ECG Reading Skill Updates — Intermediate

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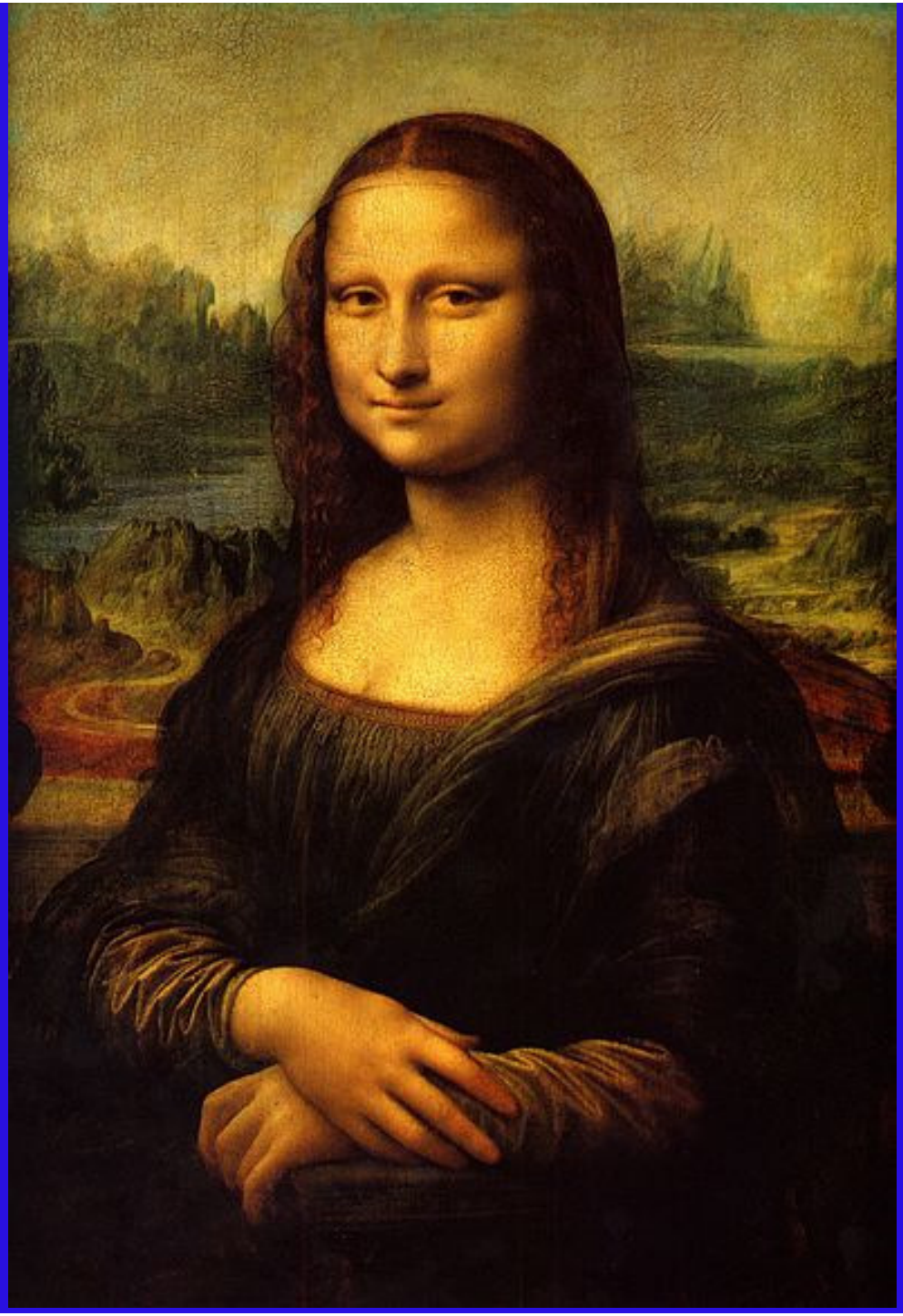


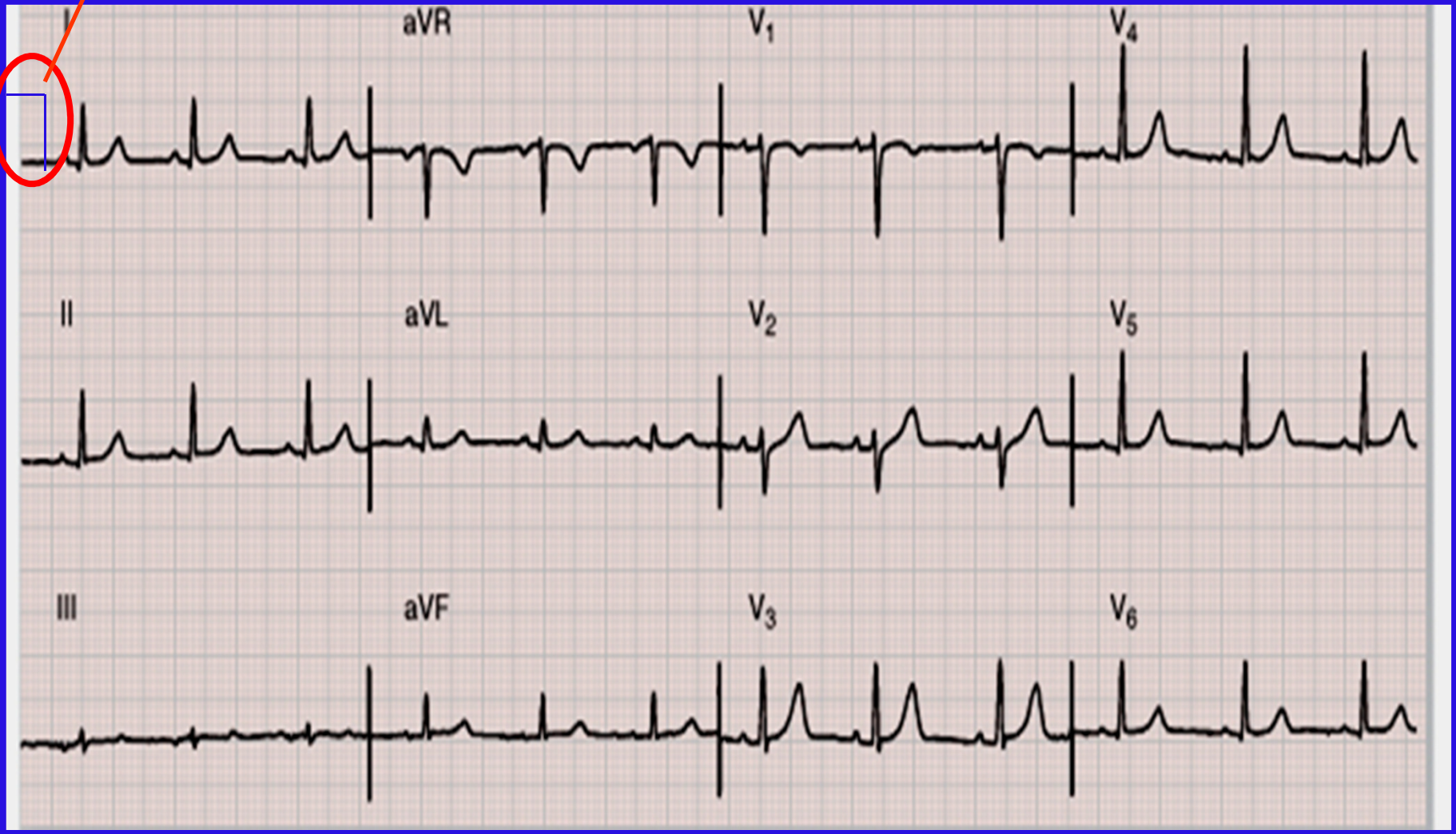
Reading ECGs

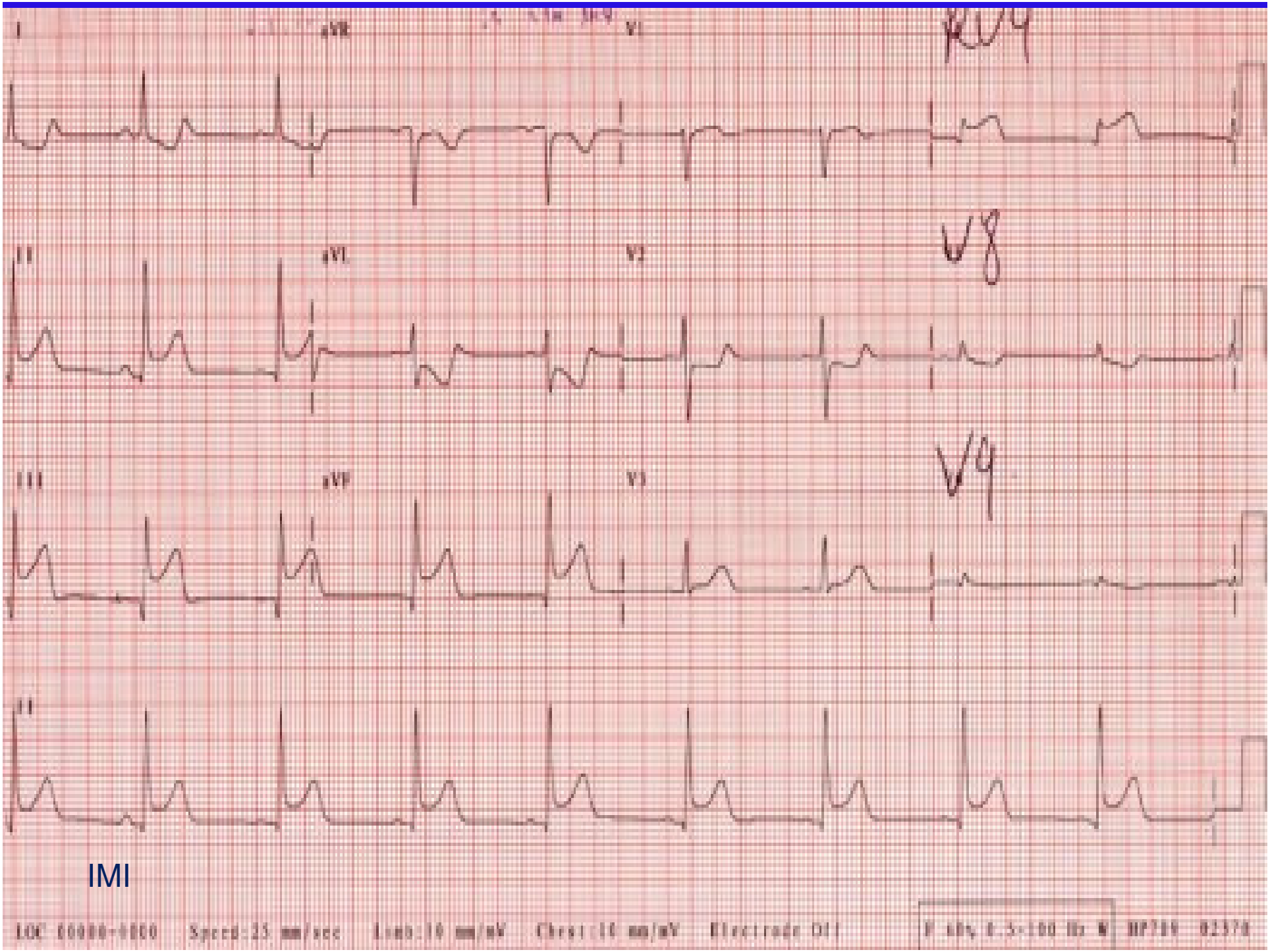
- Reading ECGs is like examining a fine art work, there are two phases to viewing:
    1. The overall gestalt of the tracing
    2. The more careful, detailed analysis.
- Take your time to check systematically HR, intervals, presence of p waves.
- The computer is usually right about intervals but often wrong about rhythm.

