

# Intermediate ECG Course – Part 1

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Joe M. Moody, Jr, MD

UTHSCSA and STVAHCS

# Topics in Intermediate ECG

- Consolidation of prior information with additional details
- Not “advanced”, but feel free to ask advanced questions
- Causes of axis deviation and wide QRS (1)
- Infarction and causes of ST segment shifts (2)
- Electrolyte effects on the ECG (2)
- Flutter versus fib, and ventricular patterns (3)
- AV conduction and AV dissociation (4)
- Tachyarrhythmias, wide and narrow QRS (5, 6)
- Integrating ECG and clinical information (7,8)

# Causes of Wide QRS

- LBBB
- RBBB (with or without fascicular block)
- Ventricular paced beat
- Ventricular premature beat or tachycardia
- WPW
- IVCD (Peri-infarction block)
- Hyperkalemia

# Left Bundle Branch Block

- Conduction delay affects the entire QRS complex, including initial forces
- Cannot interpret MI or LVH
- ST segment is discordant
- T wave is discordant
- Cannot interpret ST depression on treadmill
- Stress test should be vasodilator (dipyridamole, adenosine)
- Can interpret concordant ST elevation or depression as acute transmural injury

# Right Bundle Branch Block

- Conduction delay affects the terminal part of the QRS complex, sparing initial forces
- Can interpret MI
- ST segment is isoelectric
- T wave is discordant from the terminal delay
- Can interpret ST depression on the treadmill in V5
- Can interpret acute ST elevation for MI

# Differences Between RBBB and LBBB

	<u>RBBB</u>	<u>LBBB</u>
Affected segment of QRS	Terminal 0.06	Entire QRS
Pathologic Q wave interpretable?	Yes	No
ST segment	Isoelectric	Discordant from main QRS
T wave	Discordant from terminal delay	Discordant from main QRS
ST elevation interpretable?	Yes	Only concordant elevation
Treadmill ECG interpretable?	Yes, in V5	No, use vasodilator imaging

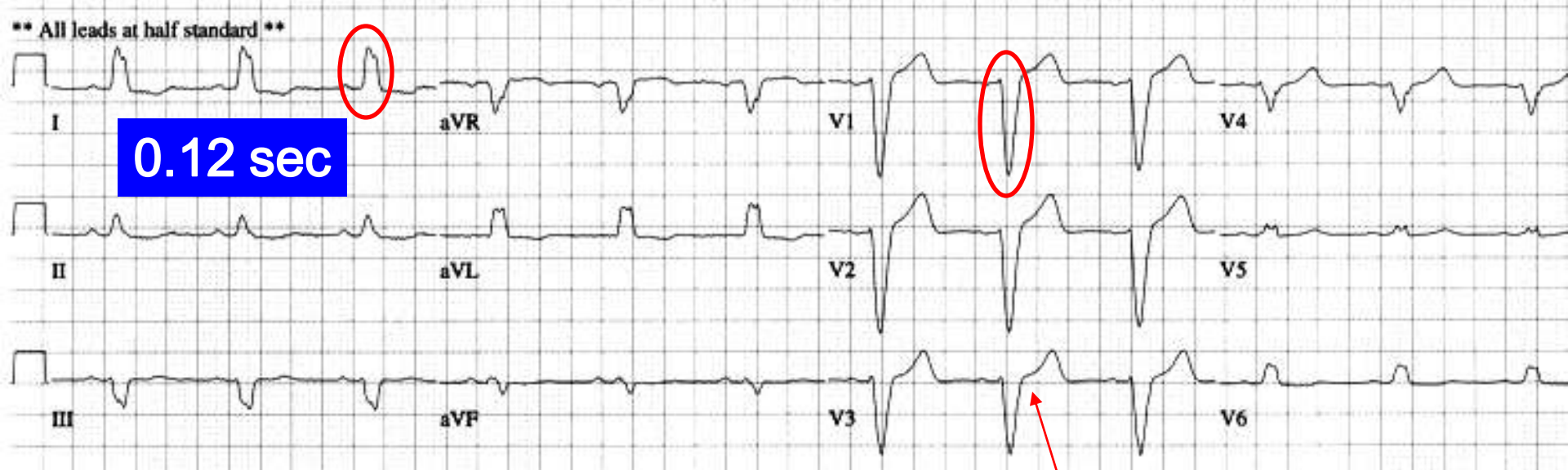
# Causes of Right Axis Deviation

- Normal variant in young or slender adults
- RVH
- COPD without cor pulmonale
- High lateral MI
- Left posterior hemiblock
- IVCD
- Arm Lead Reversal
- Dextrocardia

# Causes of Left Axis Deviation

- Left anterior fascicular block (with or without RBBB)
- Inferior wall MI
- IVCD
- RBBB incomplete in septum primum ASD
- LBBB
- Tricuspid atresia, transposition of the great vessels with common ventricle
- WPW pattern
- S1-S2-S3 pattern in chronic lung disease, may be northwest axis
- Technical Problem, limb lead reversal



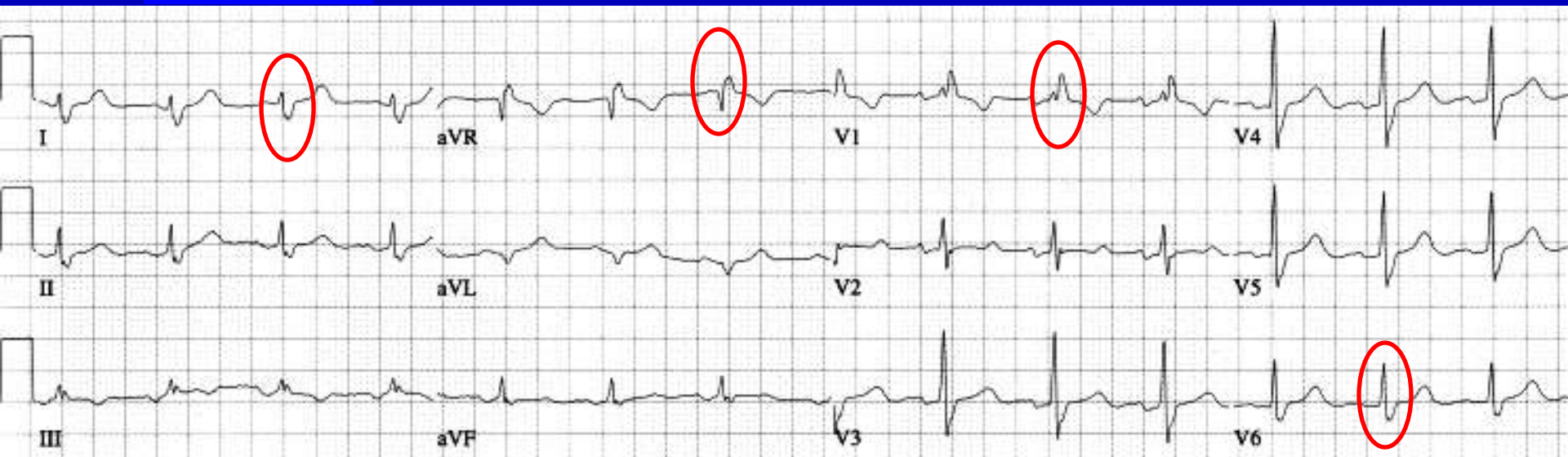
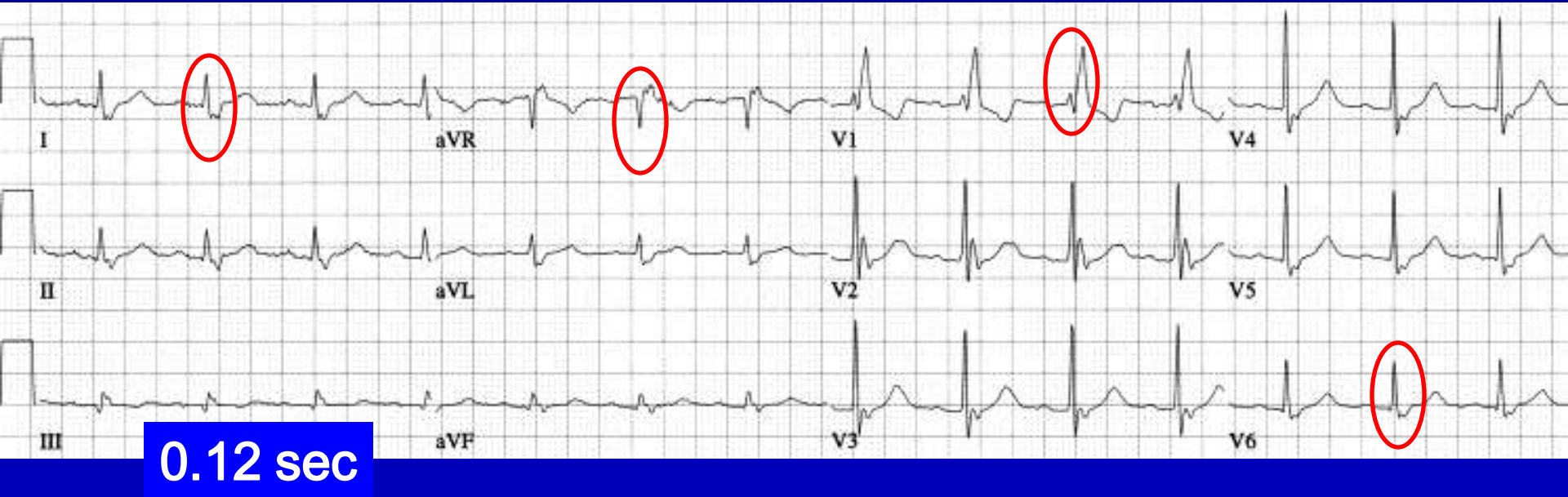


