



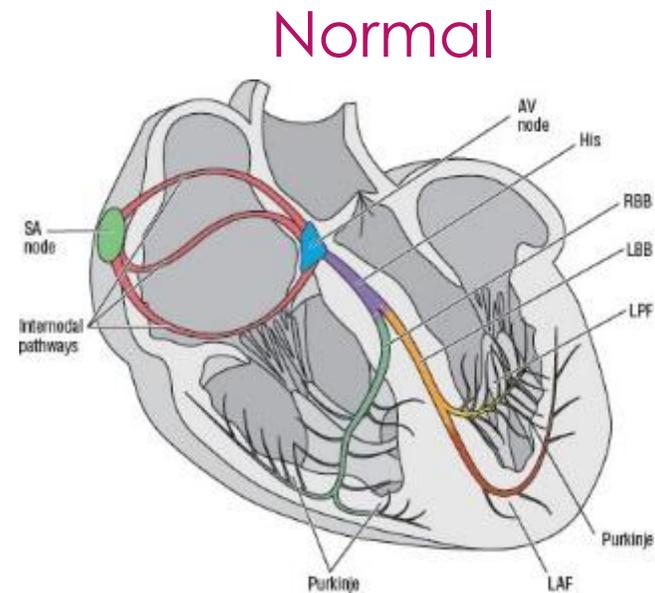
RBBB, LBBB, NS-IVCD

MK

Electrophysiology

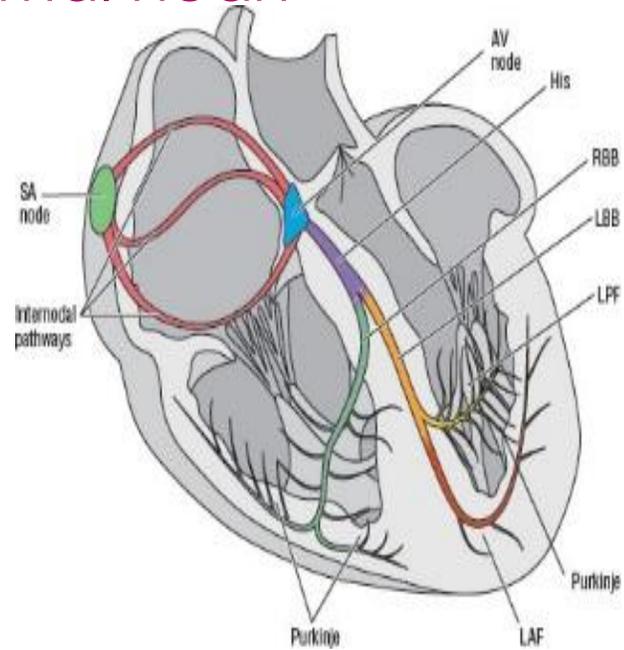
Review

- ▶ SA Node
- ▶ AV node
- ▶ Bundle of His
- ▶ Legs of bundle of His
- ▶ Purkinje fibers



Compare and contrast

Normal heart



Mexican-Jewish bottle dance



Criteria for BBB

Incomplete

- ▶ QRS 100-119 ms

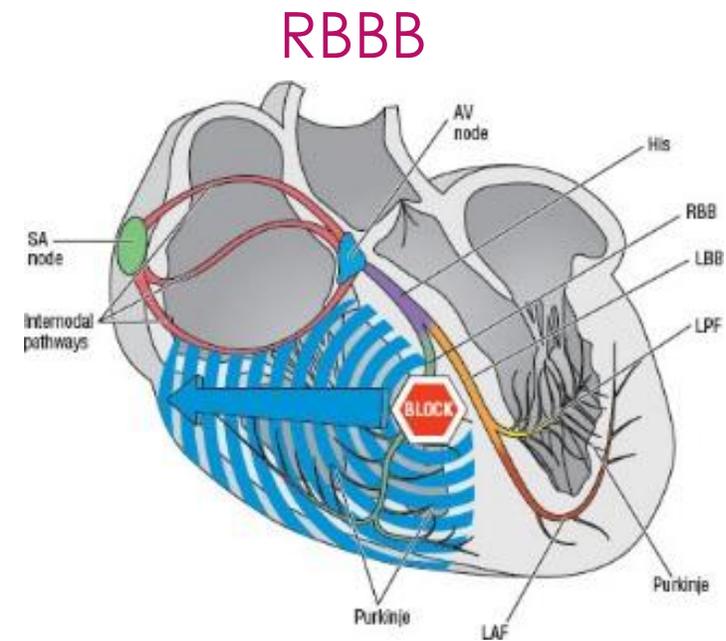
Complete

- ▶ QRS > 119 ms

RBBB-electrophysiology

Criteria

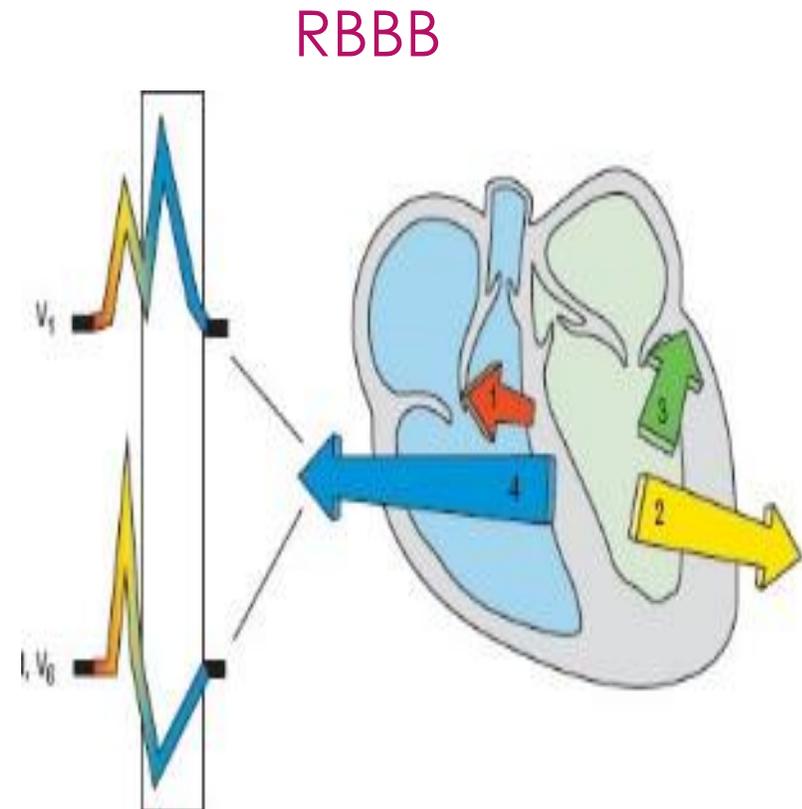
- ▶ $QRS > 119$ ms
- ▶ Slurred S in I & V6
- ▶ RSR' pattern in V1 with $R' > R$



RBBB

One more time:

- ▶ QRS > 119 ms
- ▶ Slurred S in I & V6
- ▶ RSR' pattern in V1 with R' > R

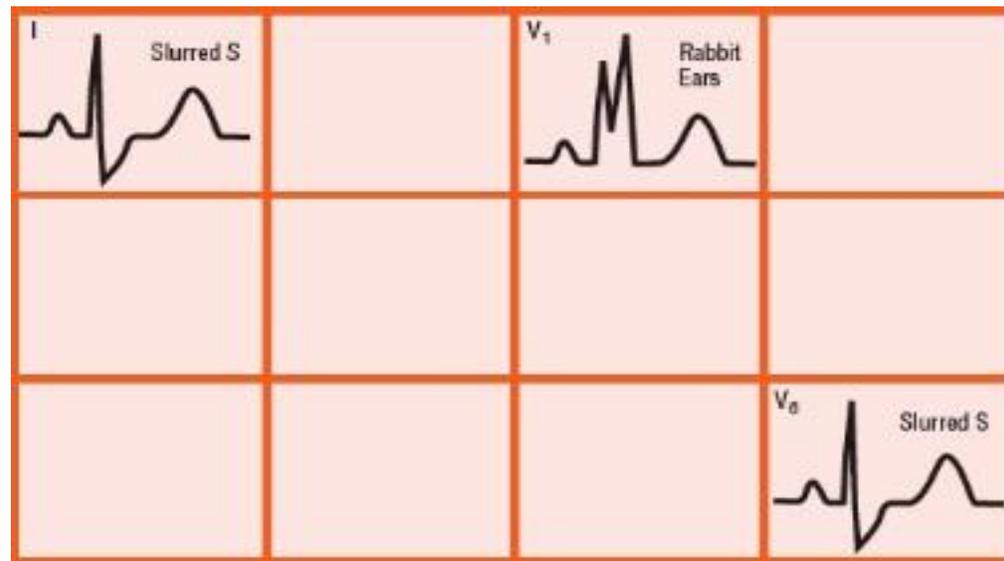


Eye movements

Your eyes:



I-V6-V1

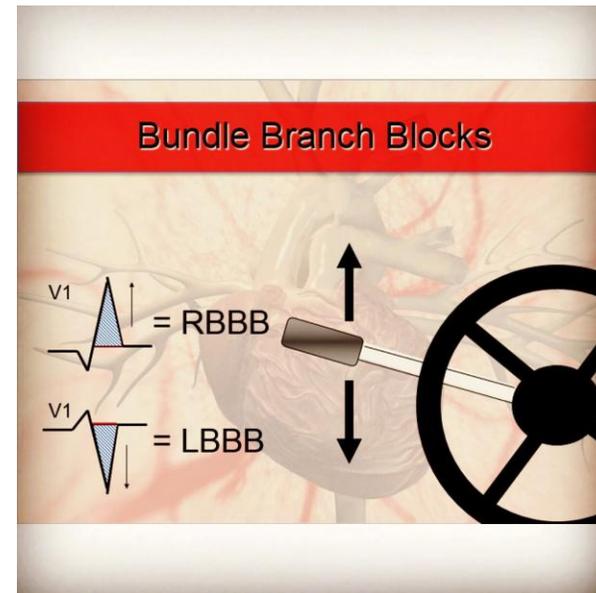


Turn signal

Last inflection before T-wave

- ▶ Is it up or down?