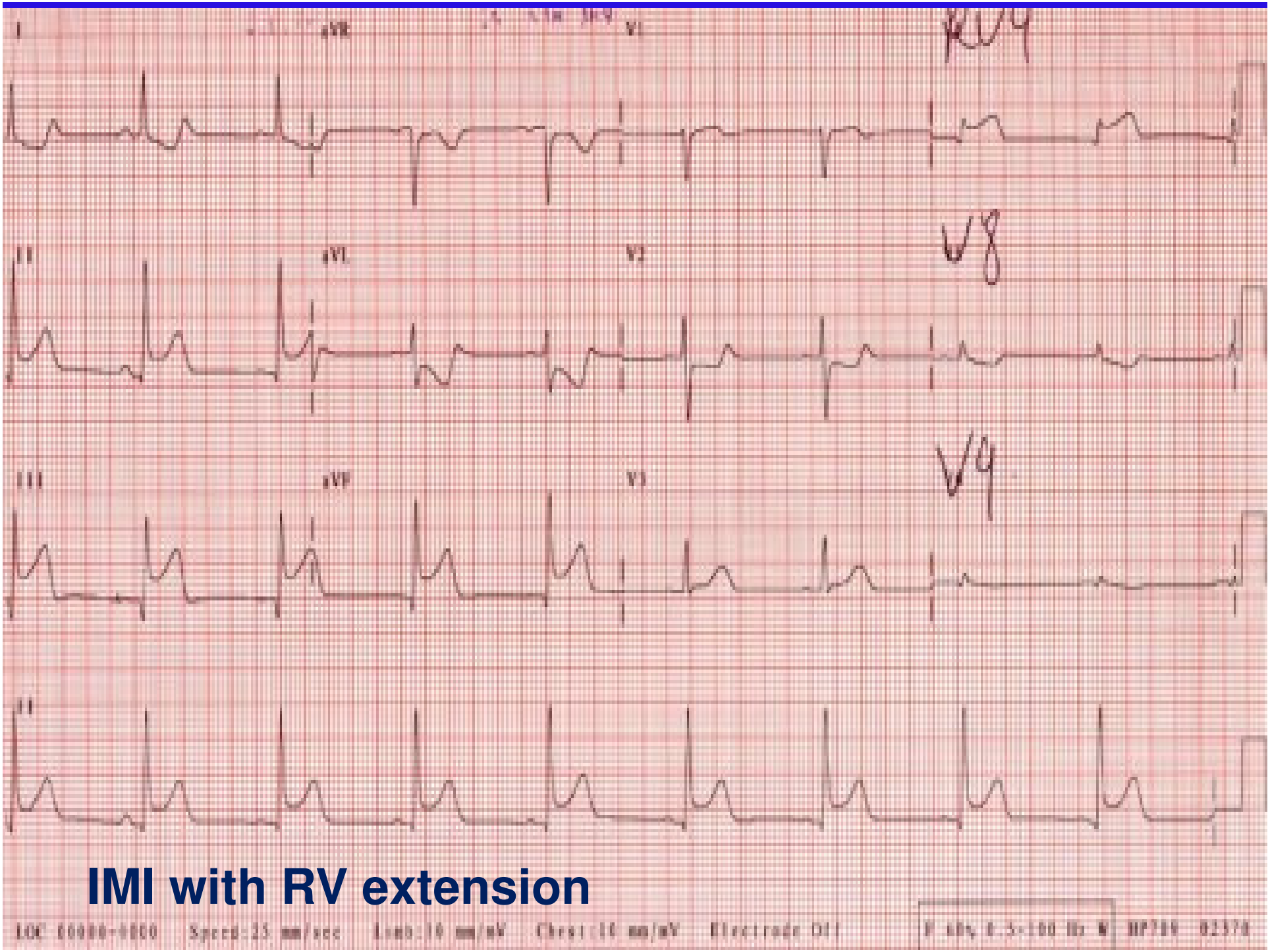
Step 1: Check Voltage Calibration

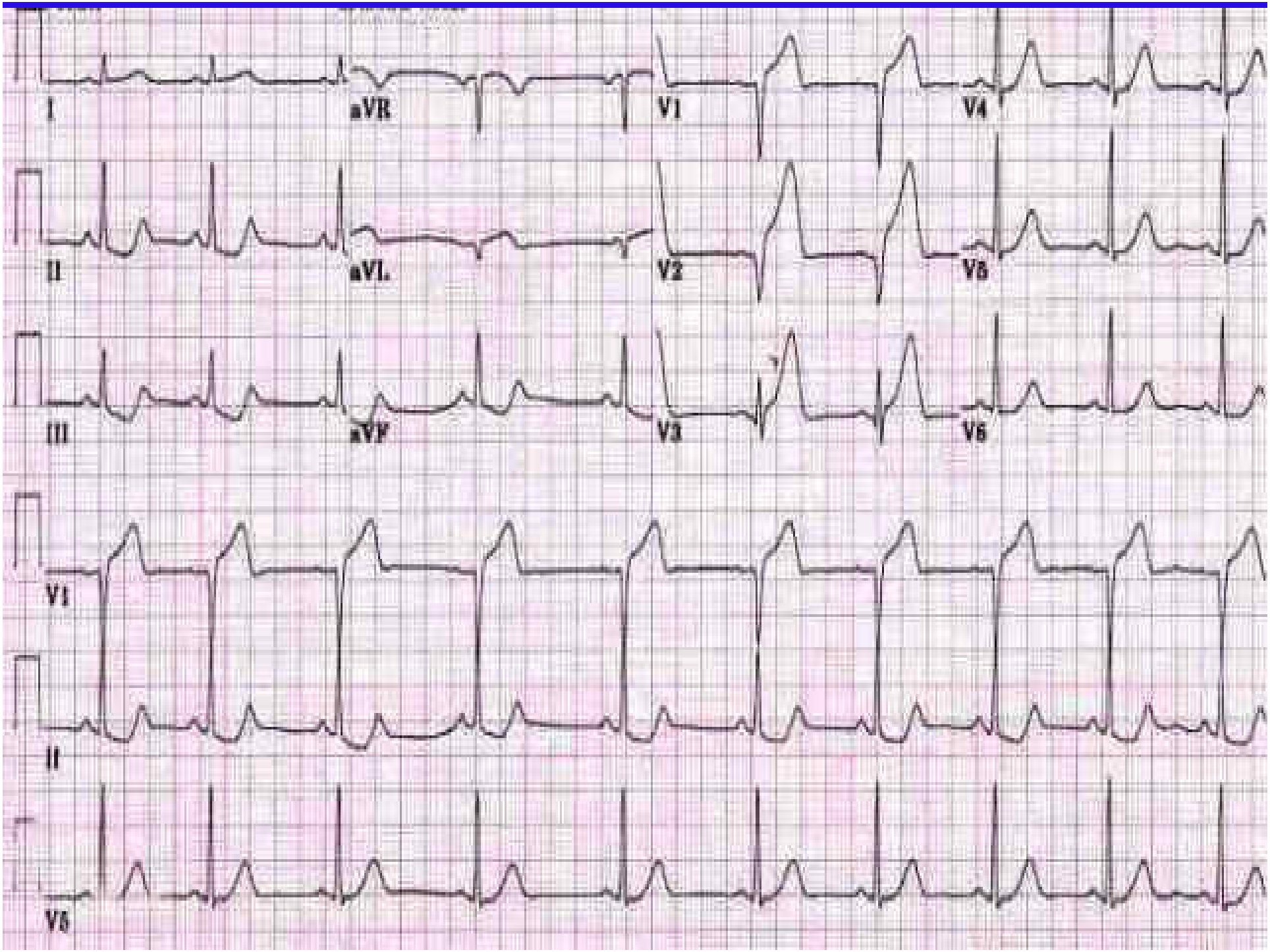
Standard 10mm = 1.0mV (or 1mm = 0.1mV)

1/2 Standard 5mm = 1.0mV (or 1mm = 0.2mV)




IMI


RV4
V8
V4
IMI with RV extension


I
aVR
V1
V4
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aVL
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III
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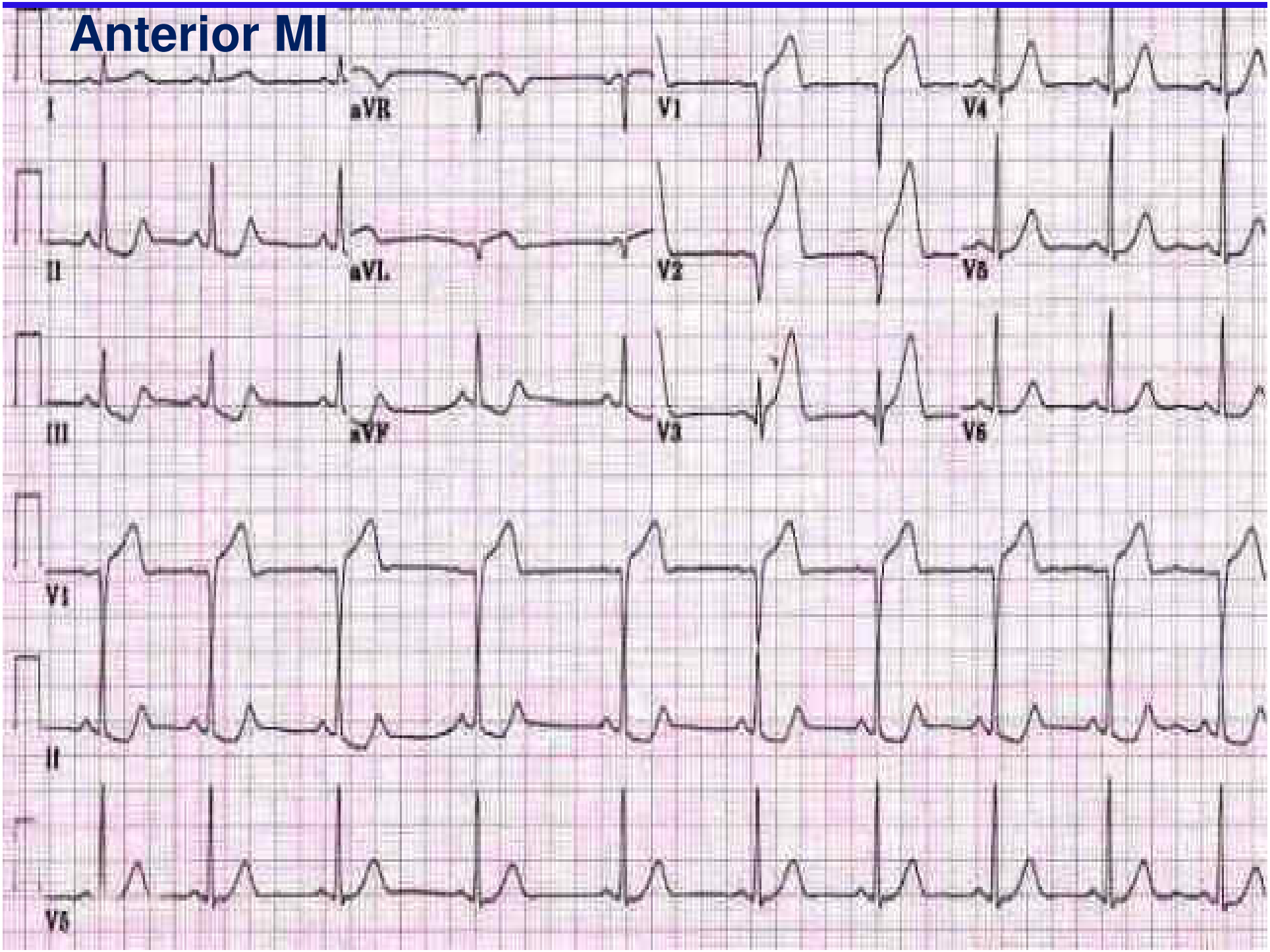
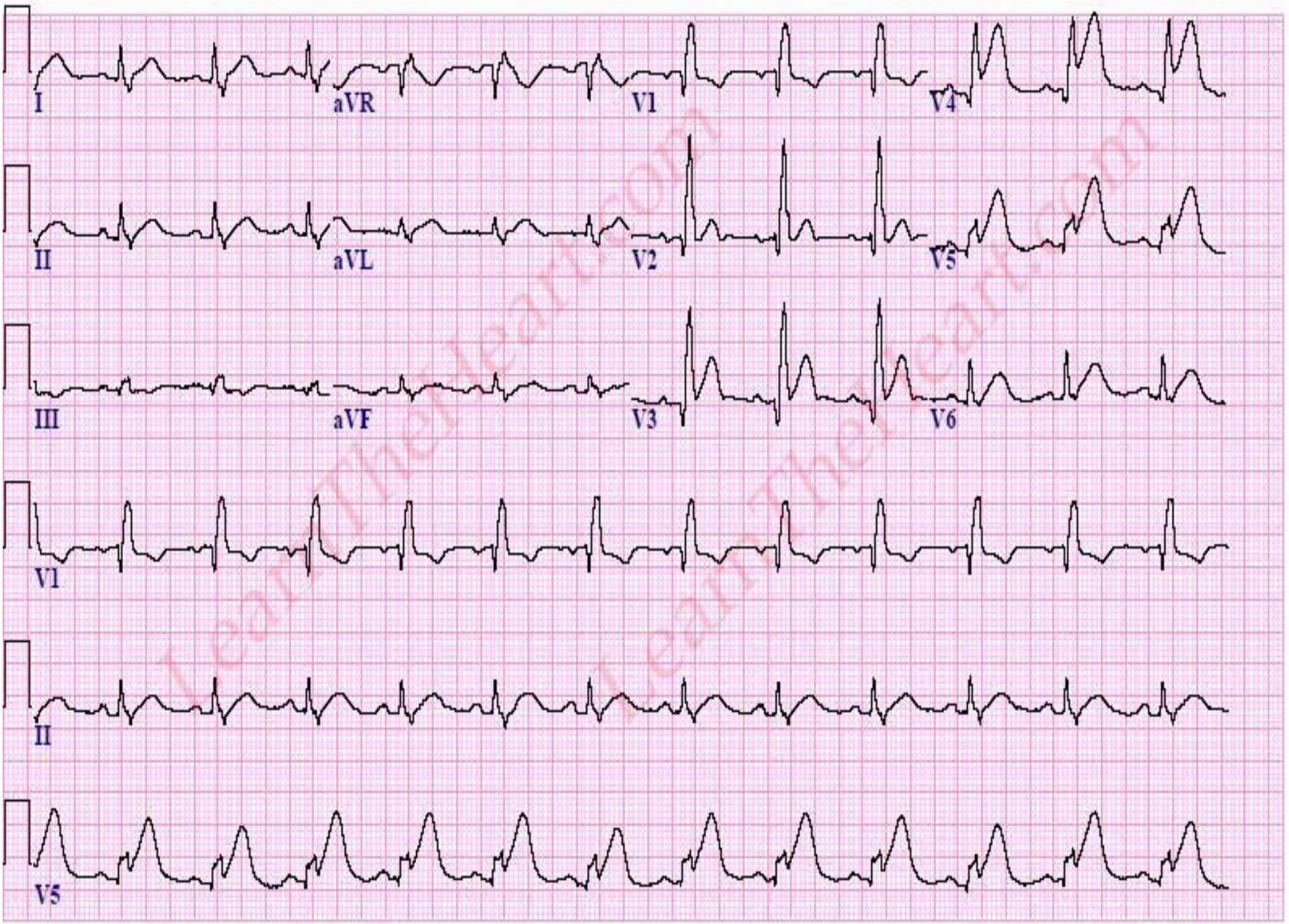
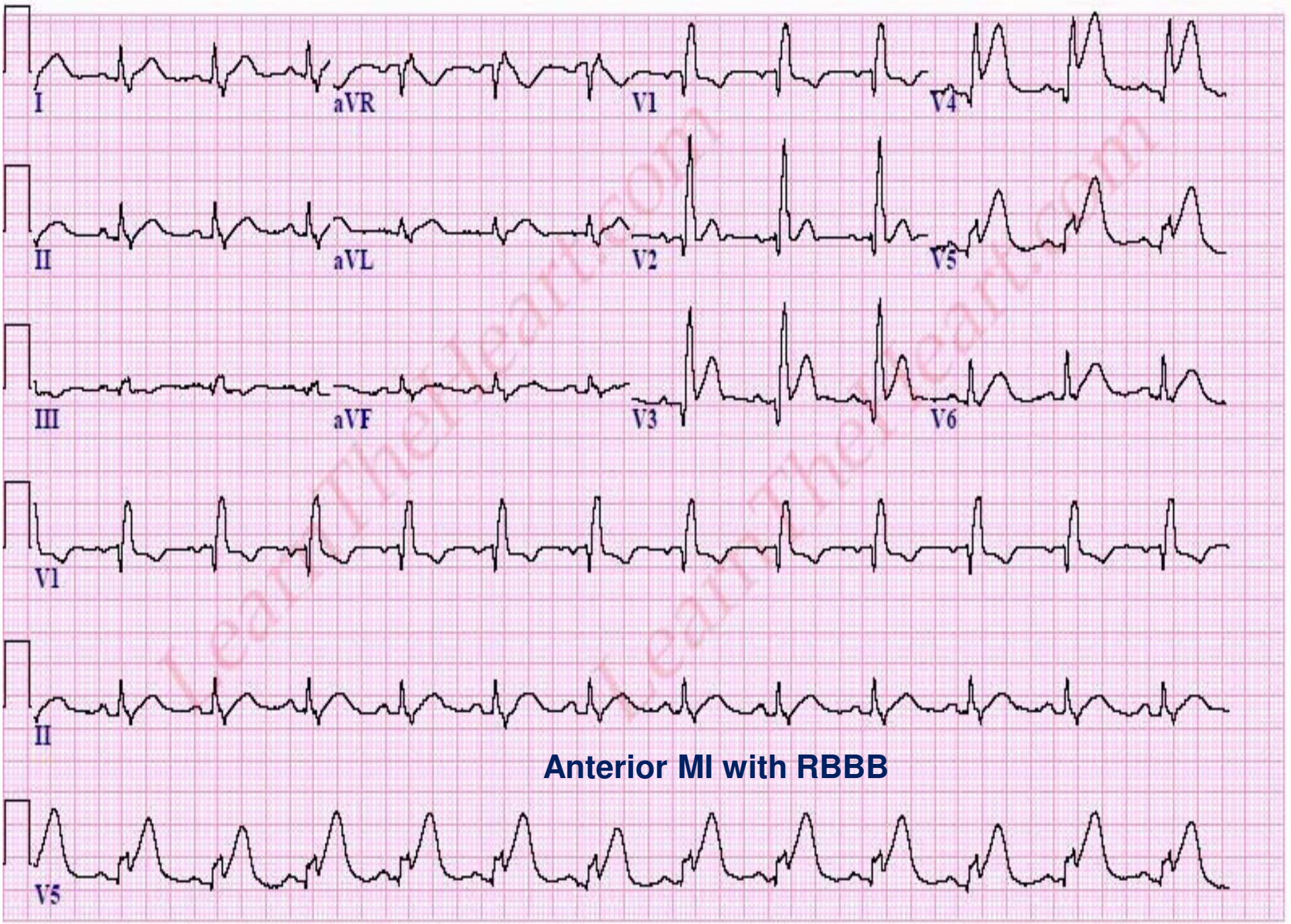
V3
V6
V1
II
V5