## ECG - LBBB

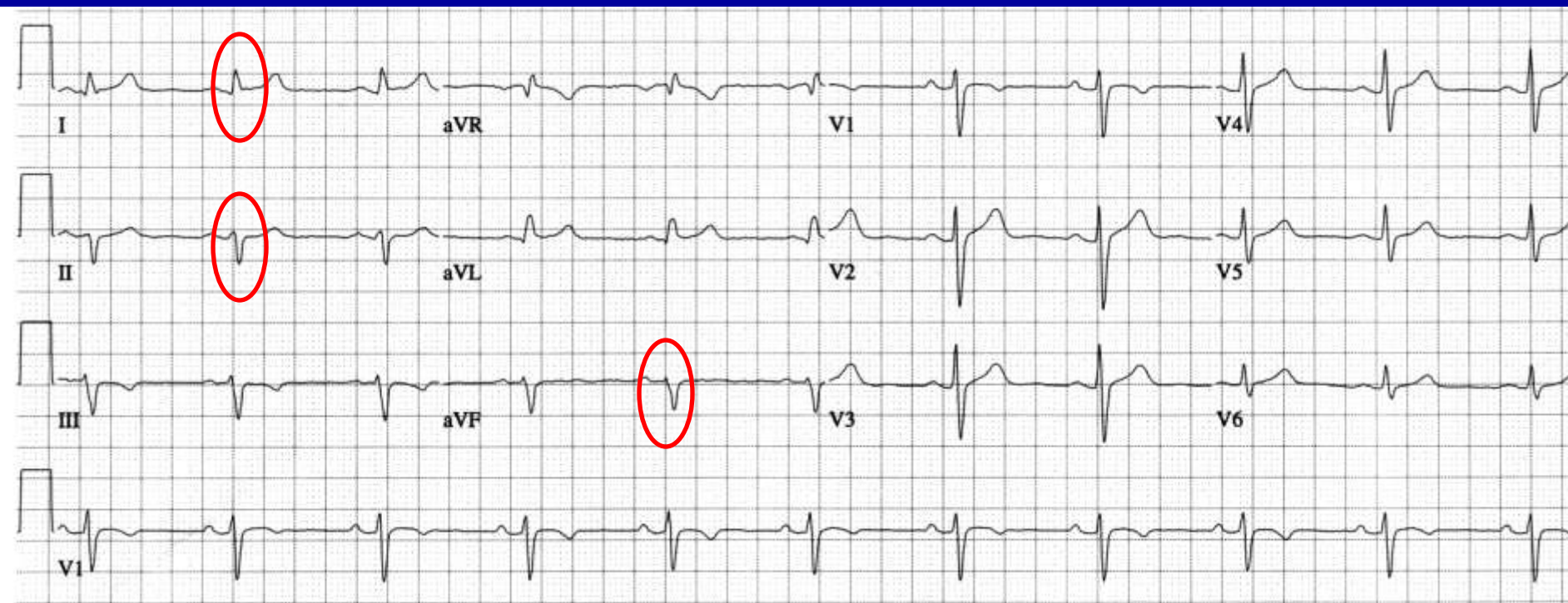
Discordant T wave



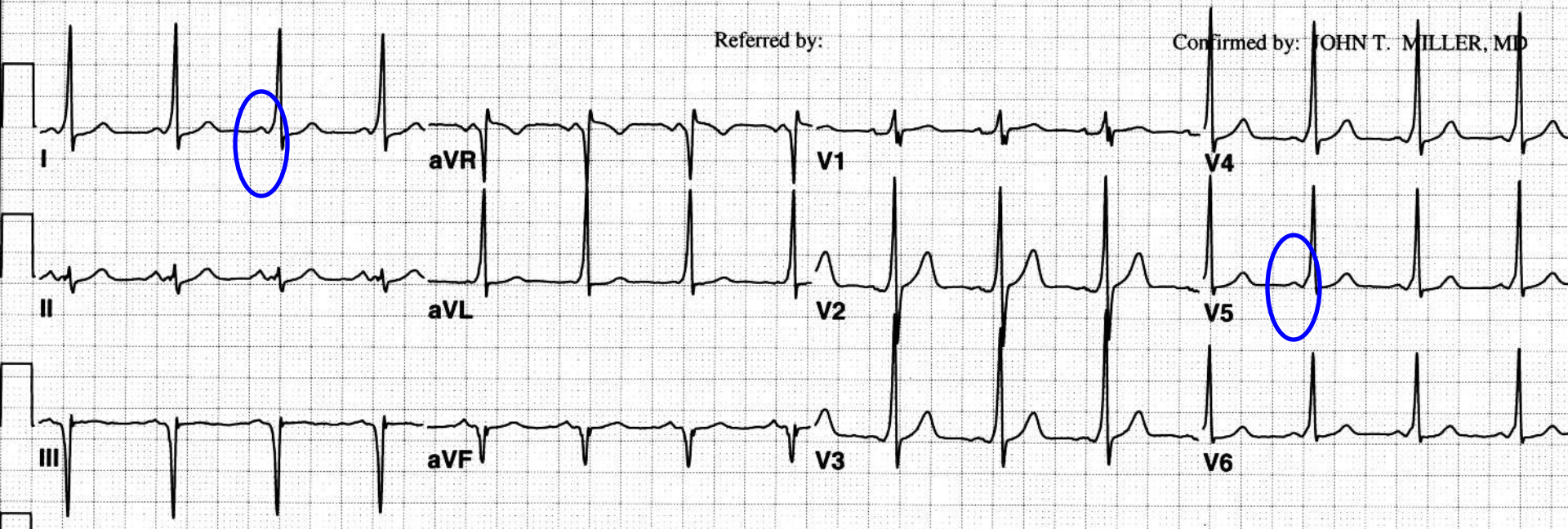
# ECG - RBBB



# ECG - LAFB





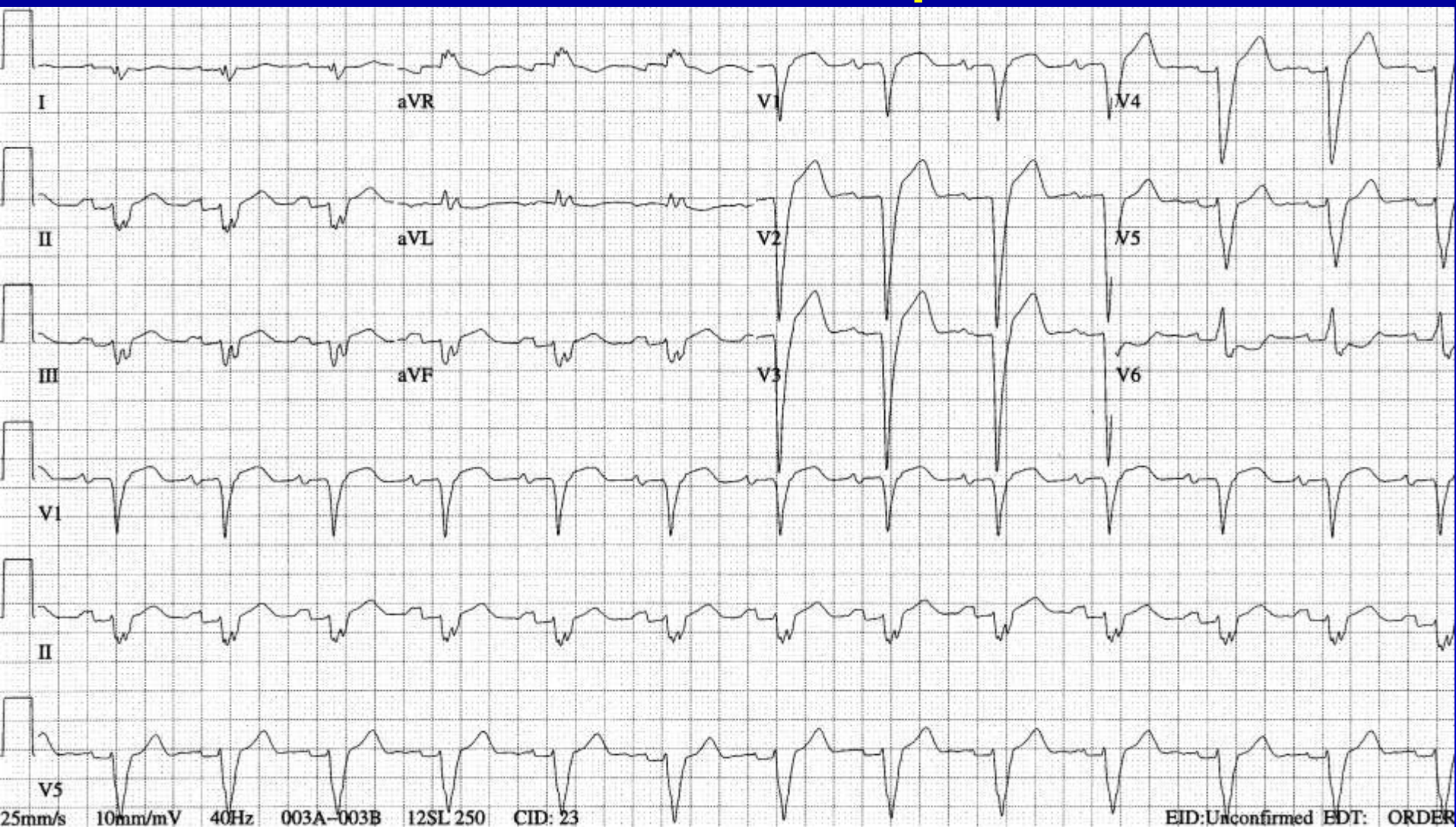


# WPW - ECG



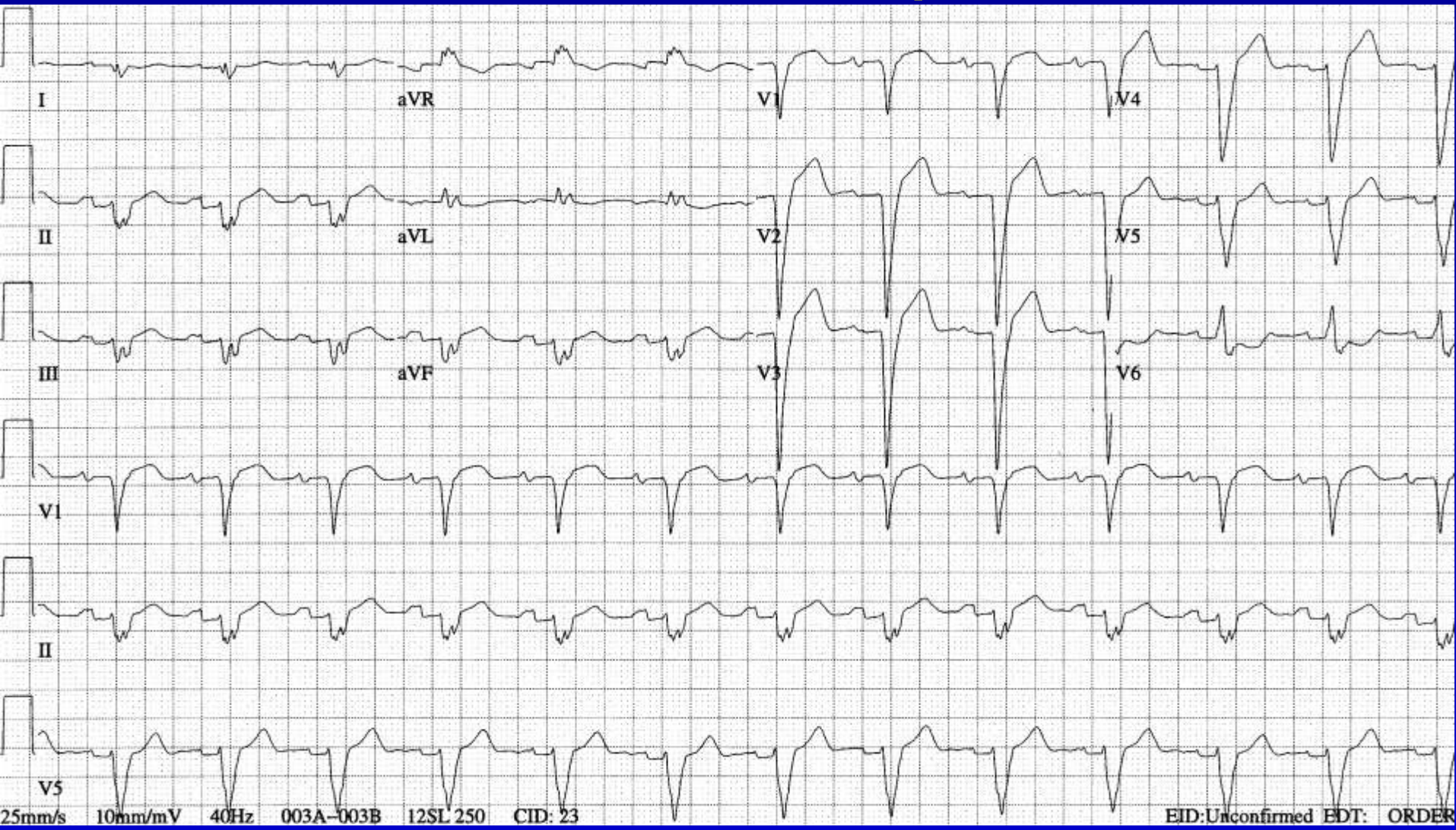


# Practice Strip 1





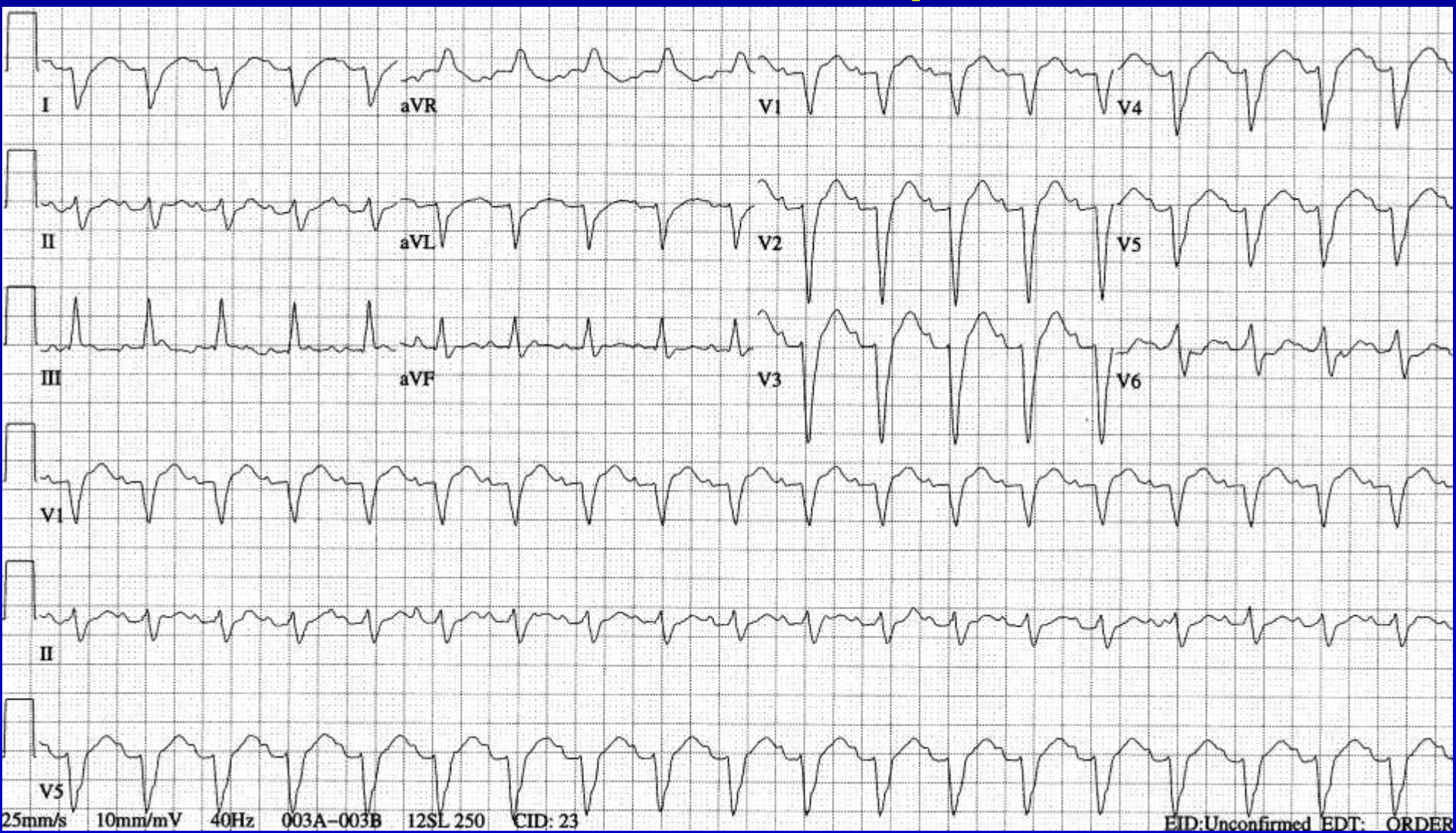
# Practice Strip 1



IVCD axis northwest, wide QRS, first degree AV block, can't diagnose MI or LVH or repolarization abnormality, but usually repolarization is discordant

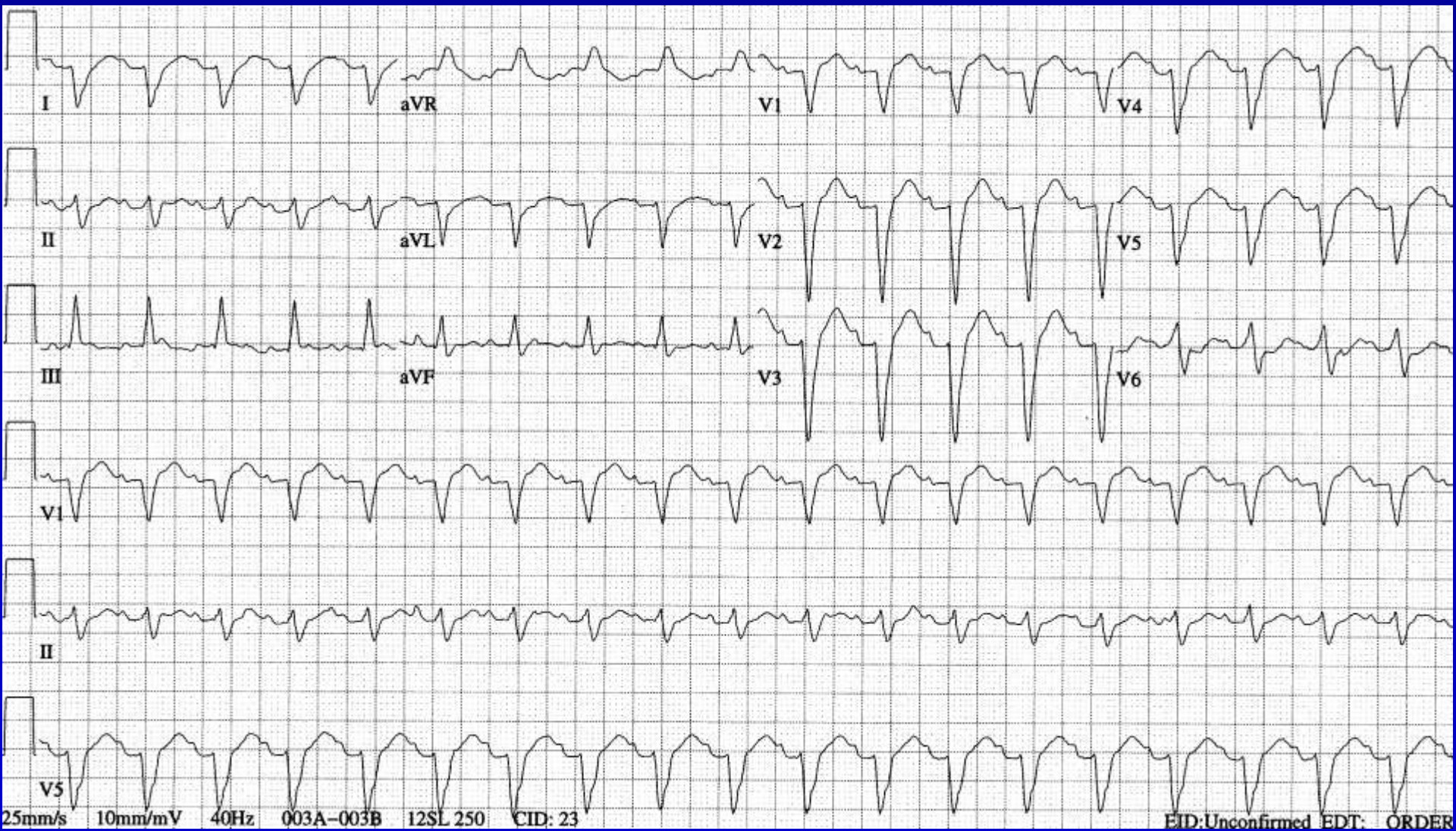


# Practice Strip 2





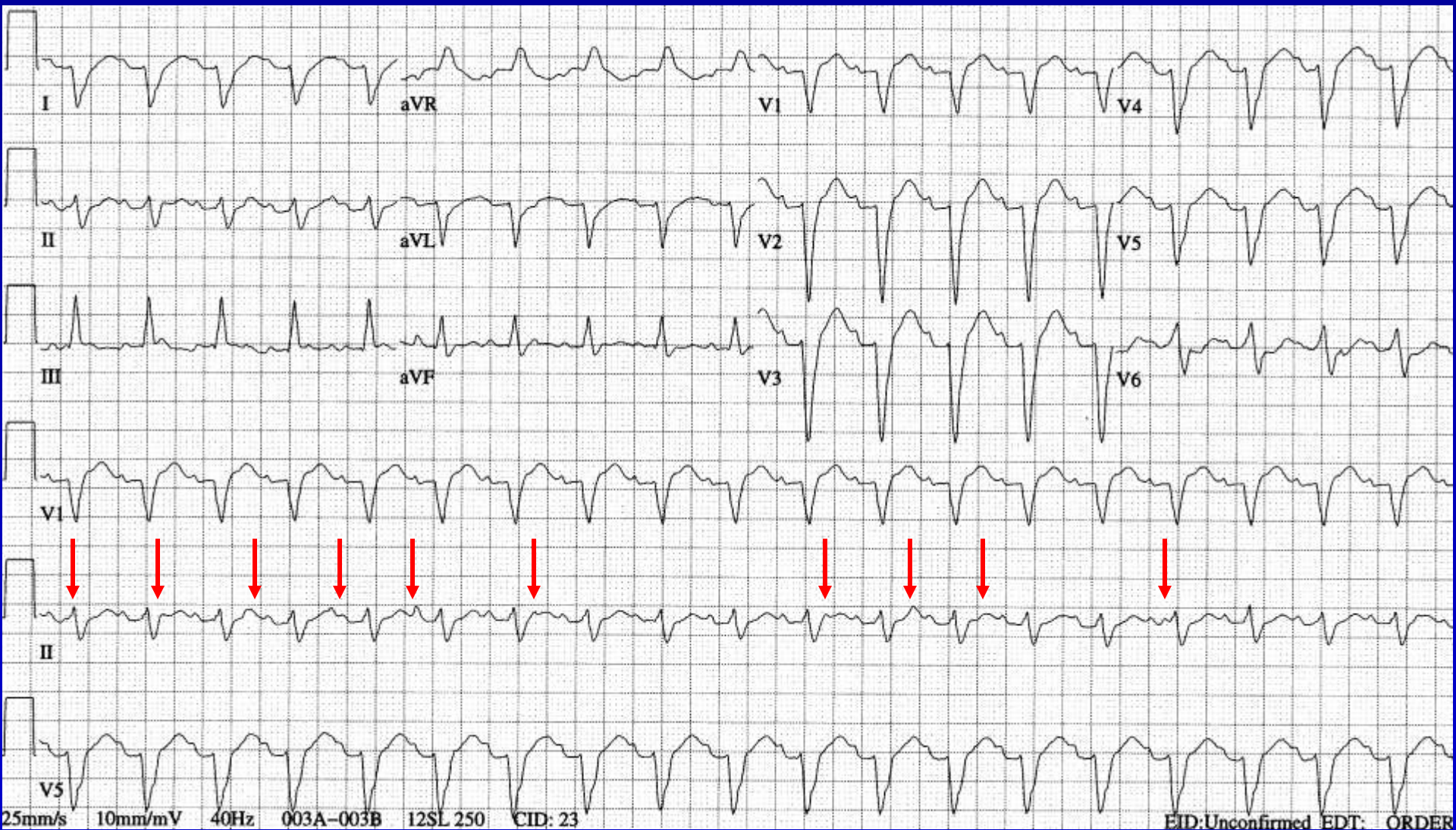
# Practice Strip 2



IVCD axis rightward, wide QRS. What is the rhythm?



