جامعة الملك سعود
King Saud University

ECG med 442

Bradycardia

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Bradyarrhythmia

Bradycardia is defined as a heart rate of less than 60
Levels of abnormalities causing it:

1

- Sinus bradycardia

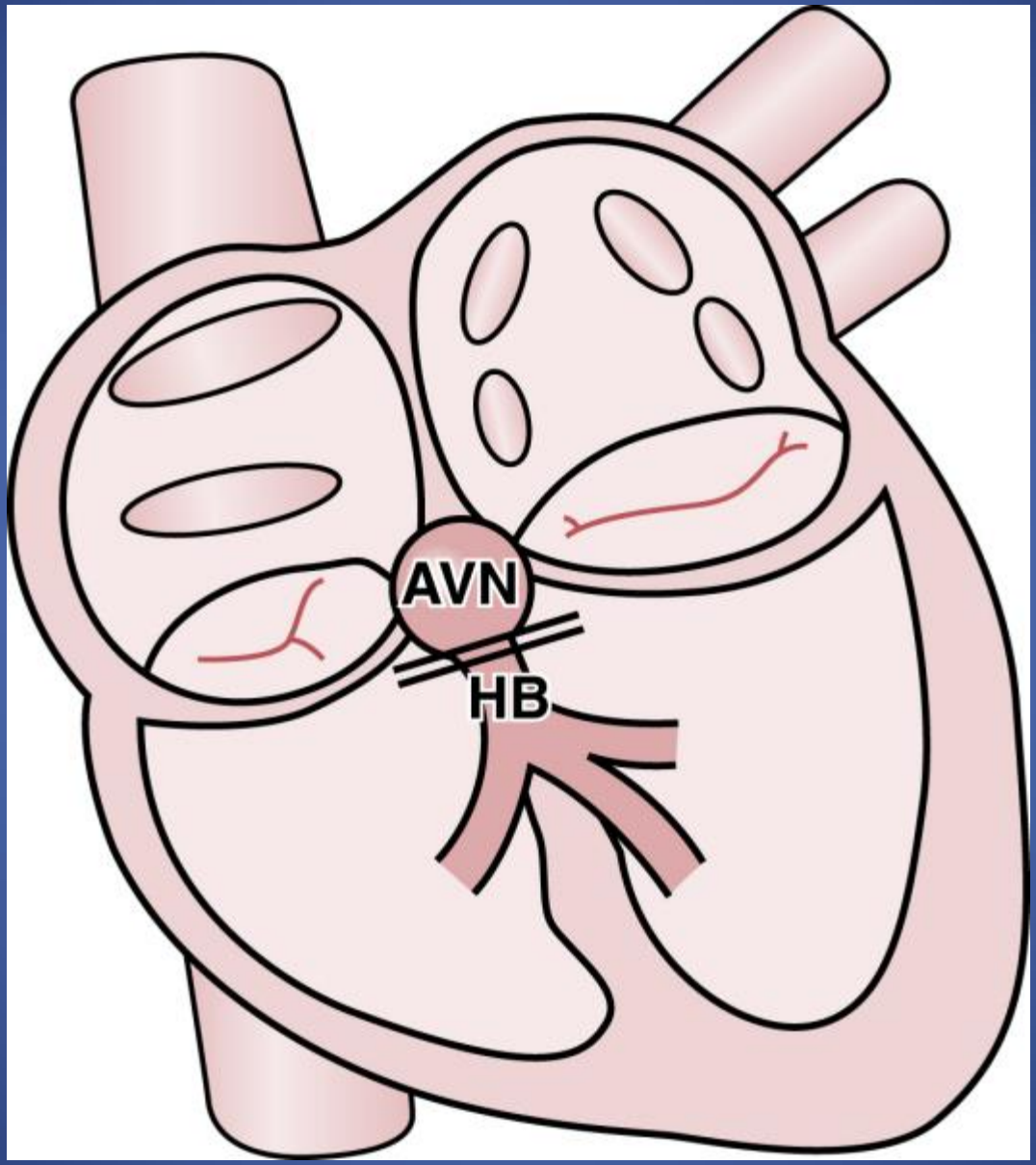
  SA node slows down due to: Aging (by wear and tear mechanisms) or Physiological (Normal people during sleep or with Athletes or with hypothermia) or Drugs causing bradycardia (beta blockers)

- SA node disease (Fibrosis, degeneration)

2

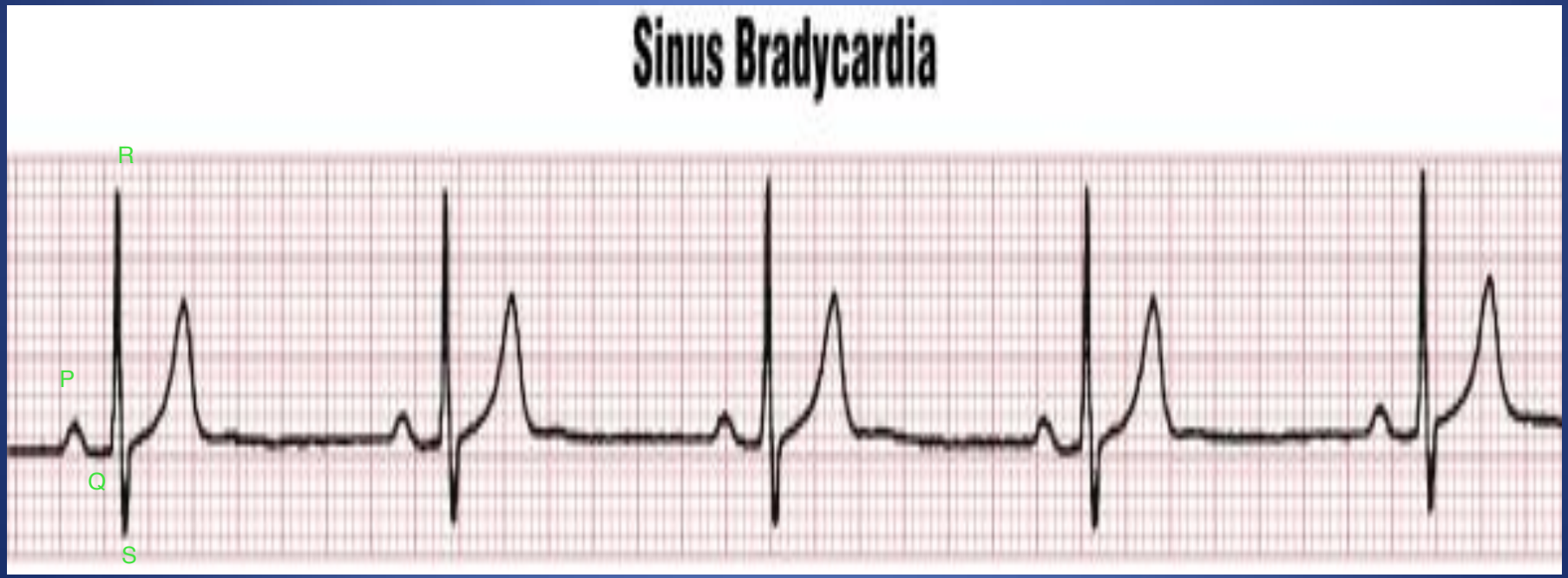
- AV node disease

How do we know the level affected?
If there's an absent P wave, the problem is in the SA node.
If the P wave is present and normal, its most likely a problem in the AV node


AVN
HB

Sinus bradycardia

Here, there's P, Q, R, S and The rate is (count the boxes between the P waves and divide 300 by them (7).
Theres another way of knowing the heart rate, just memorize:
2 boxes = 150
3 boxes = 100
4 boxes = 75
5 boxes = 60
6 boxes = 50
7 boxes = less than 50 ~



Its called sinus because every P is followed by QRS complex

Heart block causes bradycardia, there's a block at the level of the SA node and there's a block at the level of the AV node.