Anterior MI



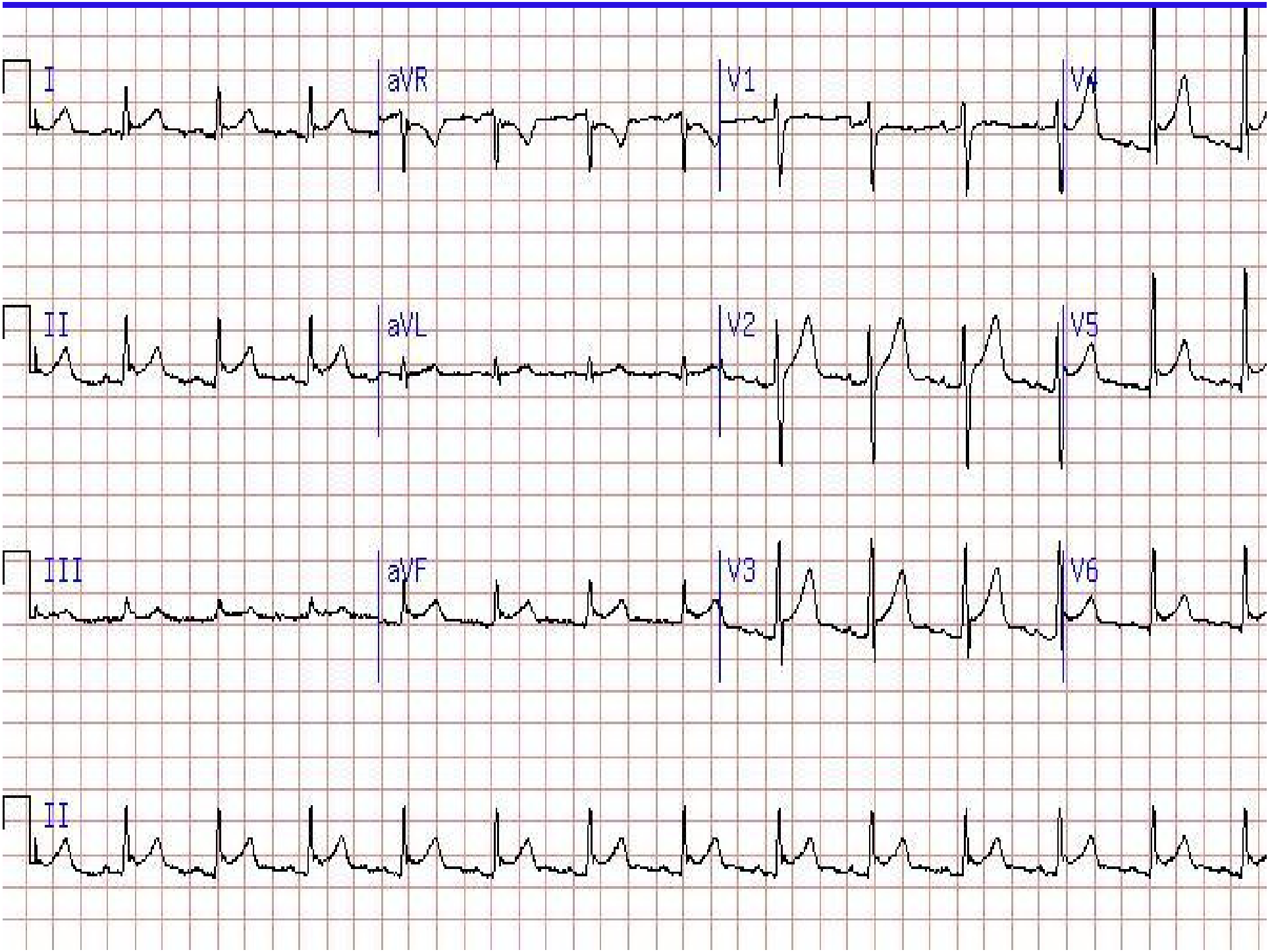

I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
II
V5
25mm/s 10mm/mV 40Hz 005C 12SL 250 CID: 2
EID:610 EDT: 18:58 21-JUN-2004 ORDER:



Anterior MI with RBBB

Reading ECGs

- When ST segment elevation is noted in more than one zone, for example, anterior and inferior, you should consider pericarditis. Be sure to ask such a patient whether or not their chest discomfort is altered by respiration or body position.
- ECGs from monitor leads should not be used to draw conclusions about QRS and ST segment morphology.


I
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II
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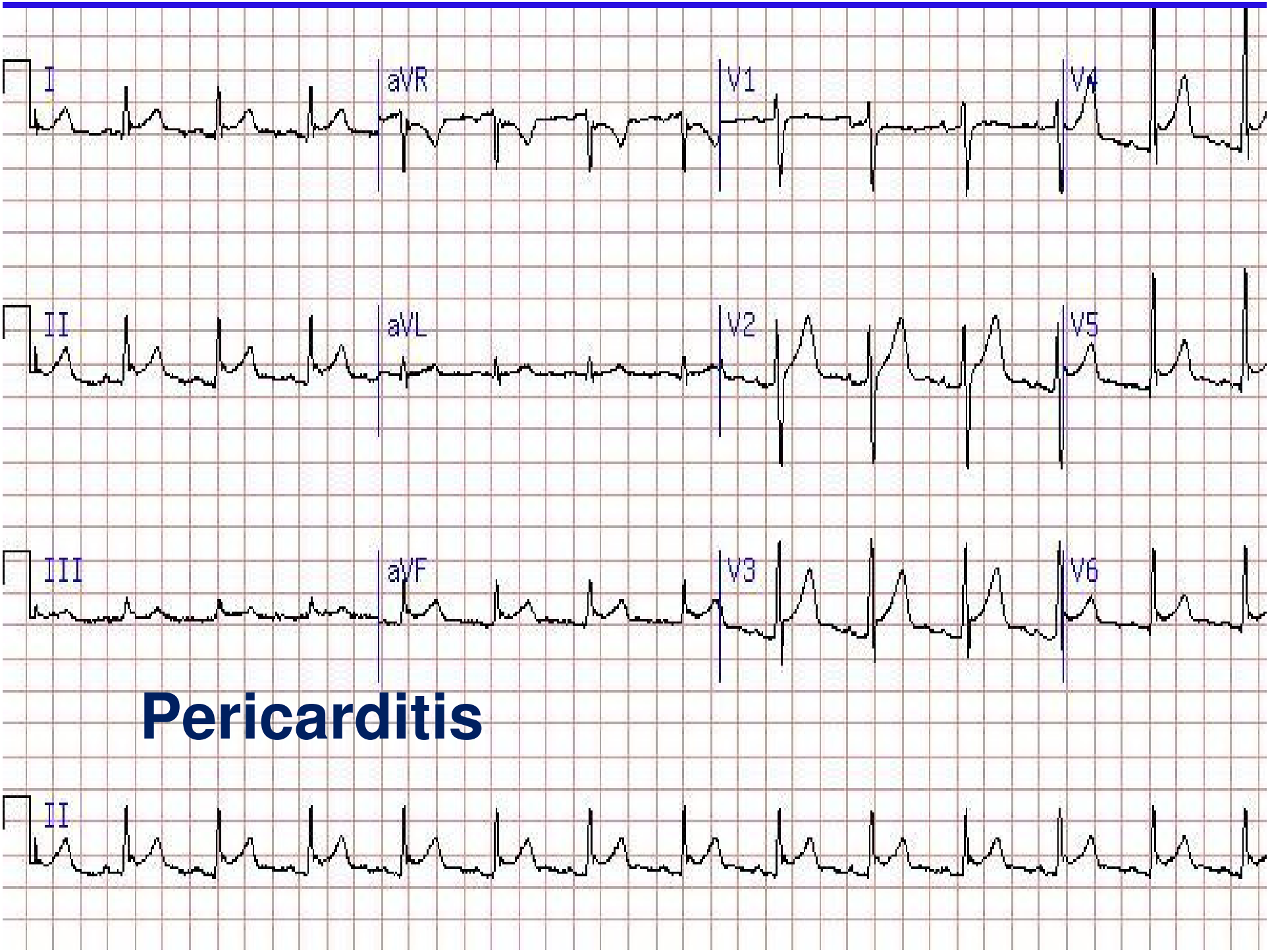