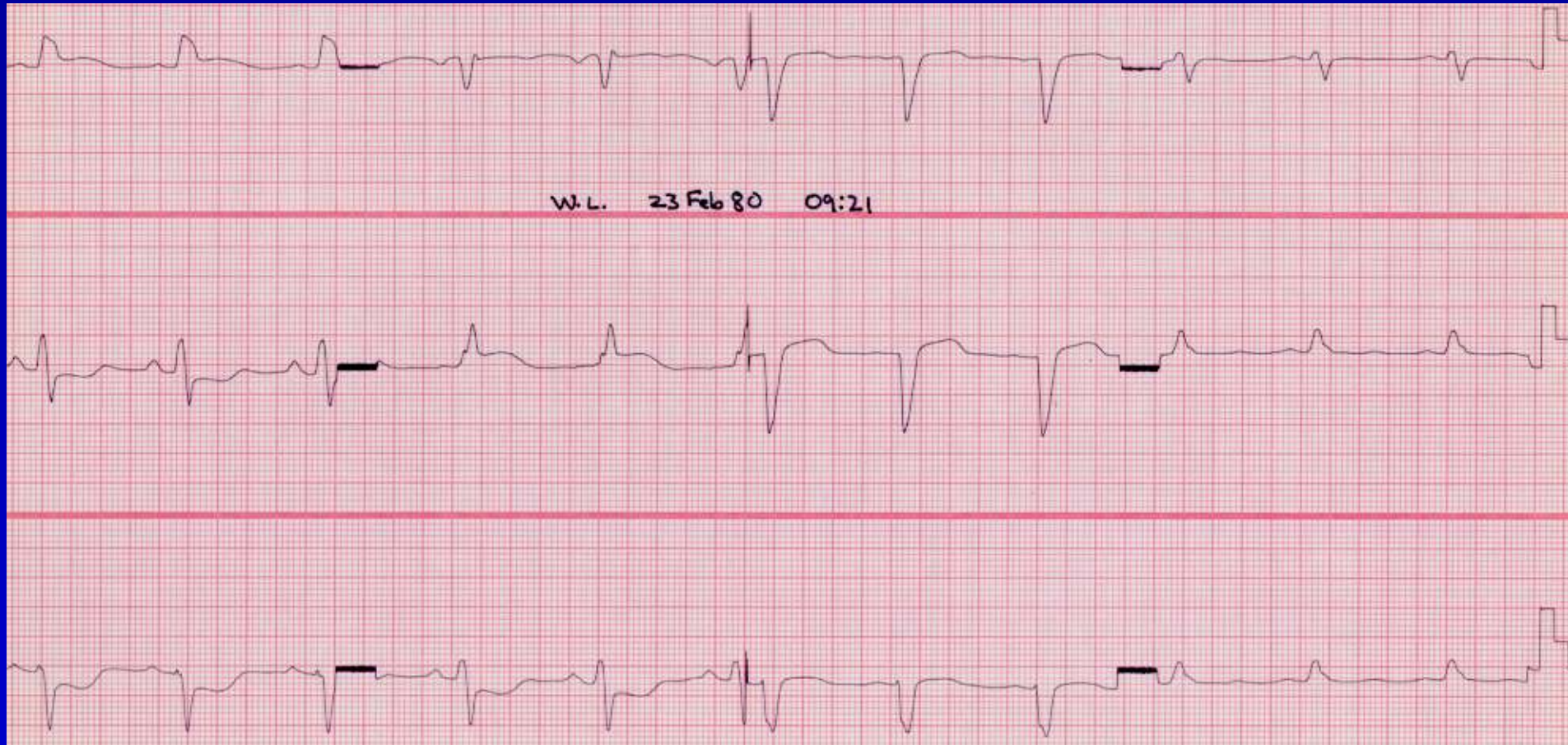
# Practice Strip 2



IVCD axis rightward, wide QRS. Atrial dissociation! This patient is status post heart transplantation with IVCD of the donor heart and with native atrial activity