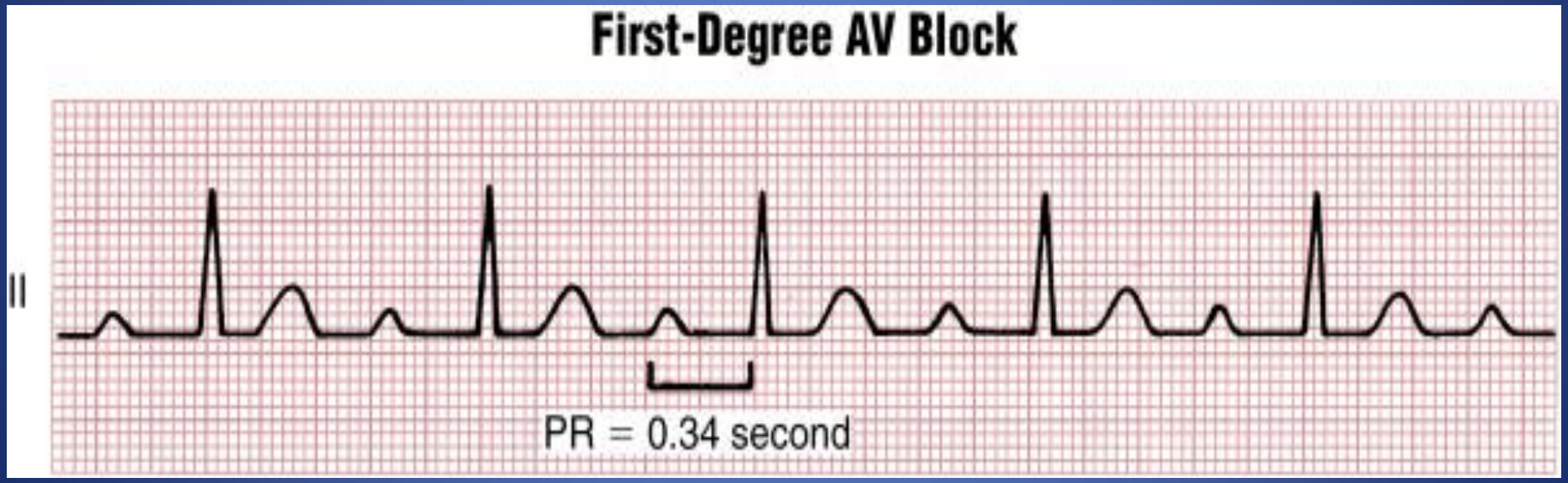
What you have to know at your level is that heart blocks happen at the level of the AV node.

Heart Block

Normal P-R interval is between (0.12-0.2sec) or you can say that if it's within one big box

1st○	• Constant PR prolongation without drop beat.
2nd○	• **Mobitz1:** Progressive PR prolongation + drop beat. • **Mobits2:** Constant PR prolongation + drop beat.
3rd ○	• Complete dissociation between P and QRS.

1st HB



Prolonged P-R interval (>0.2sec) Lazy AV node

Usually due to Wear and tear degeneration that happens with aging, or physiologically.

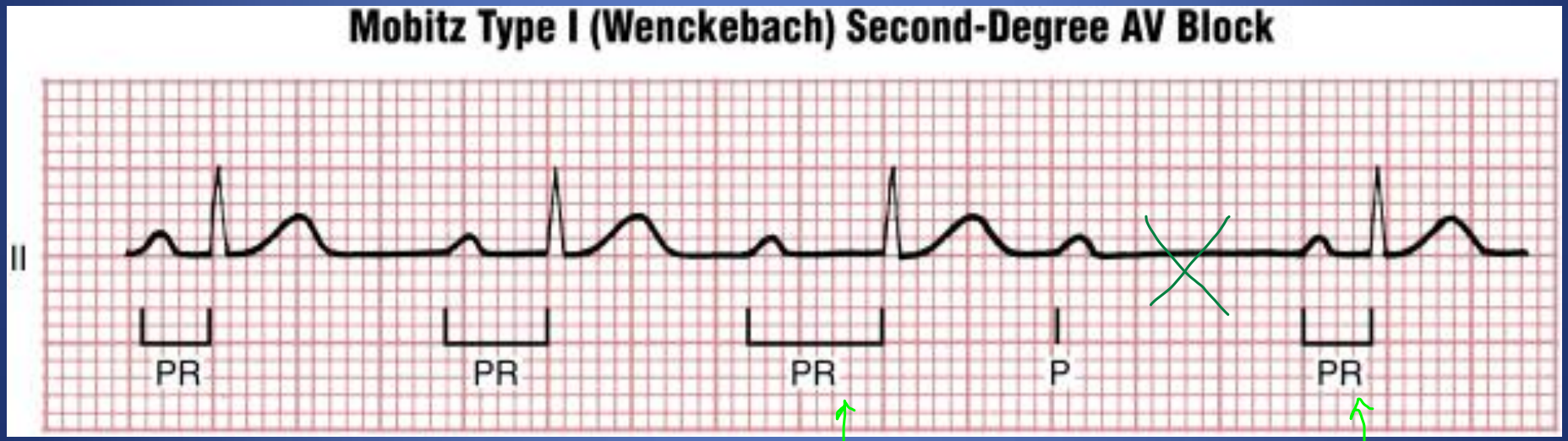
No specific treatment

Here the Av node is progressively slowing down “like describing a fatigued person till they drop. After the drop “they are well rested” so they start fresh (shortest P-R) and progressively slow down again

2nd HB Mobitz type-1

Progressive prolongation of the P-R interval followed by a QRS drop

Pronounced وينكيباخ أو وينكيبال

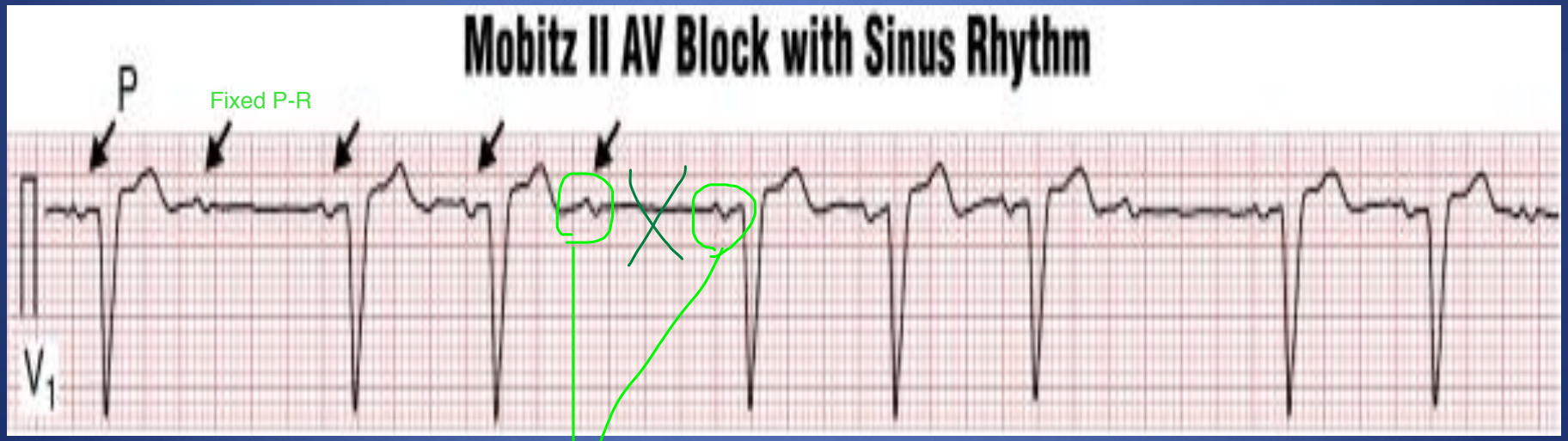


The cause is physiological. We all have it during sleep as a normal physiology. You don’t need much energy or demand, so the AV node rests. They are completely asymptomatic, and don’t need a pacemaker.

An easy way to spot the prolongation of P-R is looking at the P-R intervals before and after the QRS drop, and compare them because usually the one right after the drop is the smallest interval while the one before is the longest

2nd HB Mobitz type-2

Fixed prolongation of the P-R interval followed by a QRS drop



They usually present with Syncope and always need a pacemaker because it's dangerous and not physiological. Its pathological and mostly due to wear and tear processes

To differentiate it from type 1, compare the PR interval before and after the drop.
Here its fixed, so it's Mobitz type 2.

