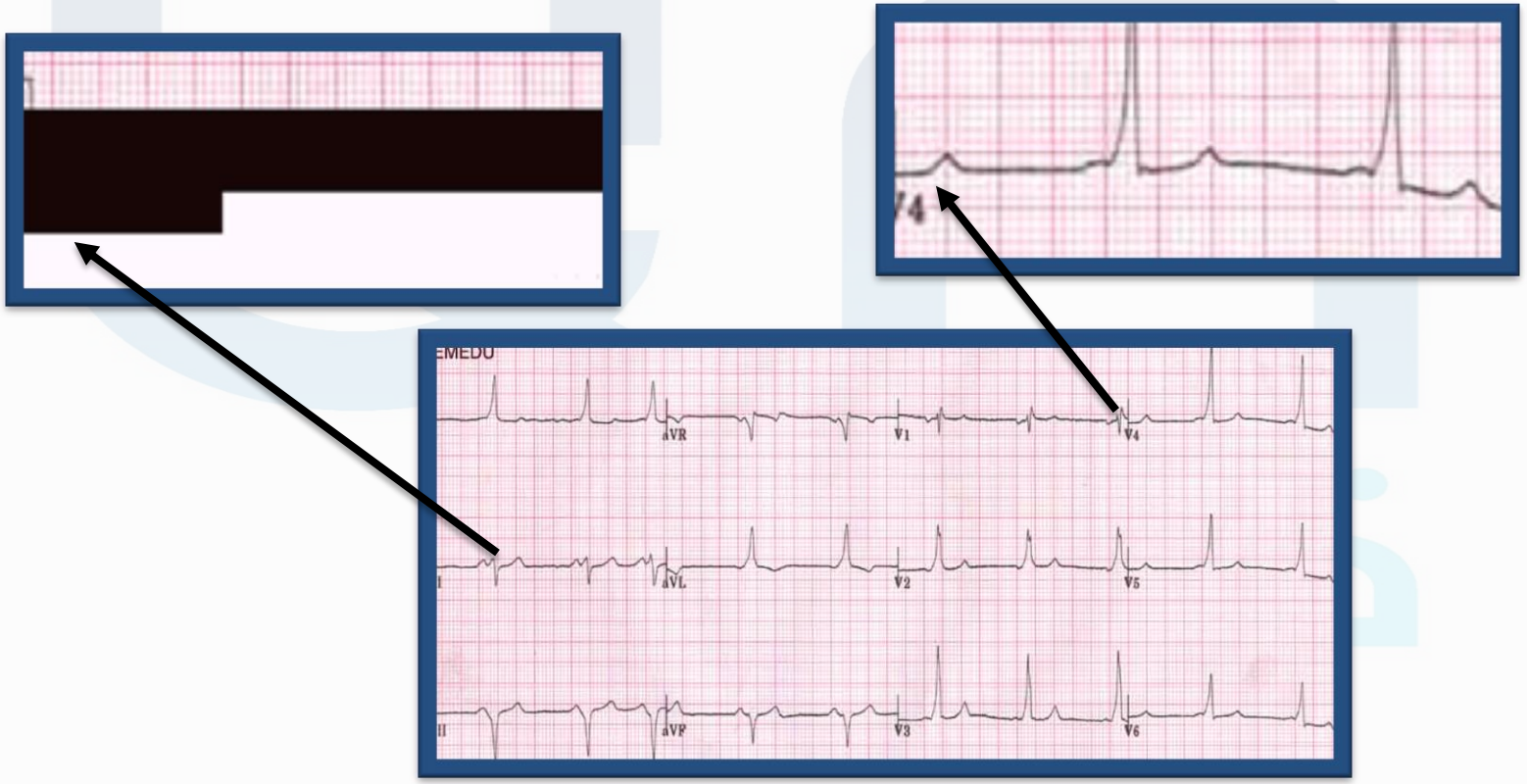
- Short PR interval
- Presence of initial slow upstroke of the QRS complex (delta wave)
- ST & T wave abnormalities





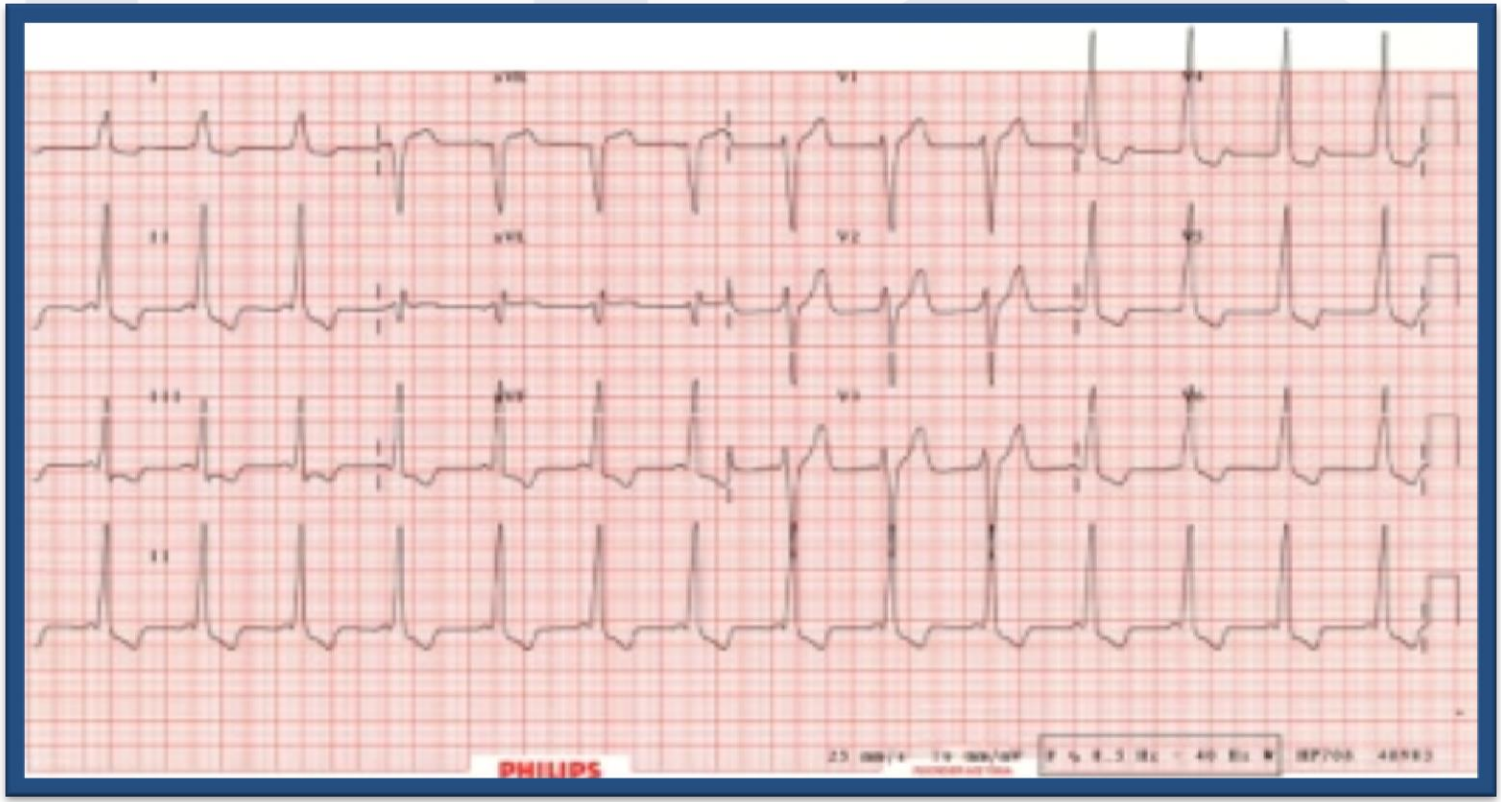
Q: A 19-year-old with recurrent dizziness and chest heaviness episodes.
- What is your diagnosis?

Wolff-Parkinson-White (WPW) syndrome



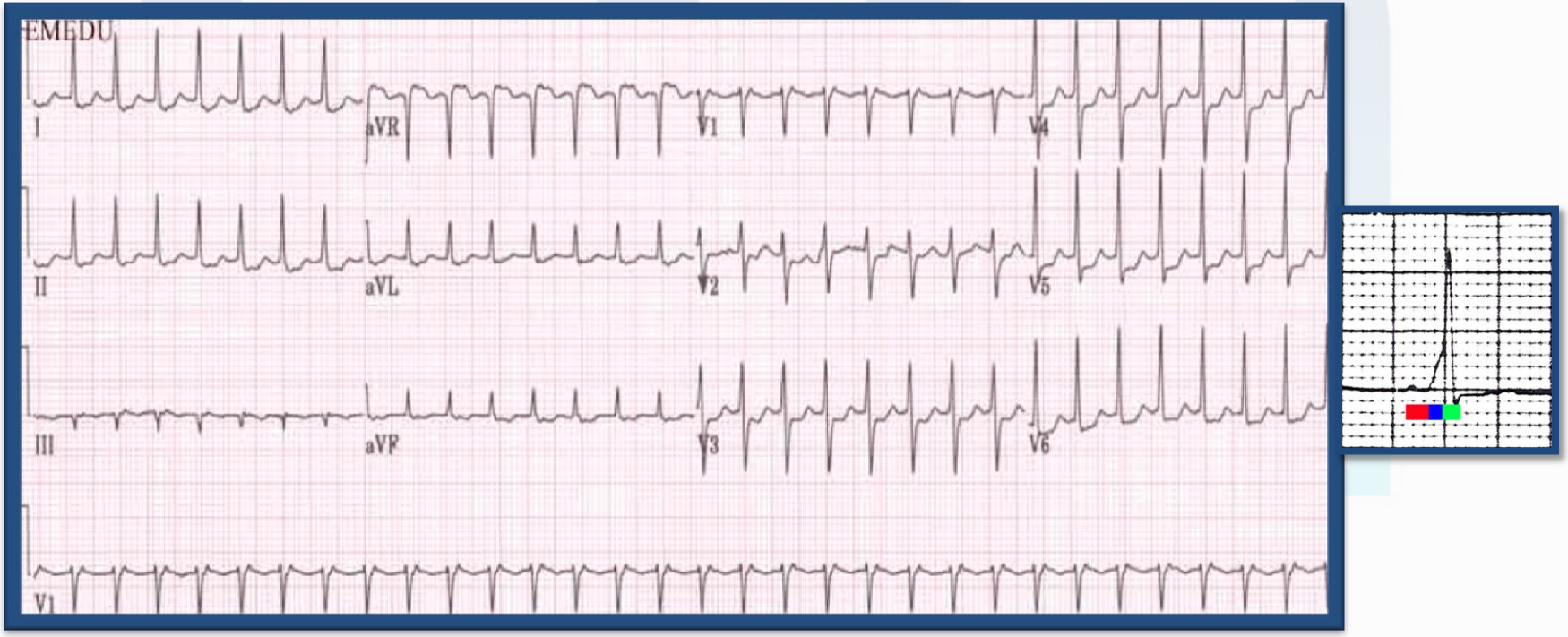
Q: Young female with recurrent episodes of palpitation.
What is the diagnosis?

WPW syndrome



Q: 30 YO female pt presented to ER complaining of palpitation, What is the cause of her arrhythmia?

WPW'S; The arrhythmia is SVT & small delta wave was just near the ECG so on acute attack you will only find SVT after recovery delta wave can be seen on ECG.



1st Degree Heart block

Rhythm #10

60 bpm	Rate
regular	Regularity
normal	P waves
0.36 S	PR interval
0.08 s	QRS duration
1st Degree AV Block	Interpretation

2nd Degree heart block Mobitz 2
Rhythm #12

40 bpm	Rate
regular	Regularity
normal, 2 of 3 no QRS	P waves
0.14 s	PR interval
0.08 s	QRS duration
2nd Degree AV Block, Type II	Interpretation

1 - Look At P wave

A- P wave Present

→ Look At Regularity

2. Irregular → Does every P followed By QRS ?

IF yes :

1- Narrow QRS → PAC

2- Wide QRS → PVC

If no :

3- H. Block 2 type Mobitz 1

4- 3RD degree heart block "complete"

1- Premature Atrial Contraction

70 bpm	Rate
occasionally irreg.	Regularity
2/7 different contour	P waves
0.14 s (except 2/7)	PR interval
0.08 s	QRS duration
NSR with Premature Atrial Contractions	Interpretation

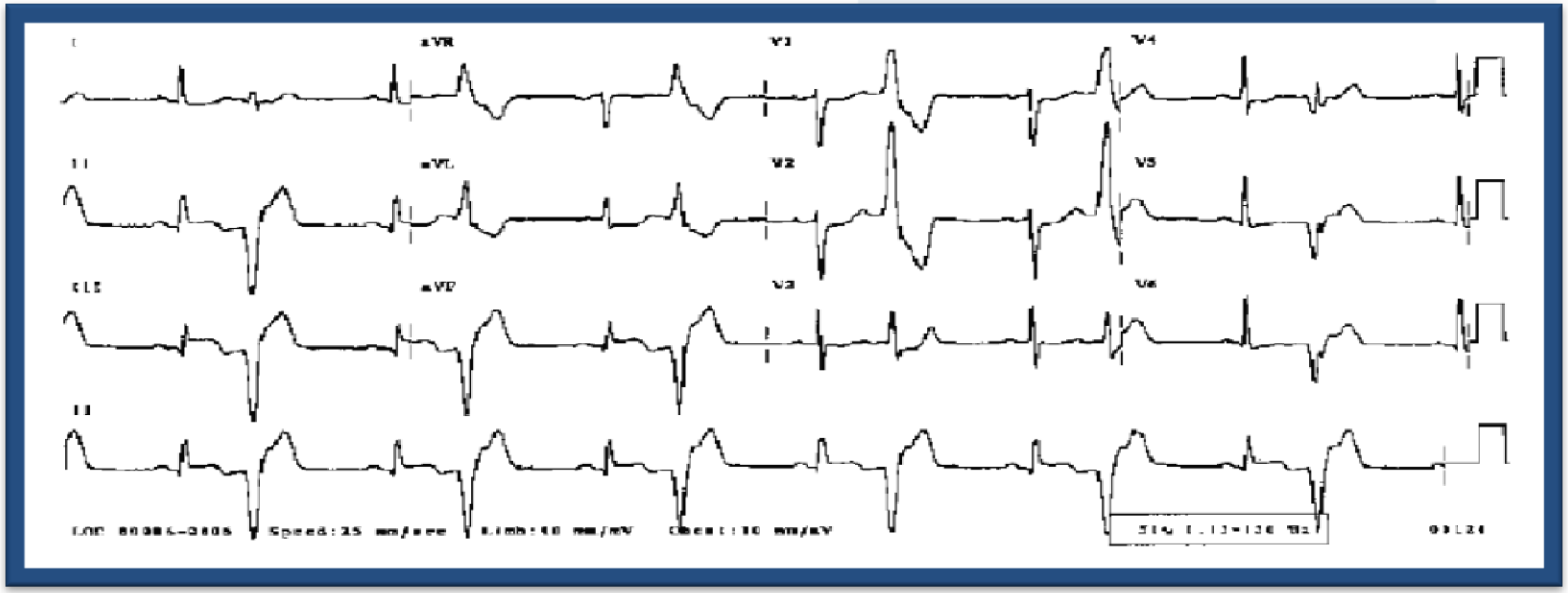
2- Premature Ventricular Contraction PVC Rhythm #4

75 bpm	Rate
occasionally irreg.	Regularity
none for 7th QRS	P waves
0.14 s	PR interval
0.08 s (7th wide)	QRS duration
Sinus Rhythm with 1 PVC	Interpretation

Q: What is your spot Dx?

Ventricular bigeminy

Dose not require treatment if asymptomatic but if symptomatic beta blockers can be used



3- 2ND Degree Heart block Mobit z 1

50 bpm	Rate
regularly irregular	Regularity
normall, but 4th no QRS	P waves
lengthens	PR interval
0.08 s	QRS duration
2nd Degree AV Block, Type I	Interpretation

4- 3rd Degree AV Block

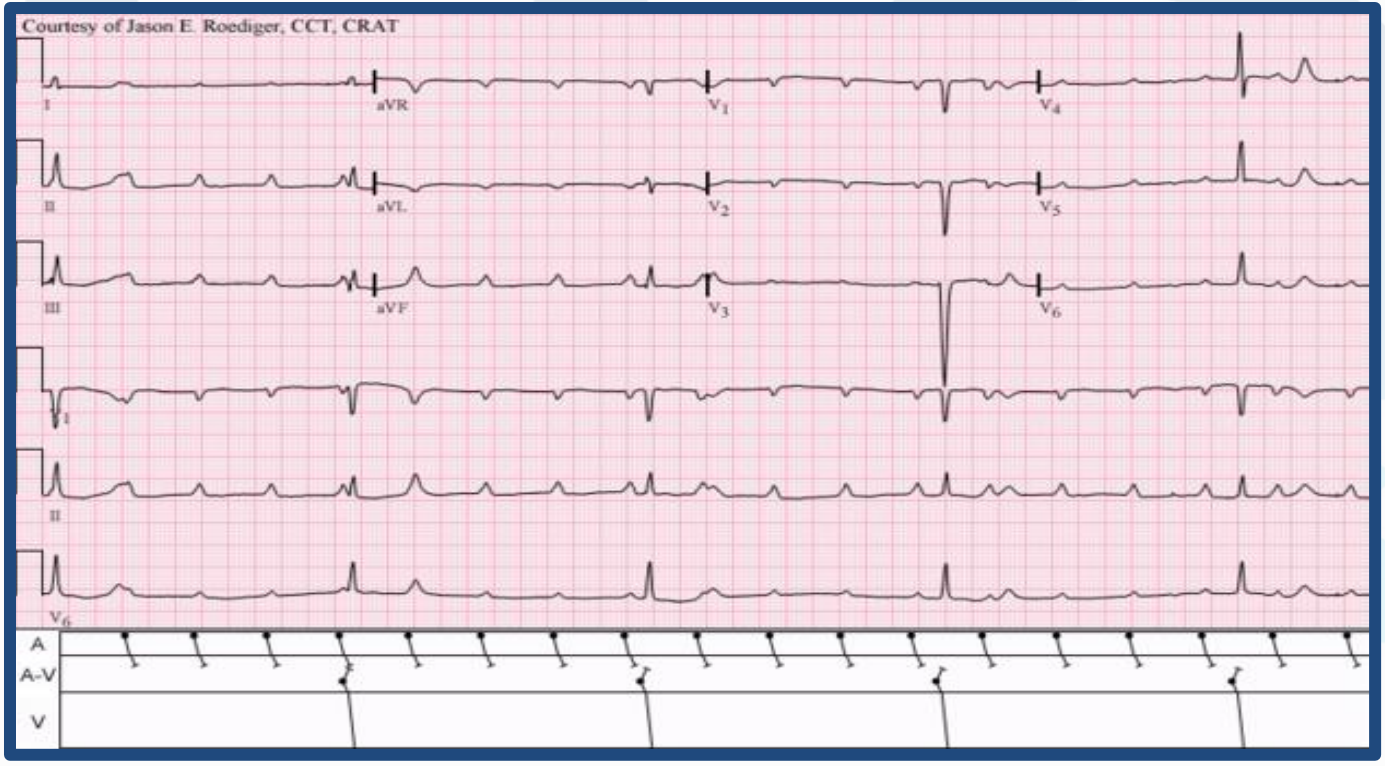
- Deviation from NSR
  - The P waves are completely blocked in the AV junction; QRS complexes originate independently from below the junction.

- Etiology: There is complete block of conduction in the AV junction, so the atria and ventricles form impulses independently of each other. Without impulses from the atria, the ventricles own intrinsic pacemaker kicks in at **around 30 - 45 beats/minute.**

Q: This ECG is for a 70 YO pt presented with recurrent attacks of dizziness.

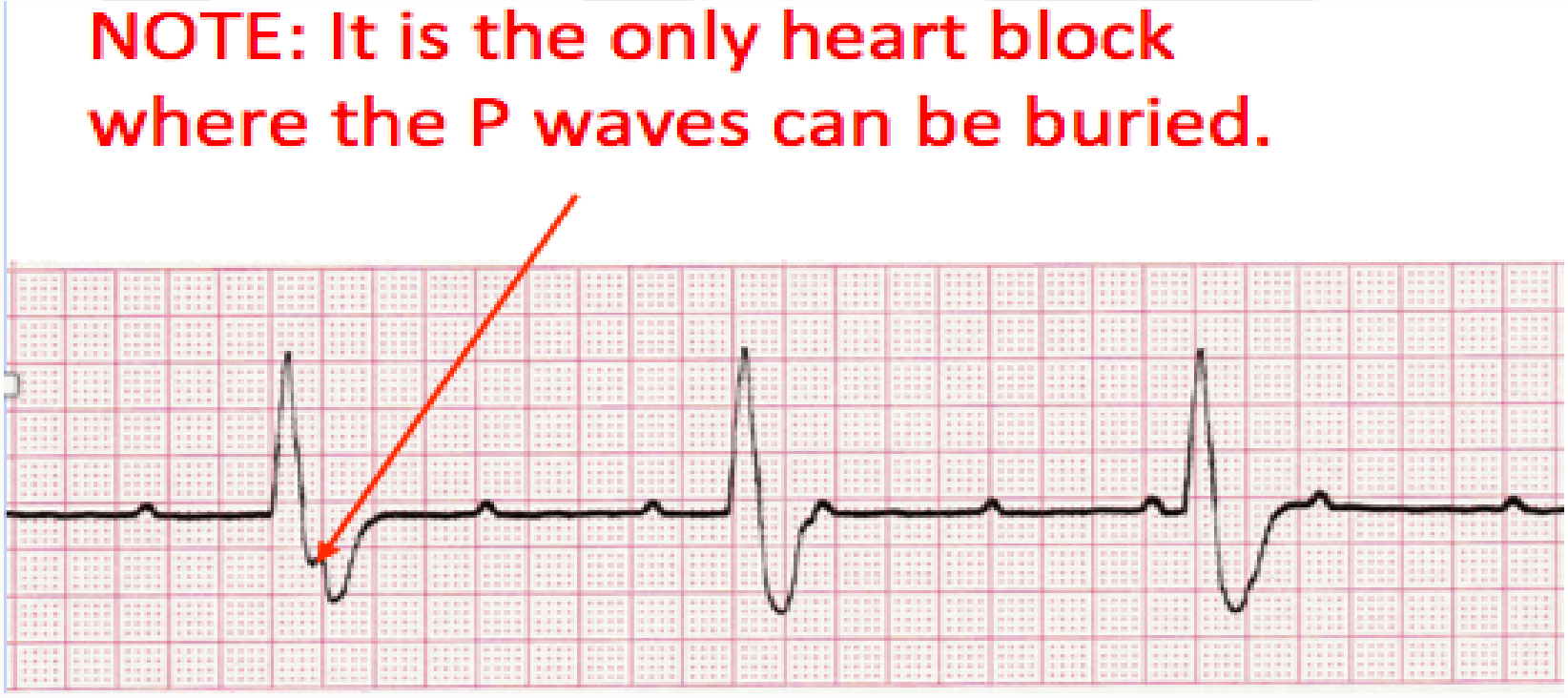
What's your Dx?

Third degree (complete) heart block.



Q: What is the diagnosis?

3rd degree heart block



1 - Look At P wave

B- P wave Absent

→ Look QRS

1.Narrow QRS → Regular ?

IF yes :

1- SVT

2- A.Flutter : Saw tooth appearance

If no :

3-A.fib

1- PSVT

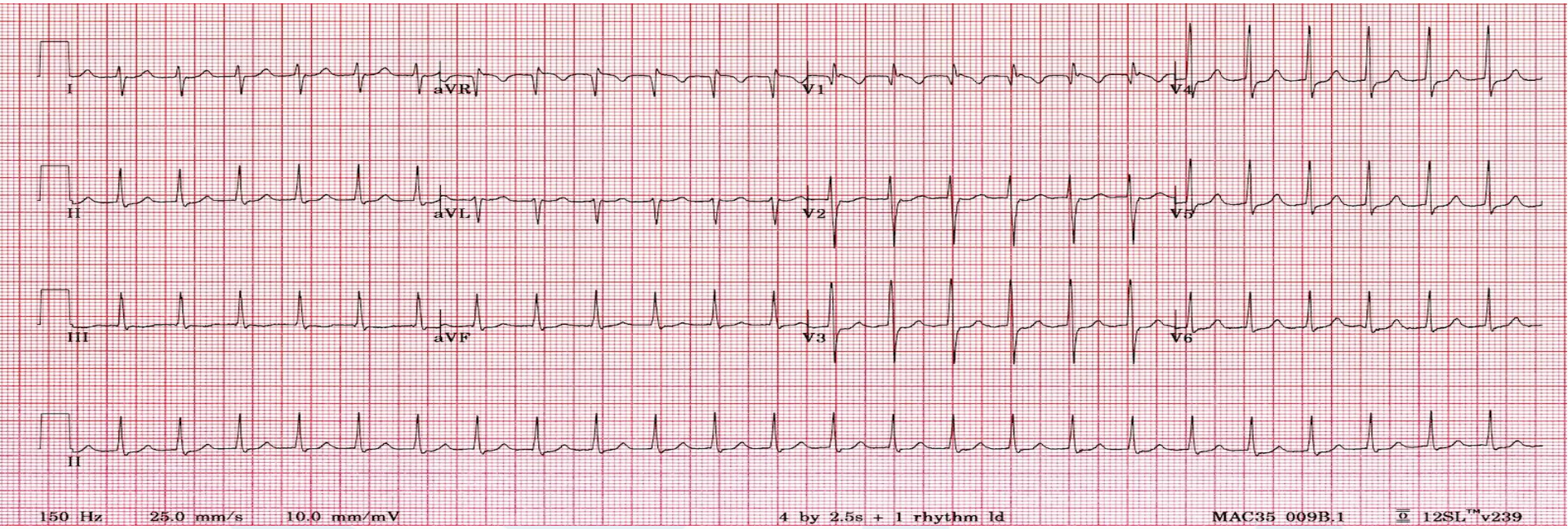
- Deviation from NSR
  - The heart rate suddenly speeds up, often triggered by a PAC (not seen here) and the P waves are lost.

- Etiology: There are several types of PSVT but all originate above the ventricles (therefore the QRS is narrow).

- Most common: abnormal conduction in the AV node (reentrant circuit looping in the AV node).