All cars except German

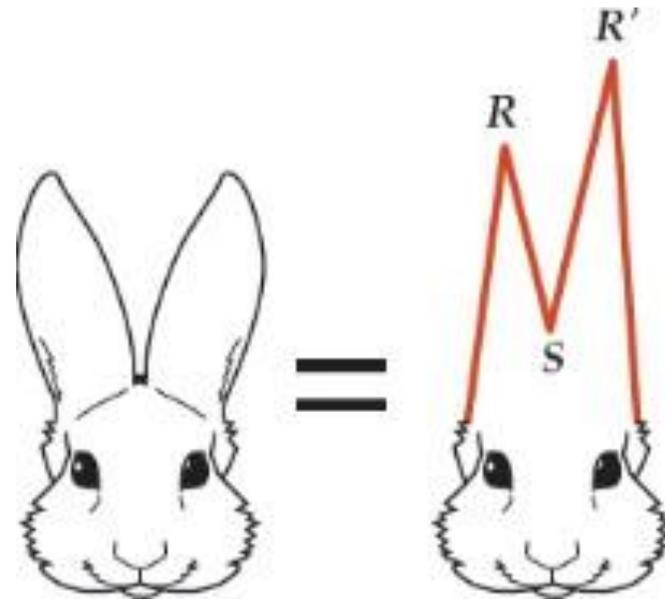


Closer look at V1

The classics

- ▶ Bunny ears

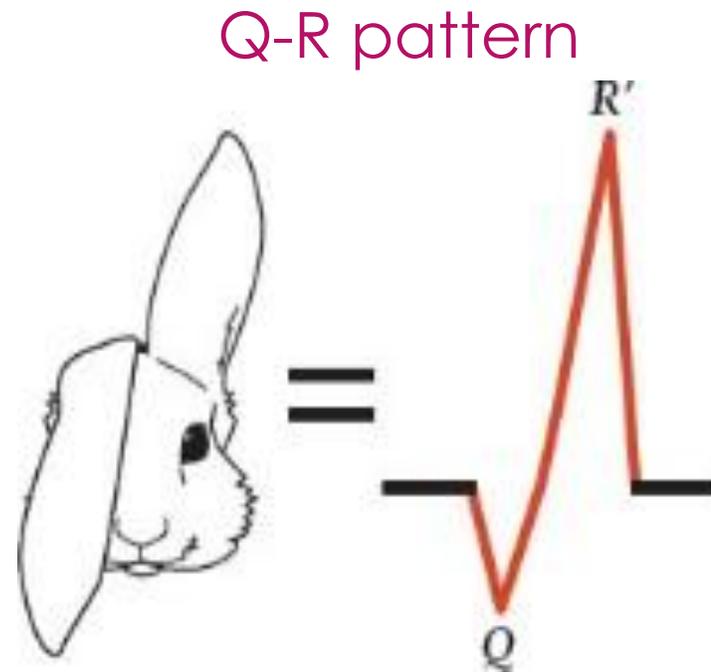
RSR'-pattern



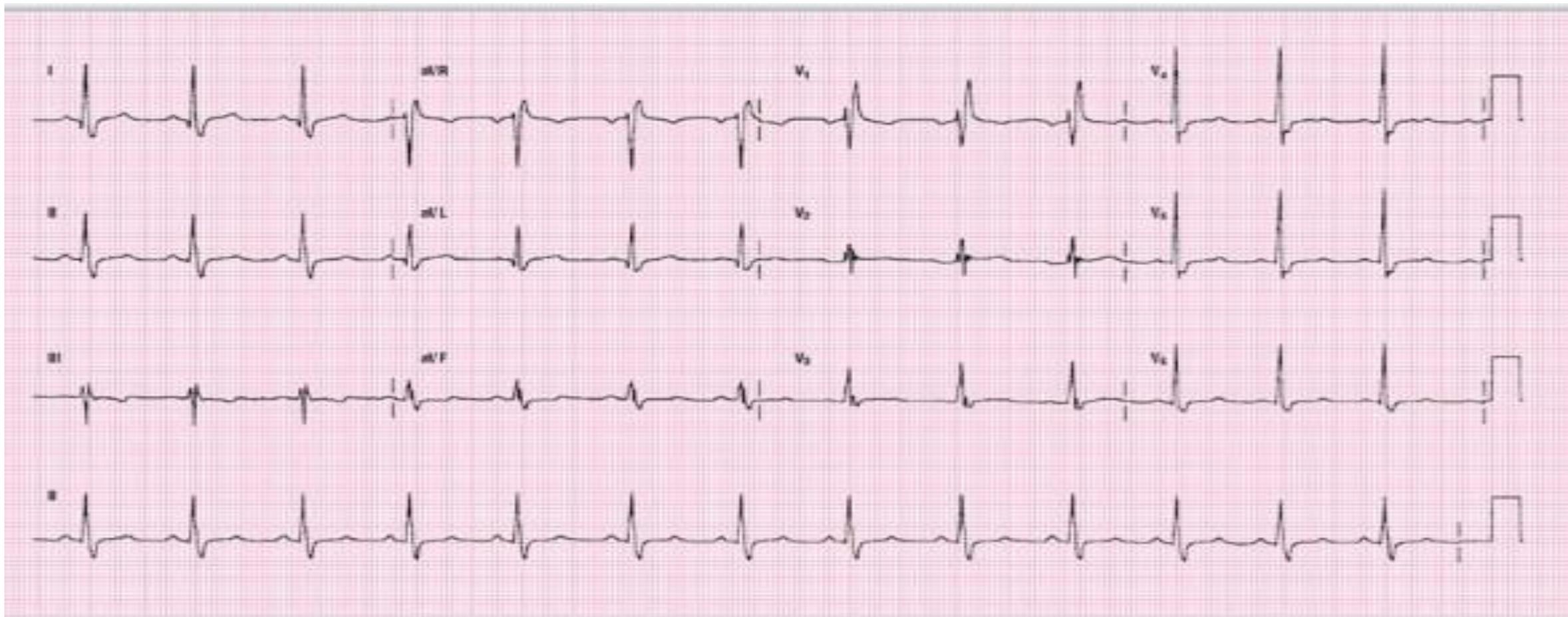
Closer look at V1

Not so classic

- ▶ QR pattern



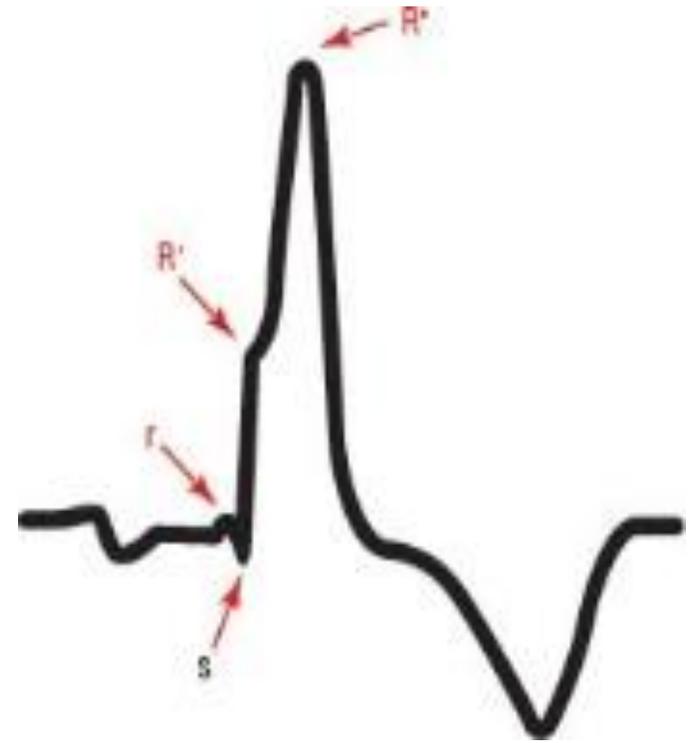
QR in V1



Complex QRS in V1

rSR'R''

► Was that even English?

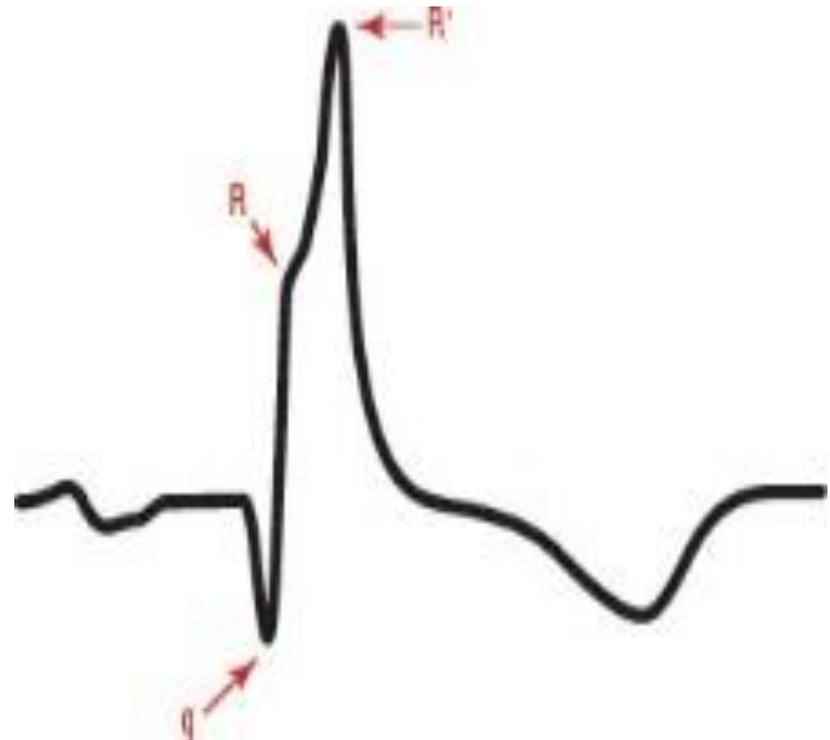


Another complex V1 representation

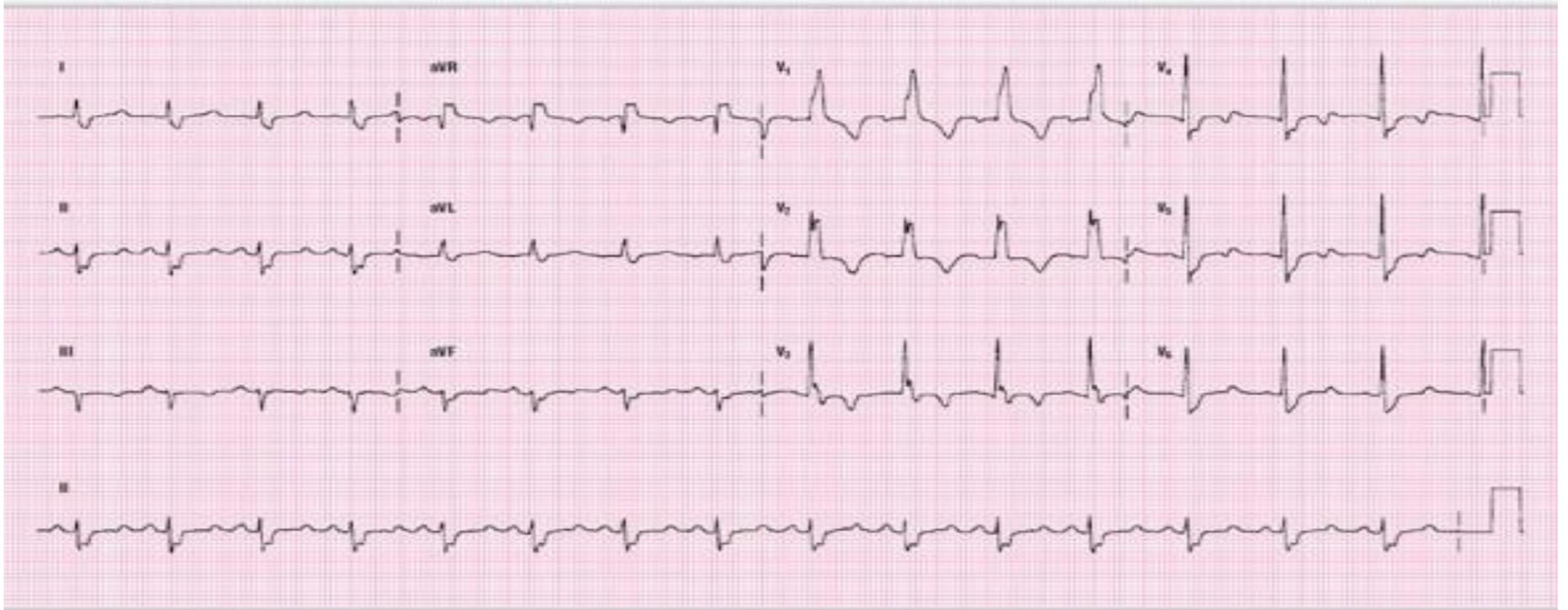
qRSR' pattern

- ▶ Do you even see the S wave?

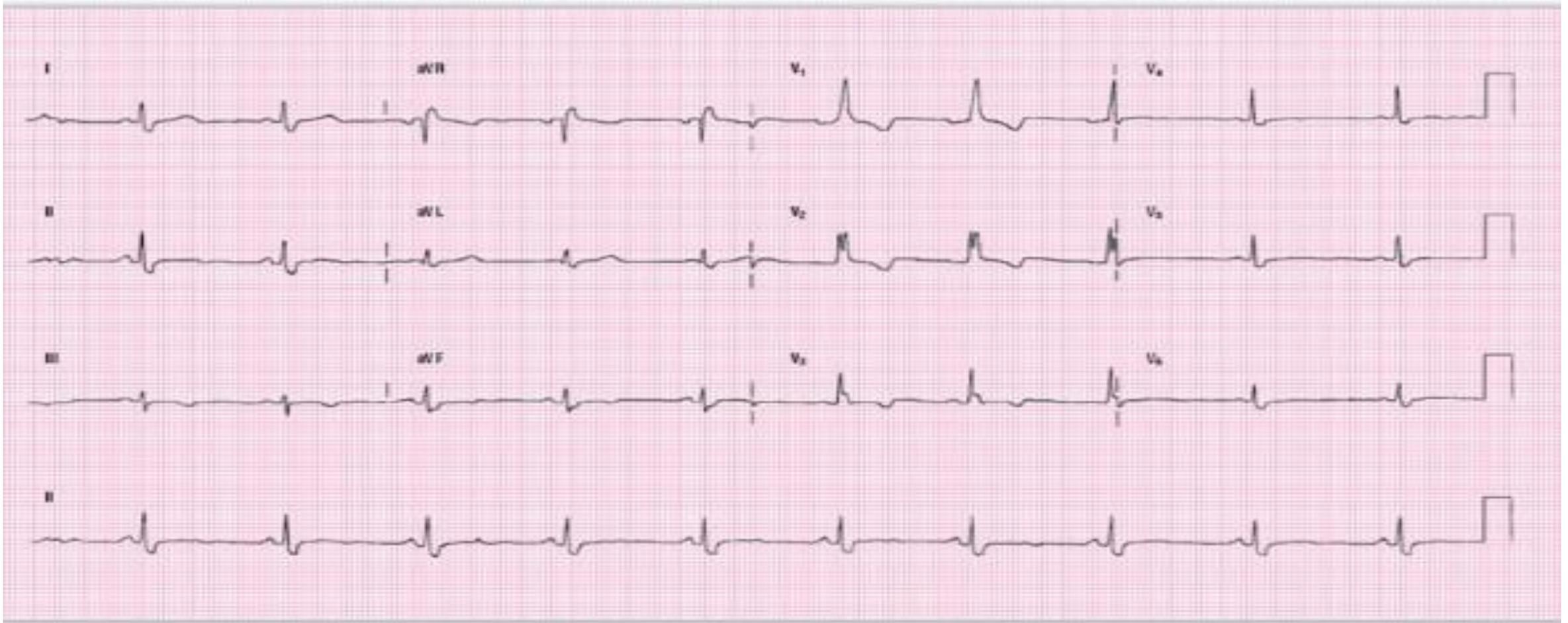
QRS in V1



This is where it came from:



Read this EKG

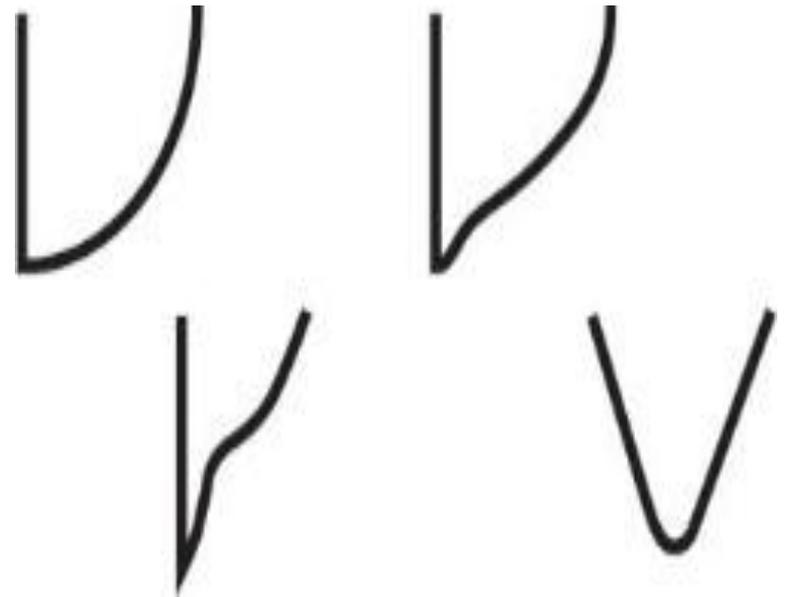


Look at V6

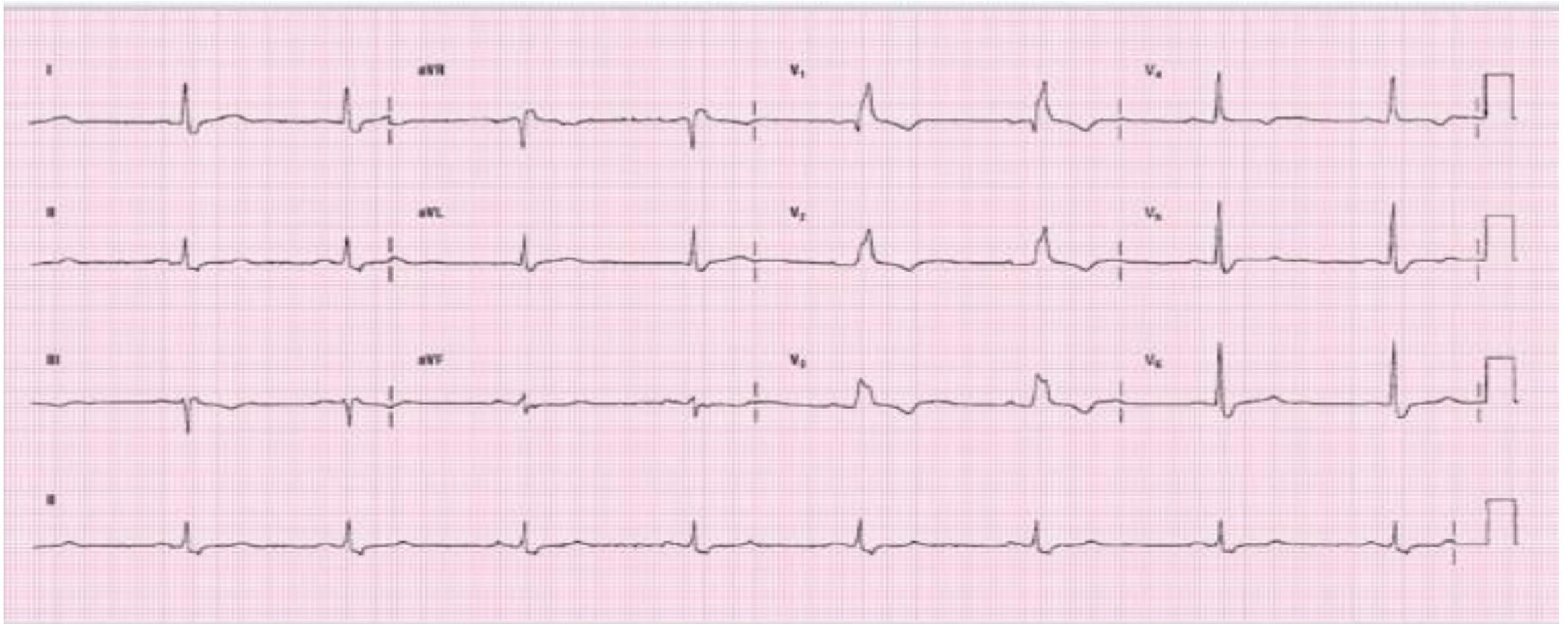
Slurred S

- ▶ Not too much variety
- ▶ All you see is all there is

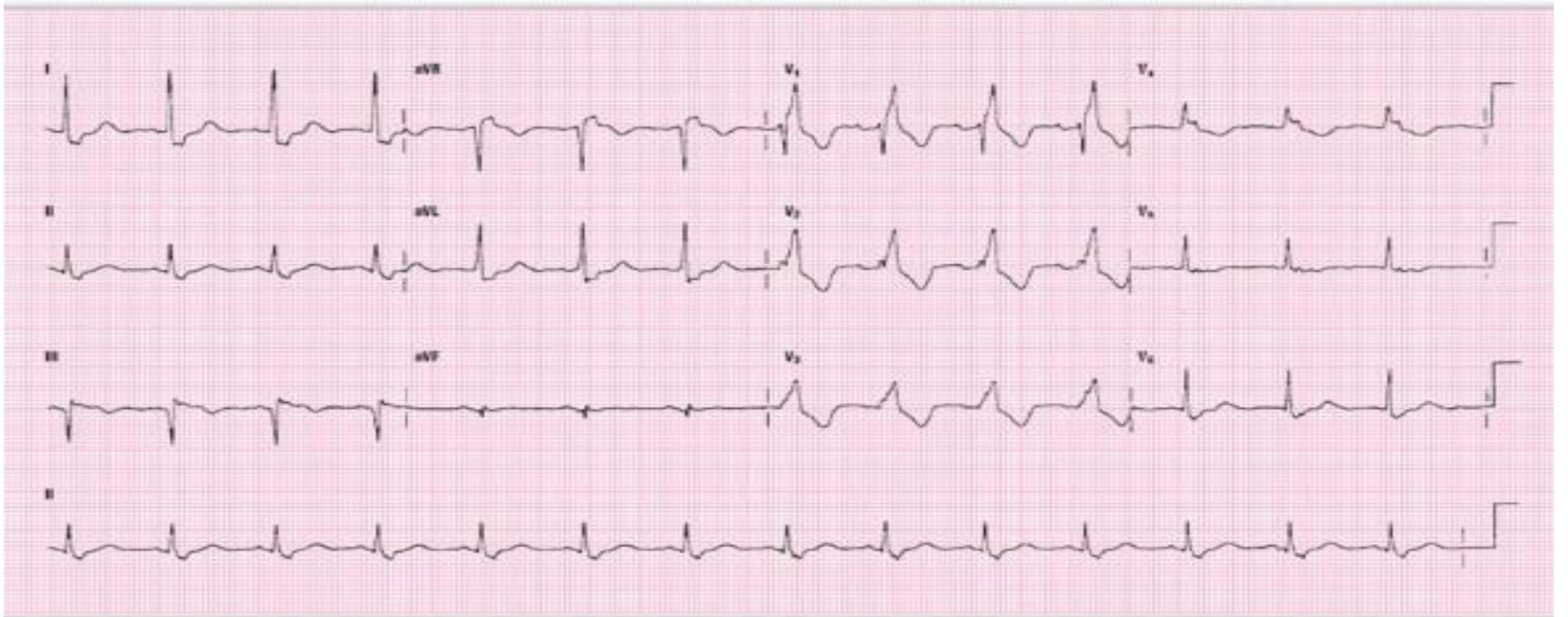
Slurred S in V6



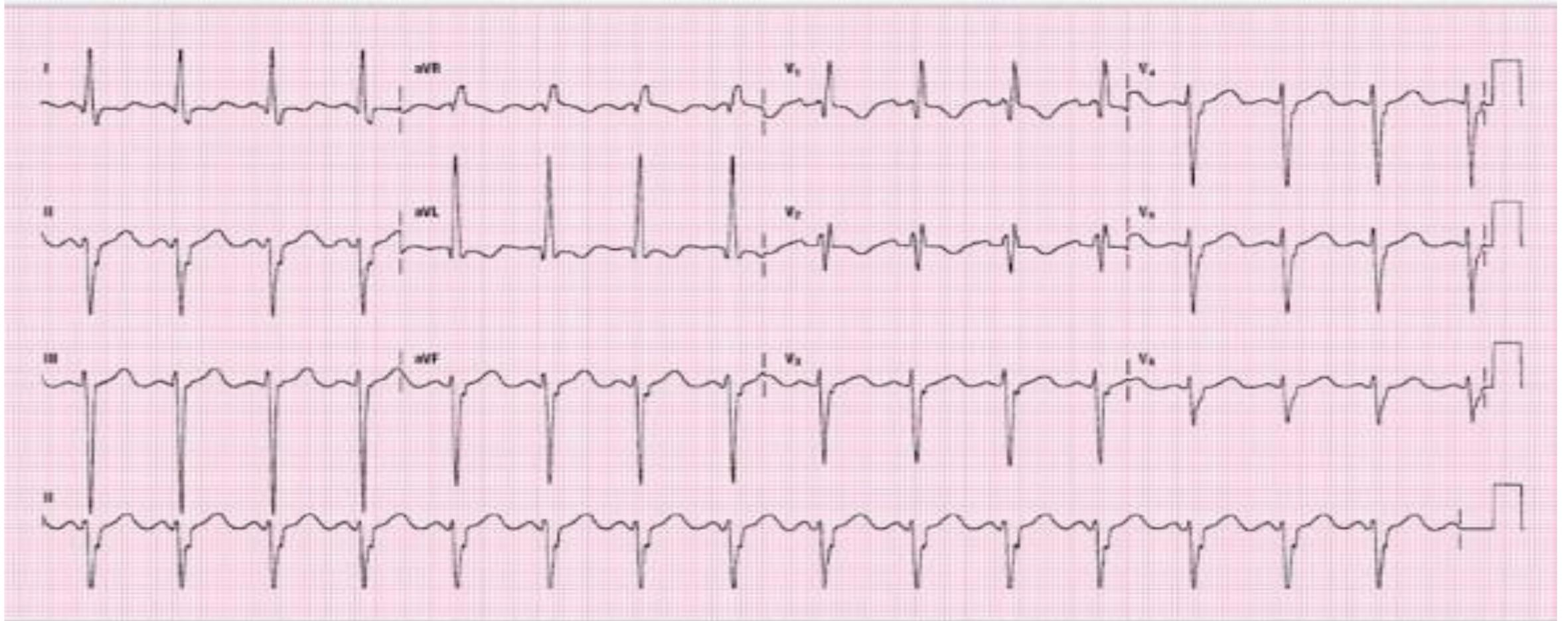
Read this EKG



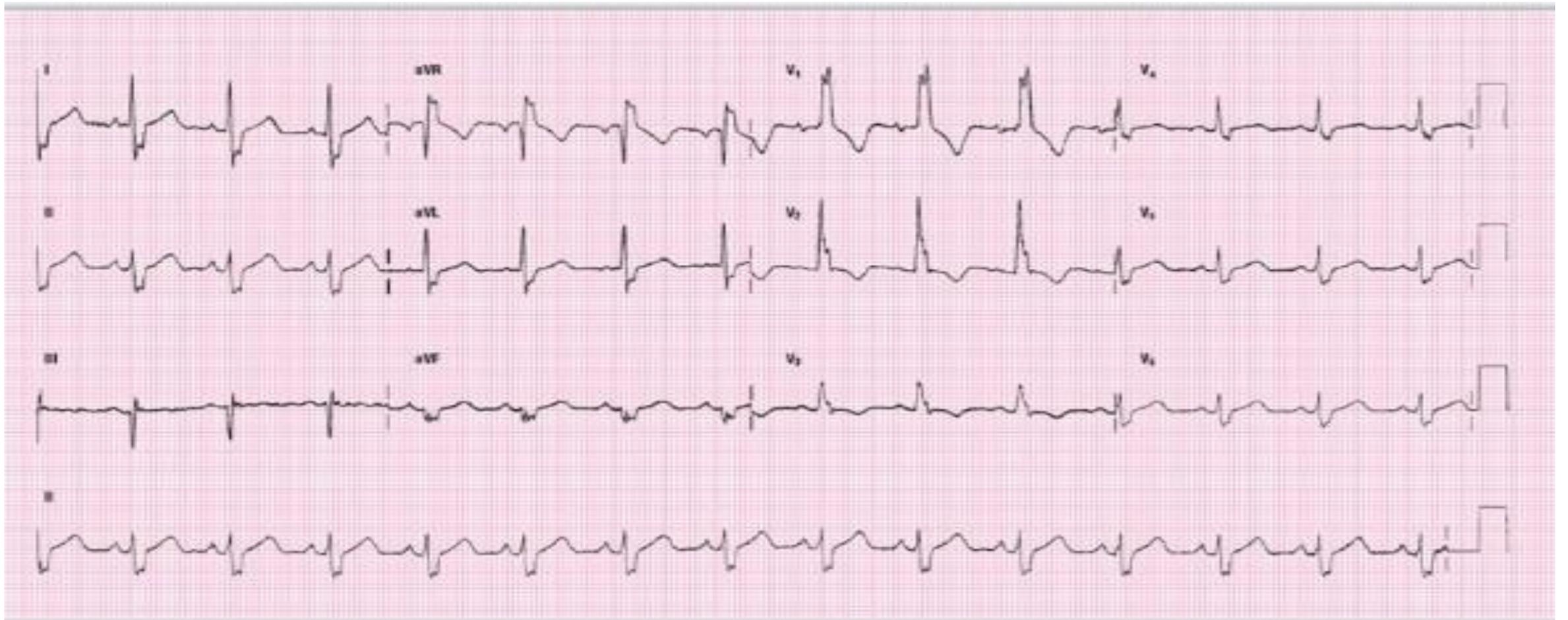