Normal heart has 3 pacemakers (from fastest to slowest):
SA node
AV node
Purkinge system

The SA is the dominant. So, if it's failing or not connecting to the AV node, the other systems will be the back up. BUT they are slower.

3rd HB

Complete dissociation between the atrium and ventricle
No relation between the P wave and QRS complex

:- AKA: AV dissociation (AtrioVentricular dissociation)

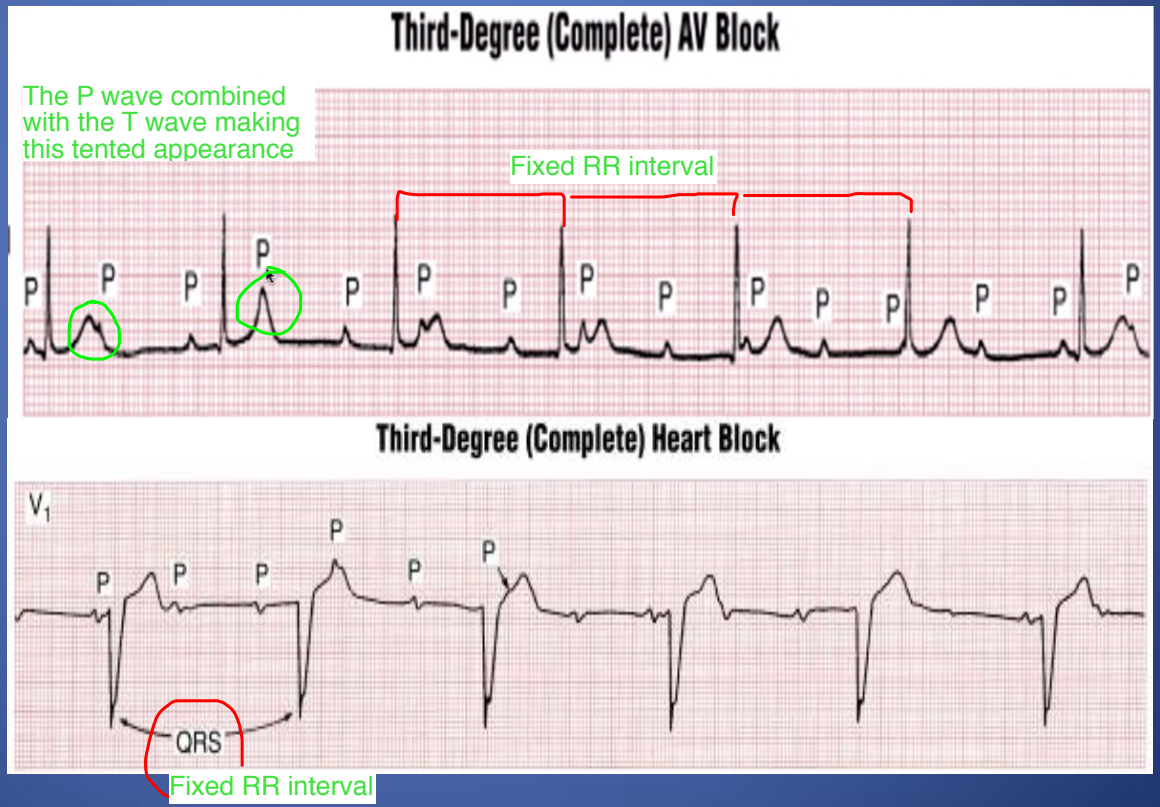
Q: What saves the person with a 3rd degree HB?
1. The AV node
2. The Purkinge system
So, they will have bradycardia

Important features of 3HB:-
1. Bradycardia
2. P wave and QRS dissociation
3. P waves are More than QRS complexes
4. Most important feature: R-R interval is Fixed.

The 4th feature is a must, because its the only evidence of dissociation

The most common cause is wear and tear processes (degeneration). The second most common is caused by Ischemia.
Other causes such as inflammation like myocarditis, drugs, connective tissue diseases, sarcoidosis by deposition on the AV node, electrolyte abnormality, and a lot more.

The treatment is with pacemaker AFTER ruling out any reversible cause. Treat the underlying cause.



Read
or skip

Some Conditions That May Cause Temporary AV Conduction Impairment

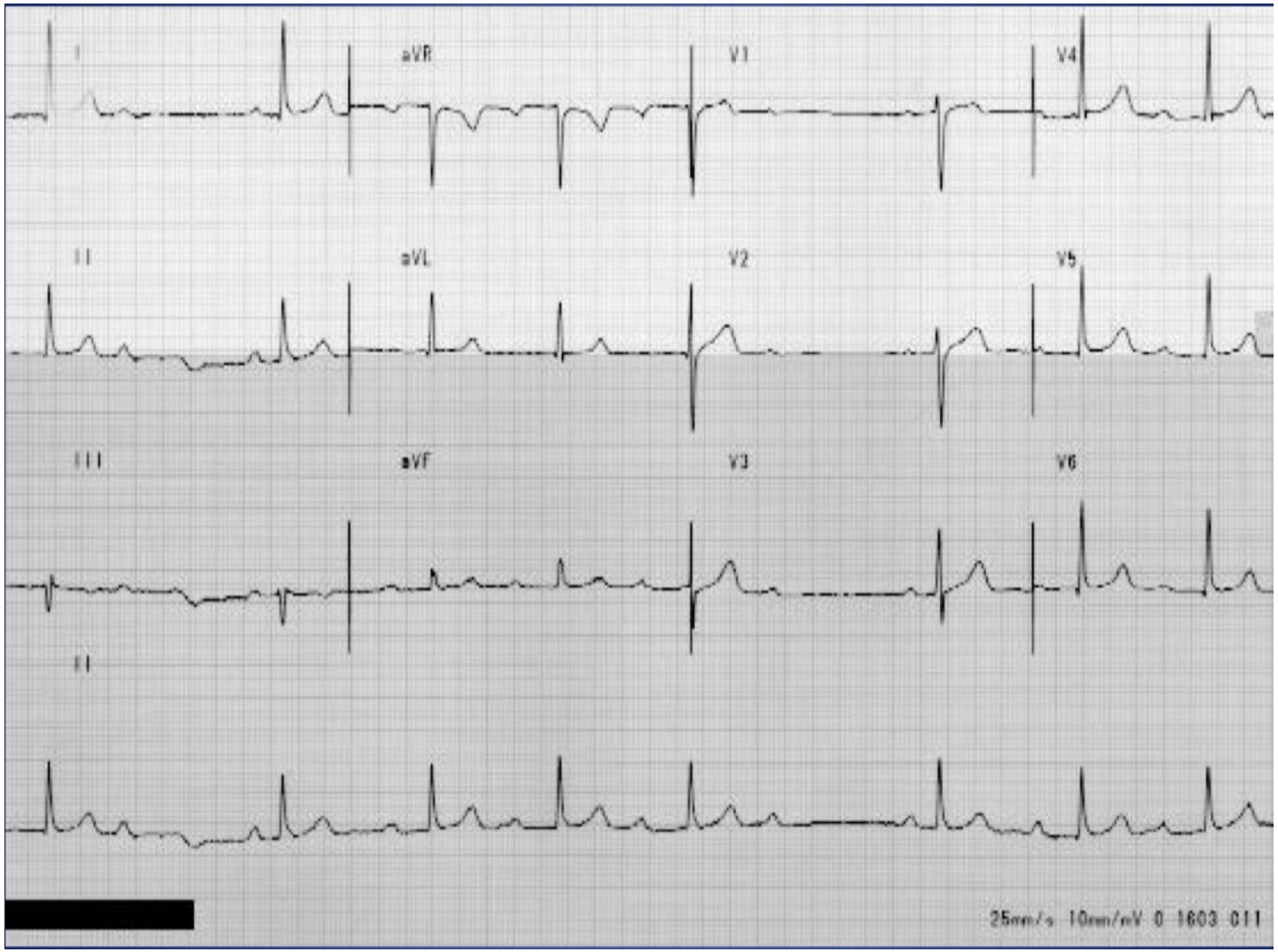
- Autonomic factors (increased vagal tone with vasovagal syncope or sleep apnea). Trained athletes at rest may show a prolonged atrioventricular (AV) interval and even AV Wenckebach with sinus bradycardia that resolve with exercise.
- Medications (especially, beta blockers; digoxin, certain calcium channel blockers) and electrolyte abnormalities (especially hyperkalemia)
- Acute myocardial infarction, especially inferior (see text discussion)
- Inflammatory processes (e.g., myocarditis, rheumatic fever, lupus)
- Certain infections (e.g., Lyme disease, toxoplasmosis)