Pericarditis

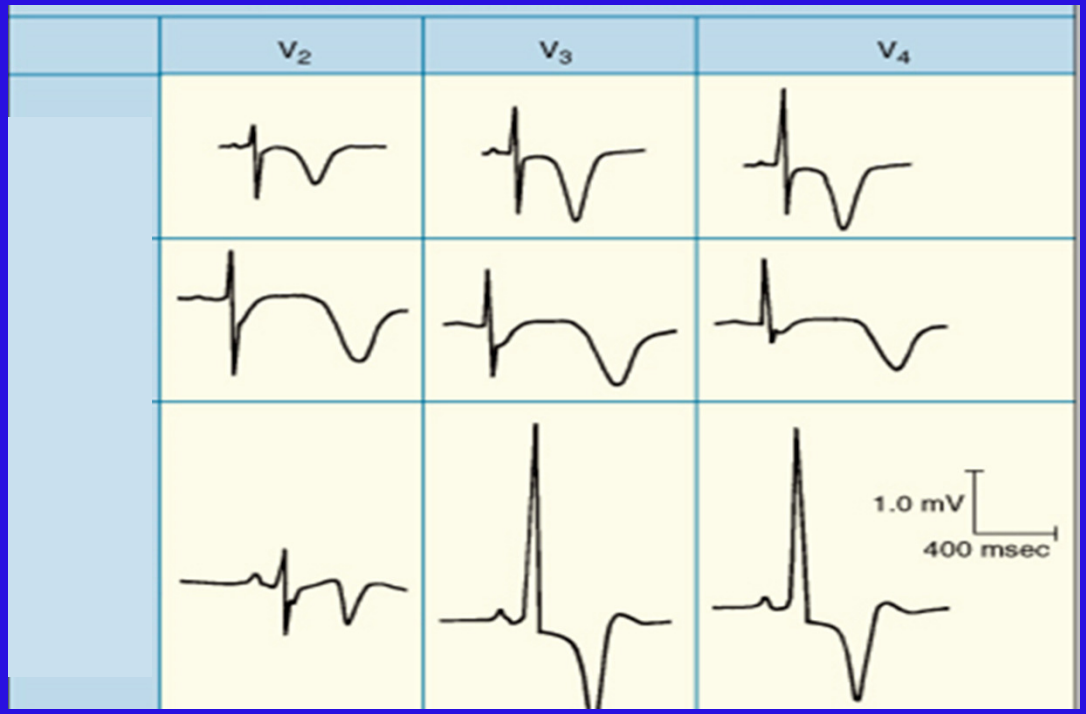
8. Check for Abnormal T Waves

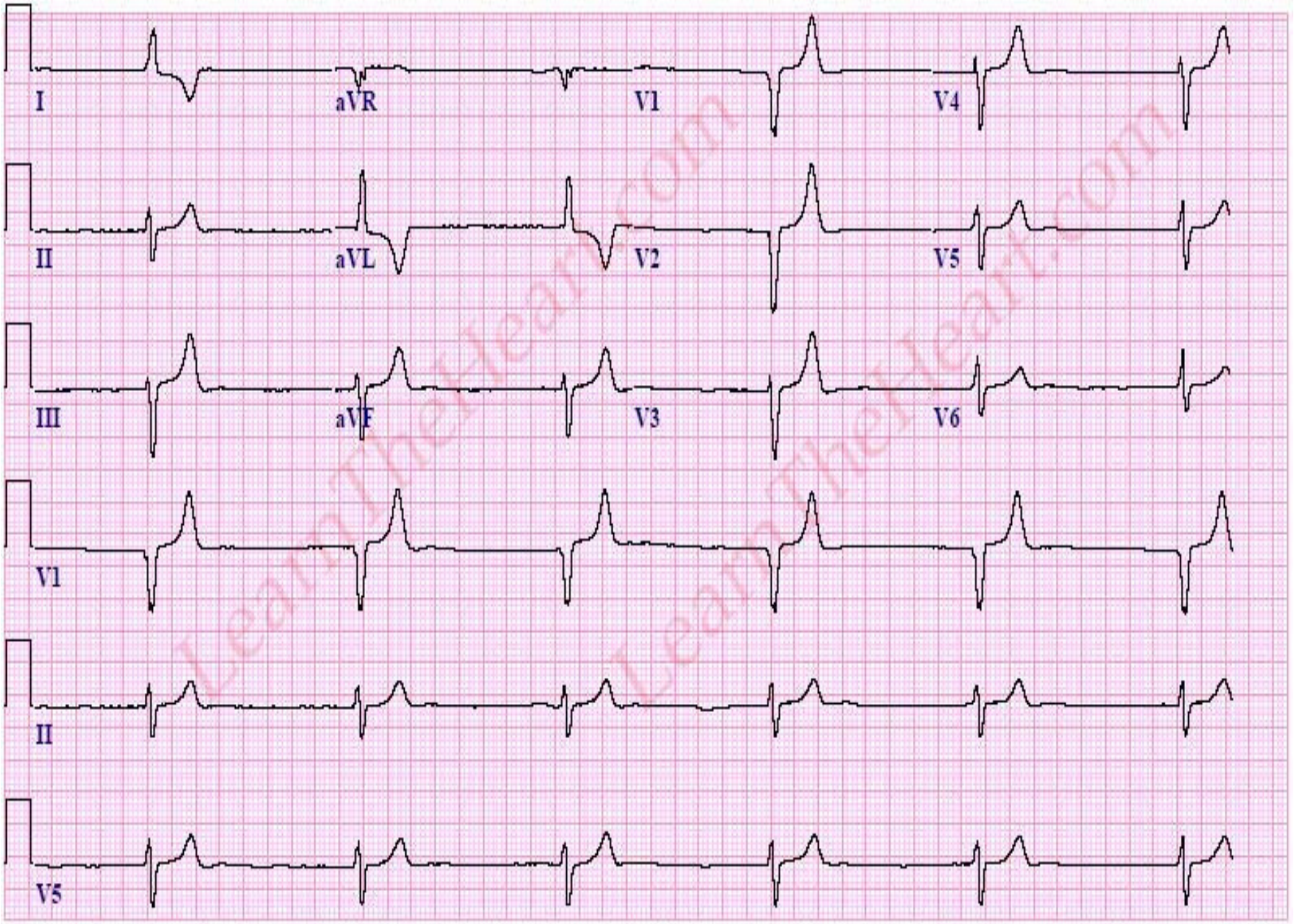
Normal T Waves

Upright in V3-V6 and I, II
Inverted in aVR
Variable in other leads

If Inverted, Consider

Juvenile T-Waves
Early Repolarization
Ischemia or Non STEMI
HOCM or LVH or RVH
Acute CVA
"Memory" T Waves
Metabolic Abnormalities




I
aVR
V1
V4
II
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V2
V5
III
aVF
V3
V6
V1
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25mm/s 10mm/mV 150Hz 005C 12SL 250 CID: 1
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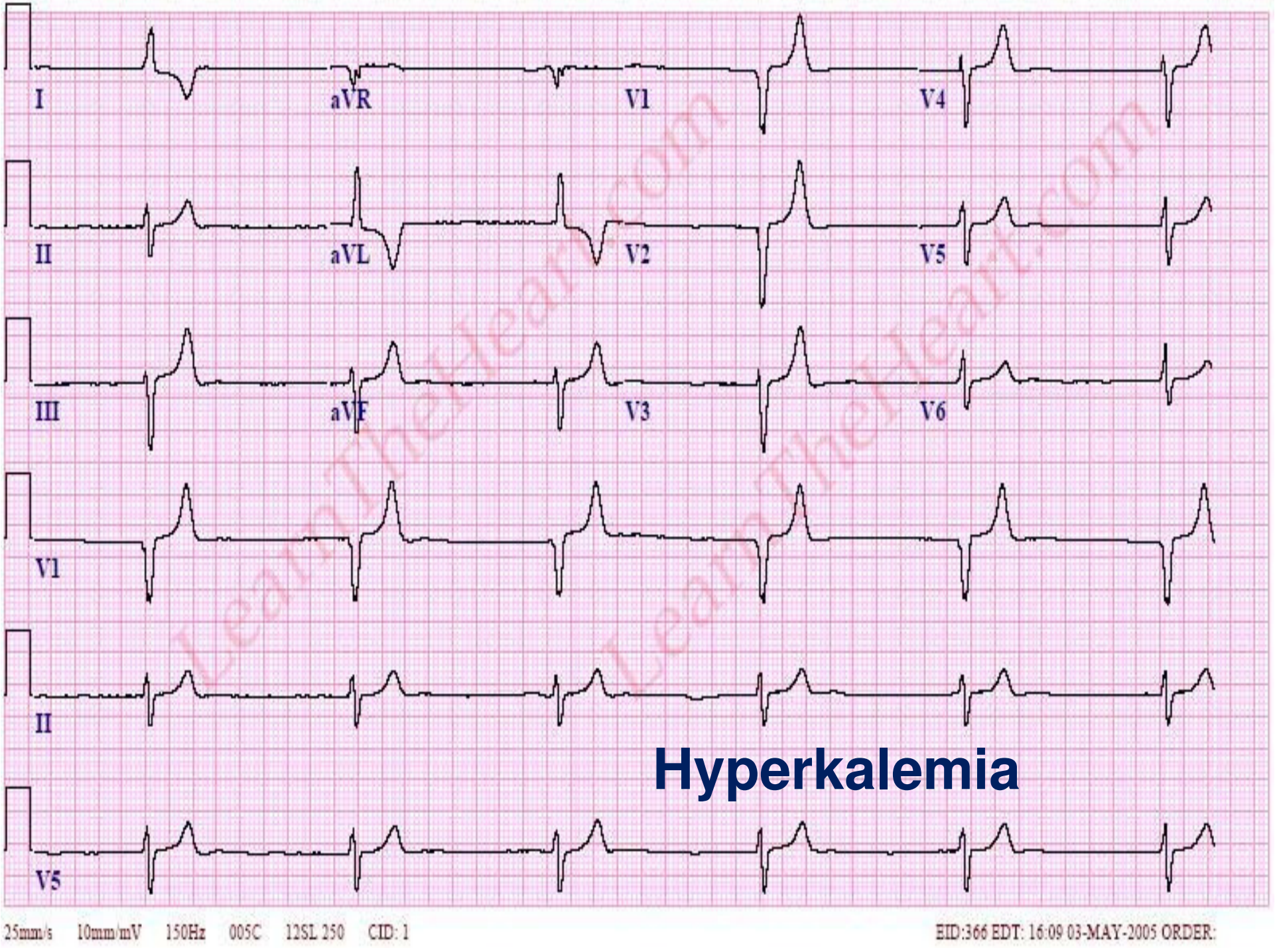
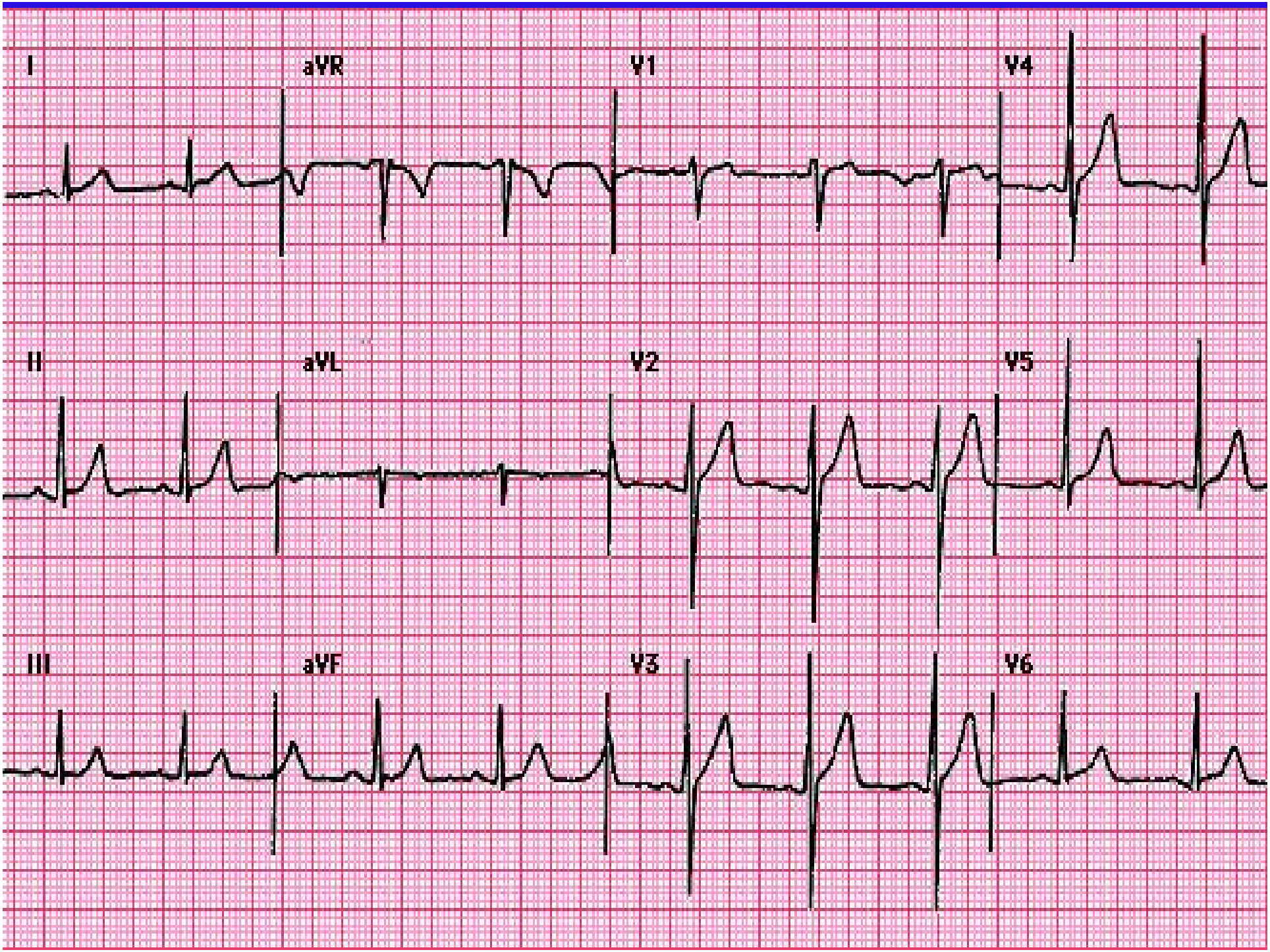


