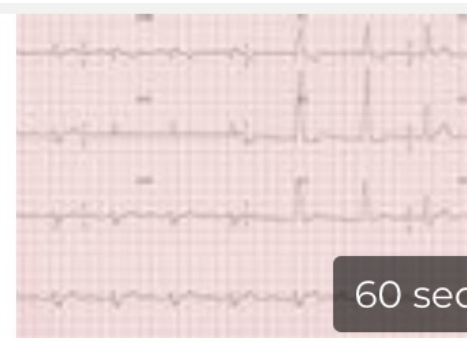


Deadliest ECGs Quiz Explained

Q1: Patient has fainted. What's going on here? What should we do with the patient?

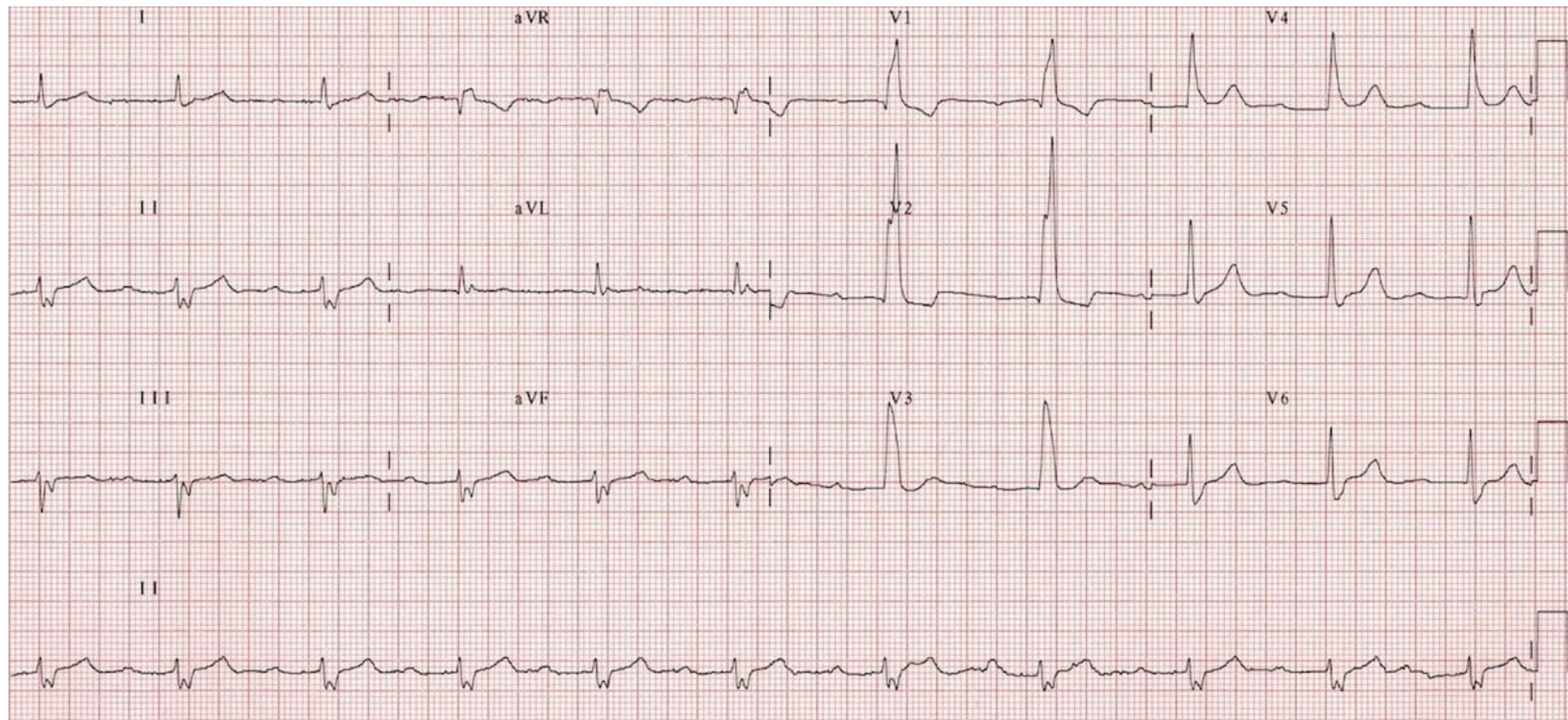


▲ RBBB. Incidental finding. ✘

◆ LBBB. Serial troponins. ✘

● 1st degree heart block. Admit cardiology. ✘

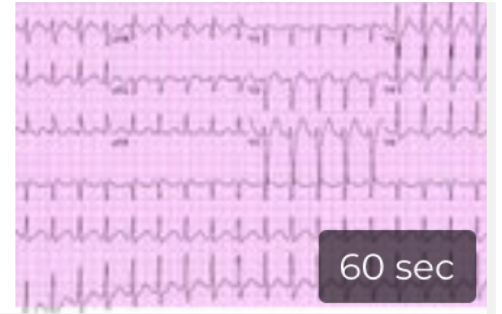
■ Incomplete trifascicular block. Admit cardiology. ✔



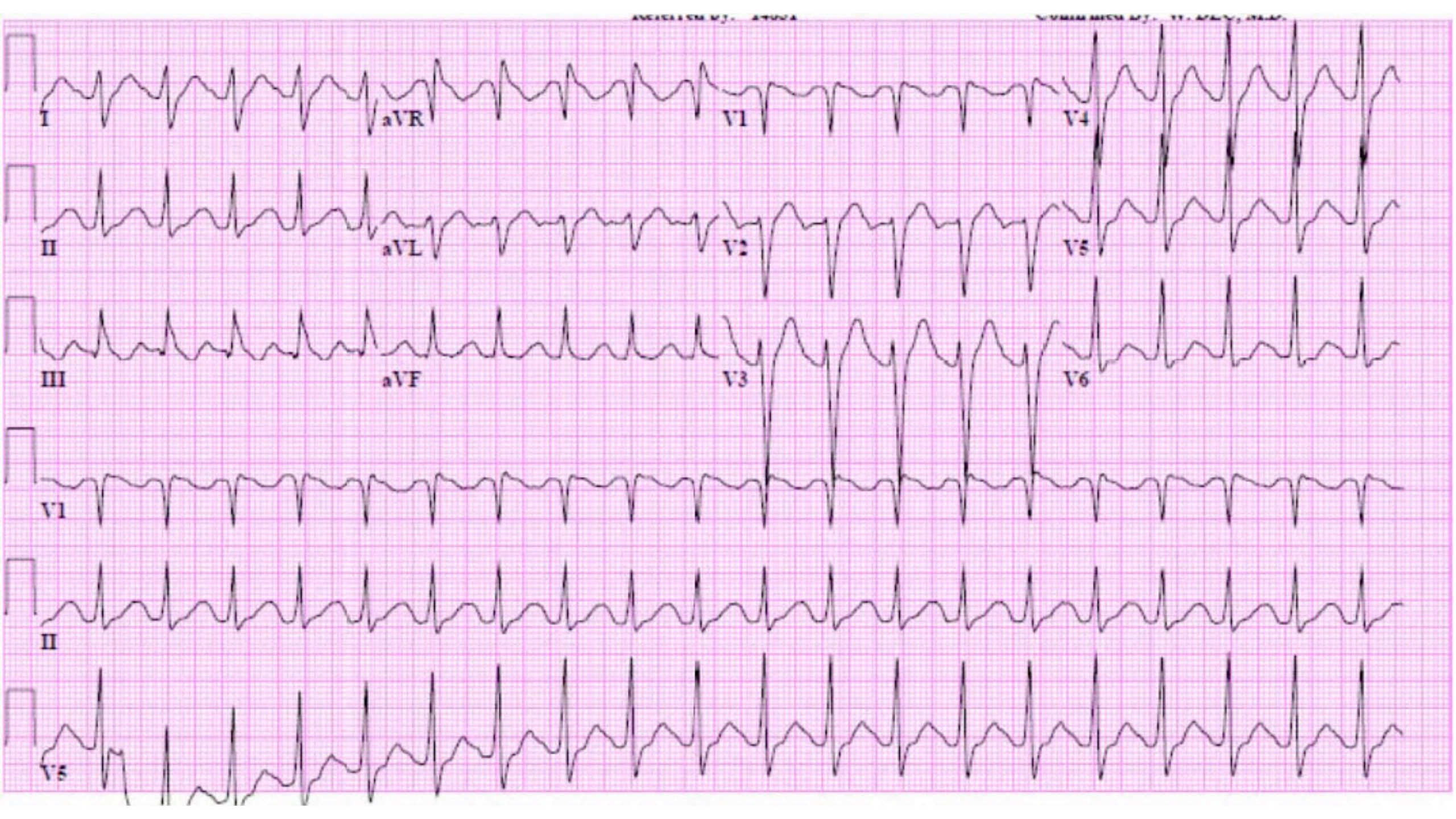
Trifascicular block (TFB) refers to the presence of conducting disease in all three fascicles:

- Right bundle branch (RBB)
- Left anterior fascicle (LAF)
- Left posterior fascicle (LPF)
- Incomplete trifascicular block may progress to complete heart block, although the overall risk is low.
- Patients who present with syncope and have an ECG showing incomplete trifascicular block usually need to be admitted for a cardiology work-up as it is possible that they are having episodes of complete heart block. Some of these patients will require insertion of a permanent pacemaker (class II indication).