Read
or skip

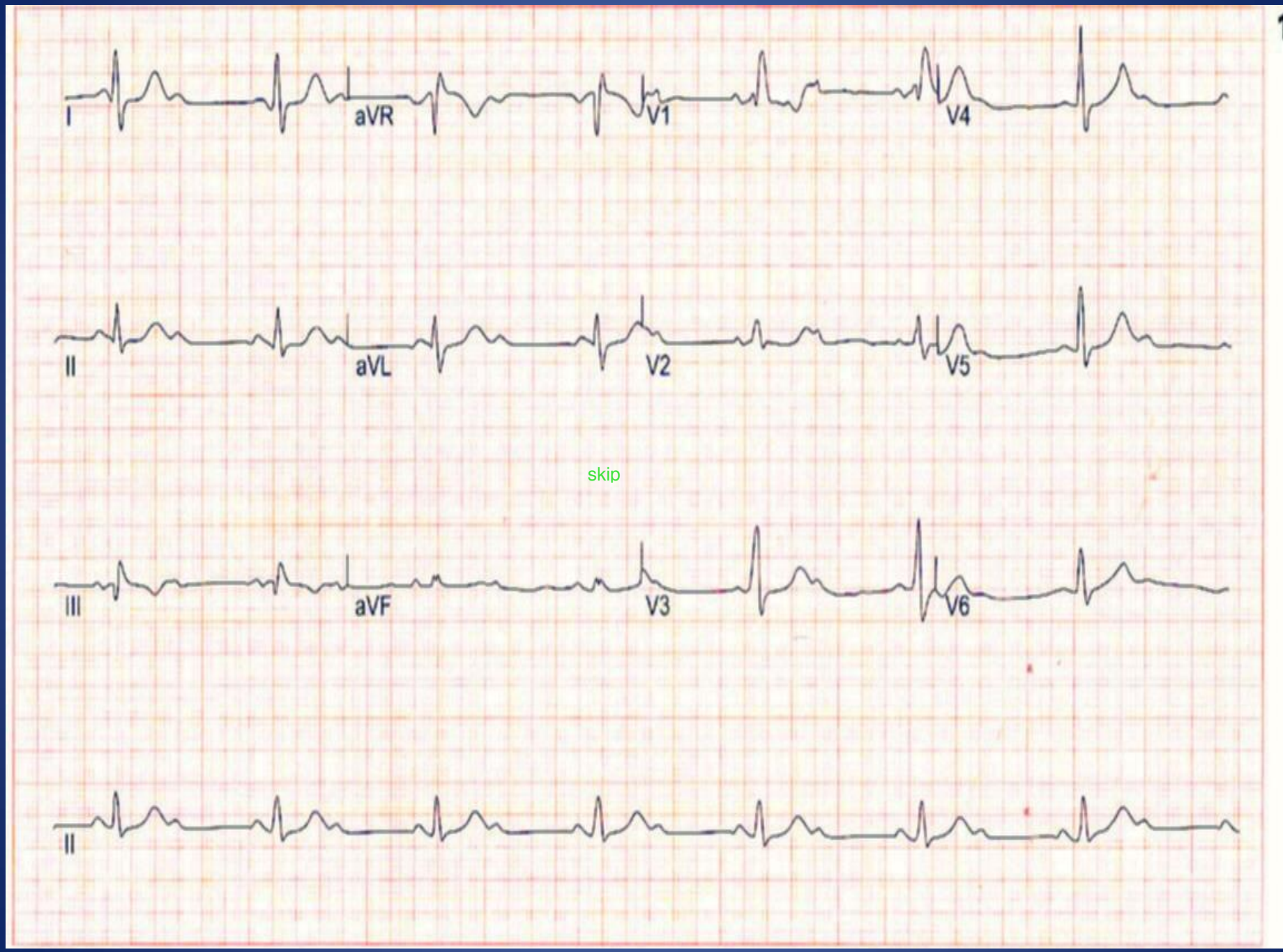
Some Causes of Permanent AV Conduction System Damage

- Acute myocardial infarction, especially anterior wall
- Infiltrative diseases (e.g., amyloid, sarcoid, lymphomas)
- Degeneration of the conduction system, usually with advanced age (Lenègre's disease) or associated with cardiac calcification around the aortic and mitral valves (Lev's disease)
- Hereditary neuromuscular diseases (e.g., myotonic dystrophy, Kearns-Sayre syndrome, Erb's dystrophy)
- Iatrogenic damage to the conduction system as the result of valve surgery or arrhythmia ablations in the area of atrioventricular (AV) node and His bundle; ethanol septal ablation for obstructive hypertrophic cardiomyopathy

Tip: for looking for Heart blocks
1. Look at the rate (Brady cardia)
2. Look at the rhythm strip, If its irregular its NOT complete heart block (rule it OUT)
3. Look at QRS interval, Drop in (2HB)
4. Look at the PR interval before and after the drop (fixed> M2, progressive> M!)



This is 2nd degree HB Mobitz type 1


I
aVR
V1
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II
aVL
V2
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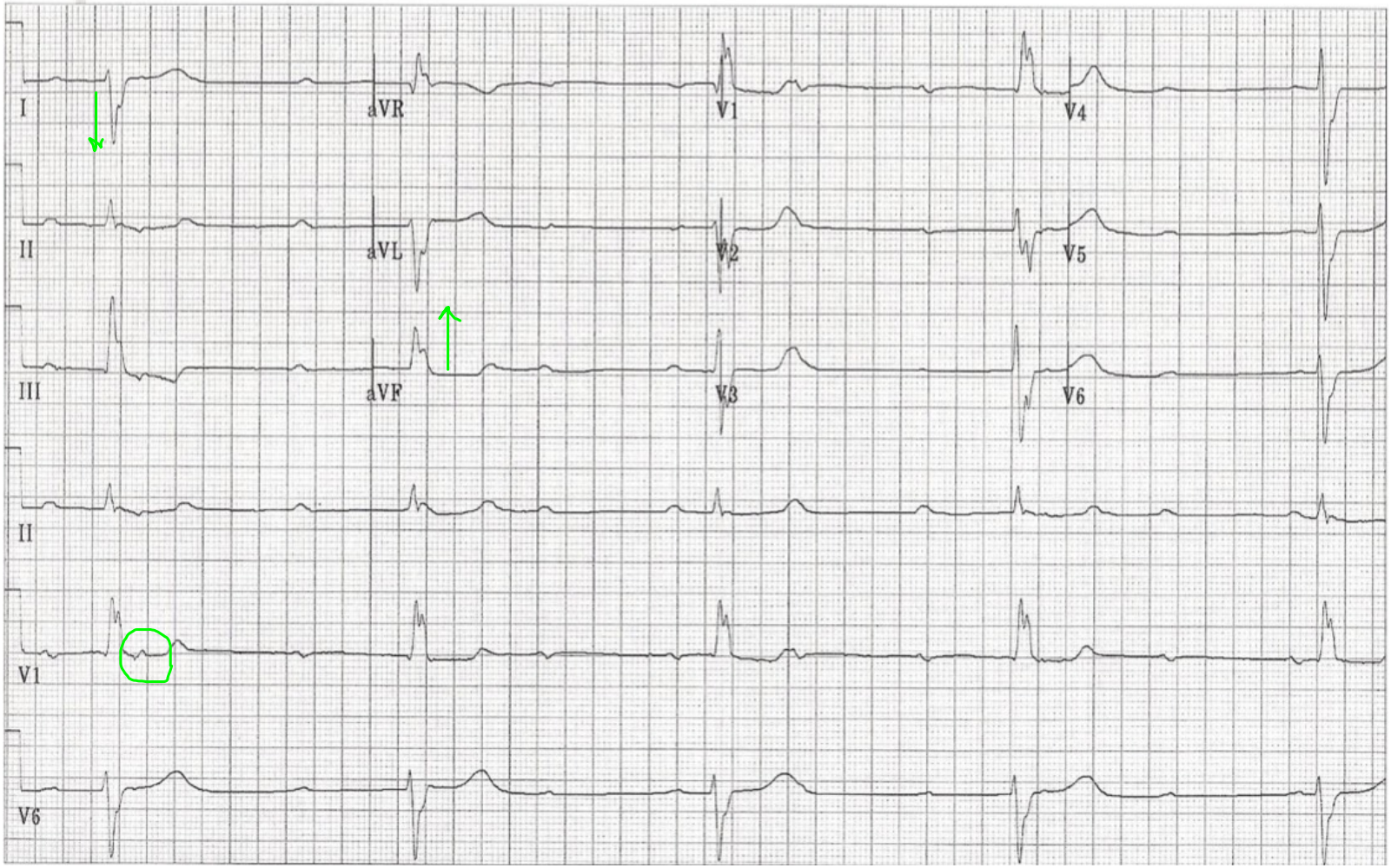
skip
III
aVF
V3
V6
II