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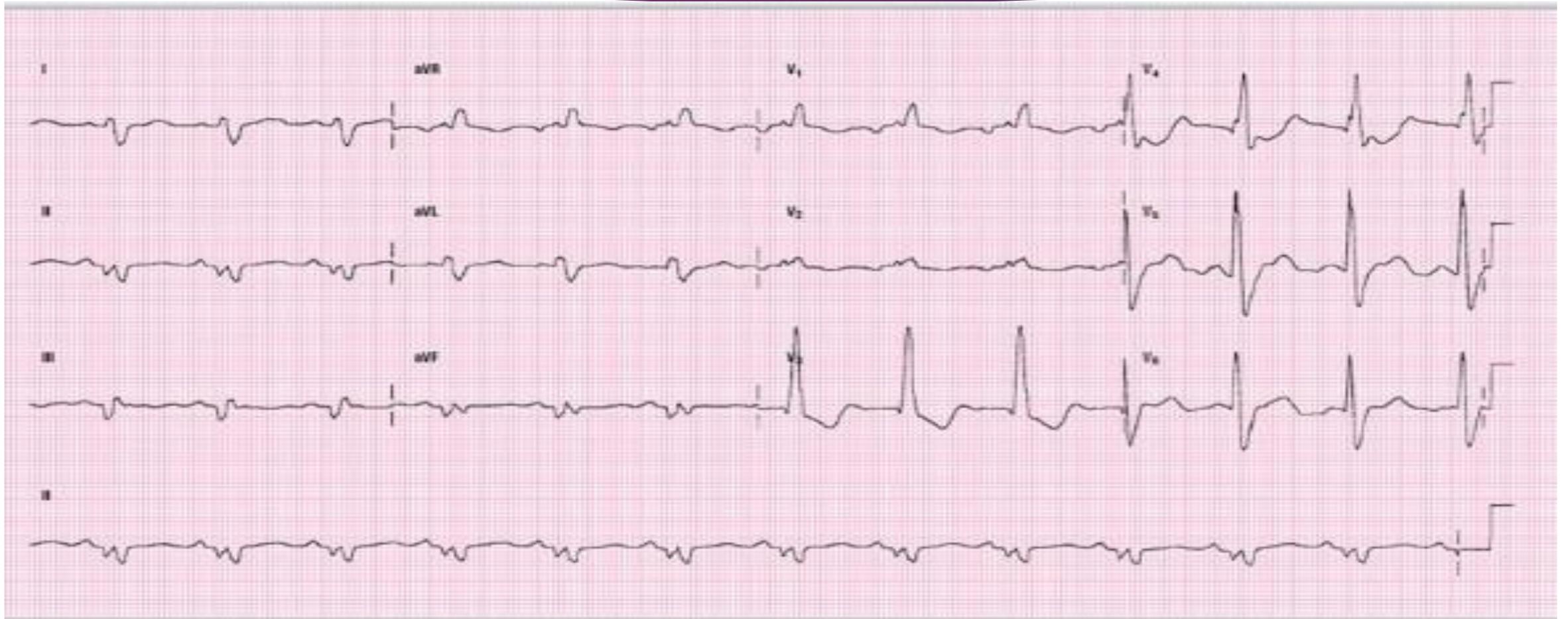
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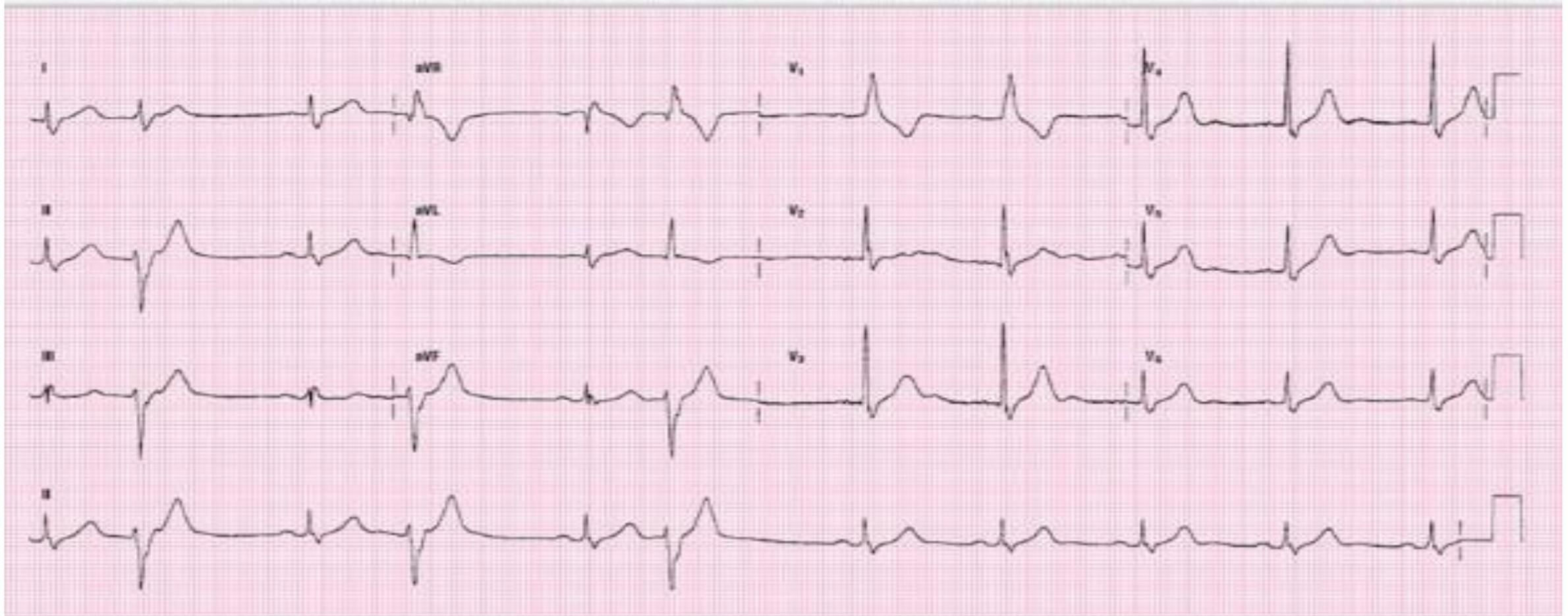
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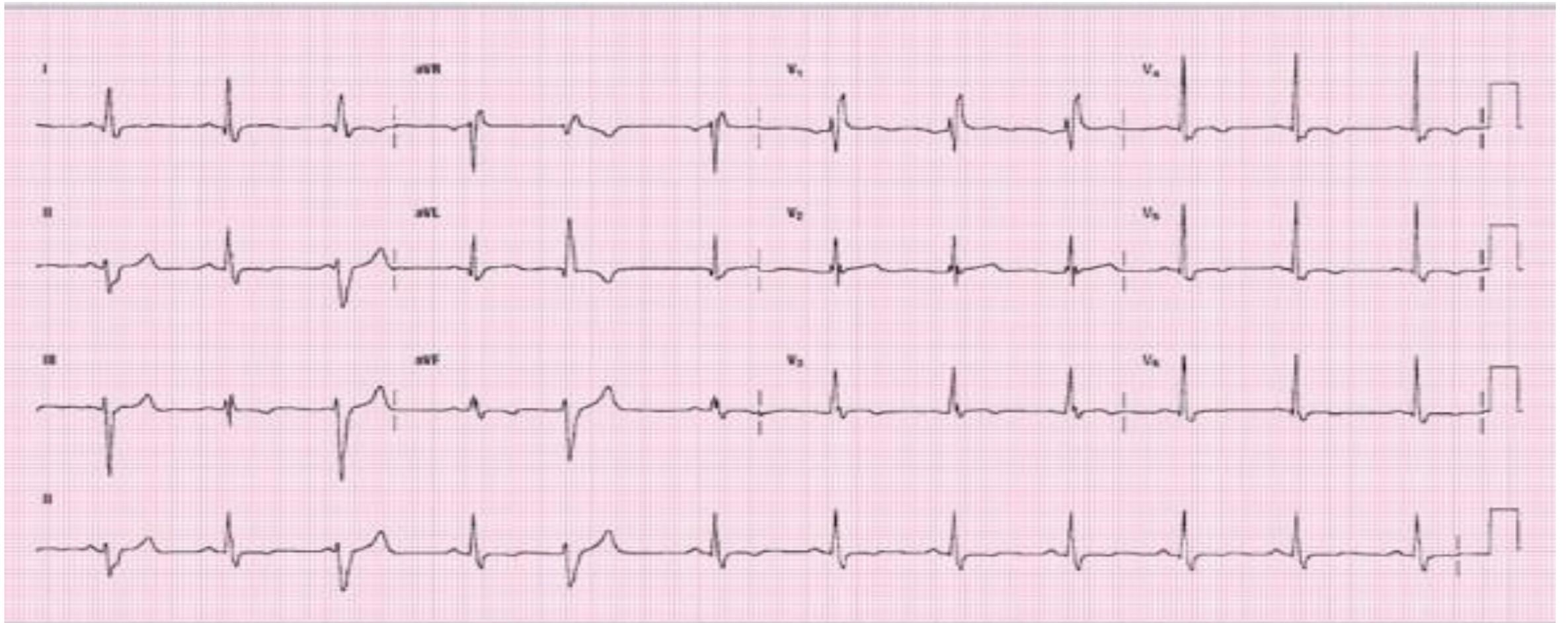
Read this EKG