Q2: Overdose patient. What now?



- This patient should have serial ECGs. ✗
- The patient needs to be moved to resus immediately. ✓
- The patient needs magnesium immediately. ✗
- The patient needs calcium immediately. ✗



Tricyclic Overdose

- +ve R wave aVR
- Widened QRS
- Prolonged QT (due to widened QRS)
- Impending seizures and arrhythmias
- The wider the QRS the greater the risk above
- Rx – Bicarbonate
- Bicarbonate should be given **before** intubation
- Once intubated patient can be hyperventilated to pH of 7.45-7.55

Q3: Palpitations. GCS 15. Systolic 110.



▲ Adenosine will help unmask the underlying rhythm.

✗

◆ This is conscious VT.

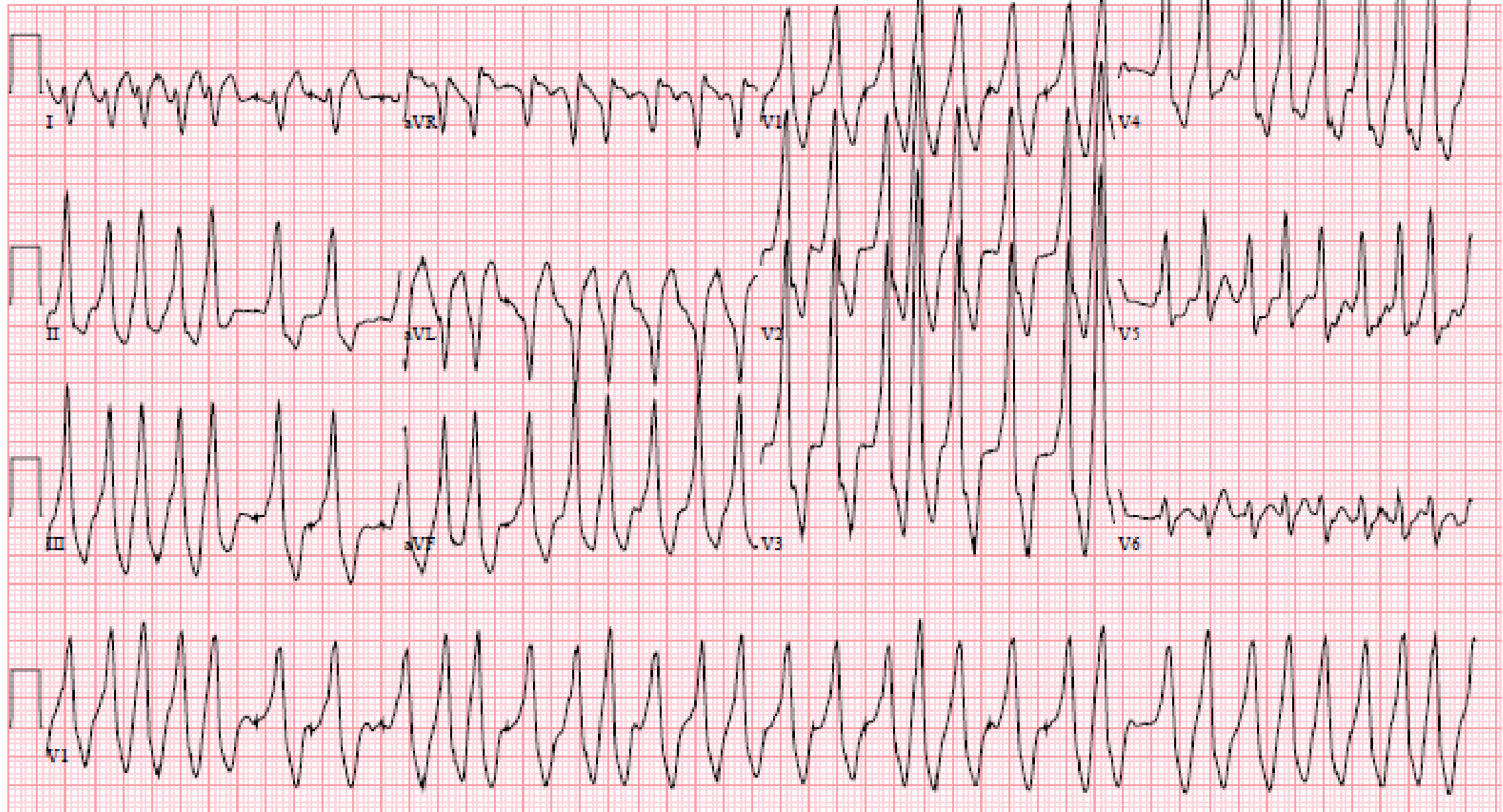
✗

● Calcium Channel Blocker is an option.

✗

■ The patient will likely need DC cardioversion.

✓

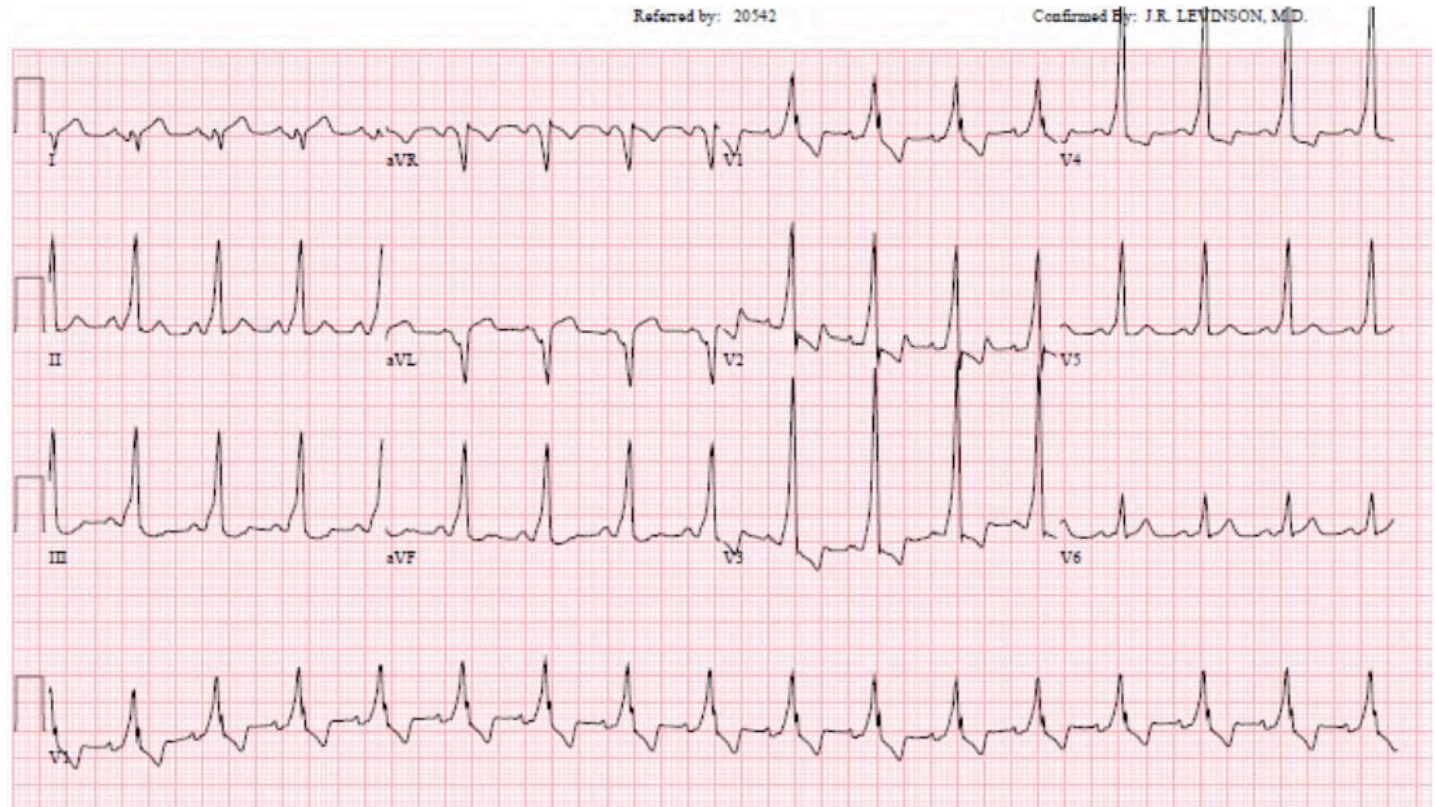
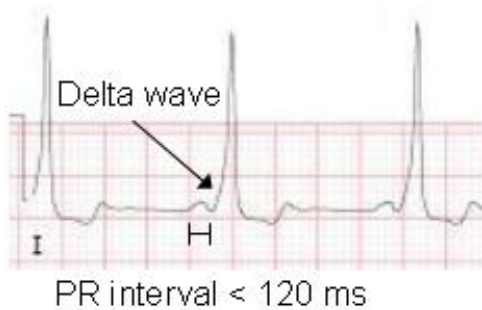


Pre Excitation AF

- Pre-excitation refers to early activation of the ventricles due to impulses bypassing the AV node via an accessory pathway.
- An accessory pathway can conduct impulses either **anterograde**, towards the ventricle, **retrograde**, away from the ventricle, or in both directions.
- AVRT with antidromic conduction results in a wide complex tachycardia which may be mistaken for [Ventricular Tachycardia](#).
- Atrial fibrillation can occur in up to 20% of patients with WPW.

