Day 7

More FLBs and WQRST's

Wide FLB's and 2RS Tachycardias

Reading Assignment

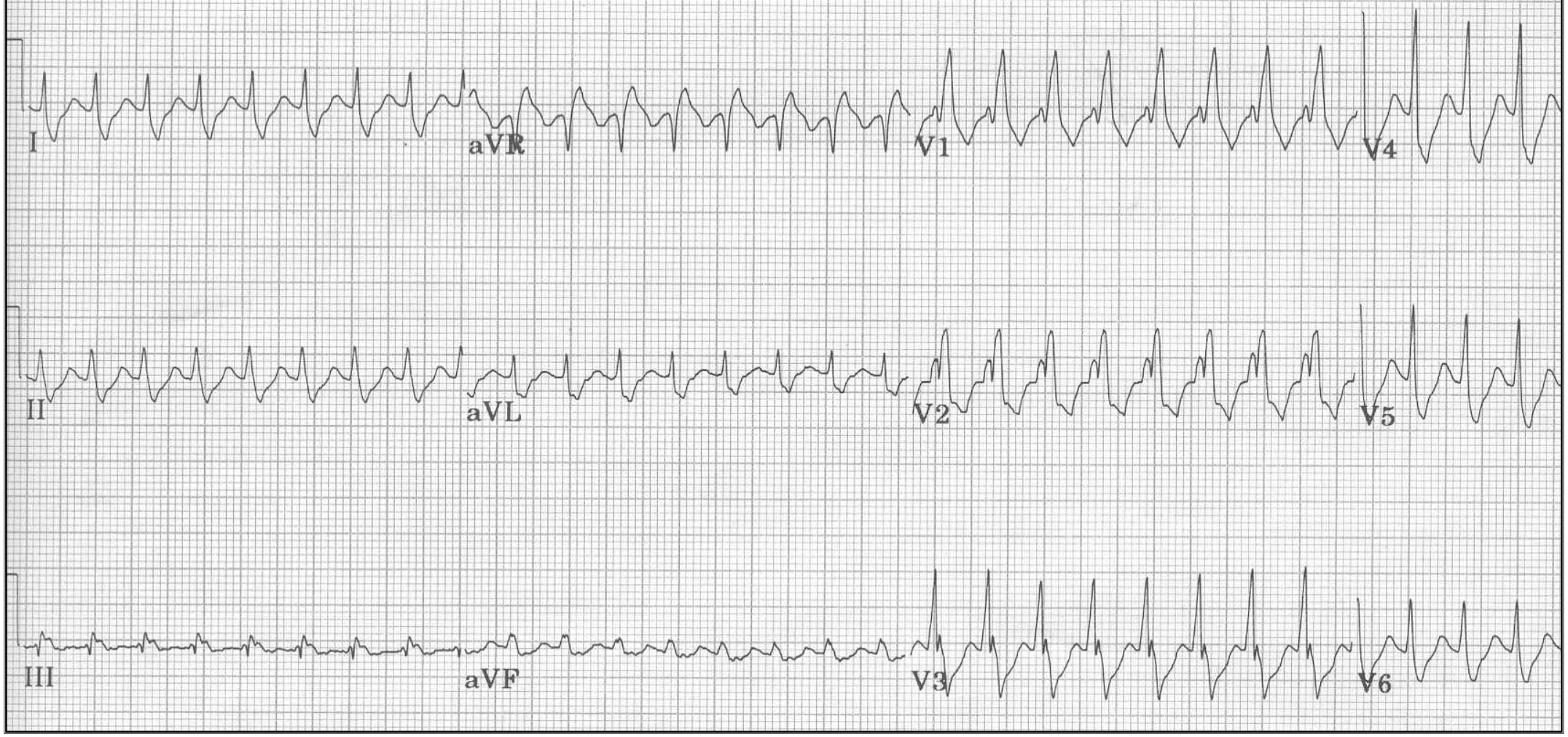
(p30-41 and 42-44)

Welcome to the “5-Step Method”

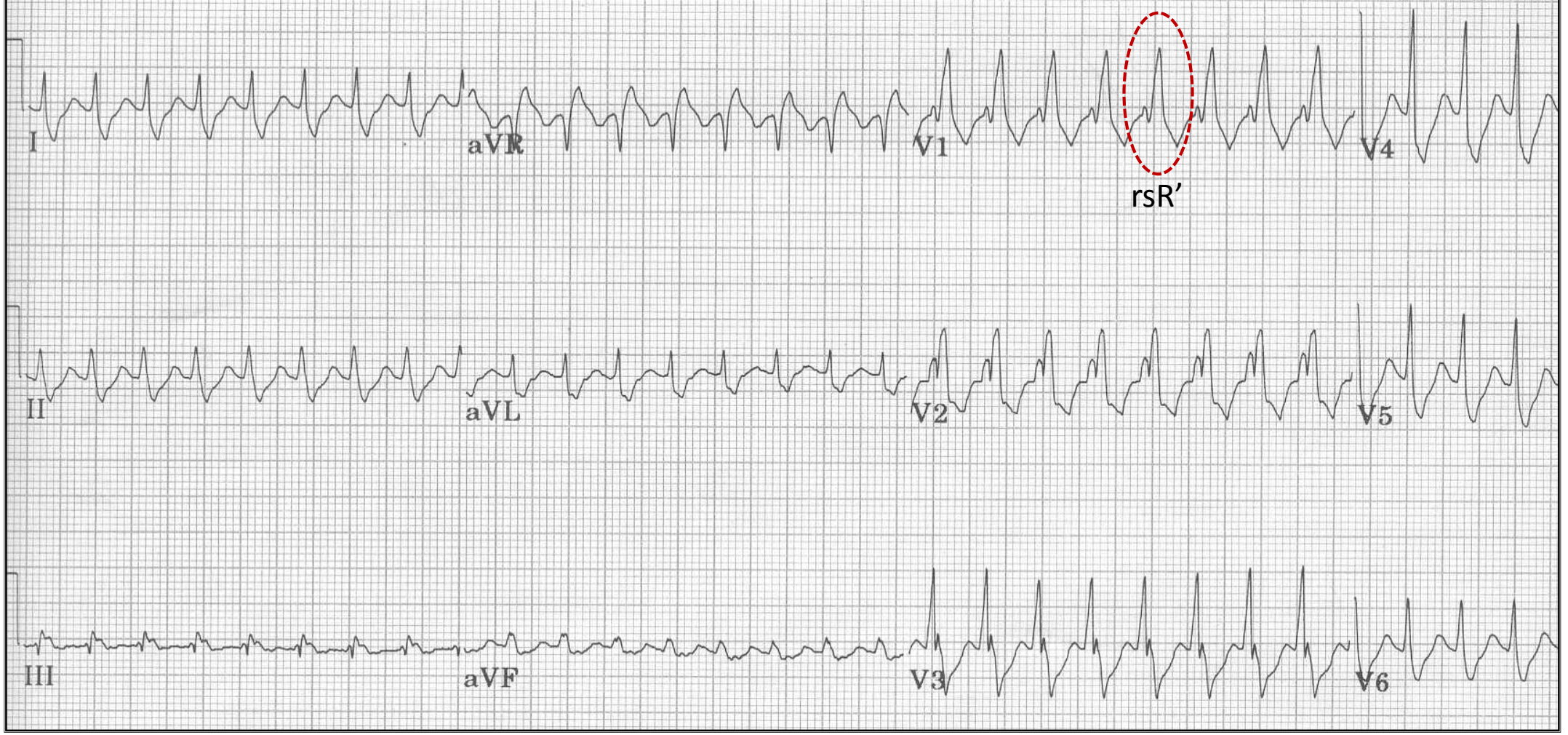
ECG #:

Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V=				
PR=				
QRS=				
QT=				
Axis=				

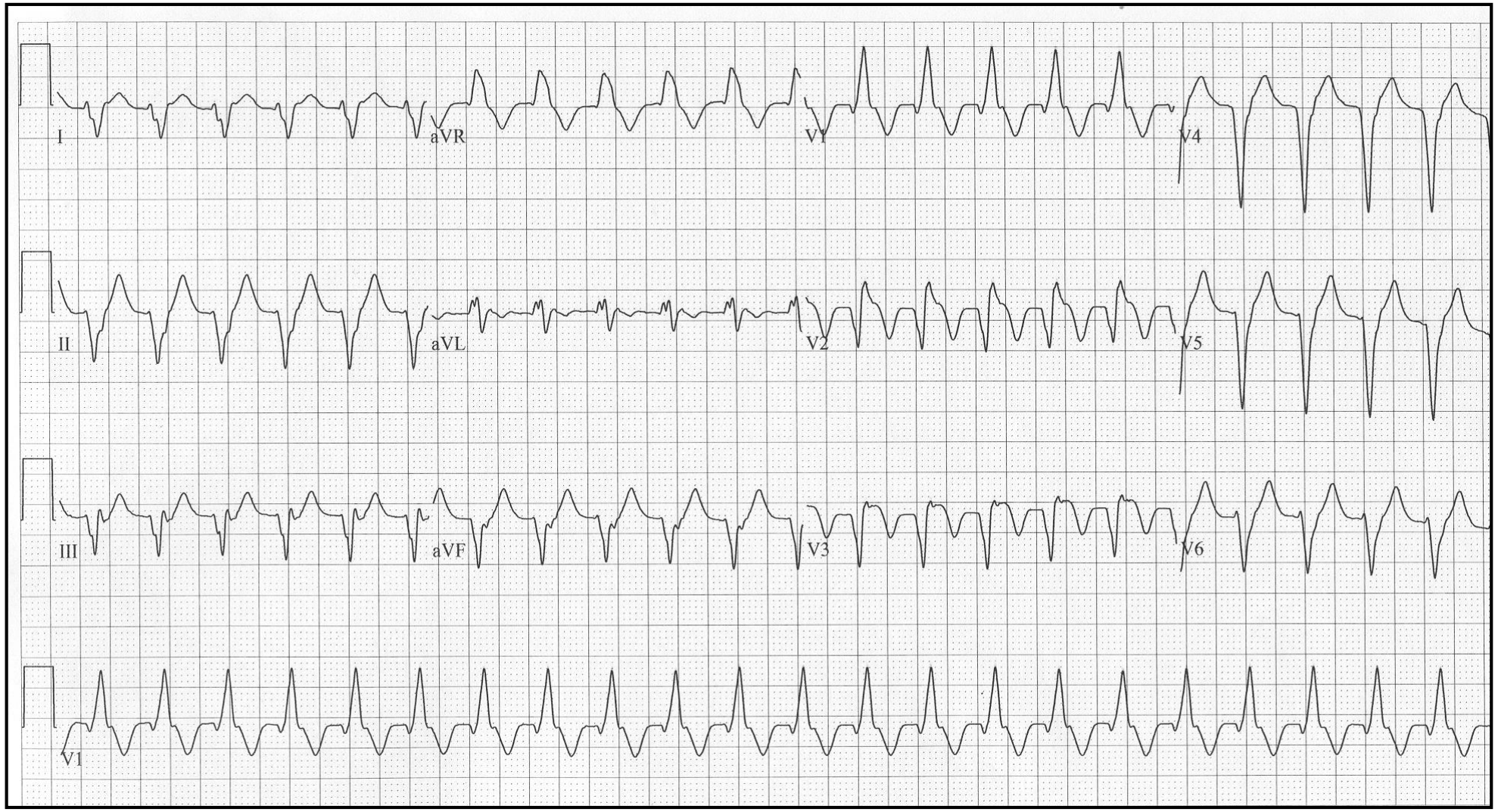
1. Compute the 5 basic measurements: HR, PR interval, QRS duration, QT interval, Axis
2. What’s the basic rhythm and other rhythm statements (e.g., PACs and PVC’s)
3. Any conduction abnormalities (SA blocks, AV blocks (Types I or II), and IV blocks
4. Waveform abnormalities beginning with P waves, QRS complexes, ST-T, and U waves
5. Final interpretations: Normal ECG or Borderline or Abnormal ECG (list final conclusions)



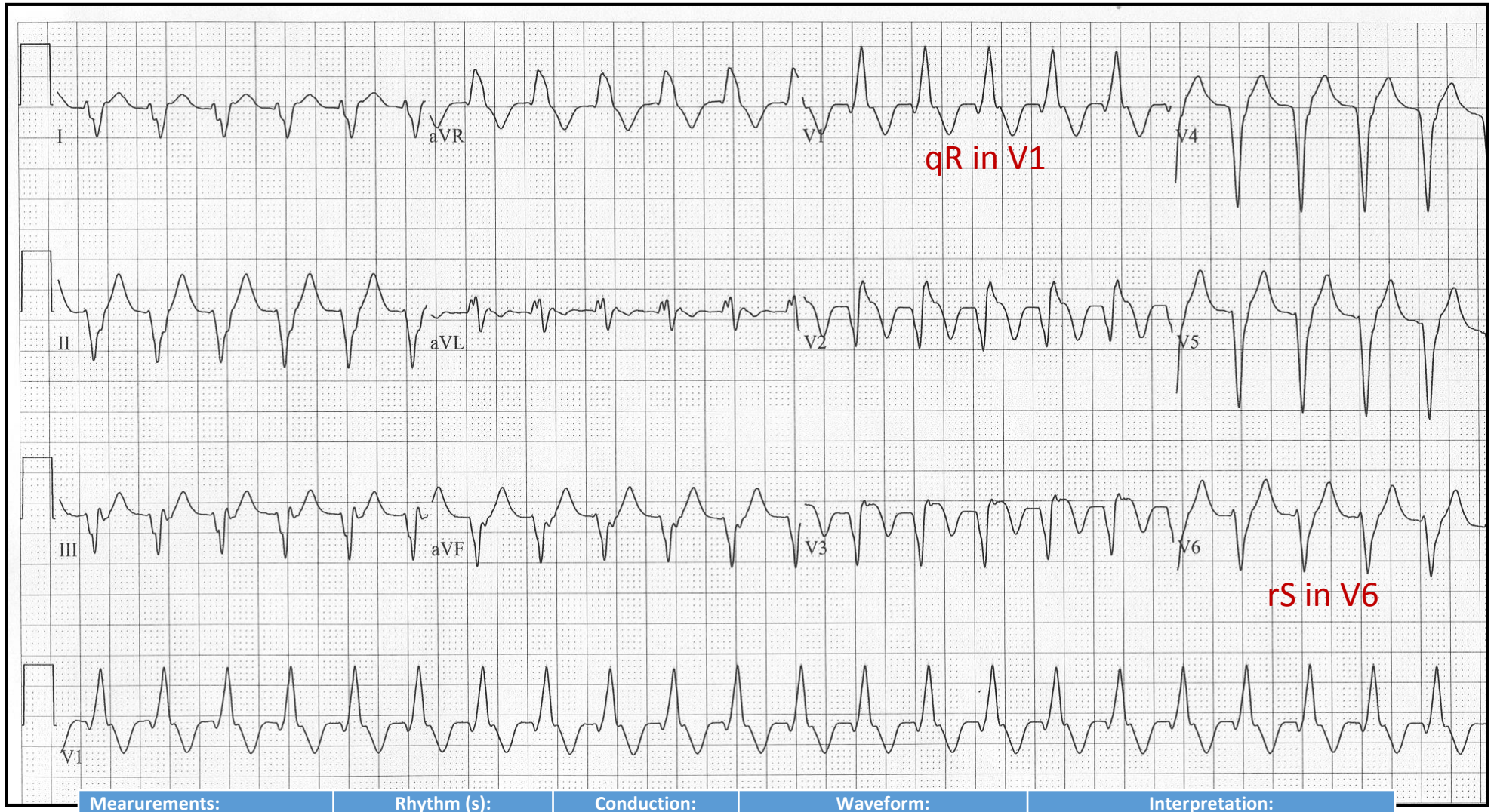
44 Year old man in the ER with palpitations and lightheadedness