Read this EKG



Read this EKG

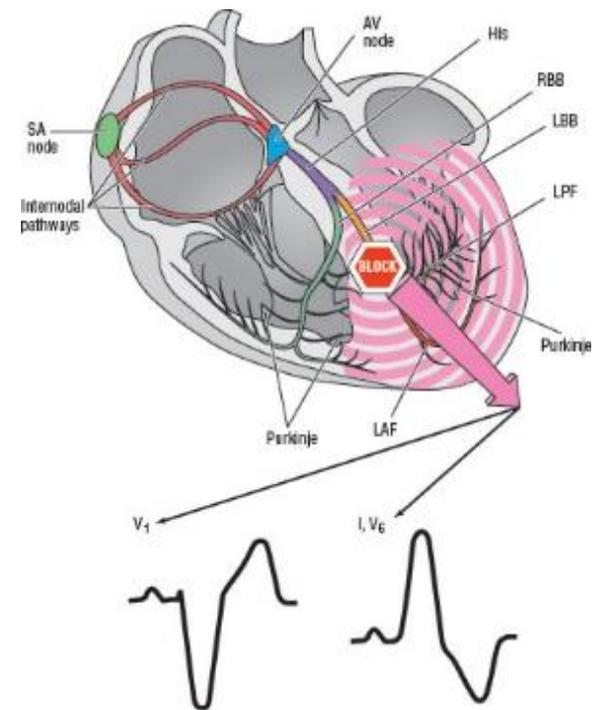


LBBB

Like a rock:

- ▶ LBBB pattern is like a rock thrown up in the air; it is either all up or all down

LBBB electrophysiology

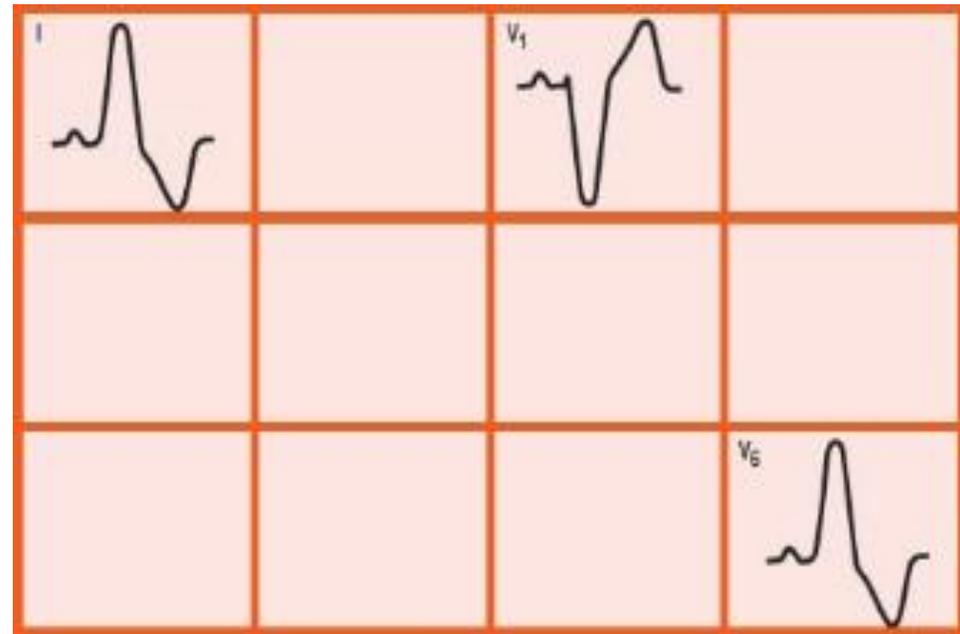


LBBB

Characteristics

- ▶ Duration >119 ms
- ▶ Broad, monomorphic R waves in I & V6, without Q waves
- ▶ Broad monomorphic S waves in V1, may have small r wave

LBBB Eye movement:

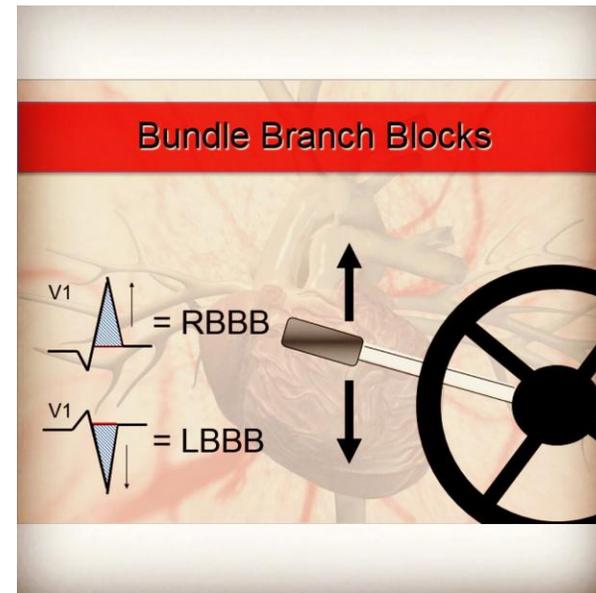


The turn signal

Last inflection before the T-wave

- ▶ Either up or down

Even in Japanese cars!



Some variations in the size of QRS

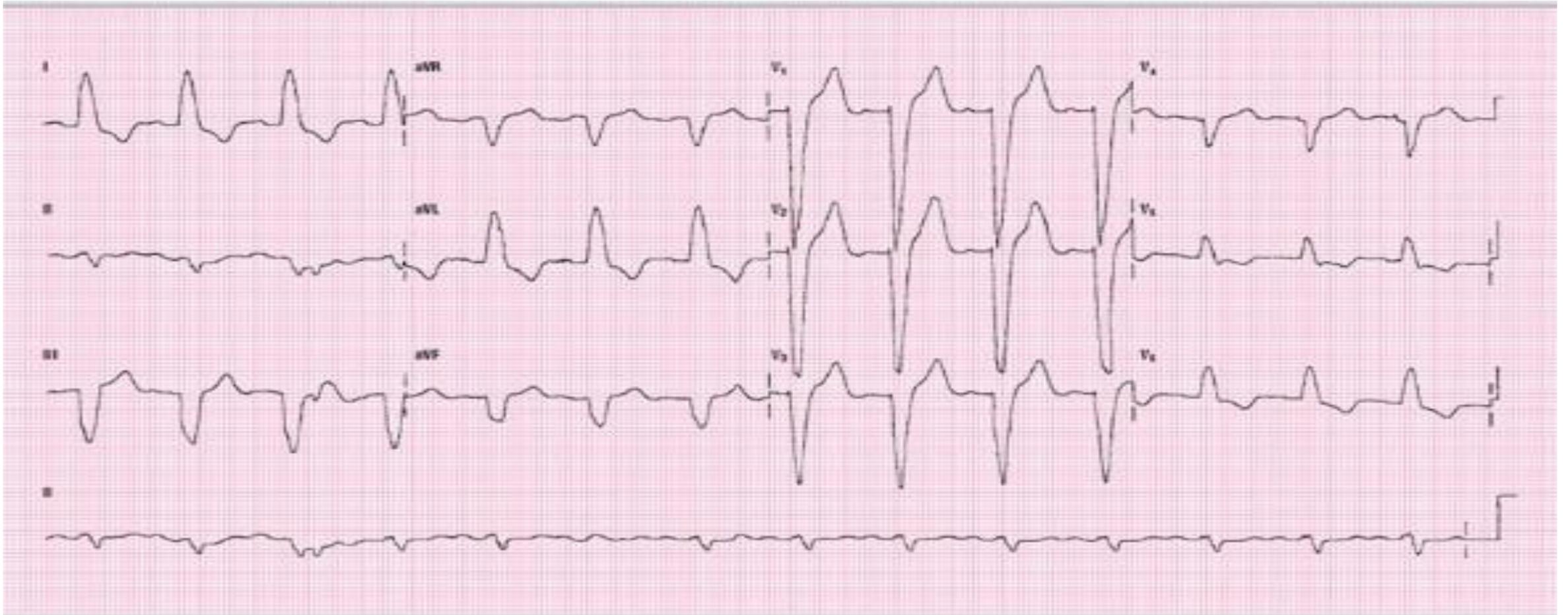
Careful about the leads:

- ▶ V6 notching is not RSR' in V1
- ▶ Tall narrow R-wave with deep S in V1
- ▶ Wide, bizarre, and ugly=LBBB or IVCD with high K