- **ECG features of Atrial Fibrillation in WPW are:**
 - Rate > 200 bpm
 - Irregular rhythm
 - Wide QRS complexes due to abnormal ventricular depolarisation via accessory pathway
 - QRS Complexes change in shape and morphology
 - Axis remains stable unlike [Polymorphic VT](#)
- **Treatment of AF with WPW**
 - Treatment with AV nodal blocking drugs e.g. adenosine, calcium-channel blockers, beta-blockers may increase conduction via the accessory pathway with a resultant increase in ventricular rate and possible degeneration into [VT](#) or [VF](#)
 - In a haemodynamically unstable patient urgent synchronised DC cardioversion is required.
 - Medical treatment options in a stable patient include procainamide or ibutilide, although DC cardioversion may be preferred.

- ECG of same patient after cardioversion
- Delta waves are evident (short PR and slurred upstroke of the QRS)



80 yo man with acute renal failure

Time limit

60
sec

Points 

1000

Answer options

Single select 

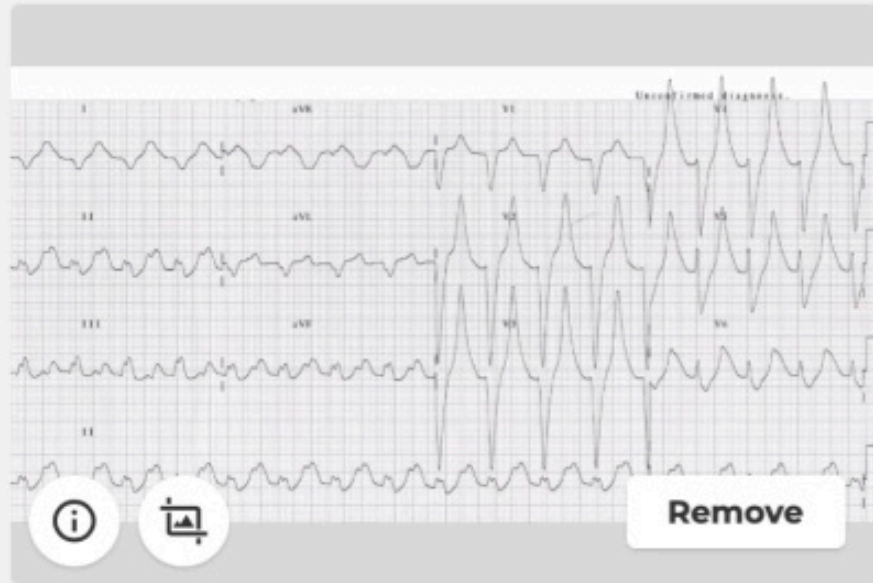


Image reveal



Original



3x3



5x5



8x8

Needs Calcium.



Needs Magnesium.

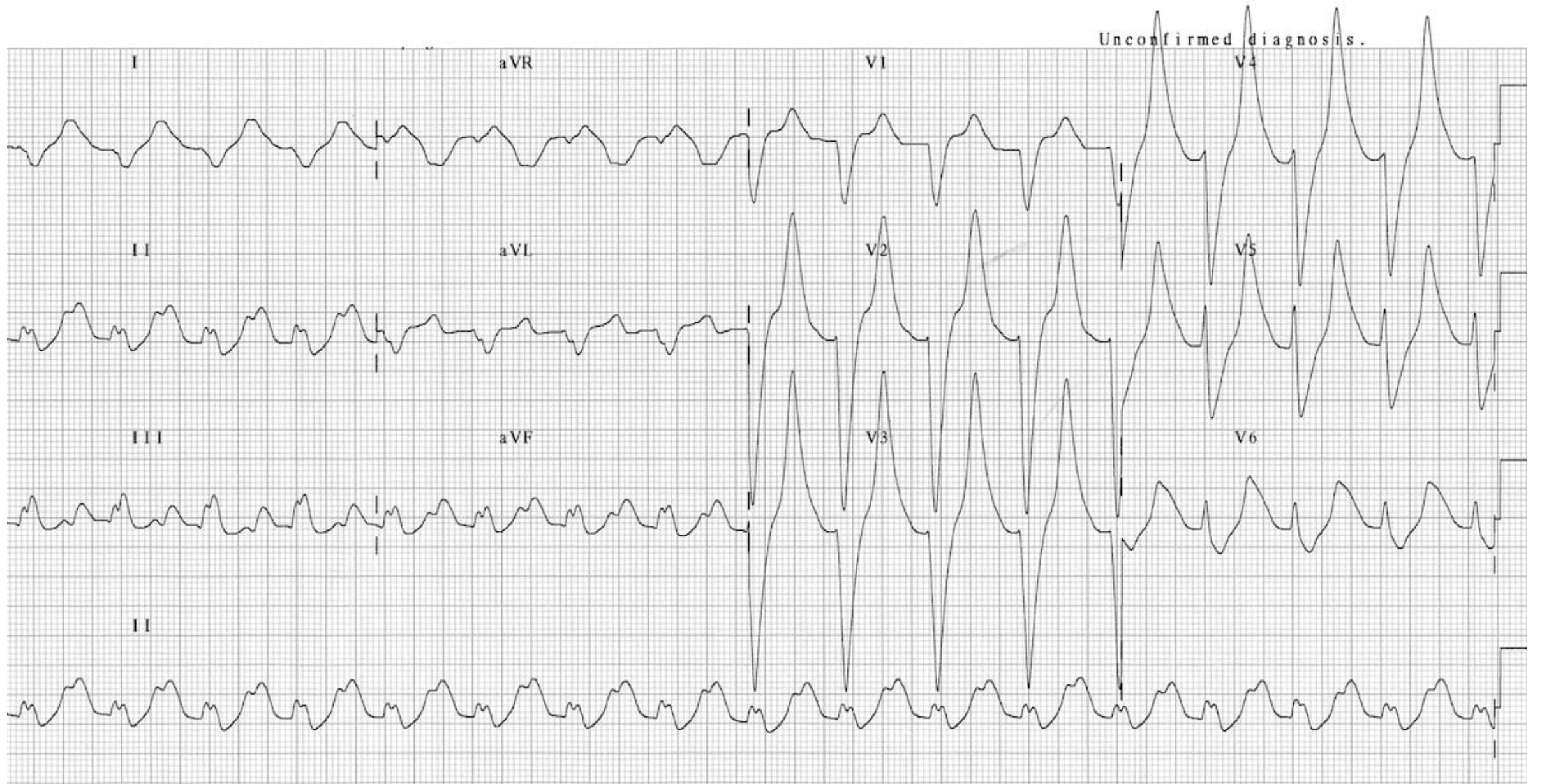


Needs Potassium.



Needs Aspirin.





Hyperkalaemia

- Bradycardia
- Flattened P waves
- Prolonged PR
- Wide QRS (continues to widen until ECG becomes sine wave)
- Peaked T waves
- Calcium is indicated if QRS is widened in addition to potassium lowering therapies

Q5: 75 yo female. Nausea and Vomiting.