Tip: for looking for Heart blocks
1. Look at the rate (Brady cardia)
2. Look at the rhythm strip, If its REGULAR its NOT Mobitz type 1 or 2, so its eather sinus bradycardia (1HB), or complete heart block (3HB)
3. Look at P wave (dissociation from QRS), P waves are More than QRS complexes
4. Look at the RR interval It's fixed. So, Its complete heart block.
All #HB features are there

ECG V-1

There's Right axis Deviation



The P wave came between QRS and T wave = dissociation

Difference between P wave and T wave, the P wave is high amplitude "pointy" narrow based. While T waves زي التلة are low amplitude BROAD based.

Tip: for looking for Heart blocks
1. Look at the rate (Brady cardia)
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3. Look at QRS interval, Drop in (2HB)
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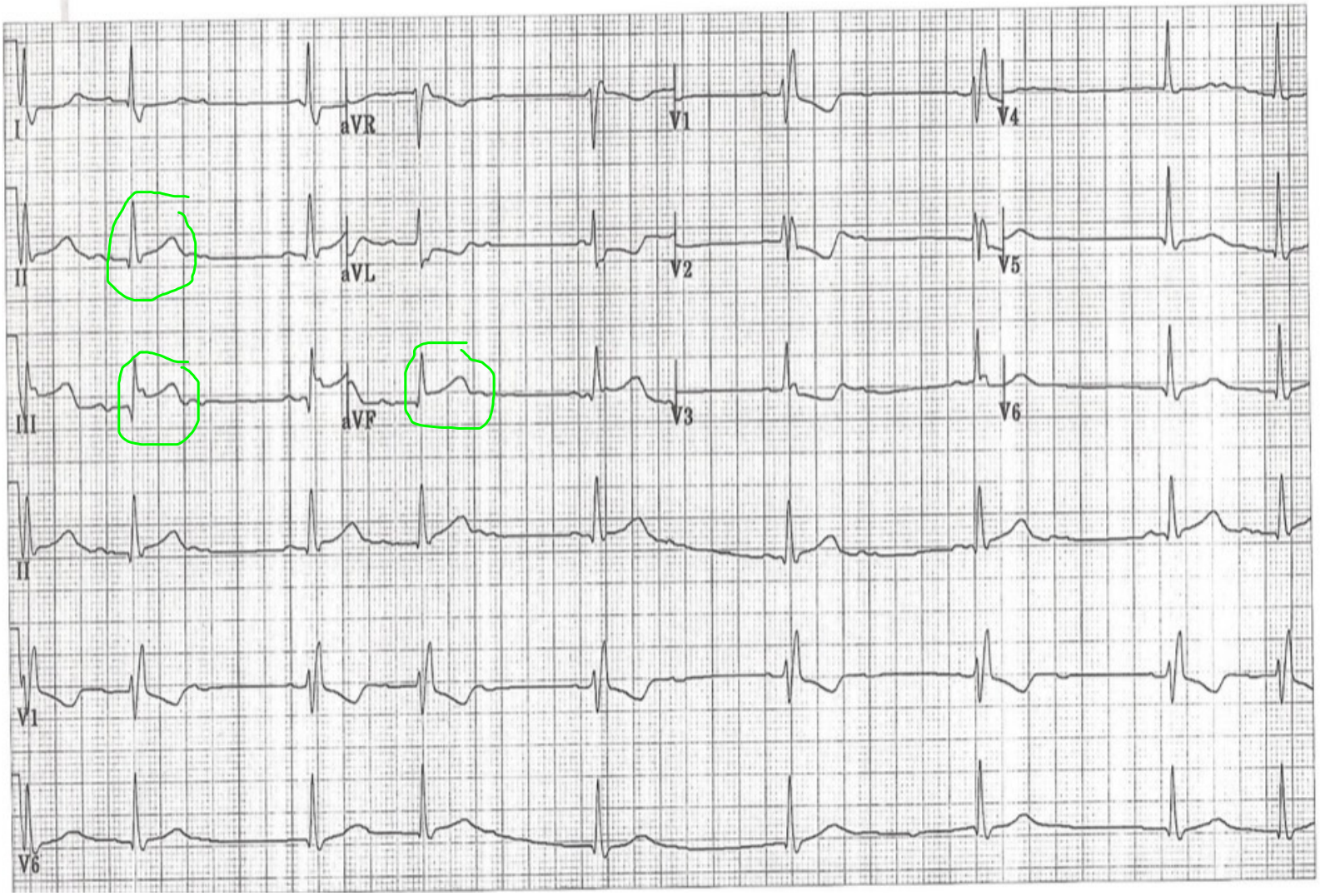
ECG V-6