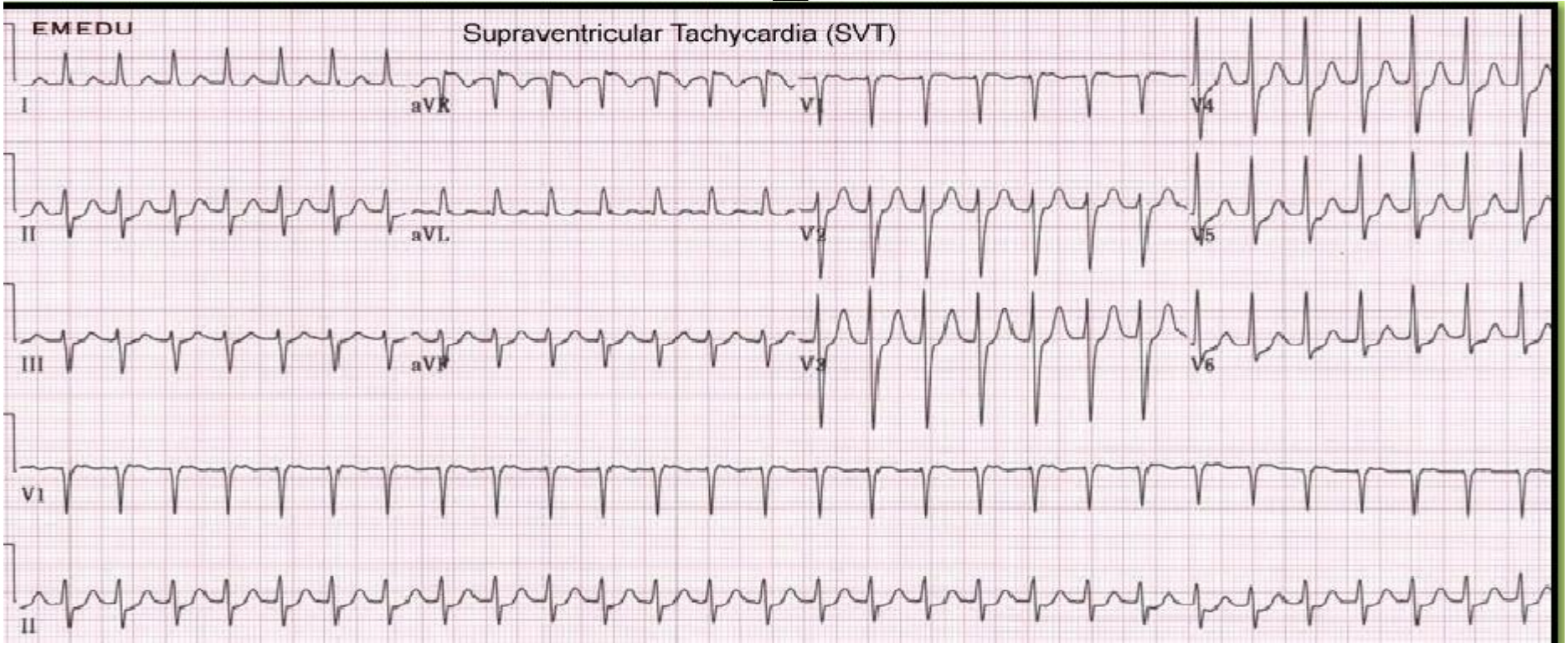
Rhythm #7

74 →148 bpm	Rate
Regular → regular	Regularity
Normal → none	P waves
0.16 s → none	PR interval
0.08 s	QRS duration
Paroxysmal supraventricular tachycardia (PSVT)	Interpretation



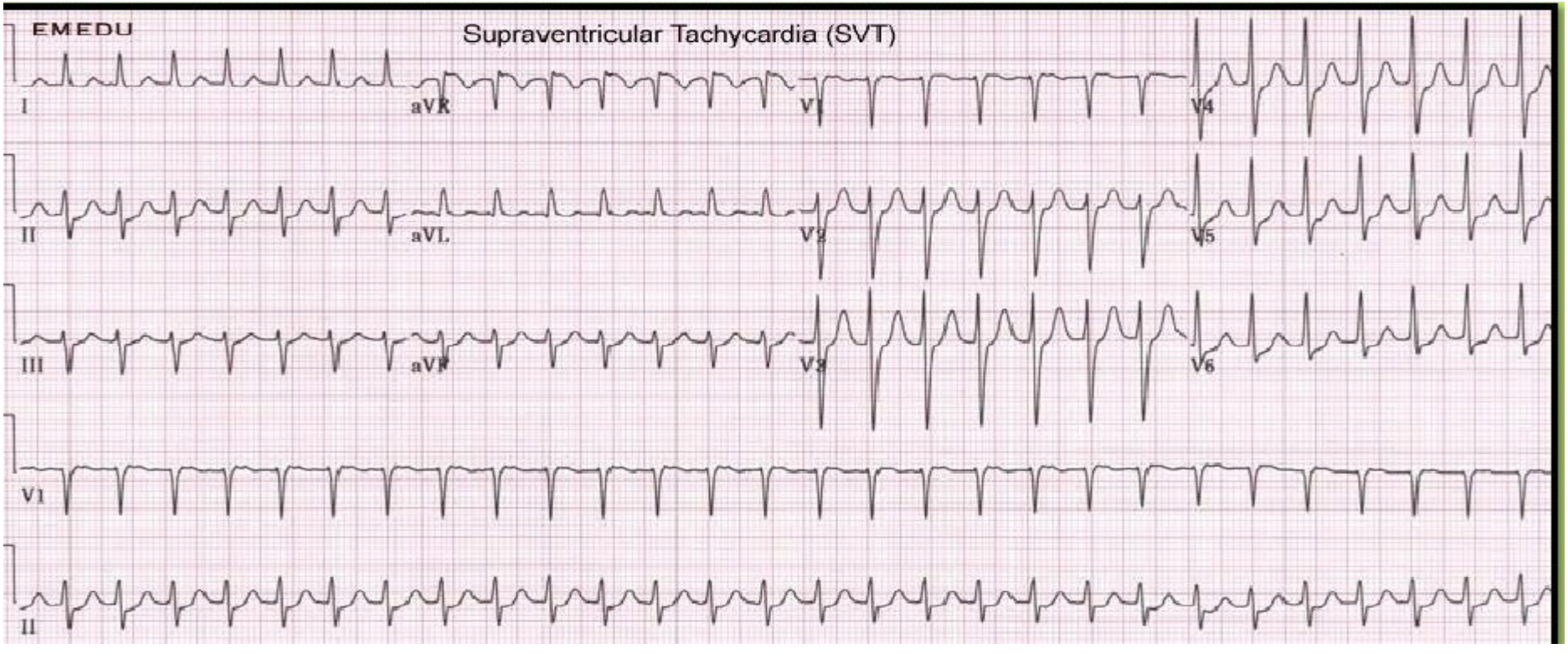
1)Name this type of arrythmia ? SVT
2) What is the heart rate ? 300/2 =150
3) Mention 3 **maneuver** that should be done to this patient ?
Valsalva maneuver , lowering the head between the knees, coughing, splashing cold water on the face, and breath holding
Then **carotids sinus** massage
4) The effective tx In patients with recurrent SVT,,,,,? catheter ablation is the most effective therapy

Q19: A pt presented with recurrent palpitation for 8 weeks, what is your Dx according to his ECG?



Paroxysmal supraventicular tachycardia.

Q20: This patient came with Palpitation & blood pressure of 130/80, & this is his ECG, what is the treatment?



Since the patient is stable : Adenosine.

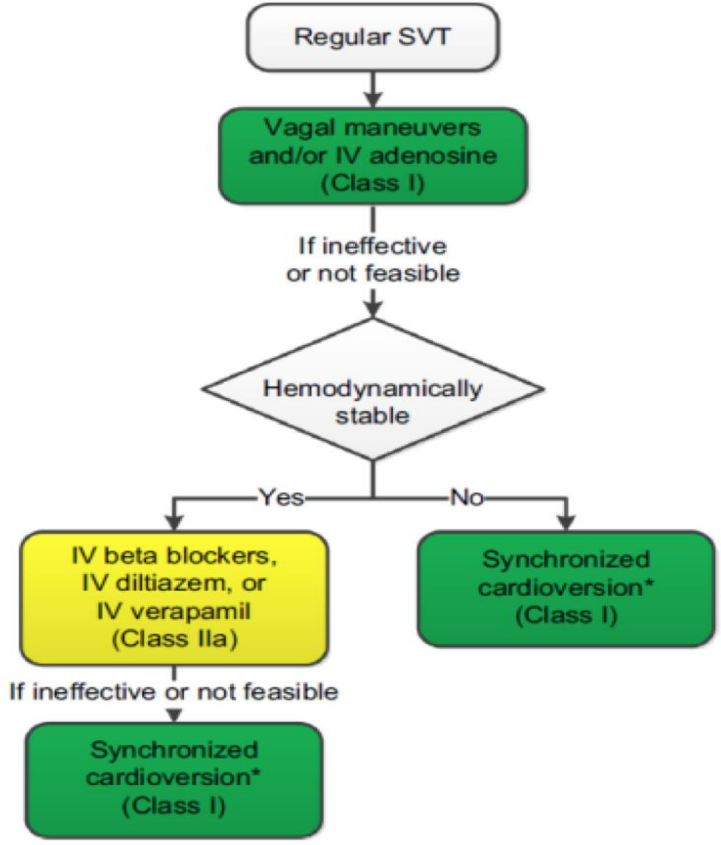
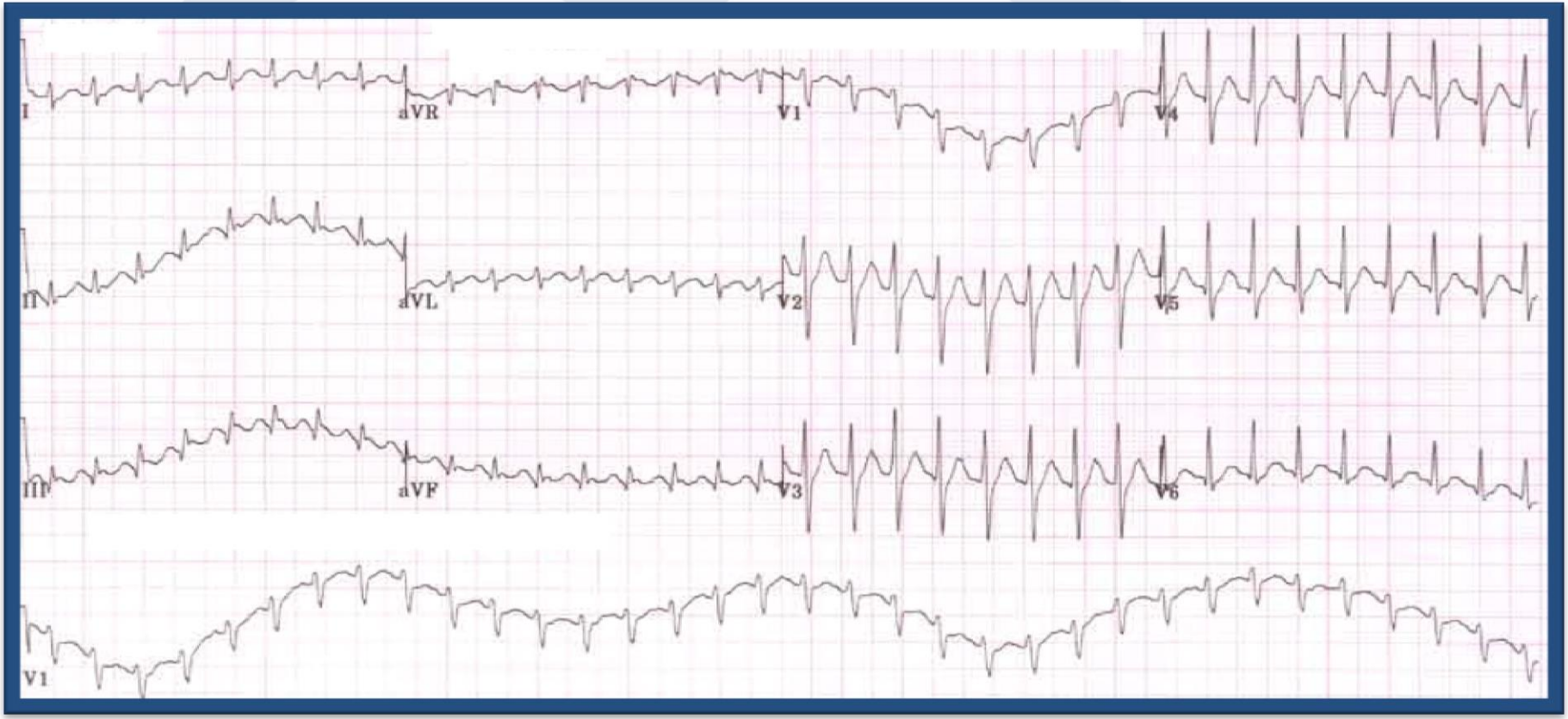


Figure 4. Treatment algorithm for AVNRT, per AHA guidelines [1]

Q: What is the best initial drug?

PSVT (narrow QRS with P wave which may or may not be descrinible)

IV adenosine



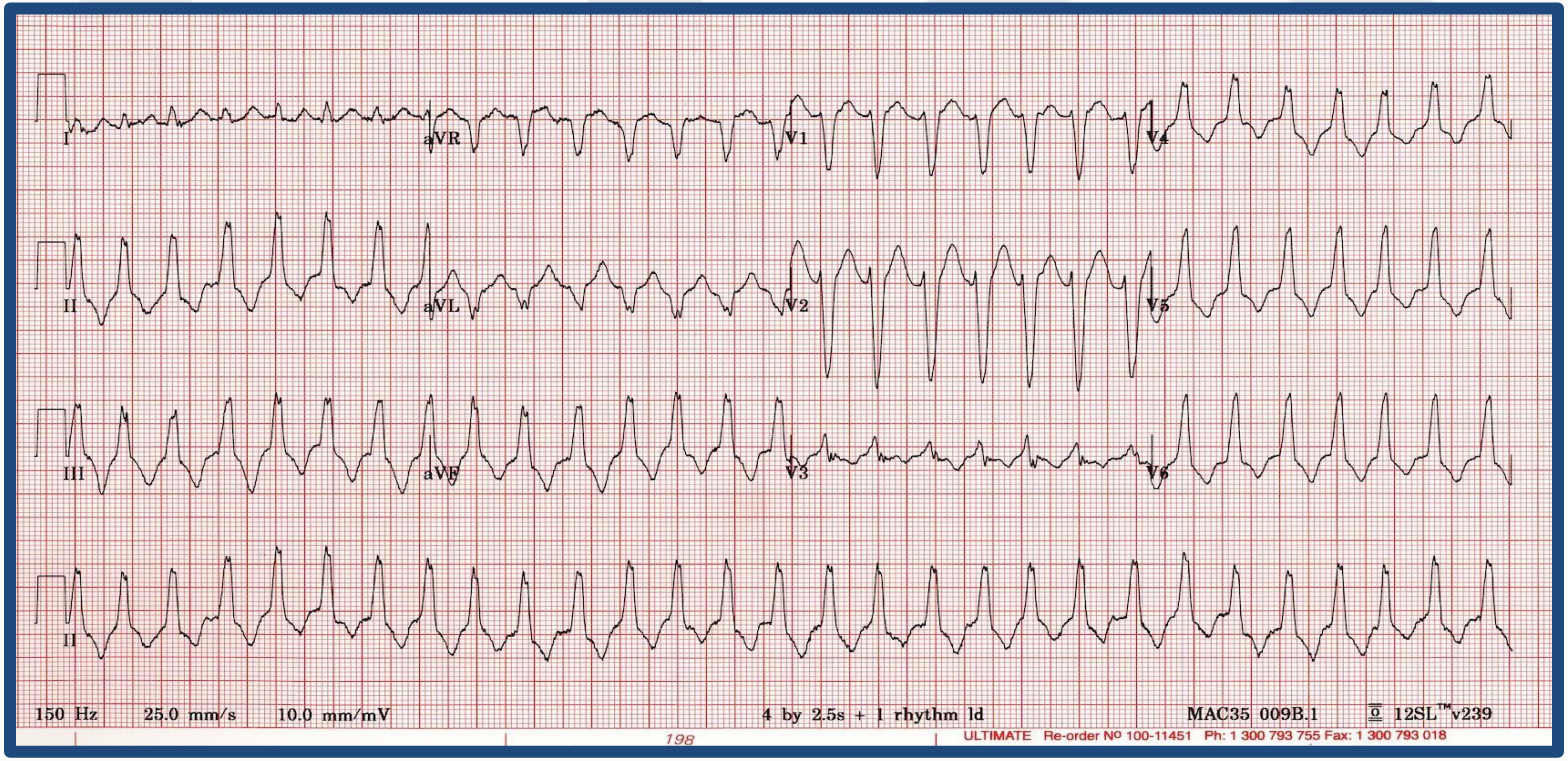
Q:A 30 year old male came to ER complaining of episodic palpitations & sweating.

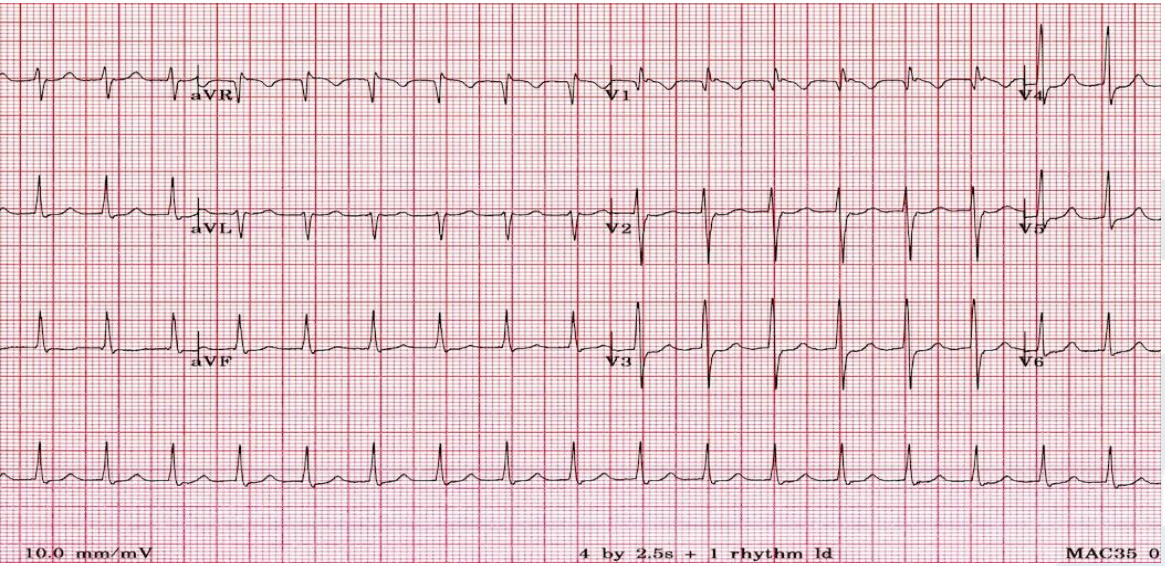
what is your spot Dx?

Supraventricular tachycardia

What is the medication of choice?

Adenosine





1- what's your diagnosis?
SVT

2- give 3 lines of management to this patient while she is in your ER ?
1) carotid massage 2) Valsalva maneuver 3) cough, cold water 4) adenosine

3- the patient complains that she has the same attake more than 3 times a week. What's your definitive treatment for her ?
If the patient is still symptomatic while taking B blocker or CCB then the definitive treatment is ablation therapy.
If the accessory pathway involves the AV node then you have to put pacemaker after ablation.

2- Atrial Flutter

70 bpm	Rate
Regular	Regularity
Flutter waves	P waves
None	PR interval
0.06 s (narrow)	QRS duration
Atrial flutter	Interpretation

Atrial Flutter

- Deviation from NSR
  - No P waves. Instead flutter waves (note "sawtooth" pattern) are formed at a rate of 250 - 350 bpm.
  - Only some impulses conduct through the AV node (usually every other impulse).

- Etiology: Reentrant pathway in the right atrium with every 2nd, 3rd or 4th impulse generating a QRS (others are blocked in the AV node as the node repolarizes).

- What is the best leads that we can see the flutter wave in ?

Inferior leads (II, III, aVF)

- The causes and the management of atrial flutter?

similar to that of Afib

- How can we control the ventricula rate ?

Digoxin, β-blockers (propanolol, metoprolol) or verapamil

- How can we restore the sinus rhythm ?

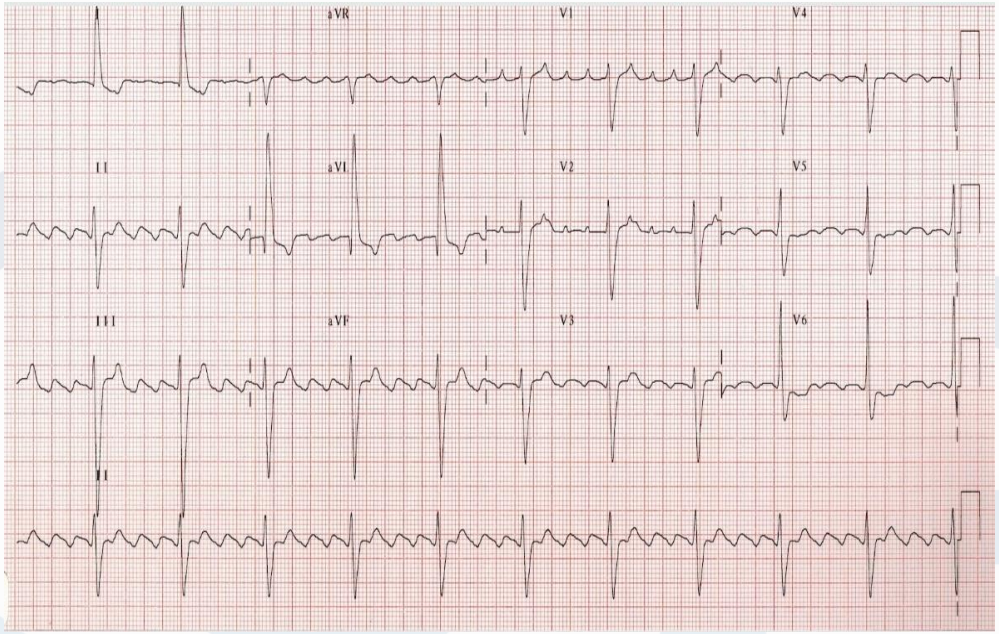
by direct current (DC) cardioversion or by using intravenous amiodarone

- How can we prevent the recurrent episodes of atrial flutter ?

Beta-blockers (propanolol, metoprolol) or amiodarone

- What is the treatment of choice for patients with persistent symptoms ?

Catheter ablation



Ptn comes to the hospital complaining from palpitation according to the ECG :

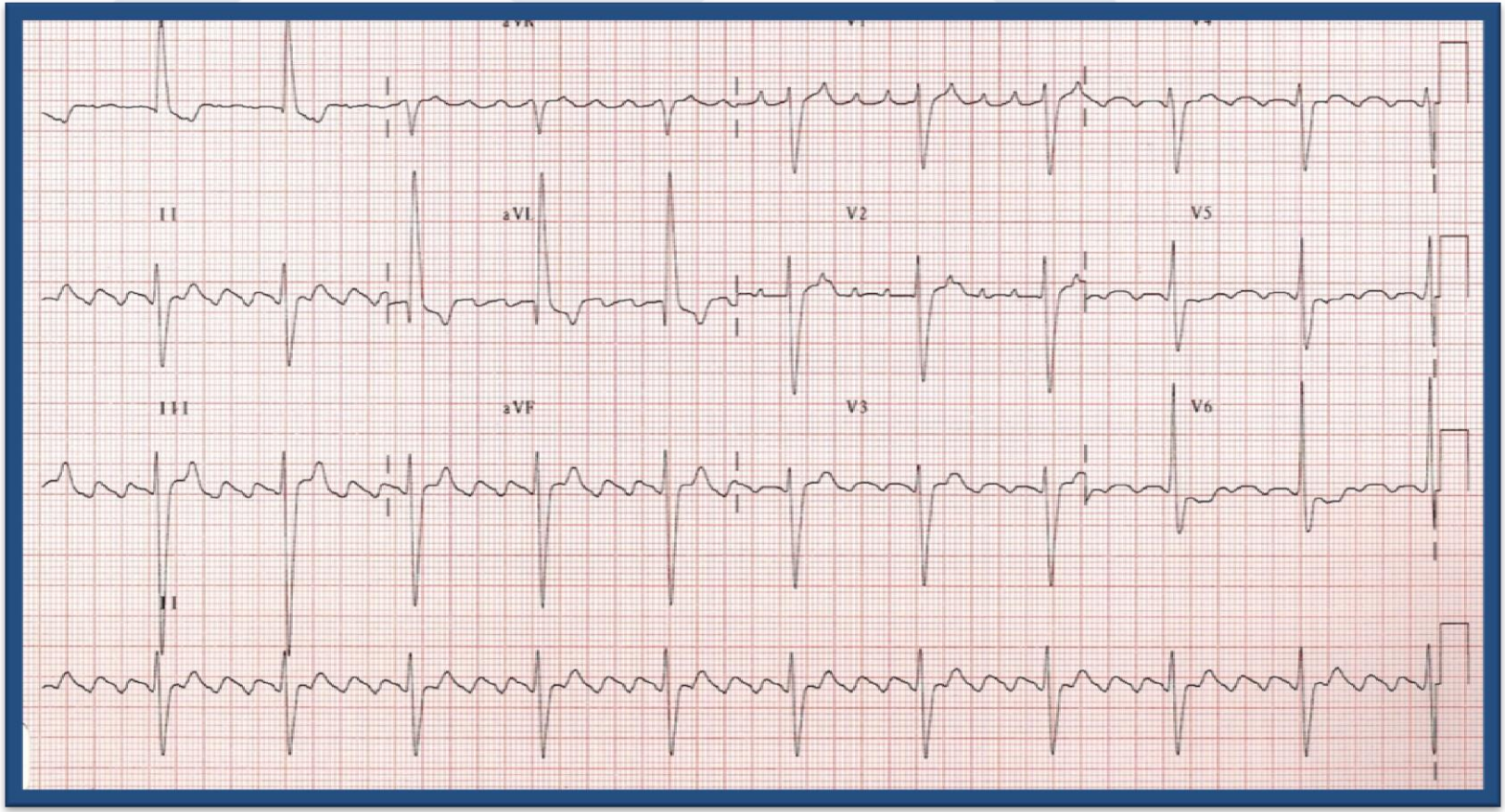
1- What is your diagnosis ?

2- if the ptn comes to ER , PB was 76/60 what you will do ?

1- atrial flutter

2- DC shock

Diagnosis?
Atrial flutter
(characteristic saw tooth appearance)



3- Atrial Fibrillation

- Etiology: Recent theories suggest that it is due to multiple re-entrant wavelets conducted between the R & L atria. Either way, impulses are formed in a totally unpredictable fashion. The AV node allows some of the impulses to pass through at variable intervals (so rhythm is irregularly irregular).
- Deviation from NSR
  - No organized atrial depolarization, so no normal P waves (impulses are not originating from the sinus node).
  - Atrial activity is chaotic (resulting in an irregularly irregular rate).
  - Common, affects 2-4%, up to 5-10% if > 80 years old

100 bpm	Rate
Irregularly irregular	Regularity
None	P waves
None	PR interval
0.06 s Narrow with normal shape	QRS duration QRS complex
Atrial fibrillation	Interpretation

A case of a pt with mid-diastolic murmur with opening snap , & difficulty on swallowing. No LVH, normal CXr. The pt develops stroke.

1)What is the valvular heart disease in this case? Mitral stenosis.

2)What is the most common arrhythmia seen in this condition ? Atrial fibrillation.

1)What is the best diagnostic radiological test in this case? ECHO.

2)What do you think the cause of the stroke is? Emboli.

30 YO pt came to the ER suffering from, SOB, palpitations, sweating & productive cough with irregular irregular pulse & mid-diastolic murmur heard on the apex of the heart.

1. **What the cause of the murmur?**

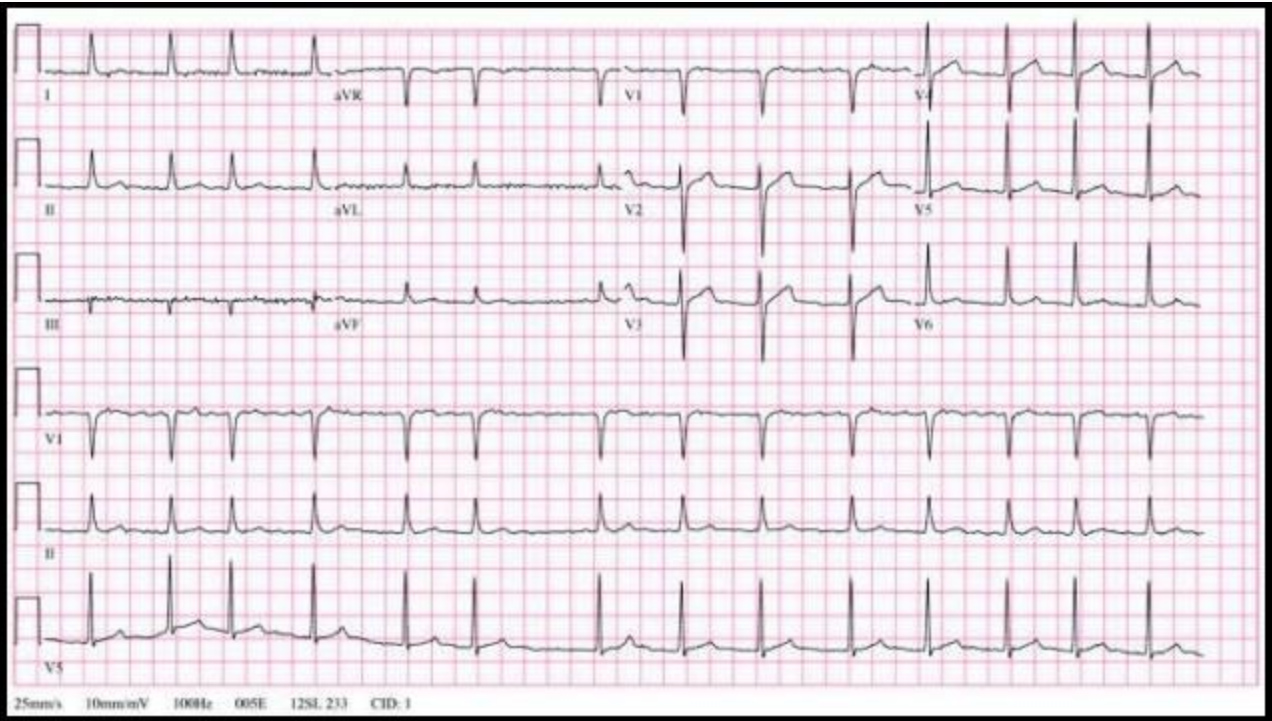
   Mitral stenosis

2. **Mention the cause of the SOB.**

   Acute pulmonary edema.