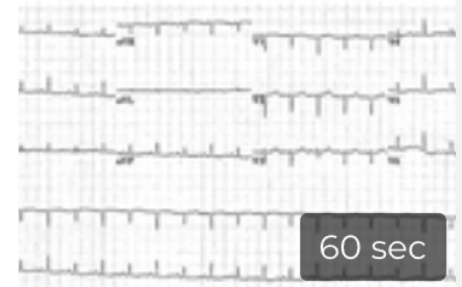
- Needs Calcium. ✗
- Needs Magnesium. ✗
- Needs Digibind. ✓
- Needs Pacing. ✗



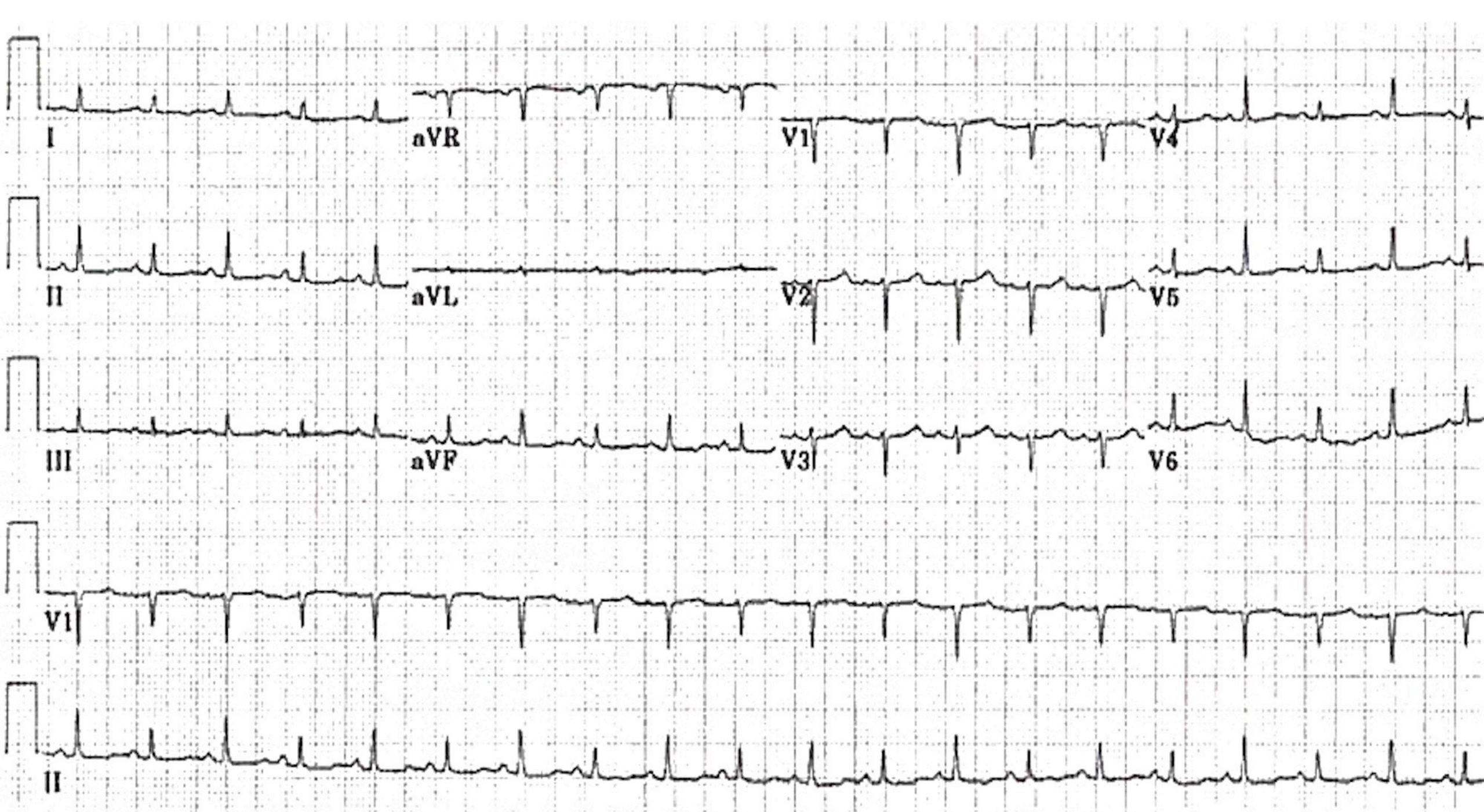
Digoxin Toxicity

- Atrial tachycardia
- High grade AV conduction block
- Frequent ventricular ectopics
- Alternating RBBB / LBBB morphology

Q6: 30 yo female. Systolic 60.



- | | | |
|---|----------------------|---|
| ▲ | PE | × |
| ◆ | Sepsis | × |
| ● | Pericardial Effusion | ✓ |
| ■ | RV infarction | × |

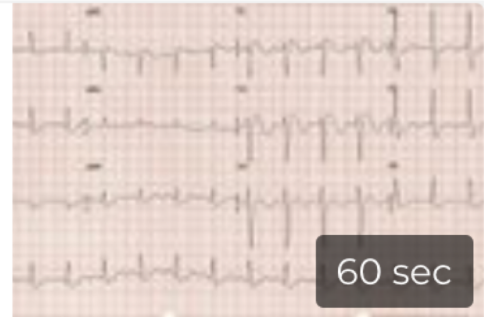


Large Pericardial Effusion

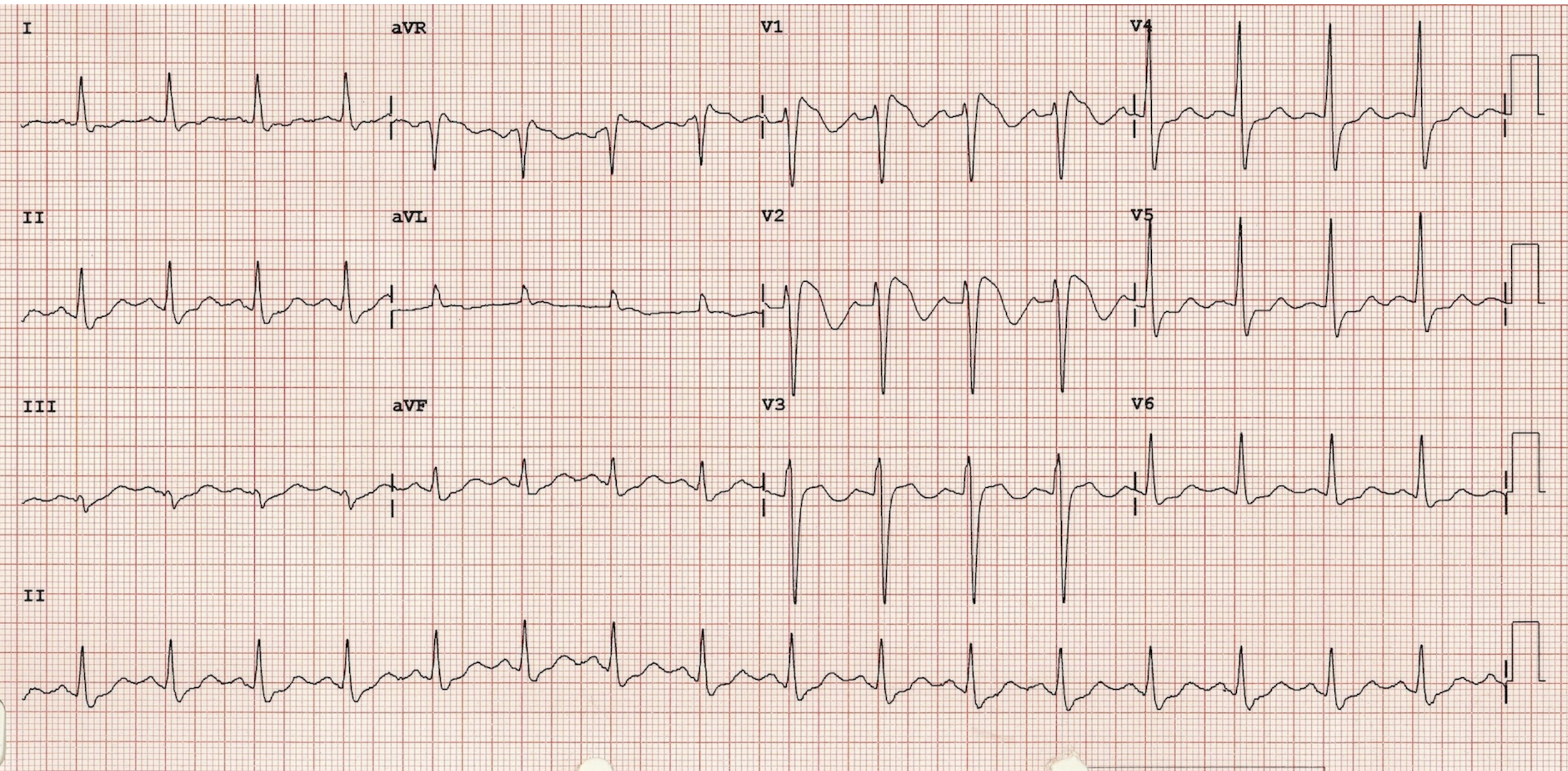
- Tachycardia
- Low voltage QRS complexes
- Electrical Alternans (i.e. variation in the amplitude of the QRS complexes with inspiration and expirations)



Q7: 40 yo old. Collapse.