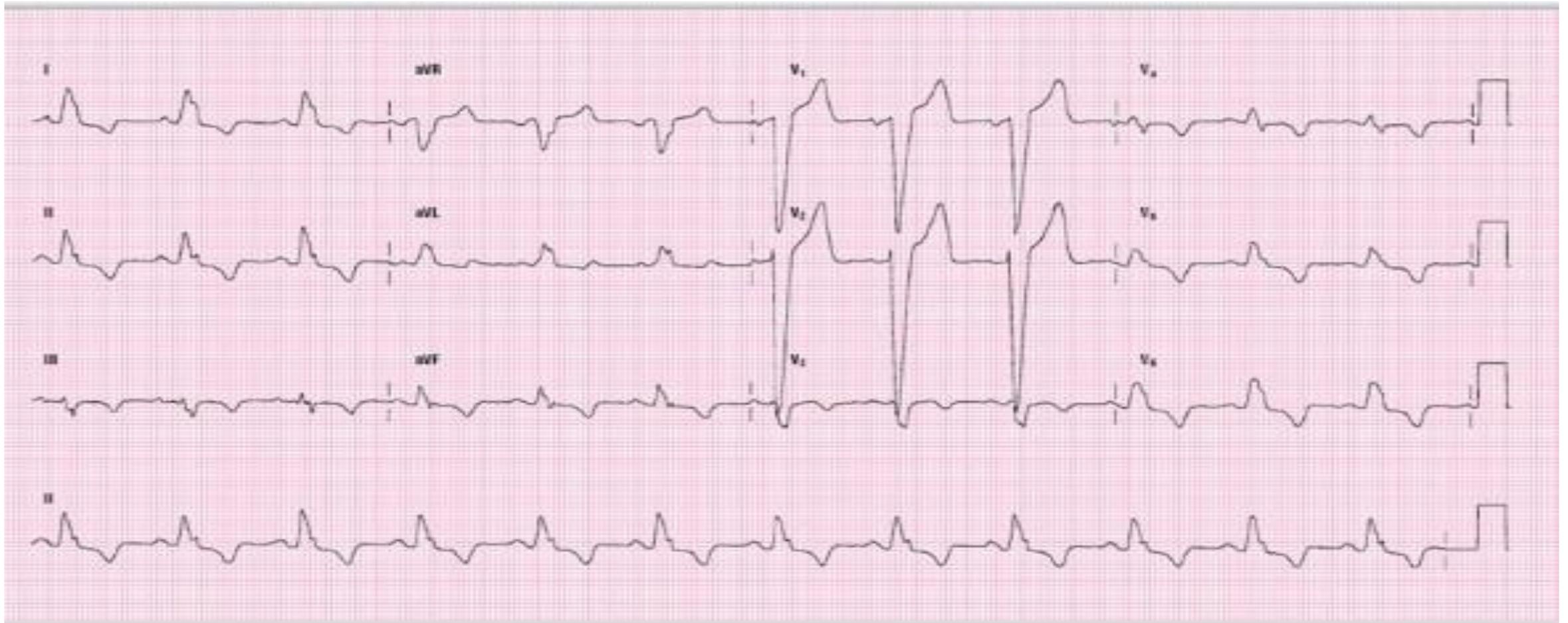
Variations



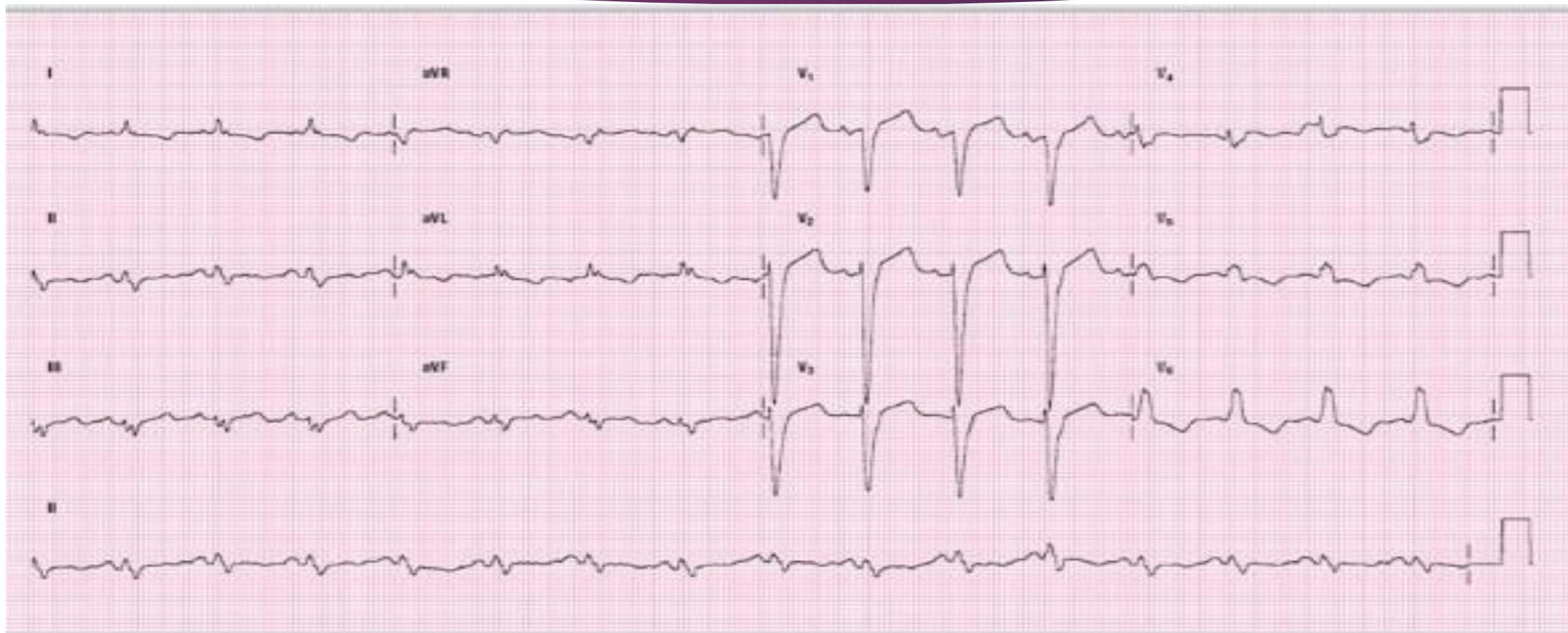
Do you see an LVH?



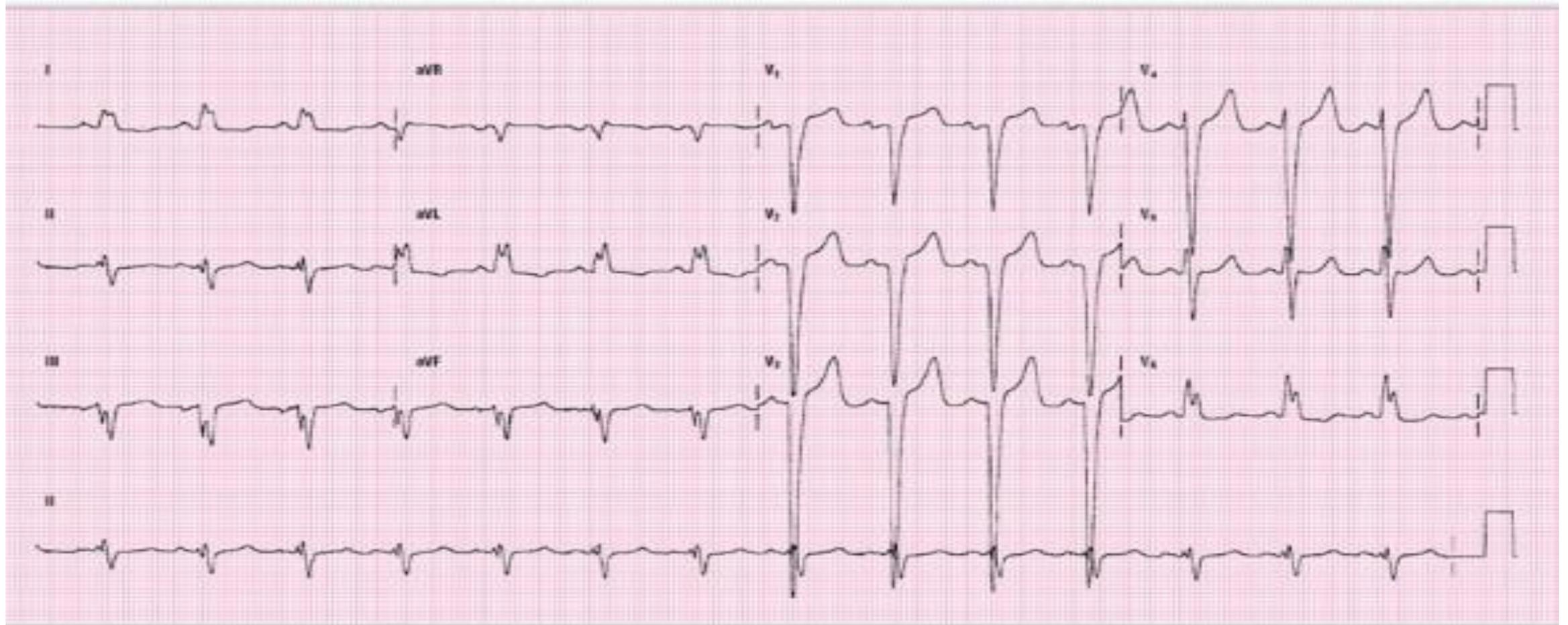
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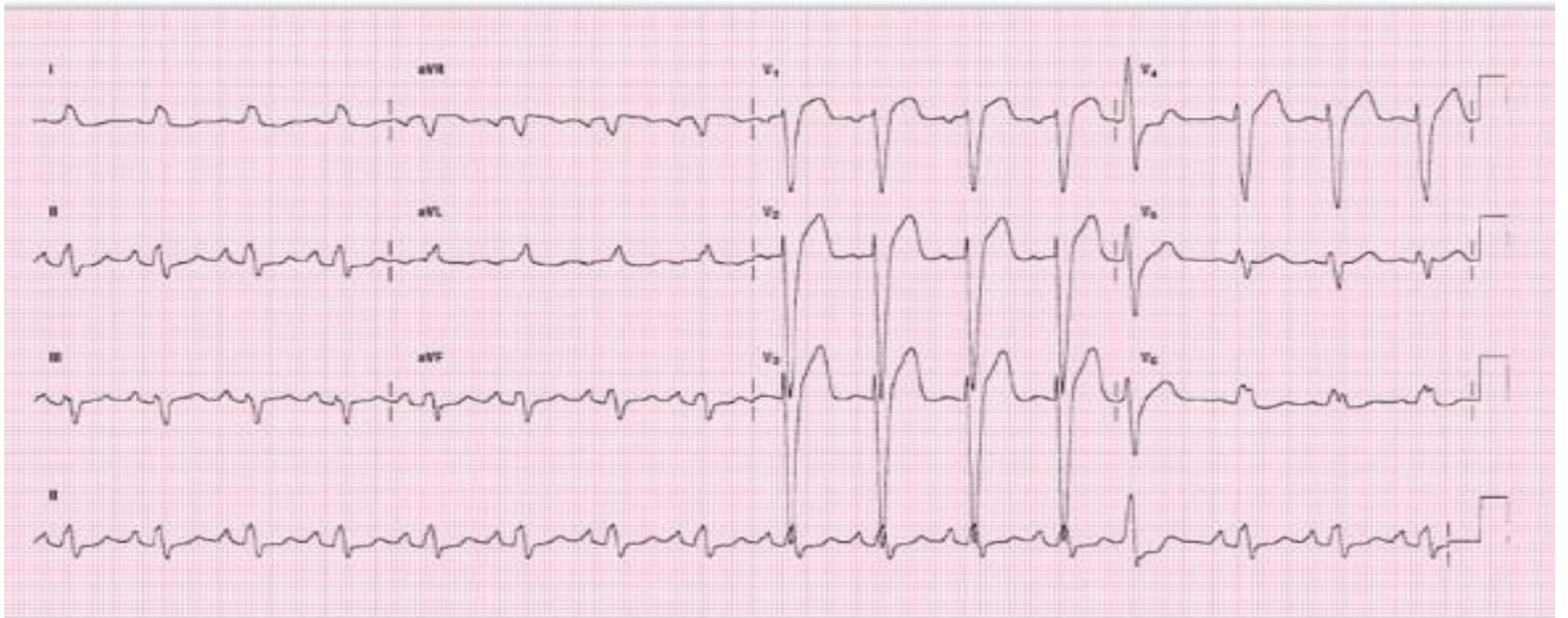
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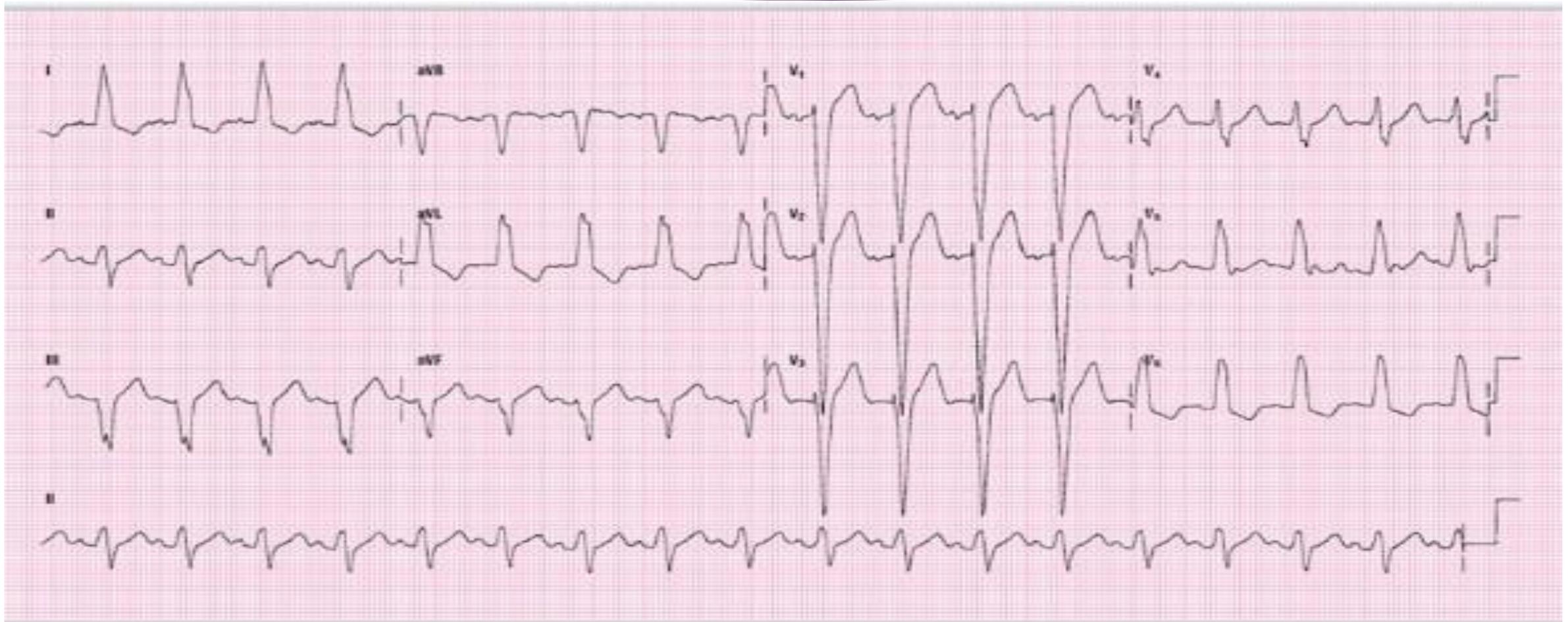
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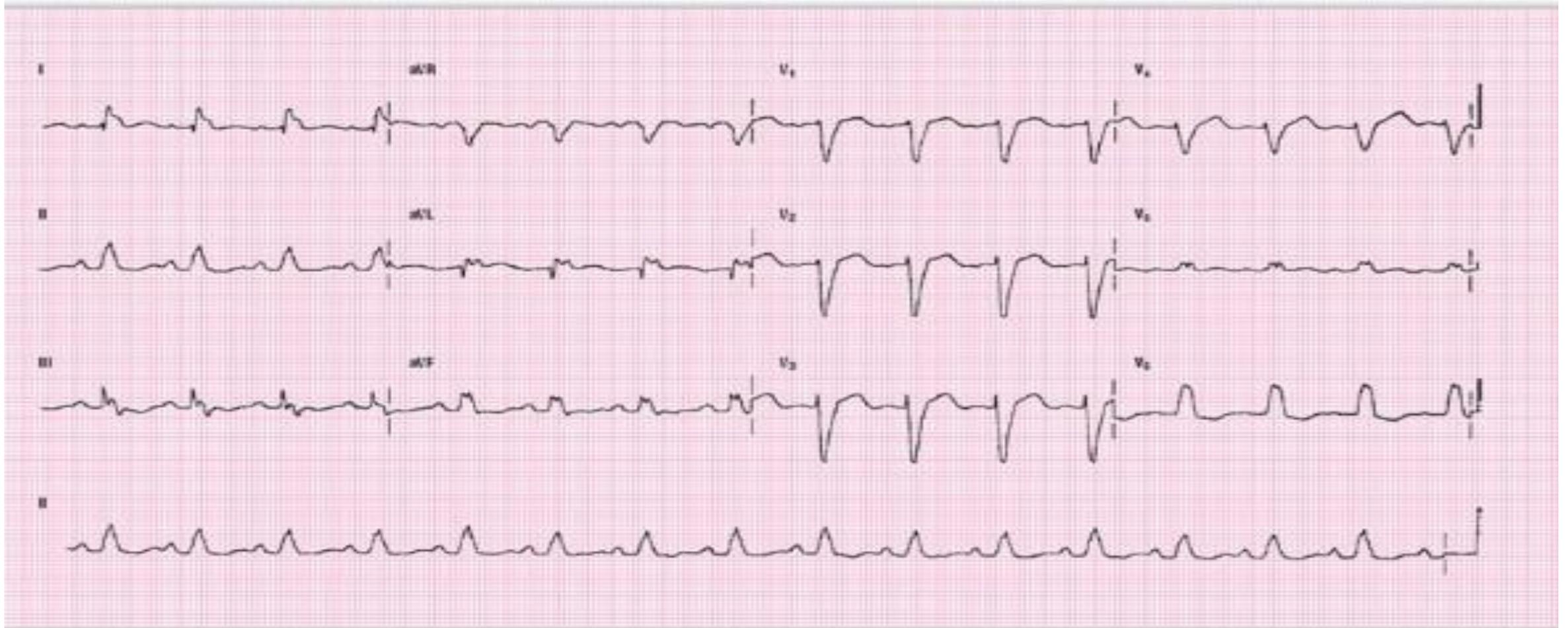
Read this EKG