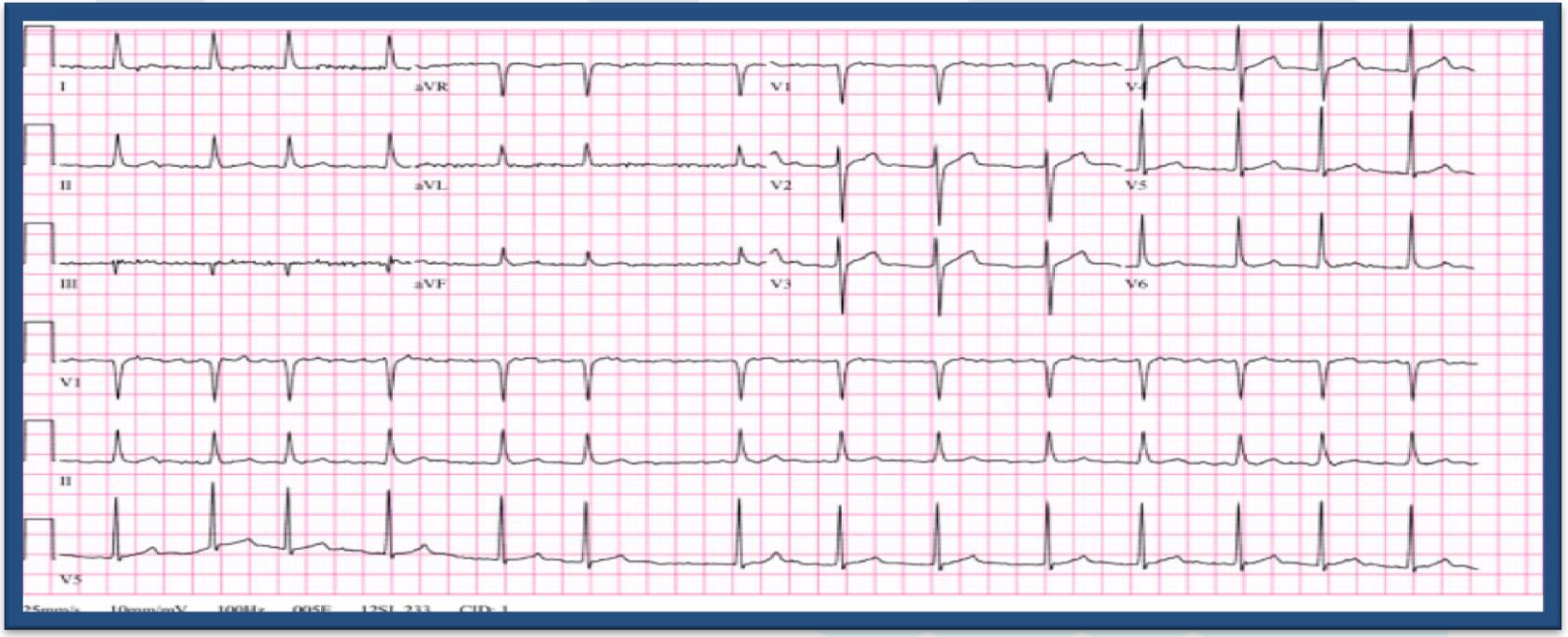
3. **What caused the irregular pulse?**

   AF



1. Dx ⇢ Atrial fibrillation : Absent P waves, Irregularly irregular rhythm, Fibrilltory waves.
2. Rate: Count the number of R waves in a 30 large squares and multiply by 10.
3. Causes of AF: a. HTN b. Heart failure c. MI d. Thyrotoxicosis ….

- A 76-year-old man comes to the physician with palpitation , dizziness and progressively worsening fatigue over the past 3 months. He has a 50-pack-year smoking history. His pulse is 11 0/min and irregularly irregular. Initial ECG findings are shown below



A- What's your diagnosis?

AF (irregularly irregular rhythm and no p waves).

B) what is the initial investigation should be done ?

ECG (If the ECG is not present in the question)

C) give five possible causes ?

1) coronary artery disease (MI)
2) Valvular heart disease, especially rheumatic mitral valve disease
3) Hypertension
4) Sinoatrial disease
5) Hyperthyroidism, pheochromocytoma
6)Excessive Alcohol intake (holiday heart syndrome)
7) Pulmonary embolism

D) what's the valvular disorder?

Mitral stenosis

E) What is the charactaristics finding of Afib on ECG ?

- Irregularly irregular RR intervals
- P-waves are indiscernible
- Tachycardia
- Narrow QRS complex (< 0.12 seconds)

G) Mention the 3 considerations in treating AF

Rate control / Rhythm control / Anticoagulation prophylaxis

H) what is the first step in management ?

Rate control (beta blocker (the best) (propanolol, metoprolol) or CCB (diltiazem, verapamil)

I) What is the best choice for rythme control ?

electrical cardioversion

J) in patient with contraindication to take anticoagulants , what's the anatomical structure to be occluded percutaneously ?

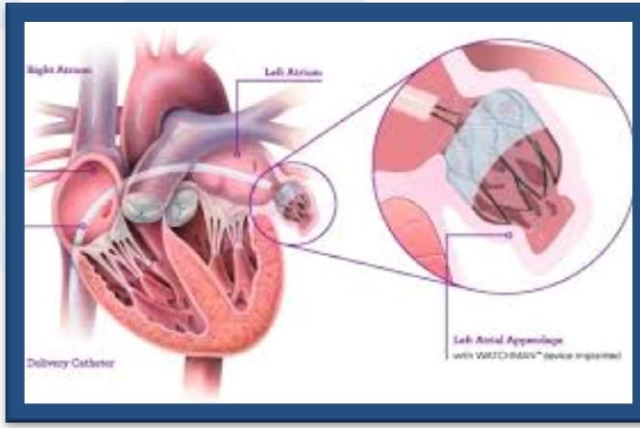
Left atrial appendage

K) Give the possible complications?

- Acute left heart failure→ pulmonary edema
- Thromboembolic events: stroke/TIA
- life-threatening ventricular tachycardia

L)AF without anatomical defect is called?

Lone AF



Management of A.fib

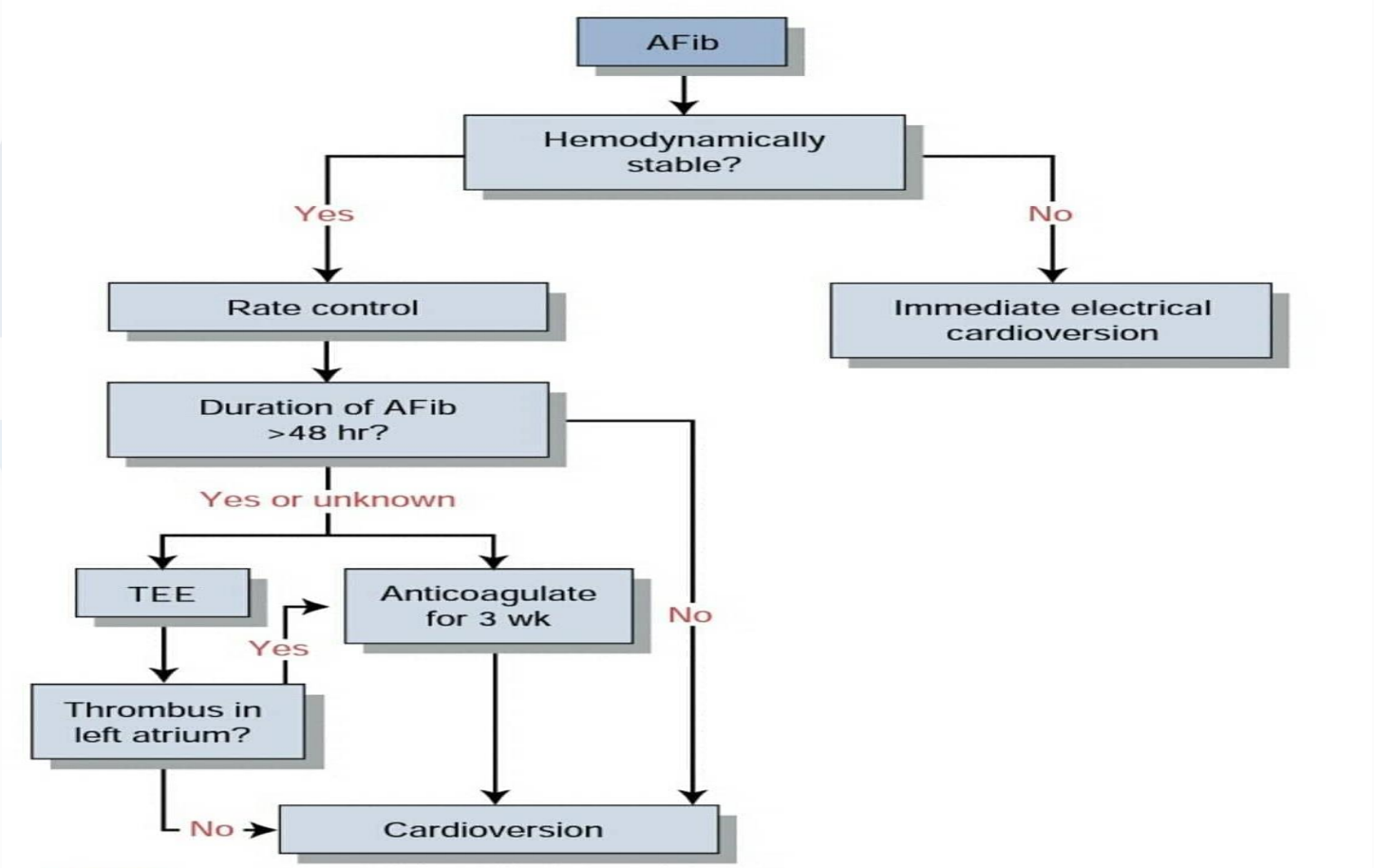


FIGURE 1-10 **Acute management of atrial fibrillation.**

- If the pt presented chest pain, confusion and his blood pressure is 90/60 pulse , what is the best initial step ? Immediate electrical cardioversion (hemodynamic unstable)

- If the pt presented chest pain, palpitation for three days and his BP is 130/95 pulse , what is the best initial step ?

  Rate control (beta blocker (the best) (propanolol, metoprolol) or CCB (diltiazem, verapamil) (hemodynamic stable)

  - What is the next step in management after we do rate control ??

    We do TEE (if present)to detect the presence of thrombus in the Lt atrium or we give anticoagulant to pateint for 4 weeks then we do cardioversion (hemodynamic stable)

- If the pt presented chest pain, palpitation for 12 hours and his BP is 130/95 pulse , what is the best initial step?

  Immediate cardioversion, after administration of intravenous heparin

- What is the preferred anticoagulant used in pt with Afib to prevent the thrombus formation ?

  Warfarin (INR 2-3)
- If the cardioversion is ineffictive , what is the next step ?

  Catheter-based radiofrequency ablation
- Where we should do the ablation ?

  In the atrial tissue around pulmonary vein openings

1 - Look At P wave

B- P wave Absent

→ Look QRS

2. Wide QRS → Regular ?

IF yes :

1- Ventricular tachycardia

2- SVT with abberancy

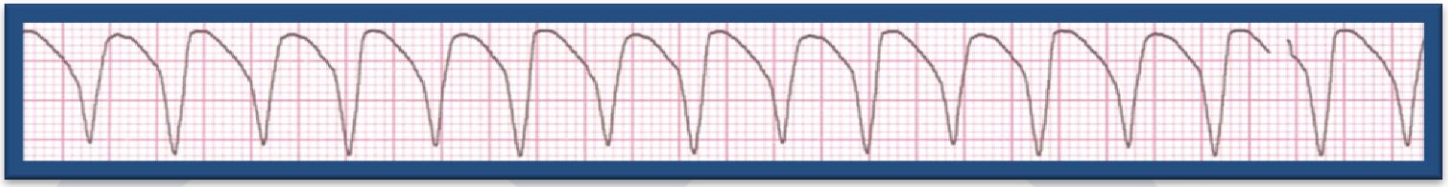
If no :

3- Ventricular fibrillation

1- V tach Rhythm

160 bpm	Rate
regular	Regularity
none	P waves
none	PR interval
wide (> 0.12 sec)	QRS duration
Ventricular Tachycardia	Interpretation

Ventricular Tachycardia



- Deviation from NSR
  - Impulse is originating in the ventricles (no P waves, wide QRS).
- Etiology: There is a re-entrant pathway looping in a ventricle (most common cause).

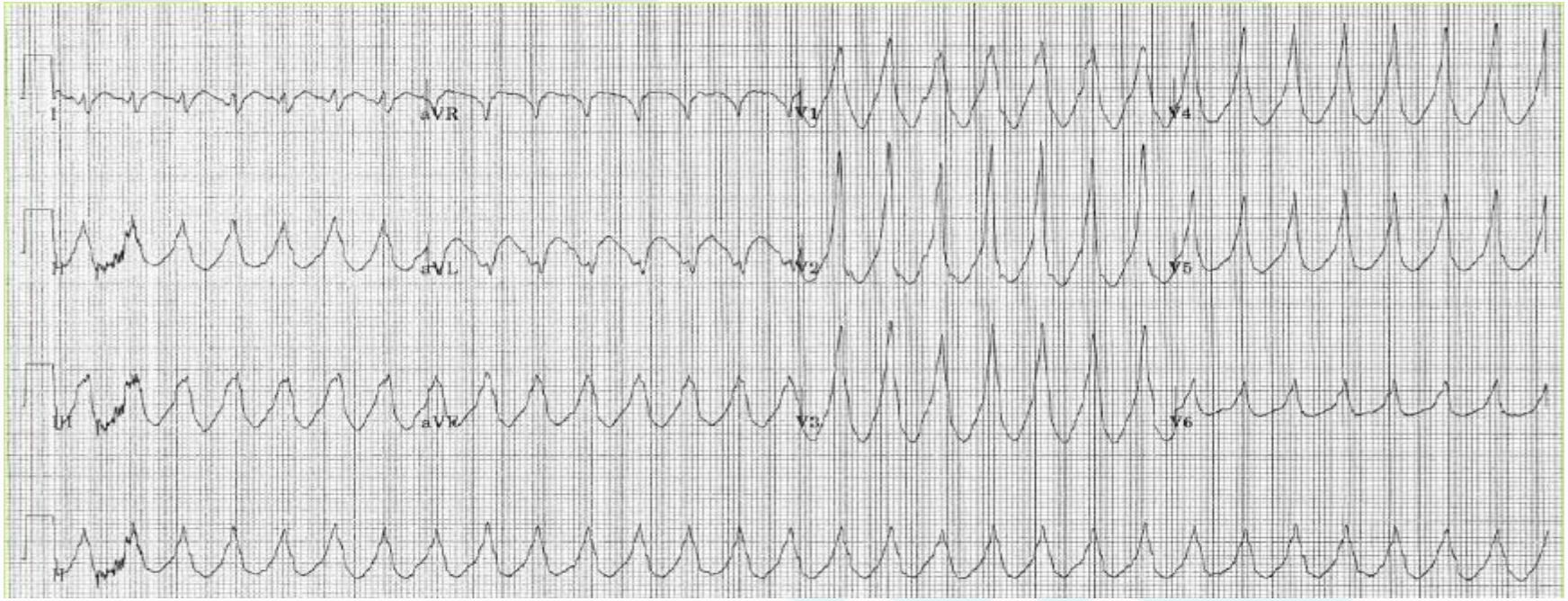
- Ventricular tachycardia can sometimes generate enough cardiac output to produce a pulse; at other times no pulse can be felt.
- 1-causes : CAD pror MI is the most common cause , active ischemia , cardiomyopathy, congenital defects ,prolonged QT syndrome ,drug toxicity .
- 2- clinically : palpitation , dyspnea , angina syncope or near syncope , signs of cardiogenic shock on PE we can see cannon A wave
- 3-dx : wide bizarre QRS

- 4-Treatment :

I. If hemodynamically stable with mild symptoms and systolic BP >90 : IV amiodaron IV procainamide or IV sotalol

II. If hemodynamically unstable or pt with severe symptoms :immidiate synchronus DC cardioversion follow with IV amiodaron

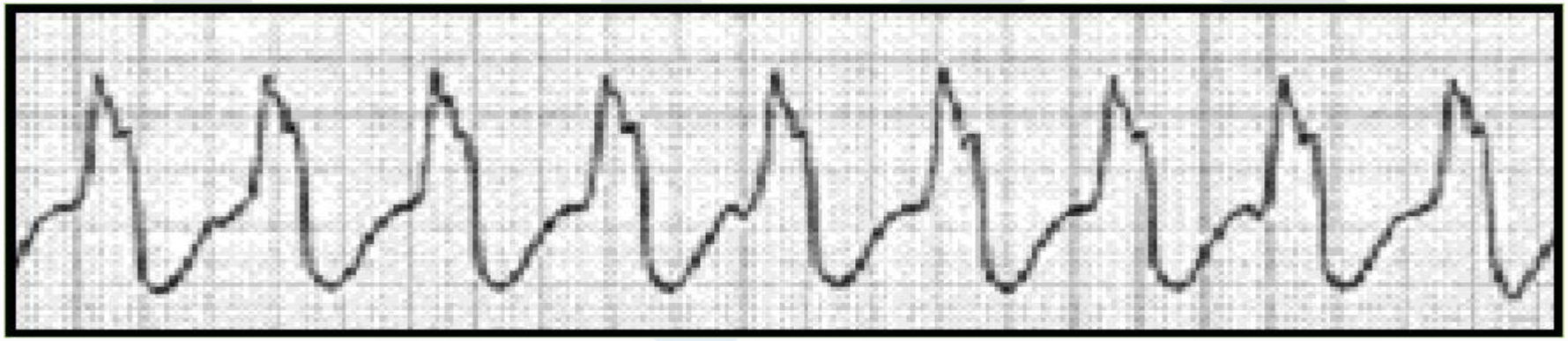
Q24:This patient presented with dizziness & palpitation, normal blood pressure. What's the treatment of this case?



Lidocaine (V. tachycardia)

(**LIDOCAINE**) **Lignocaine** is a class IB antiarrhythmic drug and is the first choice for **VT**. It is given intravenously in a dose of 1–3 mg/kg. For cardiac arrest, a 100 mg bolus is given, which may be repeated after 5–10 minutes.

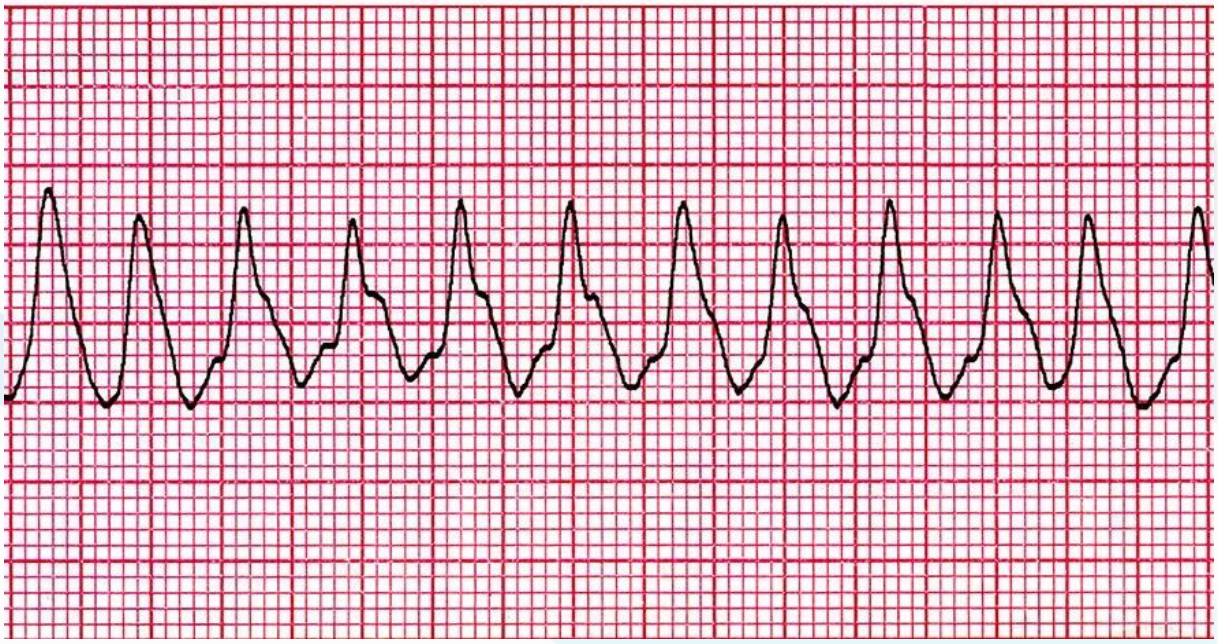
Q25: What is your finding in this lead of ECG?



Venticular tachycardia.

P waves (hard to be seen)
regular WIDE QRS interval.

Q26: A patient is hospitalized and all of the sudden he collapses, what is the ECG finding ?



- Ventricular tachycardia

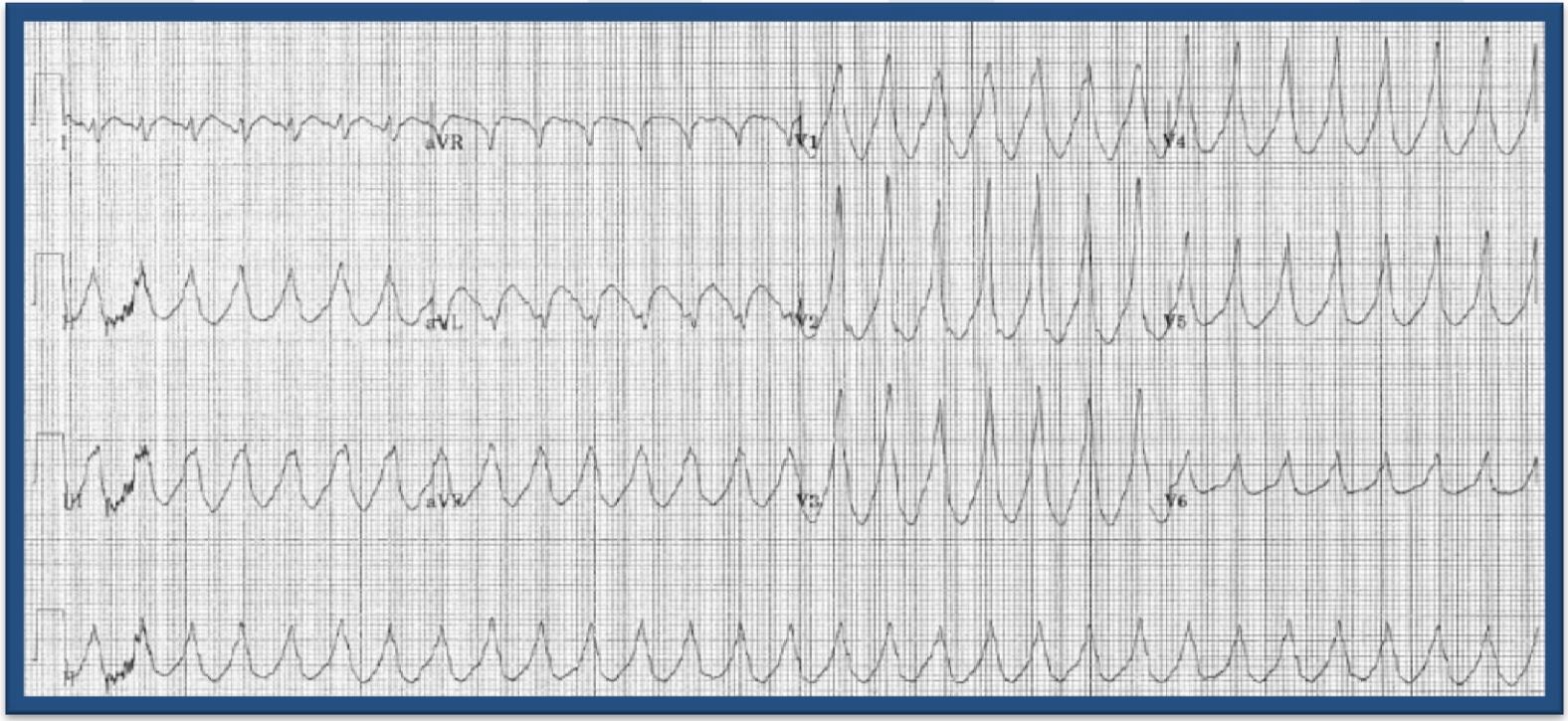
P waves. (hard to be seen)
regular WIDE QRS interval.

Q:This patient presented with dizziness & palpitation, normal blood pressure.

What's the treatment of this case?

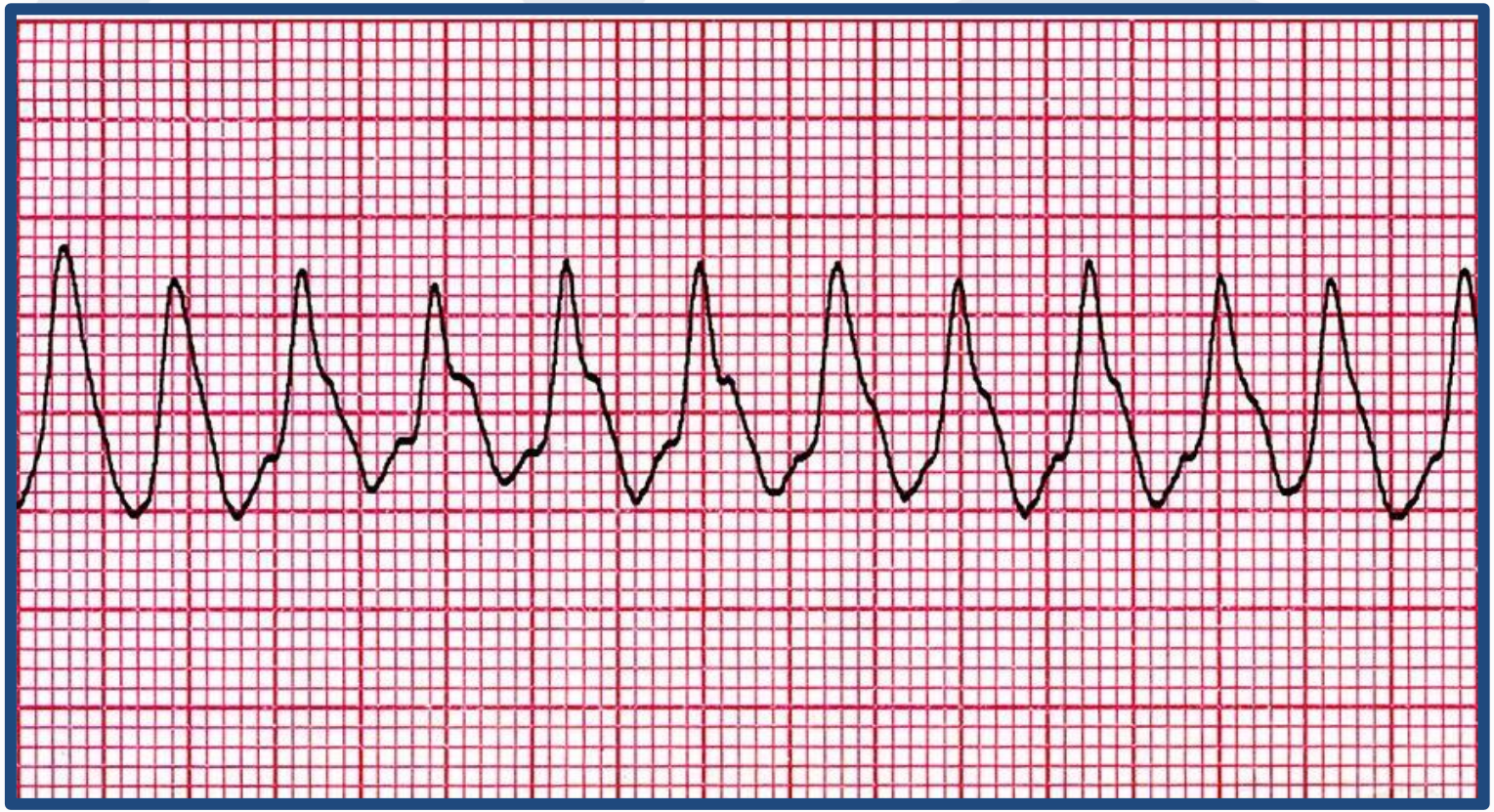
IV amiodaron or IV procainamide or Lidocain

(V. tachycardia)



Q:A patient is hospitalized and all of the sudden he collapses, what is the ECG finding ?

Ventricular tachycardia



2- Ventricular Fibrillation Rhythm

none	Rate
irregularly irreg.	Regularity
none	P waves
none	PR interval
wide, if recognizable	QRS duration
Ventricular Fibrillation	Interpretation

Ventricular Fibrillation

- Deviation from NSR
  - Completely abnormal.
- Etiology: The ventricular cells are excitable and depolarizing randomly.
- Rapid drop in cardiac output and death occurs if not quickly reversed
- causes : ischemic heart disease is the most common cause , anti arrhythmic drugs , Afib with a very rapid ventricular rate in pt with WPWs
- Clinically :cannot measure BP; absent heart sound and pulse , pt is unconscious if un treated lead to sudden cardiac death
- Dx : ECG findings : no QRS compexes ,no waves can be identified and irregular rhythm
- Treatment :Immidiate defibrillation and CPR is indicated

Q:50 YO male in CCU, he is waiting for cath., he lost his consciousness, with this ECG. Dx? Your management?

ventricular fibrillation >>DC shock.

Defibrillation vs. Cardioversion

Defibrillation	■ ***Electric shock delivered without synchronization with ECG activity*** ■ ***Used in VF or pulseless VT***
Synchronized Cardio-version	■ ***Electric shock delivered with synchronization with R wave to avoid the R on T phenomenon*** ■ ***Used in unstable tachyarrhytmias other than VF or pulseless VT***

Thank You

ECG Mini Osce

Dr.Abdullah Alwikhyan

2.Chest Pain → MI , Acute pericarditis , PE

Look at ST Segment

2- Look At **ST Segment**

If it is :

1. **Isoelectrical** → Normal or PE "Hx"

2. **Depressed ST segment** → Ischemia or NSTEMI

3. **Elevated** → look at **all LEADS IF :**

A. **Diffuse Elevation + PR depression** → A. Pericarditis

B. **Localized** → **STEMI** according to the affected leads

Isoelectric ST segment + Hx for PE

Pulmonary embolism

Q: An ECG for a 70 years old woman, bedridden, hospitalized for surgery and suddenly developed severe SOB.