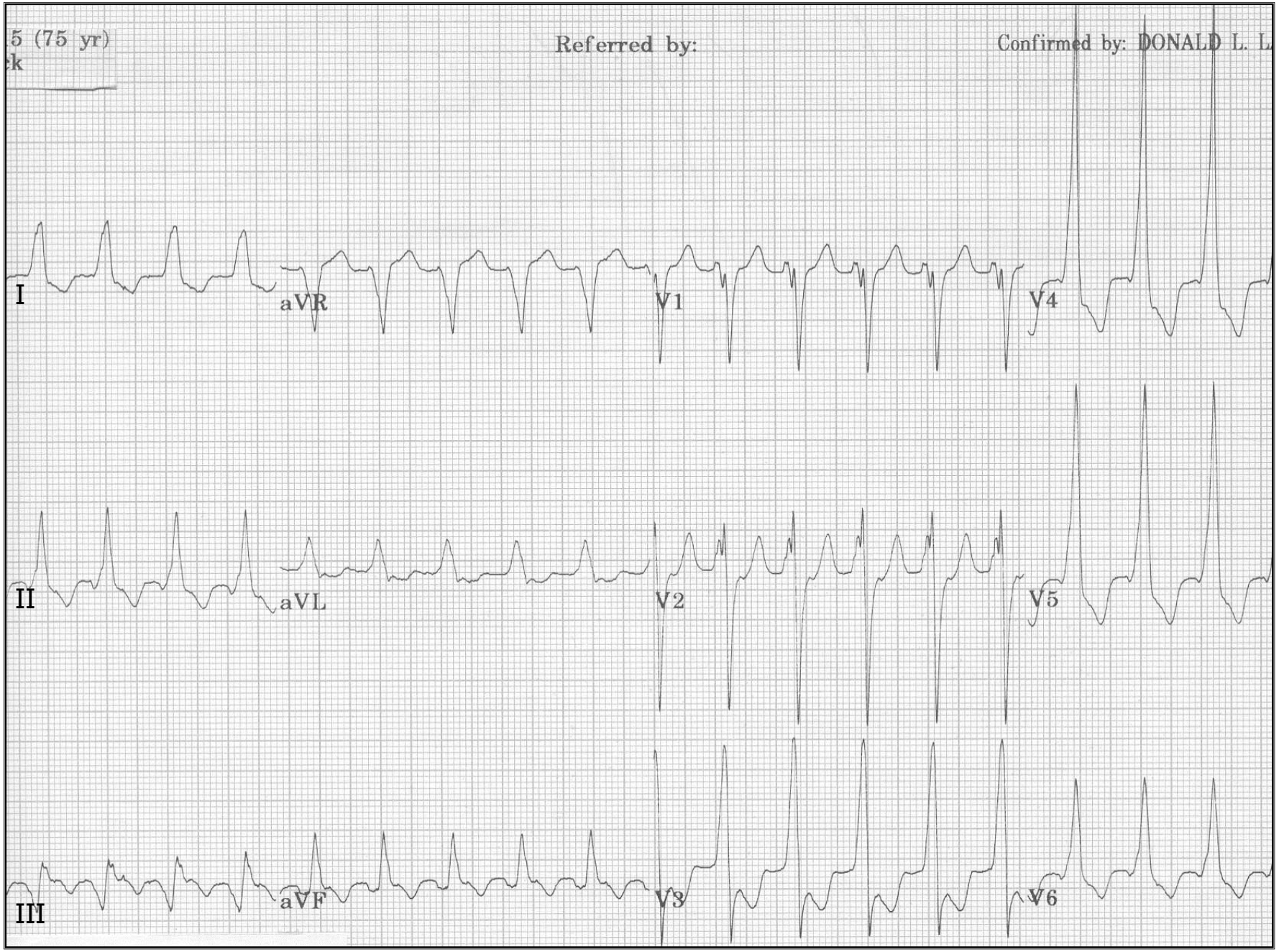
Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V=210 PR= QRS=1120 QT=240 Axis= indeterminate	Wide QRS tachycardia	• IVCD	• rsR' in V1 • Late S (rightward forces) in I, aVL, V6	Abnormal ECG: 1. High probability SVT with RBBB Clues: classic triphasic (rsR') RBBB morphology in V1 is very <u>unlikely</u> to be VT. The most likely SVT mechanism in this ECG is AVNRT with RBBB.



65 Year old man in the ICU with hypotension



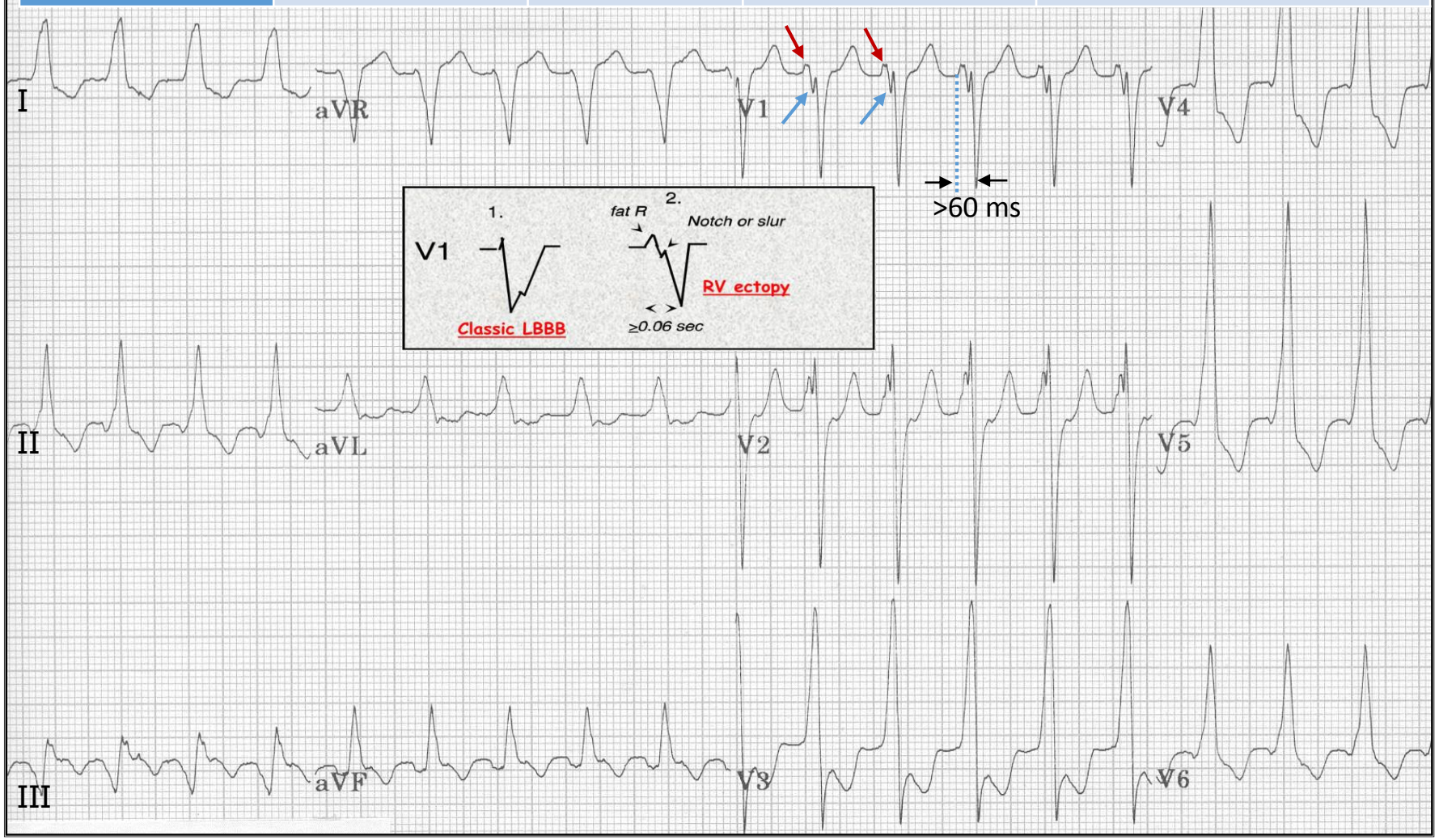
Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V=140 PR= QRS=150 QT=340 Axis= -120 (NW Quadrant)	Wide QRS tachycardia	• IVCD	• Northwest quadrant axis (lead I and II both negative) • qR pattern in V1 • rS pattern in V6	Abnormal ECG: • Left ventricular tachycardia ECG Clues for VT in this case: 1) NW quadrant axis; 2) qR in V1; rS in V6. Clinical clues: hypotension



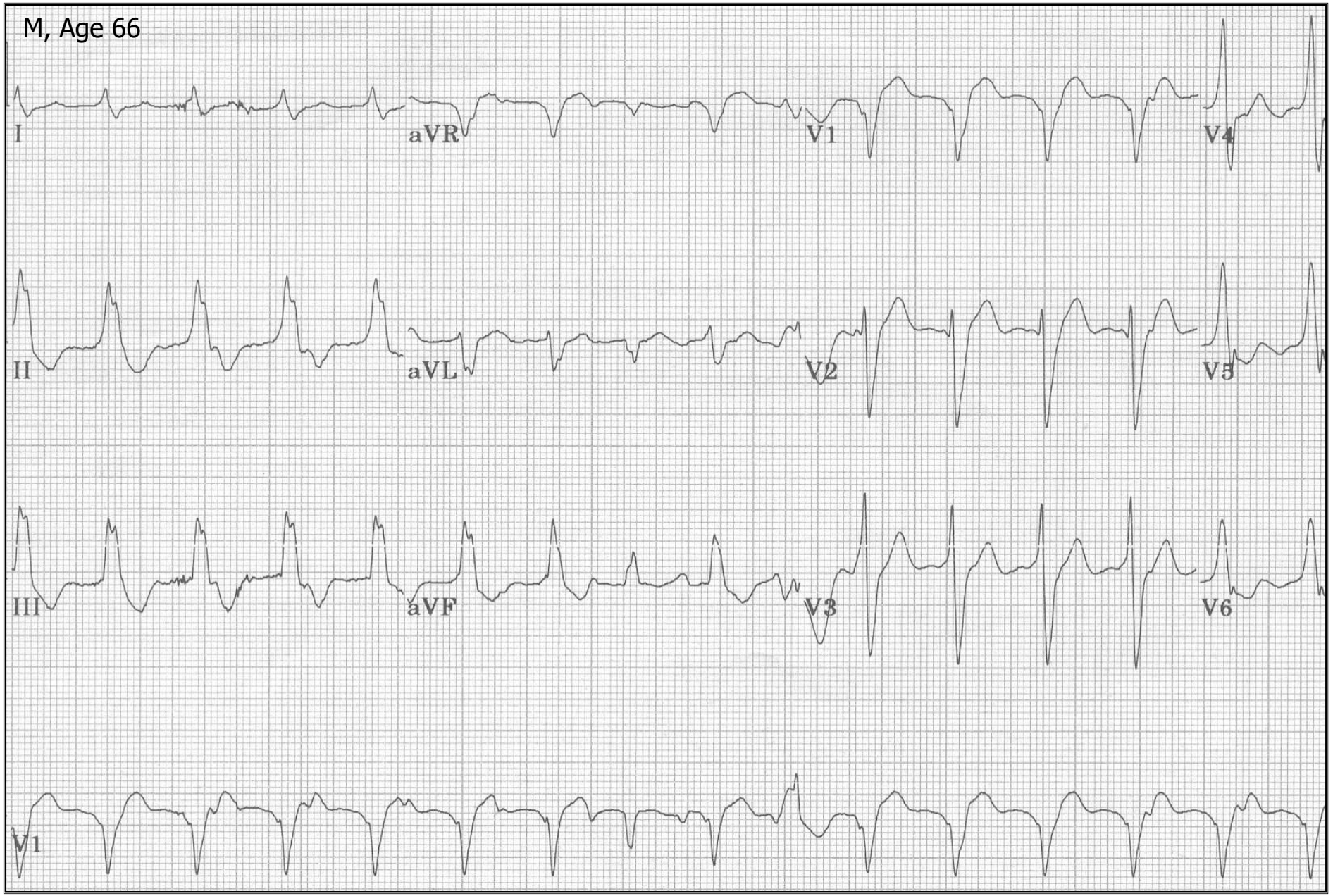
75 Year old man in the ICU with recent acute coronary syndrome

7-3

Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= 135 PR= QRS=160 QT=360 Axis= +30	Wide QRS tachycardia	• IVCD	• fat R in V1 (red arrows) • Notch on downstroke of S in V1 (blue arrows) • >60 ms delay from QRS onset to S wave nadir in V1	Abnormal ECG: 1. Right ventricular tachycardia Clues: classic VT morphology in lead V1 (RV origin)