Hyperkalemia

Is there anything abnormal about this next ECG?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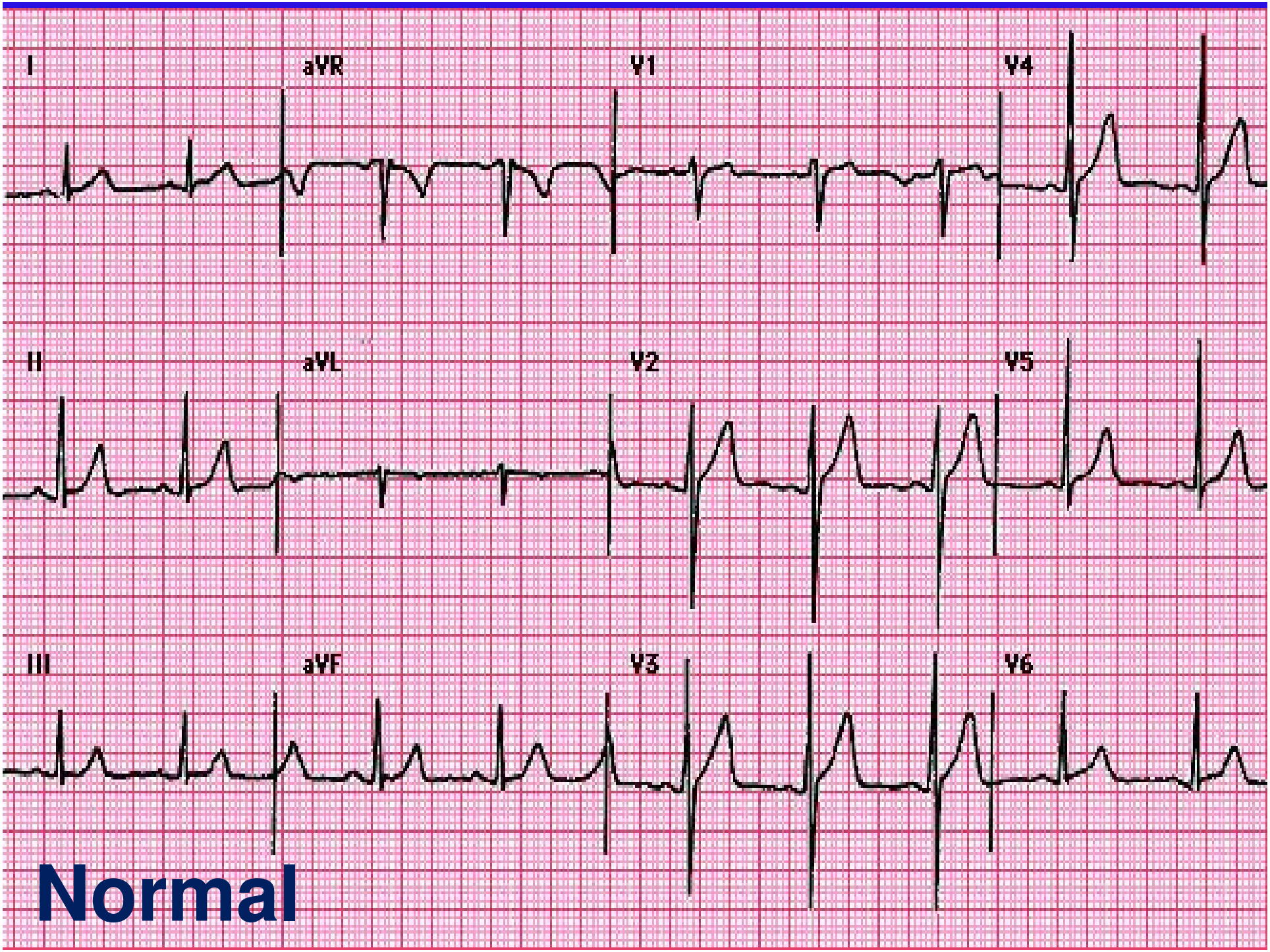
V6



Normal

Diagnosing Dysrhythmias

Diagnosing Sinus Dysrhythmias

Sinus Tachycardia

Sinus Bradycardia (following junctional escape)

Sinus Arrhythmia (Ps vary by >.16s)

Sinus Exit Block

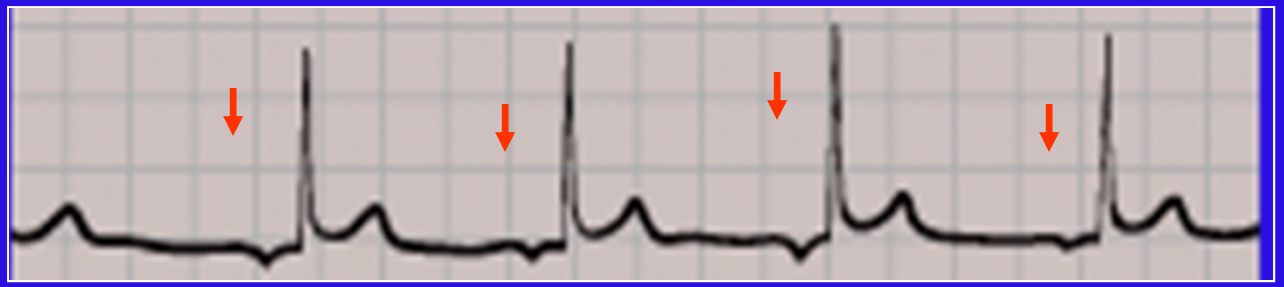
Sinus Pause/Arrest

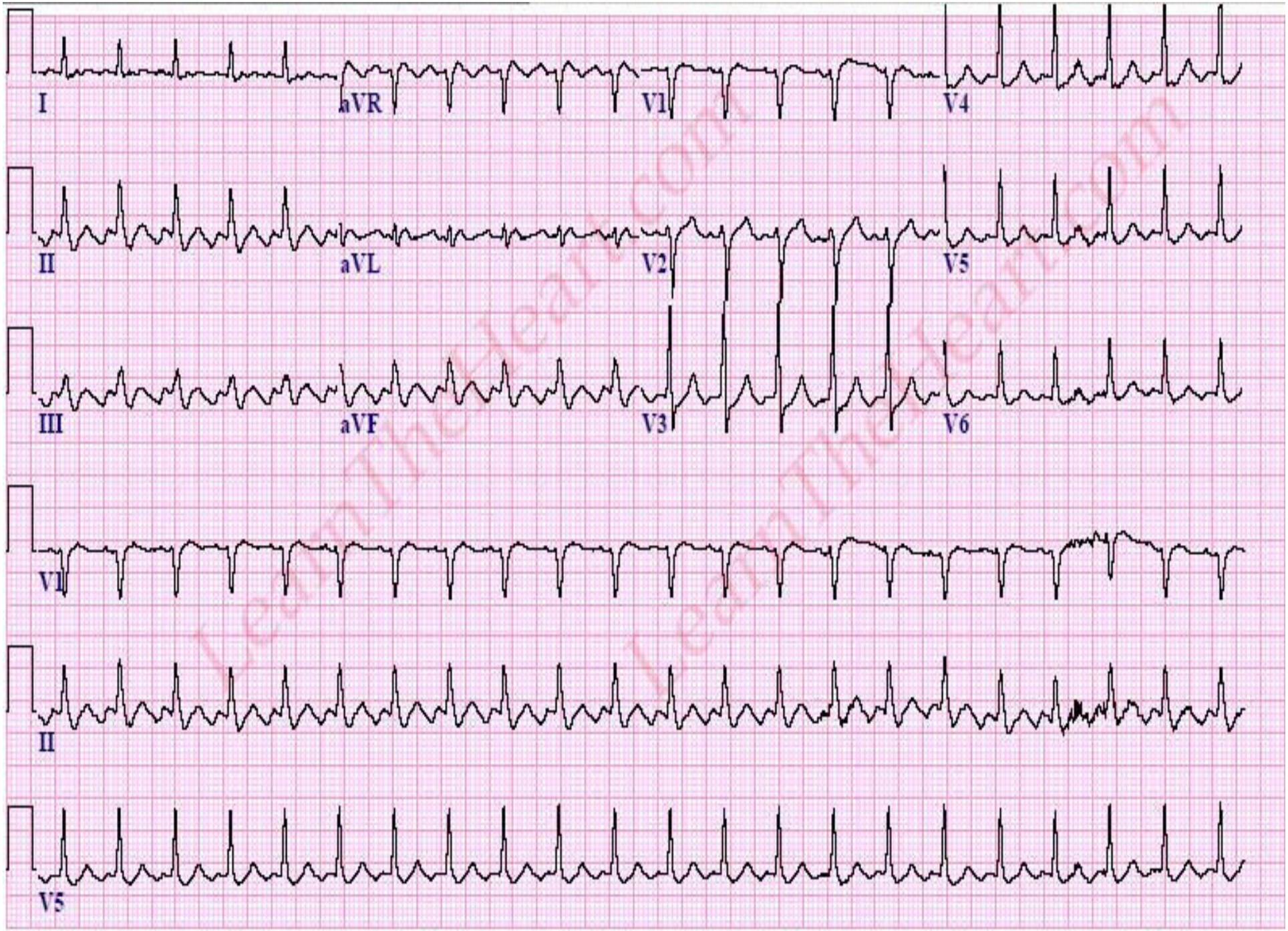
Tachy-Brady Syndrome

Diagnosing Atrial Dysrhythmias

PACs, with aberrant conduction or blocked (Hint: deformed P wave precedes the beat)

Ectopic Atrial Rhythm (Hint: PR Normal and P's identical but different from sinus P, often inverted in inferior leads)