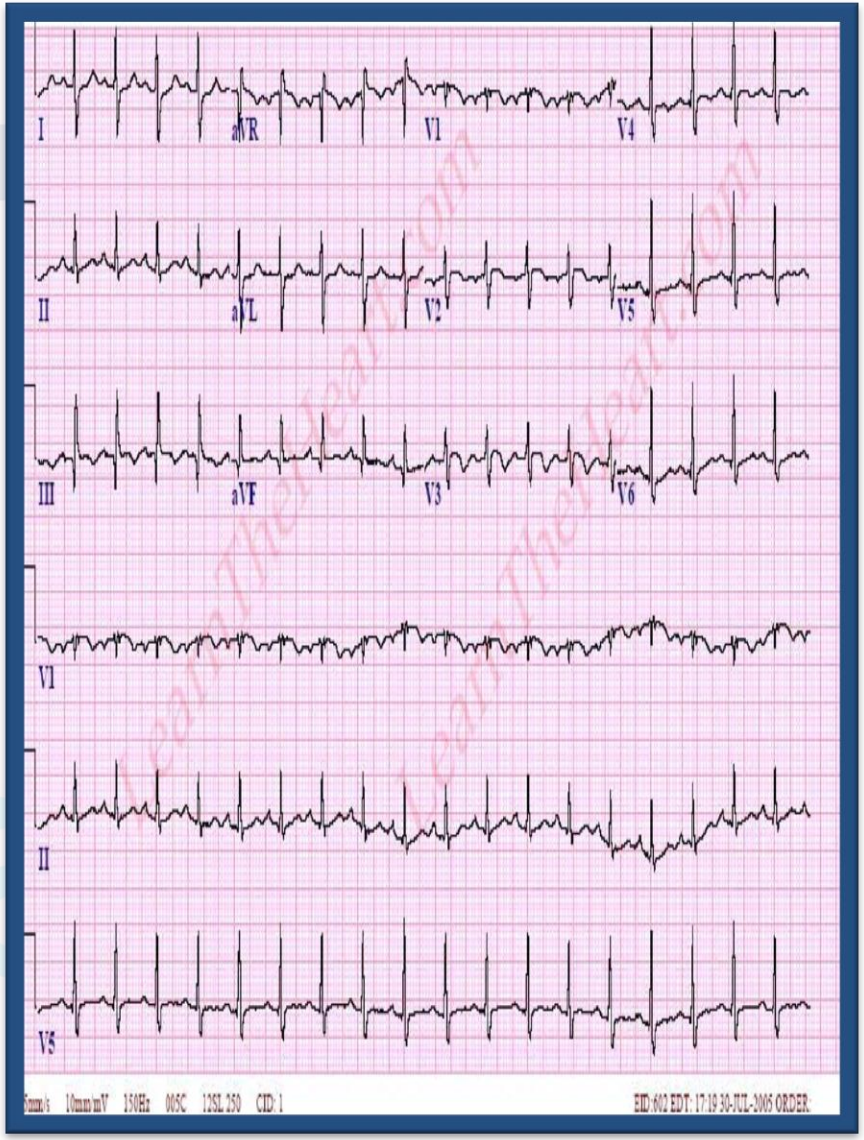
a) What's your diagnosis?

PE

b) What changes will you find on the chest x-ray?

usuallly Normal

atelectasis or plural effusion may be present, dilated pulmonary artery, widge shape opacites or cavitation



Question 1

A 35 year old female 2 weeks postpartum presented to you with SOB & chest discomfort.
On physical examination her BP was 85/56 mmHg and her SaO2 was 75% and corrected in the ER to 90%

1) 4 ECG findings:

2) your diagnosis?

3) best investigation?

4) treatment according to her vitals

Not the same image

Answers

1) sinus tachycardia, RAD, S1Q3T3 & positive R in V1

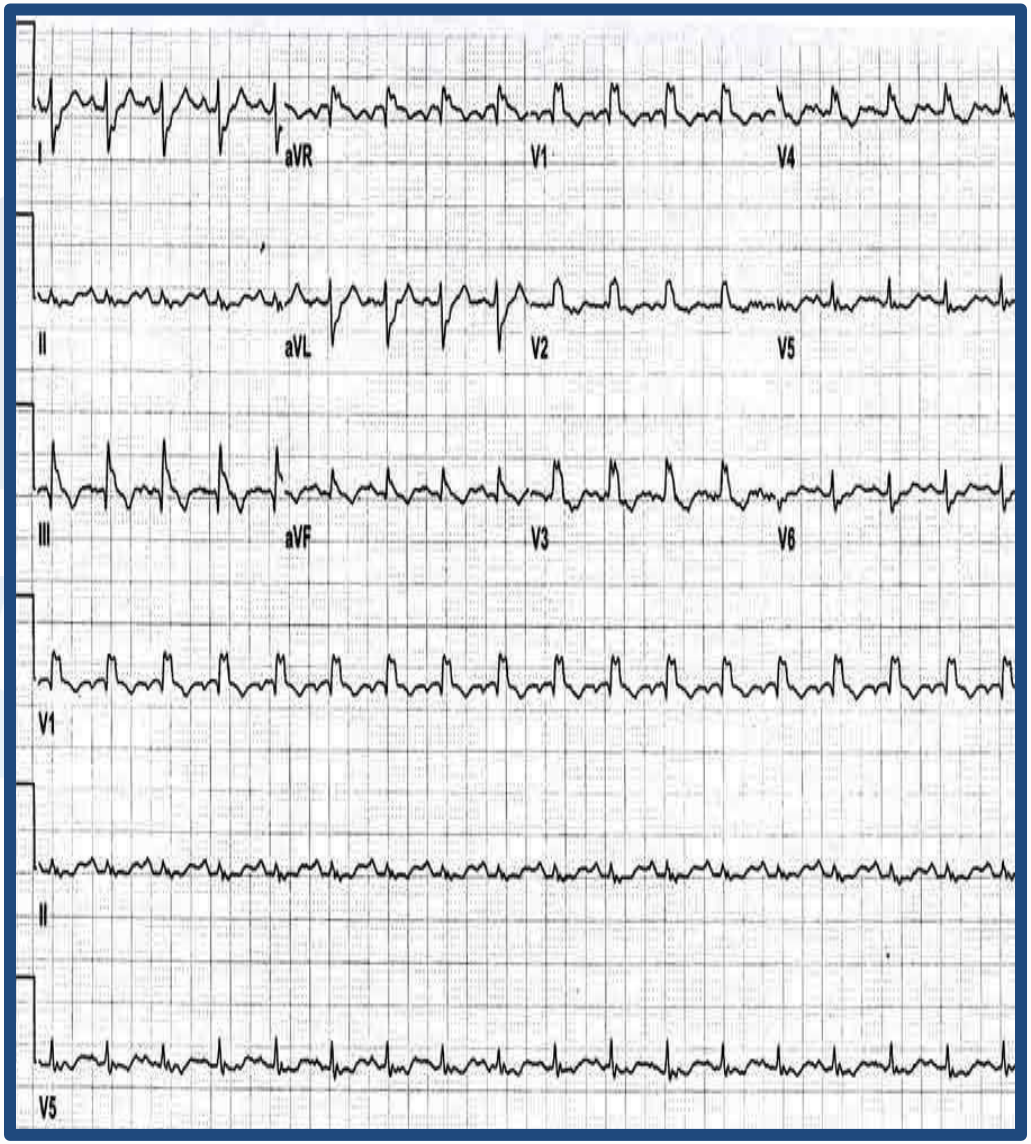
2) PE

3) CT angio

4) IV fluid to correct her BP

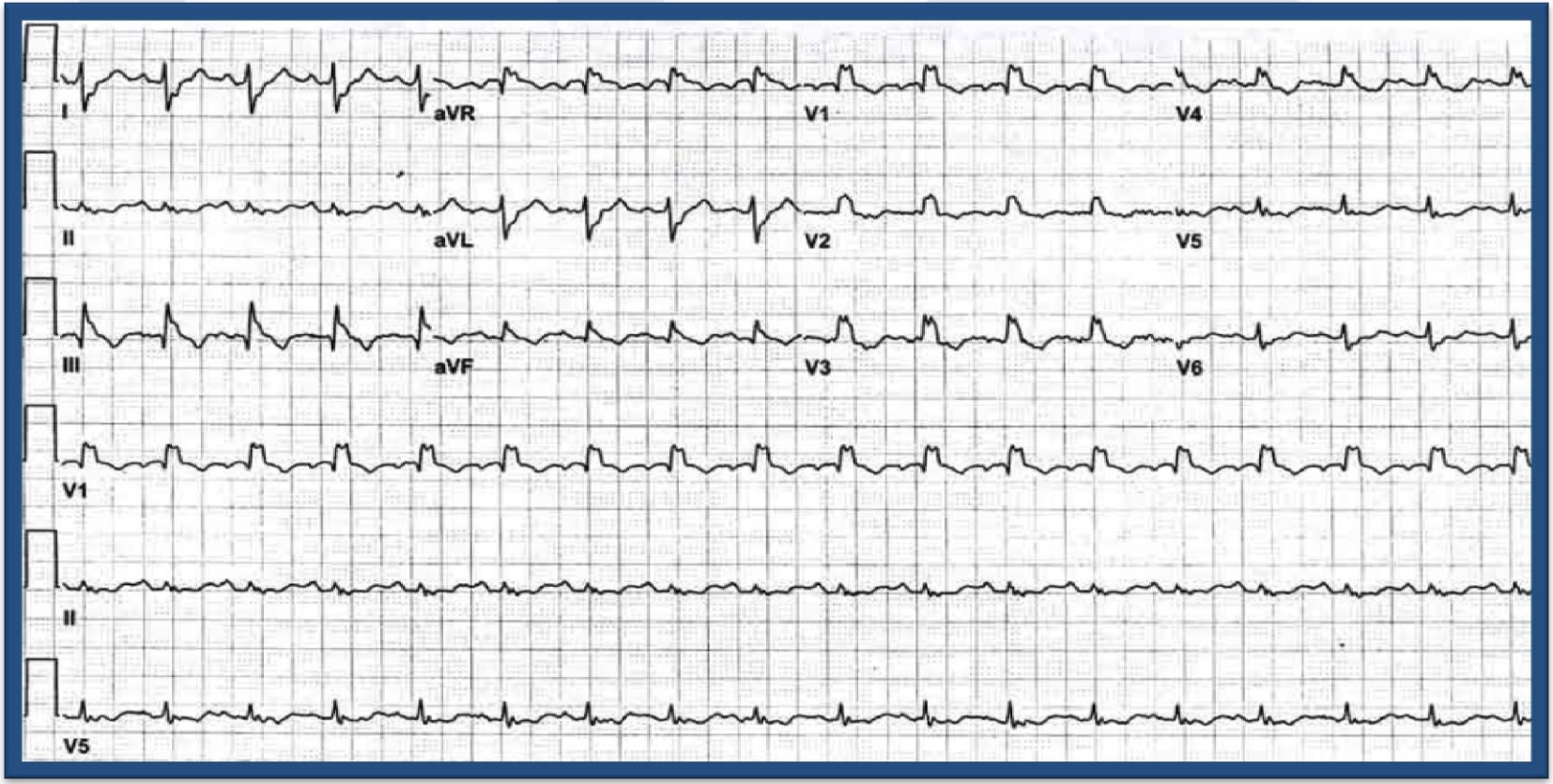
Q: YO female, bedridden , presented with sudden sob and chest pain, give two abnormalities in this ECG ?

S1Q3T3, With Wide QRS Complex And RBBB (inverted (T)from v1 to v4 (Pulmonary Embolism),



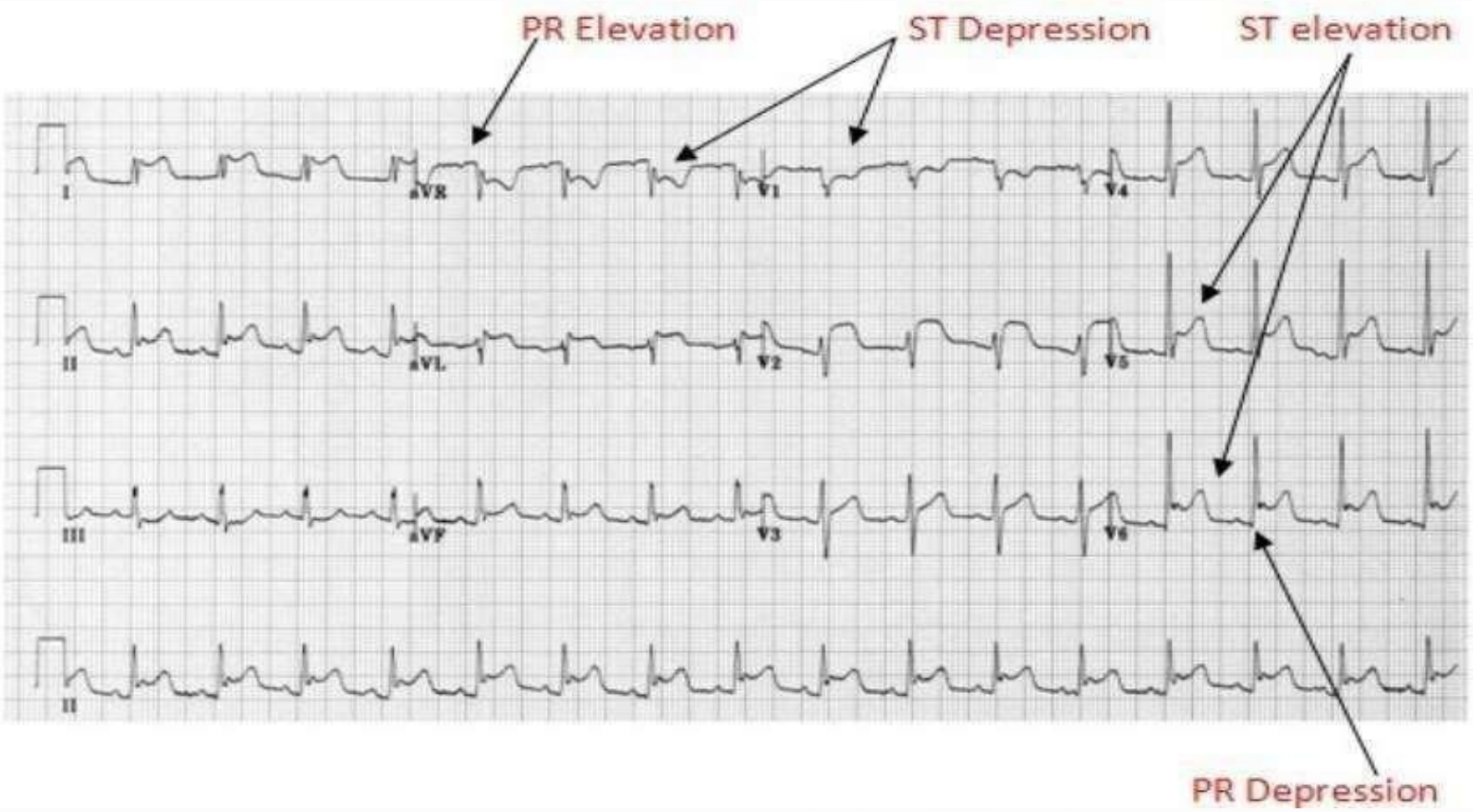
Q:This pt presented with palpitation, he is known case of recurrent attacks of DVT. Give 2 abnormalities in this ECG?

S1Q3T3, RBBB pattern which is suggestive of pulmonary embolism.



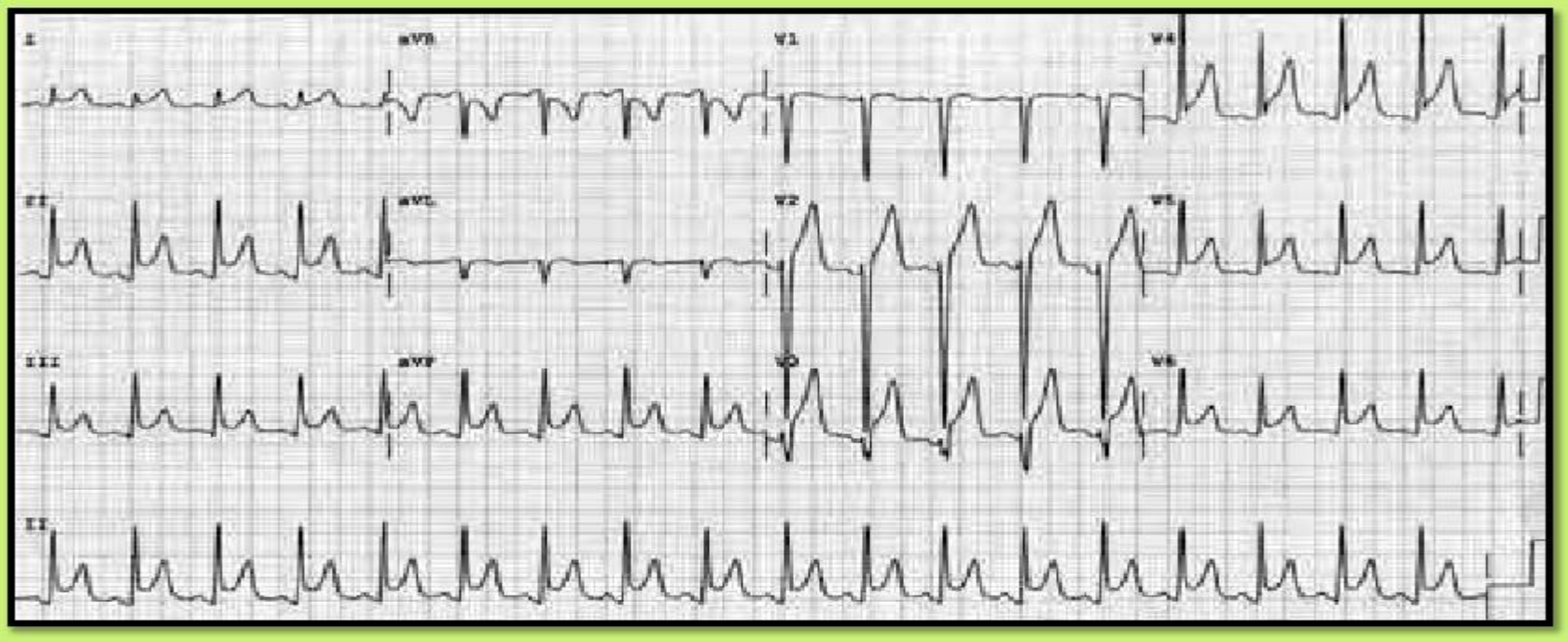
Diffuse ST elevation → A.Pericarditis

Pericarditis ECG changes



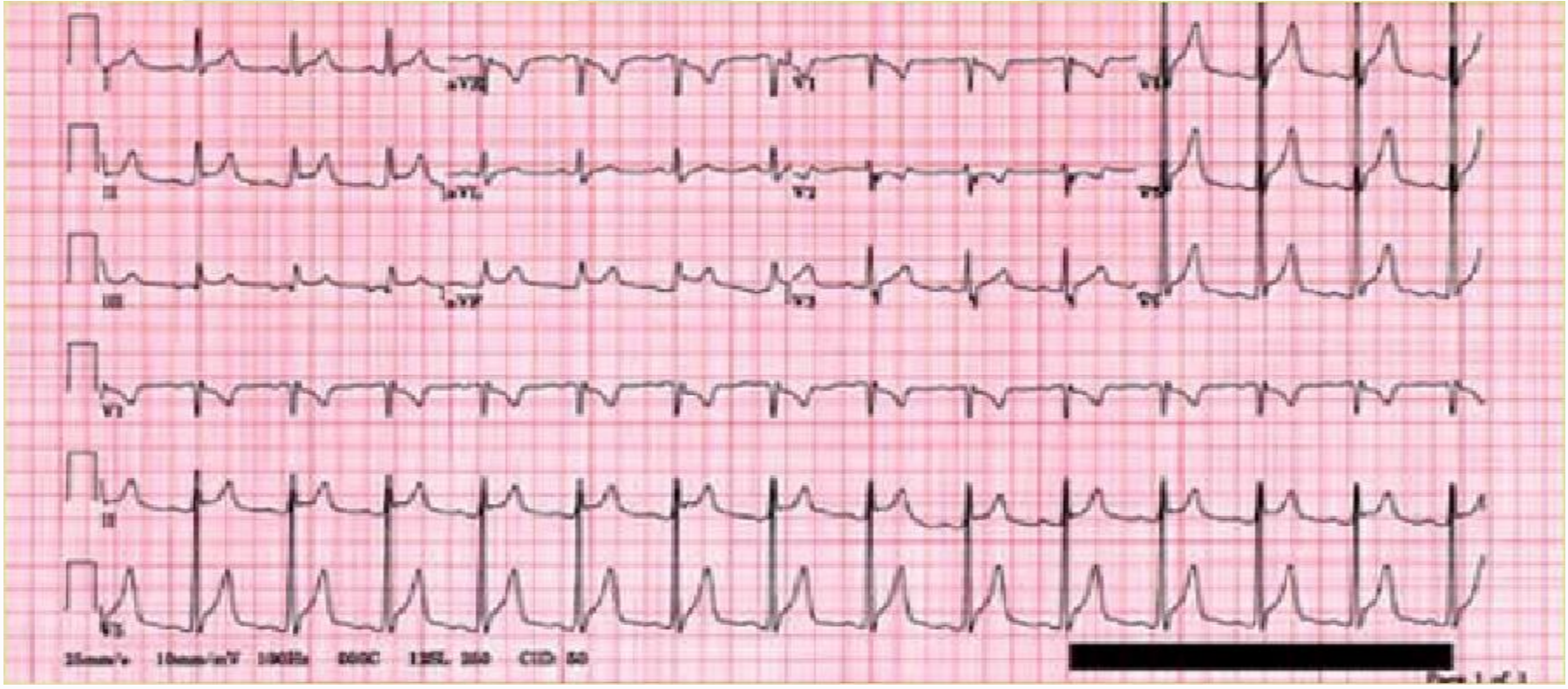
Q43: The pt came with central sudden onset of sever chest pain for 6 hrs ,

What is the diagnosis?



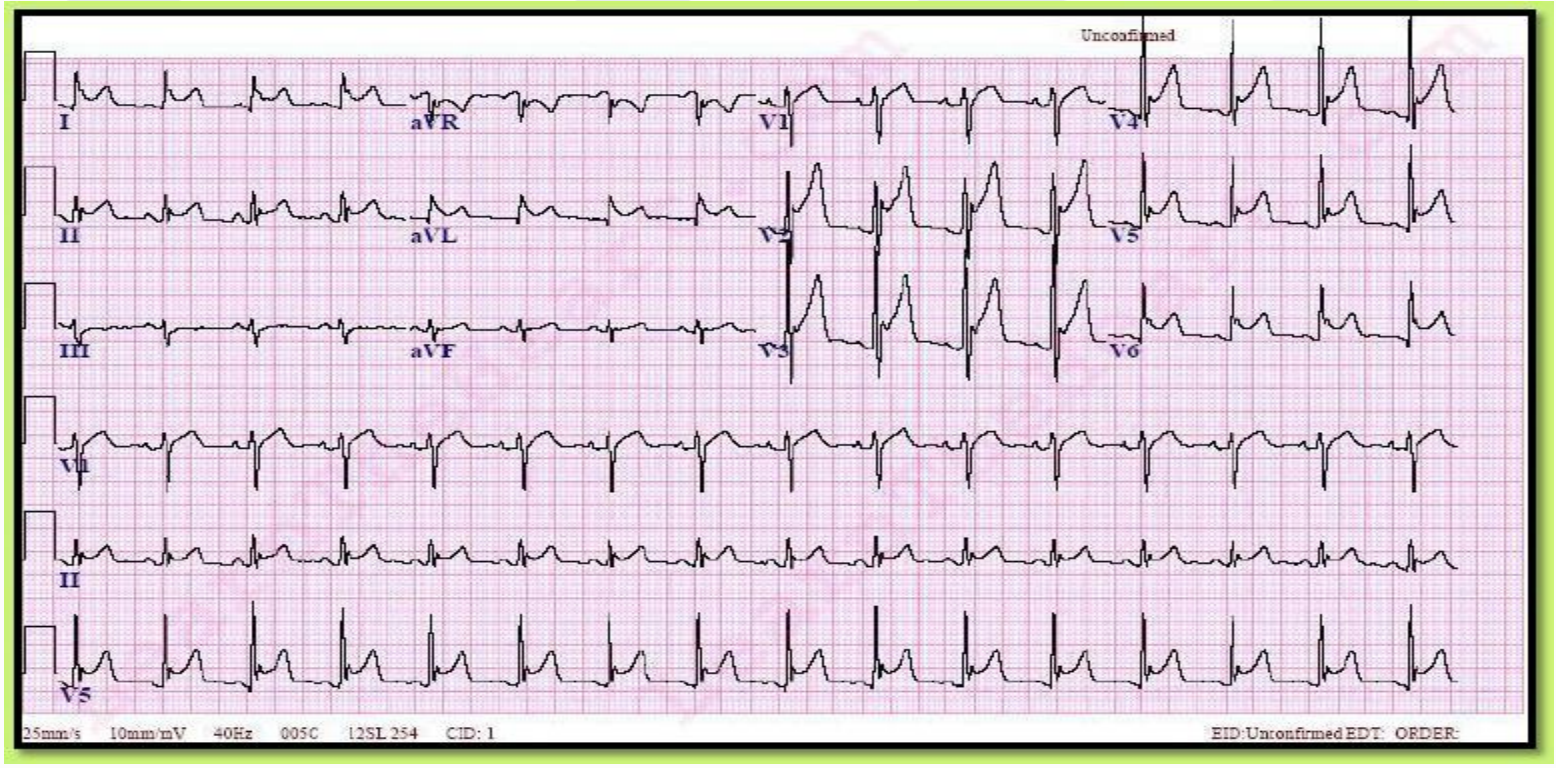
Acute Pericarditis .

Q45: A 30-year old male had a sudden onset stabbing chest pain. ECG showed the following. What is the diagnosis?



Acute pericarditis .

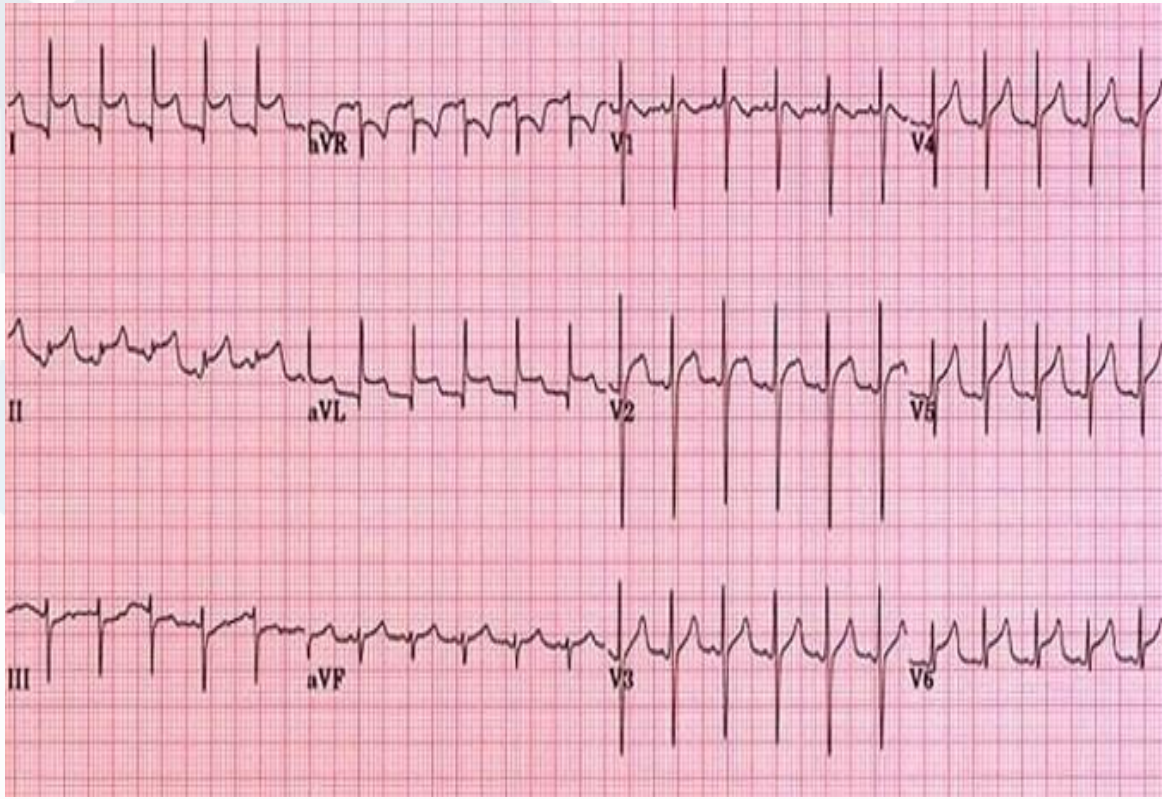
Q46: SLE patient presented with central chest pain started acutely for 30 Minutes along with mild fever. What is the ttt ?



Treatment of pericarditis due to SLE: Colchicine, Bed rest & NSAIDs.