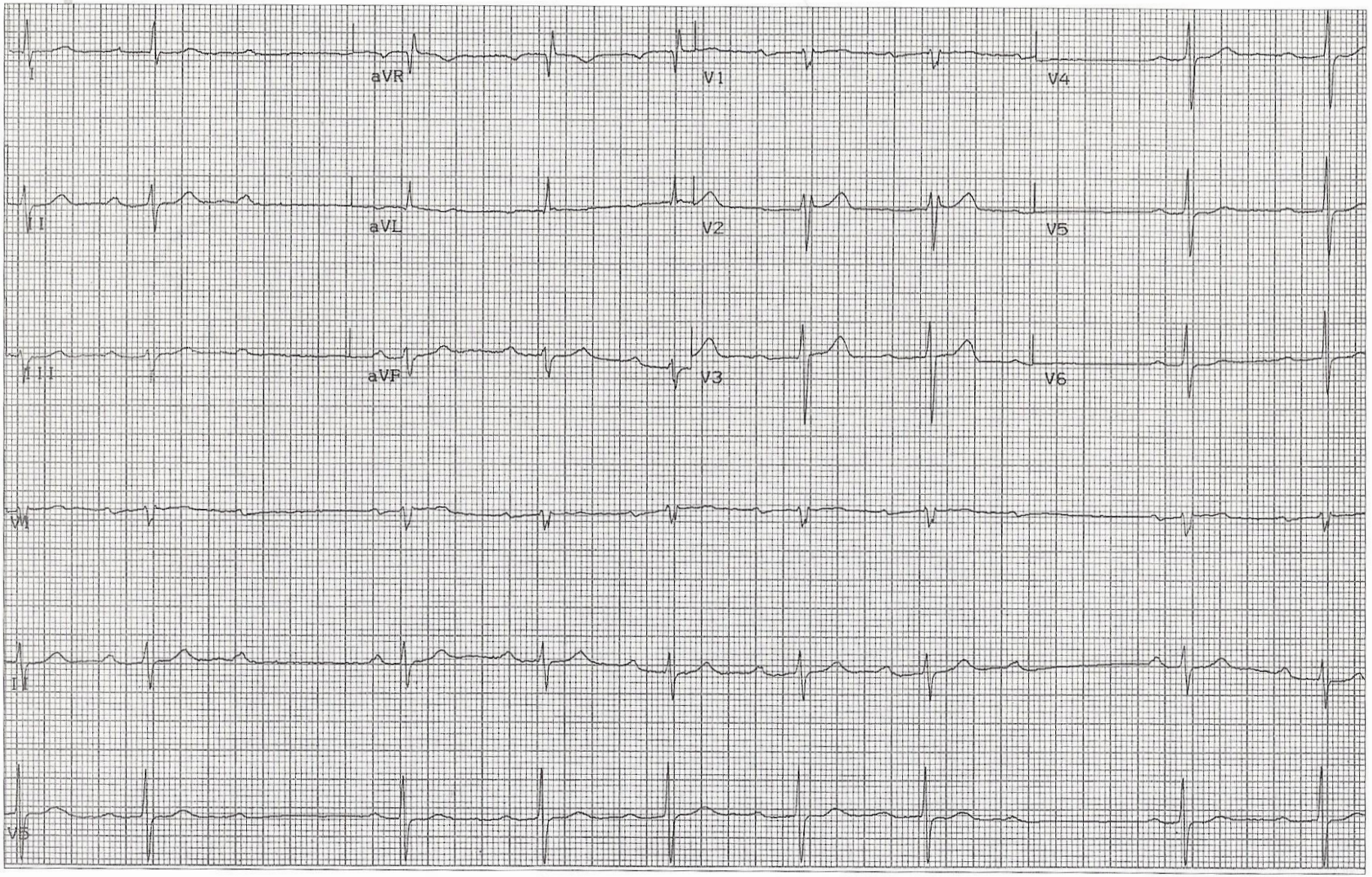


ST elevatioons
:- Inferior MI

This is 2nd degree HB Mobitz type 1

ECG V-15

skip



ECG V-22

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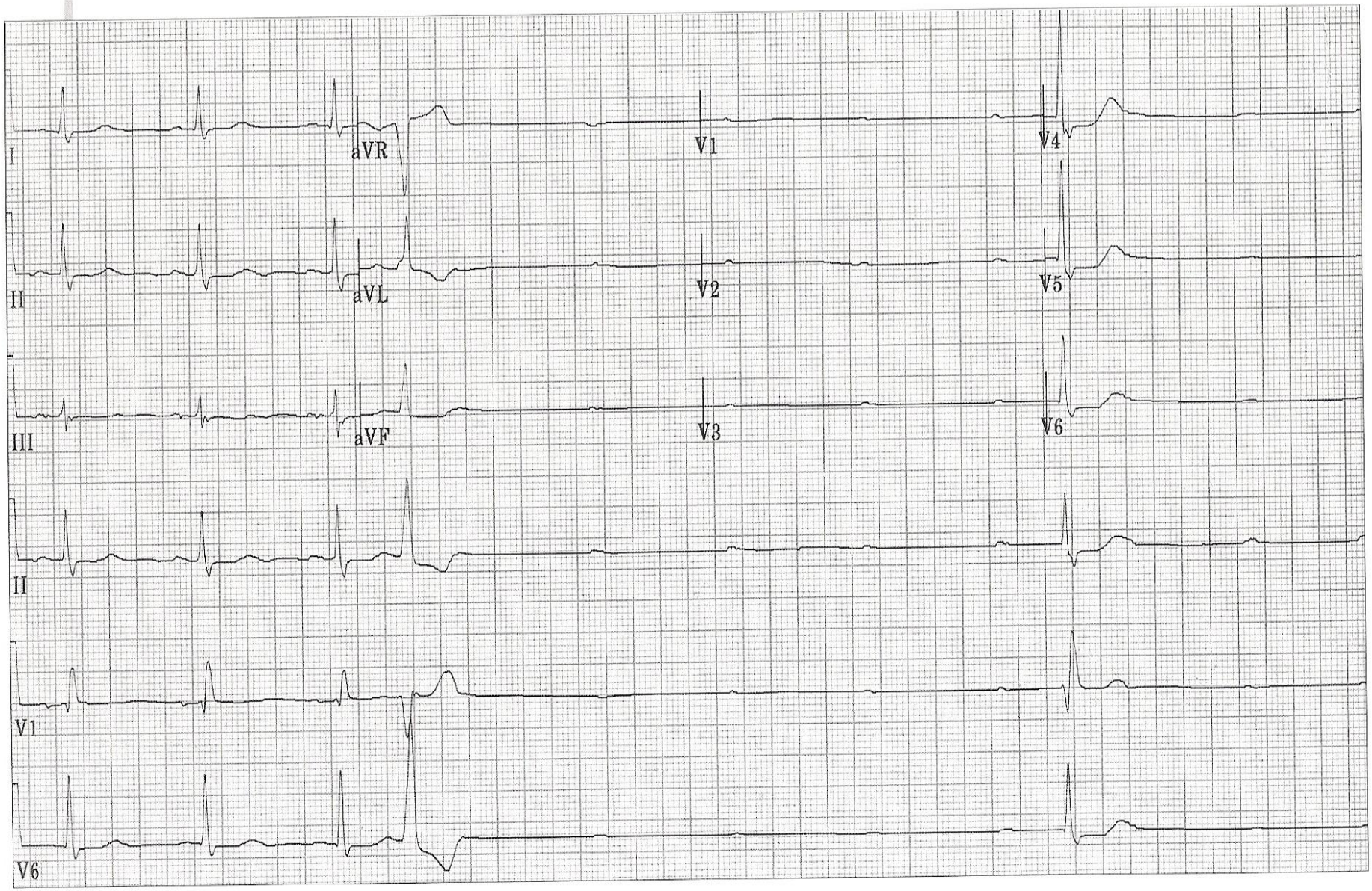

ECG V-26

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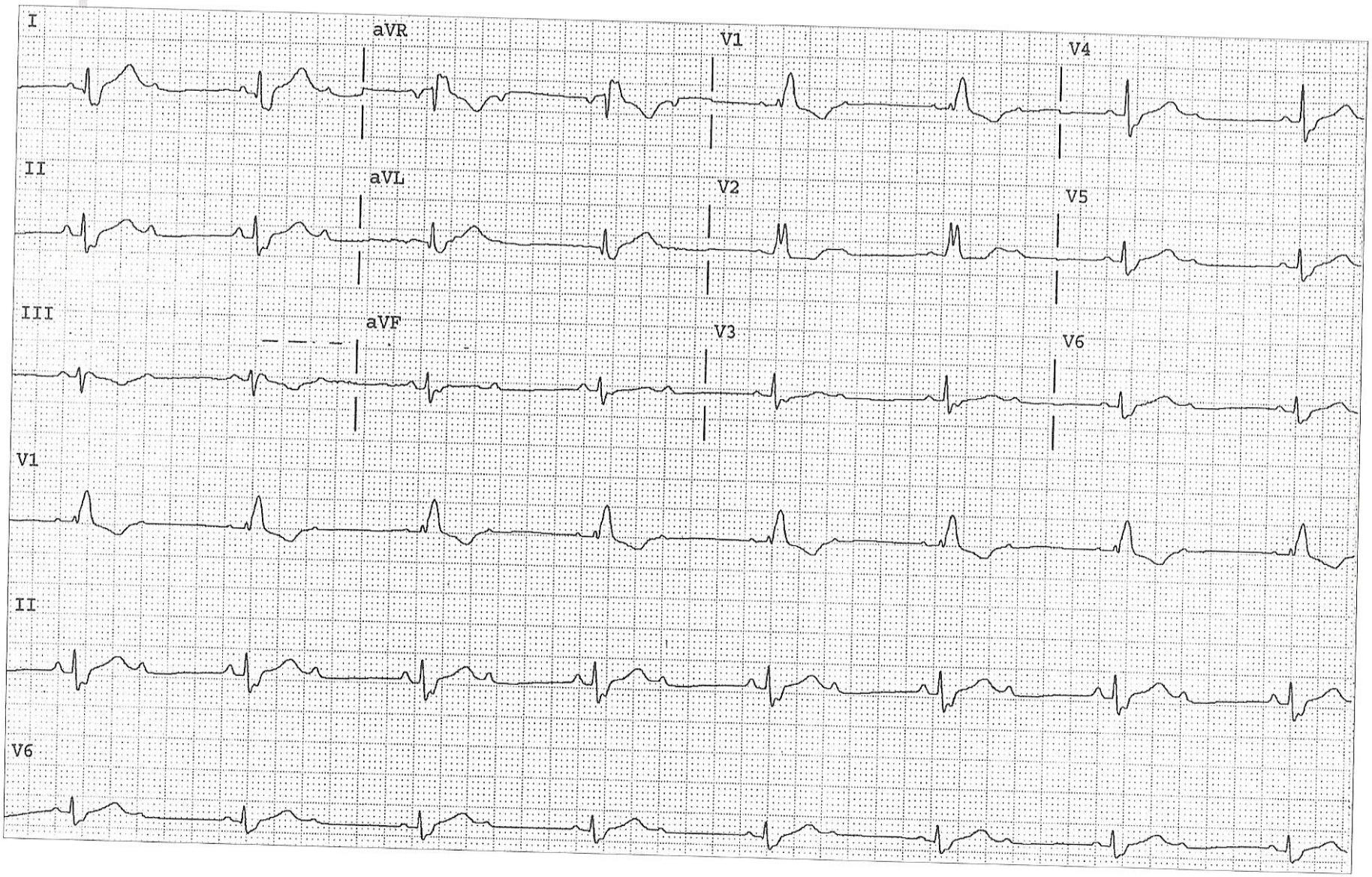