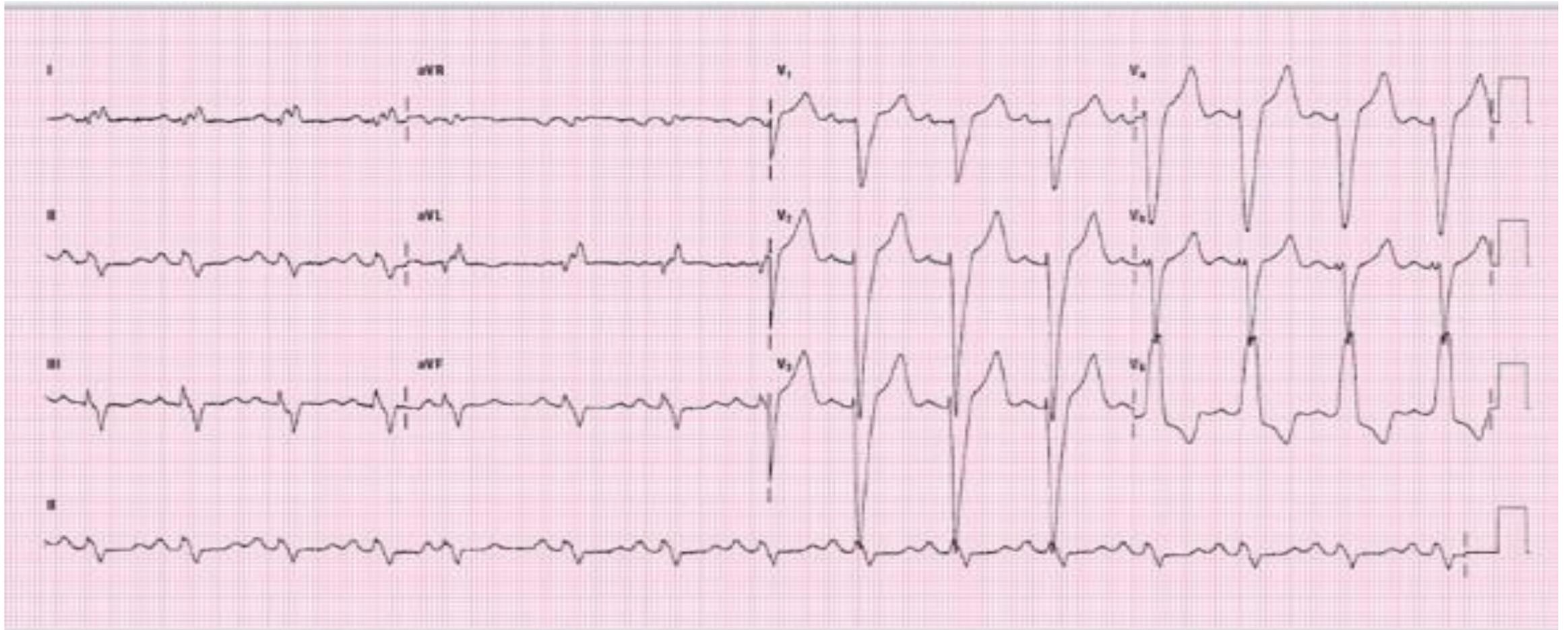
Read this EKG



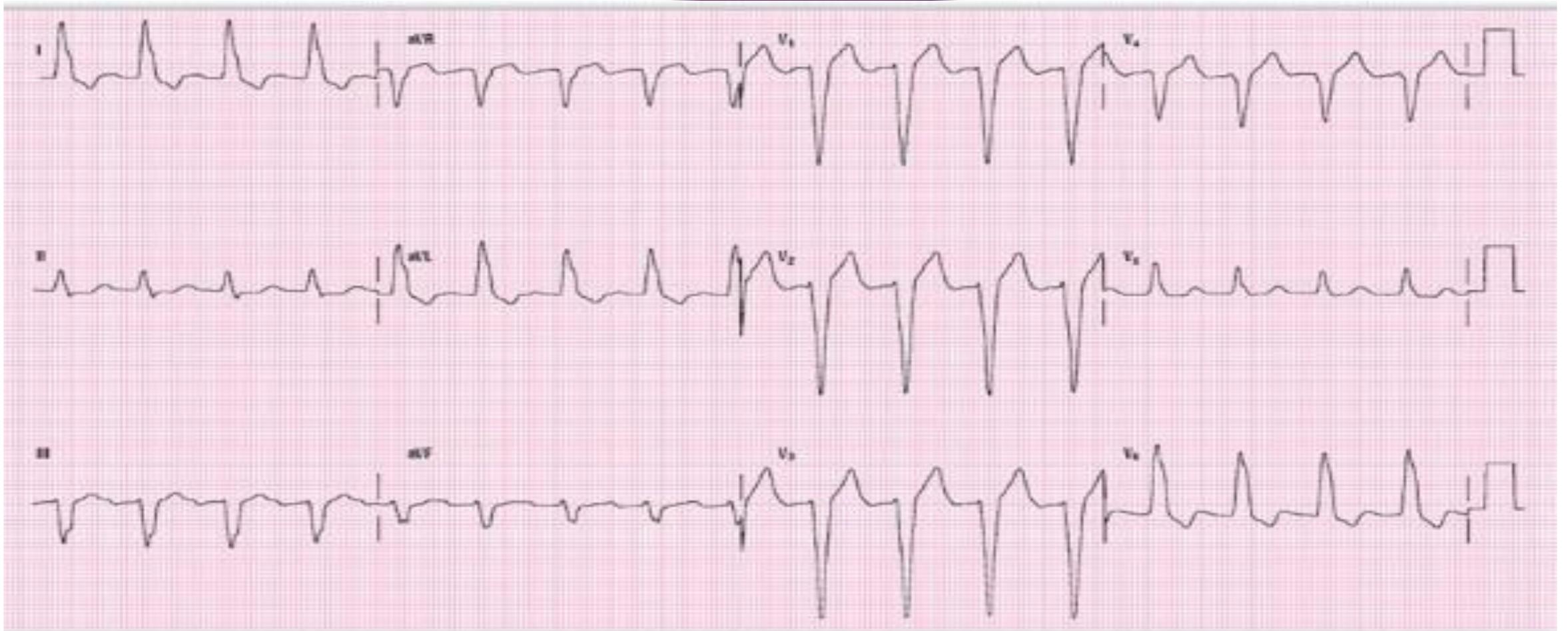
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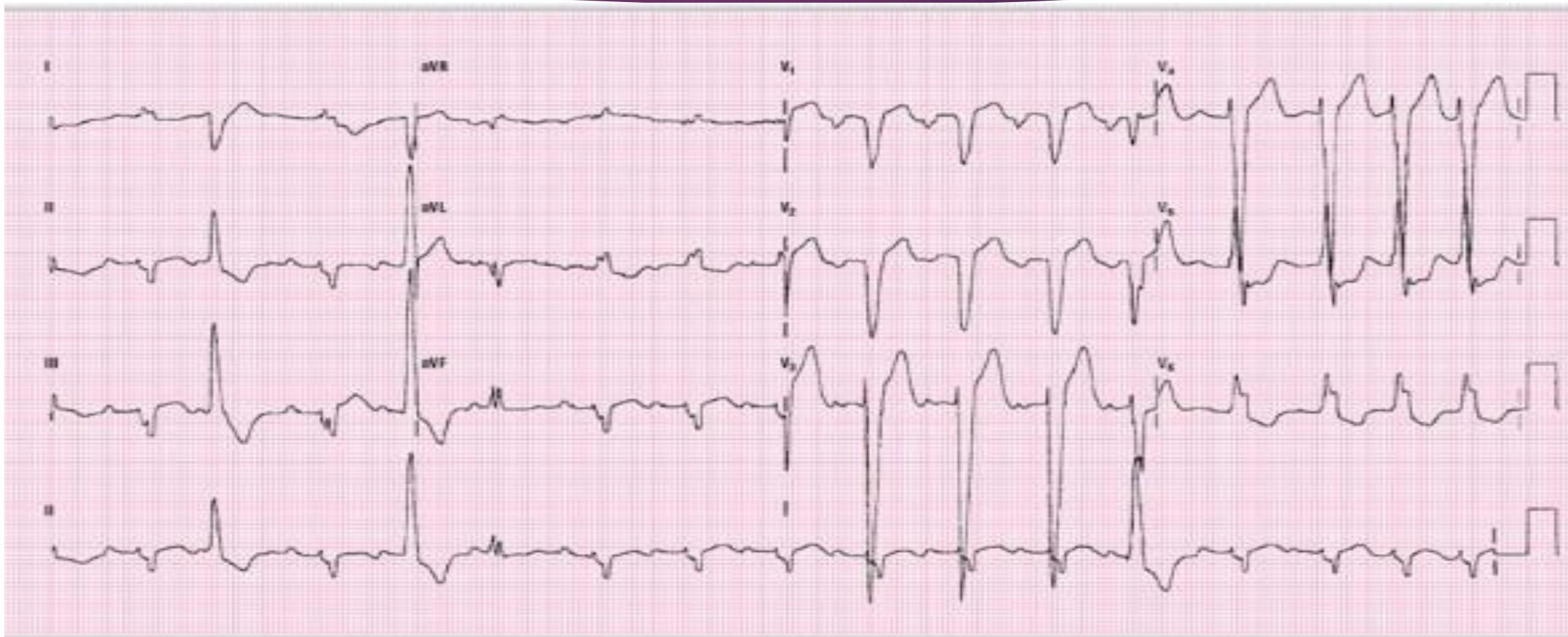
Read this EKG