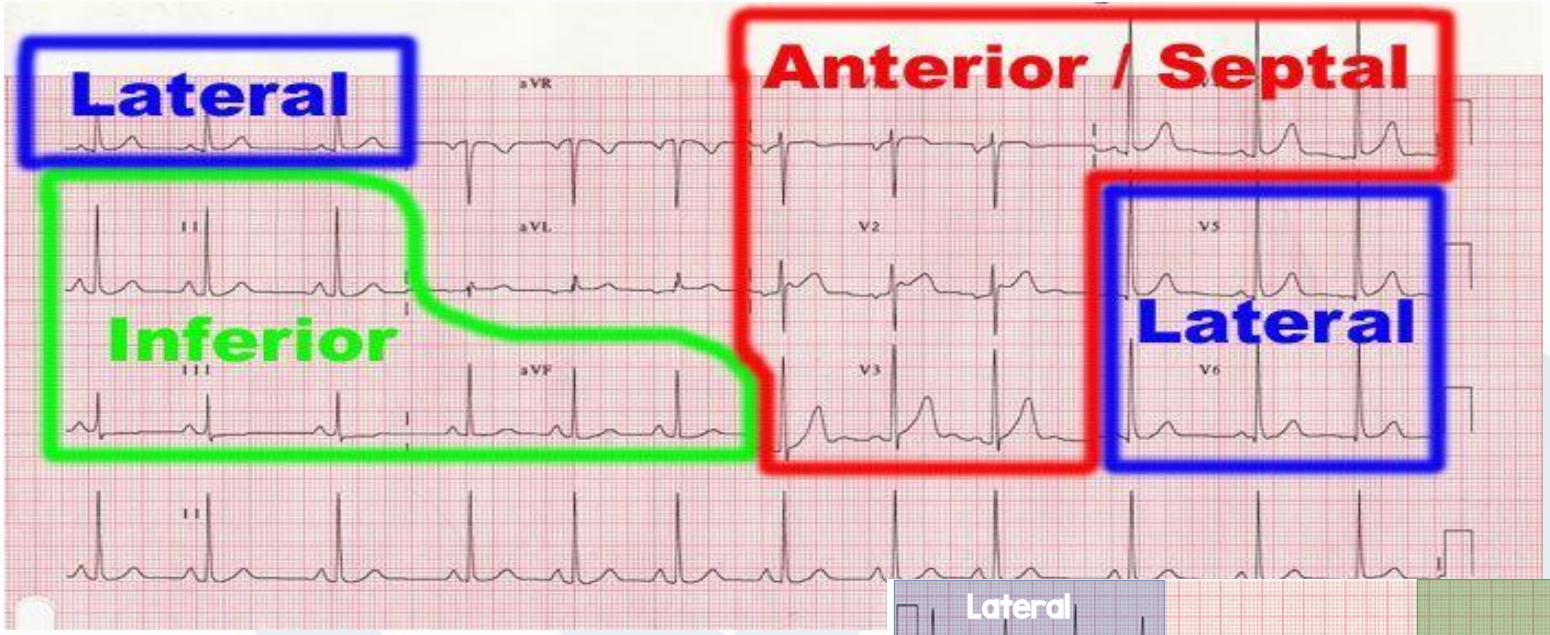
Q7 : the cause of this ECG ?

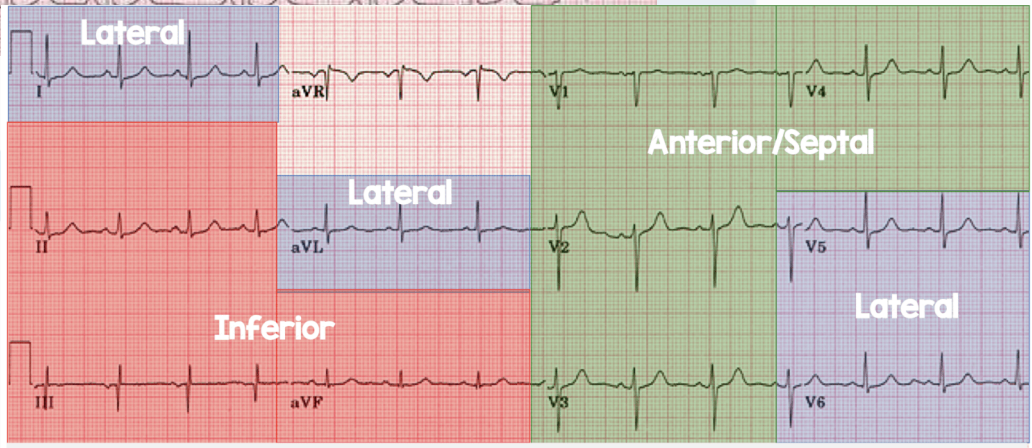
- Atherosclerosis
- Coronary occlusion
- Viral infection



- **NOTE :**
  (you must know the ECG is for pericarditis)

Localized ST Elevation → MI

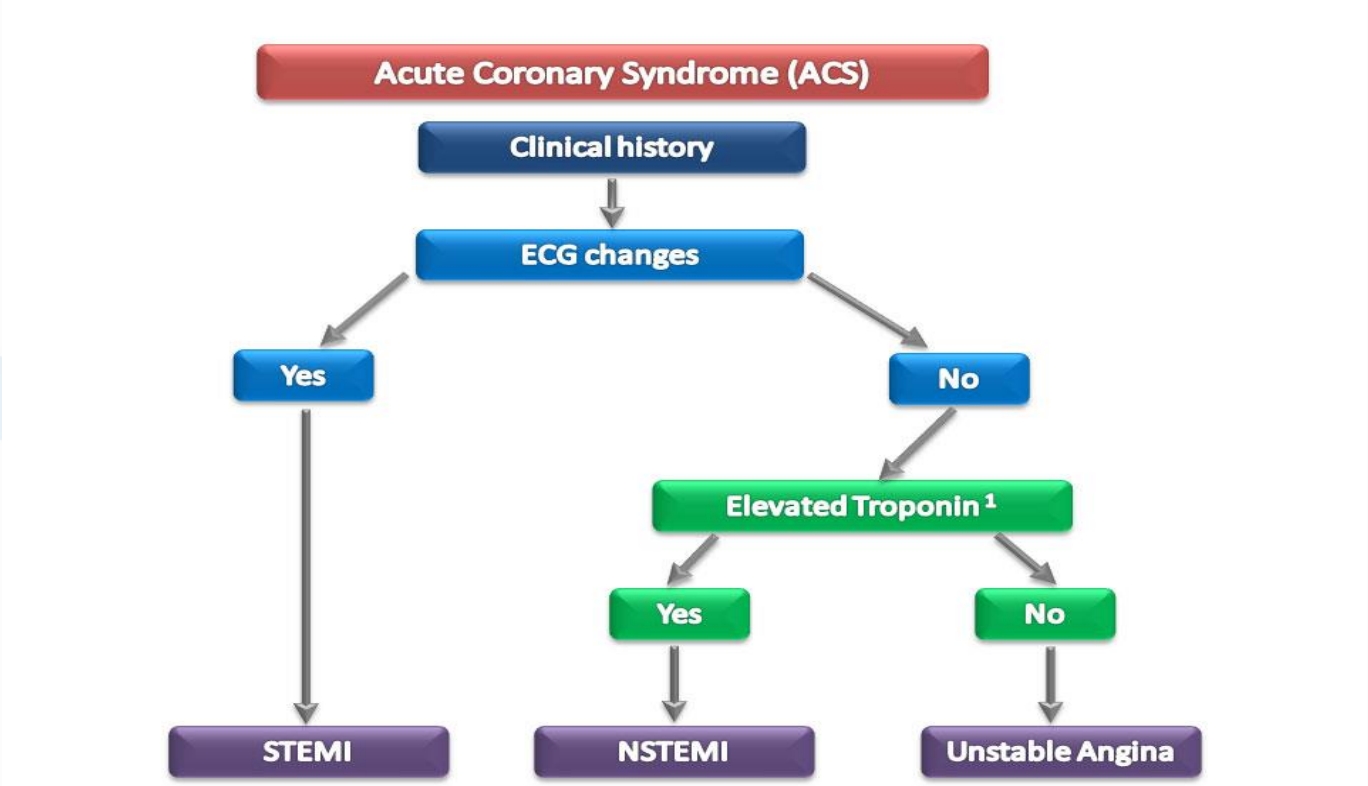




Coronary Anatomy & ECG Leads

Lateral Leads	I, aVL, V5 - V6	LCx or Diagonal of LAD
Inferior Leads	II, III, aVF	RCA and/or LCx
Anterior/Septal Leads	V1 - V4	LAD

- ECG, cardiac enzymes.
- Unstable angina.
- Admission and cath.
- CABG .

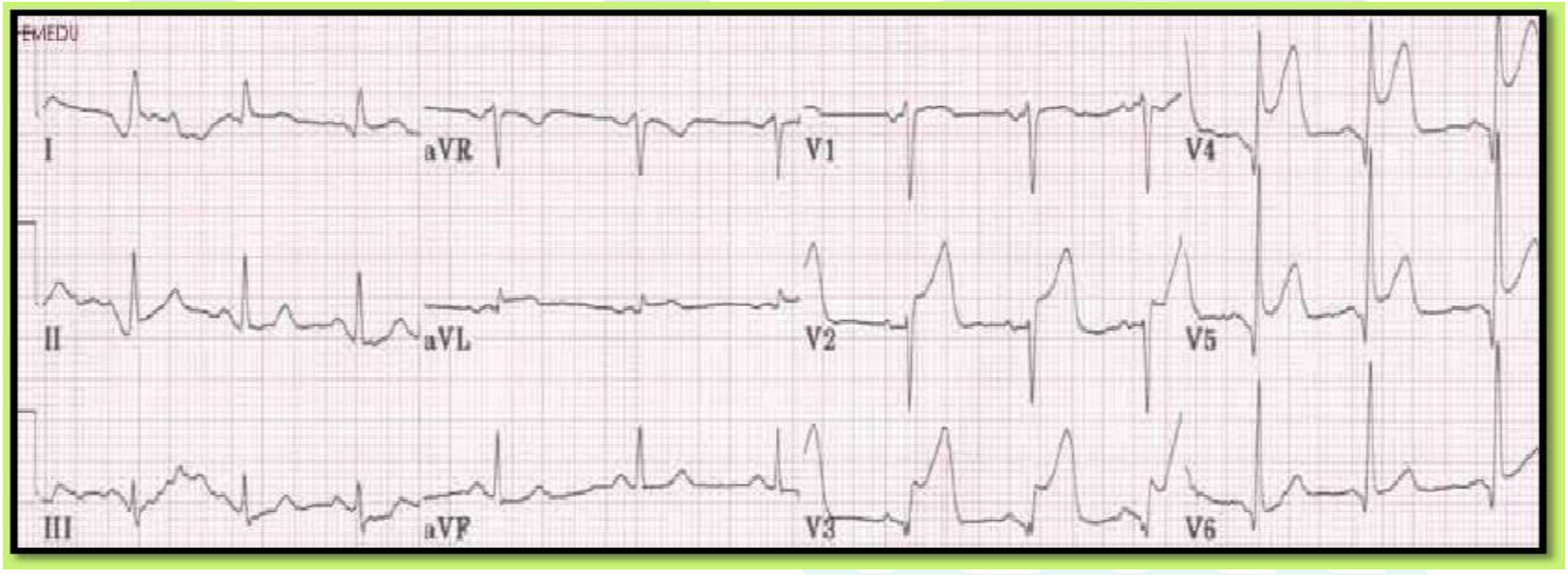


Management of ST-segment elevation myocardial infarction (STEMI)

- Oxygen for arterial saturation <90%
- Nitrates
  - Caution with hypotension, right ventricular infarction, or severe aortic stenosis
- Antiplatelet therapy
  - Aspirin + $P2Y_{12}$ receptor blocker
- Anticoagulation
  - Unfractionated heparin, low-molecular weight heparin, or bivalirudin
- Beta blockers
  - Contraindicated in overt heart failure
  - High risk for cardiogenic shock
  - Bradycardia
- Prompt reperfusion with PCI
  - Ideal first medical contact to PCI ≤90 minutes
- Statin therapy as soon as possible

PCI = percutaneous coronary intervention.

Q5: This ECG is for a 48 YO pt, presented with chest heaviness, diaphoresis &nausea for 2 hrs. What is your Dx?



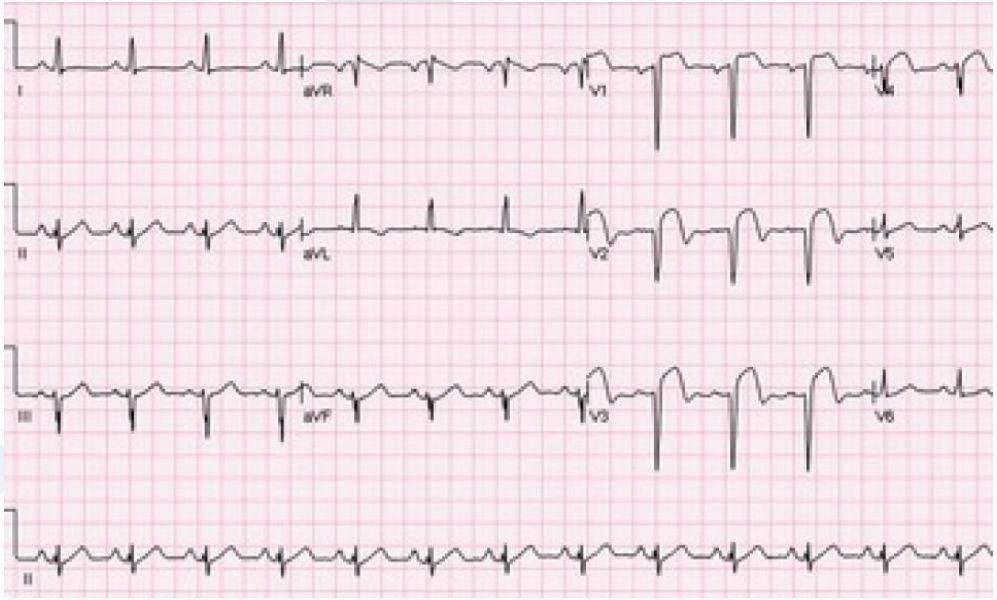
Acute Anterior wall (anteroseptal) ST elevation MI.

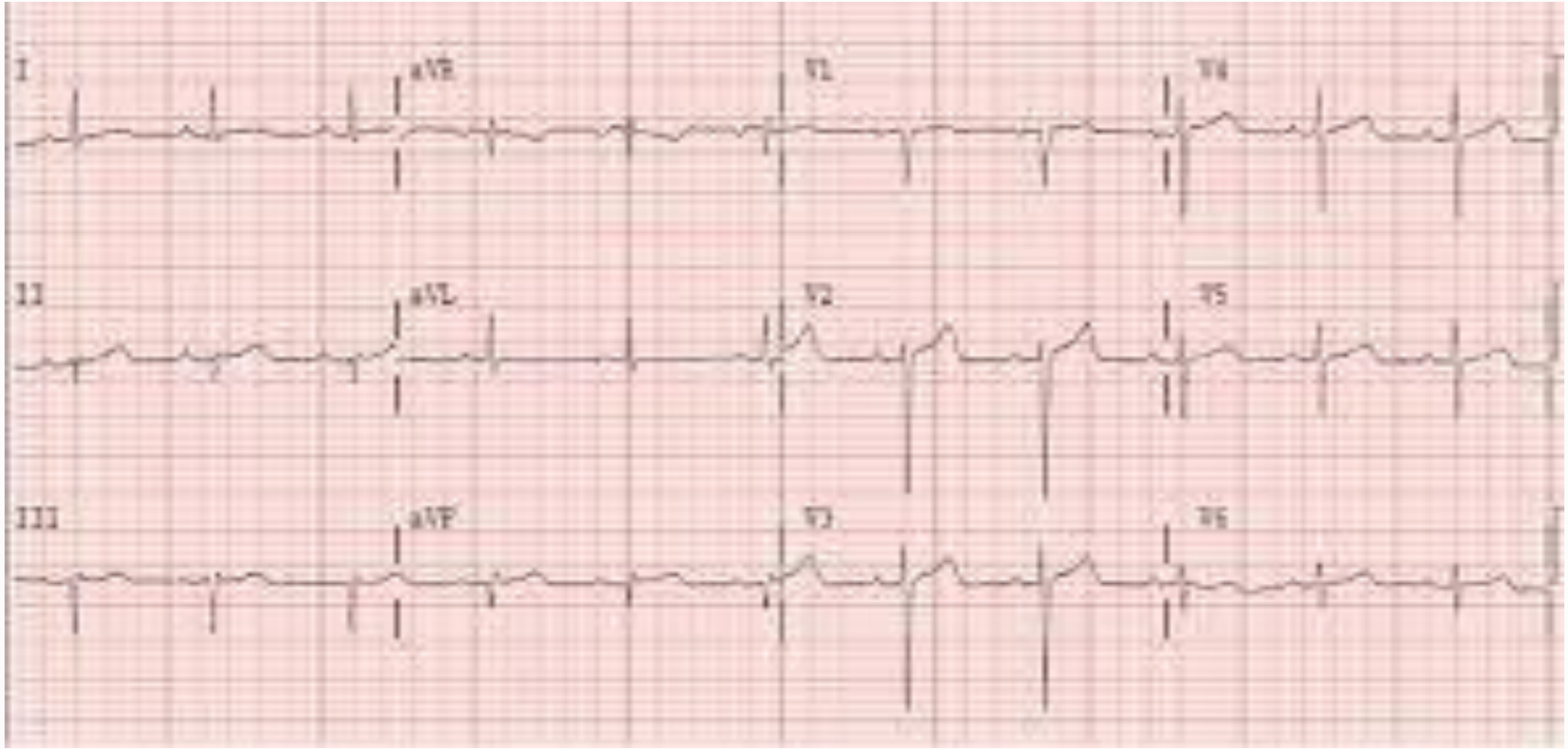
Pathological Q waves
seen in Old MI
(ECG from Google)

Q14

Q1

- Mention 3 findings?
  1. ST elevation in anterior leads
  2. Left axis deviation
  3. Q wave (exam picture)
- mention 3 modality of treatment that can decrease mortality in this patient?
  1. Thrombolytics
  2. Catheterization
  3. CABG





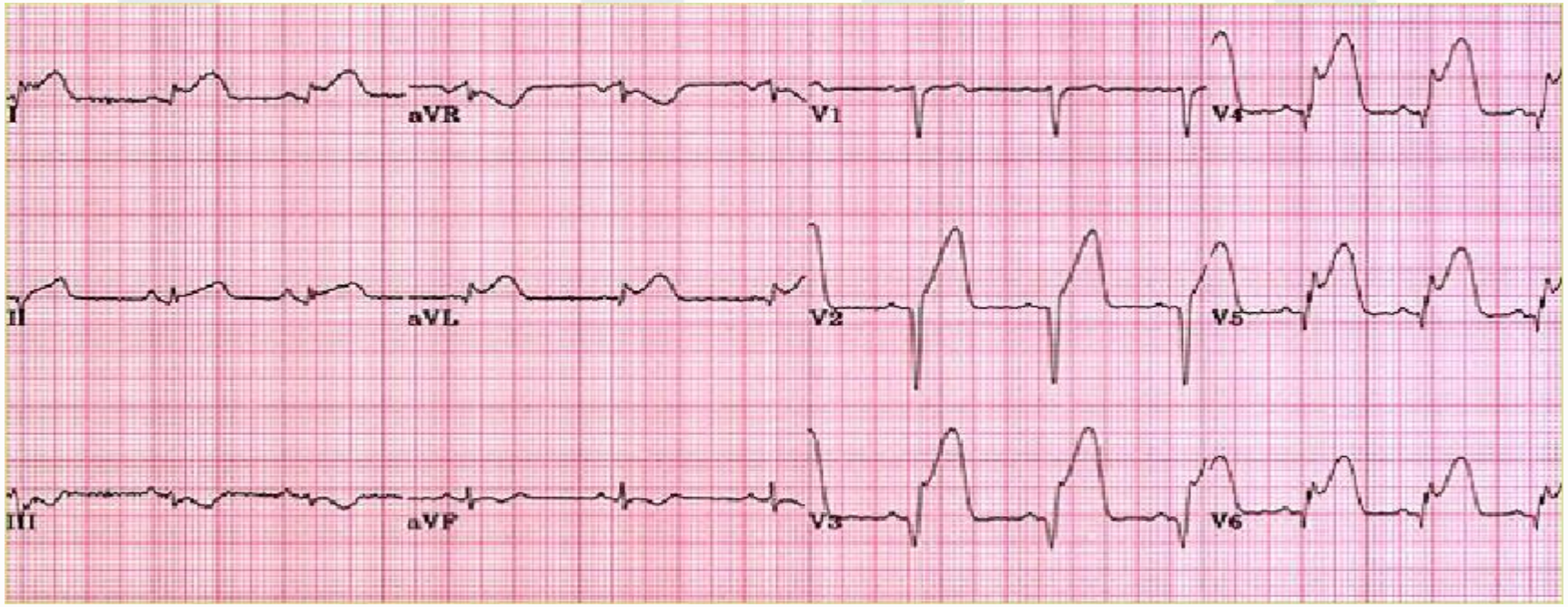
- Q6: A 48 year old man presented to the ER with chest pain and has the following ECG. What is your diagnosis?

Answer

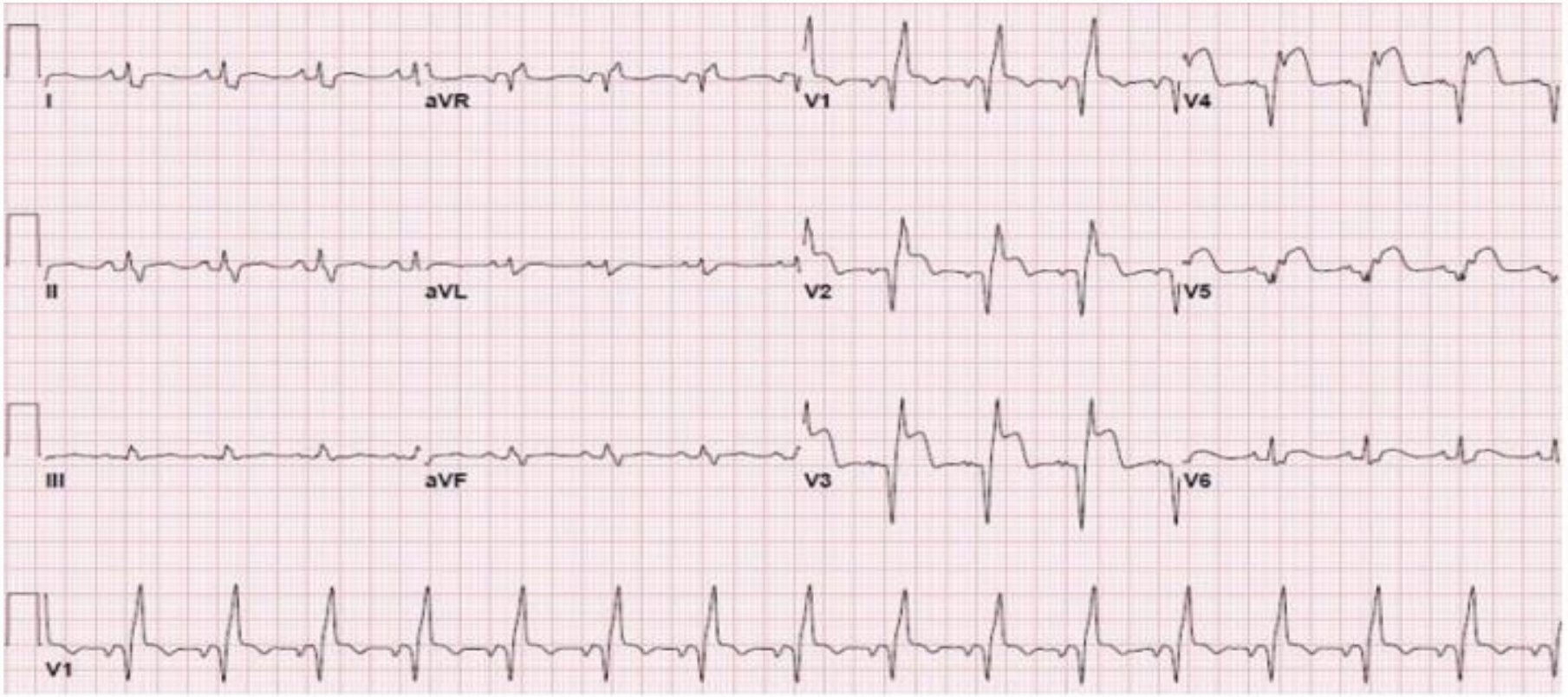
Exam ECG was clearer a bit

Answer: Acute anterior wall myocardial infarction (preferably Acute STelevation anterior wall myocardial infarction)

Q7:This 40 year-old patient presented with chest pain, what's your diagnosis?



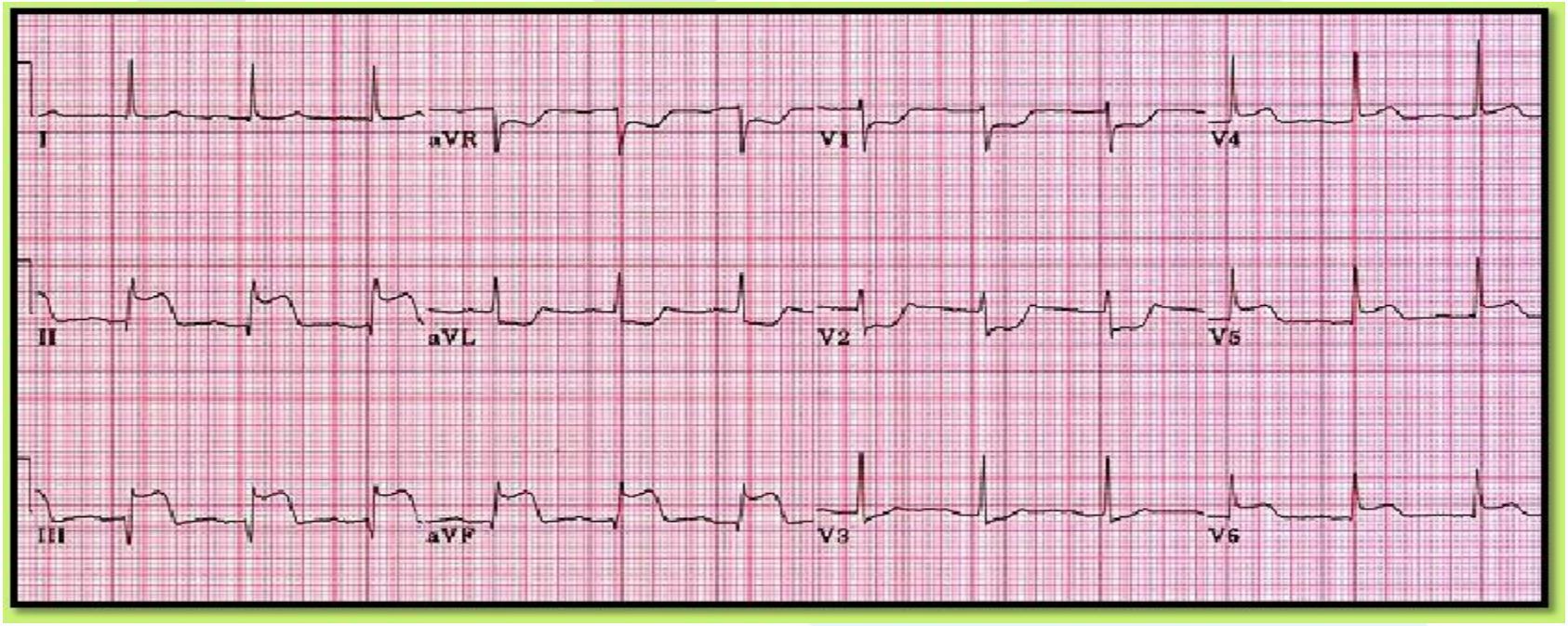
Acute Anterolateral ST elevation MI



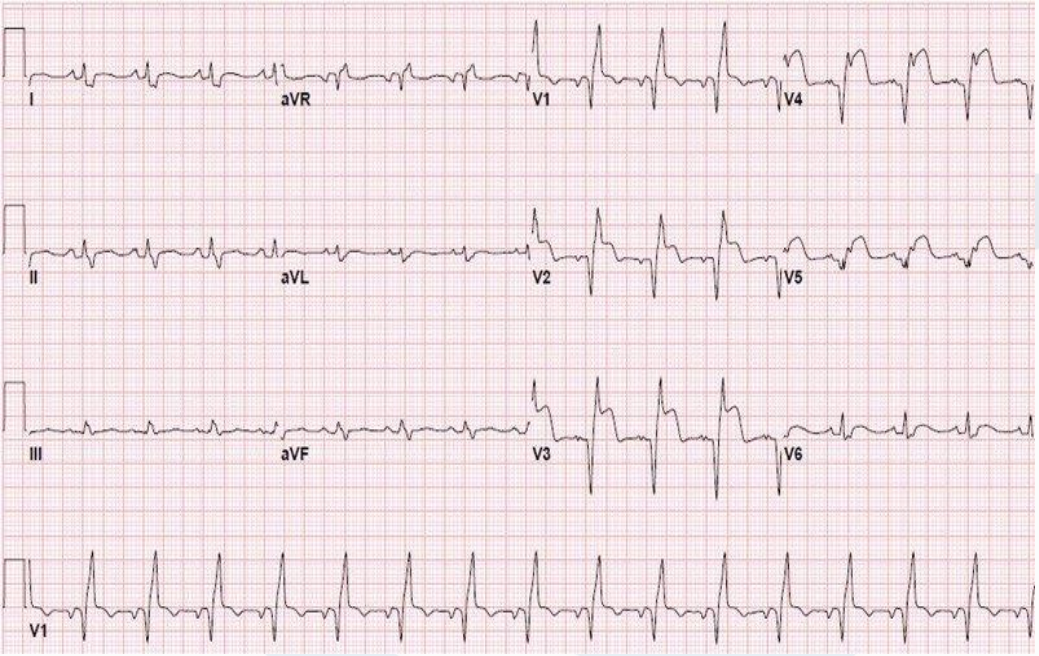
- WHAT IS YOUR DX?
- IN WHICH ARTERY WAS THE OCCLUSION?
- IF A PANSYSTOLIC MURMUR WAS HEARD ON AUSCULTATION, WHAT COMPLICATION DOES THAT INDICATE?