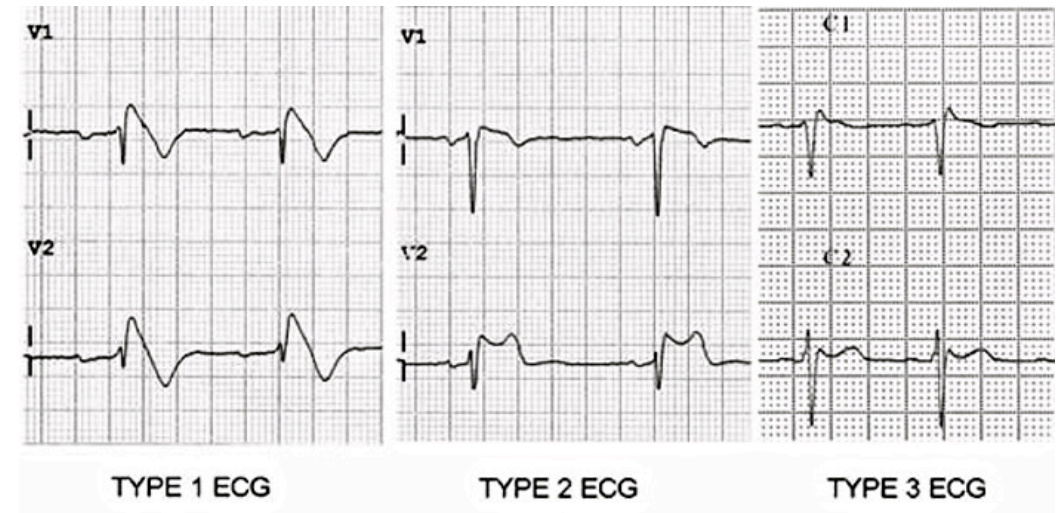


- ▲ Anterior STEMI. ✗
- ◆ Will Need Cardiology Admission. ✓
- Likely Overdose. ✗
- Hyerkalaemia. ✗

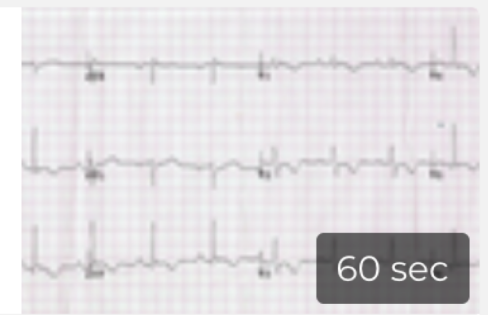


Brugada Syndrome

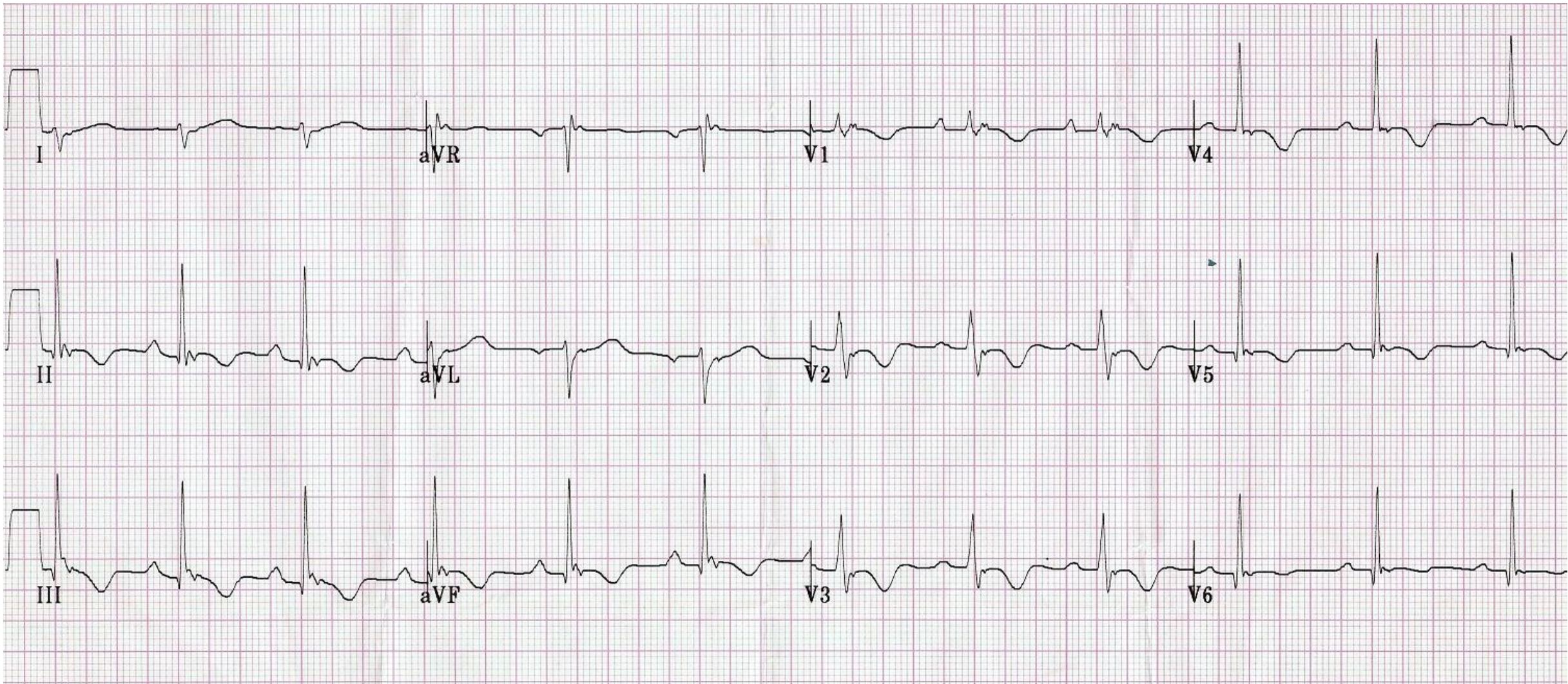
- Abnormality seen in V1 and V2
- At risk of VT, VF, and sudden death
- 3 types:
 1. “Coved” ST elevation $> 2\text{mm}$ at the J-point, followed by an inverted T wave
 2. “Saddleback” ST segments with $> 2\text{mm}$ J-point elevation, $> 1\text{mm}$ ST elevation and a positive or biphasic T wave
 3. “Saddleback” ST segments with $> 2\text{mm}$ J-point elevation, $> 1\text{mm}$ ST elevation and a positive or biphasic T wave
- Inherited arrhythmogenic condition
 - Mutation of cardiac sodium and calcium channels
- May be unmasked by fever



Q8: 35 yo male. Palpitations



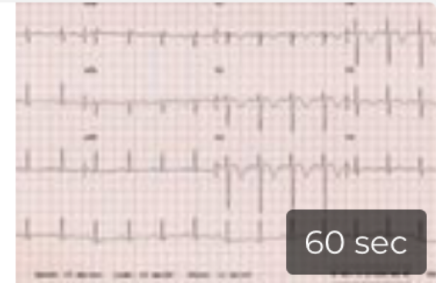
- ▲ At risk of Sudden Cardiac Death. ❌
- ◆ At risk of right ventricular VT. ❌
- Common cause of sudden death in young people. ❌
- All of the above. ✔️



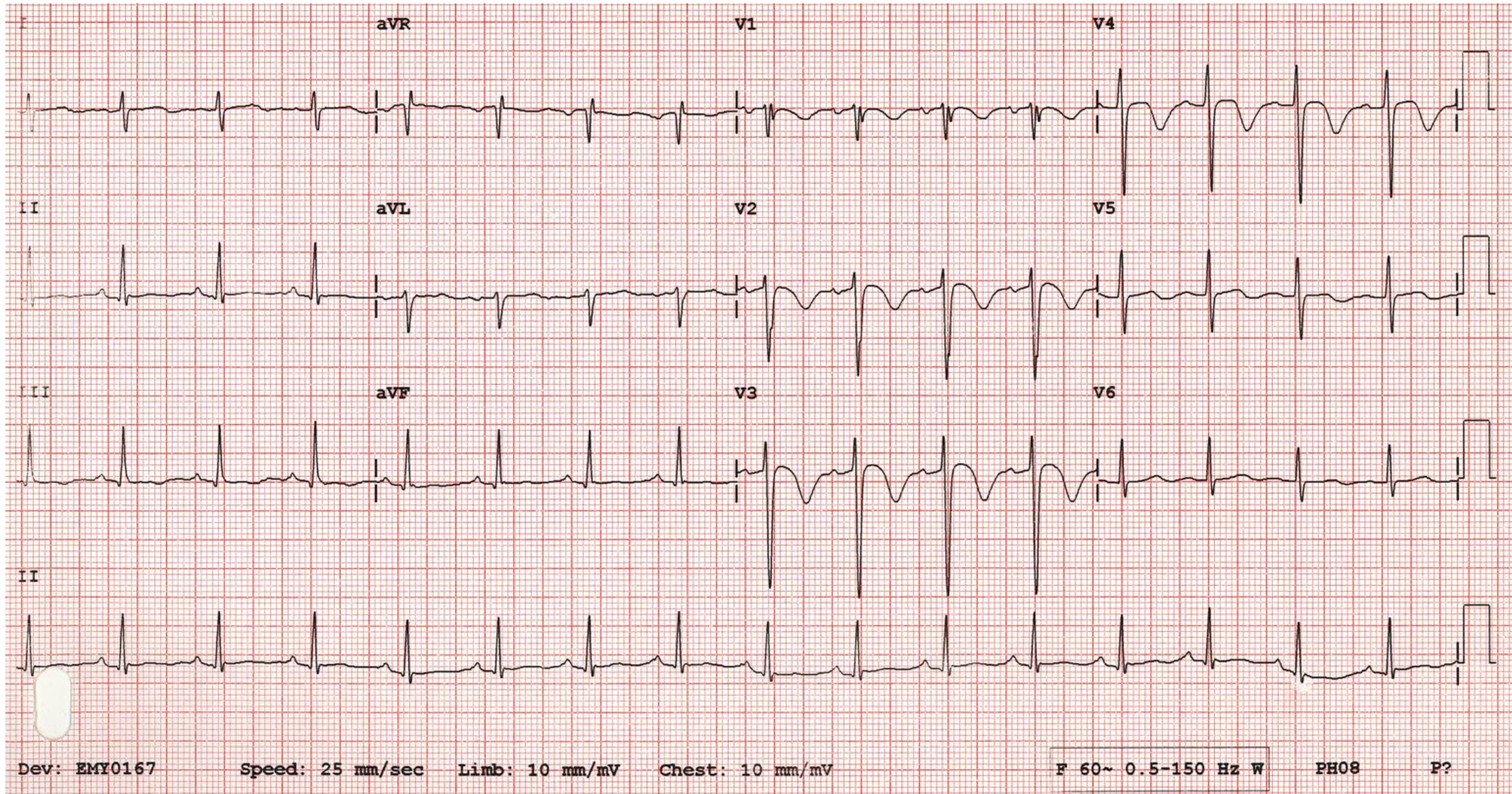
Arrhythmogenic Right Ventricular Cardiomyopathy