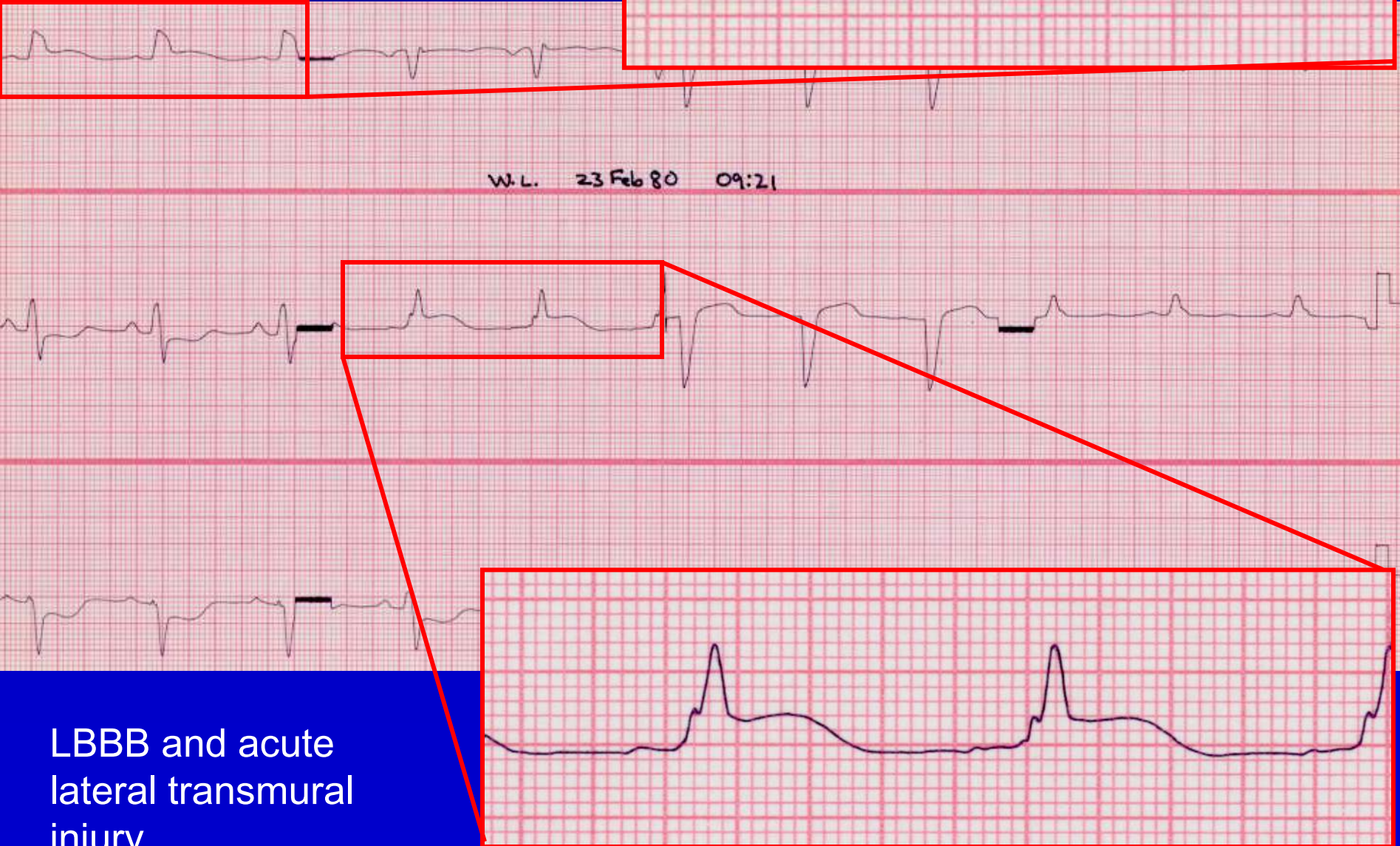


# Practice Strip 3



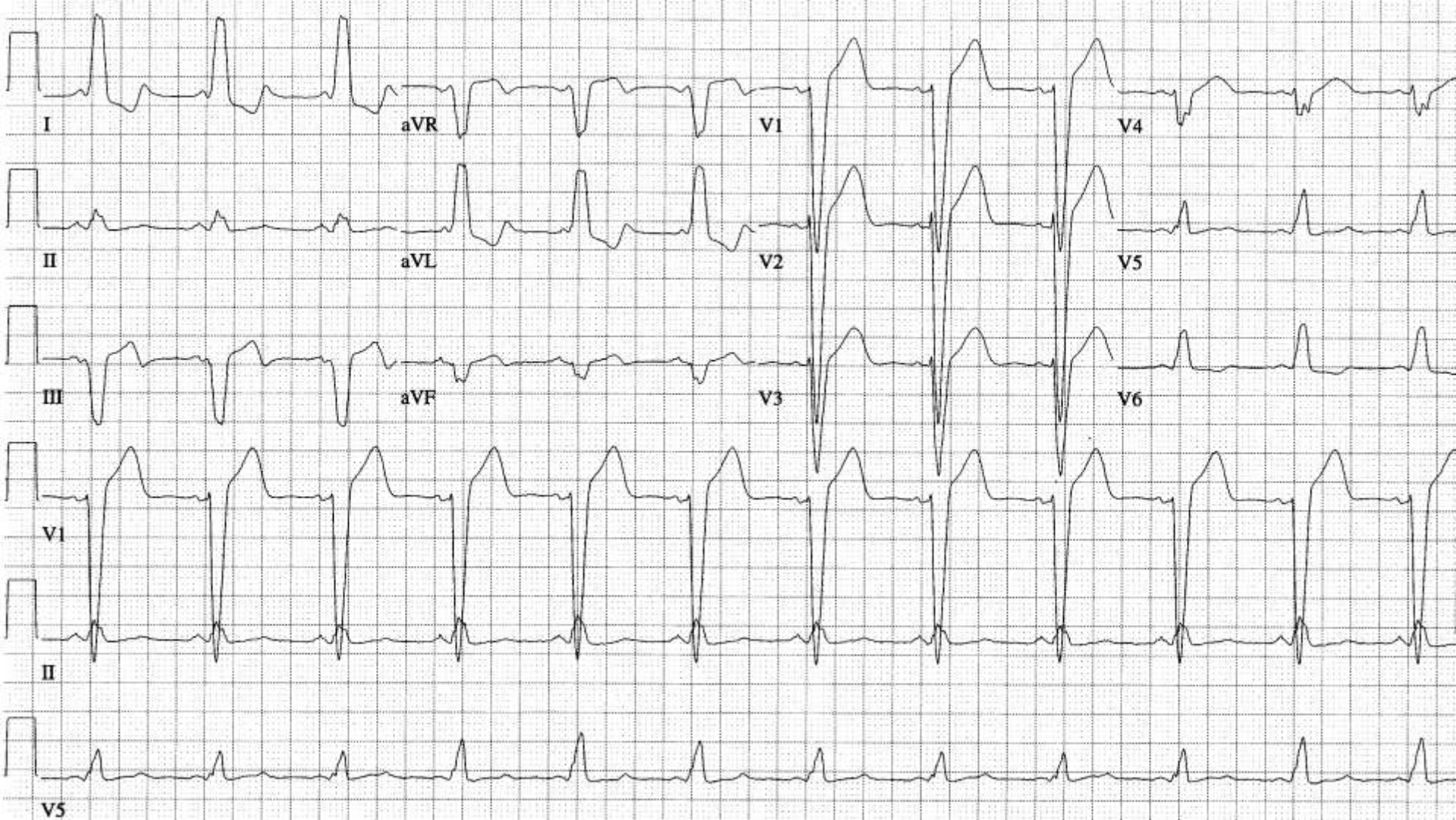


# Practice Strip 3



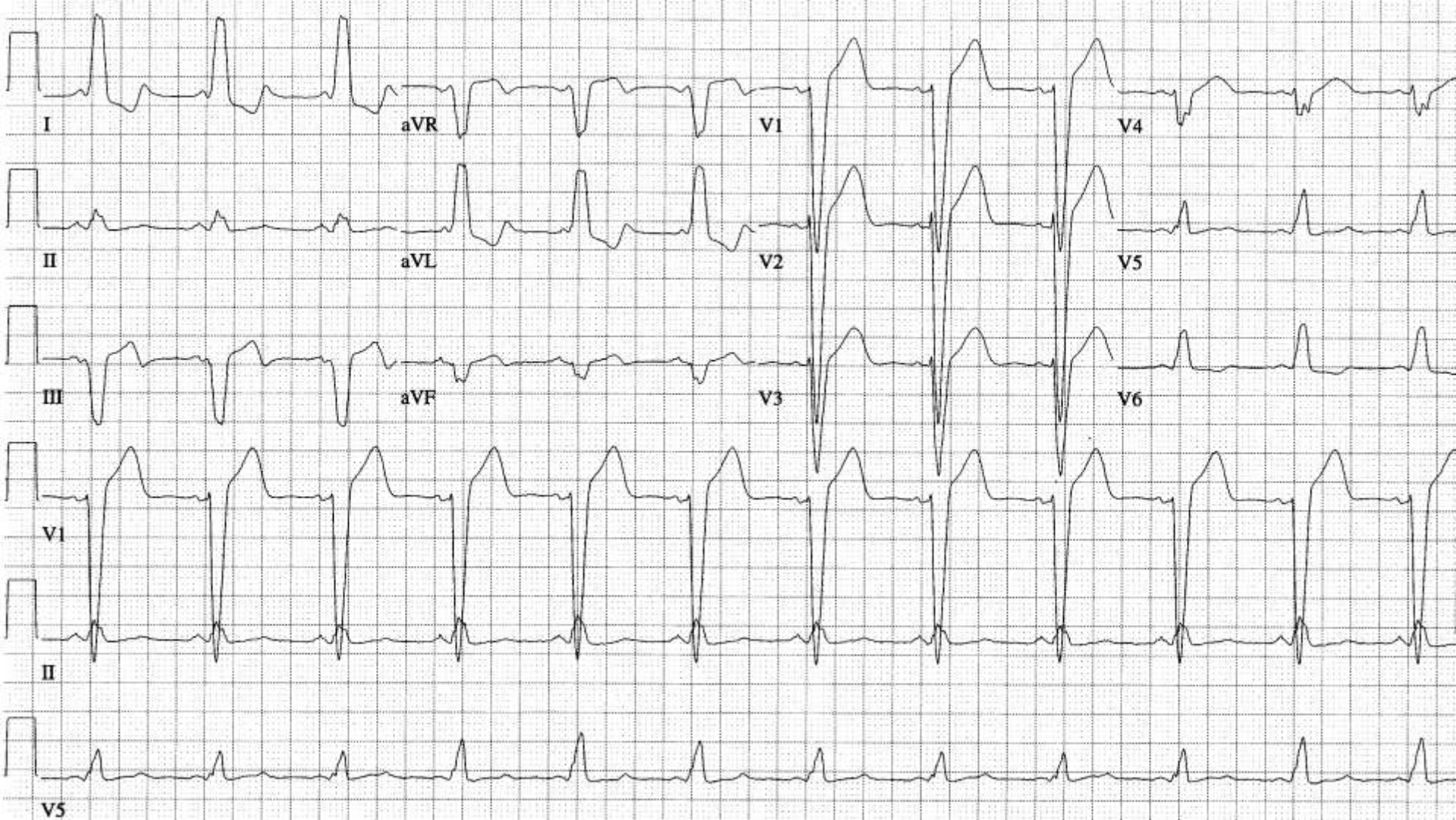


# Practice Strip 4





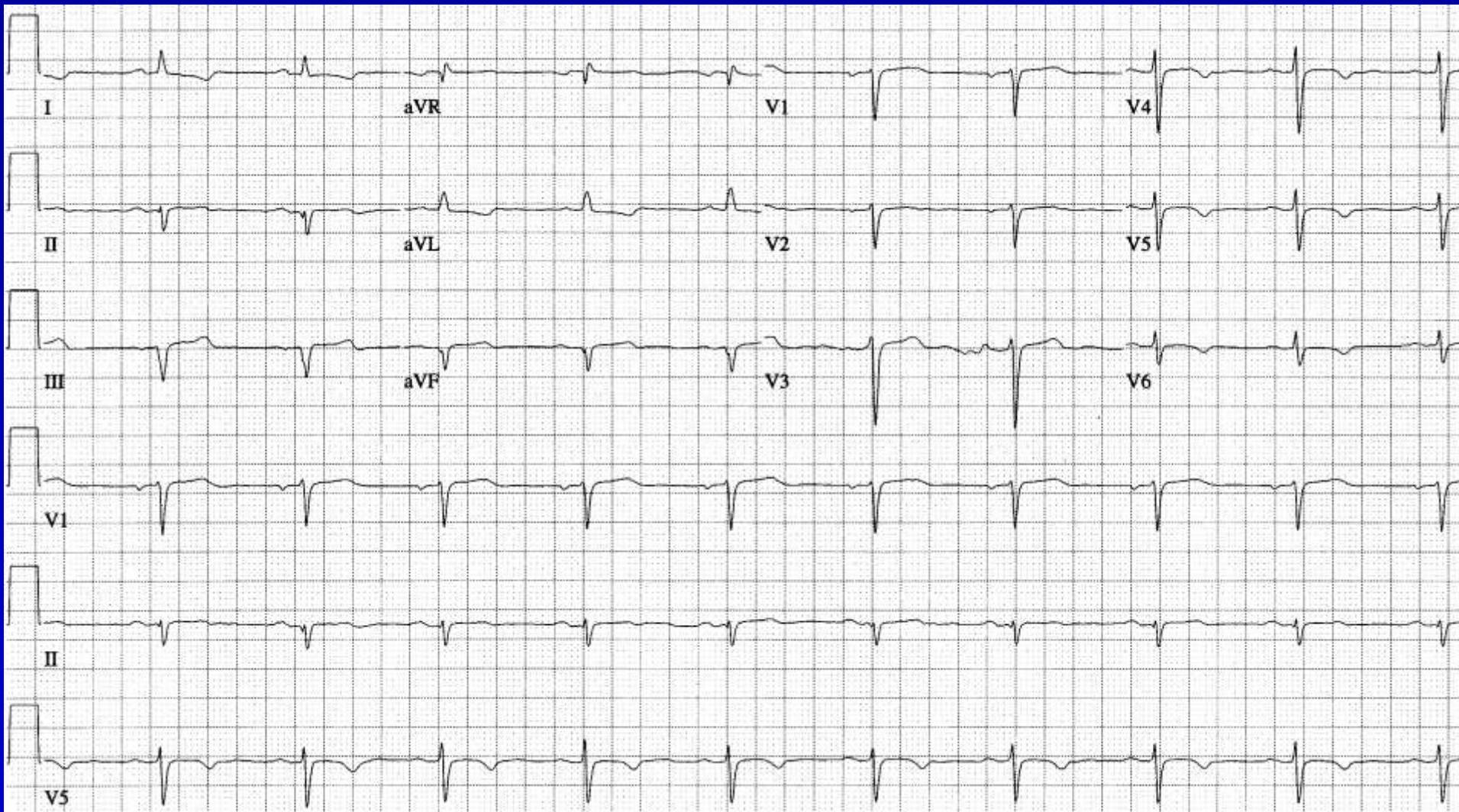
# Practice Strip 4



LBBB with short PR, wonder about WPW, coexistence with LBBB, concertina effect

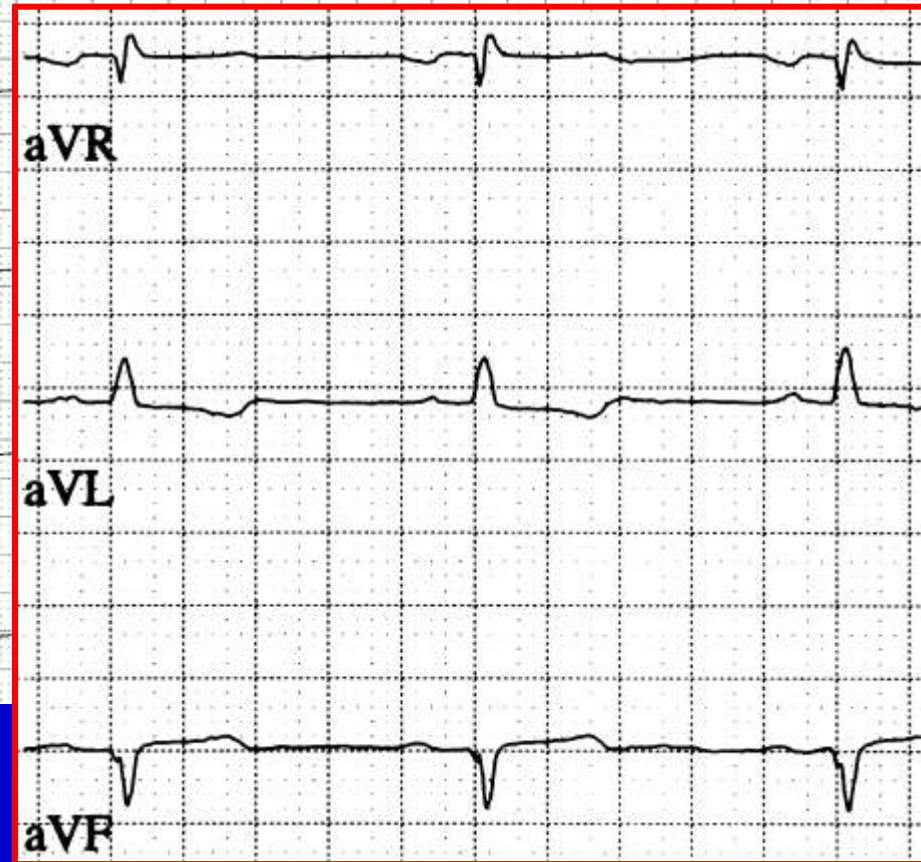