- acute anterioseptal ST elevation MI
- LAD artery
- VSD

Q8: Patient presented with chest pain. what is your diagnosis **?**



Acute inferior wall ST-elevation MI.



A 55 years old male comes with chest pain and this is his ECG.

1- what's your diagnosis knowing that his cardiac enzymes are negative?
Massive anterior wall STEMI.

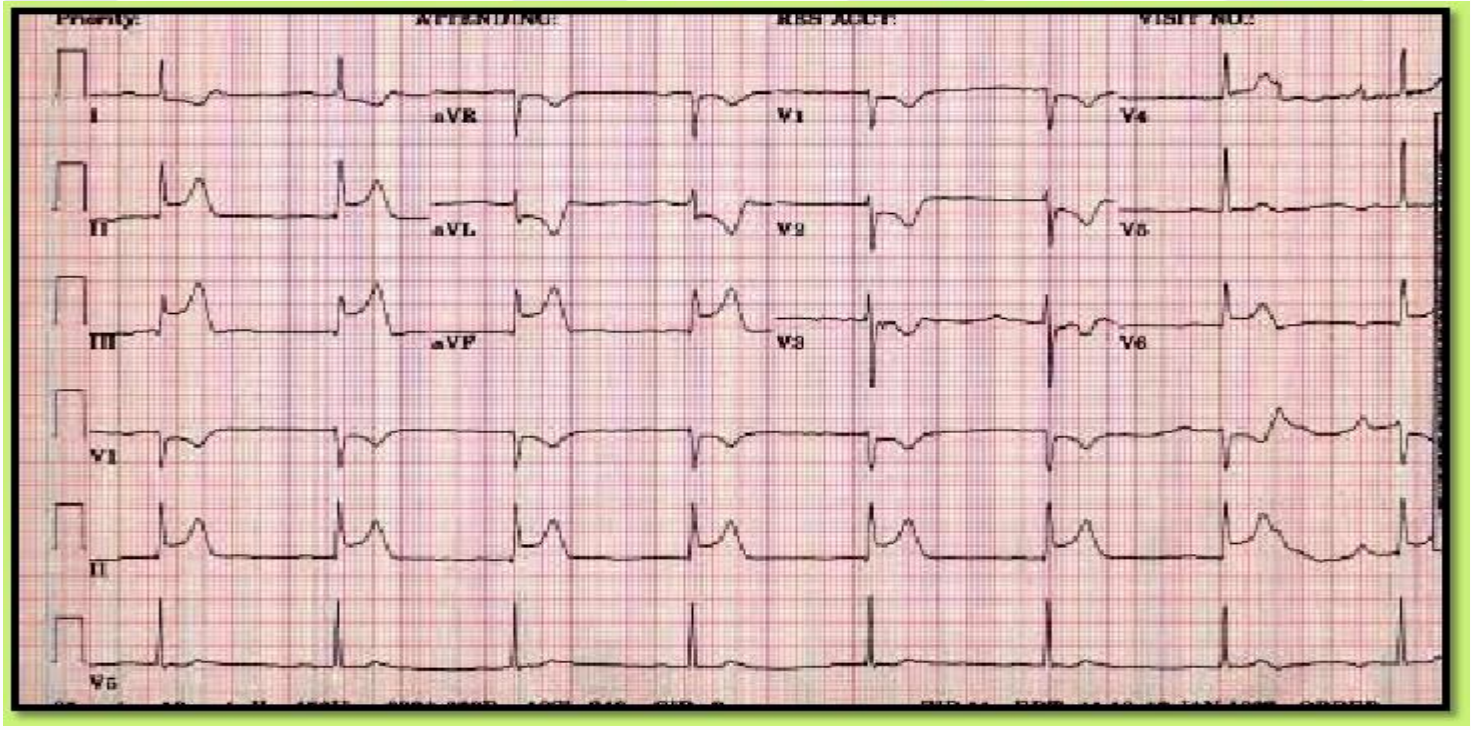
2- give me 3 lines of management for this patient when he comes to your hospital's ER knowing that his BP = 80\45 and O2 sat 90%?

1) elevate his BP and give him IV Fluid
2) antiplatelet (3 baby aspirin)
3) give him O2 therapy
4) anticoagulant

3- 2 weeks later the same patient came with chest pain and SOB and by stethoscope you heard a pansystolic murmur. Give me two DDX?

1) Mitral regurg 2) VSD

Q9: 70 YO male came with palpations & chest pain. Mention 2 abnormalities in this ECG.

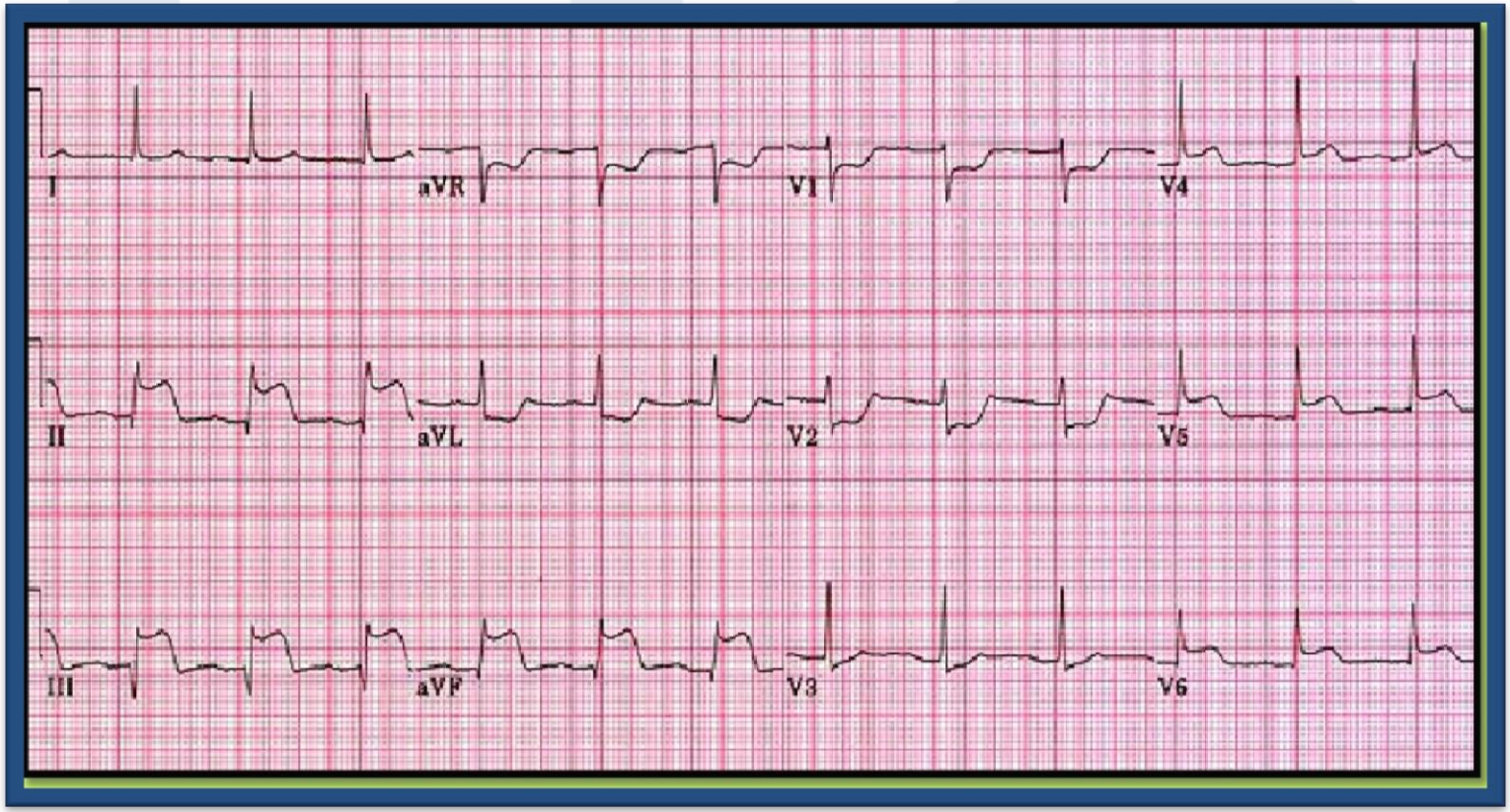


1. ST elevation leads II, III, avF.
2.T-inversion in aVL.

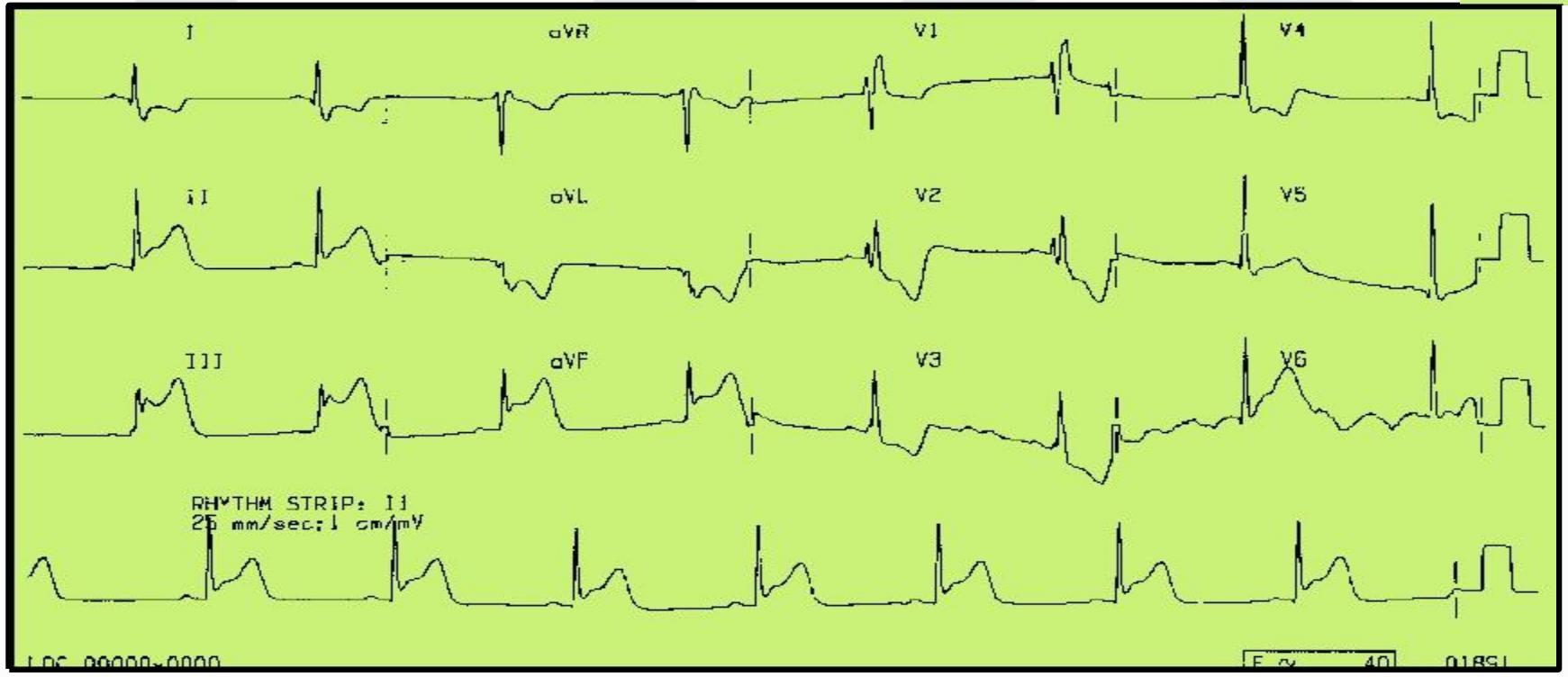
Q: Patient presented with chest pain. what is your diagnosis ?

Acute inferior wall ST-elevation MI. (leads : II, III, aVF)

Note : in inferior MI the pt is hypotensive ! DO NOT give diuretics or nitrates as it may cause cardiovascular collapse

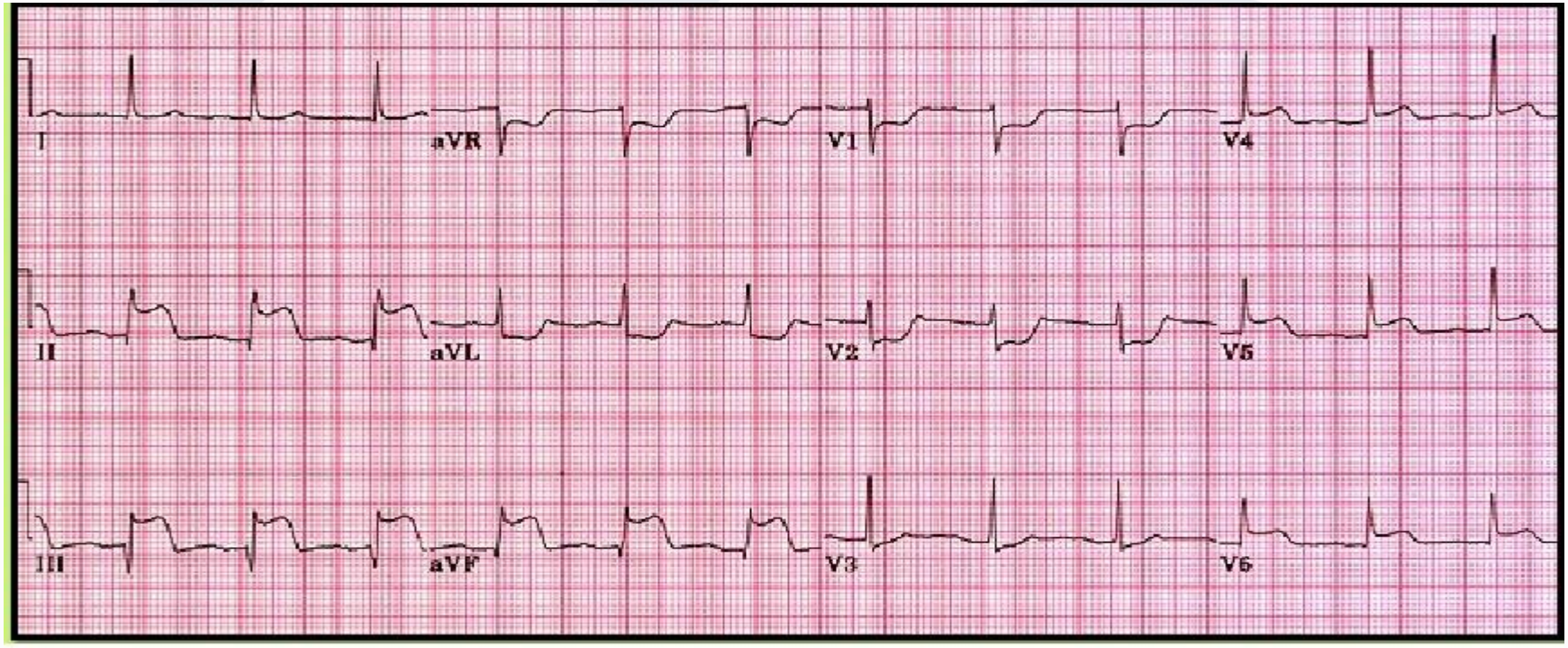


Q11: 60 YO male pt, presented with acute chest pain for 30 minutes, what is the Dx? &What is your management for this pt?



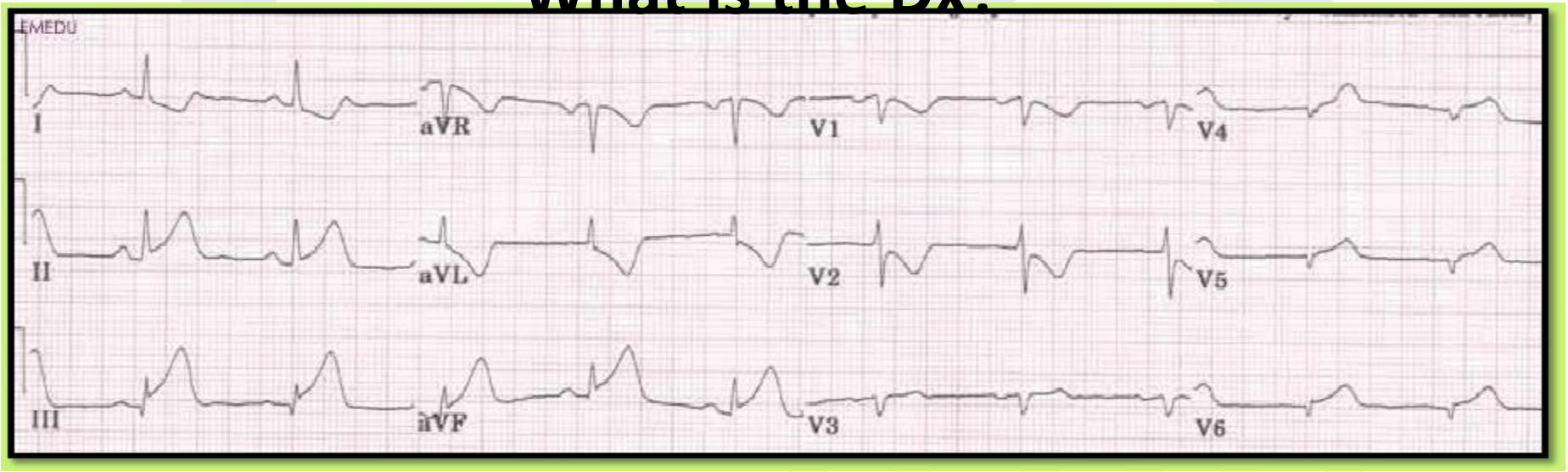
Acute inferior wall myocardial infarction/Oxygen, sublingual nitrate, aspirin, IV morphine ,streptokinase.

Q12: 54 YO male pt, known case of DM, HTN, presented with acute chest pain, what is the Dx?



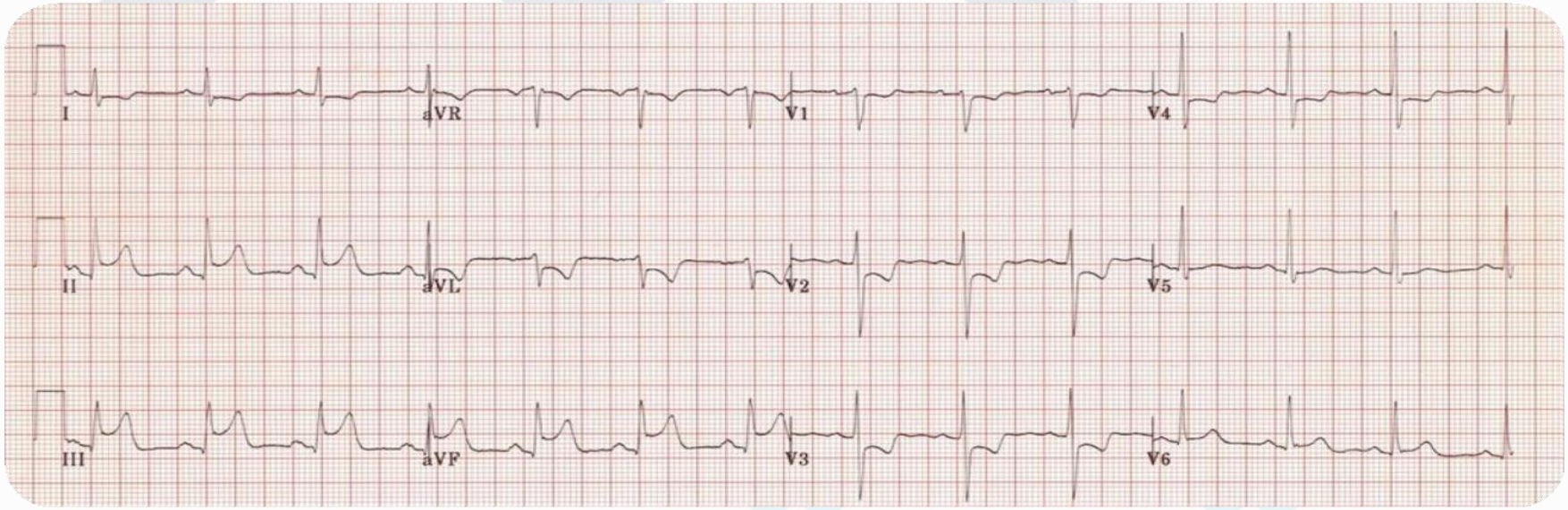
Acute st elevation inferior wall mi acute, inferior wall , st (if u miss any one , ... elevatedmi it will be considered wrong).

Q13: 55 YO male presented to ER complaining of chest pain of 30 min duration, with this ECG. What is the Dx?



Acute ST elevation inferior wall MI (And it must be written like this).

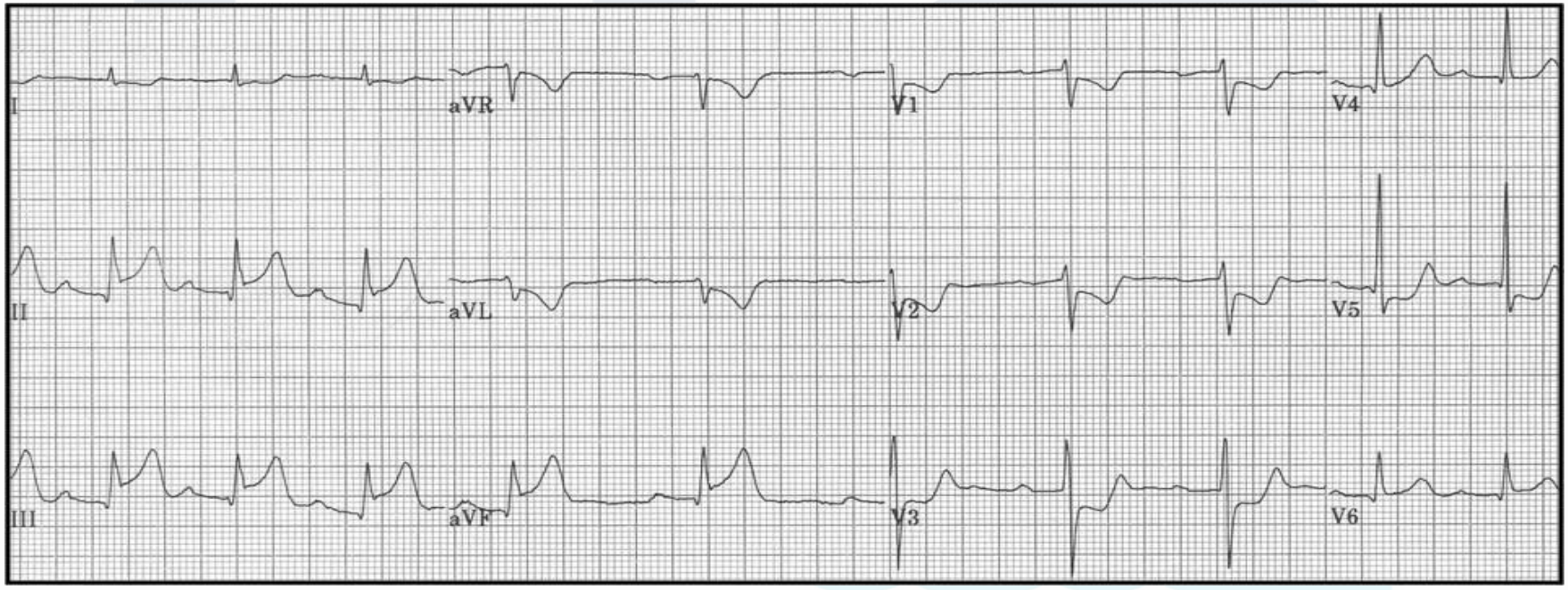
Q15 What is your diagnosis ?



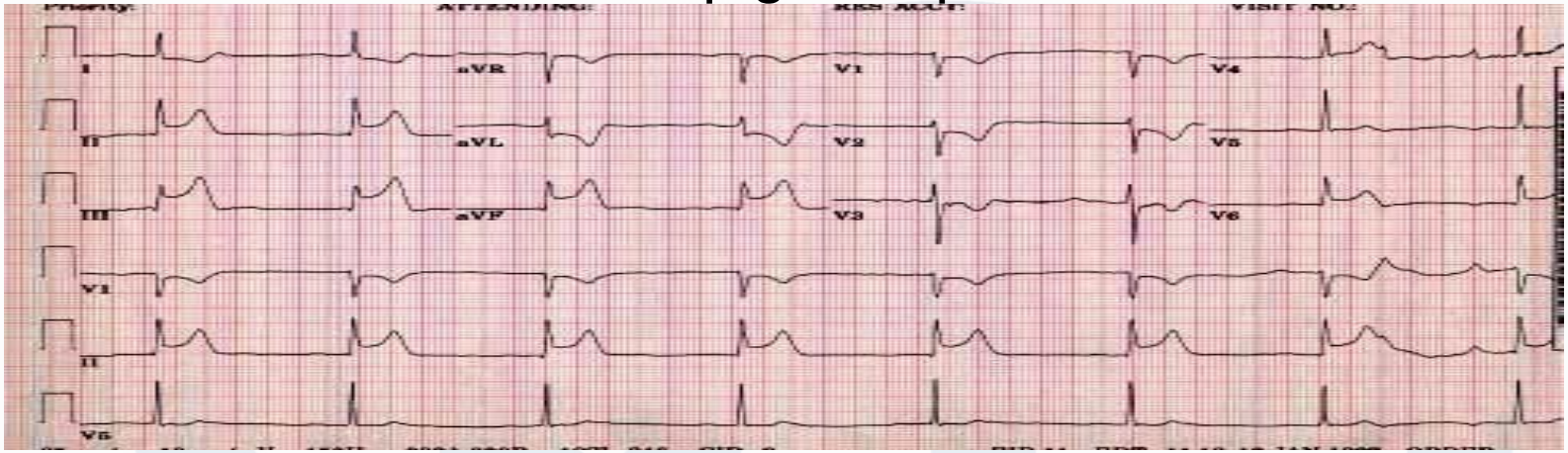
- Acute ST elevation inferior wall Myocardial
- Infarction

Q16: What is your diagnosis ?

Answer : Acute Inferior wall ST elevation MI



Q. this patient came to the ER complaining from severe epigastic pain

- 

- 1) what is the cause of the pain ?

Referred pain due to inf ST elevaion MI

- 2) if u know that the patient was hypotensive and in bradycardia , what u should do ?

IV fluids & atropine

3) What is the ideal tx of MI in this patient ?

BAS MONA drugs except nitrates and morphine because the ptn is hypotensive

Question 2

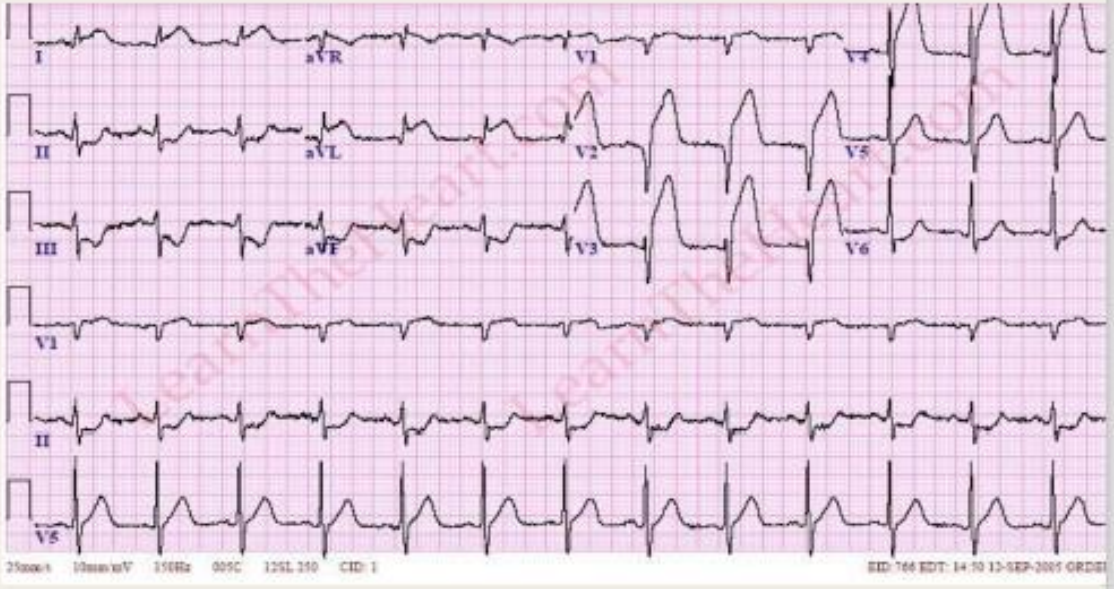
A 72 year old male patient with previous history of graft bypass presented to you with severe chest pain.
On physical examination his BP 85/50.