- Right axis deviation and a dominant R wave in V1 are signs of Right Ventricular Hypertrophy.
- Simultaneous T-wave inversions in the anterior and inferior leads (particularly leads V1-4 plus III + aVF) are referred to as the Right Ventricular Strain pattern, and are another sign of RVH.
- Localised QRS widening / slurring in V1-3 and the presence of Epsilon waves are signs of:-
- Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC).
 - Inherited AD condition
 - Palpitation, syncope and death due to Right ventricular tachycardia
 - Male:Female – 3:1
 - Greek and Italian decent
 - Second most common cause of sudden cardiac death in young people

Q9: Chest pain. What should you do for the patient?



- Admit to cardiology. ✓
- Serial Troponins. ✗
- Out patient stress test. ✗
- Outpatient Holter monitor. ✗



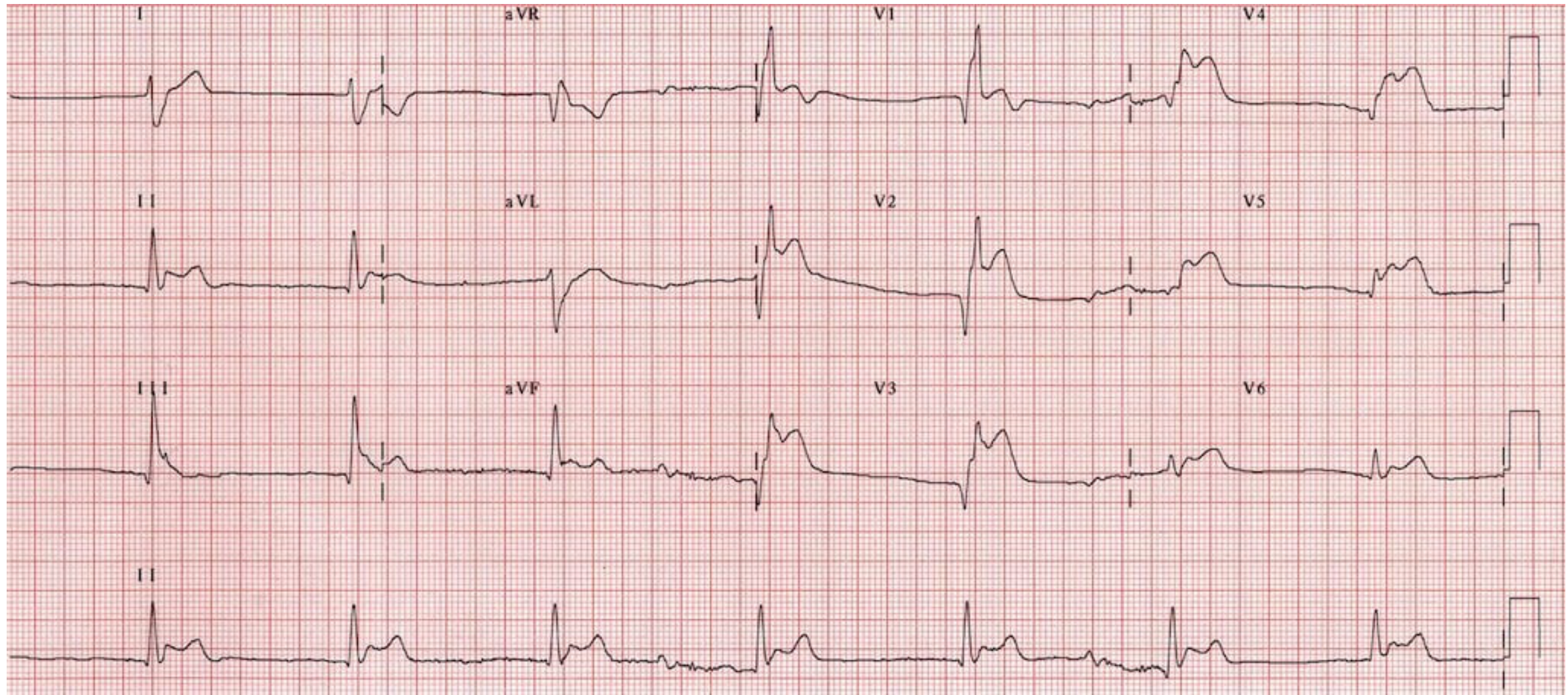
Wellen's

- Cardiac enzymes may be normal
- Critical LAD stenosis
- “Widow maker lesion”
- Patient must be admitted for inpatient investigation

Q10: Onset of severe chest pain in 65 yo woman after her mother just died.

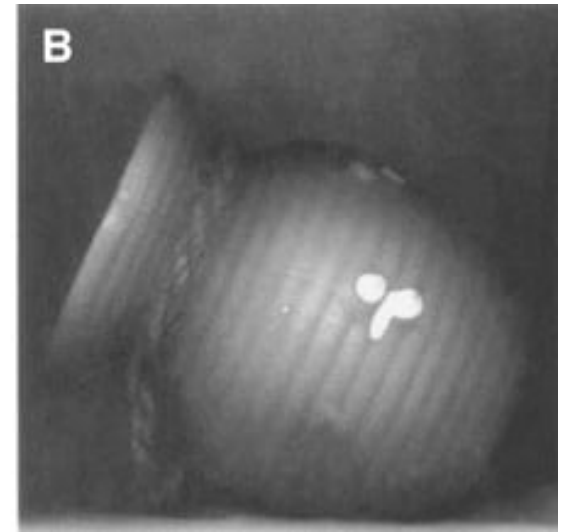
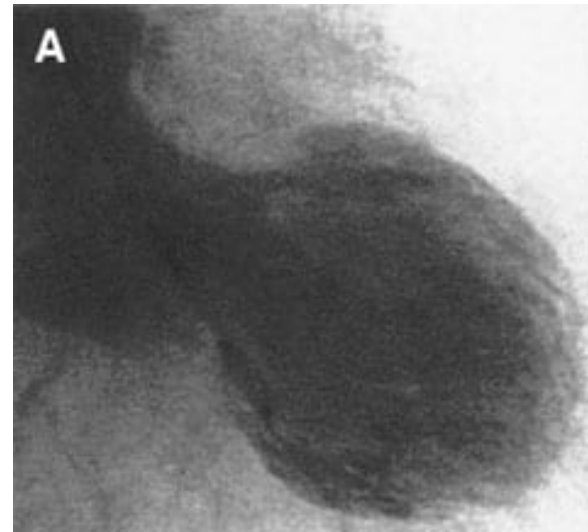


- ▲ The angiogram will show normal coronary arteries. ❌
- ◆ Cardiac enzymes may be raised. ❌
- Echo may be diagnostic. ❌
- All of the above ✅

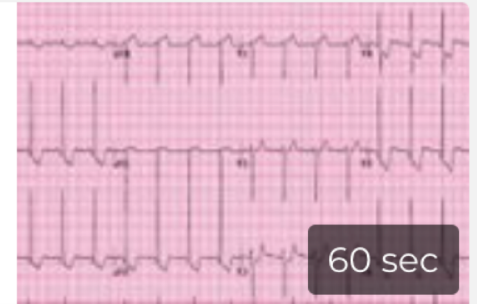


TakoTsubo (octopus trap)