I
aVR
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V5
III
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V3
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V1
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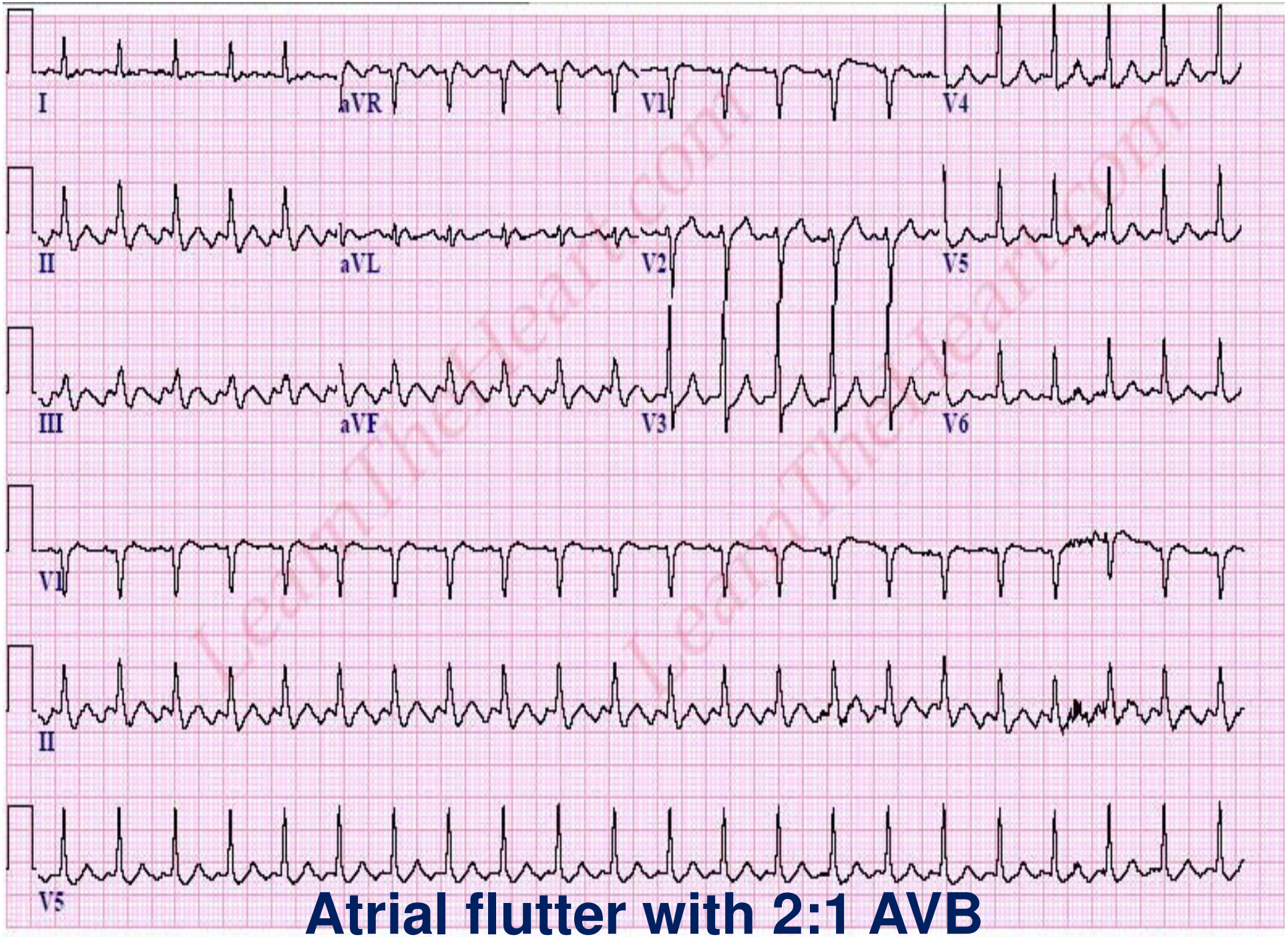
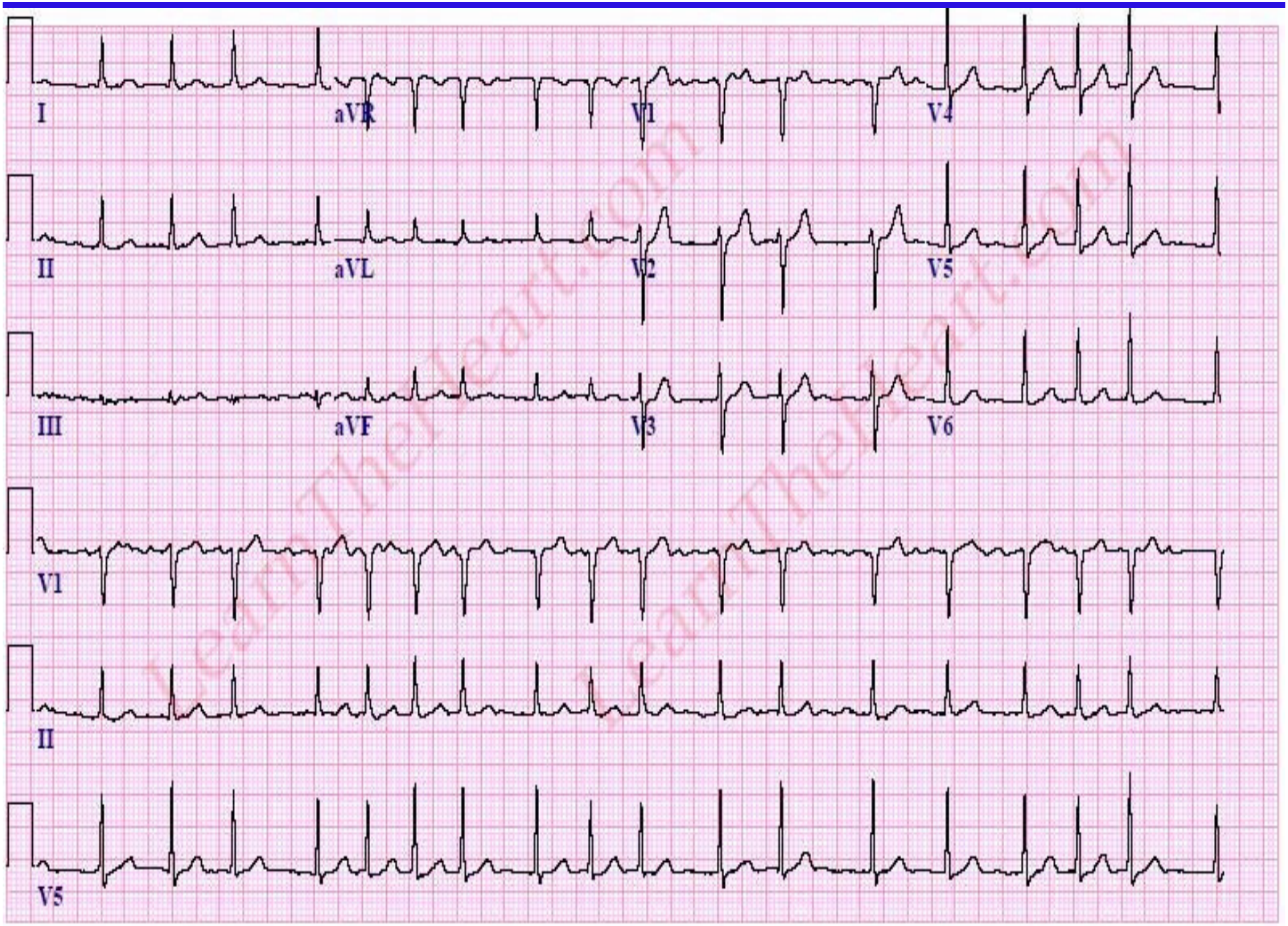
25mm/s 10mm/mV 40Hz 005C 12SL 254 CID: 27
EID:610 EDT: 16:43 15-MAY-2005 ORDER:



Atrial flutter with 2:1 AVB


I
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25mm/s 10mm/mV 40Hz 005C 12SL 250 CID: 2
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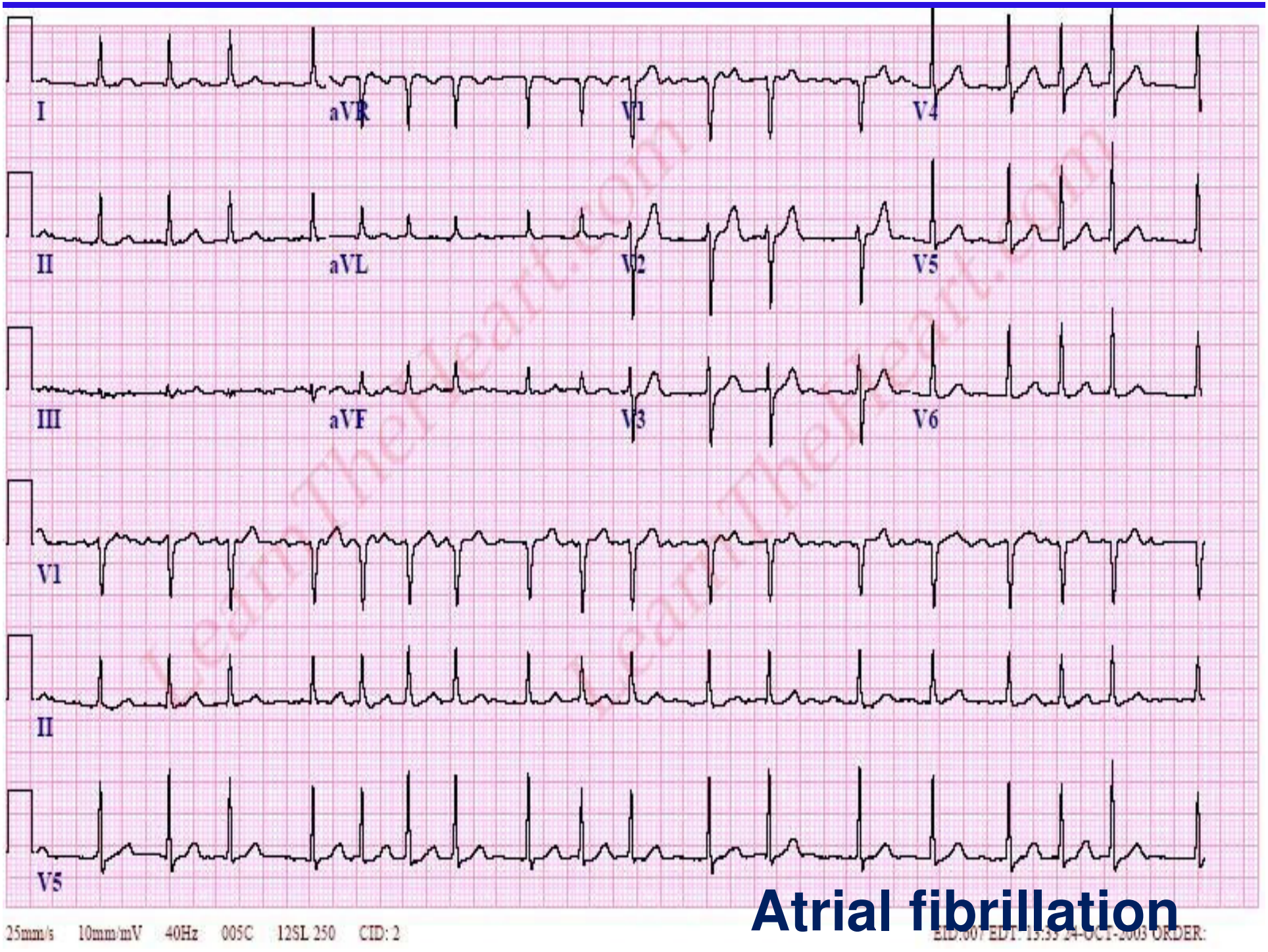
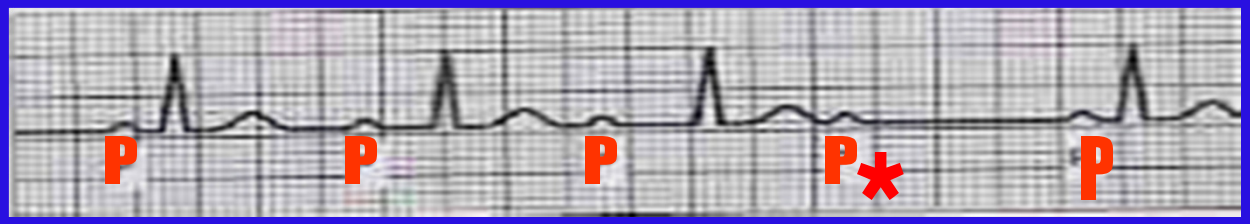


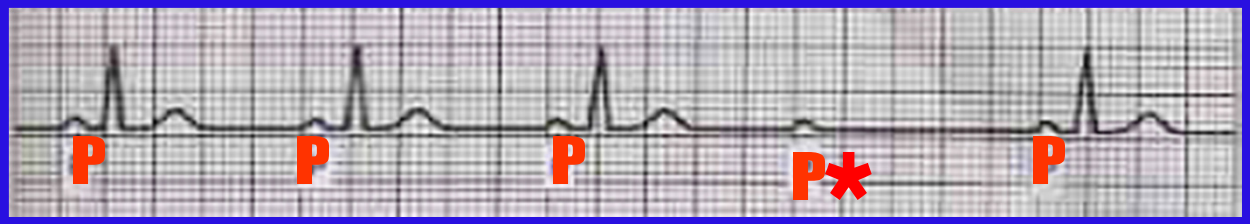
Atrial fibrillation

Diagnosing Atrio-Ventricular Blocks

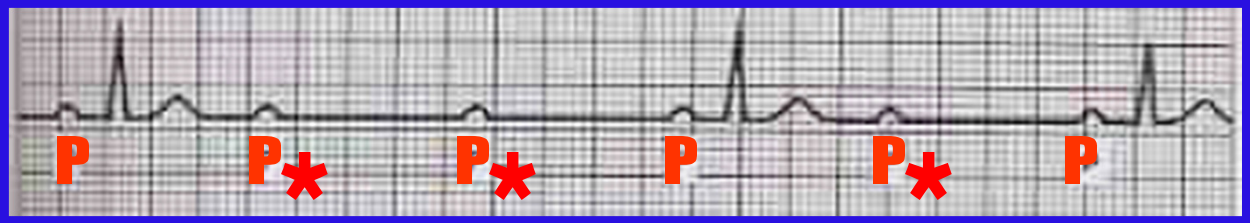
First Degree AVB



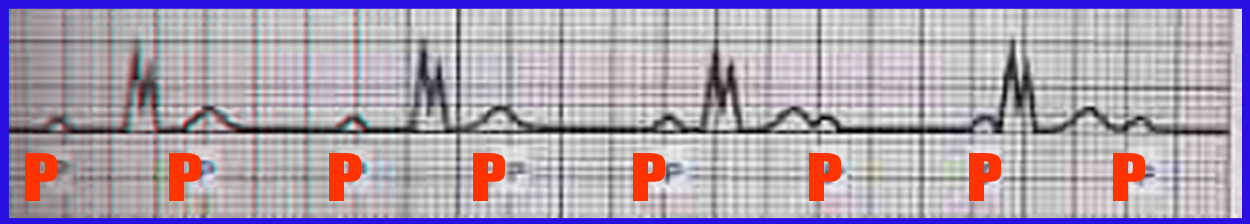
2nd Degree AVB, Mobitz Type I (Wenkebach)