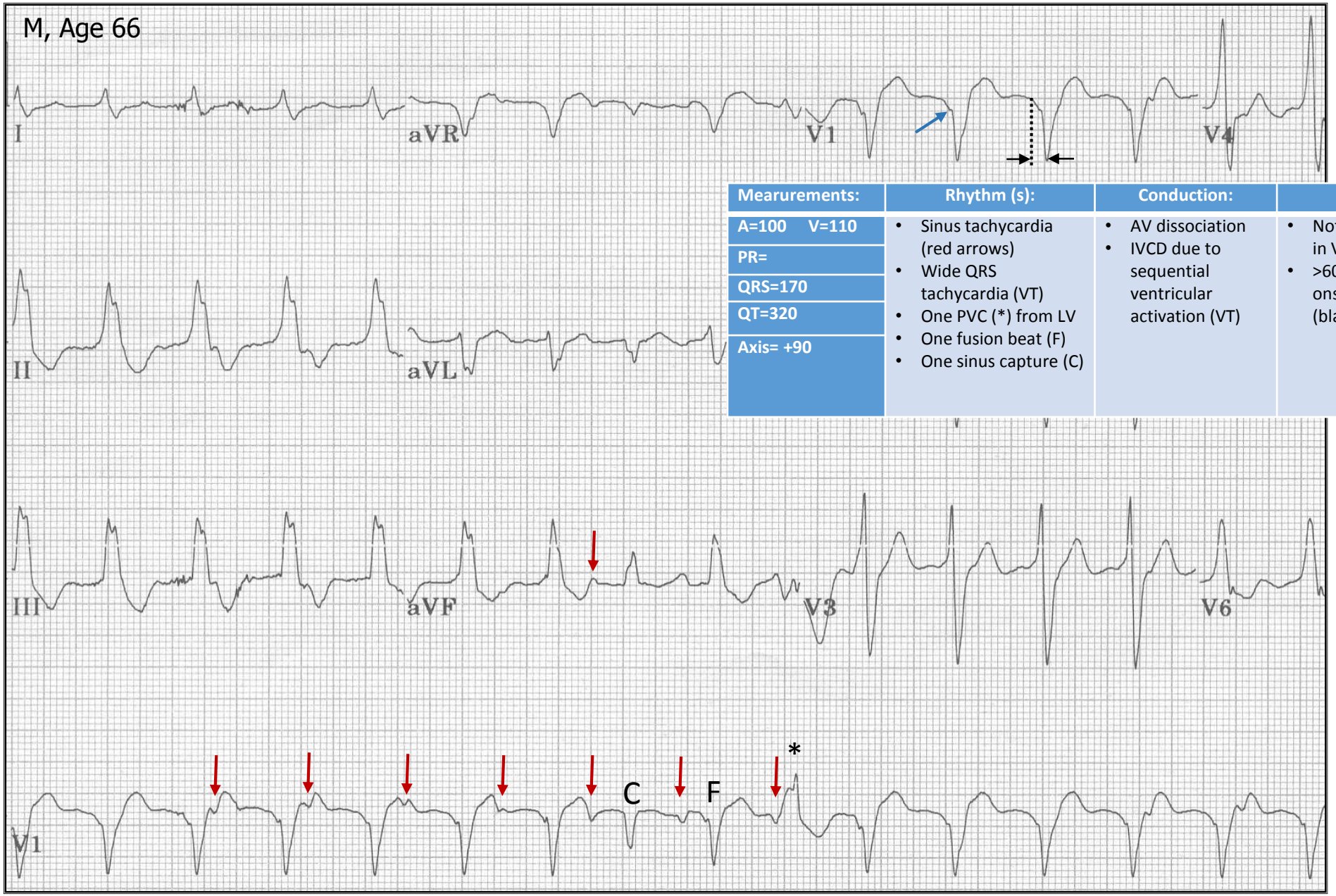


75 Year old man in the ICU with recent acute coronary syndrome

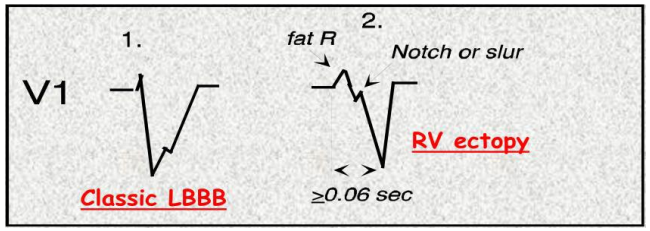


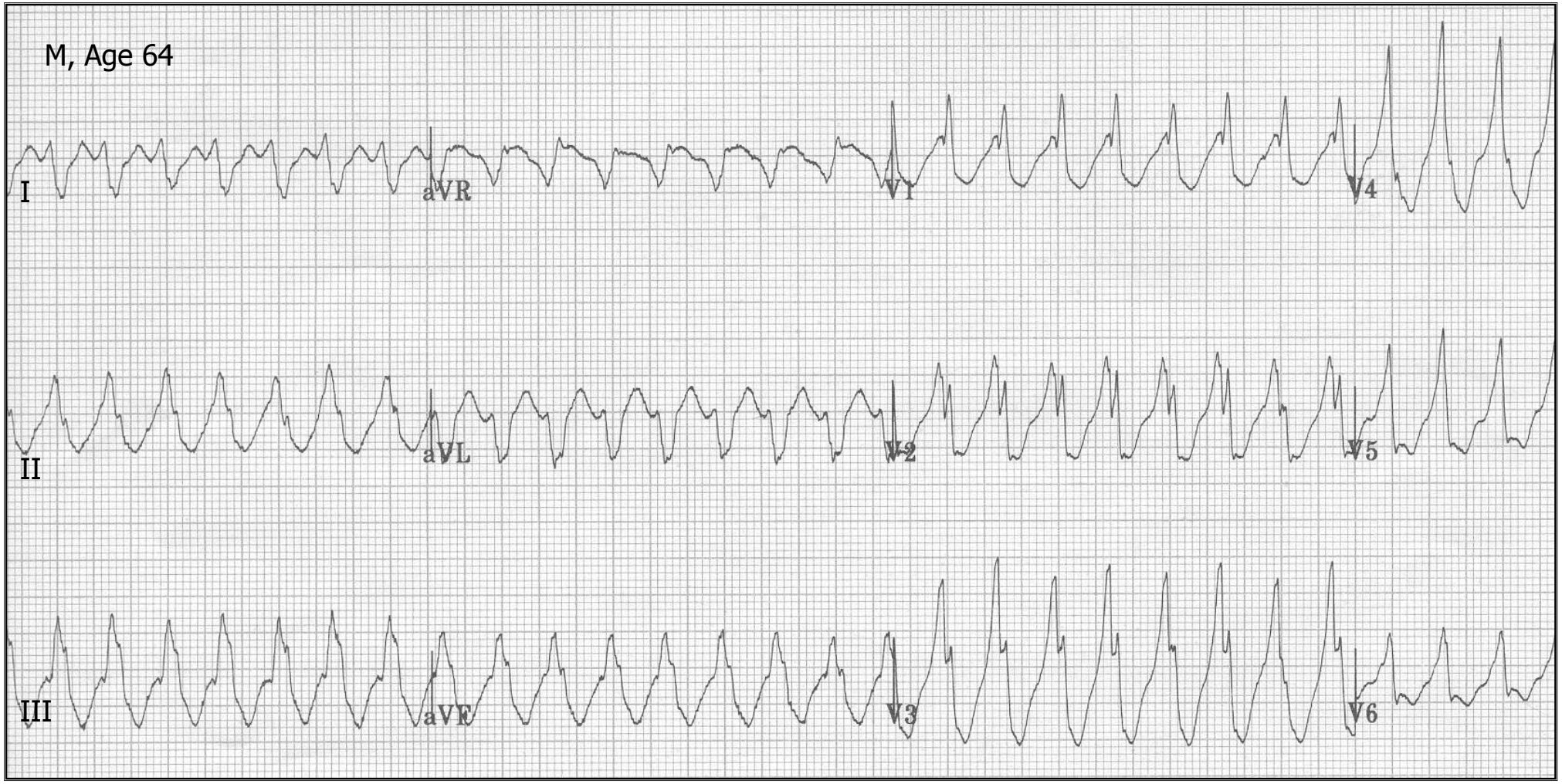
7-4

M, Age 66

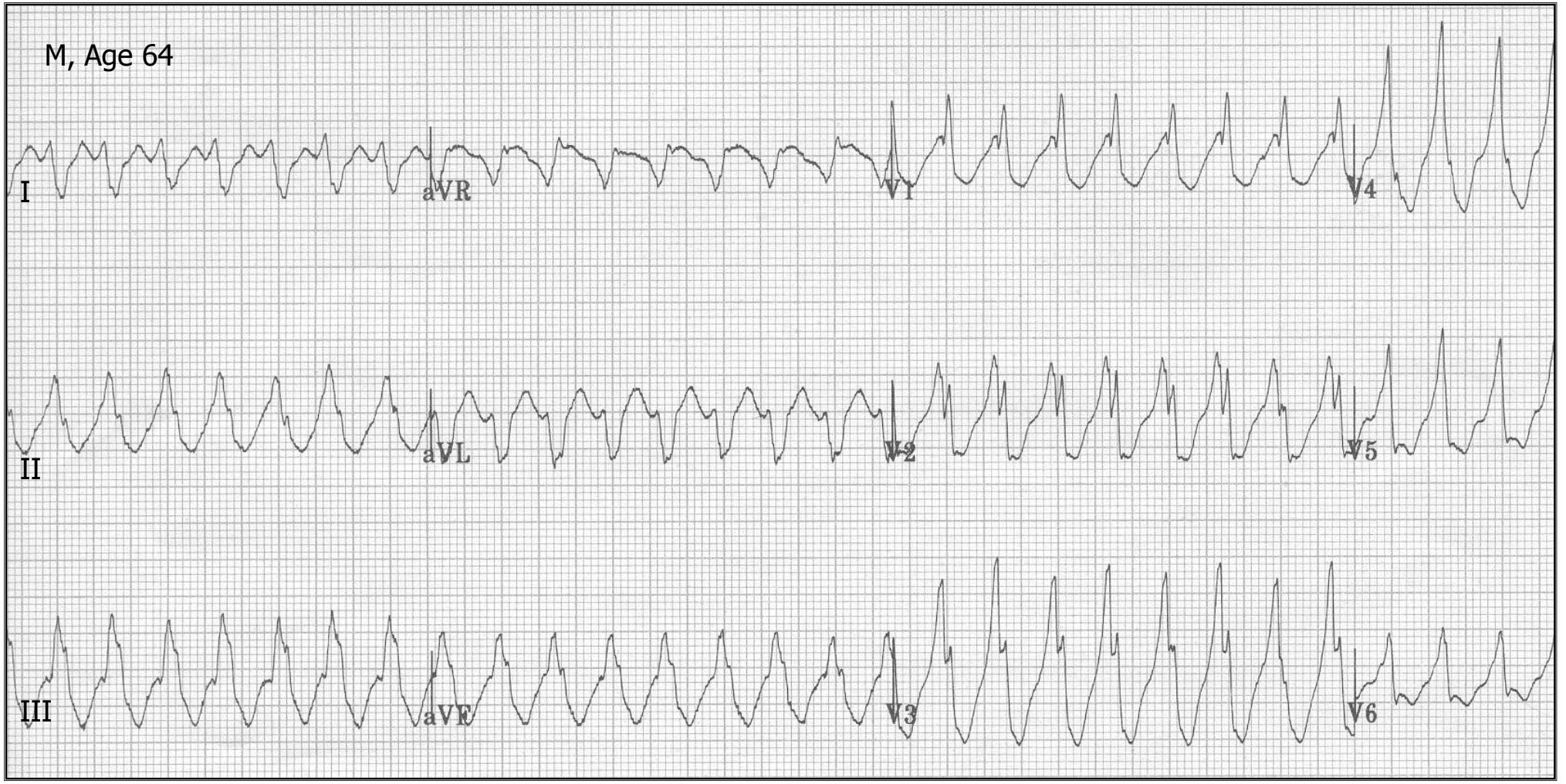


Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A=100 V=110 PR= QRS=170 QT=320 Axis= +90	• Sinus tachycardia (red arrows) • Wide QRS tachycardia (VT) • One PVC (*) from LV • One fusion beat (F) • One sinus capture (C)	• AV dissociation • IVCD due to sequential ventricular activation (VT)	• Notch on downstroke of S in V1 (blue arrow) • >60 ms delay from QRS onset to S nadir in V1 (black arrows)	Abnormal ECG: 1. Right ventricular tachycardia with incomplete AV dissociation from the competing sinus tachycardia VT Clues: V1 QRS morphology; AV dissociation with fusions and captures

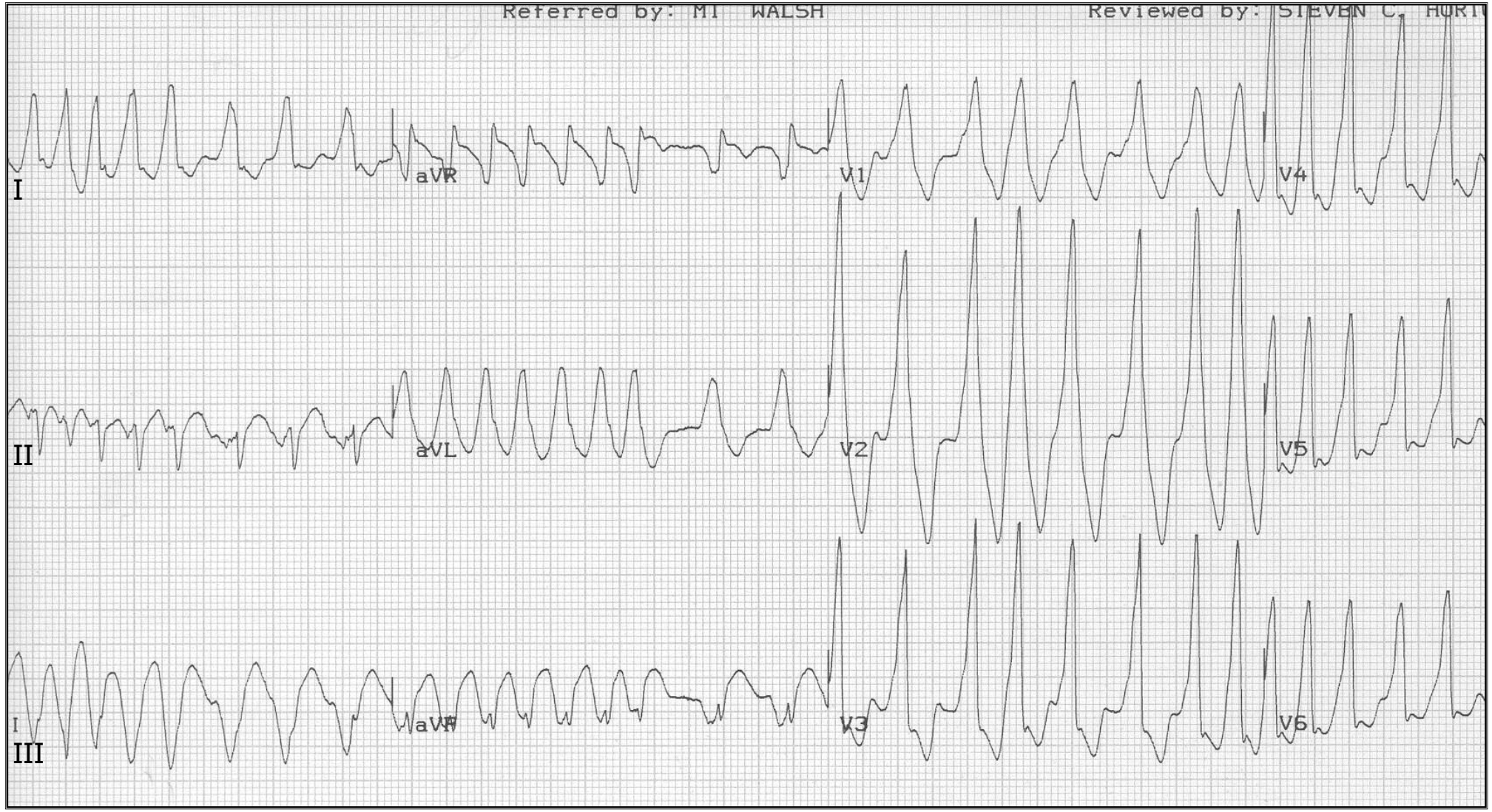




7-5



Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= 200 PR= QRS=150 QT=320 Axis= +105	Ventricular tachycardia	IVCD due to sequential ventricular activation during VT	• Concordant QRS complexes V1-6 (all QRS's in same direction) favors VT diagnosis	Abnormal ECG: • Ventricular tachycardia Another VT clue: initial part of QRS moves more slowly than later parts suggesting origin in ventricular muscle rather than Purkinje network (see V2, for example)