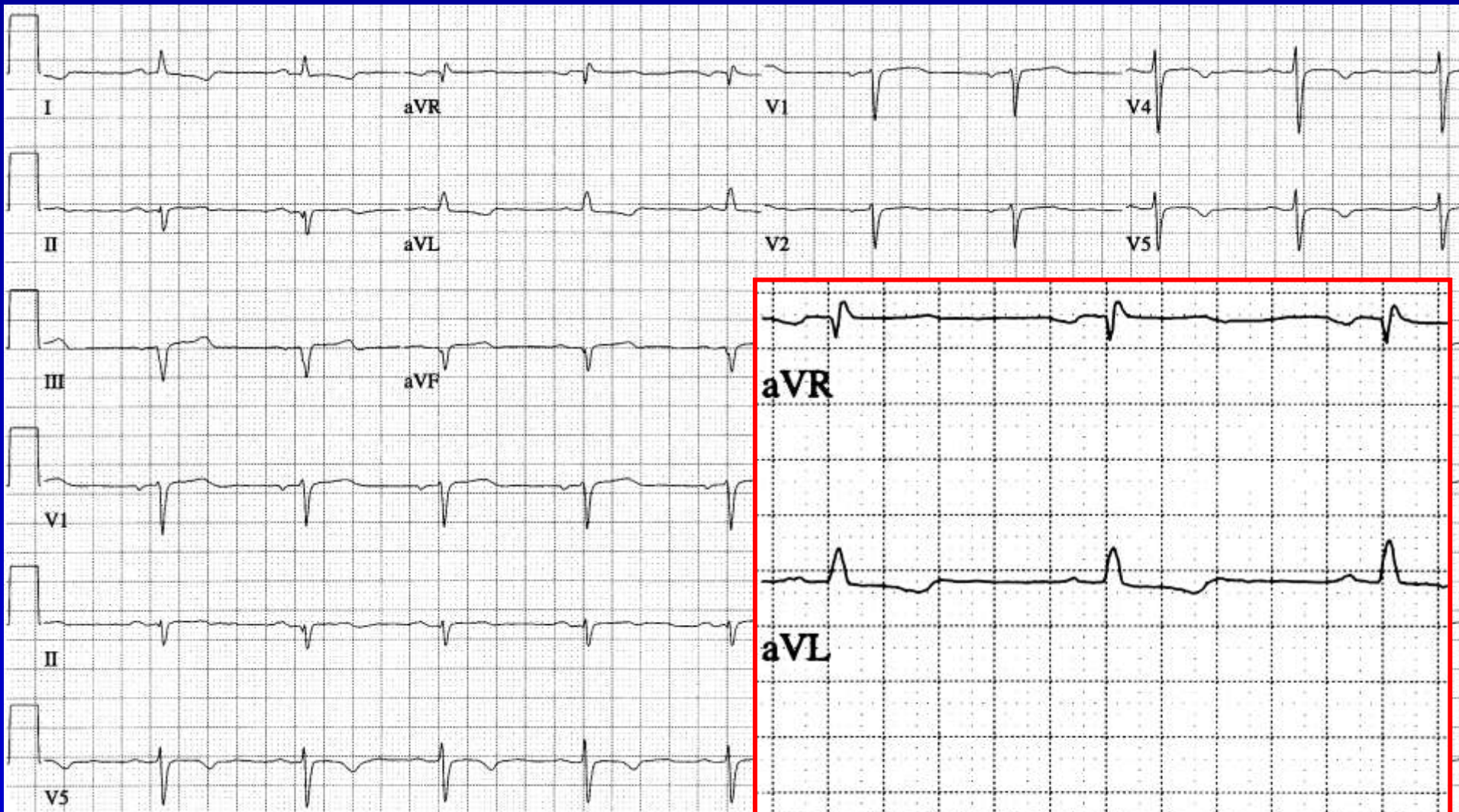


# Practice Strip 5





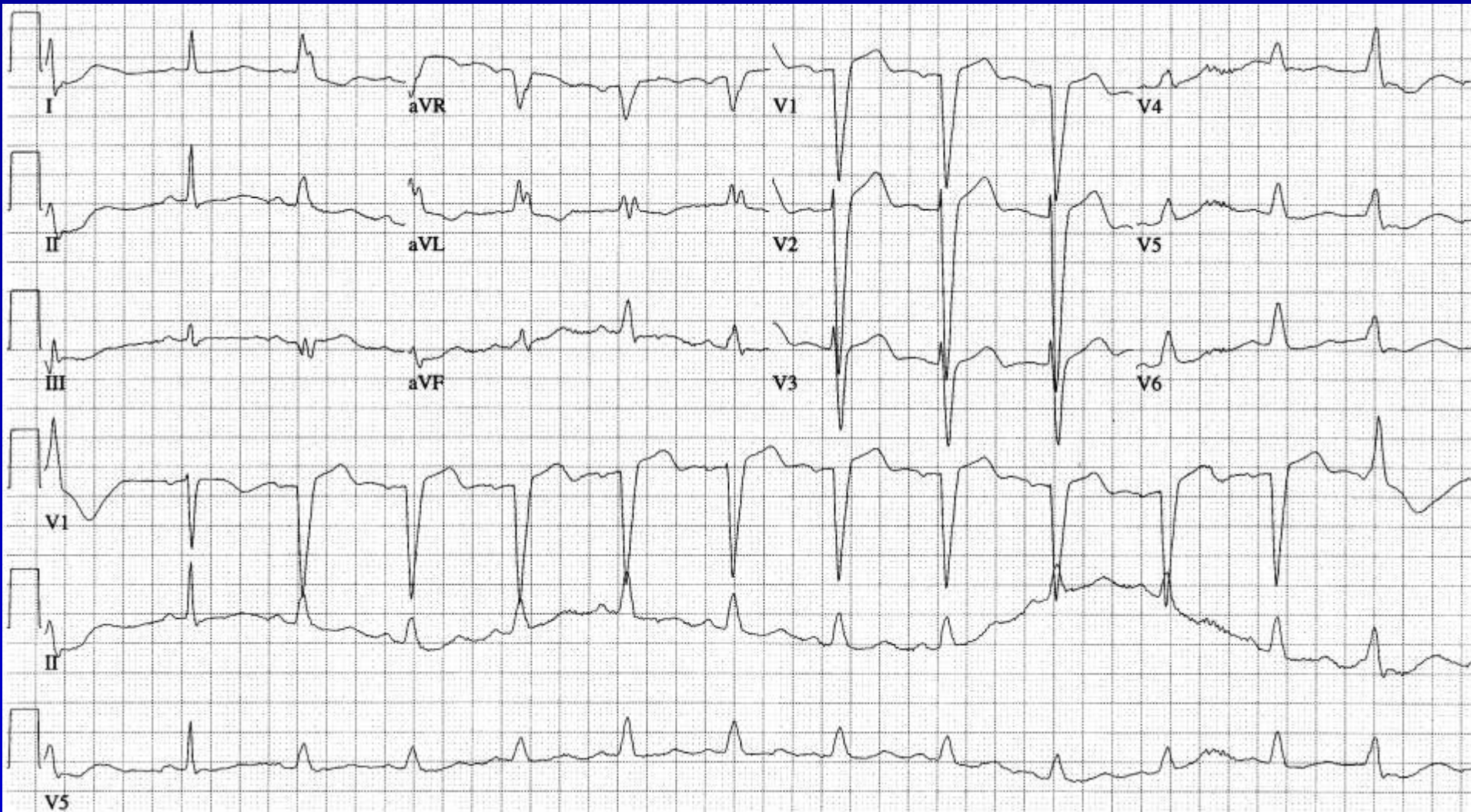
# Practice Strip 5



IMI and AFB: peak in aVL before aVR

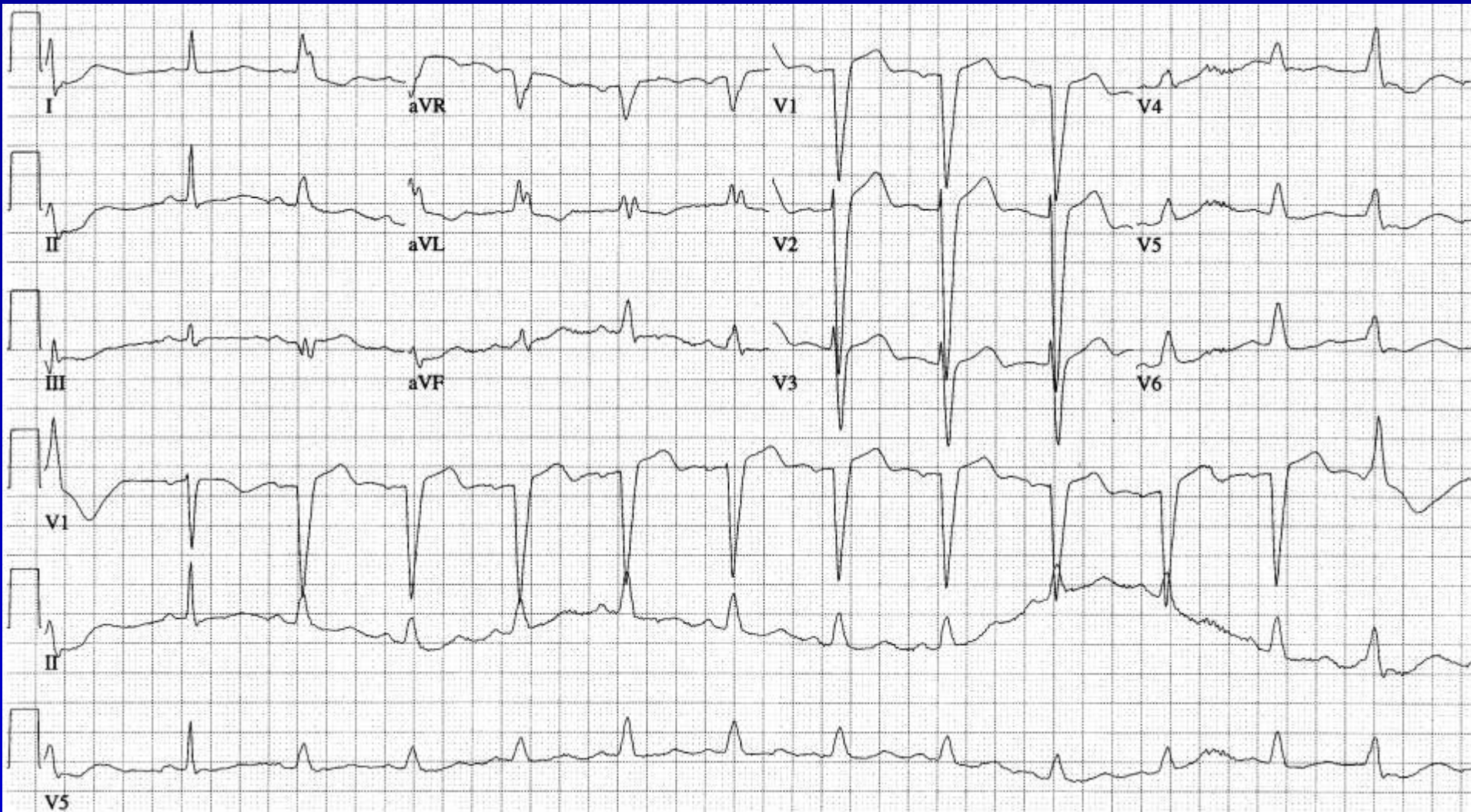


# Practice Strip 6





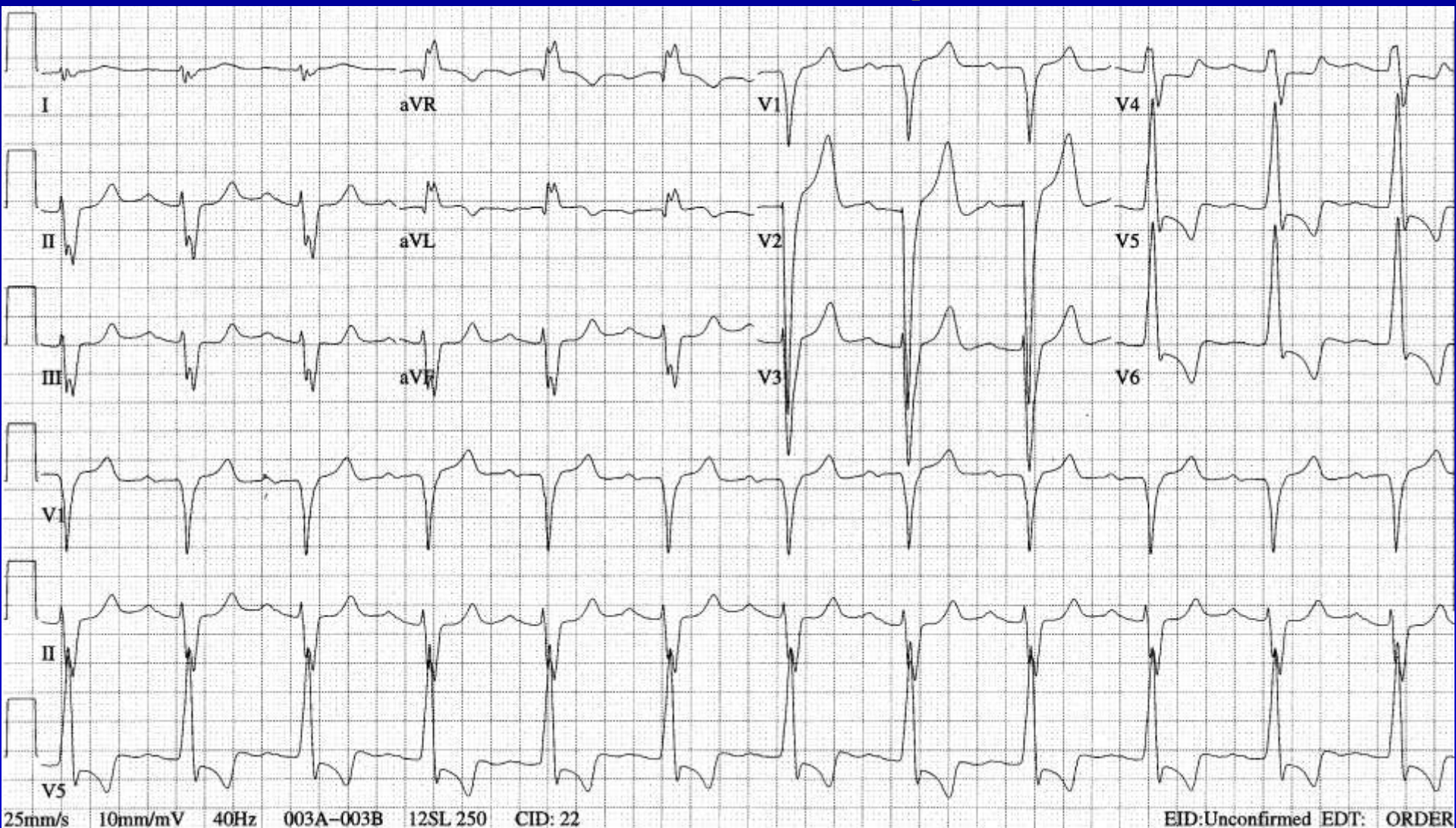
# Practice Strip 6



LBBB, rate-related, notice second beat, after the PVC, and notice the last beat, another similar PVC



