

**Sociedad Mexicana de Electrofisiología y Estimulación Cardíaca.  
Instituto Nacional de Cardiología.  
México, 2008.**

# **Dilemas clínicos en electrofisiología.**

**Sami Viskin.  
Tel Aviv Medical Center.**





Se:1  
Im:1

[H]

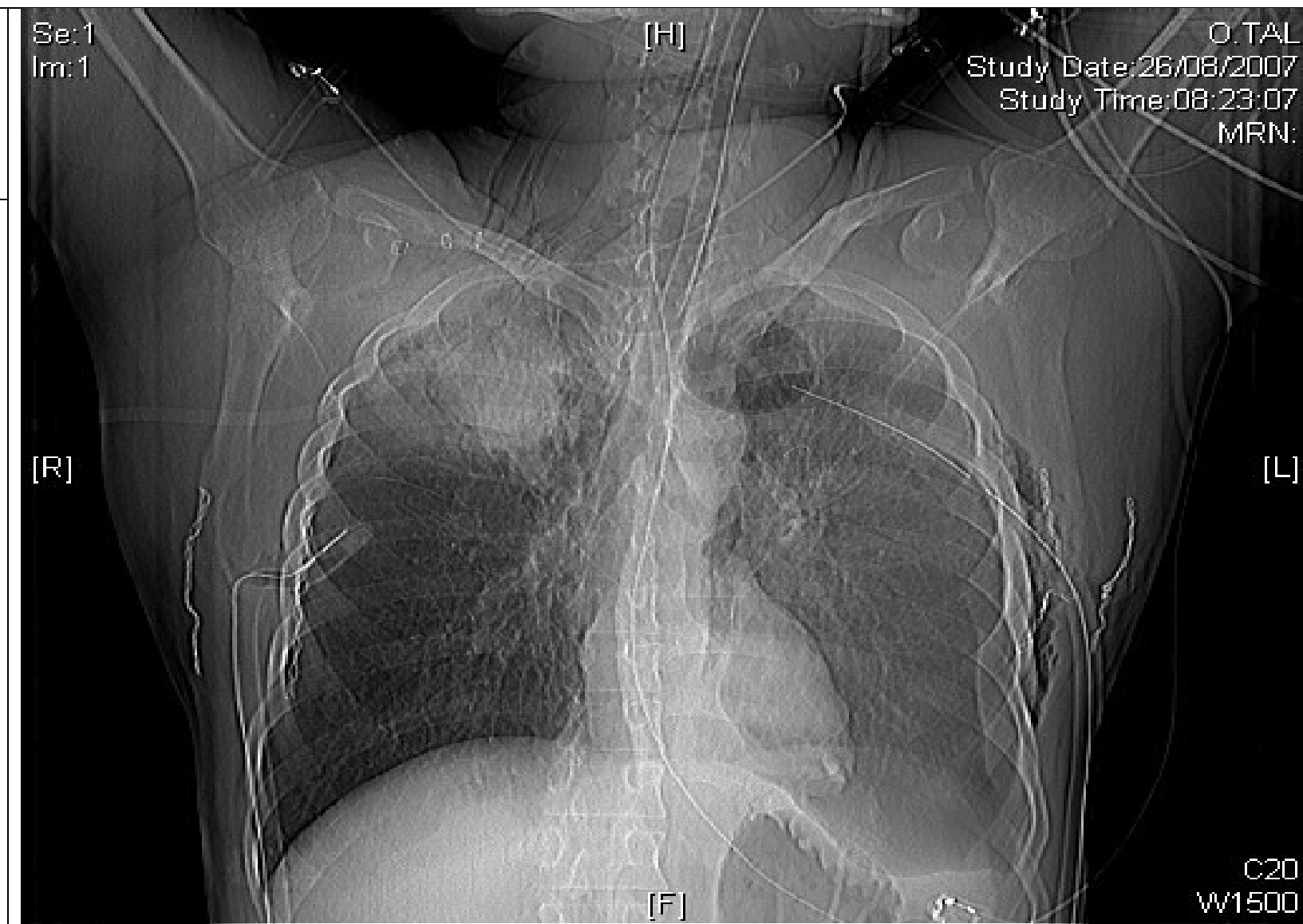
O.TAL  
Study Date:26/08/2007  
Study Time:08:23:07  
MRN:

[R]

[L]

[F]