2nd Degree AVB, Mobitz Type II



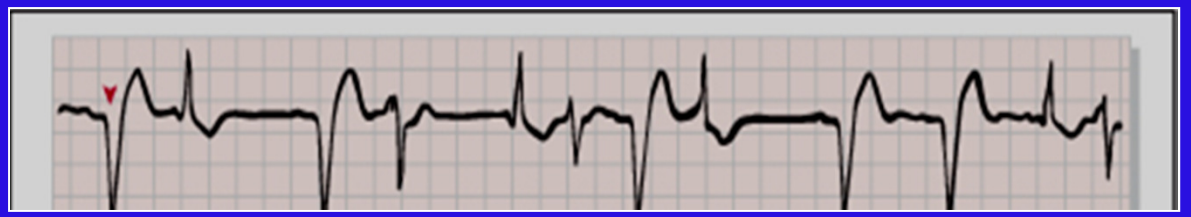
2nd Degree AVB, High Grade



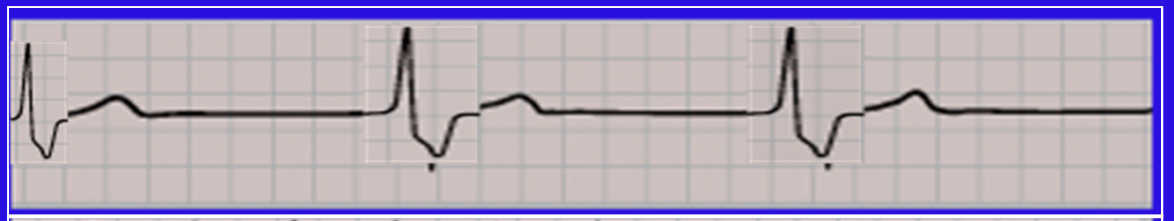
3rd Degree AVB

Diagnosing Ventricular Dysrhythmias

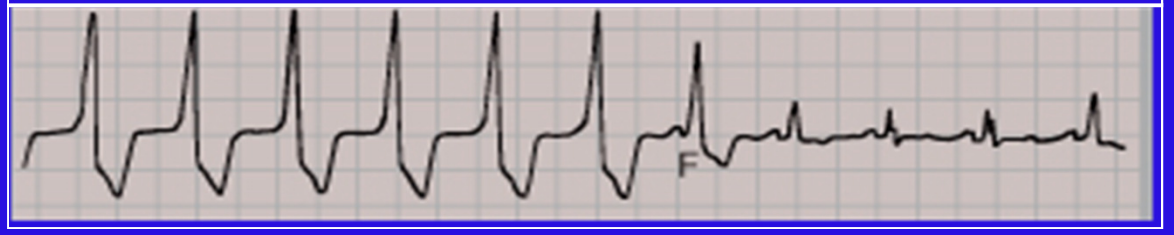
PVCs, Multifocal
(Hint: wide ectopics w/o preceding P, with compensatory pause)



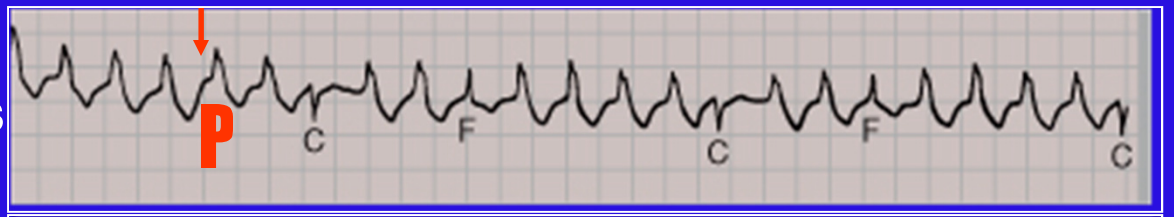
Ventricular Escape Rhythm
(Hint: Late wide complexes with rate<40)



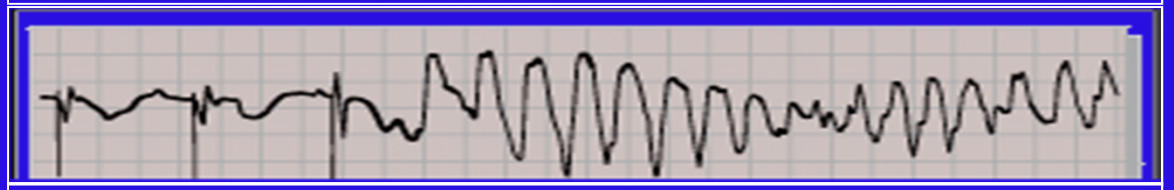
Accelerated Idioventricular Rhythm (AIVR)



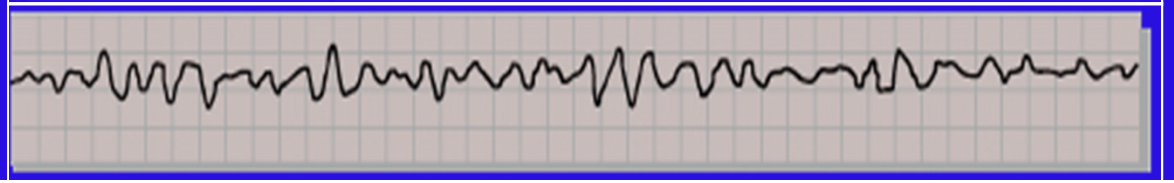
Ventricular Tachycardia, with capture & fusion beats