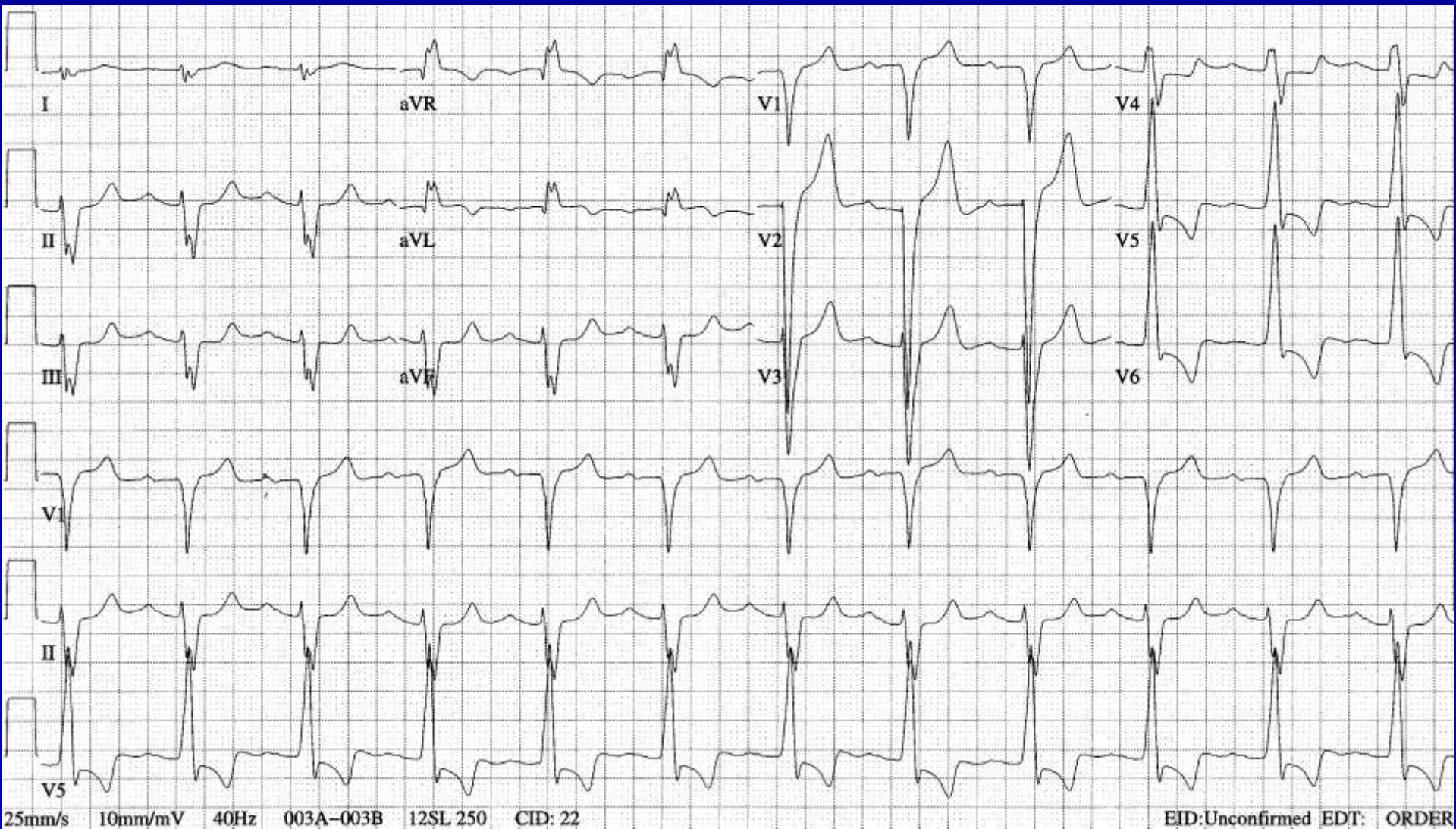
# Practice Strip 7



IVCD axis rightward, wide QRS. First degree AV block, northwest axis



# Practice Strip 7



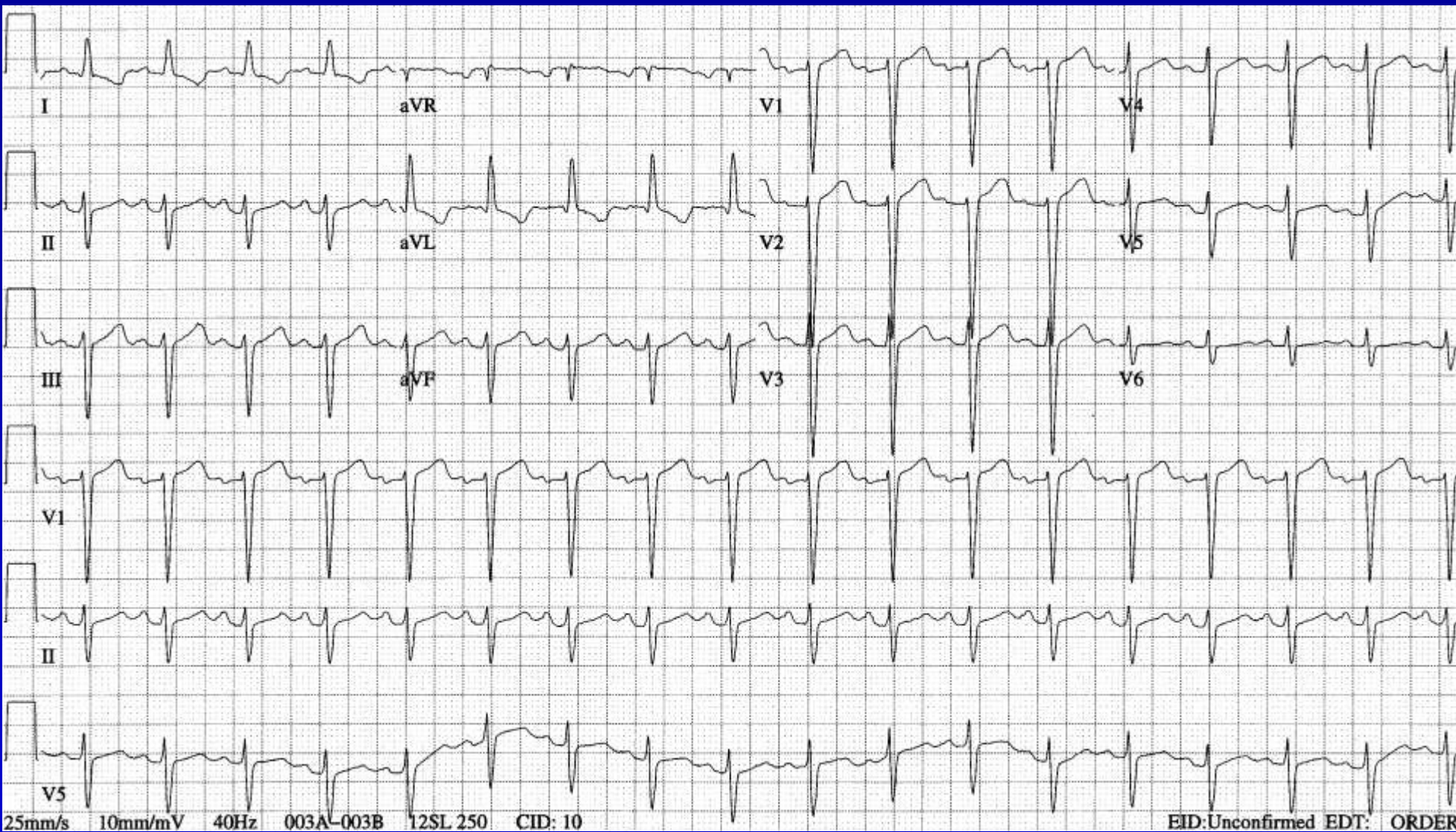
25mm/s 10mm/mV 40Hz 003A-003B 12SL 250 CID: 22

EID:Unconfirmed EDT: ORDER

IVCD axis rightward, wide QRS. First degree AV block, northwest axis, wonder about lateral periinfarction block

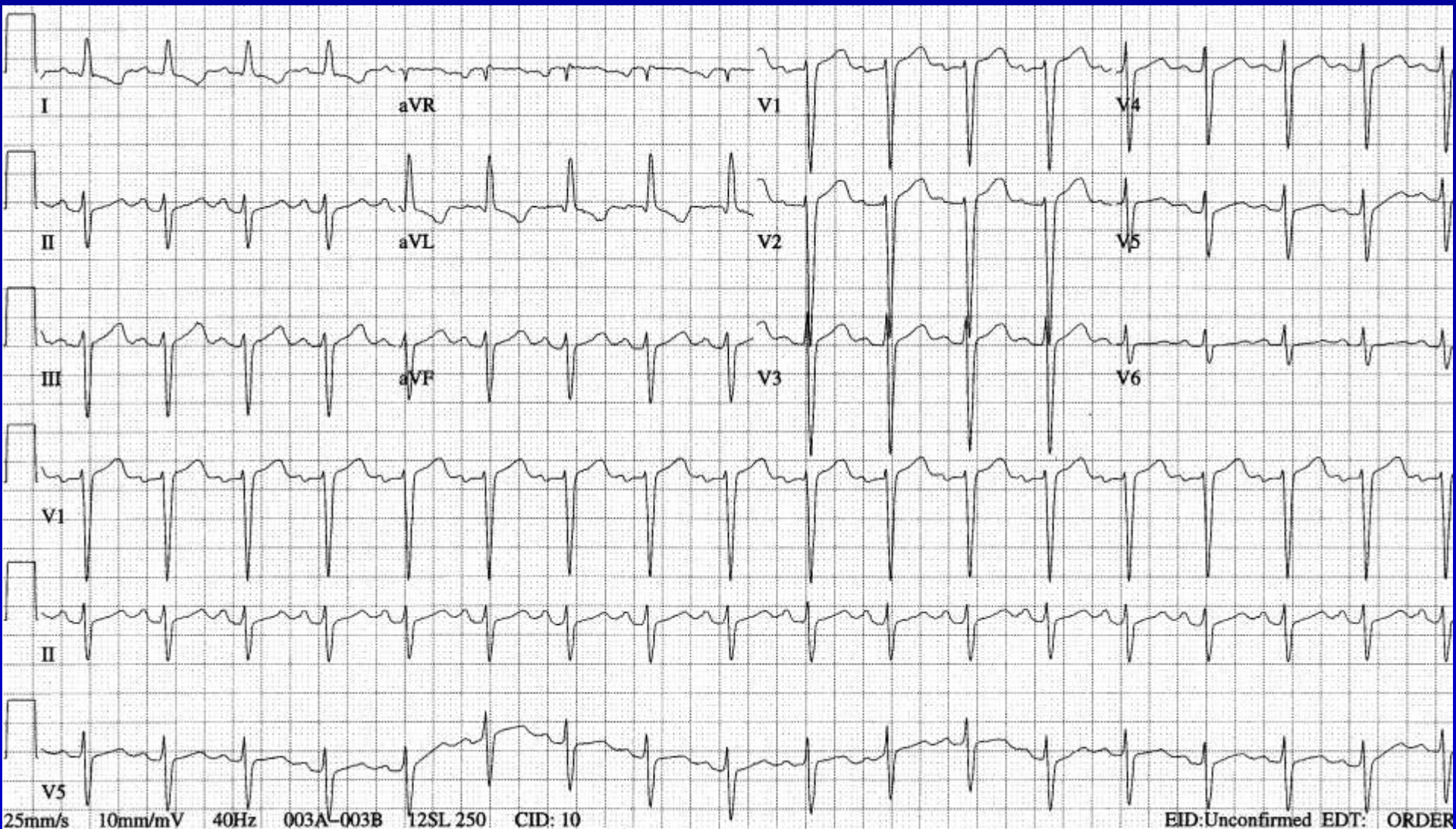


# Practice Strip 8





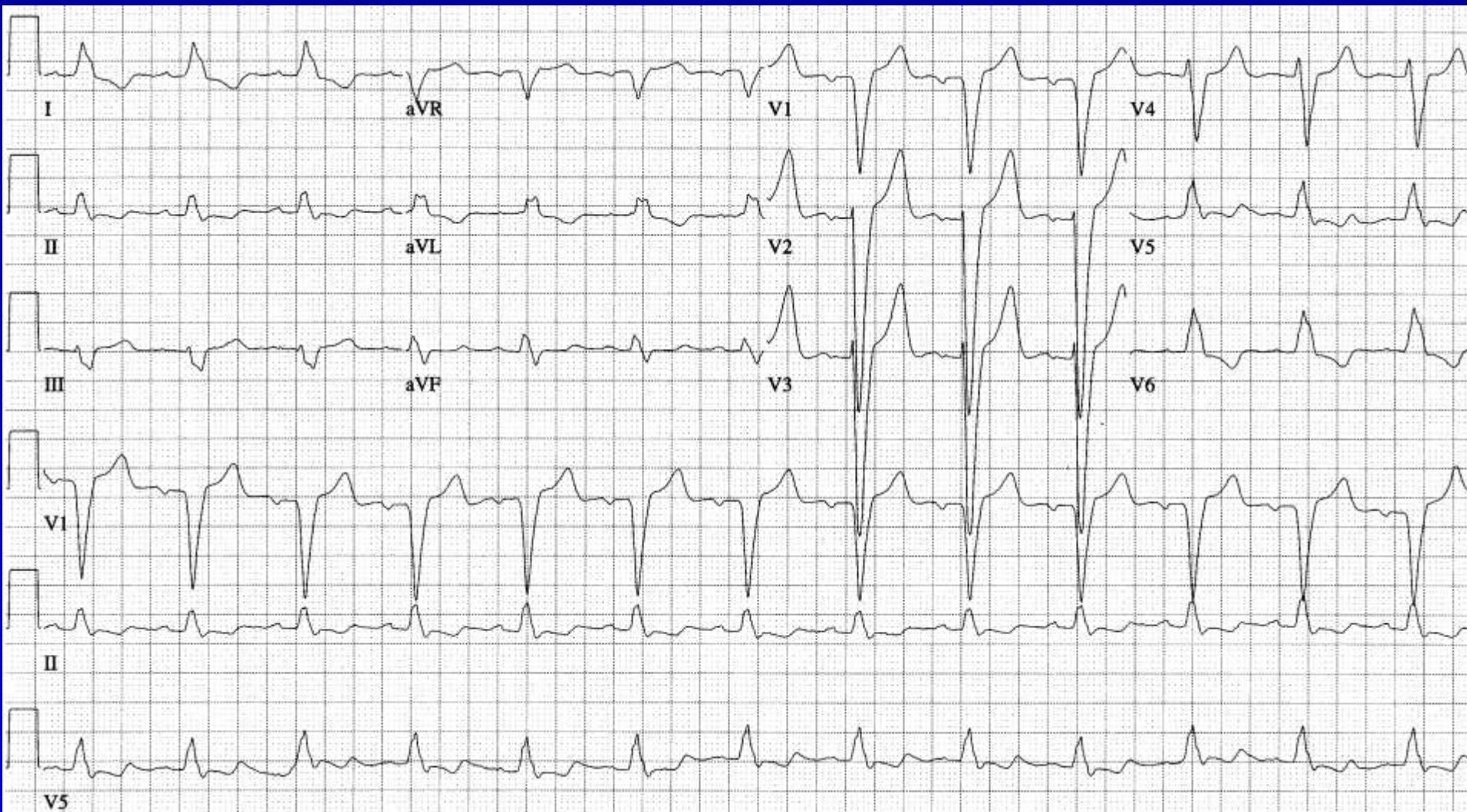
# Practice Strip 8



Left anterior fascicular block, often with T discordance and poor precordial R progression, often false positive for LVH

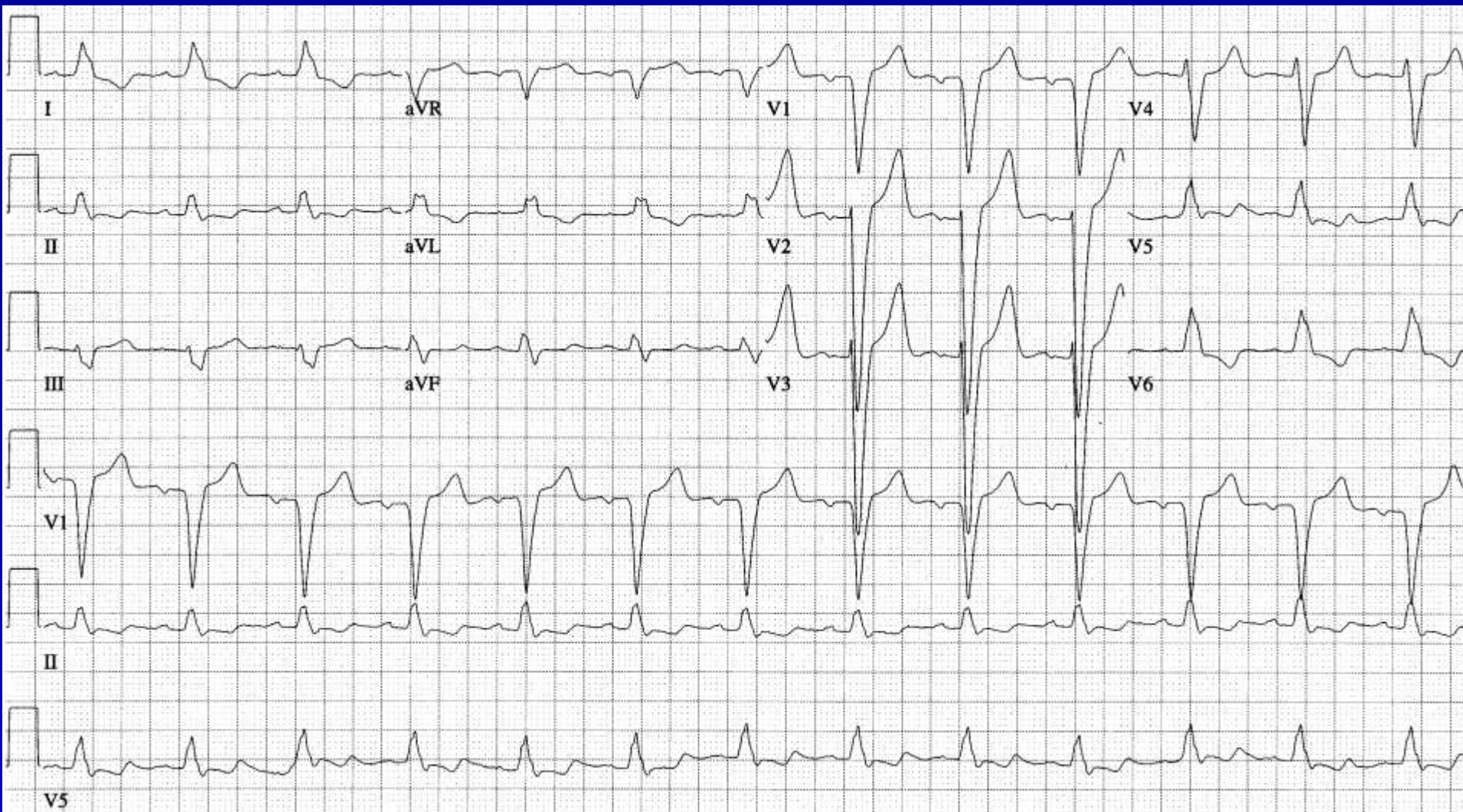


# Practice Strip 9





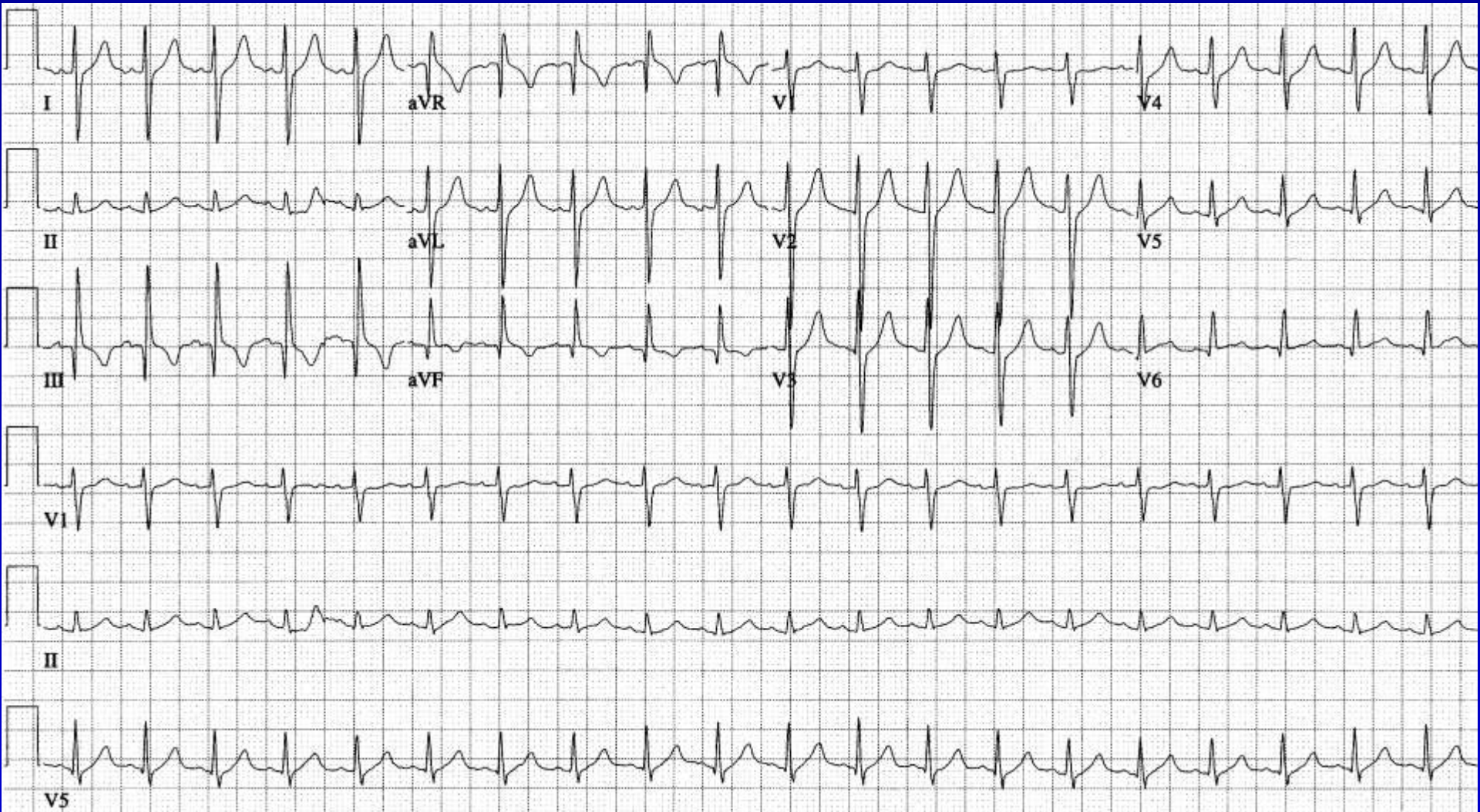
# Practice Strip 9



LBBB can't read MI, LVH, ischemia. LBBB and MI give false positive and false negative.