C20  
W1500



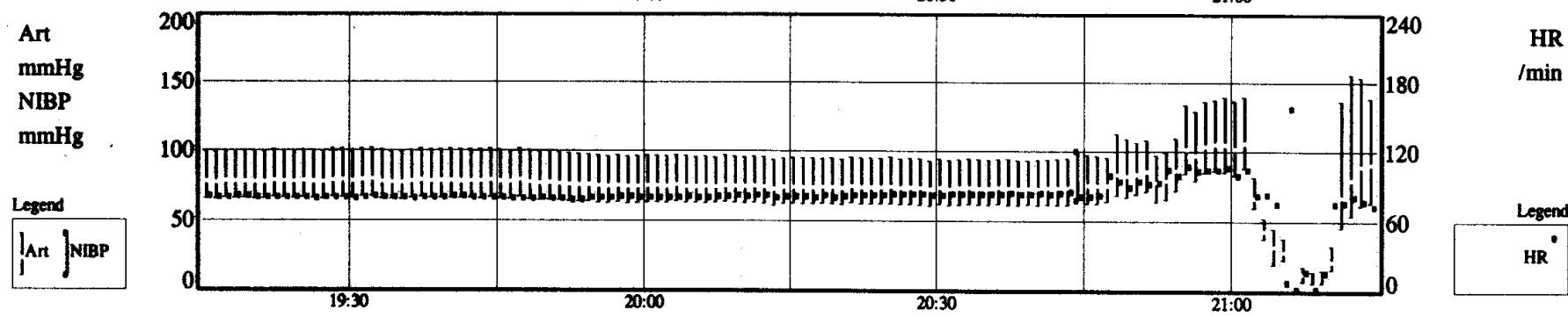
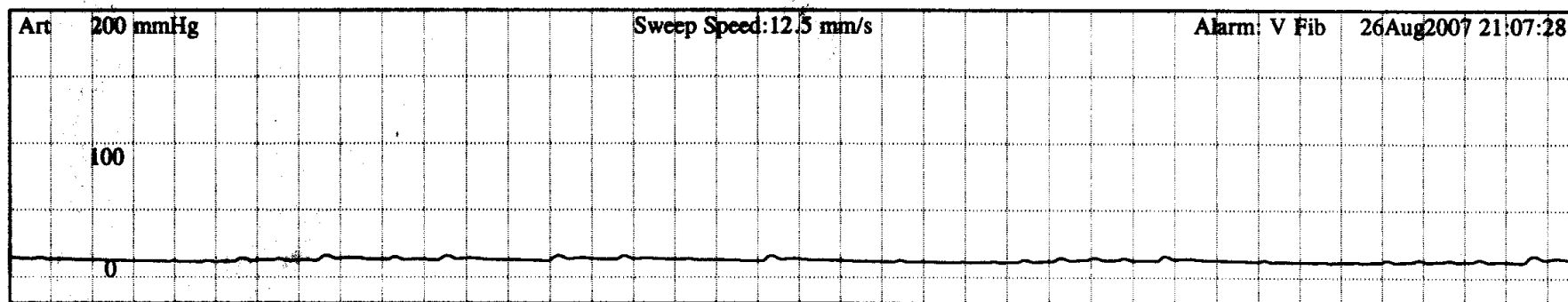
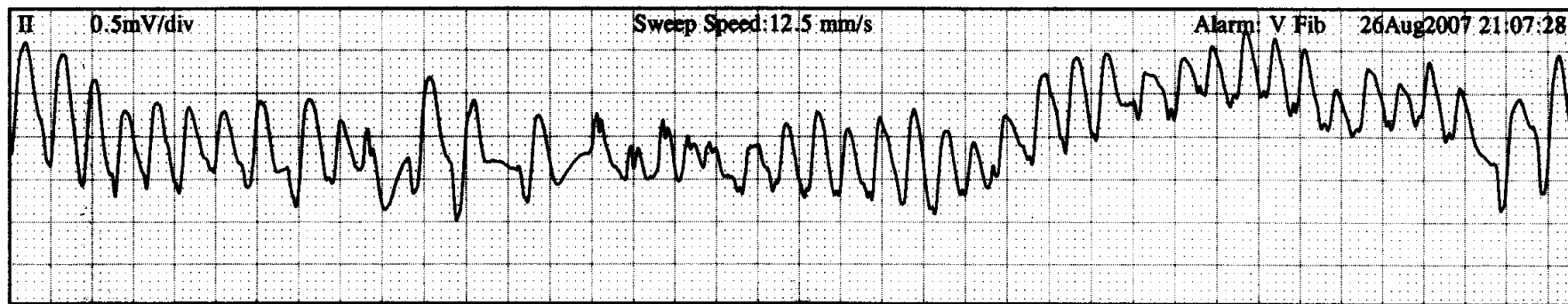
Se:4  
Im:138

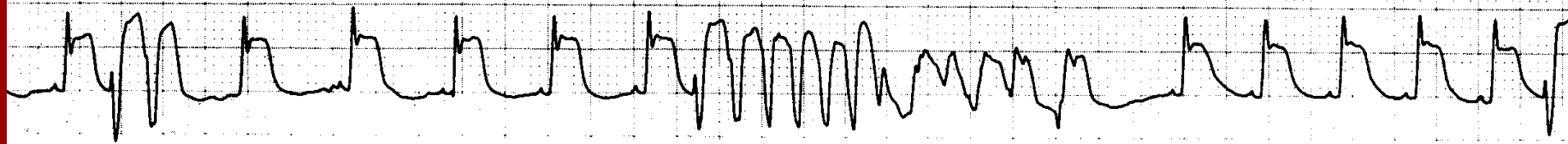
[A]

O.TAL  
Study Date:26/08/2007  
Study Time:08:23:07  
MRN:



# Houston..... We have a problem.....

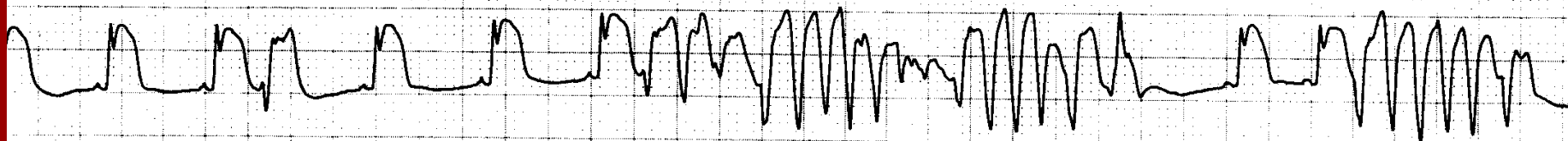




II 0.5mV/div

Sweep Speed: 12.5 mm/s

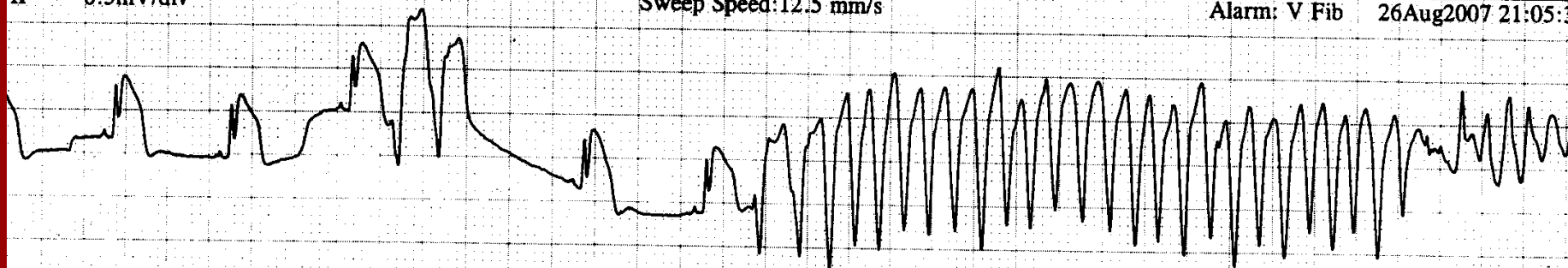
Alarm: Tachy 26Aug2007 21:04:5



II 0.5mV/div

Sweep Speed: 12.5 mm/s

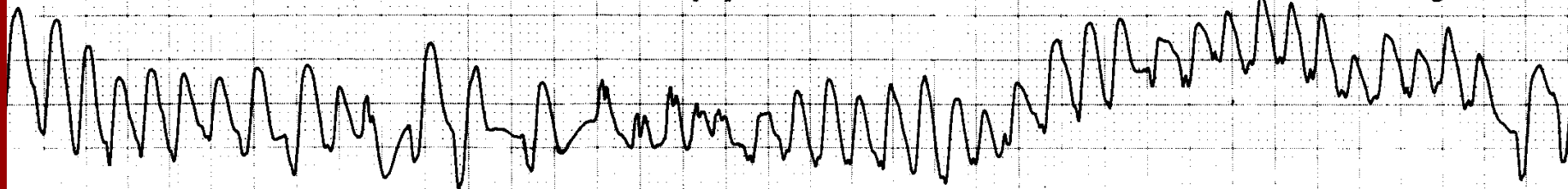
Alarm: V Fib 26Aug2007 21:05:3



II 0.5mV/div

Sweep Speed: 12.5 mm/s

Alarm: V Fib 26Aug2007 21:07:3



**Acute coronary embolism following CT-guided lung needle-biopsy.** A. Manosur. King Hussein Cancer Center. Amman Jordan





**ES: Male/56.**

**Old inferior MI.**

**Good LV-function (LVEF 45%).**

**Smoker, asthma (mild).**

**Past history of drug abuse.**

**Tx: Aspirin, clopidogrel, ramilpril,  
nitrates, simvastatin, methadone.**