ECG V-27

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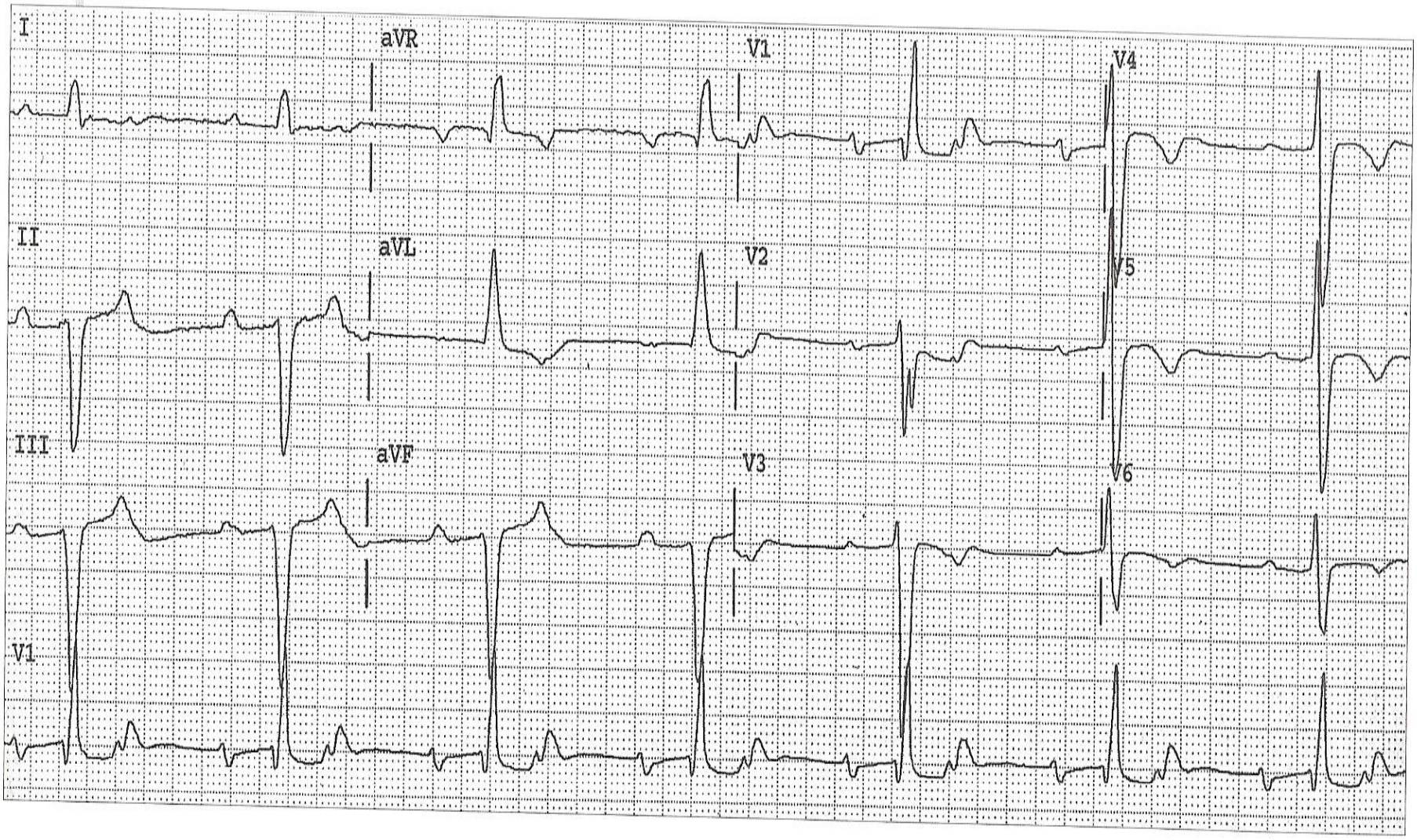