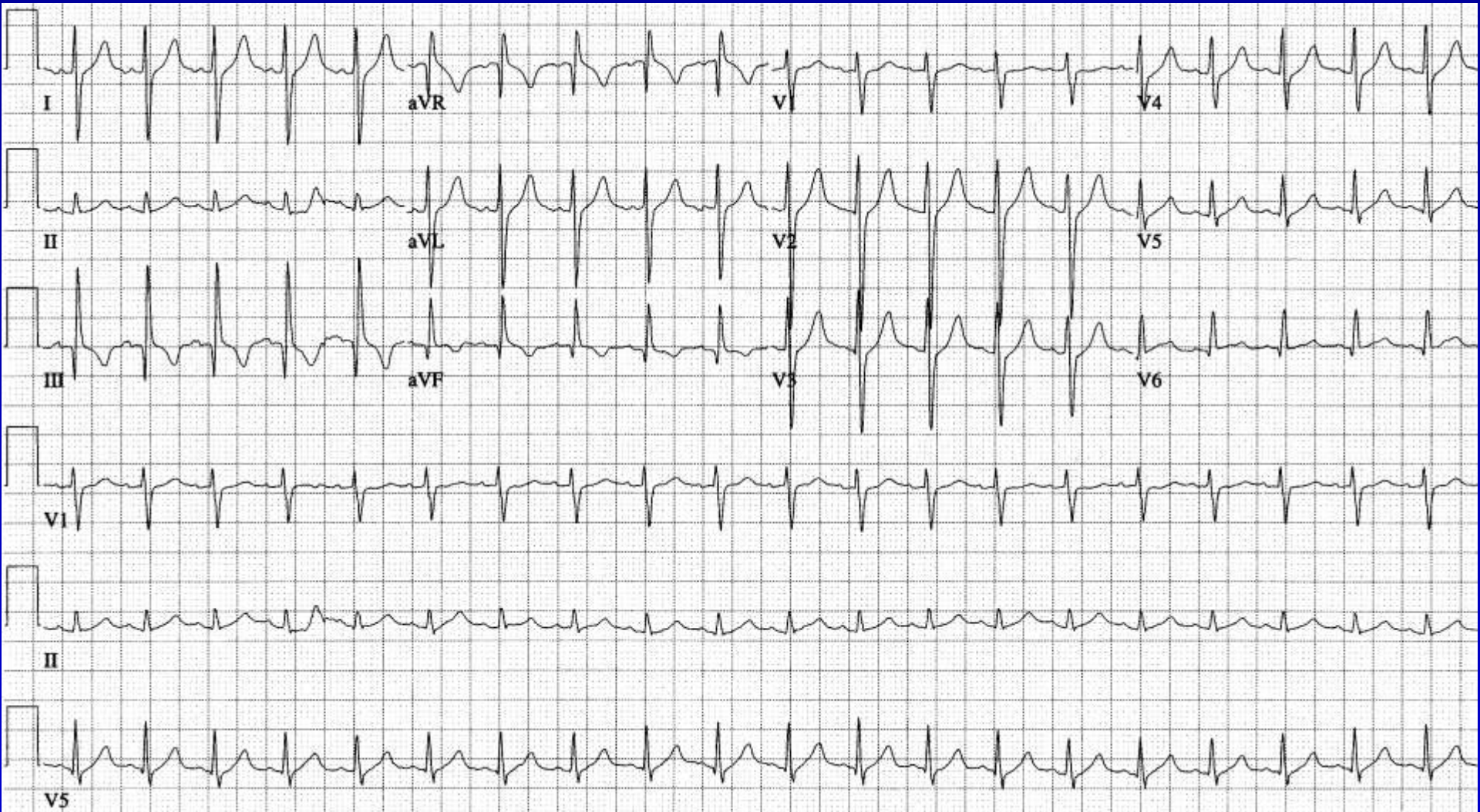


# Practice Strip 10





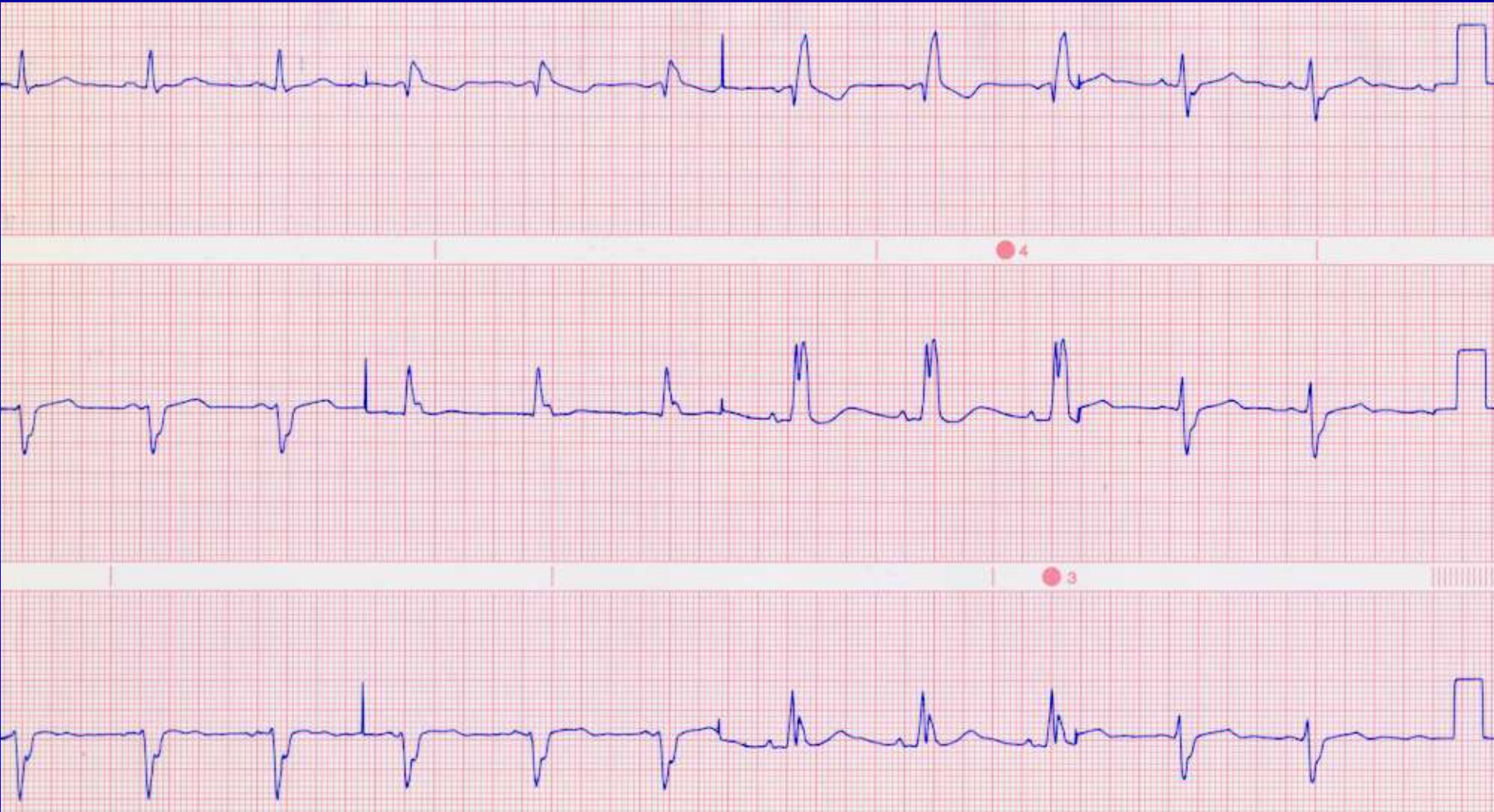
# Practice Strip 10



LBBB, with RS in I and qR in inferior leads

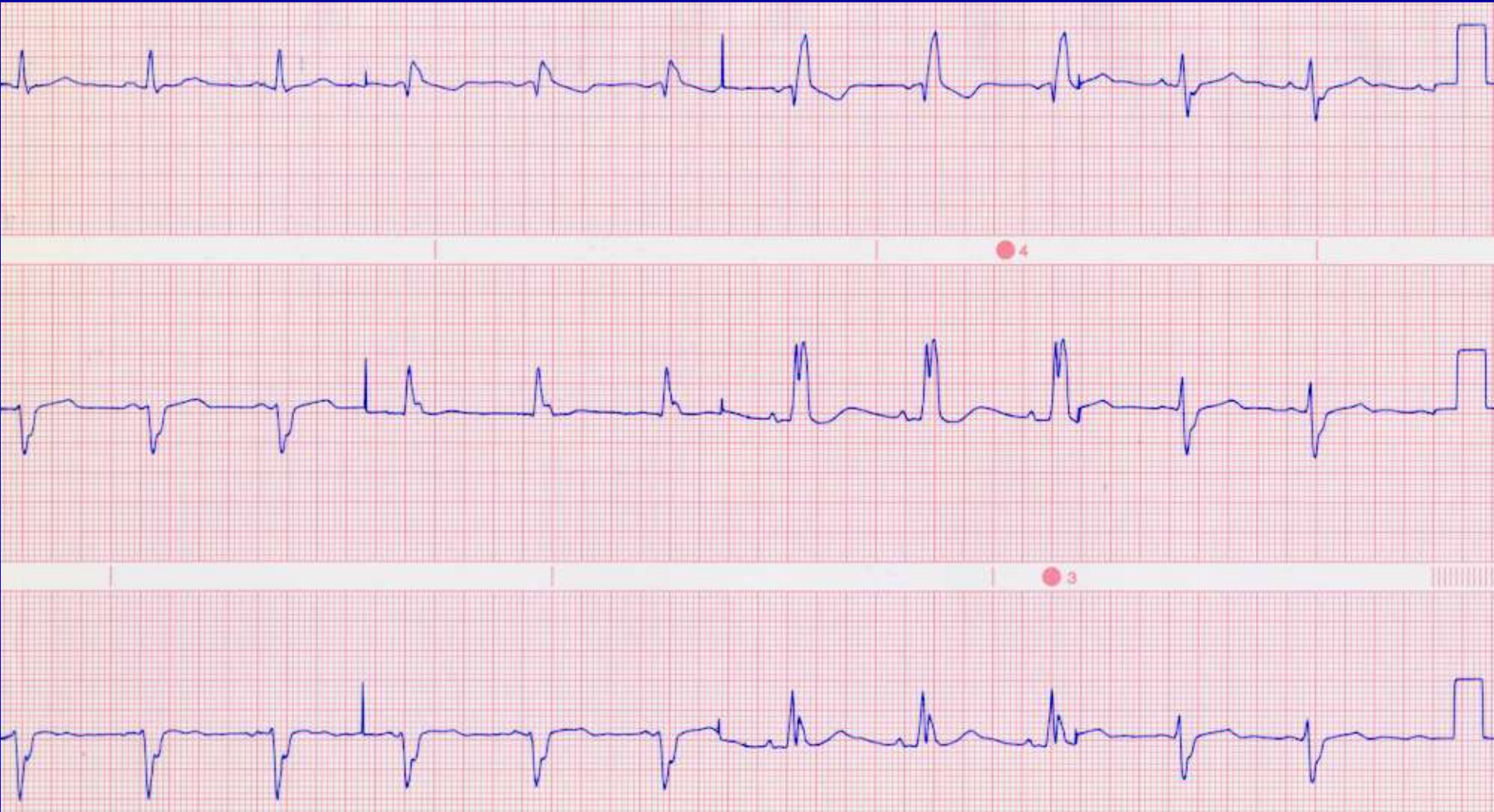


# Practice Strip 11





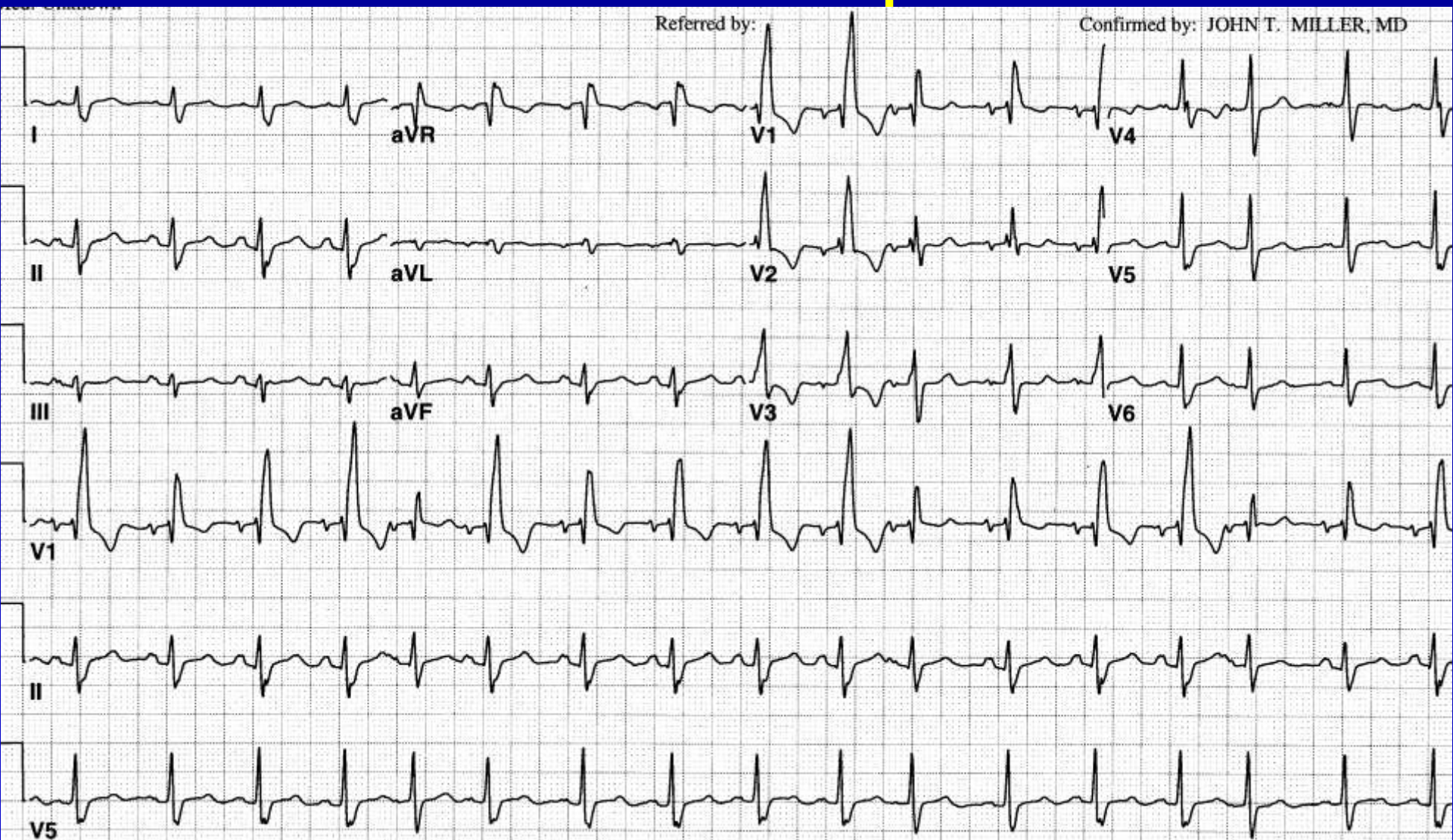
# Practice Strip 11



RBBB and LAFB

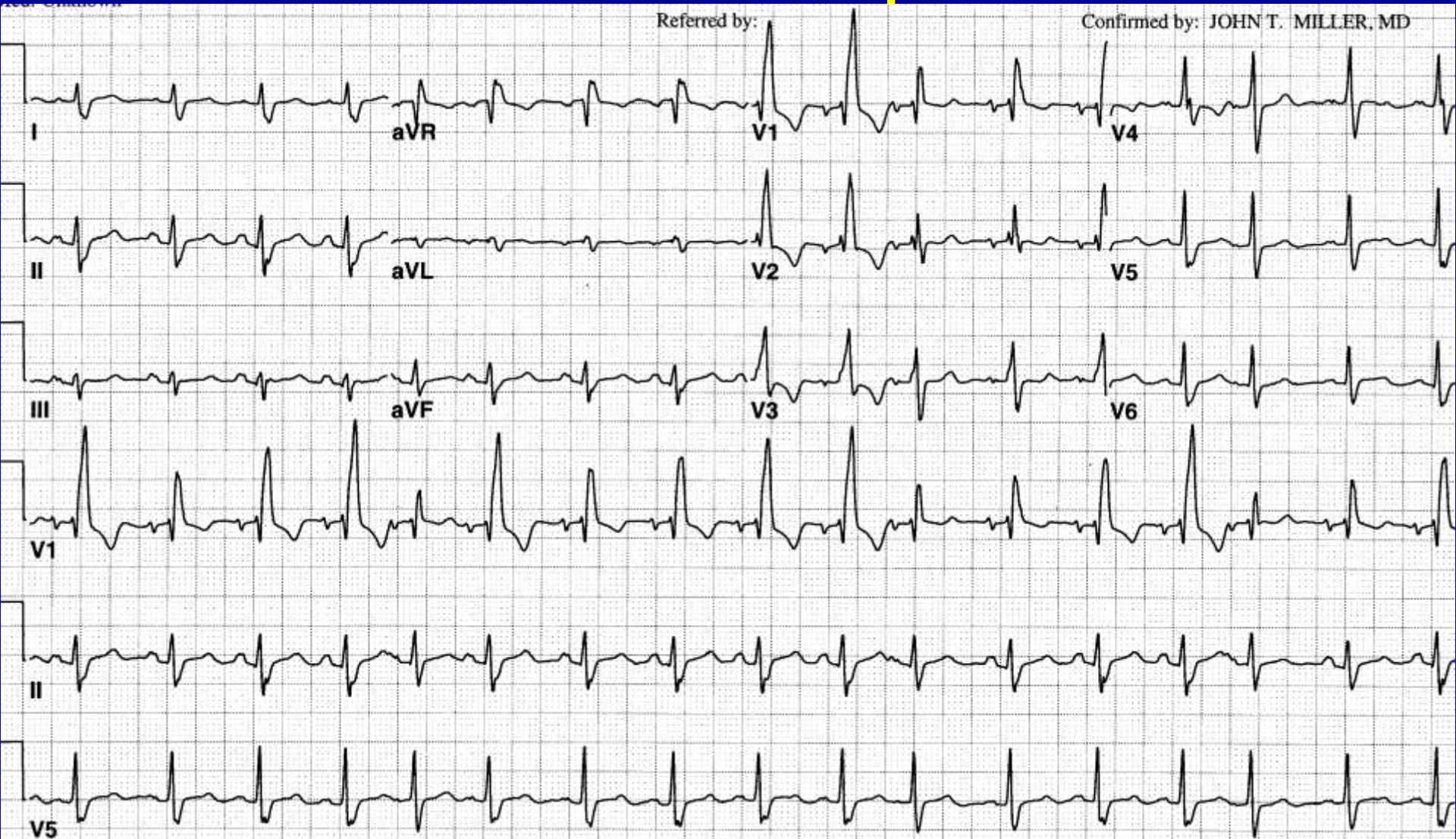


# Practice Strip 12



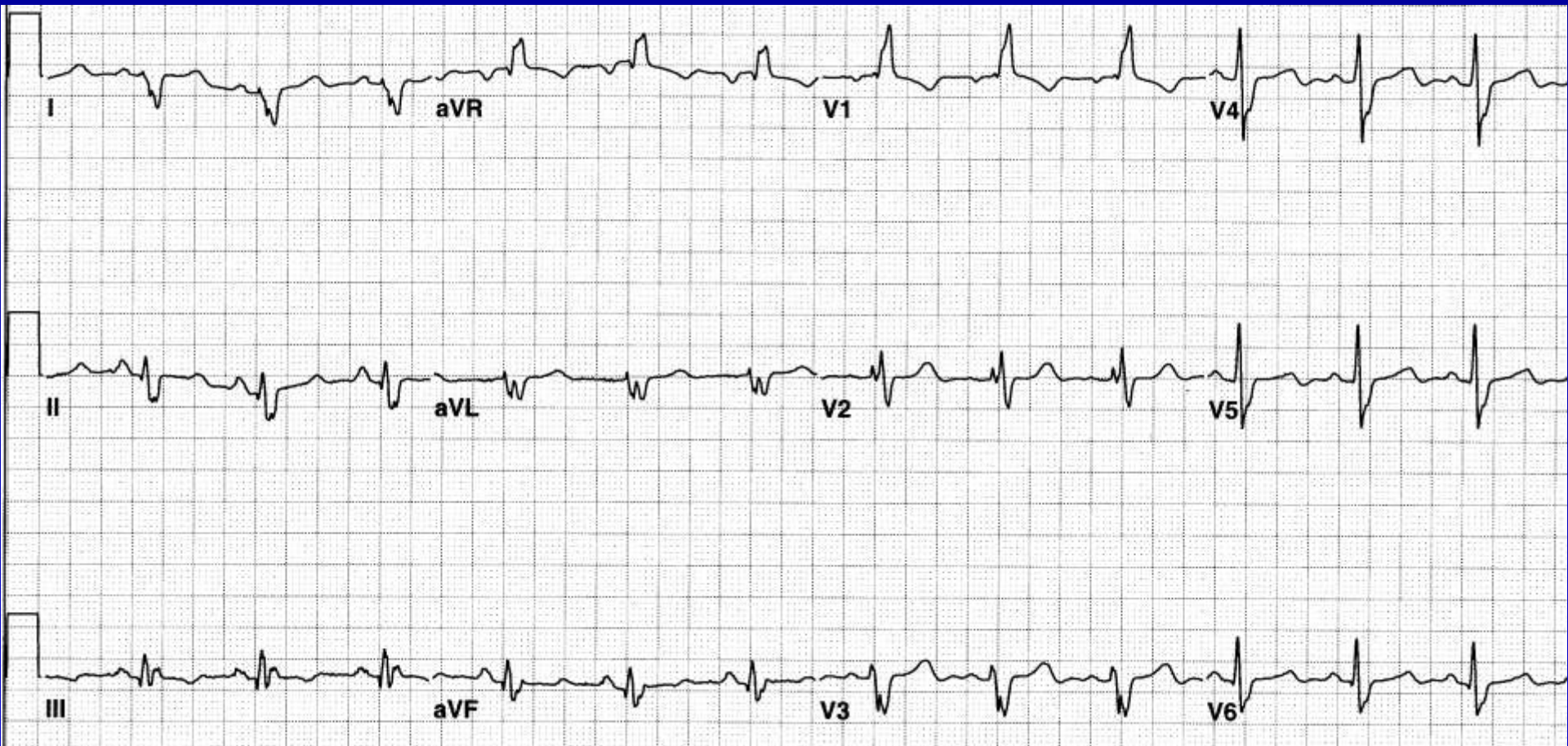


# Practice Strip 12



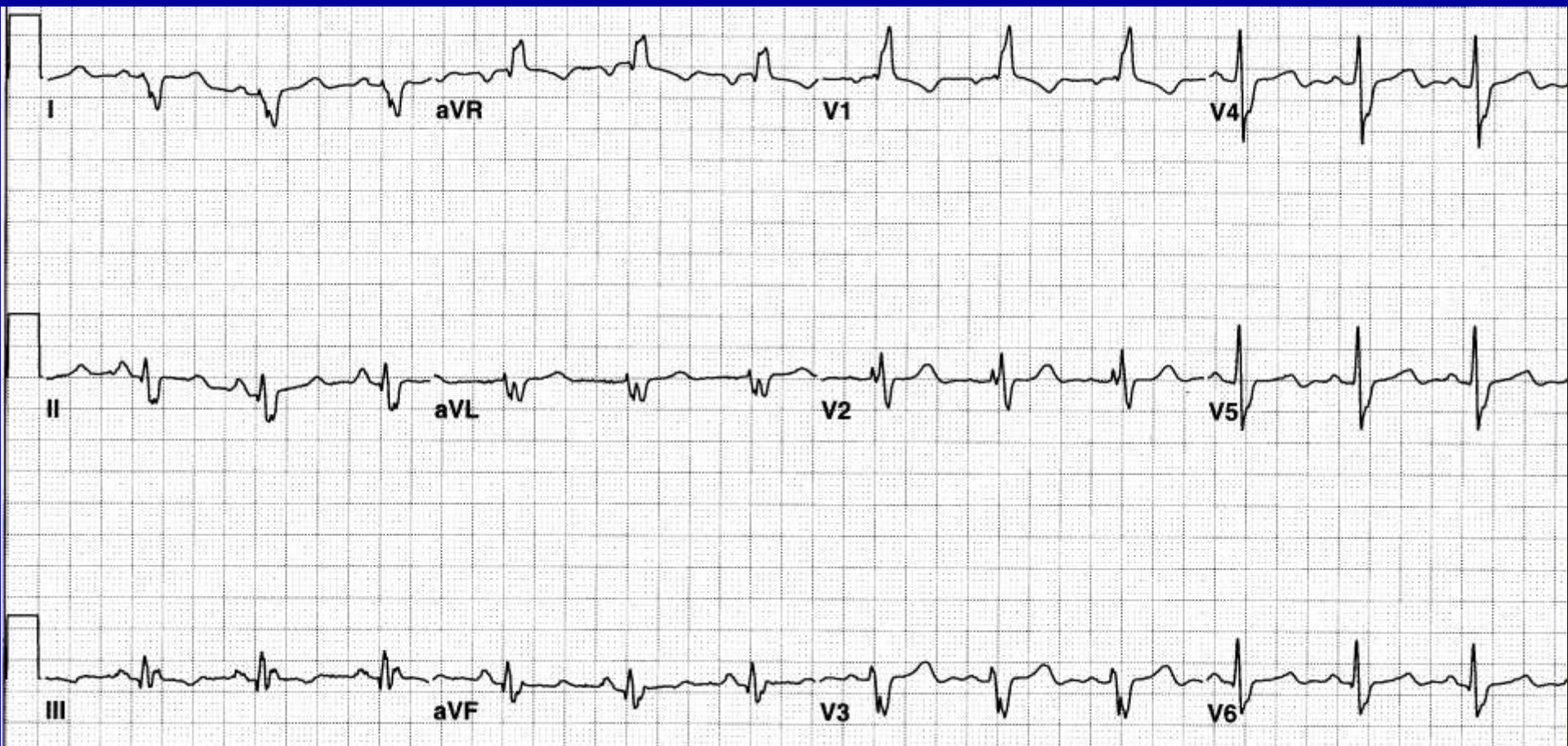
RBBB with variable degree of block, better after PAC