**→ Hospitalized in neurology  
following a first episode of  
convulsions.**

129-  
02:56:54  
25mm/s  
10mm/mV  
40Hz

ERAZ, SHIMUEL  
ID: 5100754-0

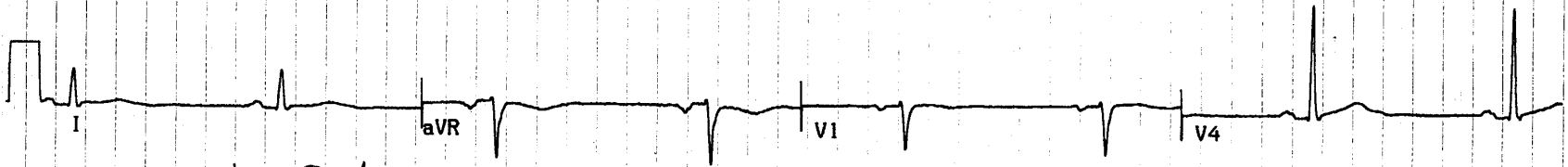
BRUCE  
PRE-TEST  
HR: 46bpm

12 Lead Report  
Clock 1: 00:00  
Clock 2: 00:00  
Speed: 0.0mph  
Grade: 0.0%

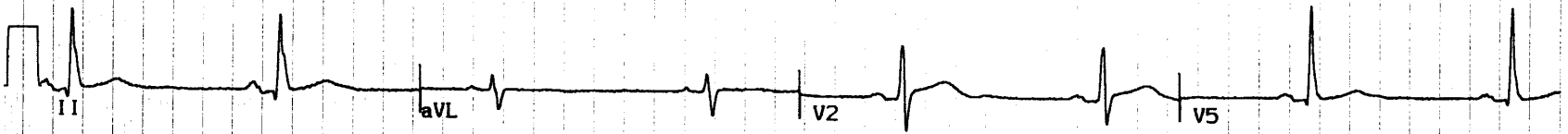
SOURASKY MC CARDIOLOGY DEPT. PROF. KEREN  
Measured At 80ms post J (10mm/mV)  
Auto Points

Lead	ST(mm)	Lead	ST(mm)
I	-2.4?	V1	-9.4?
II	-4.8?	V2	-0.8?
III	-7.0?	V3	-1.0?
aVR	-6.7?	V4	-3.8?
aVL	-6.0?	V5	-0.7?
aVF	-4.9?	V6	68.2?

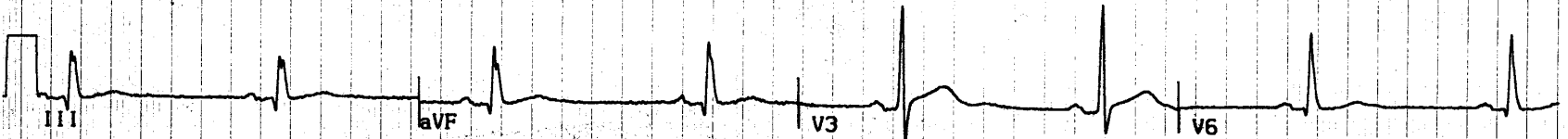
756  
Syncope - Malignant - CPR

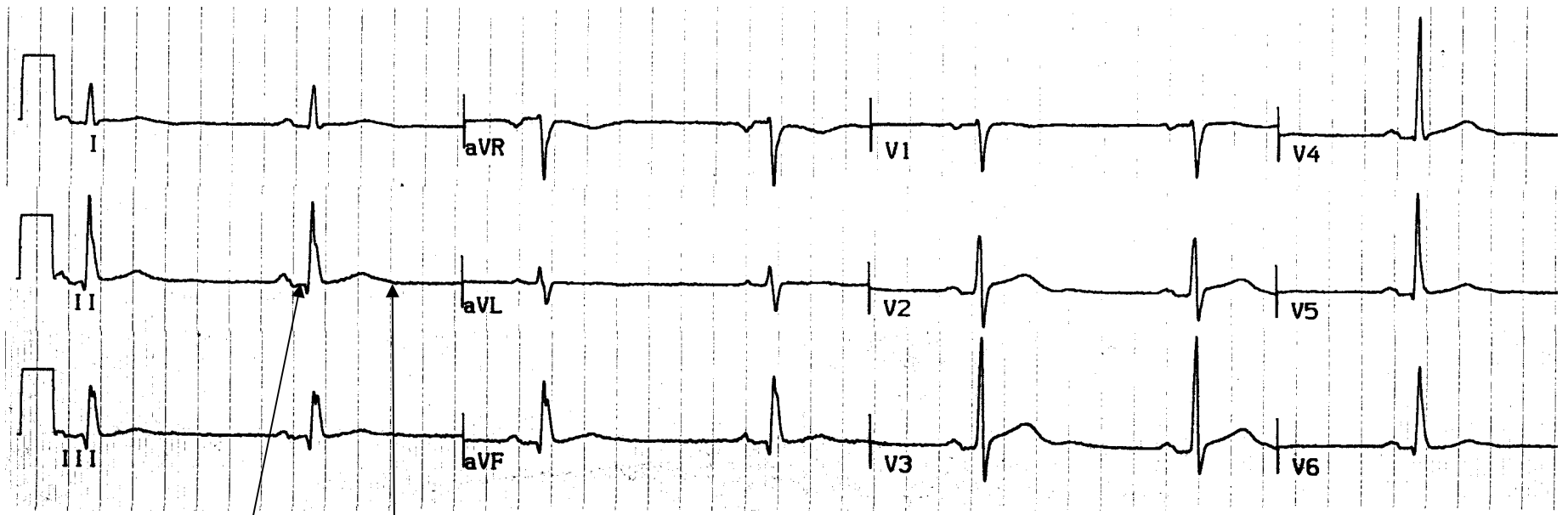


Old Inf MI  
Good LV.