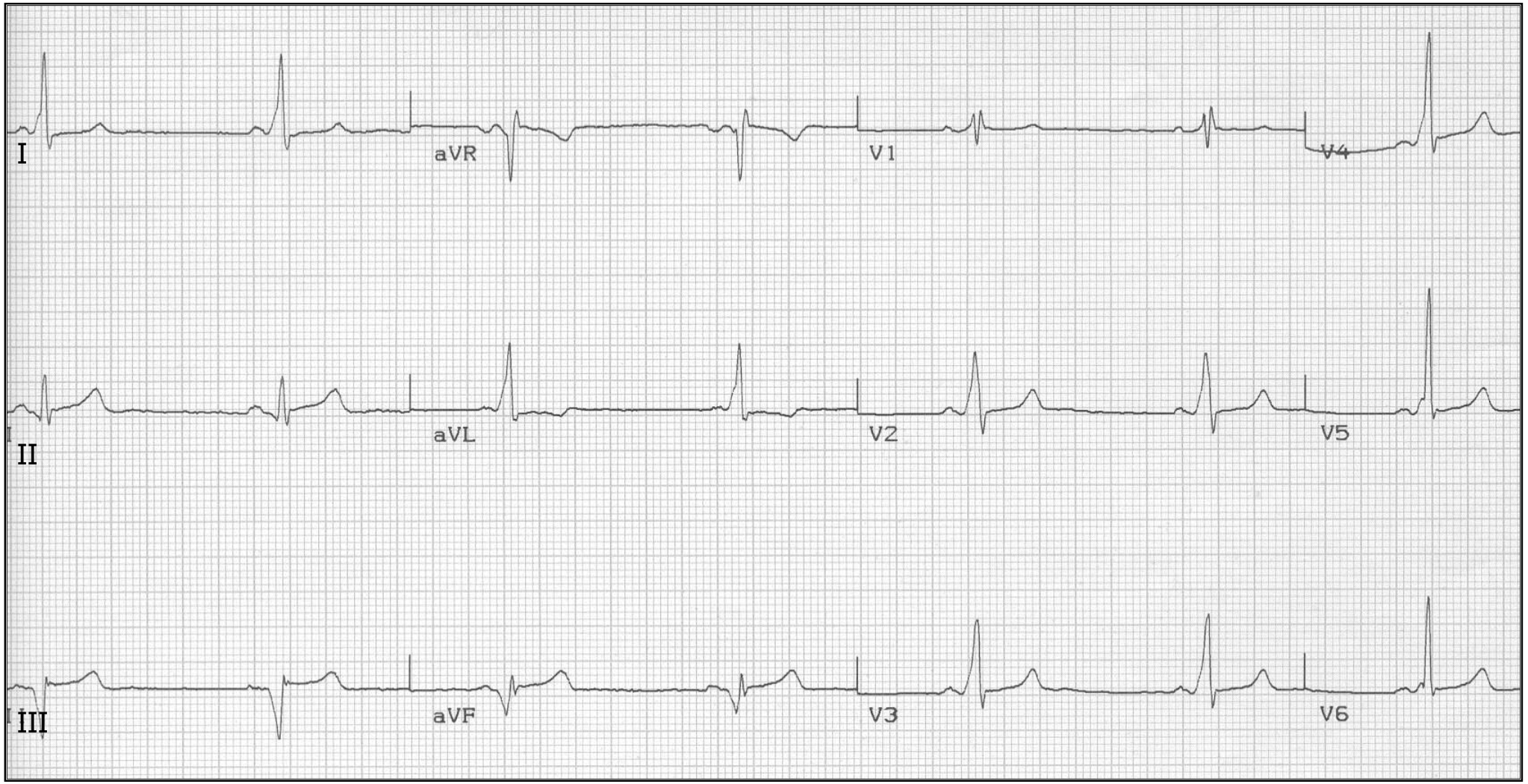


56 year old man with long history of intermittent palpitations

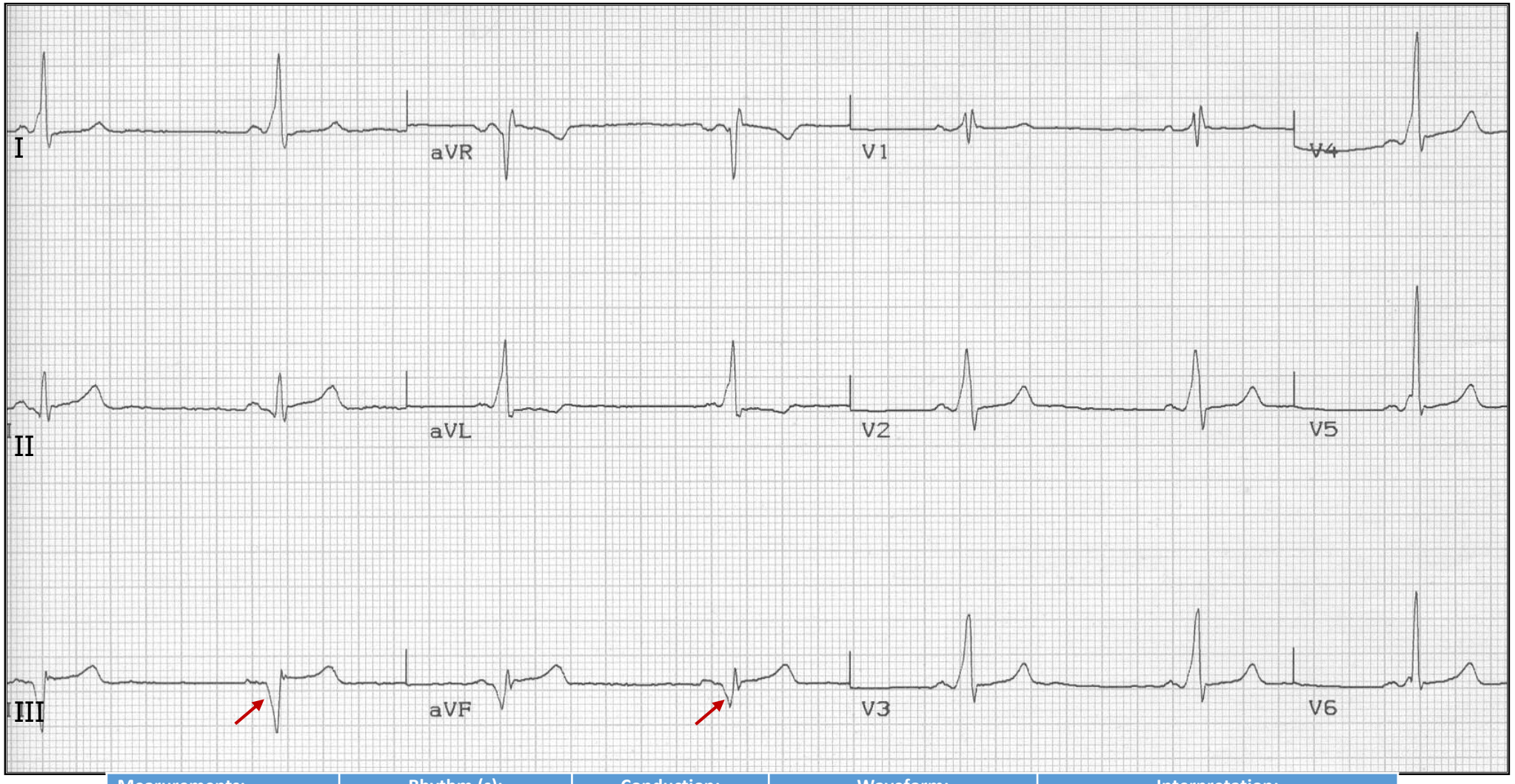
7-6a

Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= ~200 PR= none QRS= ~140 (but variable) QT= ~280 Axis= -40	Atrial fibrillation with rapid HR	Variable IVCD (QRS's with varing duration)	• Irregular wide QRS tachycardia • Concordant QRS V1-6	Abnormal ECG: • Rhythm (A-fib) • Accessory pathway (WPW) Clue: some QRS's occur at >300 bpm (see arrows). The AV node can't conduct that fast; i.e., use of accessory pathway.

7-6a

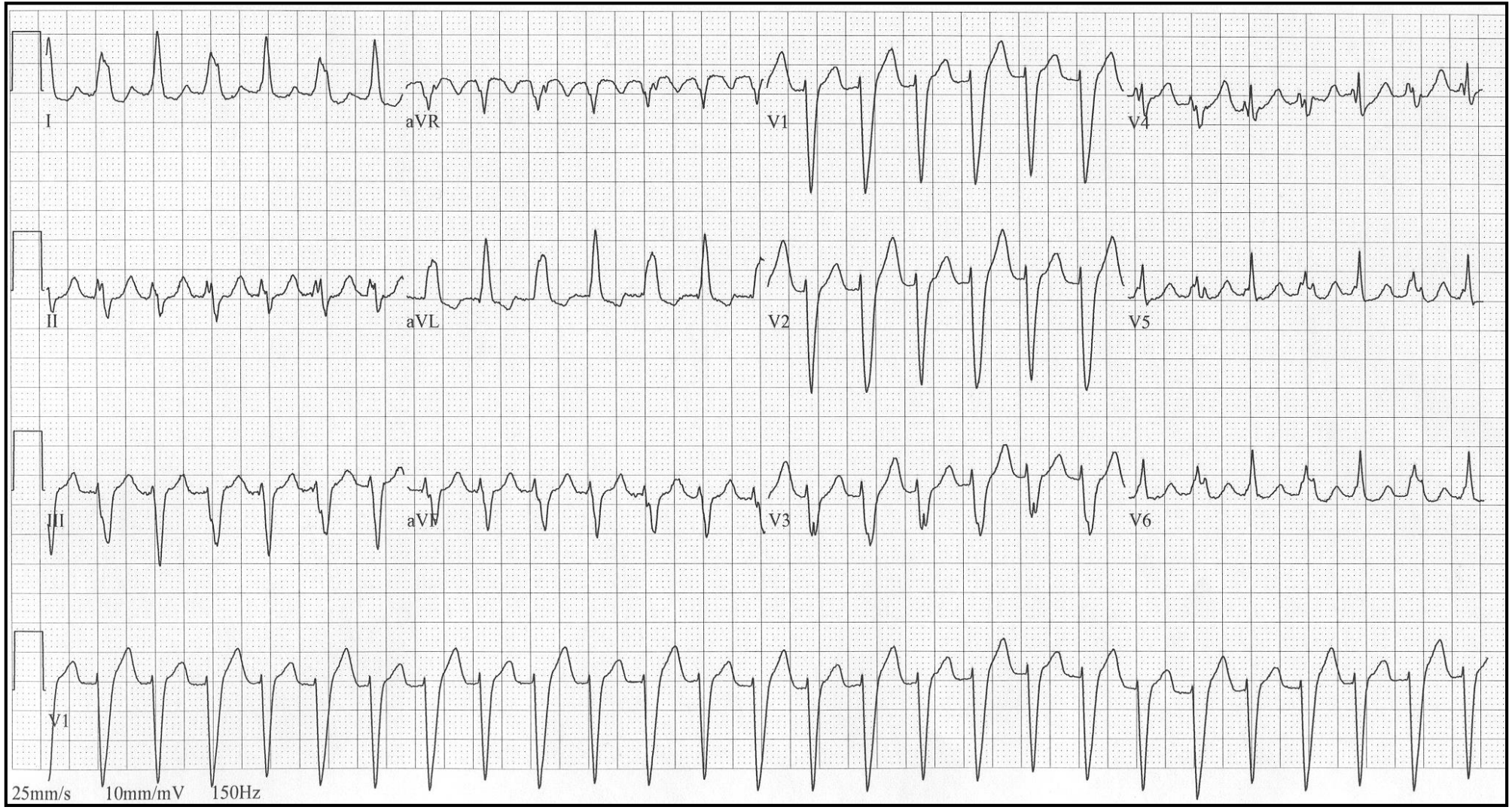


56 year old man with long history of intermittent palpitations (after a treatment)

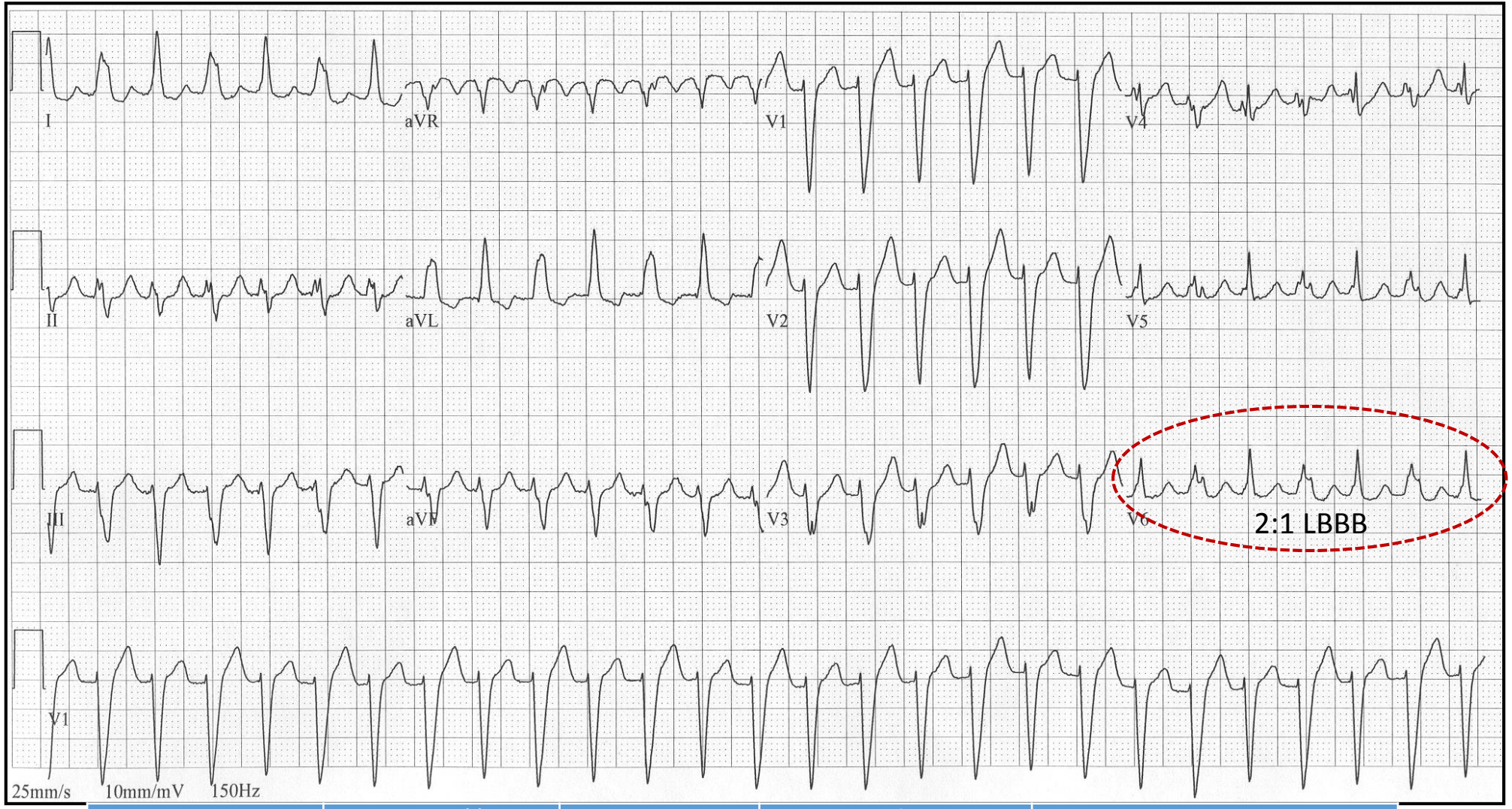


Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A=45 V=45 PR=110 (short) QRS=11o QT=440 Axis= -10	Marked sinus bradycardia	• short PR • IVCD	• delta waves are negative in II, III, aVF looking like pathologic Q-waves (arrows)	Abnormal ECG: • WPW type preexcitation • Heart rate (sinus bradycardia) When this person goes into atrial fibrillation (see previous ECG) there is very rapid conduction with variable wide QRS morphology)