Read this EKG



Read this EKG

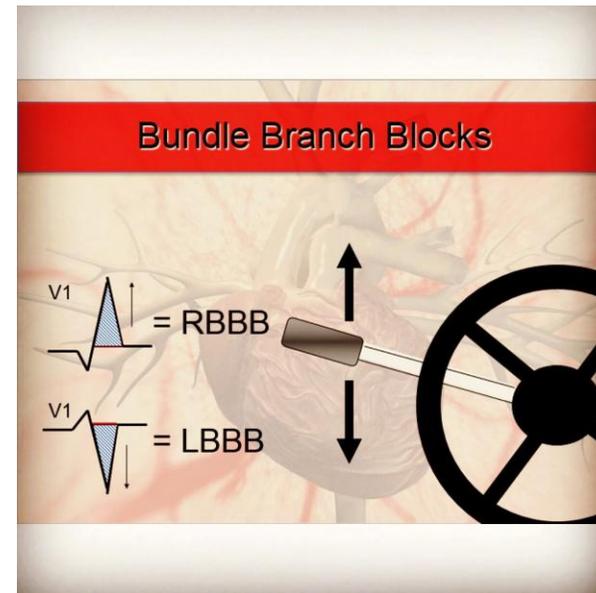


NS-IVCD

Criteria

- ▶ I & V6=RBBB
- ▶ I&V6=LBBB
- ▶ The turn signal is in conflict

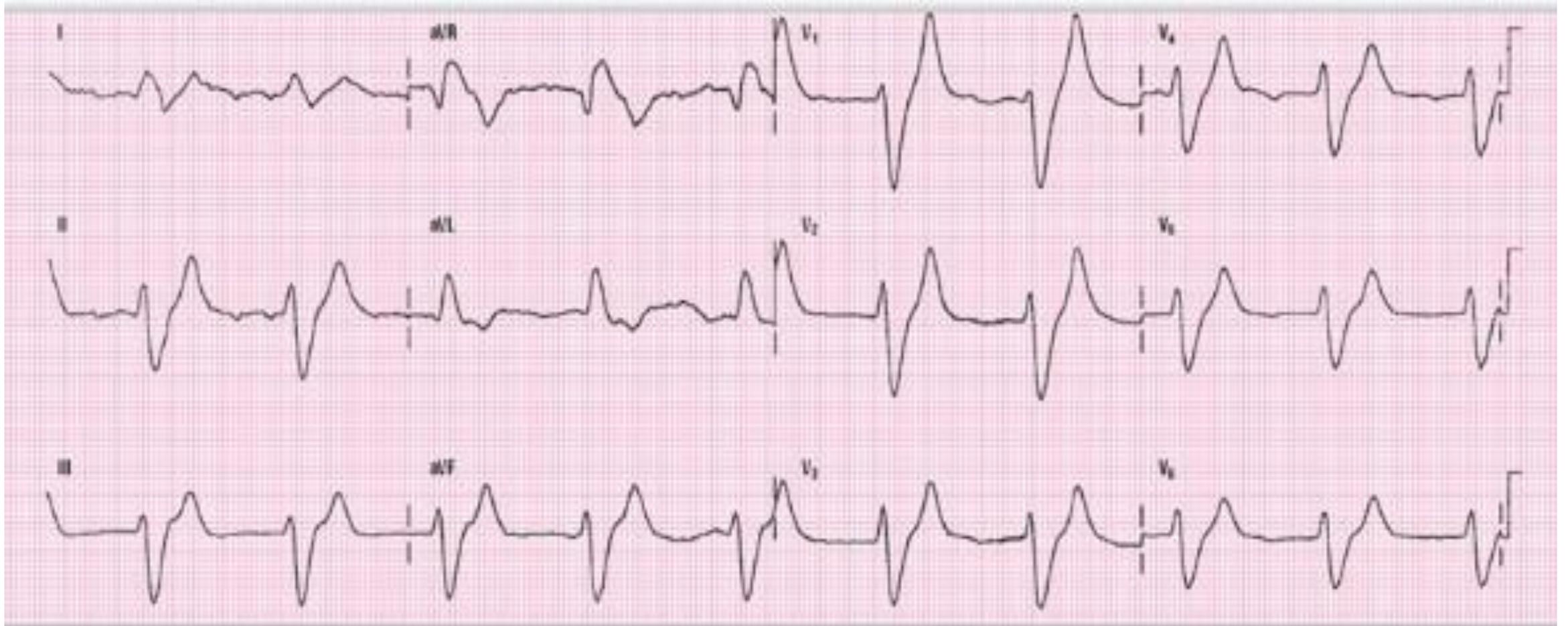
Turn sign



Read this EKG



Read this EKG

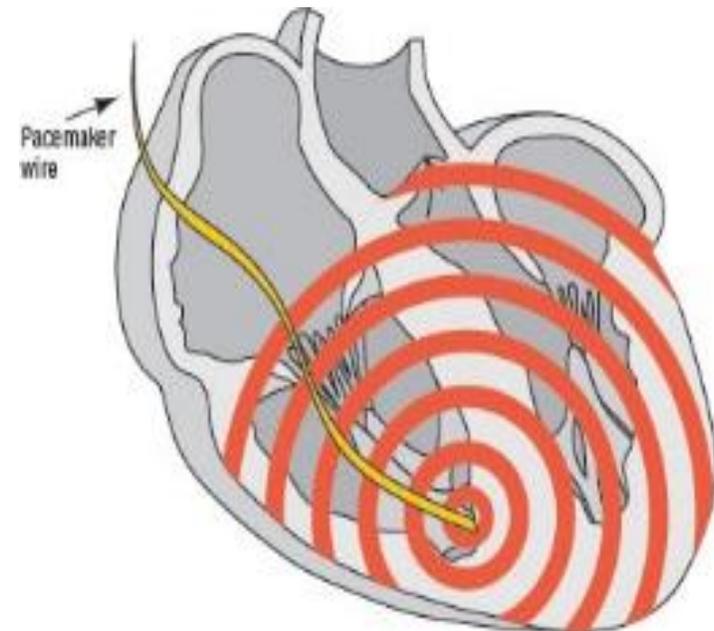


A special case:

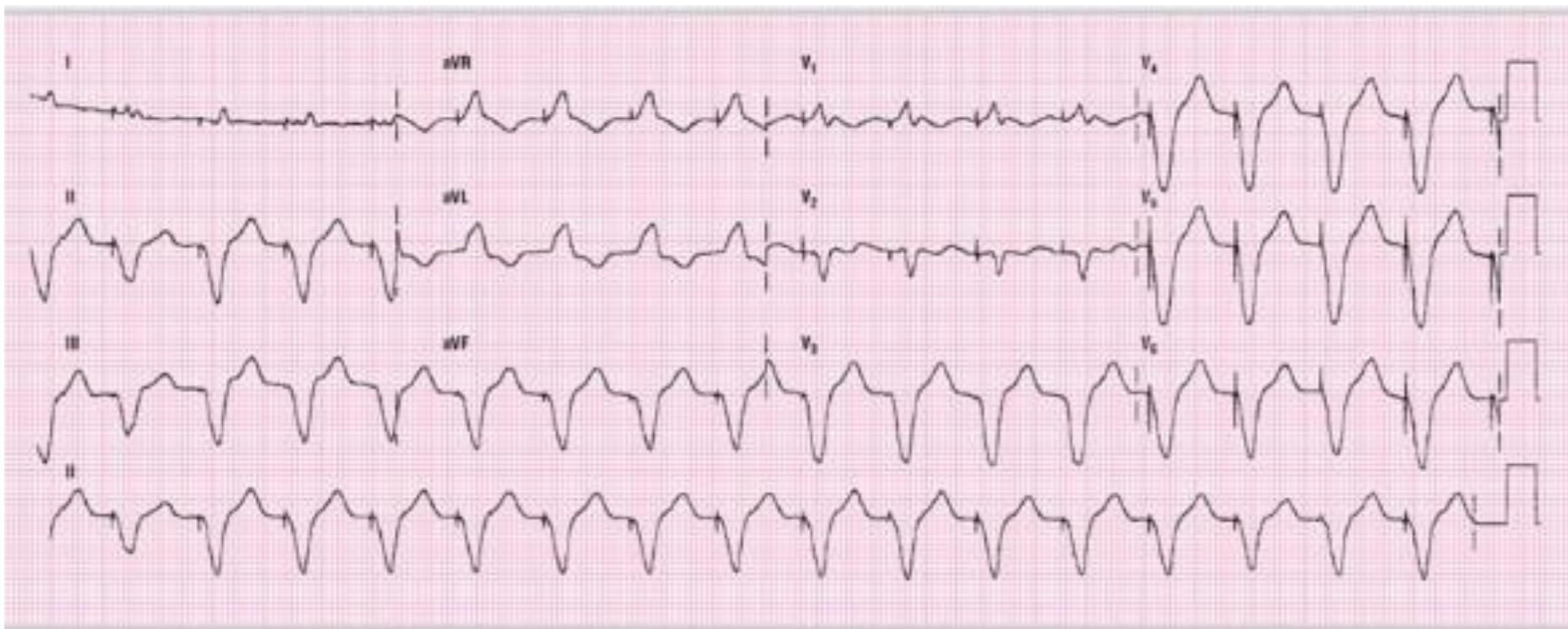
What will you see?

- ▶ Wide QRS?
- ▶ NS-IVCD?
- ▶ LBBB?
- ▶ RBBB?

Pacemaker wire



An Ugly EKG:



Axis deviation 101:

2 thumbs up

How To Check Axis in ECG

QRS in Lead I QRS in Lead AVF

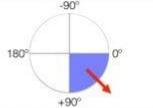
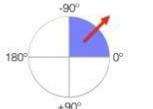
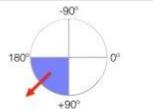
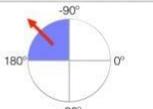
+ + and + + =

Normal Axis

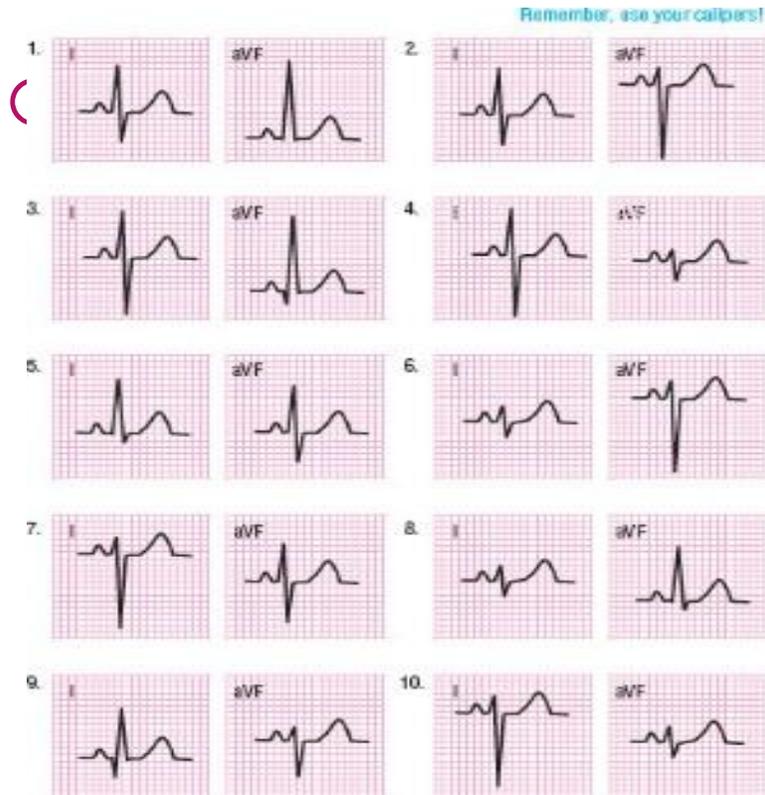
"two thumbs up" sign

The diagram illustrates that a positive QRS complex in both Lead I and Lead AVF results in a normal axis, which is represented by a 'two thumbs up' sign. The QRS complexes are shown as tall, narrow spikes with a positive sign above each. The 'two thumbs up' sign shows two hands with thumbs pointing upwards.

I & aVF

Lead I	Lead aVF	Quadrant	Axis
POSITIVE	POSITIVE		Normal Axis (0 to +90°)
POSITIVE	NEGATIVE		**Possible LAD (0 to -90°)
NEGATIVE	POSITIVE		RAD (+90° to 180°)
NEGATIVE	NEGATIVE		Extreme Axis (-90° to 180°)

Axis Deviation:



Answers:

- ▶ 1 Normal
- ▶ 2 Left
- ▶ 3 Right
- ▶ 4 Extreme right
- ▶ 5 Normal
- ▶ 6 Left
- ▶ 7 Extreme right
- ▶ 8 Normal
- ▶ 9 Left
- ▶ 10 Right

Final words of wisdom

QRS > 119 ms

- ▶ LBBB
- ▶ RBBB
- ▶ IVCD
- ▶ Ventricular or aberrantly conducted beats

Clinical pearls:

- ▶ IF IVCD -> check K
- ▶ IF V-tach -> start V-tach protocol

Some technicalities:

LBBB

- ▶ NO LVH
- ▶ NO RVH
- ▶ Left axis deviation is common
- ▶ Some cardiologists say you can't really see the axis deviation, because electricity does not follow normal pathways

RBBB

- ▶ You can still see LVH & RVH
- ▶ Although I'm skeptical about RVH

Question?