Methadone 175g/day  
Somavil, Tritae, Monobit, Plovix, Aspirin





**QT=520**

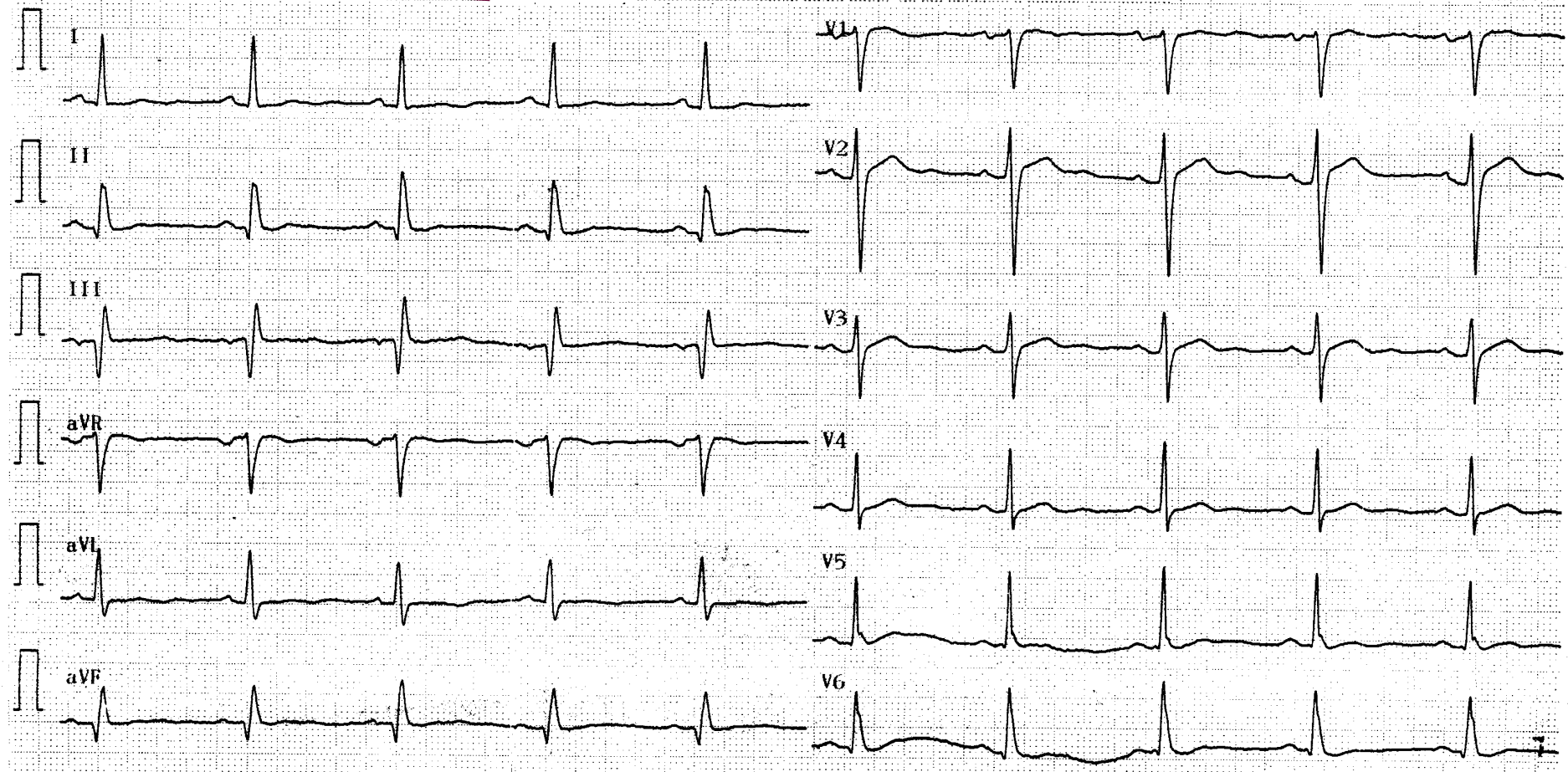
**RR=1400**

**QTc=440**

Vent rate	58	bpm
PR int	176	ms
QRS dur	116	ms
QT/QTc int	370/ 368	ms
P/QRS/T axis	16/ 9/ -30	°
RV5/SV1 amp	1.260/ 1.025	mV
RV5+SV1 amp	2.285	mV

Vent rate	58	bpm
PR int	176	ms
QRS dur	116	ms
QT/QTc int	370/ 368	ms
P/QRS/T axis	16/ 9/ -30	°
RV5/SV1 amp	1.260/ 1.025	mV
RV5+SV1 amp	2.285	mV