Torsades de Pointes complicating Long QT



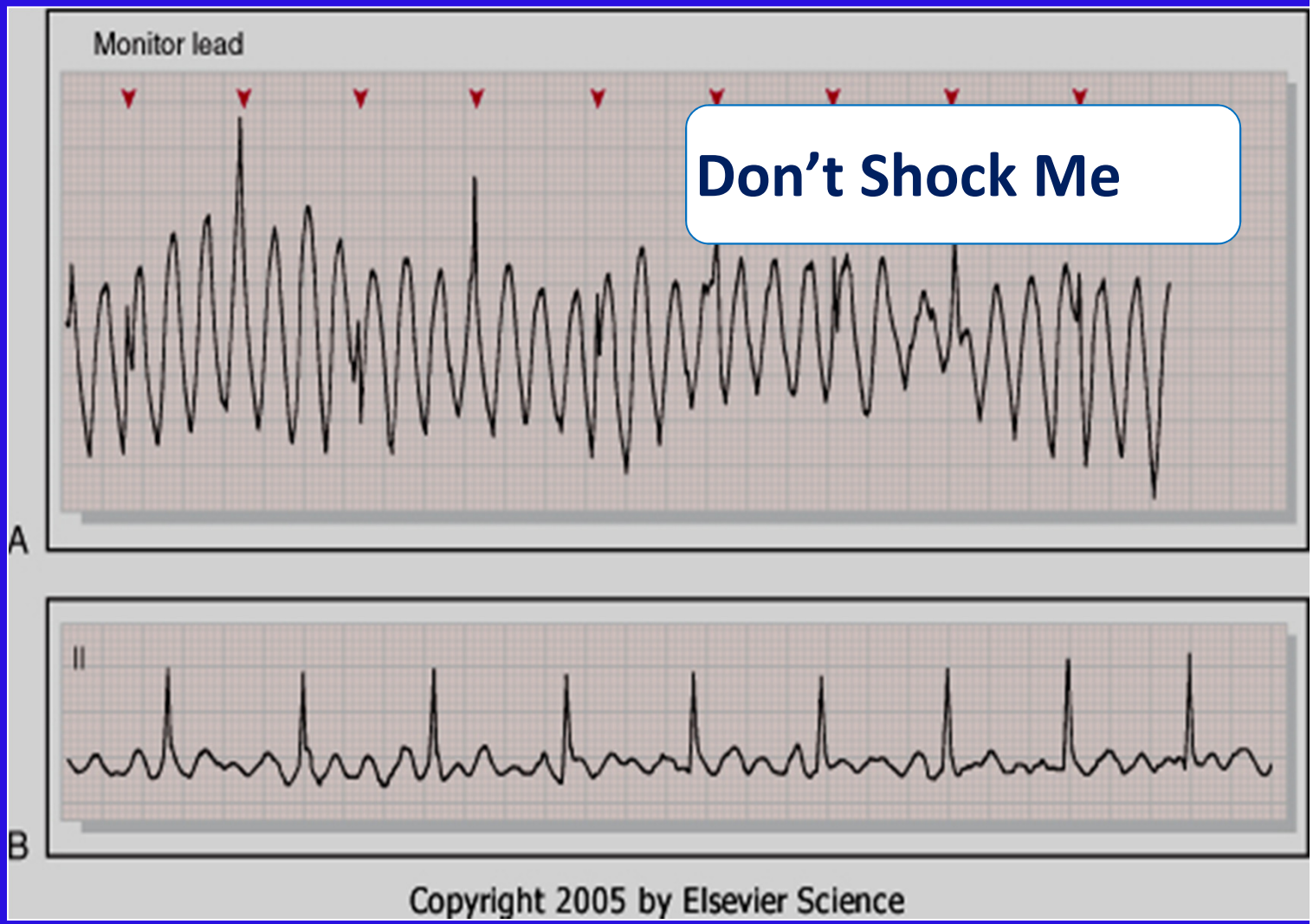
Ventricular Fibrillation

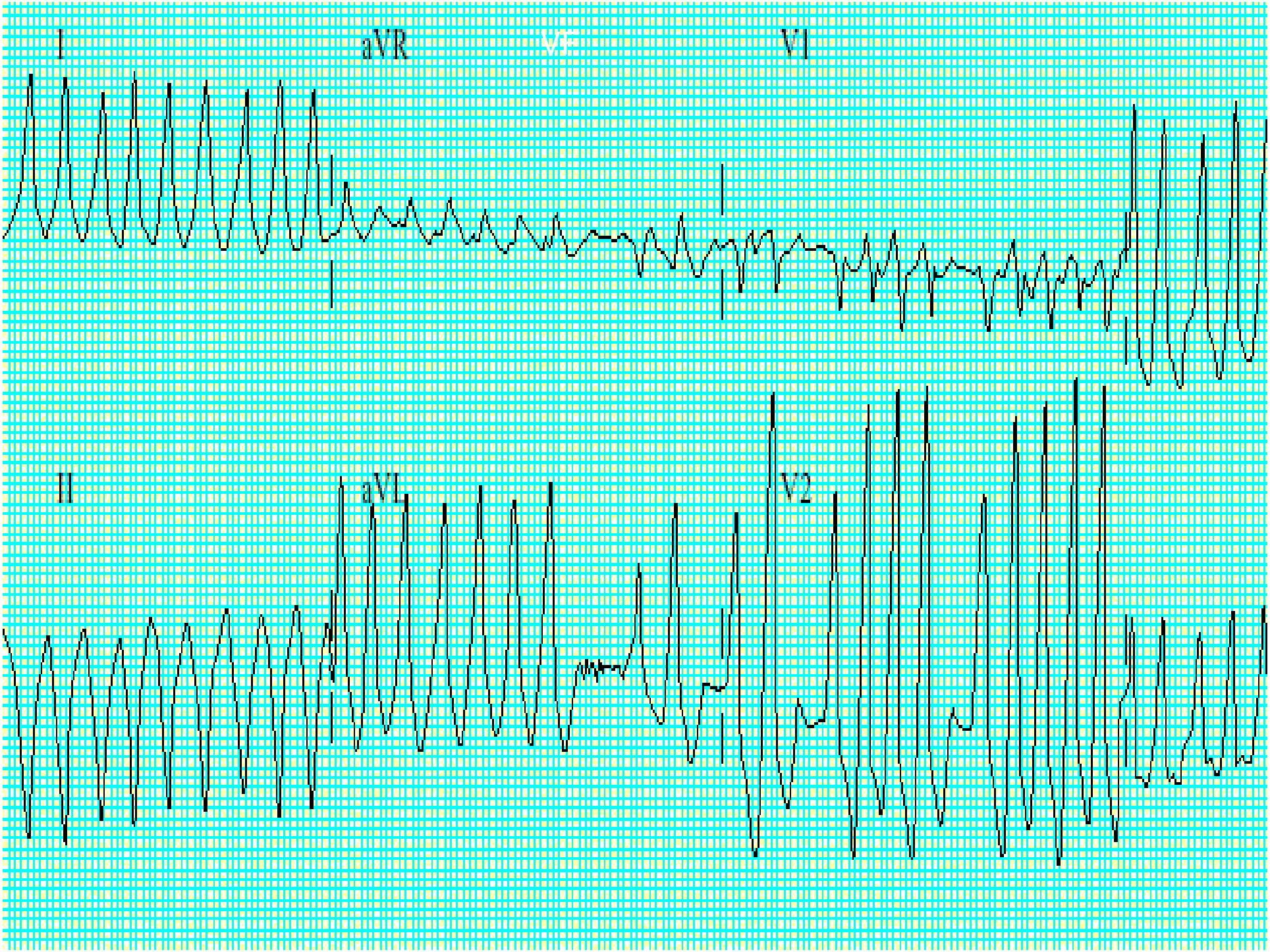


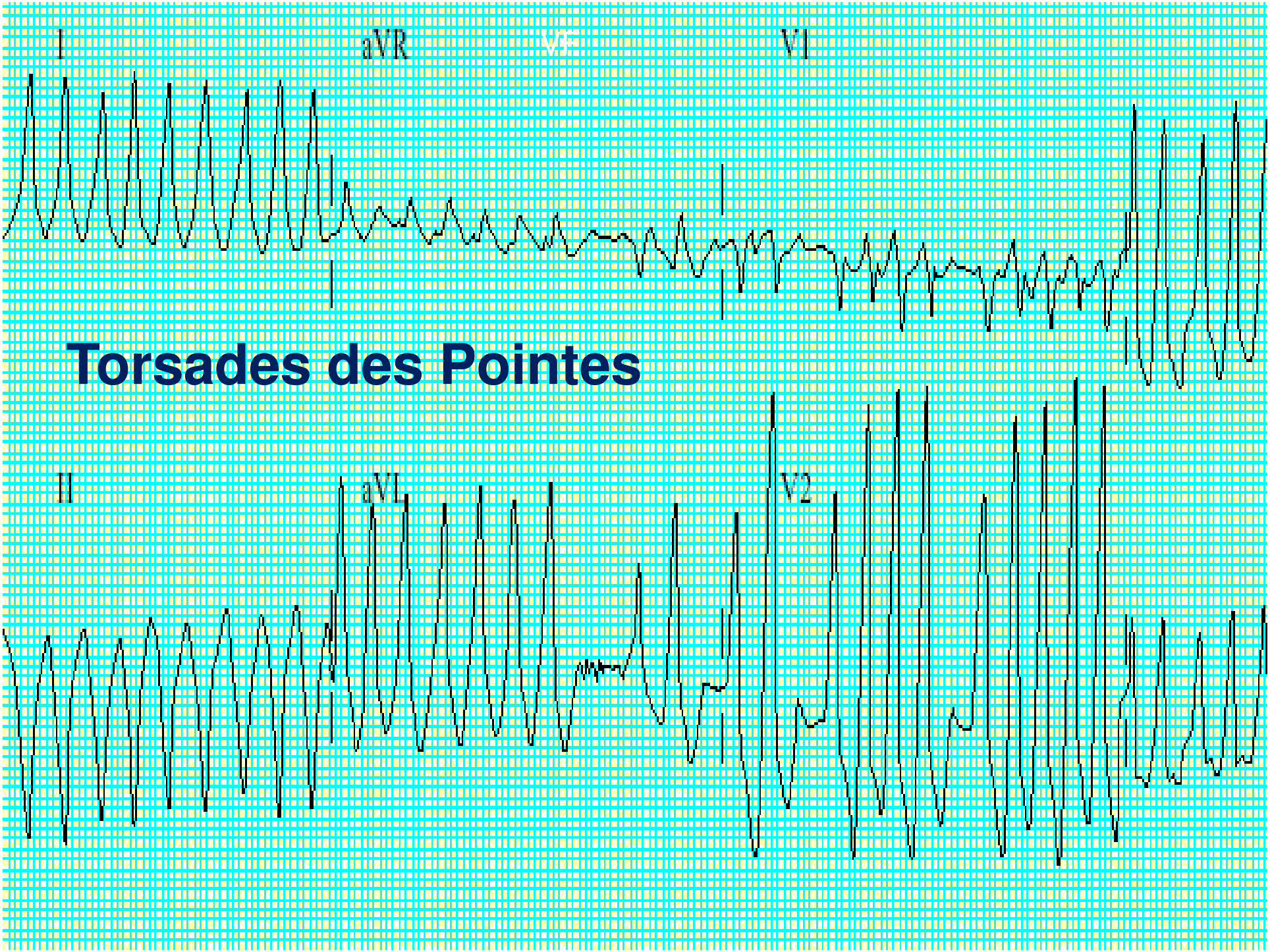
Diagnosing Artifactual Dysrhythmias

Motion Artifact simulating PMVT – tooth brushing

Tremor artifact simulating atrial fib-flutter



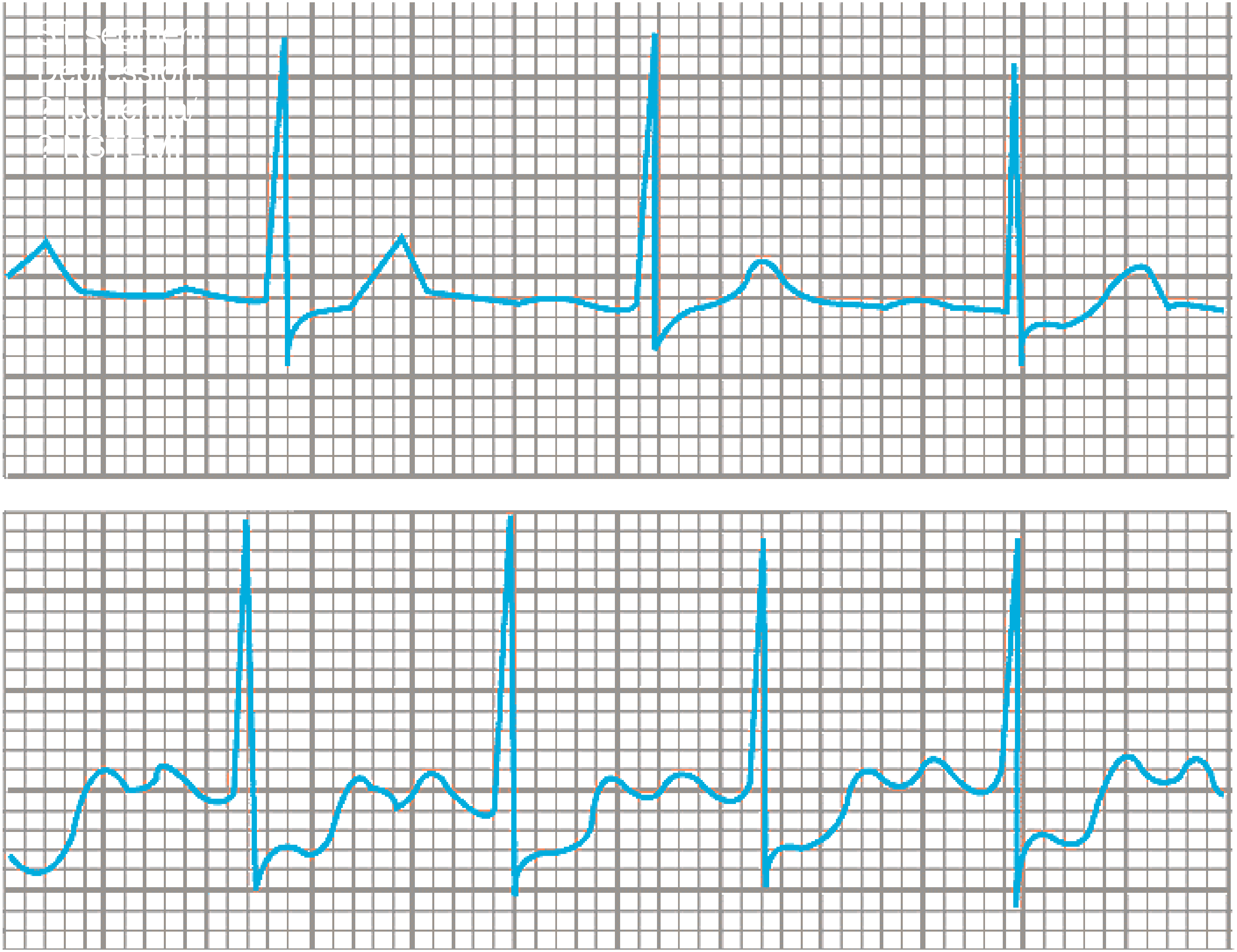

I
aVR
V1
II
aVL
V2



Torsades des Pointes

Reading ECGs

- Remember that ECGs contain prognostic as well as diagnostic information. Sum total of R wave voltage is a rough measure of left ventricular ejection fraction.
- If you are the clinician involved in a particular patient's care, try to correlate and integrate the ECG findings with other clinical data from the history and physical exam.
- Minor degrees of ST segment depression may be important in a patient with ?? ACS.


ST segment
Depression
? Ischemia/
? NSTEMI

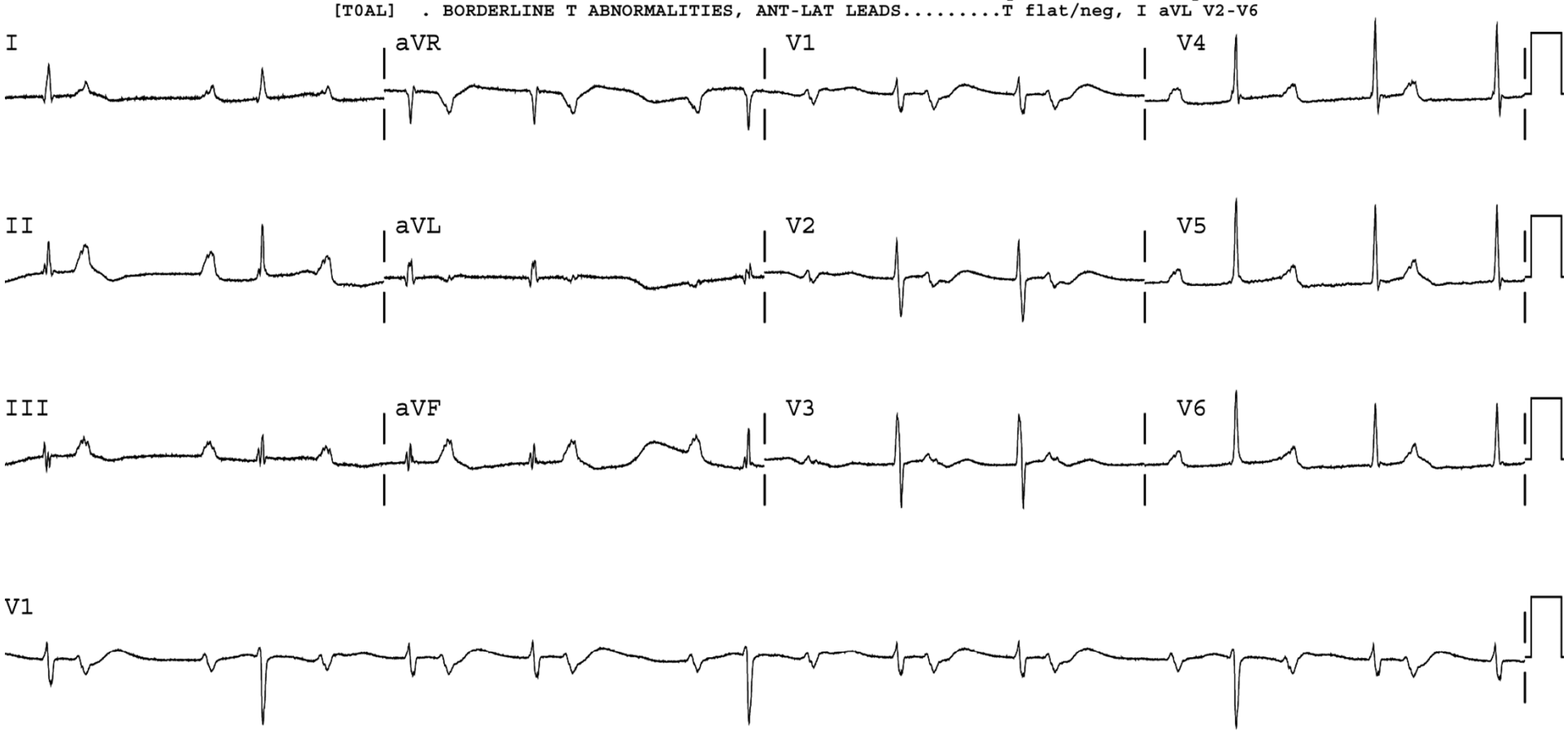
Reading ECGs

- I often give a copy of a current ECG to patients with a history of ASHD to take with them when they are travelling – an Arizona tidbit related to “snow birds”!!
- Echocardiography is more accurate at predicting LVH than the ECG, however, LVH on the ECG implies a worsened prognosis.

Reading ECGs

- Computer ECG interpretation is not 100% accurate. It is somewhere in the neighborhood of 80-85% accurate. All computer read ECGs should be over read by a human being who is experienced in reading ECGs.
- The best way to become an expert at reading ECGs is PRACTICE, PRACTICE, PRACTICE.

[AFIB0] . ATRIAL FIBRILLATION.....? Atrial activity
[PVPC] . PAIRED VENTRICULAR PREMATURE COMPLEXES.....sequence of 2 V complexes
[T0AL] . BORDERLINE T ABNORMALITIES, ANT-LAT LEADS.....T flat/neg, I aVL V2-V6



Reading ECGs

- Trick question:

Name three situations in which a standard surface ECG reveals two different P wave morphologies occurring at two different heart rates.

Reading ECGs - Answer

- A patient with a heart transplant;
- Siamese twins;
- An individual who is having an ECG recorded while holding hands with another person!


The
End