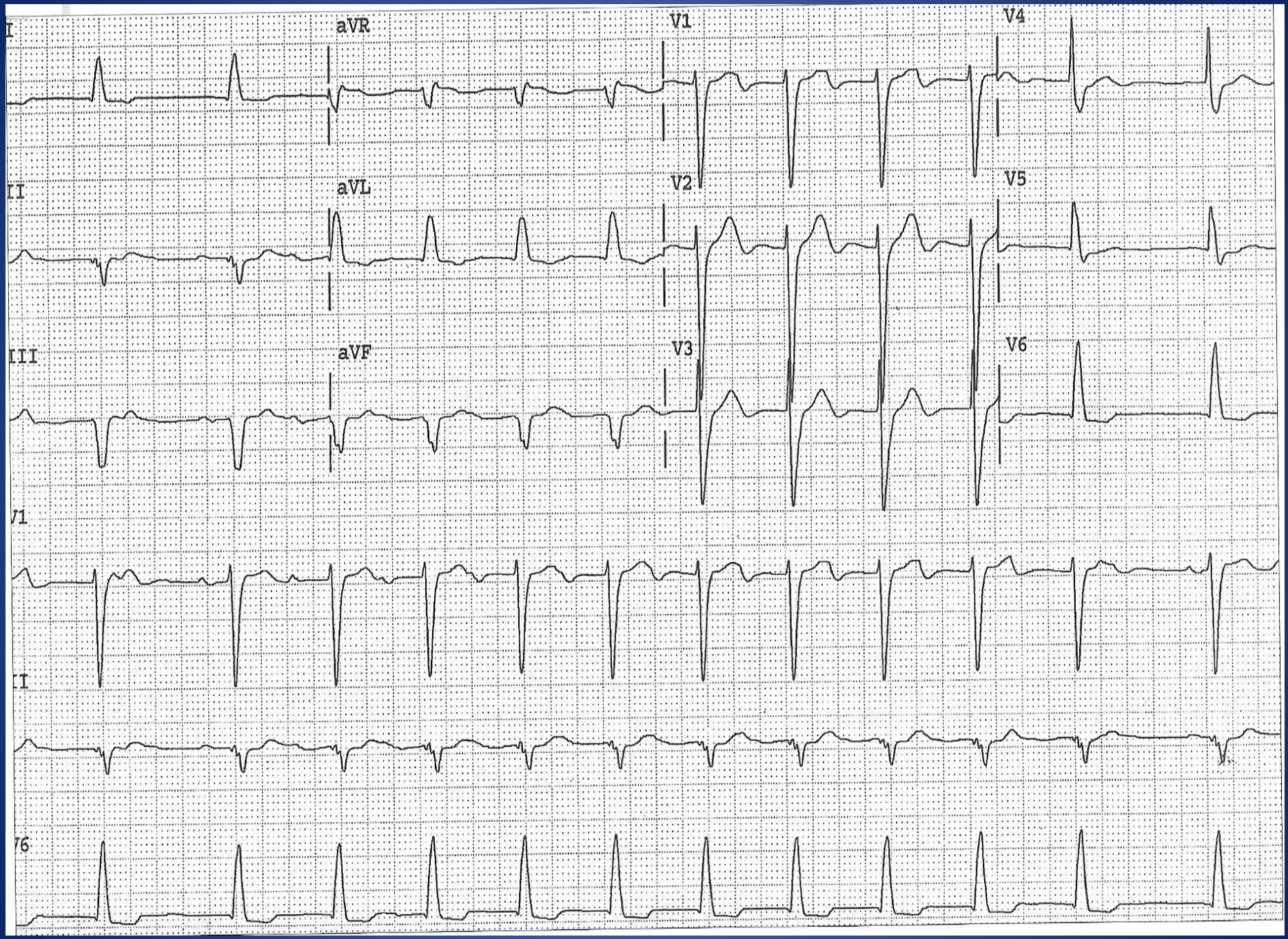
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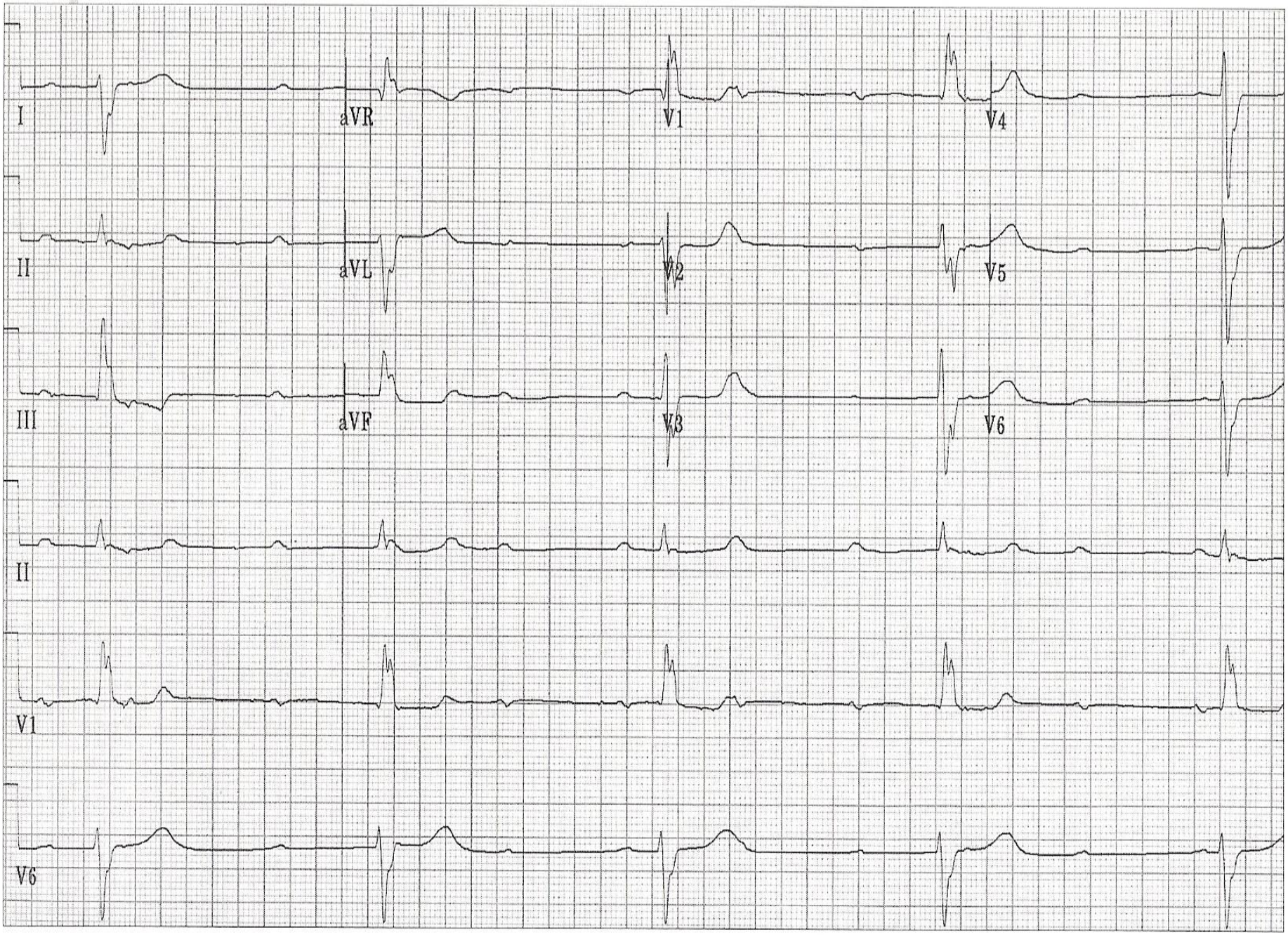
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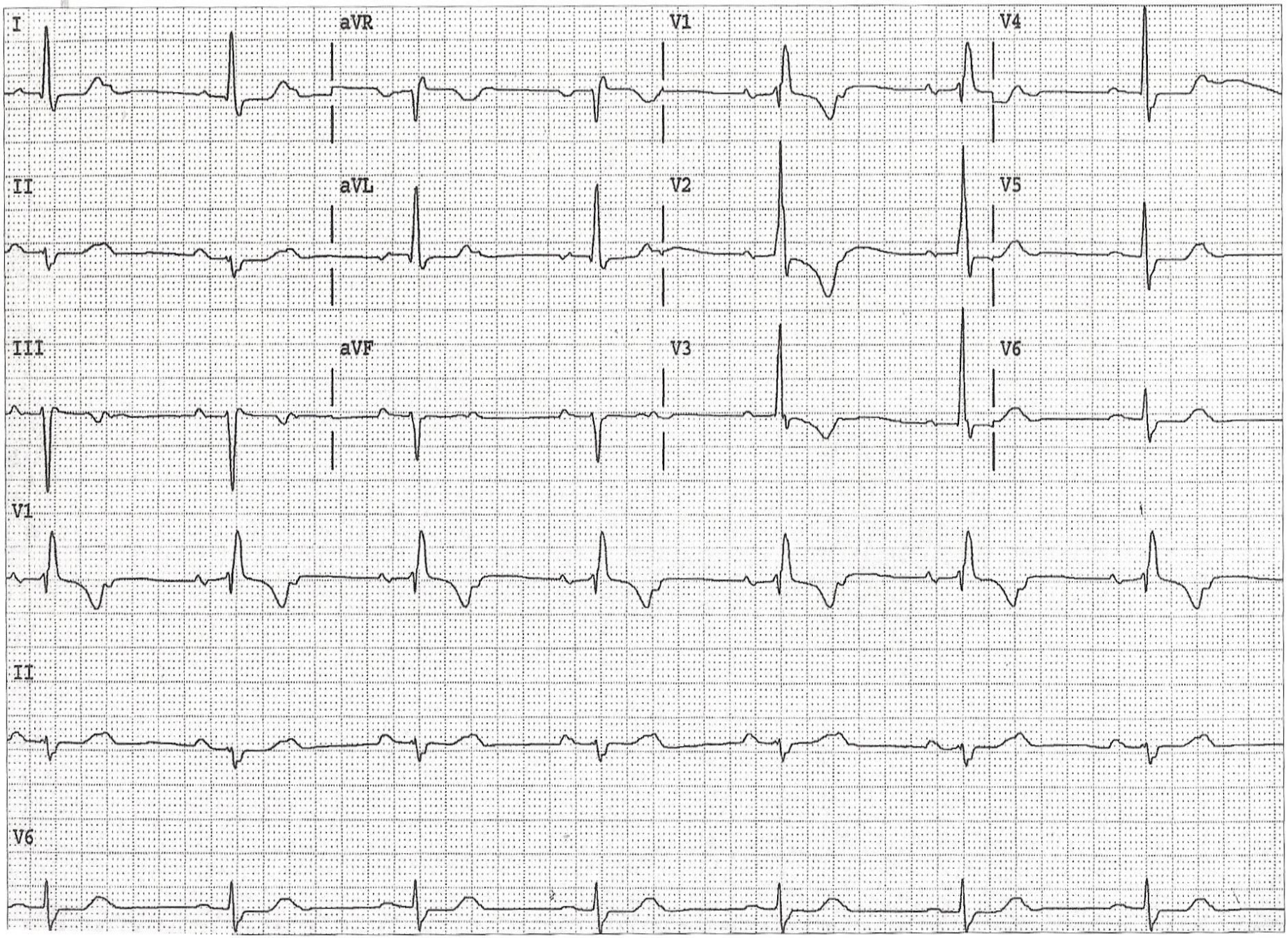
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