10 mm/mV 25 mm/s Filter: H60 D 35



# Exercise Bruce III

3:17:24

ID: 5100754-0

BRUCE  
EXERCISE 3

Clock 1: 02:03  
Clock 2: 00:08

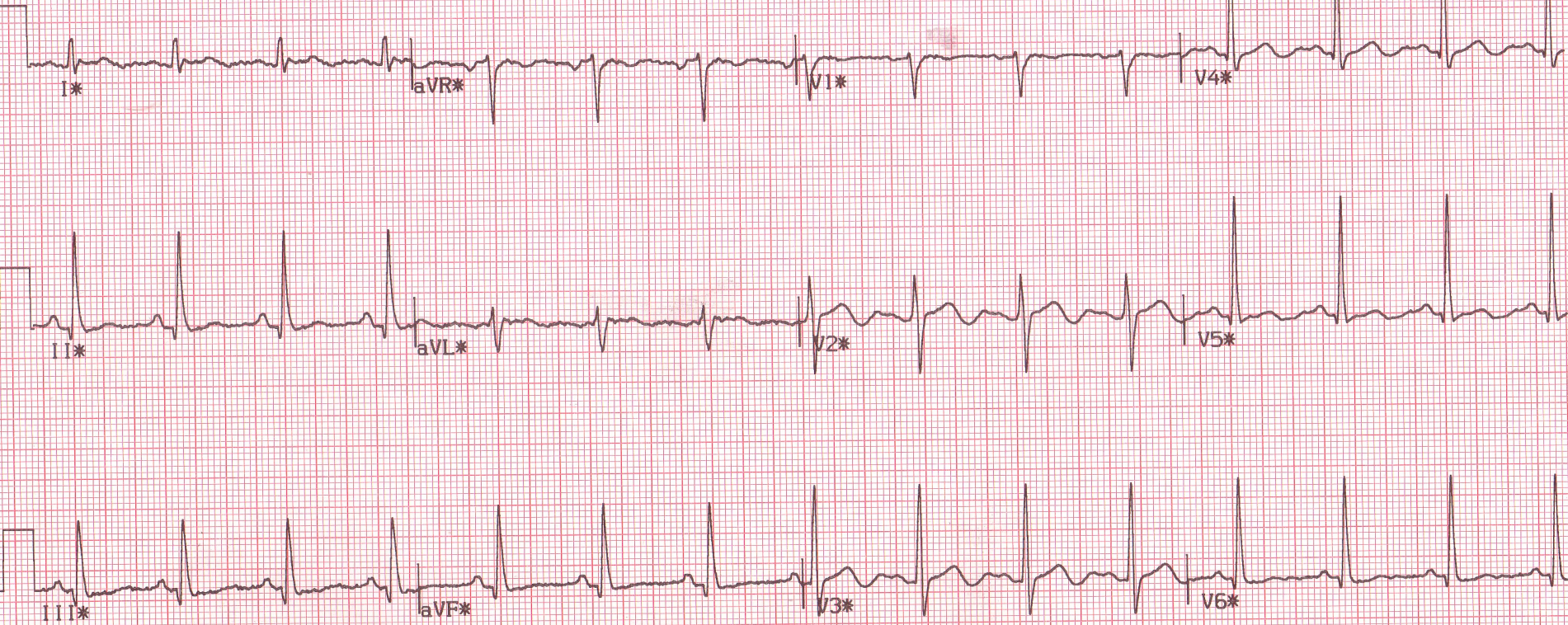
Measured At 80ms post J (10mm/mV)  
Auto Points