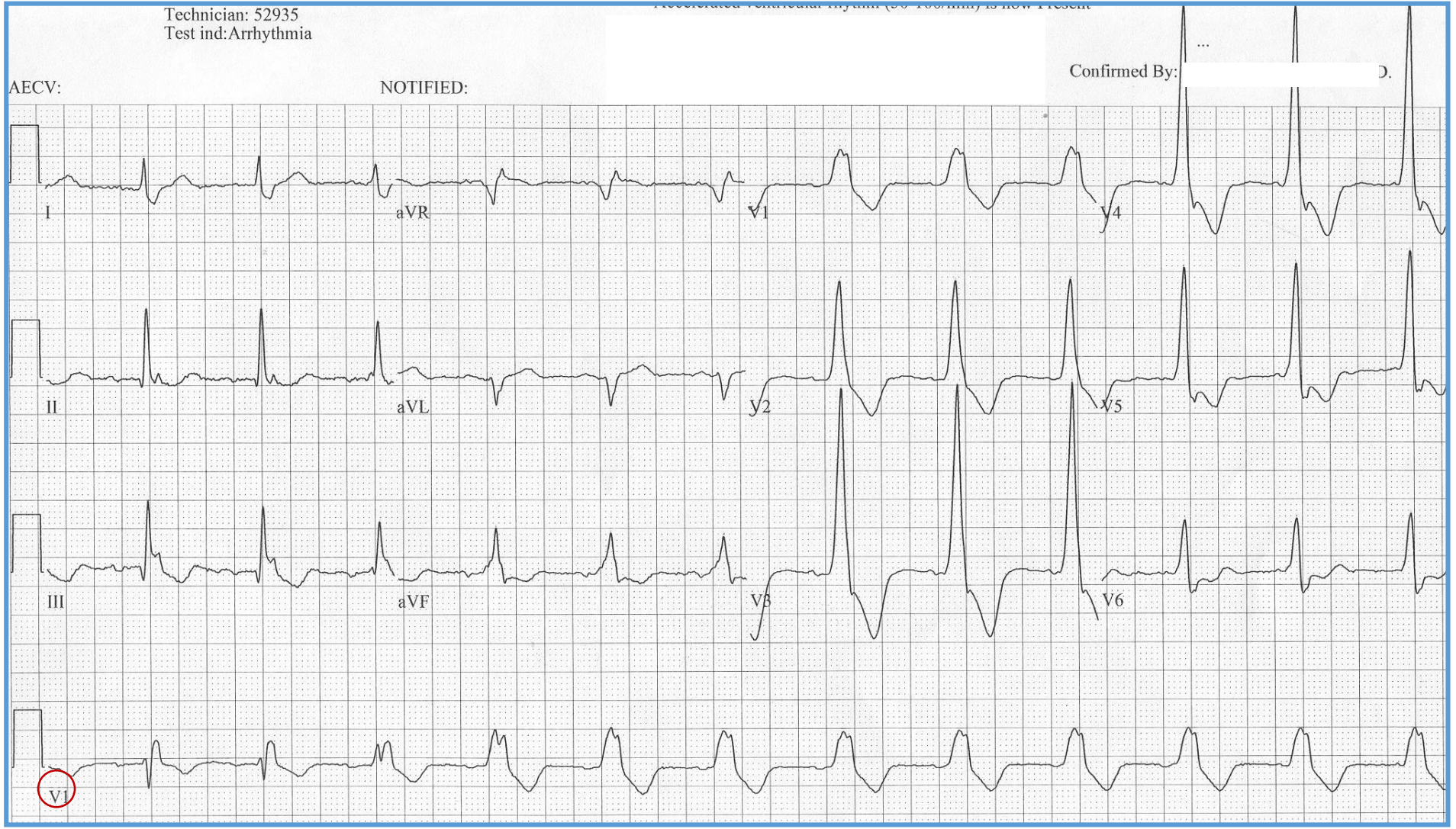
7-6b



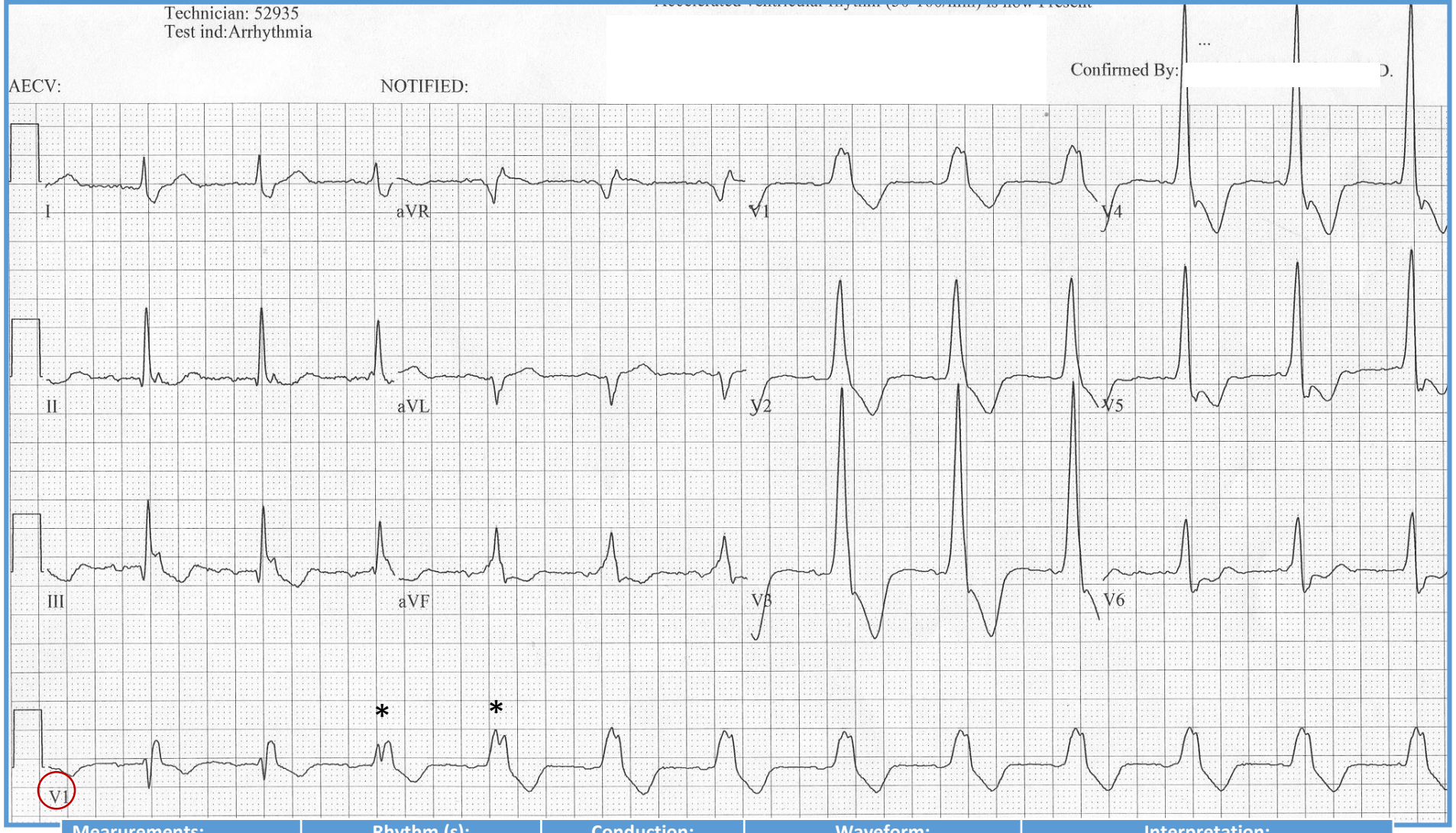
47 year old woman with recent onset of palpitations



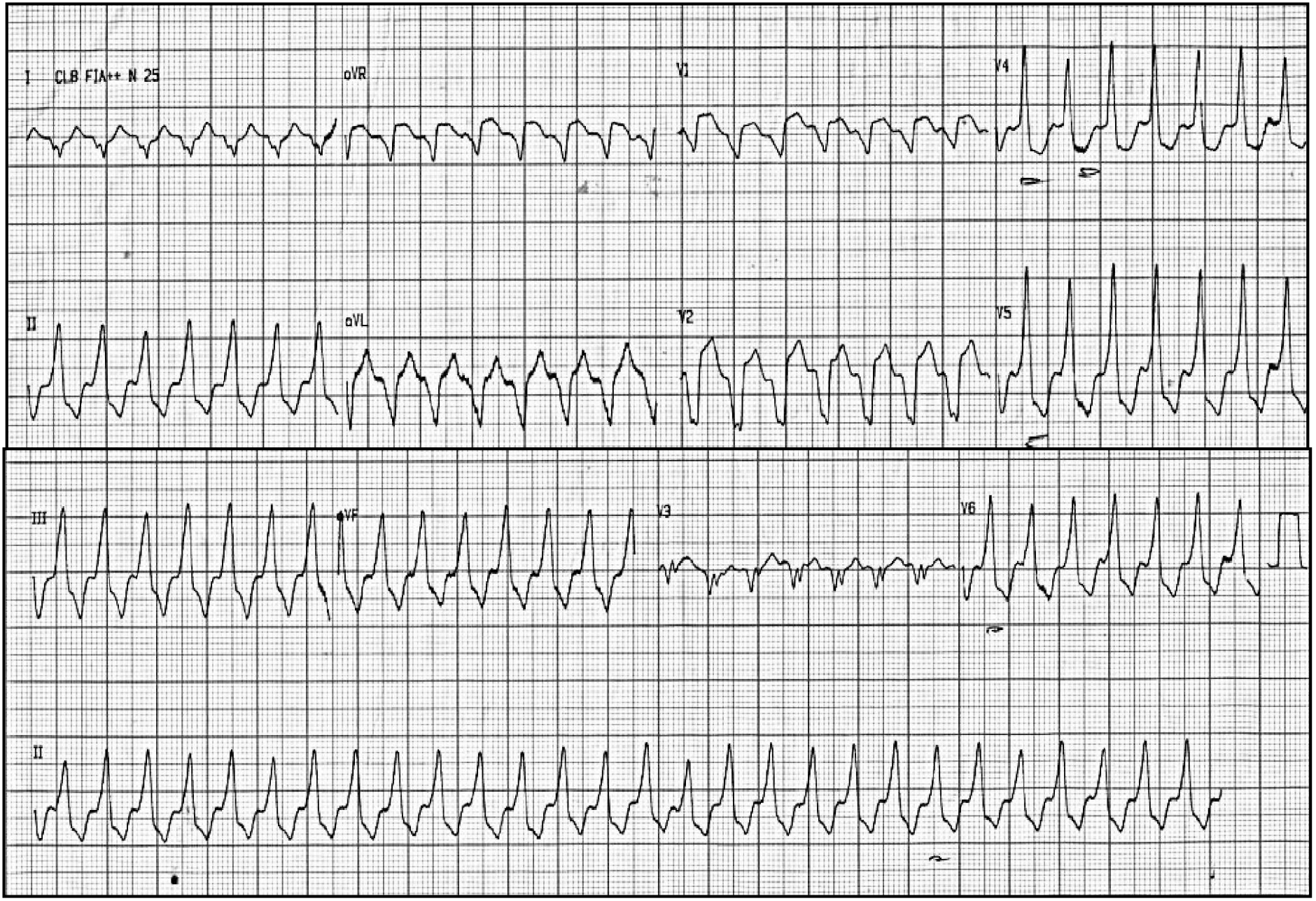
Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= 160 PR= QRS= 100 & 130 QT= ~260 Axis= -30	Supraventricular tachycardia	2:1 LBBB	Alternating notched monophasic R in I, aVL, V6 (LBBB)	Abnormal ECG: • Rhythm/Rate: SVT (probably AVNRT) • Conduction (2:1 LBBB) Note: This is an unusual SVT due to the alternating 2:1 LBBB. At a slower rate all the QRS's would likely be narrow.