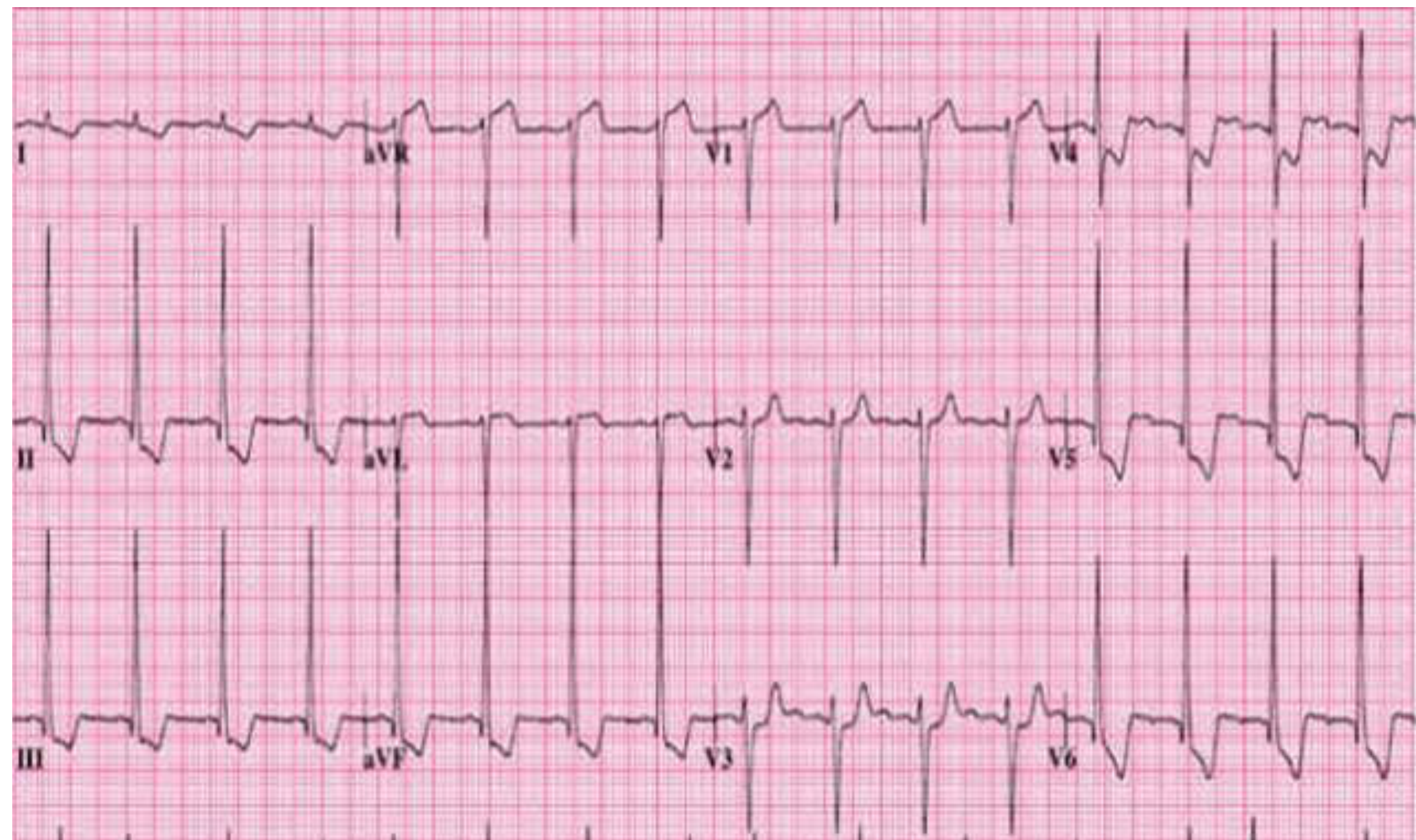
- A STEMI mimic producing ischaemic chest pain, ECG changes +/- elevated cardiac enzymes with characteristic regional wall motion abnormalities on echocardiography.
- Typically occurs in the context of severe emotional distress (“broken heart syndrome”).
- Patients have normal coronary arteries on angiography.
- Originally described in Japan within the last 20 years, Tako-tsubo has become increasingly recognised, possibly in no small part due to the increased use of angiography in cardiology.



Q11: 25 yo athlete. Was in AF, now resolved.

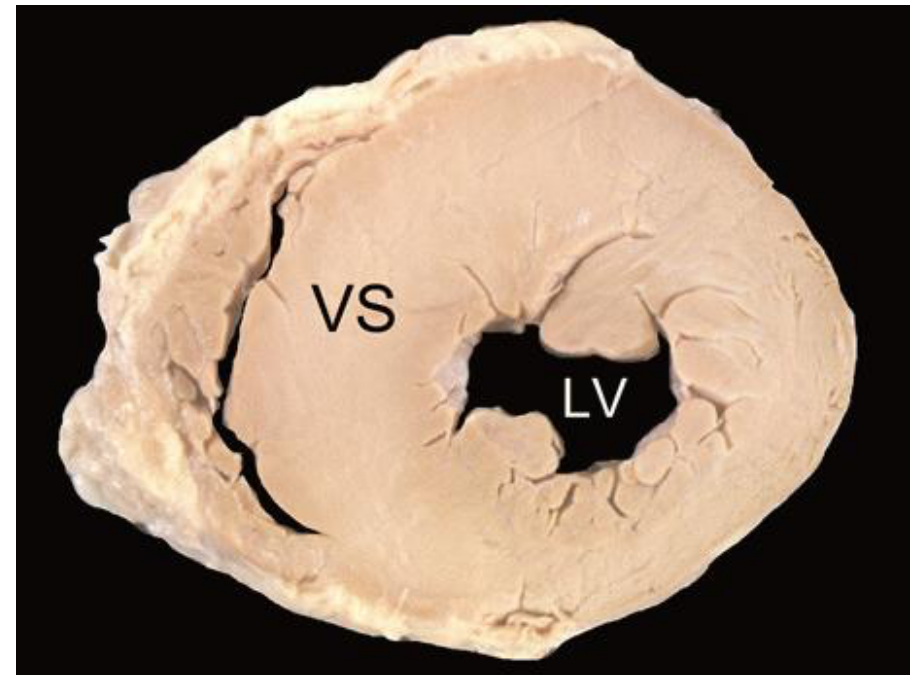


- ▲ At risk of sudden cardiac death. ✗
- ◆ Should have an expedited echocardiogram ✗
- should not exercise until he sees a cardiologist. ✗
- All of the above. ✓



Hypertrophic Cardiomyopathy

- Hypertrophic cardiomyopathy (HCM) is one of the most common inherited cardiac disorders (affecting ~ 1 in 500 people) and is the number one cause of sudden cardiac death in young athletes. Annual mortality is estimated at 1-2 %.
- The chief abnormality associated with HCM is left ventricular hypertrophy (LVH)

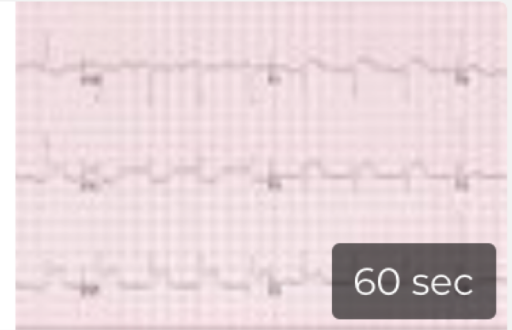


- The most commonly observed pattern is asymmetrical thickening of the anterior interventricular septum (= *asymmetrical septal hypertrophy*).
- This pattern is classically associated with systolic anterior motion (SAM) of the mitral valve and dynamic left ventricular outflow tract (LVOT) obstruction.
- However, in the majority of cases (75%), HCM is not associated with LVOT obstruction (hence the name change from HOCM to HCM).

- ECG features of Hypertrophic Cardiomyopathy
- Left ventricular hypertrophy results in increased precordial voltages and non-specific ST segment and T-wave abnormalities.
- Asymmetrical septal hypertrophy produces **deep, narrow (“dagger-like”) Q waves** in the lateral (V5-6, I, aVL) and inferior (II, III, aVF) leads. These may mimic prior myocardial infarction, although the Q-wave morphology is different: infarction Q waves are typically > 40 ms duration while septal Q waves in HCM are < 40 ms. Lateral Q waves are more common than inferior Q waves in HCM.

- Left ventricular diastolic dysfunction may lead to compensatory left atrial hypertrophy, with signs of left atrial enlargement (“P mitrale”) on the ECG.
- There is an association between HCM and Wolff-Parkinson-White (WPW) syndrome: ECG features of WPW were seen in 33% of patients with HCM in one study. At least one genetic mutation has been identified that is associated with both conditions.
- Atrial fibrillation and supraventricular tachycardias are common. Ventricular dysrhythmias (e.g. VT) also occur and may be a cause of sudden death.

Q12: Central crushing chest pain.