25mm/s  
10mm/mV  
40Hz

HR: 87bpm

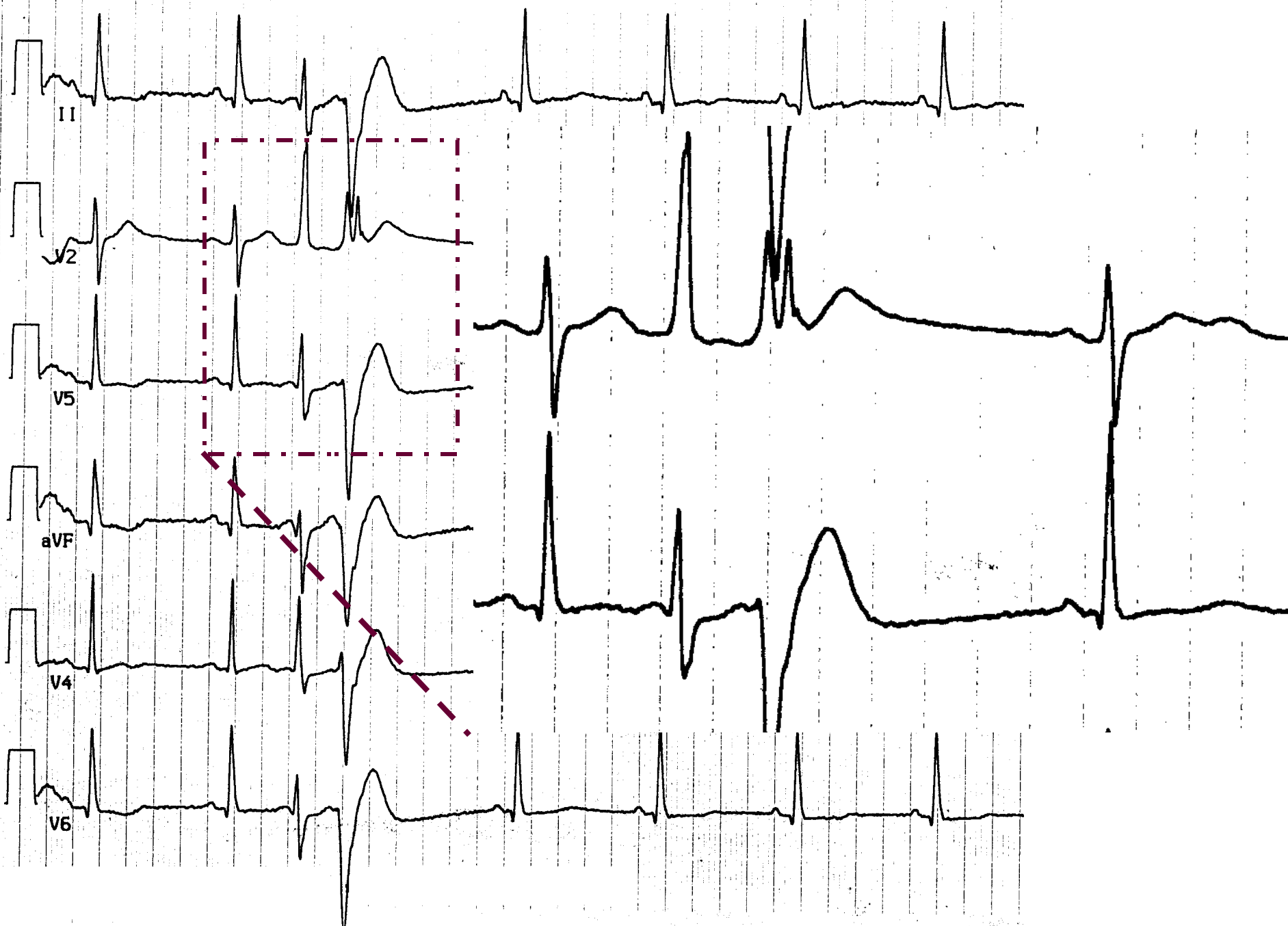
Speed: 3.4mph  
Grade: 14.0%

Lead	ST(mm)	Lead	ST(mm)
I	0.5	V1	0.3
II	-0.2	V2	1.8
III	-0.6	V3	1.3
aVR	0.0	V4	0.7
aVL	0.6	V5	0.2
aVF	-0.4	V6	0.0



# Recovery from exercise.





II

V2

V5

aVF

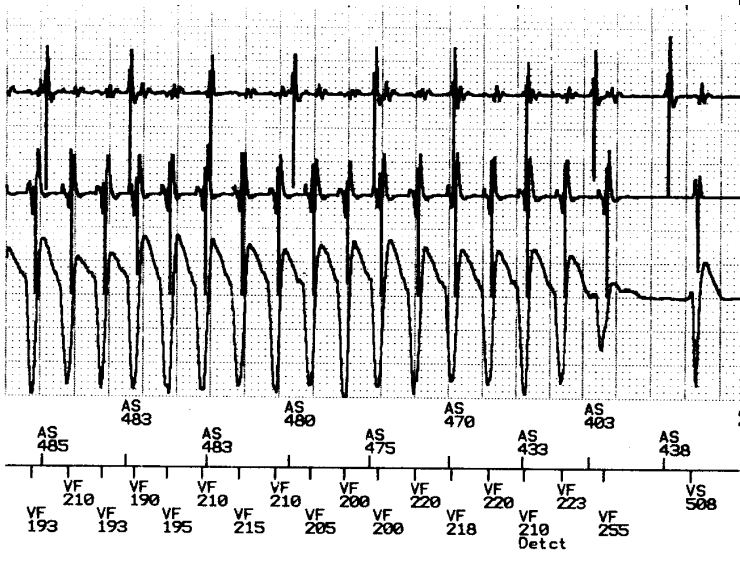
V4

V6

# One week after ICD implantation.



Pre-attempt EGM (10 sec max)  
 Initial Detection Rate 130 min-1  
 Pre-attempt Avg A Rate 279 min-1  
 Pre-attempt Avg V Rate