Check out the V1 rhythm strip

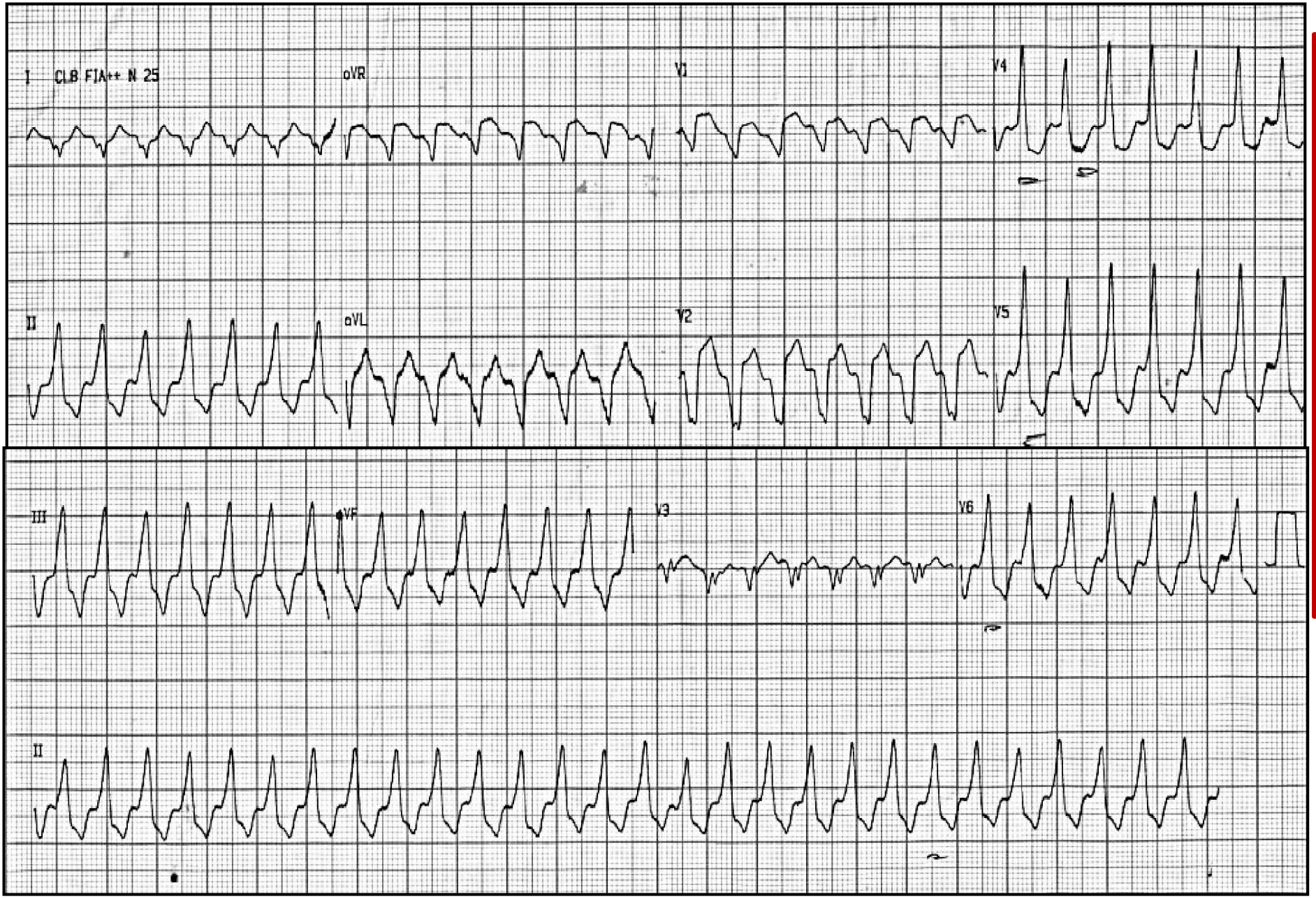


Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= ~75 V= ~75 **PR= ~200** (1st 2 beats) **QRS= 140** **QT= 400** **Axis= +75**	Sinus rhythm (1st 2 beats) followed by accelerated ventricular rhythm (from the LV; also called an 'isochronic' ventricular rhythm due to a similar HR as the sinus rate)	• RBBB (1st 2 beats)	• rSR' (1st 2 beats) • Fusion beats (*); when the ventricular rhythm begins there is also partial conduction from the sinus rhythm into the ventricles.	Abnormal ECG: • RBBB • Isochronic ventricular rhythm (note the subtle AV dissociation (shortening of PR intervals) during the ventricular rhythm)



67 y.o. man with syncope; brother died suddenly 10 yrs. ago

7-9a

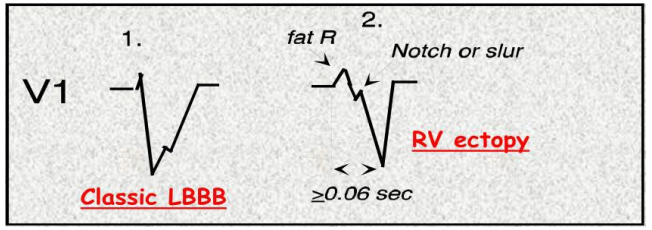


HR: 190 bpm
QRS: 120 ms
QT: ~240 ms
Axis: +100

Rhythm: Ventricular tachycardia (RV outflow track origin; note the inferior frontal plane axis of +100 degrees and LBBB like QRS)

Waveform: wide QRS with slurred V1 downstroke

Abnormal ECG: VT



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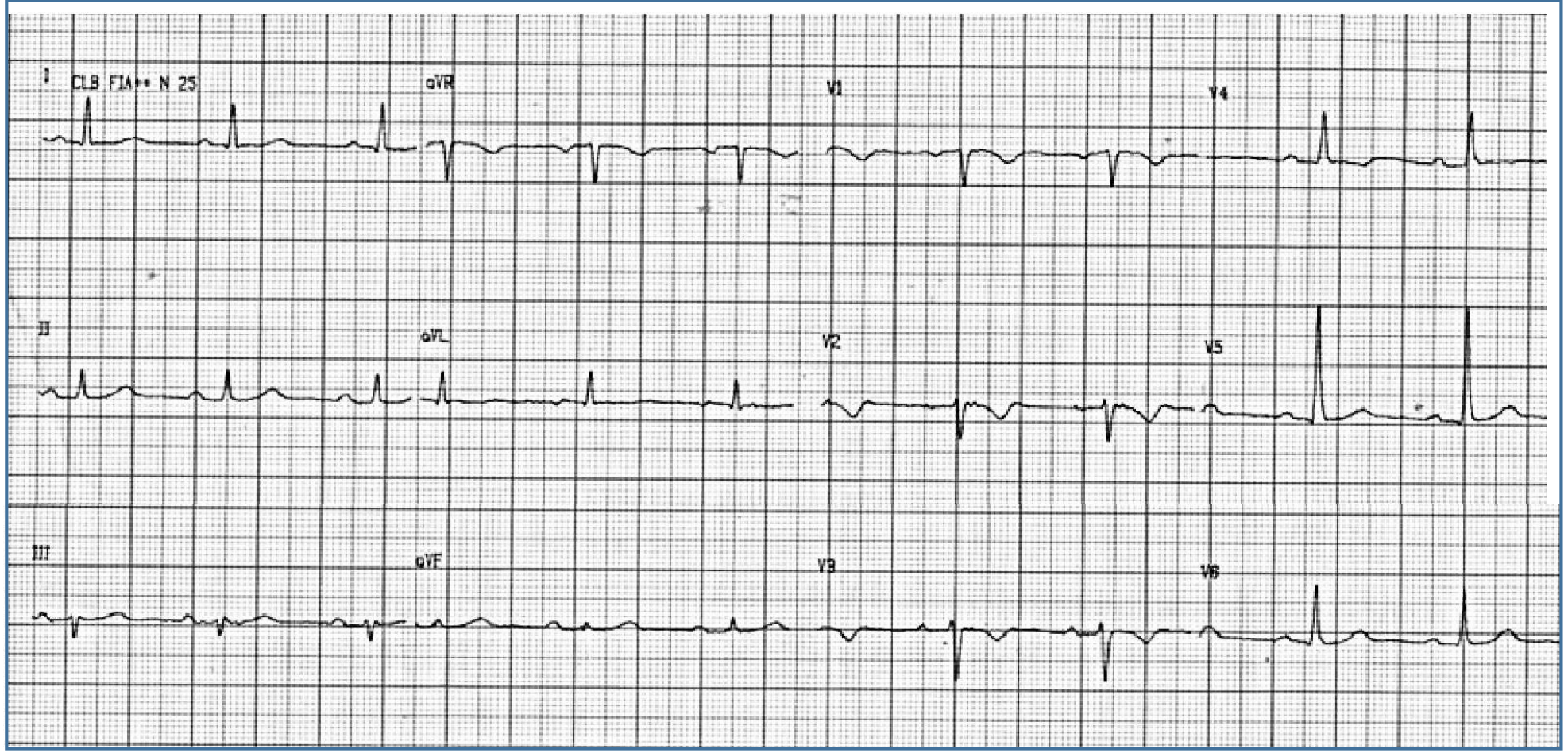
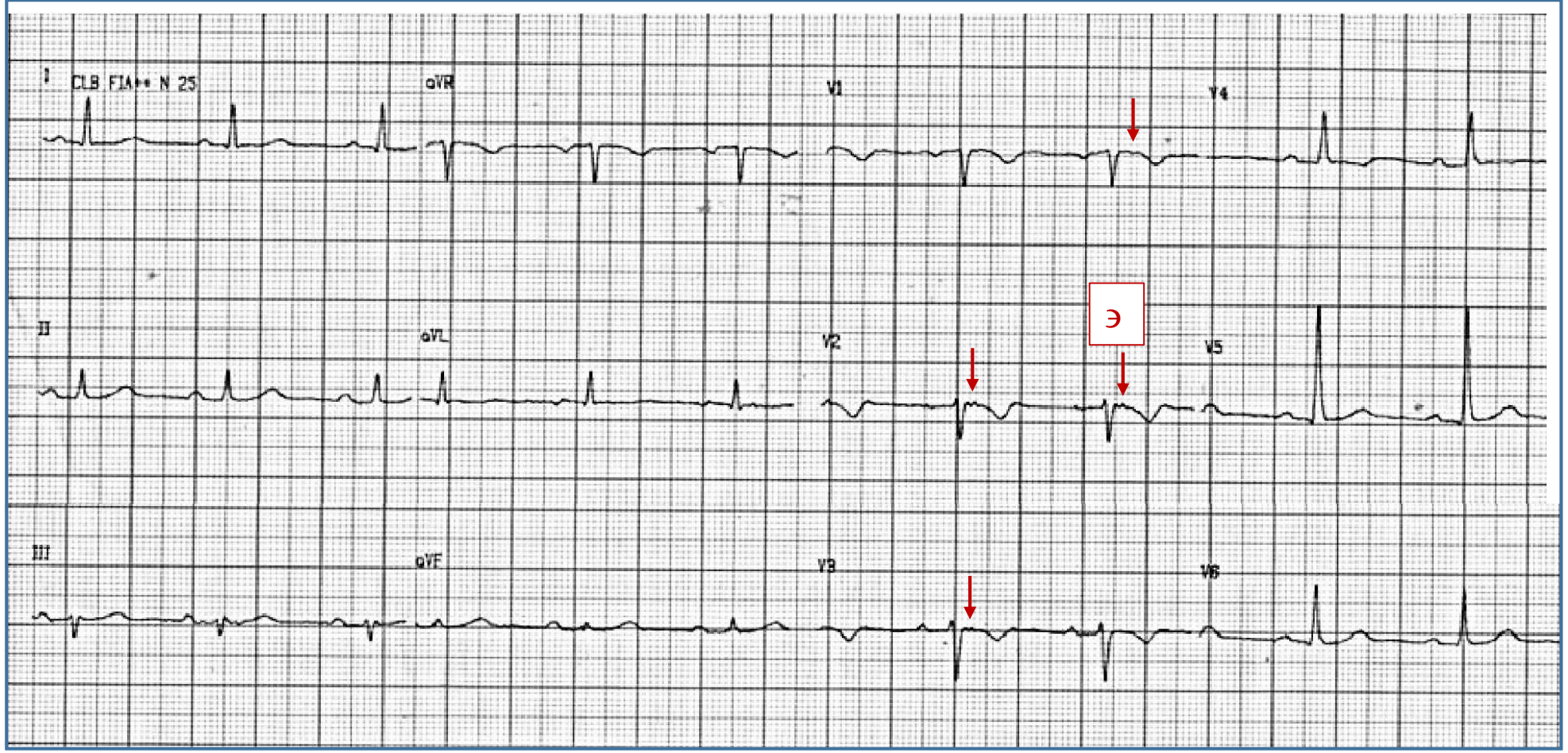
7-9a