1) Diagnosis

2) 3 lab tests

3) if the cath is not available what is your next step

4) how to treat his hypotension



Answers

1) Massive anterior wall MI (STEMI)

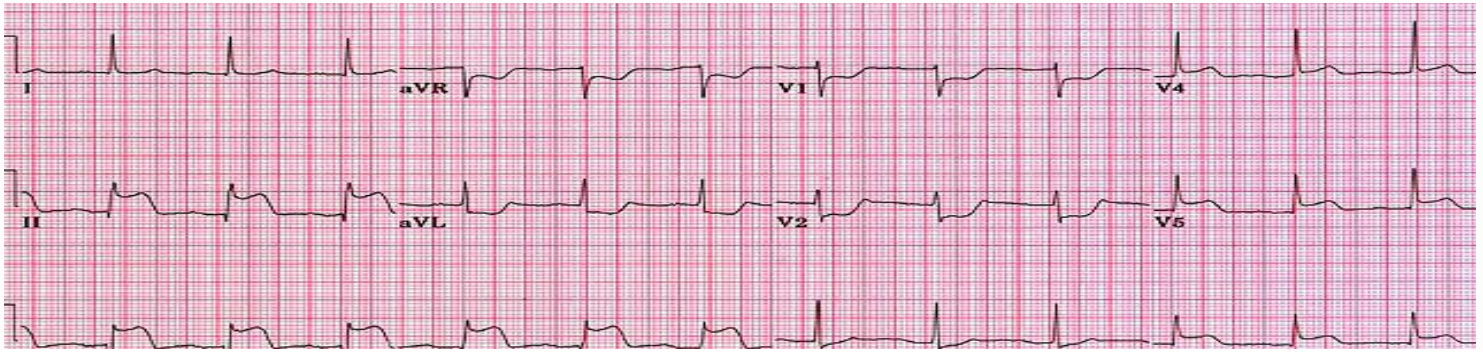
2) Cardiac marker, CBC& KFT

3) Alteplase time to needle 30 minutes

4) dobutamine or dopamine

Q 12 , 13

(pic 1)



(pic 2)

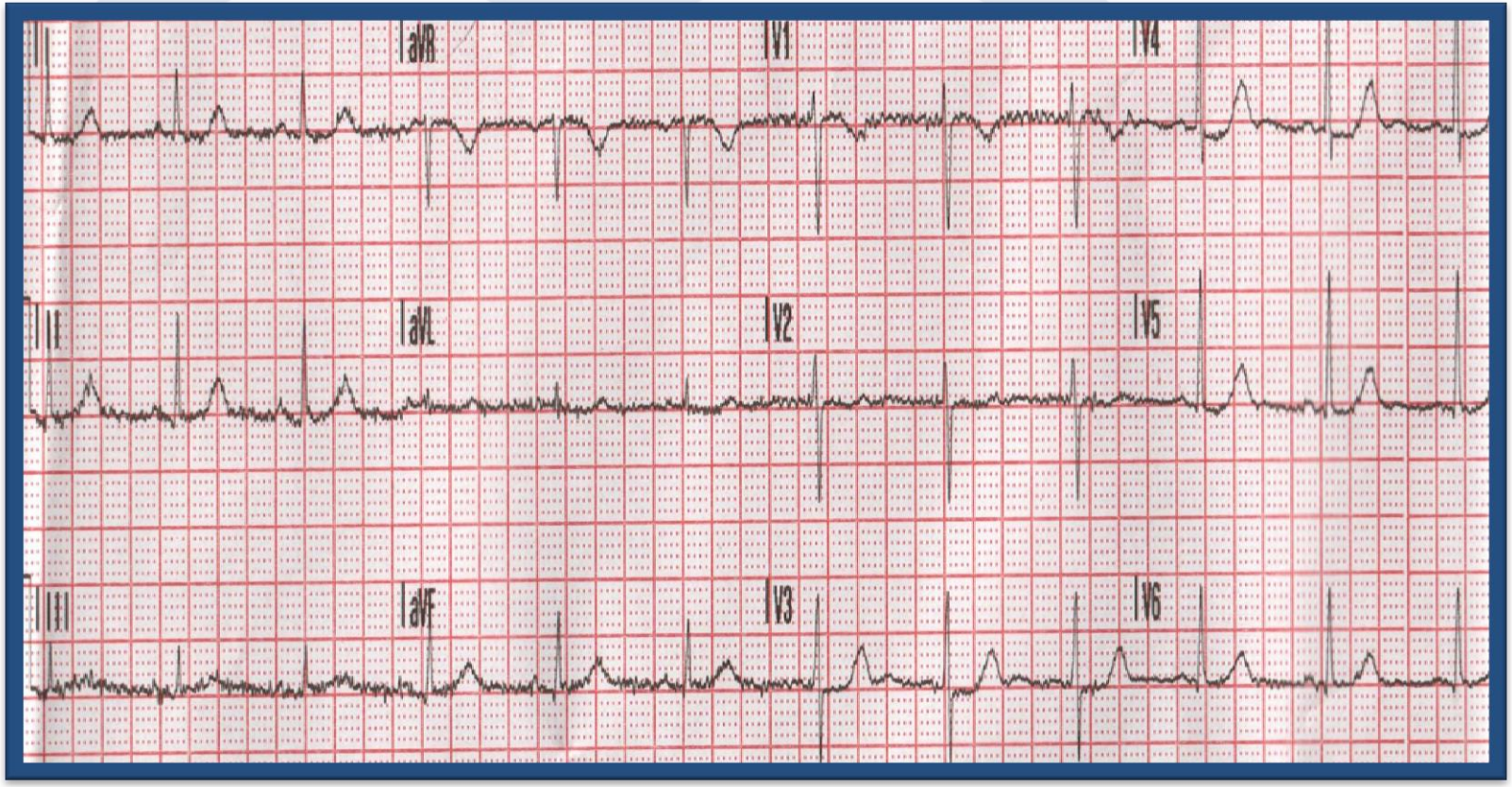
•Patient came to ER complaining of sudden chest pain , ECG was done (pic 1) , what are the abnormalities in this ECG , and what is the diagnosis ?

Acute inferior wall ST elevation MI

•After 2 days another ECG was done (pic 2) , what are the abnormalities , what is the diagnosis ?

Atrial fibrillation

Q: A 48 year old male , who developed rapidly worsening chest pain on minimal exercise or even at rest,for less than 15 minitues , no vomiting was associated with the following ECG changes :



1) Identify the abnormality in the previous ECG .

Inverted T-wave with no ST- Elevation

2) According to the History (rapidly worsening chest pain on minimal exercise or even at rest, for less than 15 minutes , no vomiting was associated , with Non ST-elevation & T-wave inversion ECG changes) , Give the spot diagnosis .

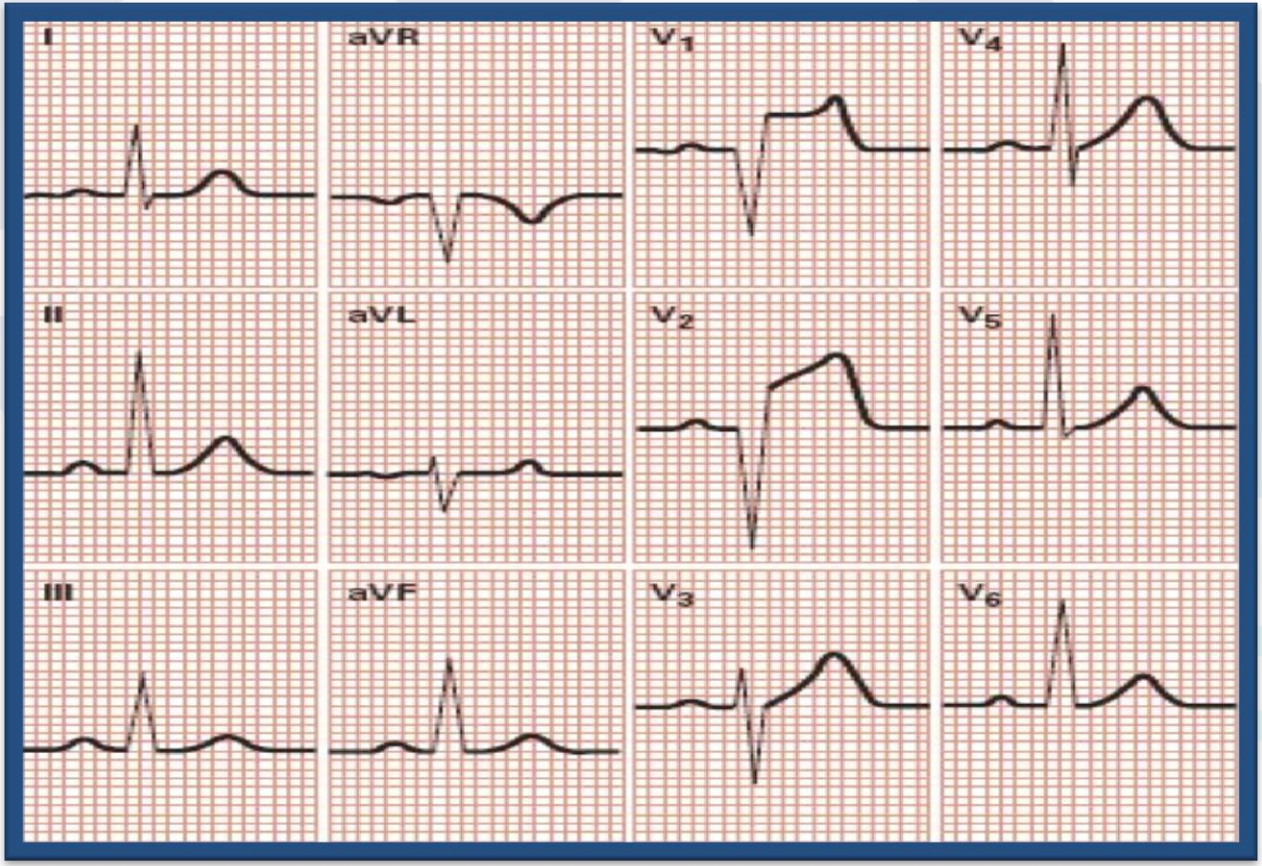
Unstable angina but we must do cardiac enzymes to R/O NSTEMI

5. Identify The Abnormality :

STEMI in leads V1-V4

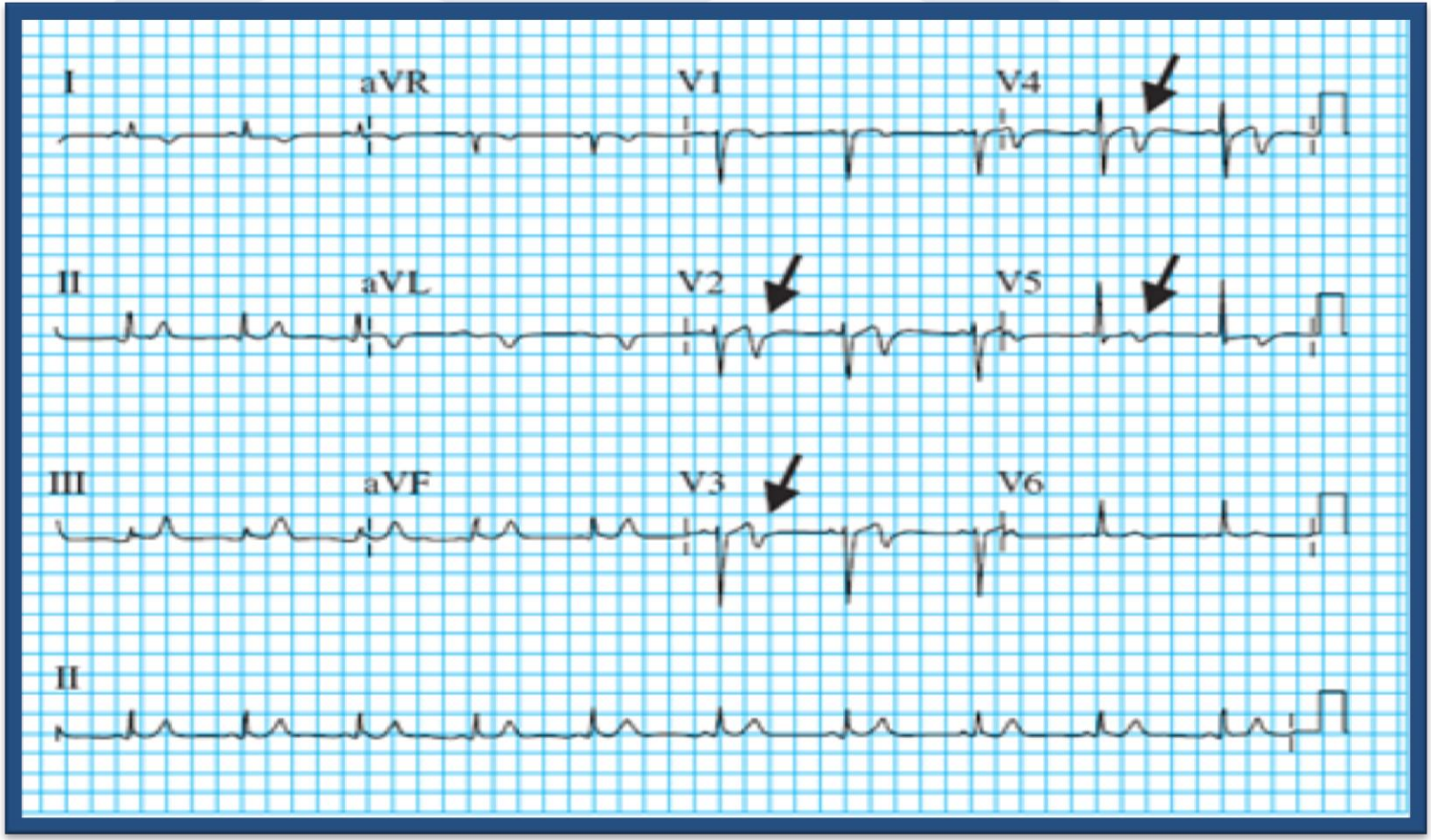
The occluded artery is :

left coronary artery – left coronary descending



Q: Identify the abnormality in the ECG .

ST- Elevation & Inverted T-wave



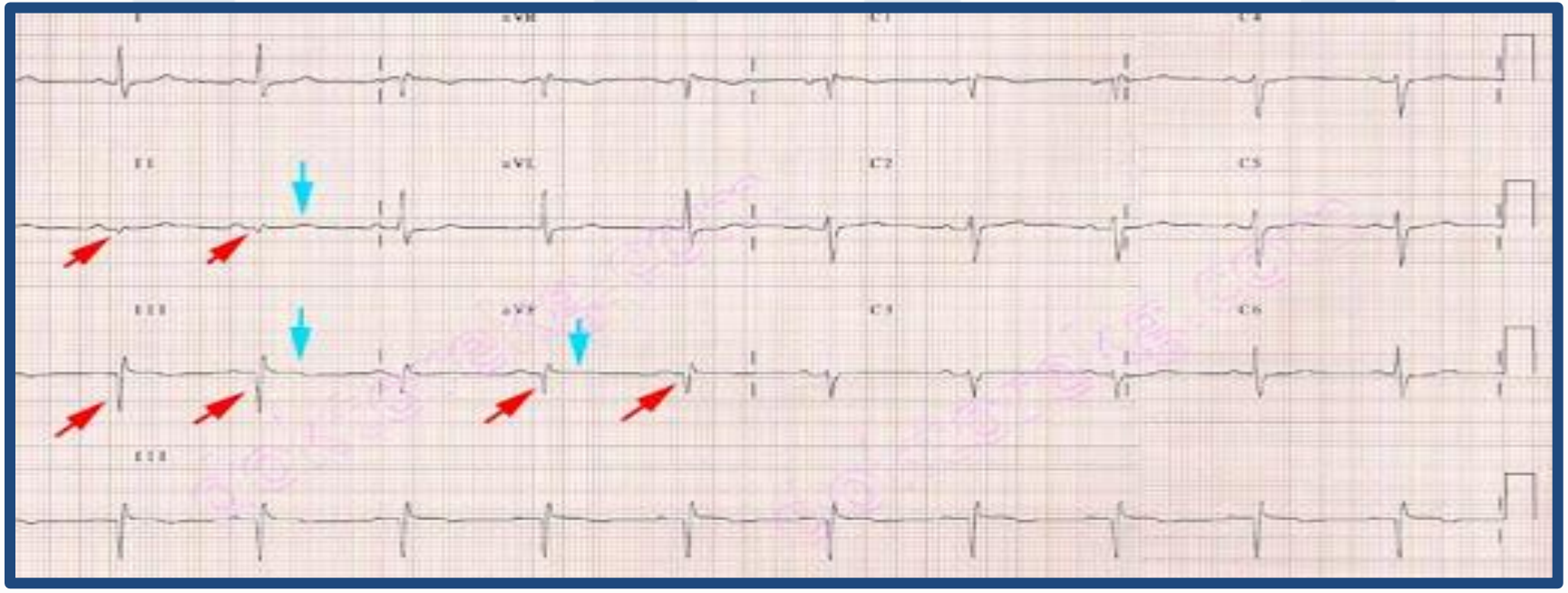
Q: 70 years old man who had underwent coronary bypass graft operation after inferior wall
myocardial infarction. The ECG was recorded when the patient was asymptomatic.

- Mention pathological findings on the ECG .

Q waves in leads II, III and aVF

- What is your diagnosis?

Old inferior MI



Electrolytes

Calcium → Affect QT Interval

ECG Changes: Hypocalcemia/Hypercalcemia

Serum Ca^{++} < 8.5mg/dL

- *Lengthened ST*
- *Lengthened QT*
- *May cause Torsades de pointes*

Serum Ca^{++} > 10.5mg/dL

- *Shortened ST*
- *Shortened QT*

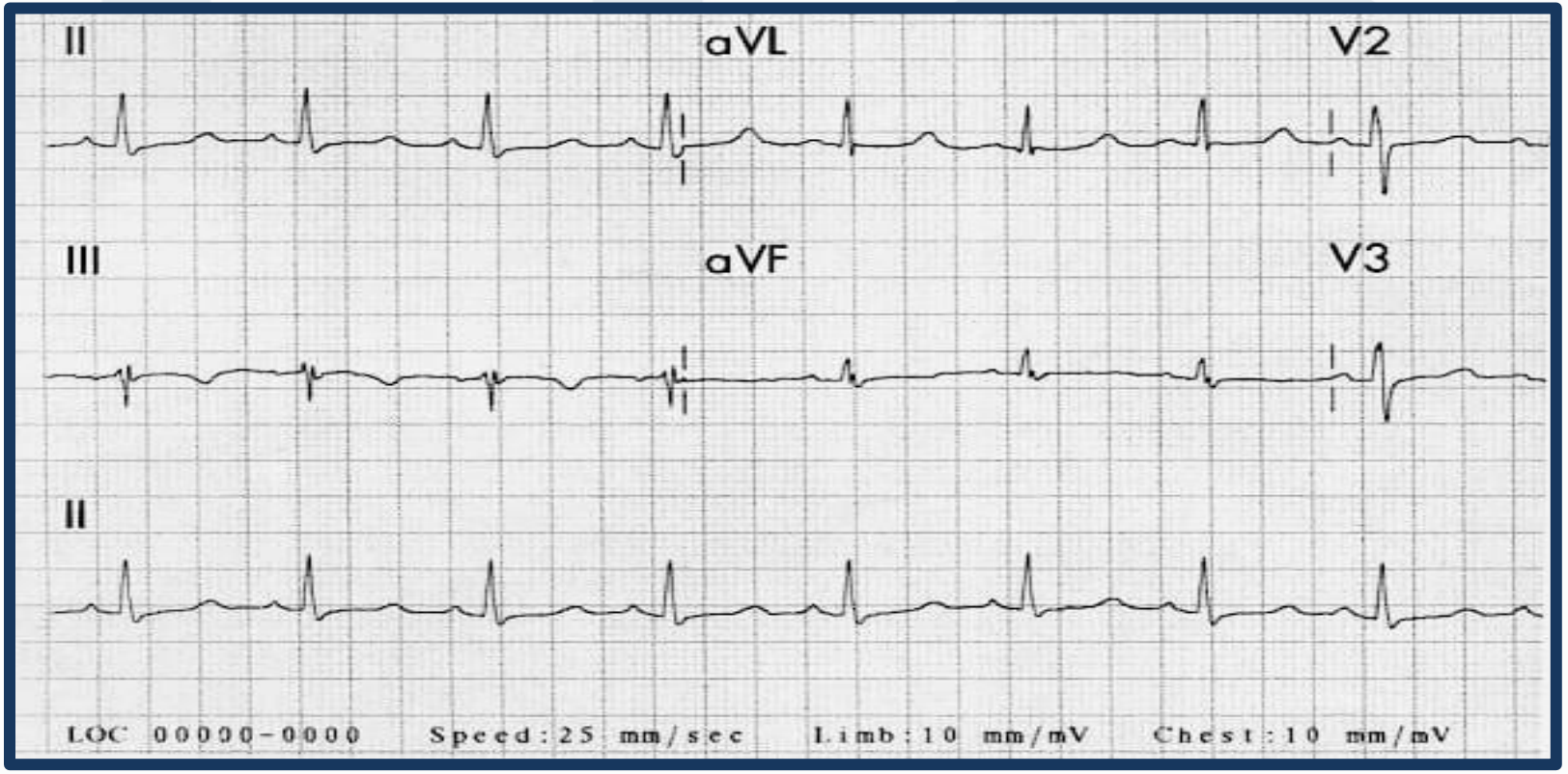
Q1 - What is the abnormality in this ECG?

1- prolonged QT segment

2- prolonged ST segment

Q2 - What is your dx ?

Hypocalcemia



Station 8

Post parathyroidectomy pt. with this ECG :

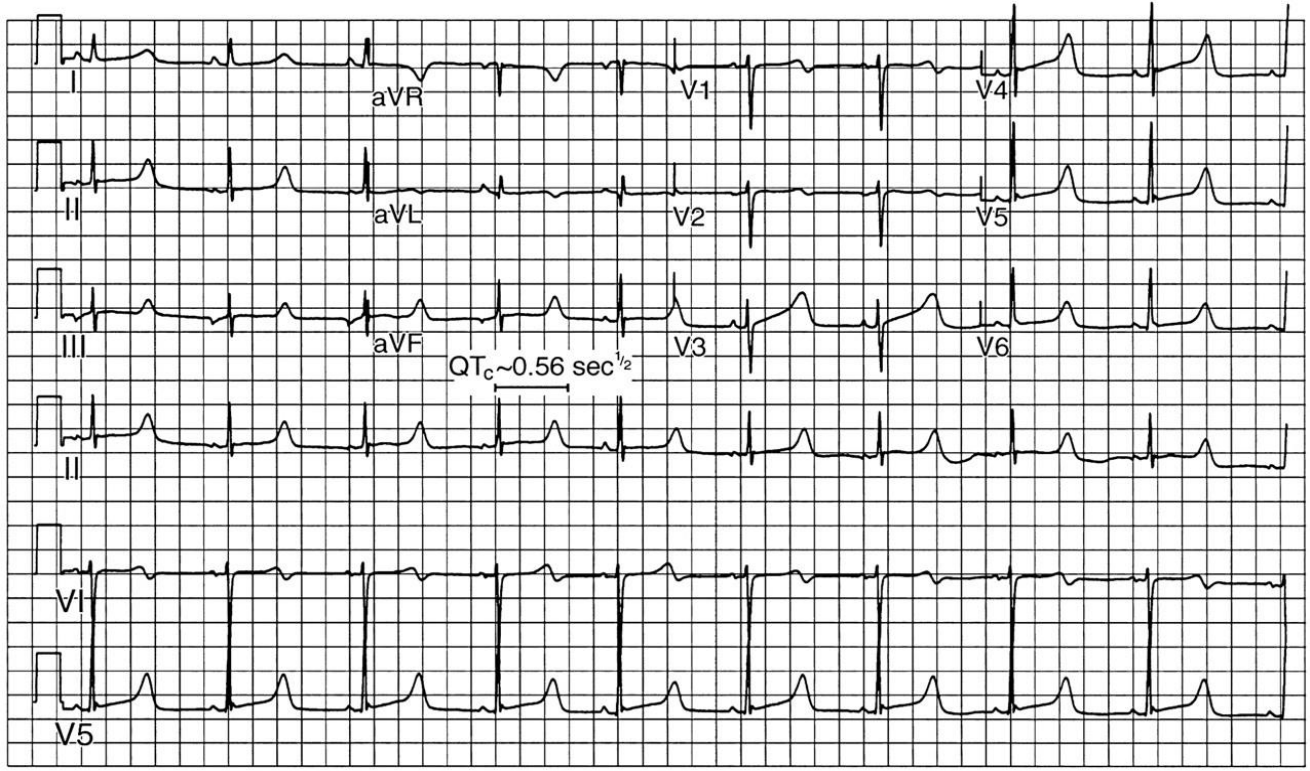
Q1 :Mention abnormality

- Long QT interval

Q2: mention 3 conditions are associated with this ECG?

- hyperphosphatemia
- Hypocalcemia
- Hypomagnesemia

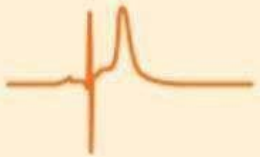
NOT SURE :/



Potassium → CKD or Drugs

Hyperkalemia ECG changes

Note:-if you see chronic renal disease or missed dialysis or crash of muscle(painfull muscle) you should think of hyperkalemia

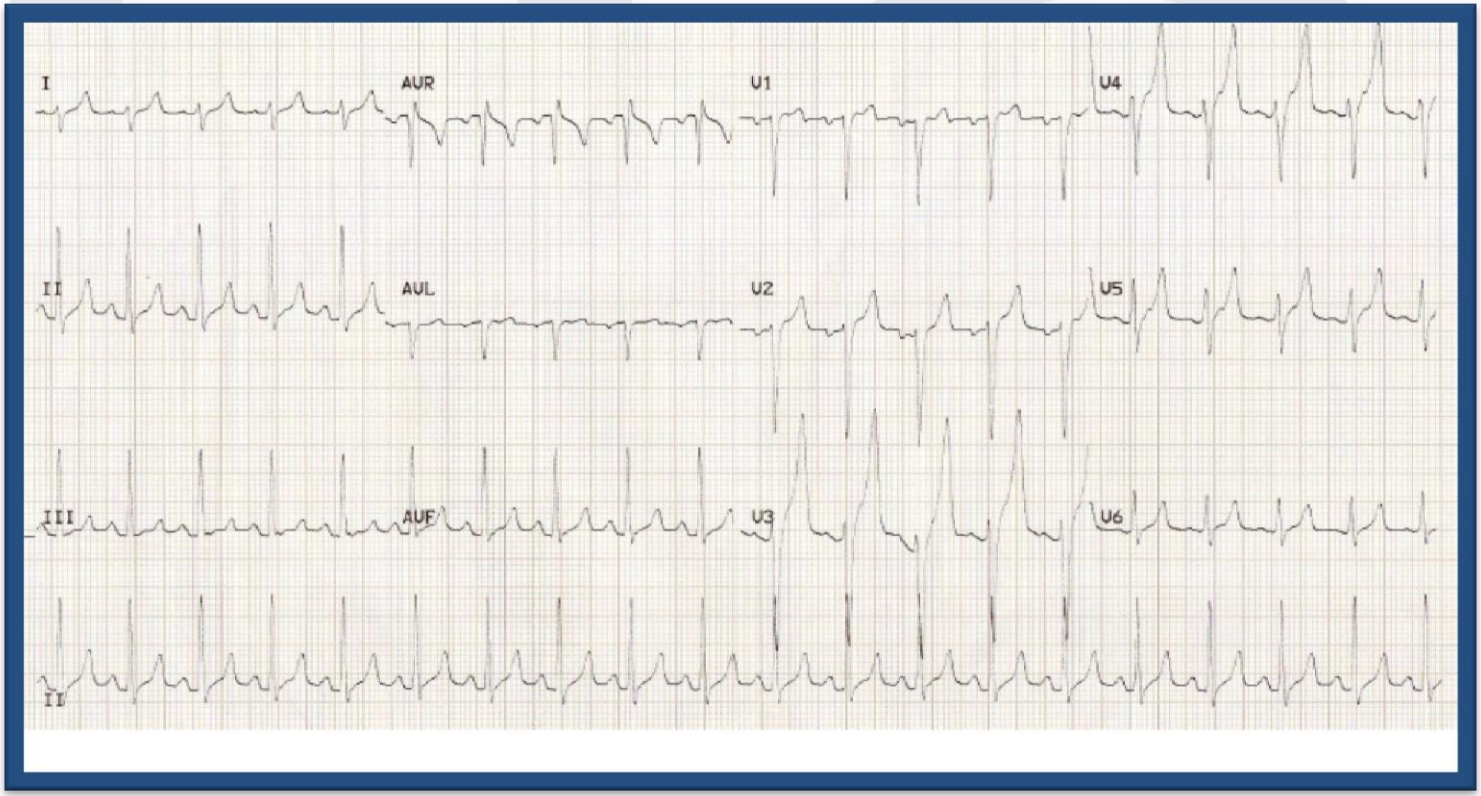
Serum potassium	Typical ECG appearance	Possible ECG abnormalities
Mild (5.5–6.5 mEq/L)		Peaked T waves Prolonged PR segment
Moderate (6.5–8.0 mEq/L)		Loss of P wave Prolonged QRS complex ST-segment elevation Ectopic beats and escape rhythms
Severe (>8.0 mEq/L)		Progressive widening of QRS complex Sine wave Ventricular fibrillation Asystole Axis deviations Bundle branch blocks Fascicular blocks

EpoMedicine

	Medication
Membrane Stabilizers	Calcium gluconate
Shifters	Insulin + glucose
	Albuterol
Excreters	Furosemide
	Sodium bicarb
	Sodium polystyrene sulfonate
Definitive	Hemodialysis

Q: Patient with chronic renal failure presented with chest pain, what is the biochemical test you have to do?