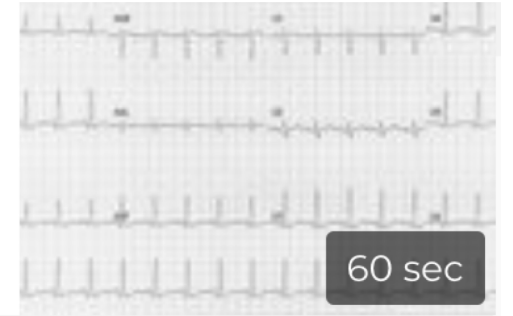
- ▲ This patient may need a fluid bolus if hypotensive. ✓
- ◆ Nitrates can be used for pain. ✗
- Likely LAD lesion. ✗
- Left Ventricular Infarct pattern ✗



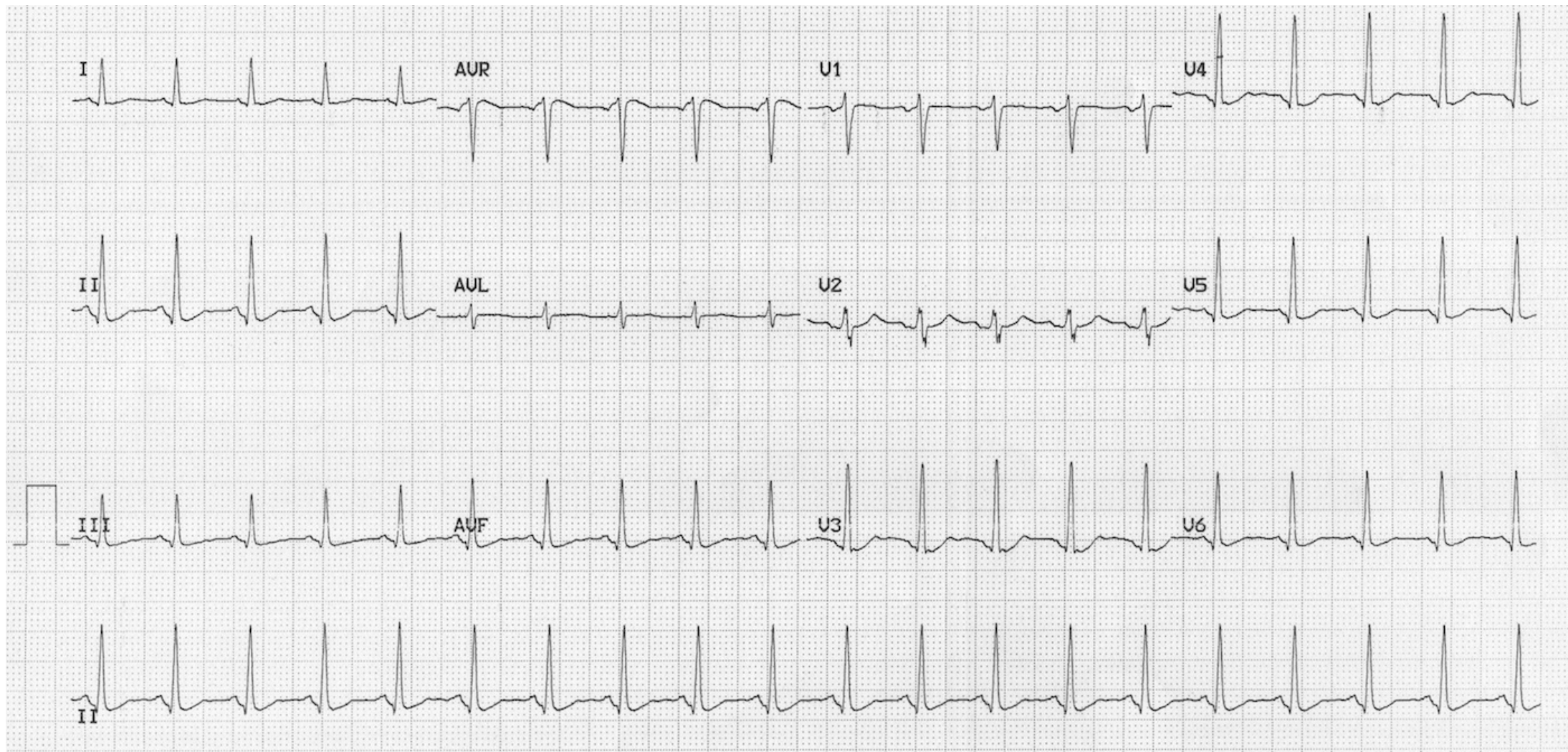
Right Ventricular Infarction

- Suggested as V1 elevation and Elevation in III >II
- Important to recognize RV infarct:
 - Right ventricular infarction complicates up to 40% of inferior STEMIs.
 - Patients with RV infarction are very **preload sensitive** (due to poor RV contractility) and can develop **severe hypotension in response to nitrates** or other preload-reducing agents.
 - Hypotension in right ventricular infarction is treated with **fluid loading**, and nitrates are contraindicated.

Q13: Overdose 4/24 ago. GCS 15 . What abnormal features are present? What treatment is required?



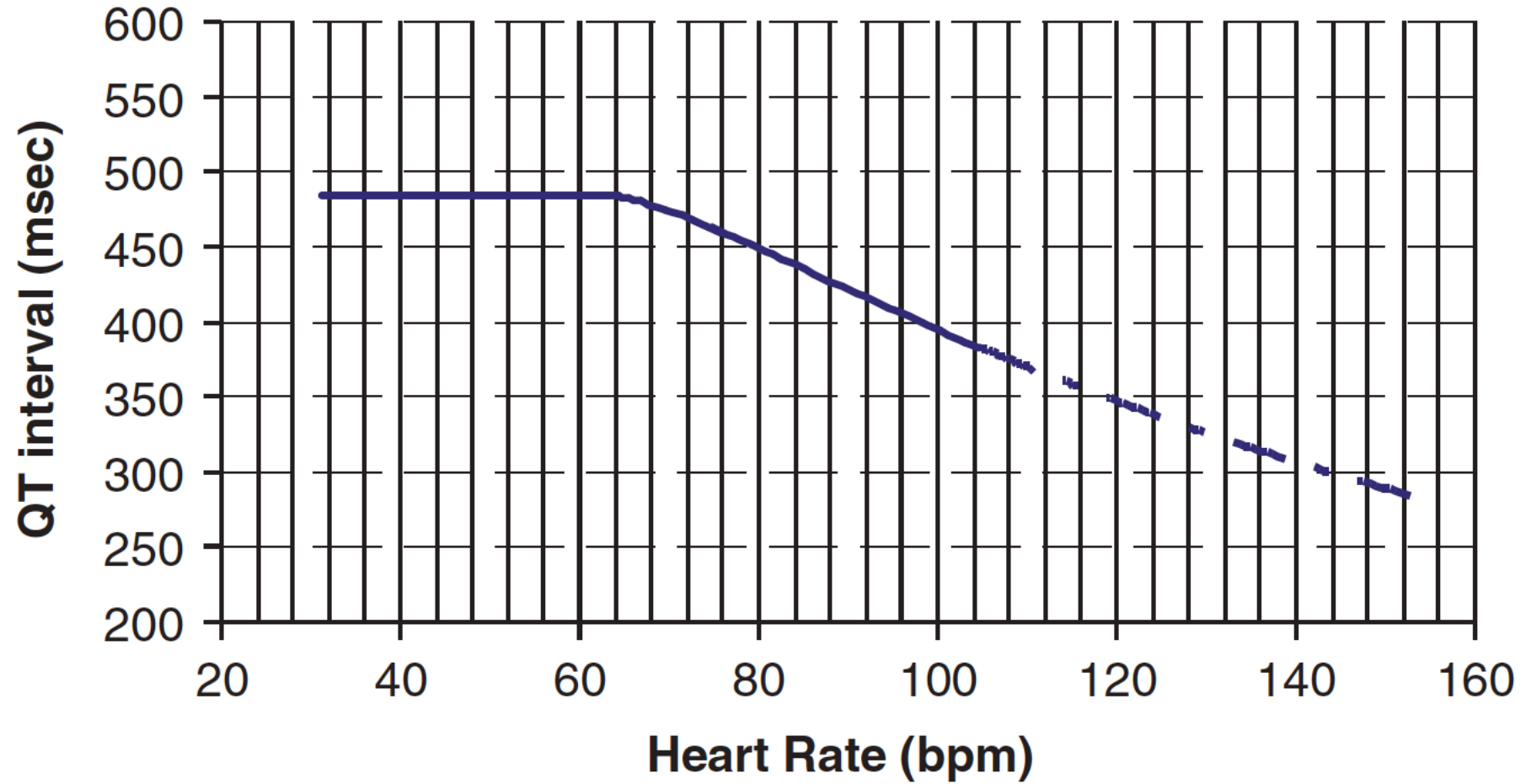
- Prolonged QT. Admit SSU. Serial ECGS. ✓
- Prolonged QT. Needs immediate treatment with magnesium. ✗
- Prolonged QT. Needs immediate treatment with Calcium. ✗
- Prolonged QT. Needs intubation and hyperventilation. ✗



Quetiapine Overdose

- Prolonged QT
- Tachycardia is Protective
- NO documented cases of Torsades de point with Quetiapine overdose
- Use of Nomogram to assess risk of arrhythmia

QT Interval Nomogram



Can Quick BRAD Walk Home?

- Causes of sudden collapse not to miss of ECG:
 - Can Quick BRAD Walk Home?:
 - Conduction blocks
 - Long/ short QT
 - Brugada
 - RV infarction
 - ARVC
 - DCM
 - WPW
 - Hypertrophy (HCM or LVH due to AS)