# Practice Strip 13



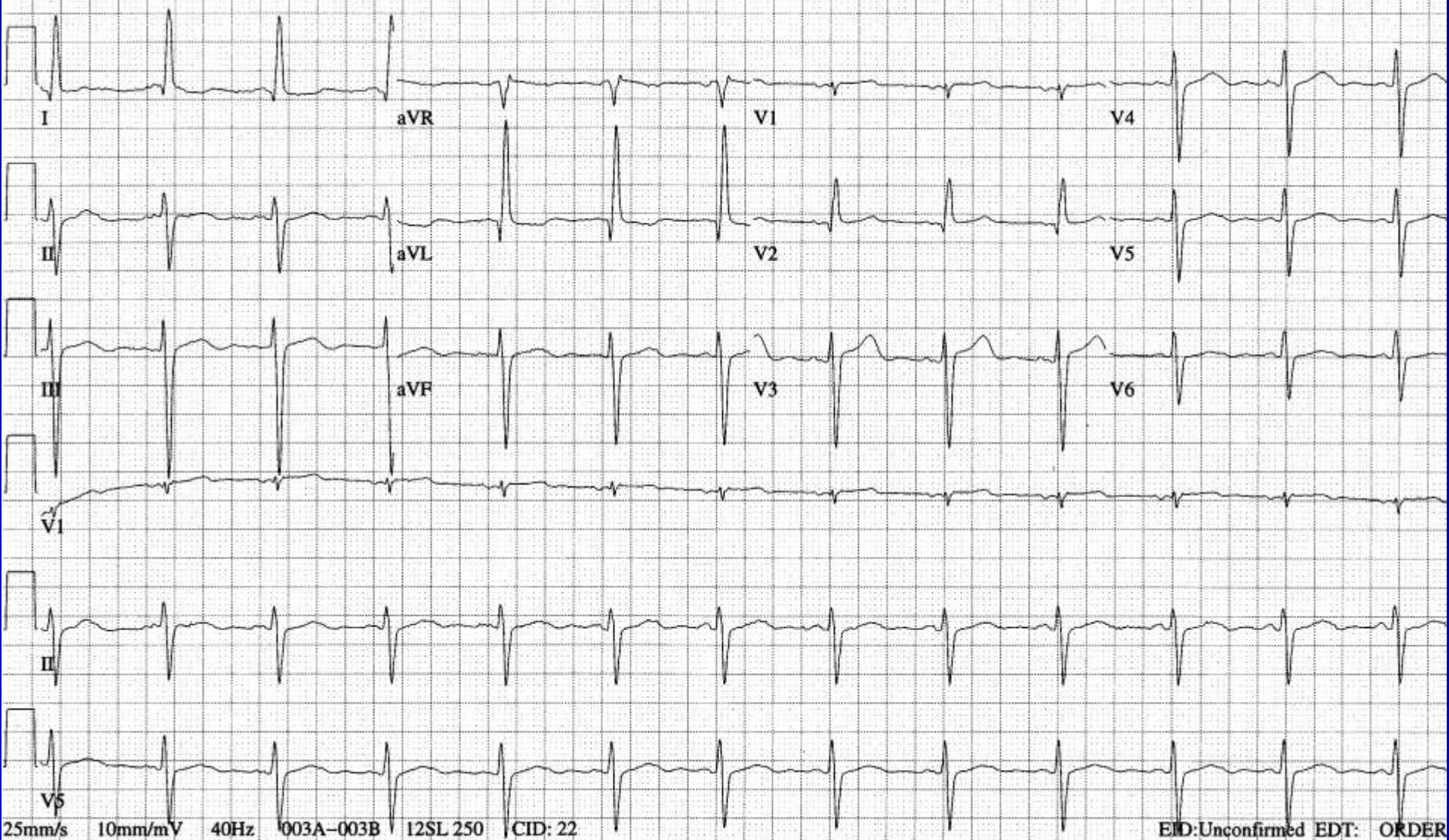


# Practice Strip 13



RBBB plus LPFB

# Practice Strip 15

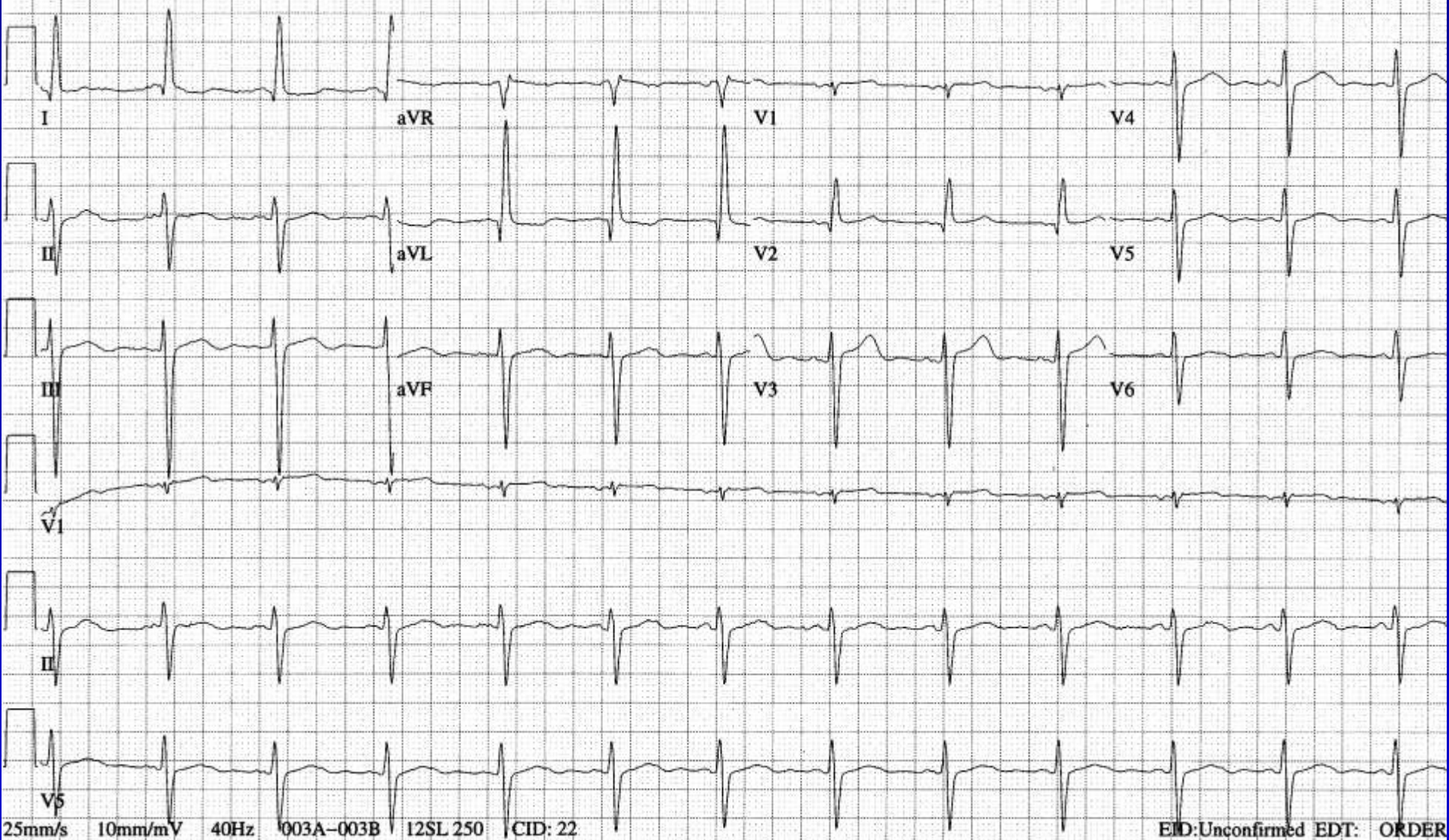


25mm/s 10mm/mV 40Hz 003A-003B 12SL 250 CID: 22

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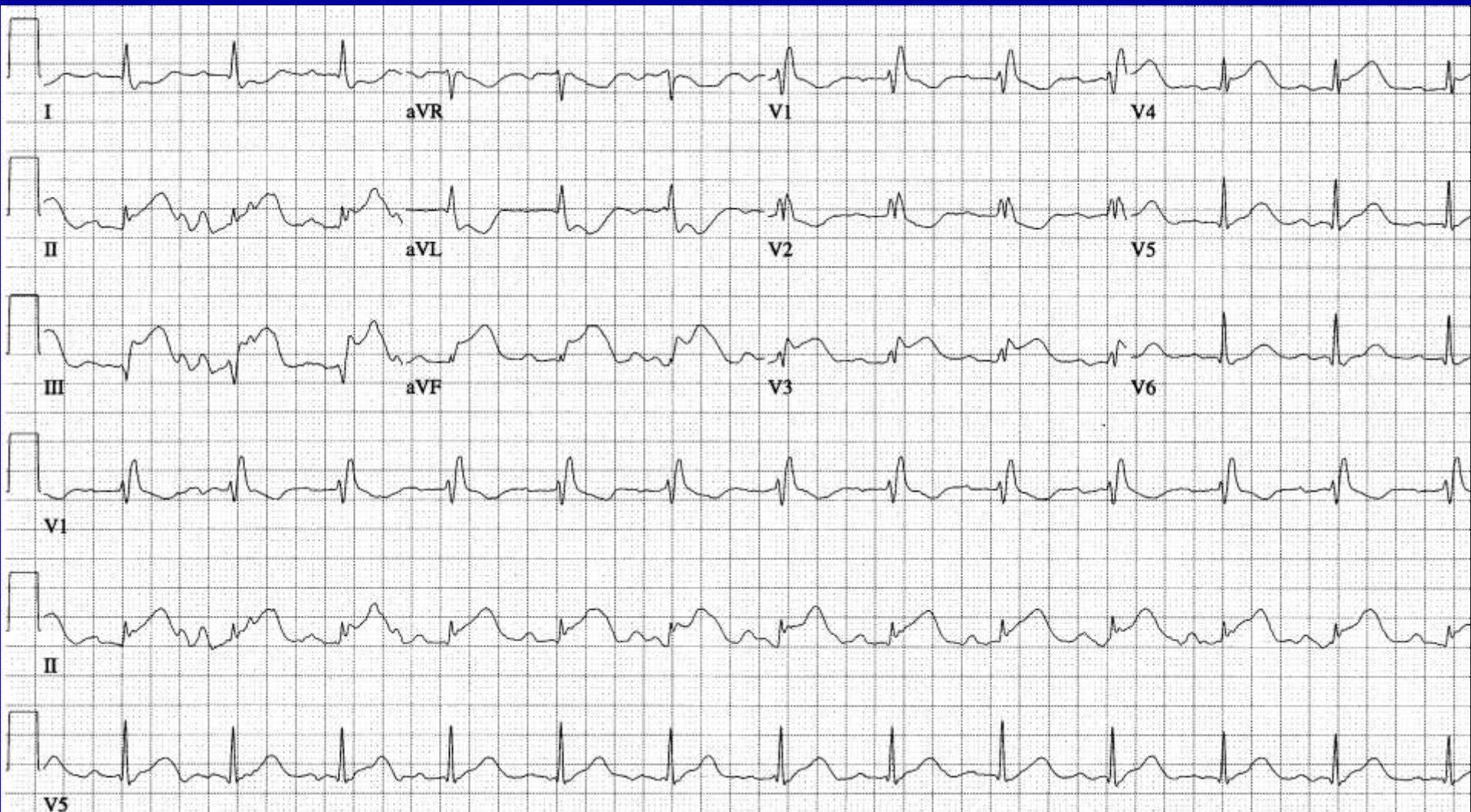
# Practice Strip 15



LAFB, confuse with LVH, may coexist; V2 probably too high, poor R progression with persistent S in V5 and V6 is common in AFB

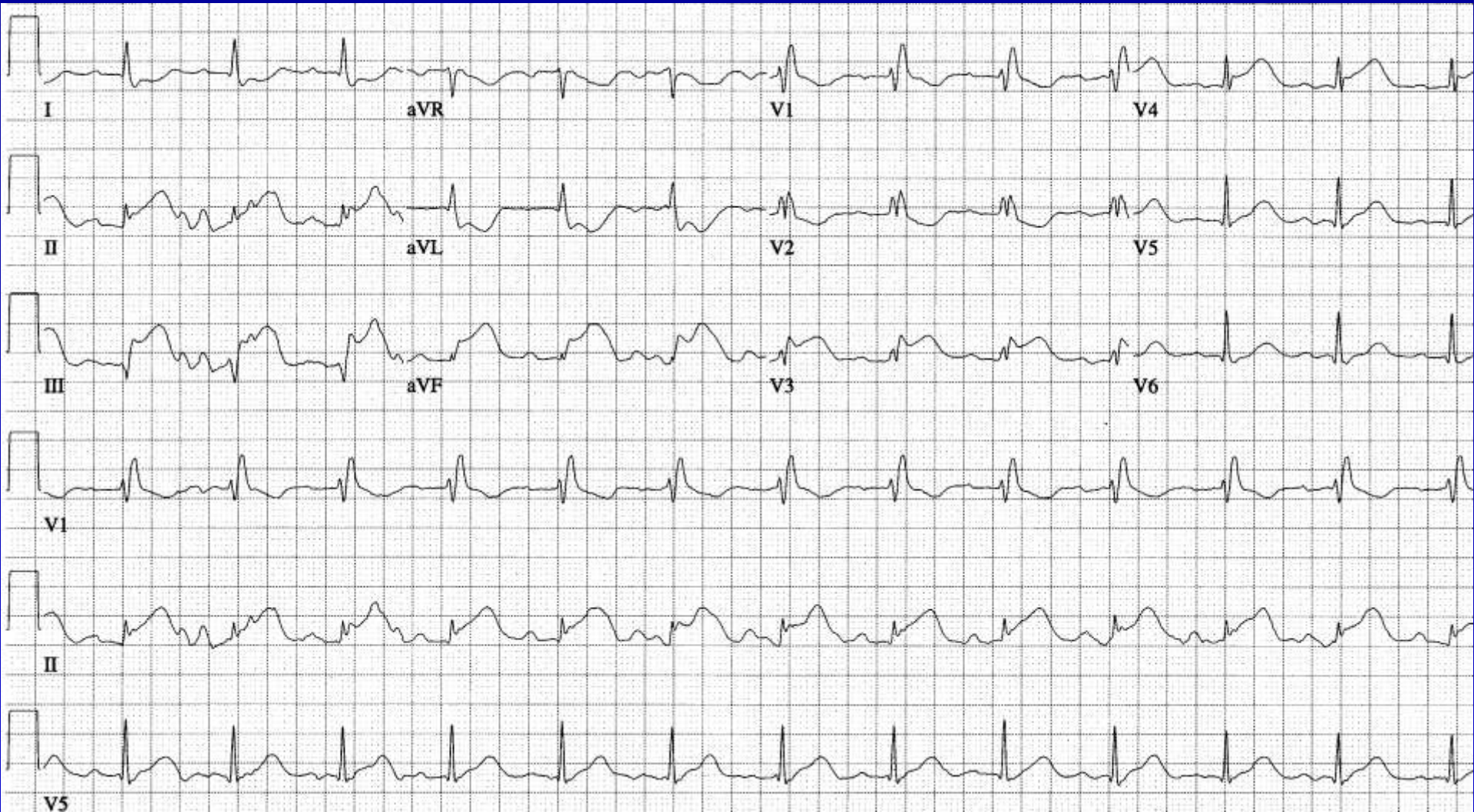


# Practice Strip 16





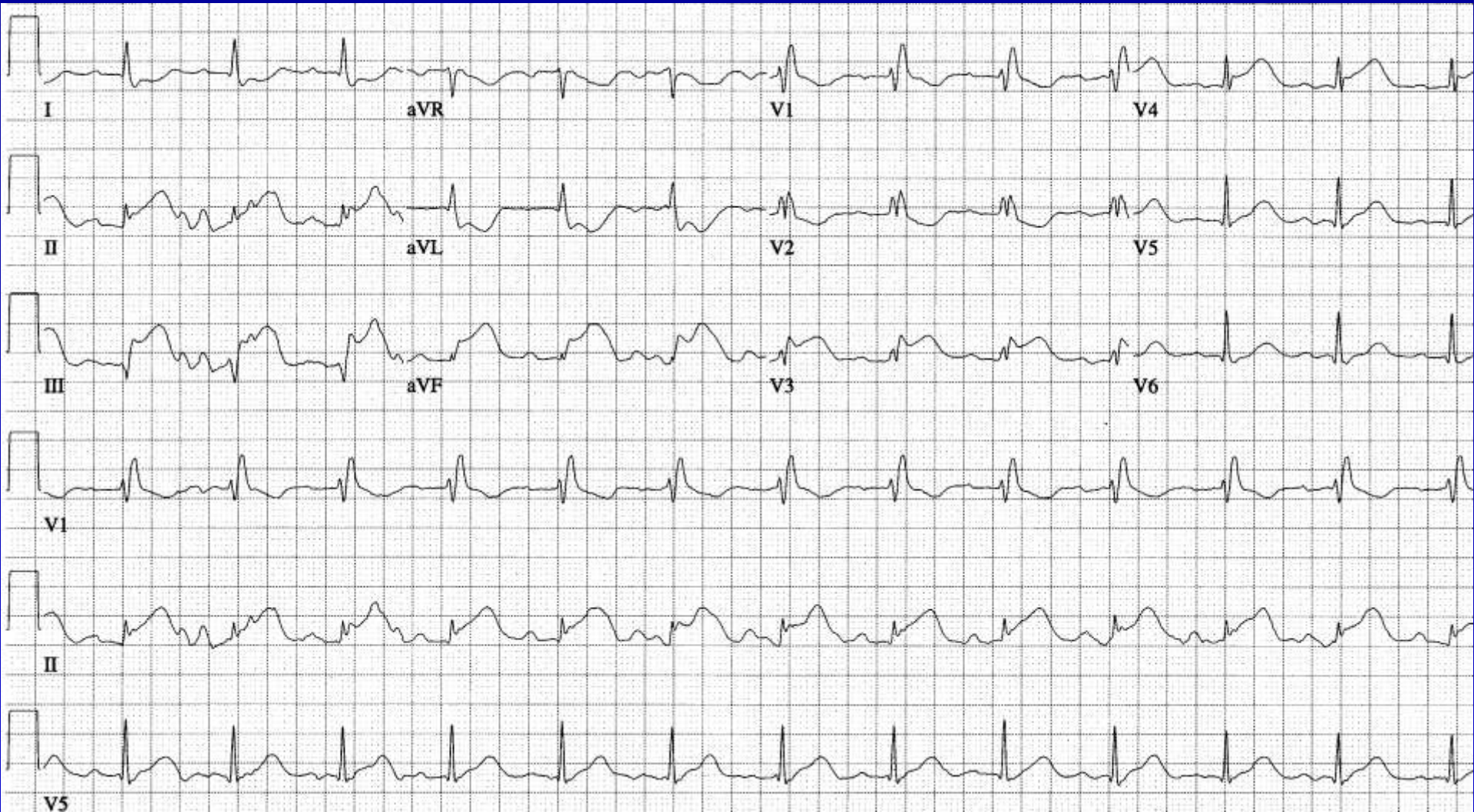
# Practice Strip 16



RBBB and acute MI – What vessel?



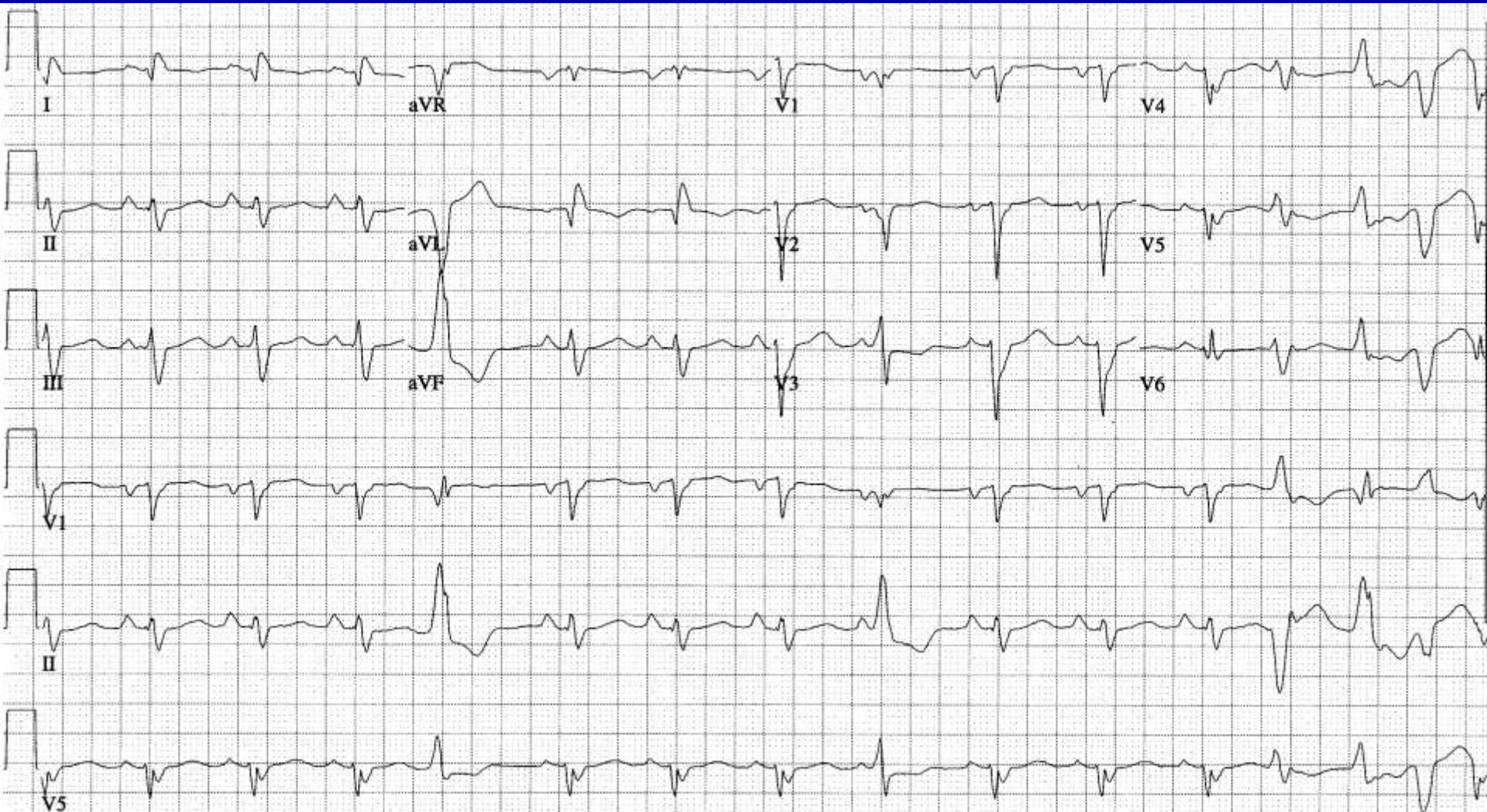
# Practice Strip 16



RBBB and acute MI – What vessel? Dominant left circumflex or distal wraparound LAD

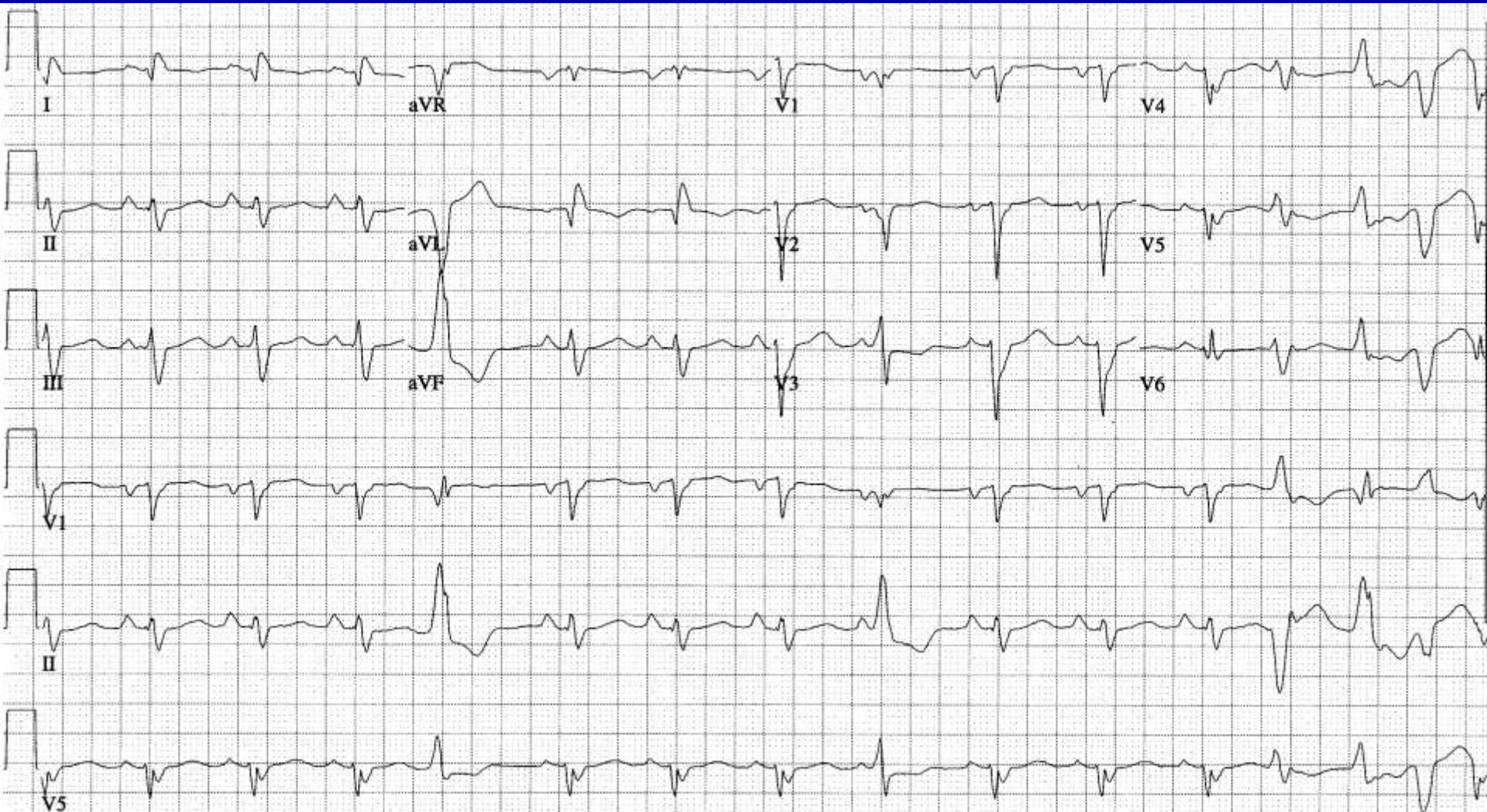


# Unknown 3





# Unknown 3



45 yo woman wt 250, sinus rhythm rate 90, LAE, QRS 0.15 sec, ?lateral wall MI, PVC's with triplet or quadruplet