Serum Potassium.

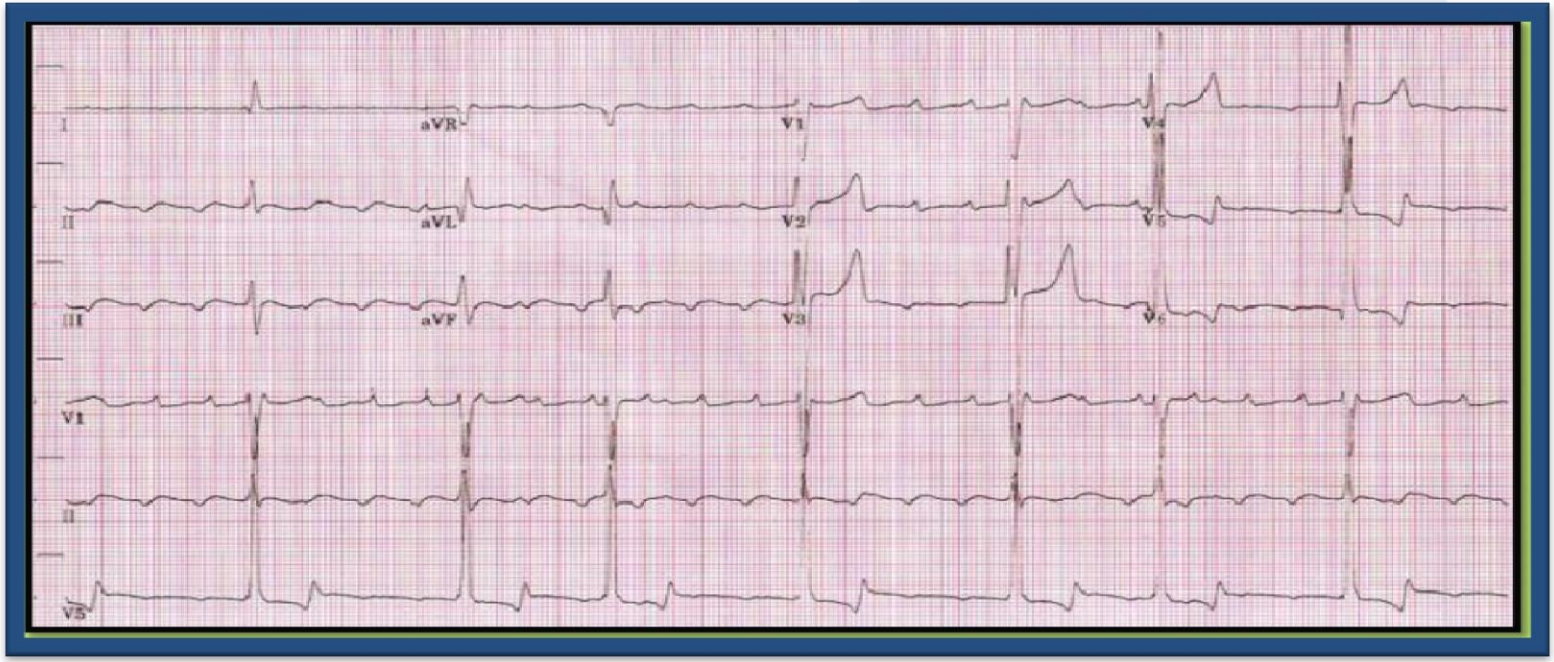


Q: This ECG is for a known case of chronic renal failure, what is your spot Dx?

Hyperkalemia

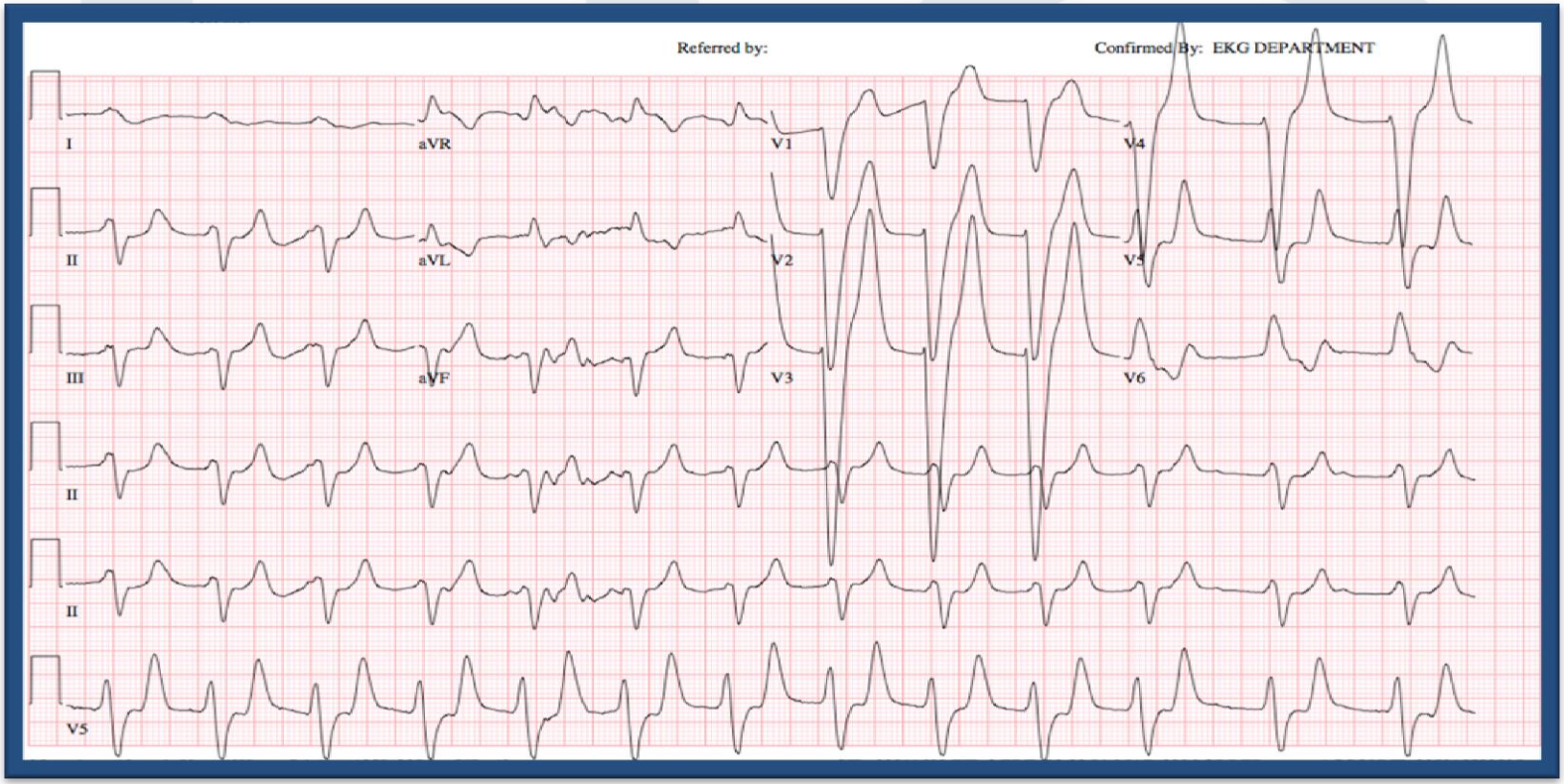
what is the most emergency ttt?

IV calcium gluconate.

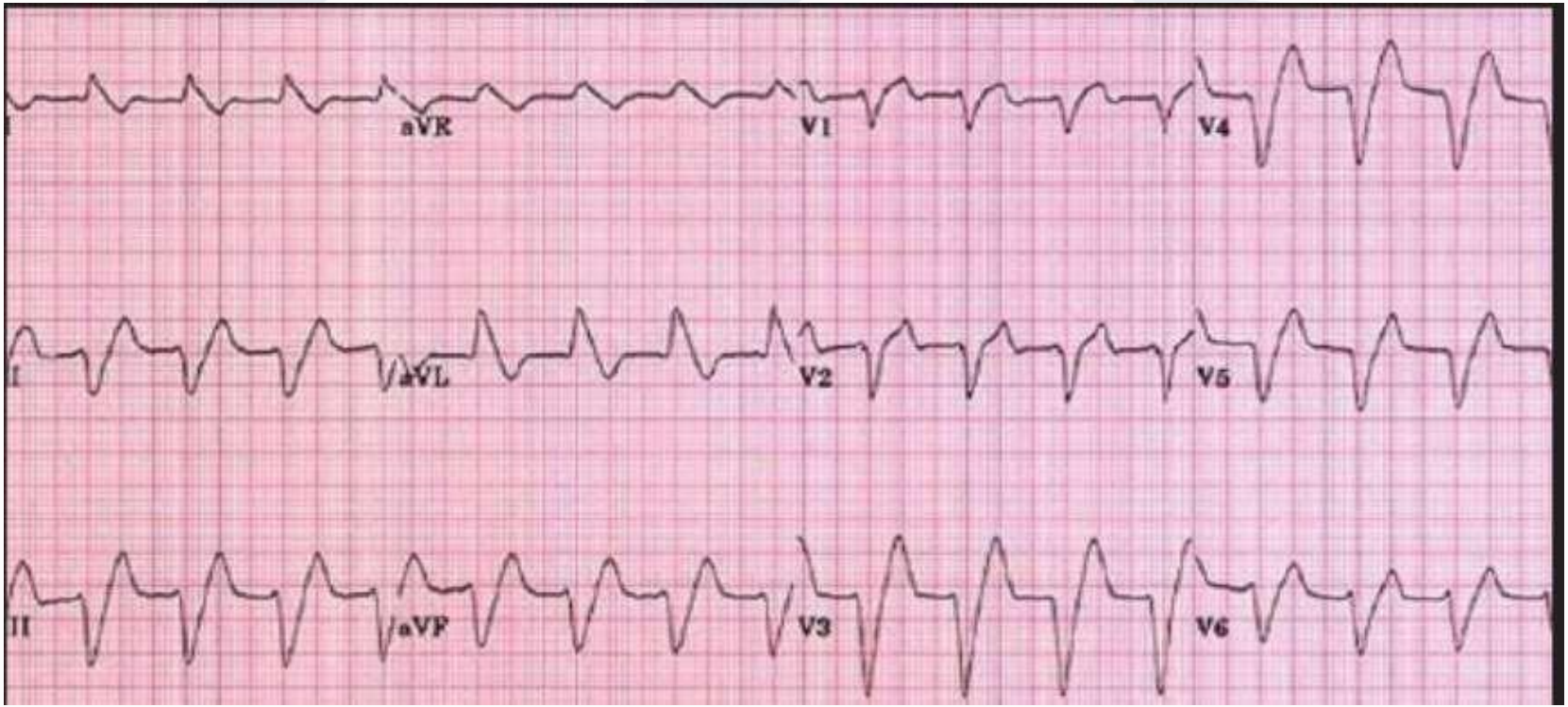


Q: The patient has HTN on **ACEI**. Mention 2 abnormalities in this ECG and what in the underlying cause?

Wide QRS / peaked (hyperacute) T wave
Hyperkalemia (caused by ACEI)



Q69.A 26 year old man is undergoing a strenuous physical exam to become a firefighter . 1 hour later , he is brought to the ER C/O generalized fatigue , painful muscles and dark urine&You did an ECG for him in pic.



1-What is the spot diagnosis ?

Rhabdomyolysis induced Hyperkalemia

2-What is the most important test to be done in such cases ?

oECG and K+ level

o UA

o CPK

o Creatinine

3-Management ?

1st : ttt the hyperkalemia (emergency) by Ca-glucanate + dextrose and IV insulin

2nd : ttt of rhabdomyolysis part by hydration+ mannitol and

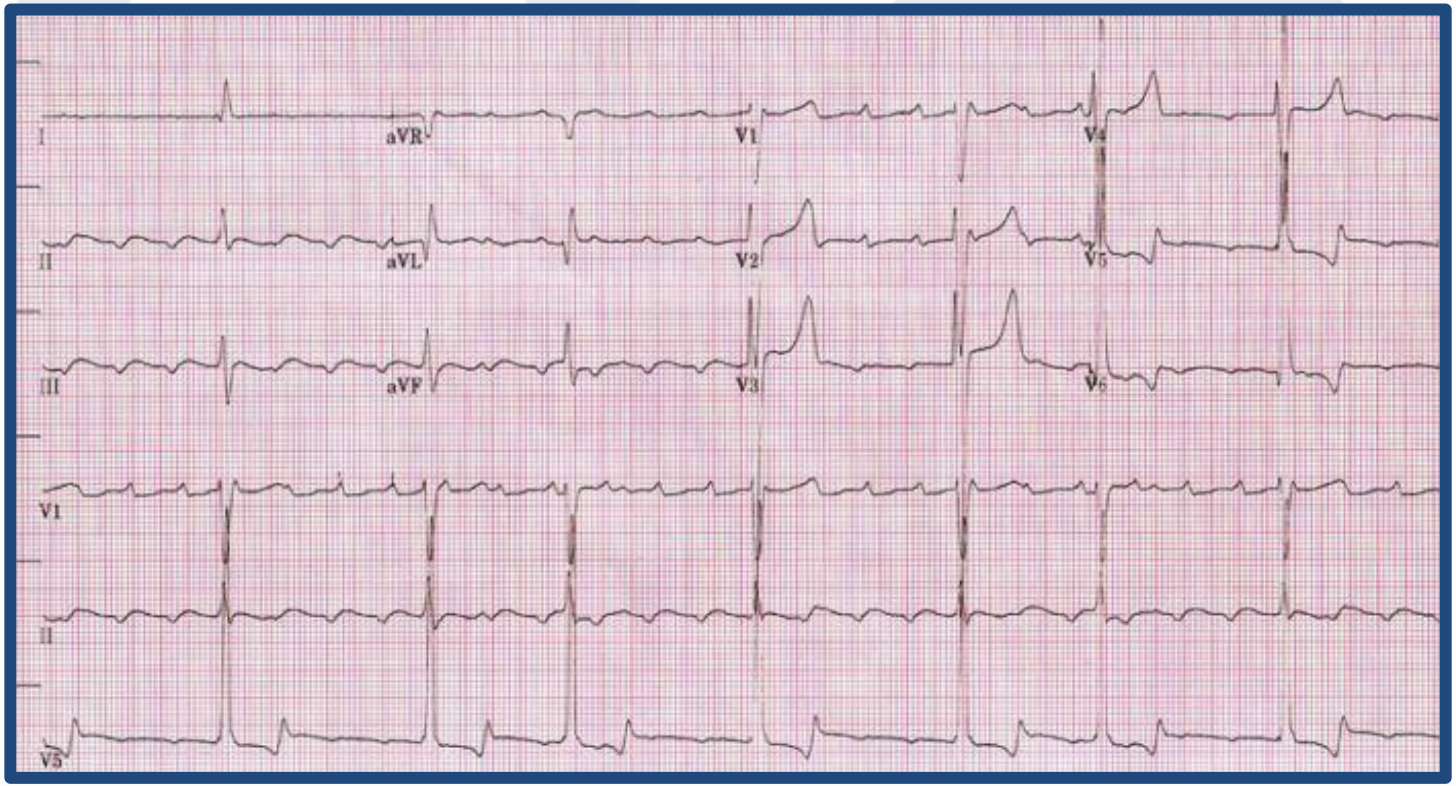
Alkalinization of the urine with bicarbonate

Q: This ECG is for a known case of chronic renal failure, what is your spot Dx? what is the most emergency tt?

Hyperkalemia / IV calcium gluconate.

Q: known case chronic renal failure on dialysis, what is the cause of his ECG changes ?

hyperkalemia



Q: 60 YO DM pt with chronic dialysis came with this EKG.

1- Give 2 abnormalities in this EKG ?

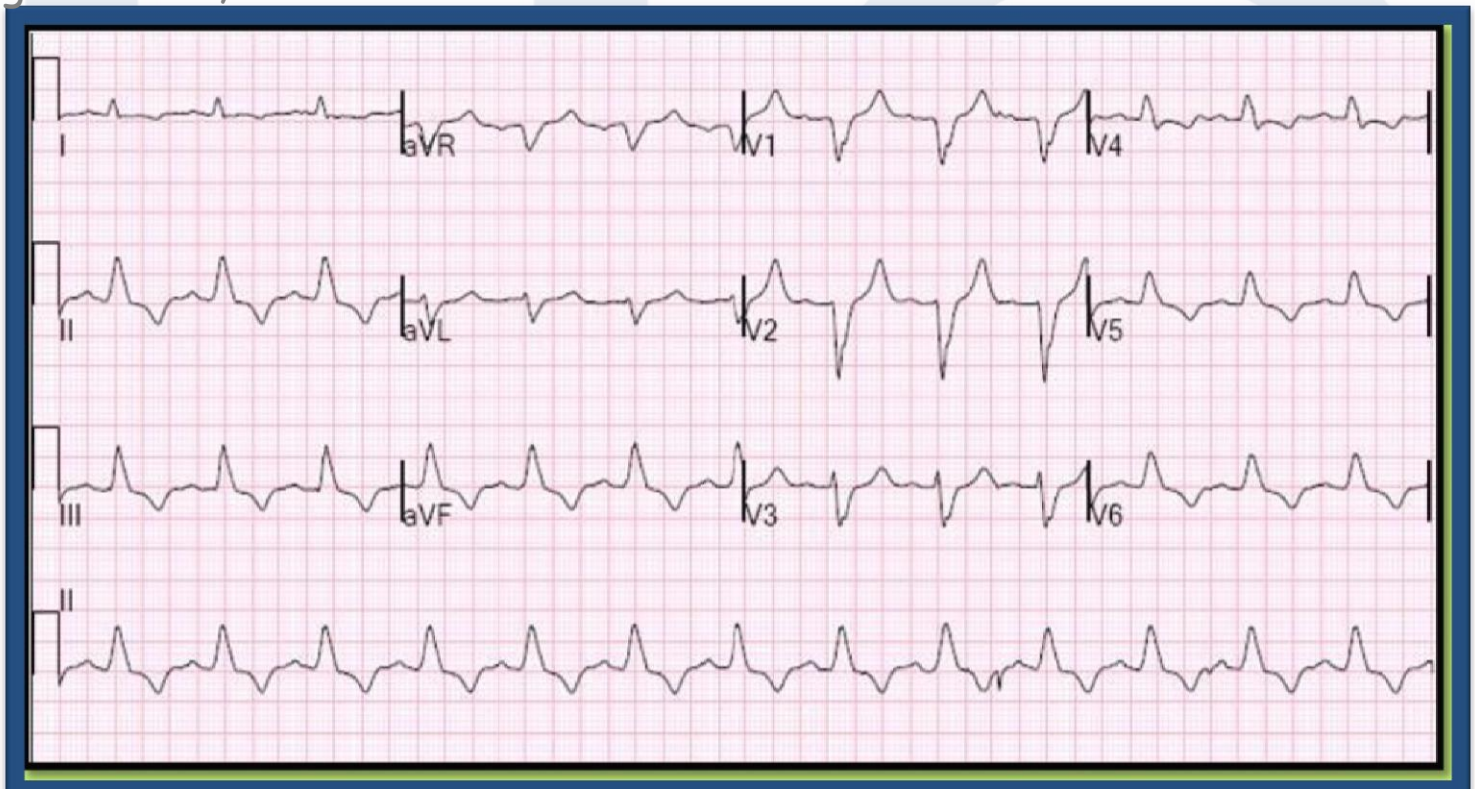
hyper acute T-waves , Wide QRS.

2- what is the cause of this EKG ?

Hyperkalemia.

3- Give 2 line of treatment.

Ca gluconate , Glucose & IV insulin.

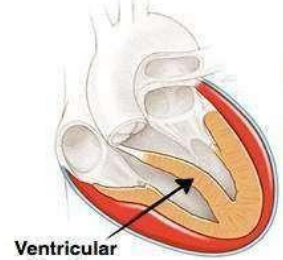


Others

Q. Pt presented with sudden onset chest pain, Bp: 90\60 & dilated neck veins ,what is the Dx?

Cardiac temponade

Cardiac Tamponade



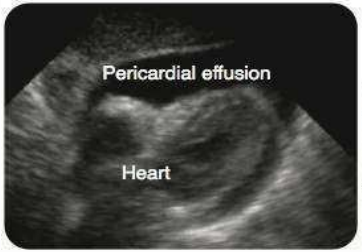
Beck's Triad

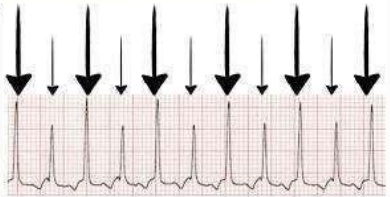
1. Hypotension
2. Jugular venous distension
3. Muffled heart sounds

Don't mix up with:

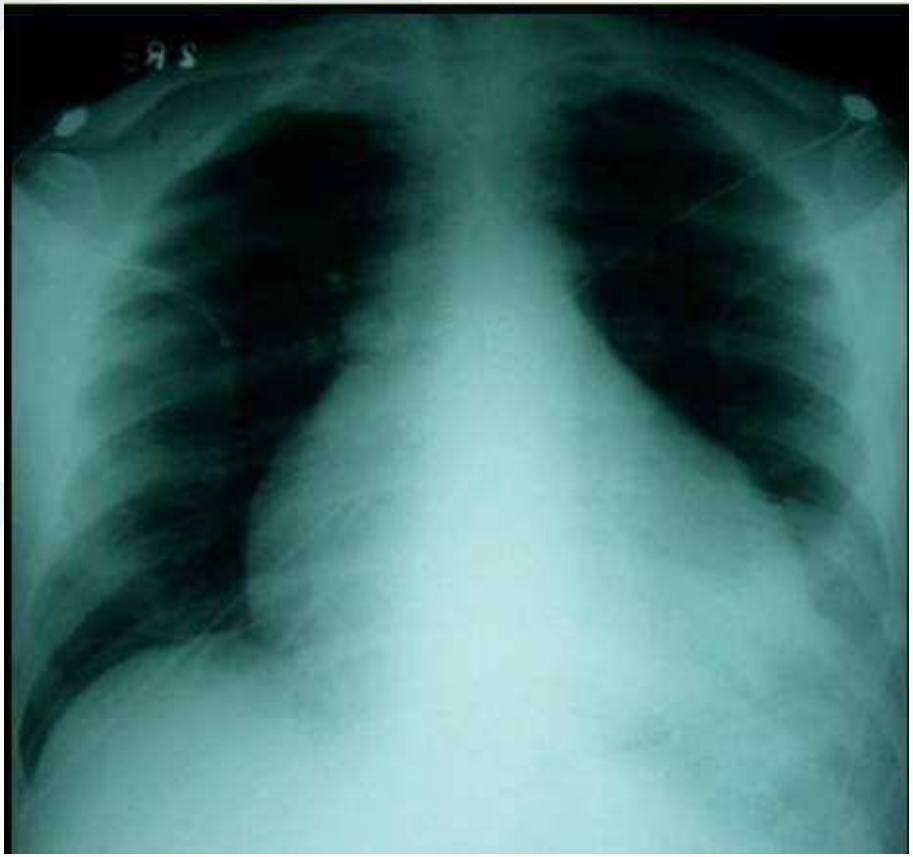
Tension pneumothorax

1. Hypotension
2. Jugular venous distension
3. **Absent breath sounds**





Electrical Alternans



-What is the ECG abnormality :

Electrical alternans

-What is the next investigation you request ?

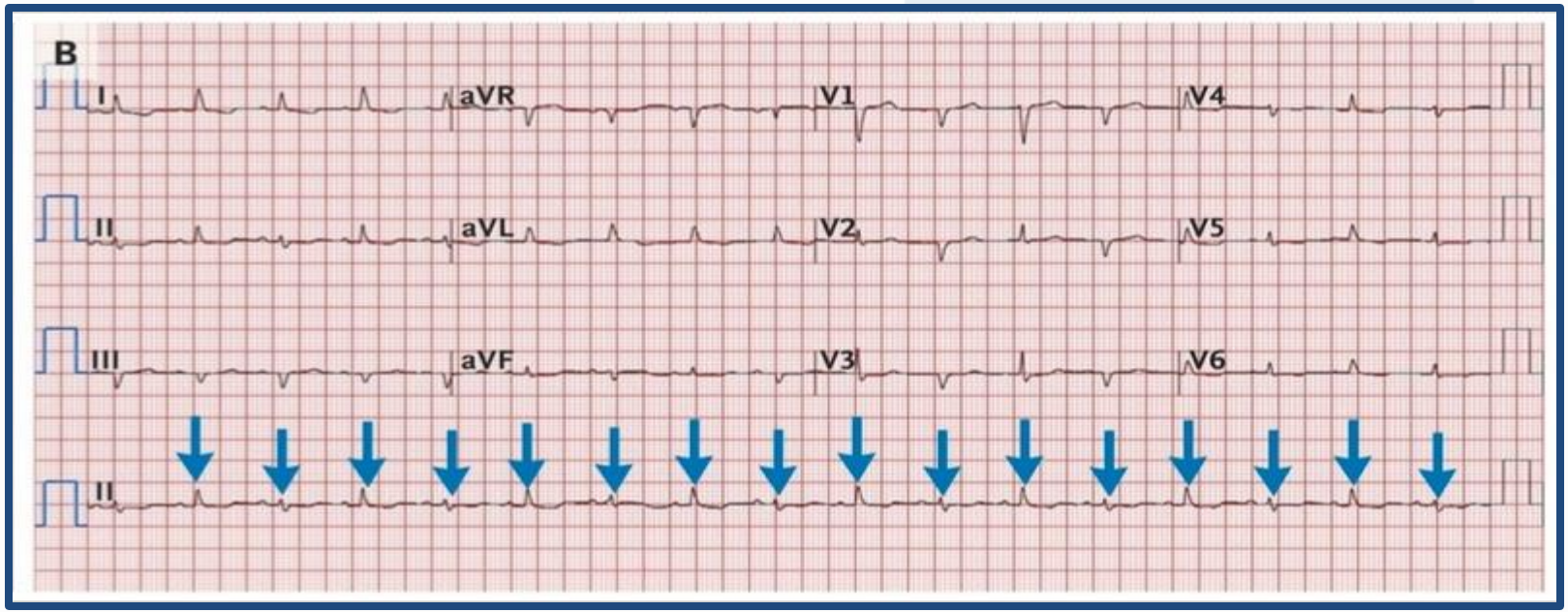
Echocardiogram

-What is the most accurate inves. ?

CT and MRI (especially in localized pockets of effusion)

-What is your diagnosis ?

Pericardial effusion



Managment

Pericardial drainge is preferable in :

-Traumatic hemopericardium

-post surgical effusion

-susp. of Bacterial or TB

Pericardiocentes is used to treat :

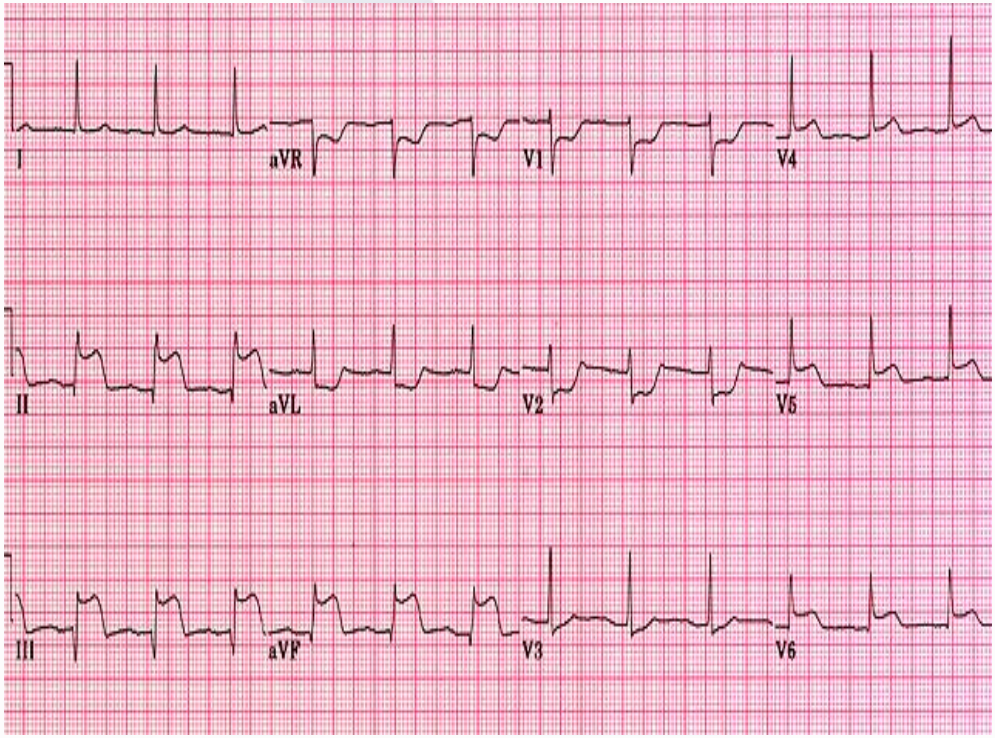
- Viral
- Idiopathic
- Neoplastic
- Hypothyroid
- Renal failure related tamponade

Q8 : Best management for this ECG in emergency room ?

- Cardiac Catheterization
- Morphine , Oxygen , Nitrate , Aspirine
- Thrombolytic (streptokinase..)

إجابة الدكتور

- Anti coagulant



Q3

Q1: Dx:

Mobitz 2

Q2: TTT:

Pacemaker

Thank You