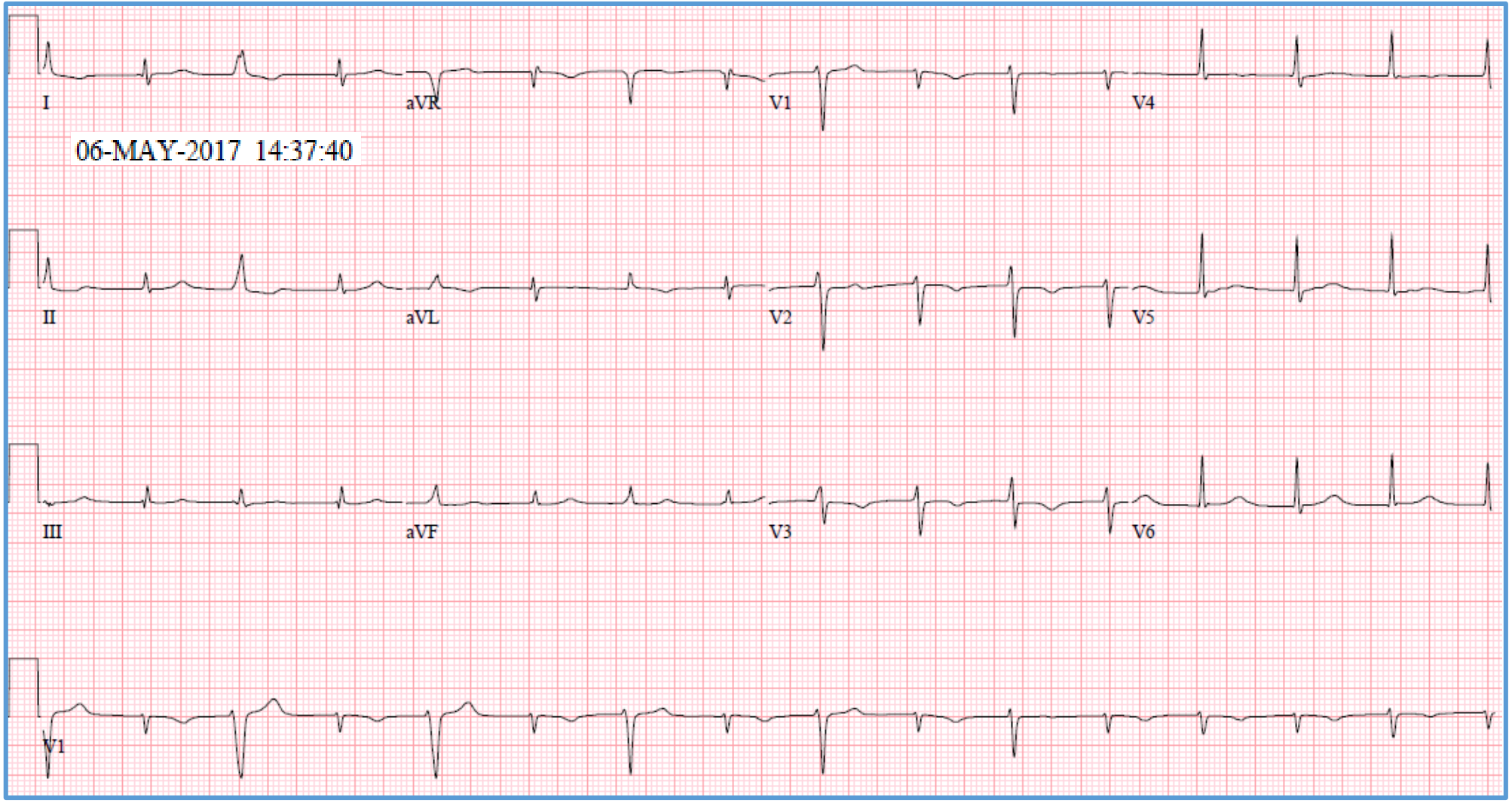


67 y.o. man with syncope; post cardioversion

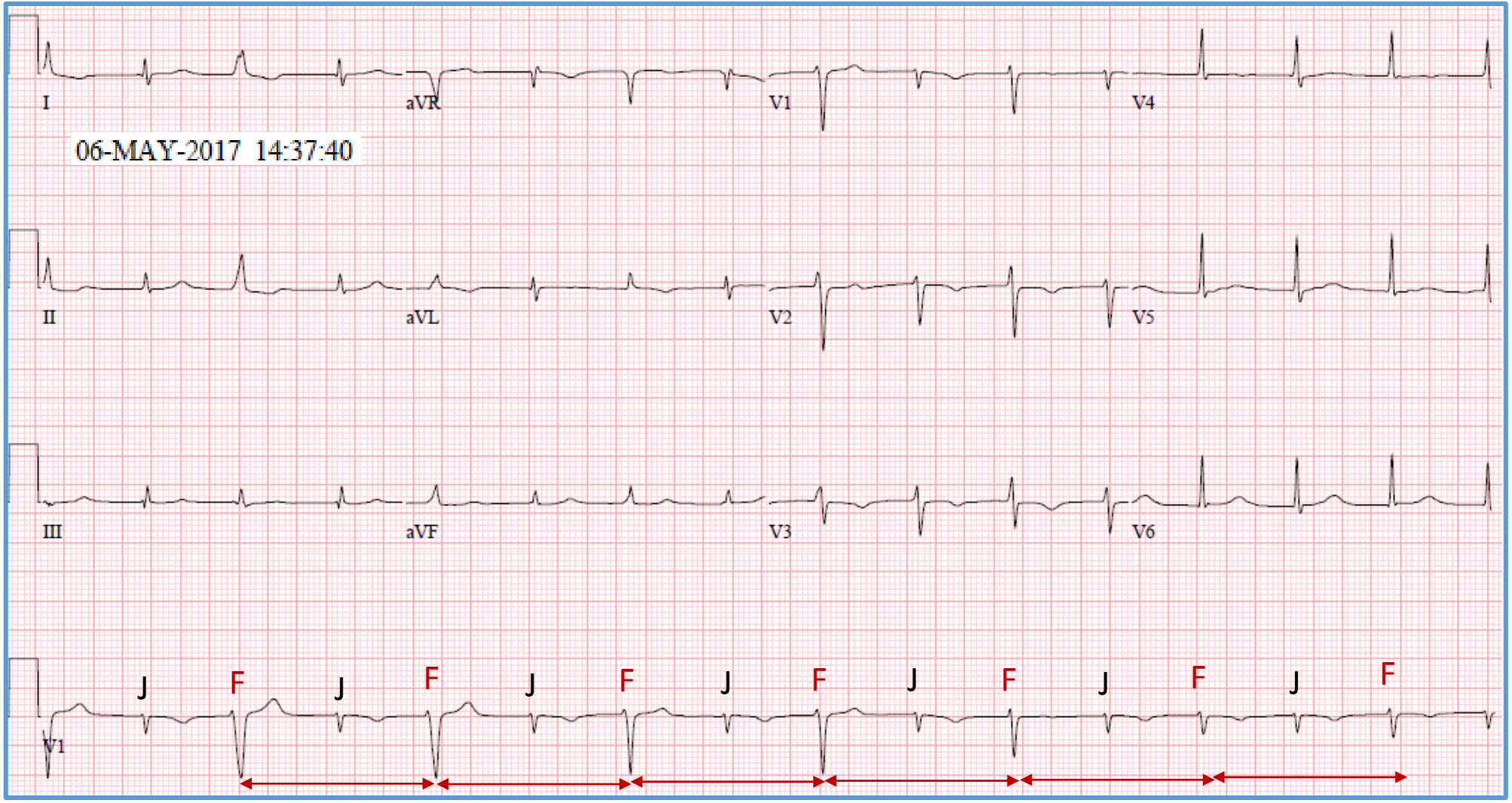


Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= 65 V= 65 PR=200 QRS=80 QT=400 Axis= 0	Sinus rhythm	Normal SA, AV, IV conduction	• Very tiny Epsilon waves V1-3 (arrows) • T wave inversion V1-4	Abnormal ECG: • Arrhythmogenic right ventricular dysplasia (ARVD) • T wave abnormalities (V1-4) associated with ARVD Epsilon waves are subtle indicators of altered conduction in the RV outflow track associated with high risk of RVOT tachycardias (see previous ECG 7-9a) and sudden cardiac death.

7-9b

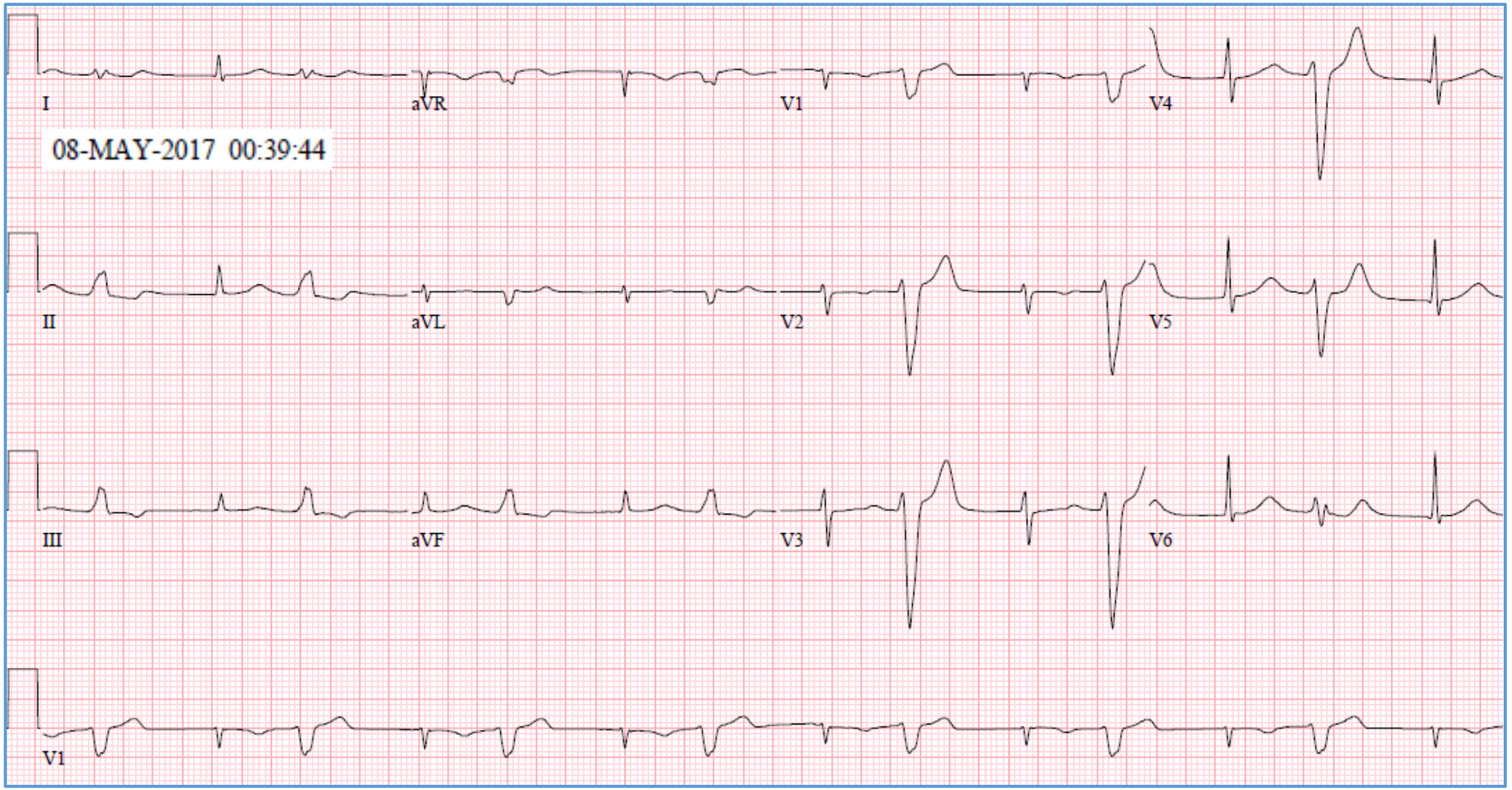


25 year old man ‘found down’ in bathroom: rhabdomyolysis and acute renal failure; admitted to shock/trauma unit.



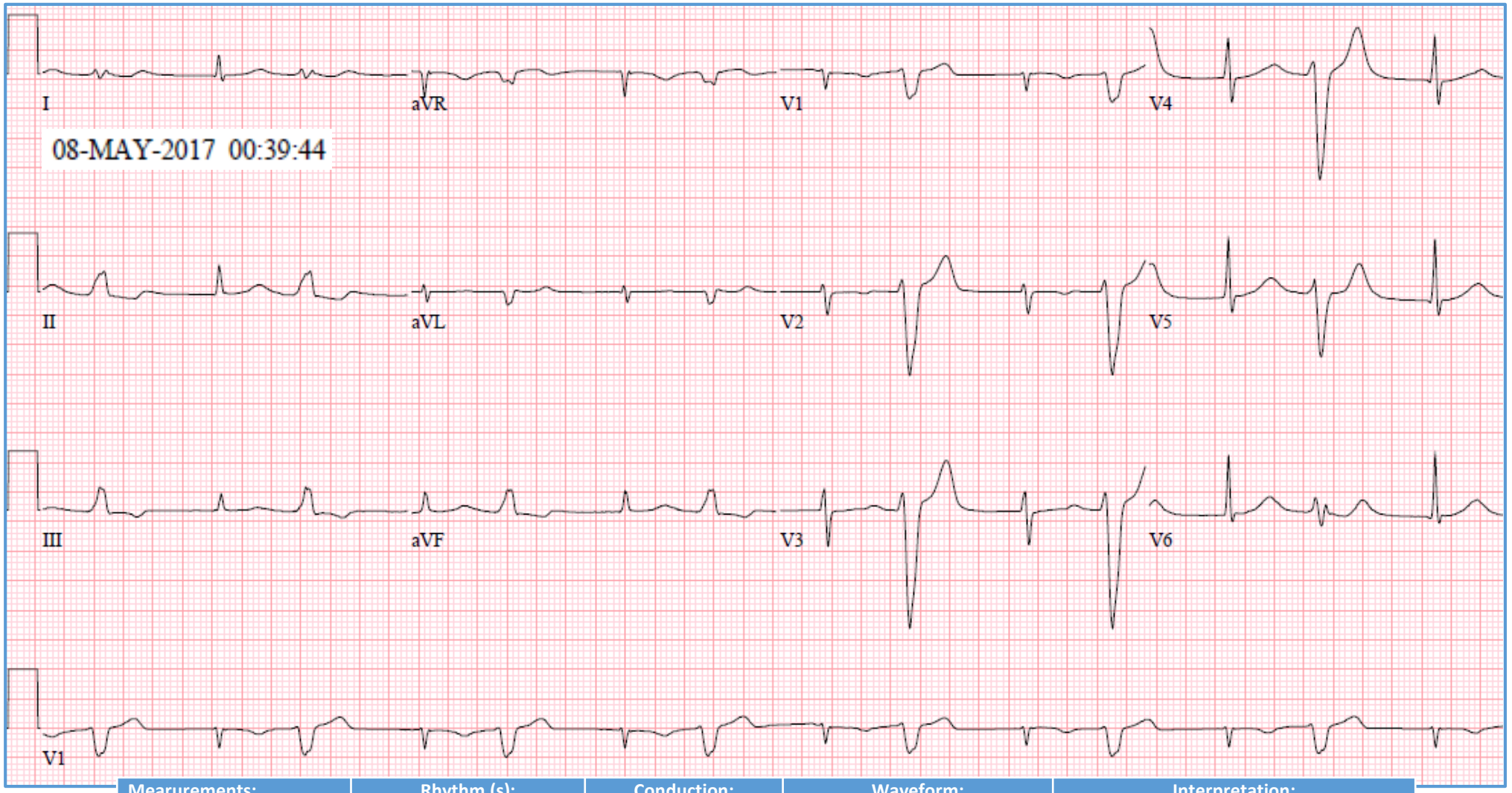
Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= ~90 PR= QRS= 80 (junctional beats) QT=360 Axis= +60	• Accelerated junctional rhythm (J) • Competing parasystolic ventricular rhythm with fusion beats (F); Note the constant RR interval between the parasystolic beats (F) as they merge with the junctional beats (J) Amazing!	Normal IV	• T inversion V1-3	Abnormal ECG: 1. Parasystolic ventricular rhythm 2. Accelerated junctional rhythm 3. Nonspecific T abnormalities Note: the fusion beats result from the merger of an RV ectopic focus with the accelerated junctional beats.

7-10a



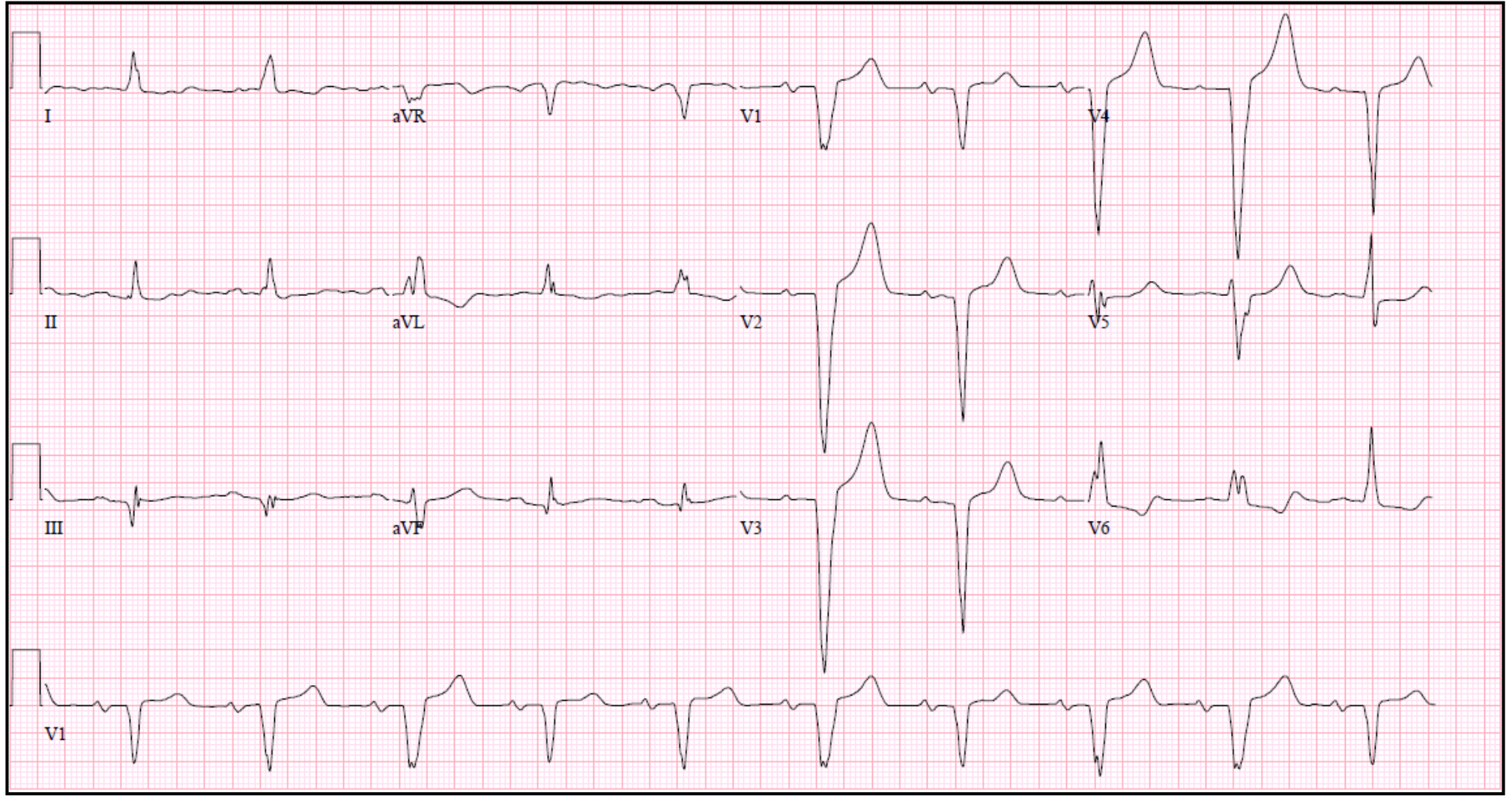
25 year old man ‘found down’ in bathroom: rhabdomyolysis and acute renal failure; admitted to shock/trauma unit.

7-10b



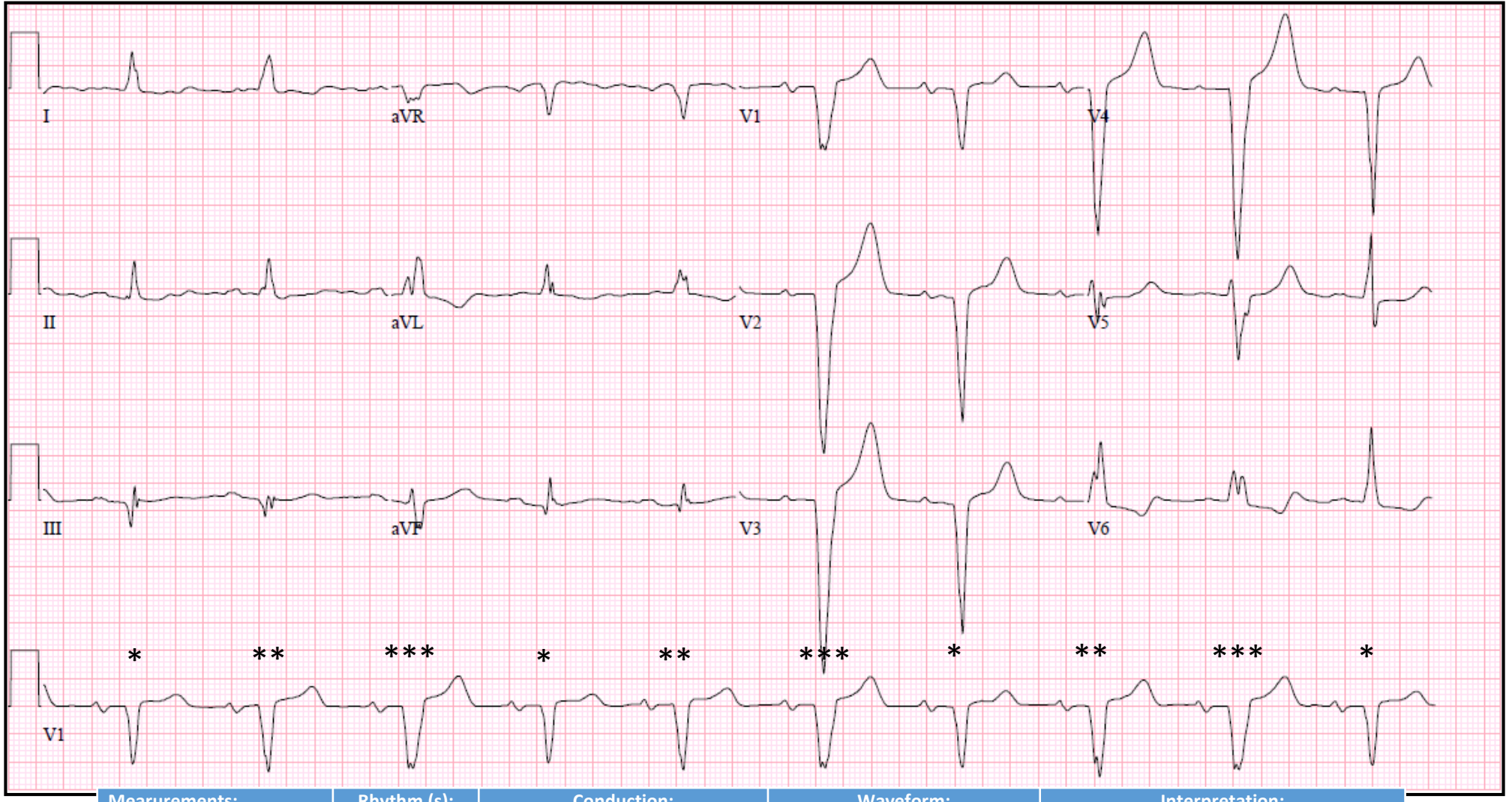
Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= V= ~85 PR= QRS=70 QT= ~420 Axis= +60	• Accelerated junctional rhythm • PVC's (RV origin) in a pattern of bigeminy	Normal IV	• Normal QRS • Minor T inversion (V2)	Abnormal ECG: 1) Rhythm 2) Prolonged QT (for heart rate)

7-10b

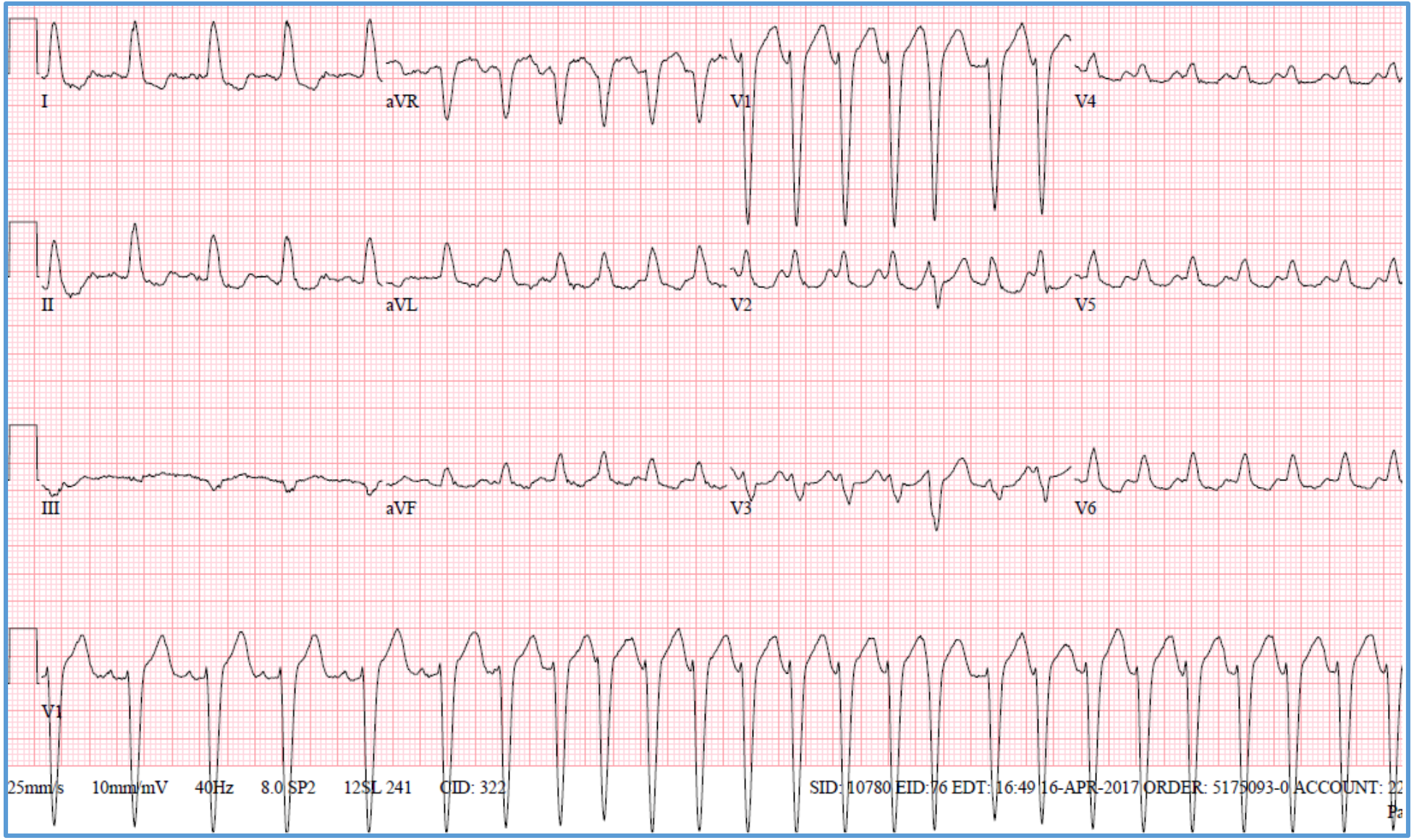


9-May-2014: LS: 70 y man; status post aortic valve replacement and quad CABG

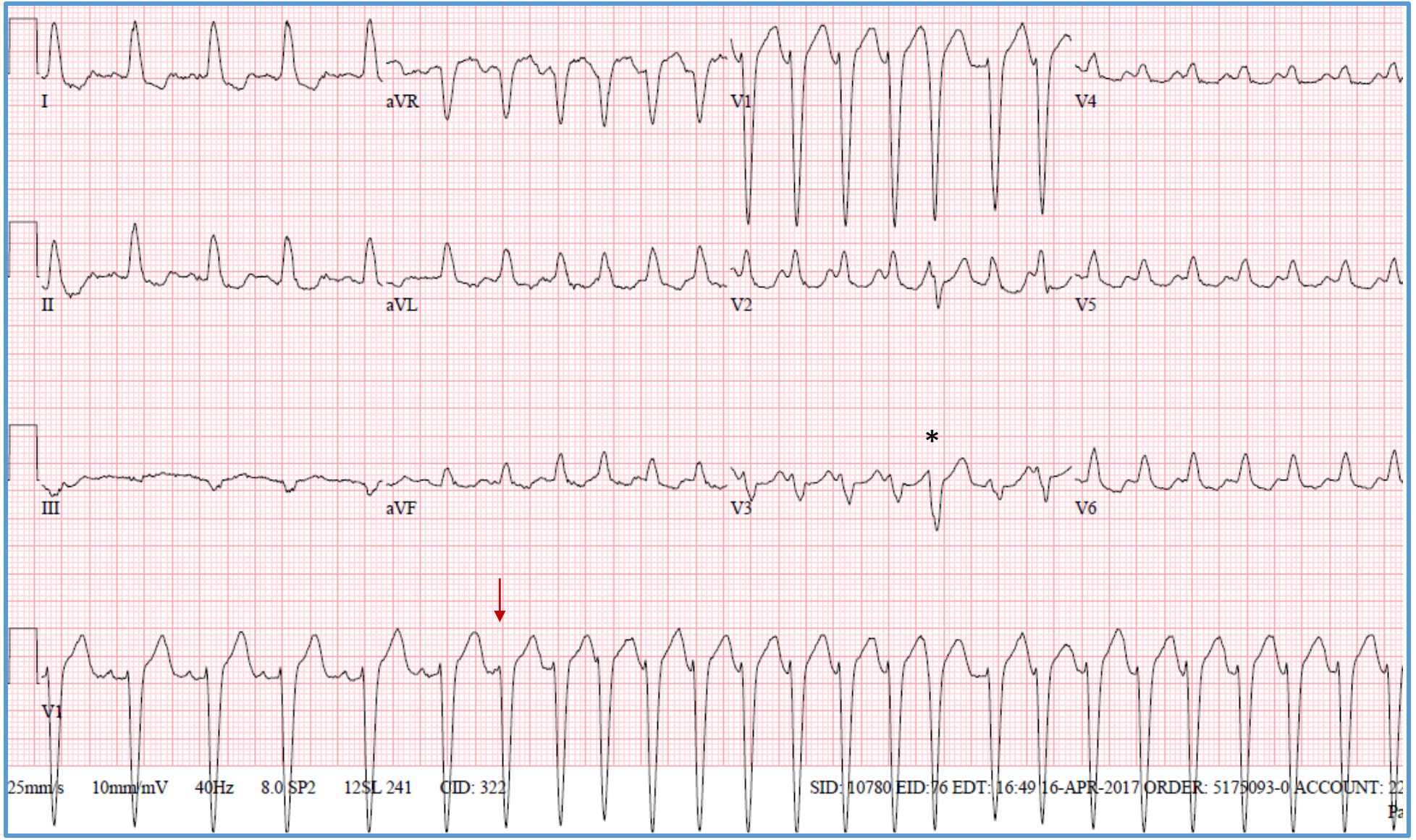
A funny thing happened on the way through the left bundle !



Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= 65 V= 65 PR=240 QRS=110 - 160 QT= 440 - 560 Axis= Normal	Sinus rhythm	• 1st degree AVB • 2nd degree LBBB (note the 3 different LBBB morphologies: incomplete *, more incomplete **, and complete ***)	ST-T changes secondary to the LBBB	Abnormal ECG: 1. 1st degree AV block 2. Incomplete LBBB (Is there such a thing as LBBB *Wenckebach*, or is it just an increasingly tired left bundle ?)



83 year old woman; dyspnea and fatigue



Mearurements:	Rhythm (s):	Conduction:	Waveform:	Interpretation:
A= 100 V=100 & 170 PR=160 QRS=120 QT=360 Axis= +15	• Sinus tachycardia and • Probable A-fibrillation beginning with arrow (note slight irregularity of RR) • One PVC (*)	• Normal SA, AV • LBBB	Secondary ST-T changes of LBBB	Abnormal ECG: 1. Heart rate (tachycardia) 2. Rhythms (Sinus tachy, A-Fib with RVR, and a PVC) 3. Conduction (LBBB)