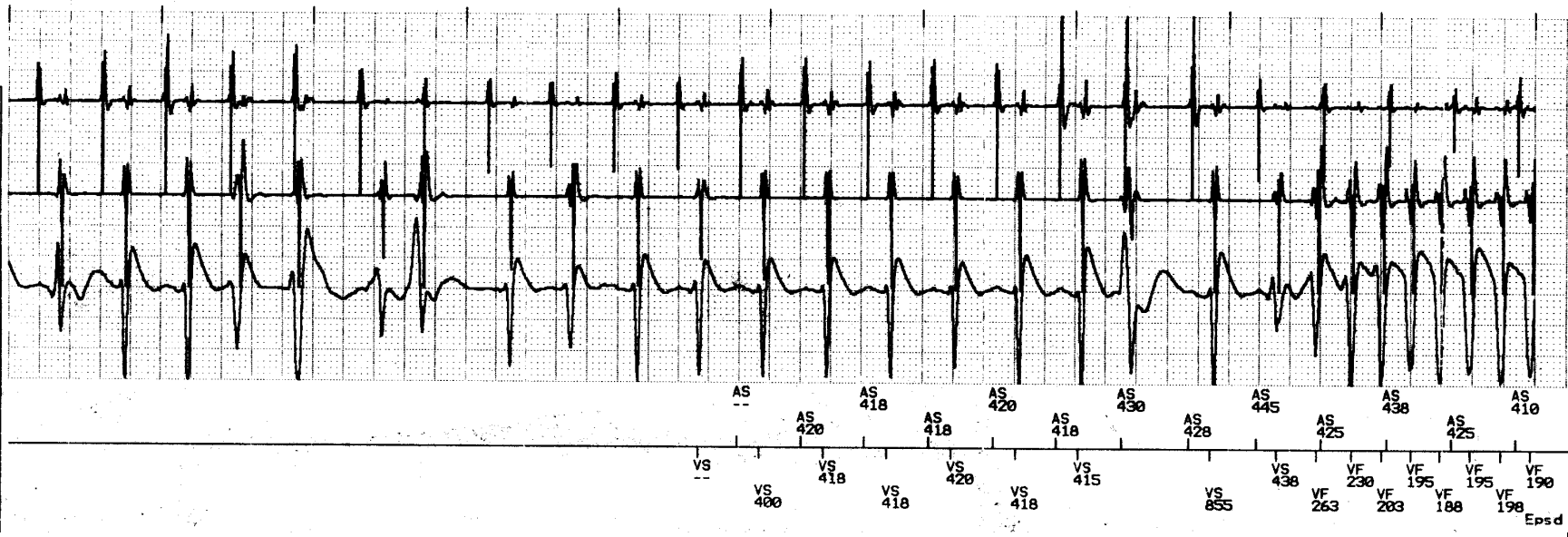


Chrg

25 mm/s

Order  
 up trace to bottom trace, traces are:

Onset EGM (10 sec max)



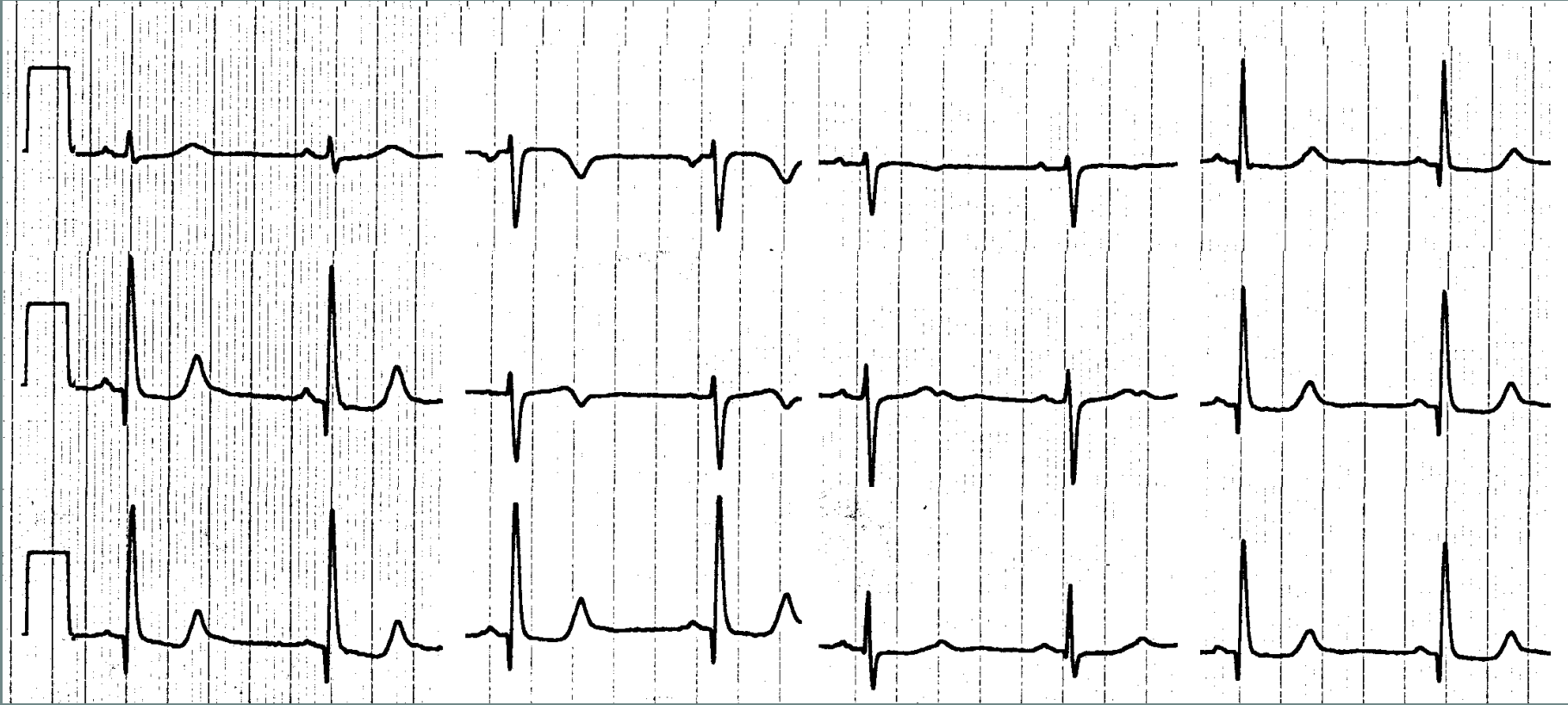
Epsd



**Case #2**

**Malignant syncope  
without documented  
arrhythmias**

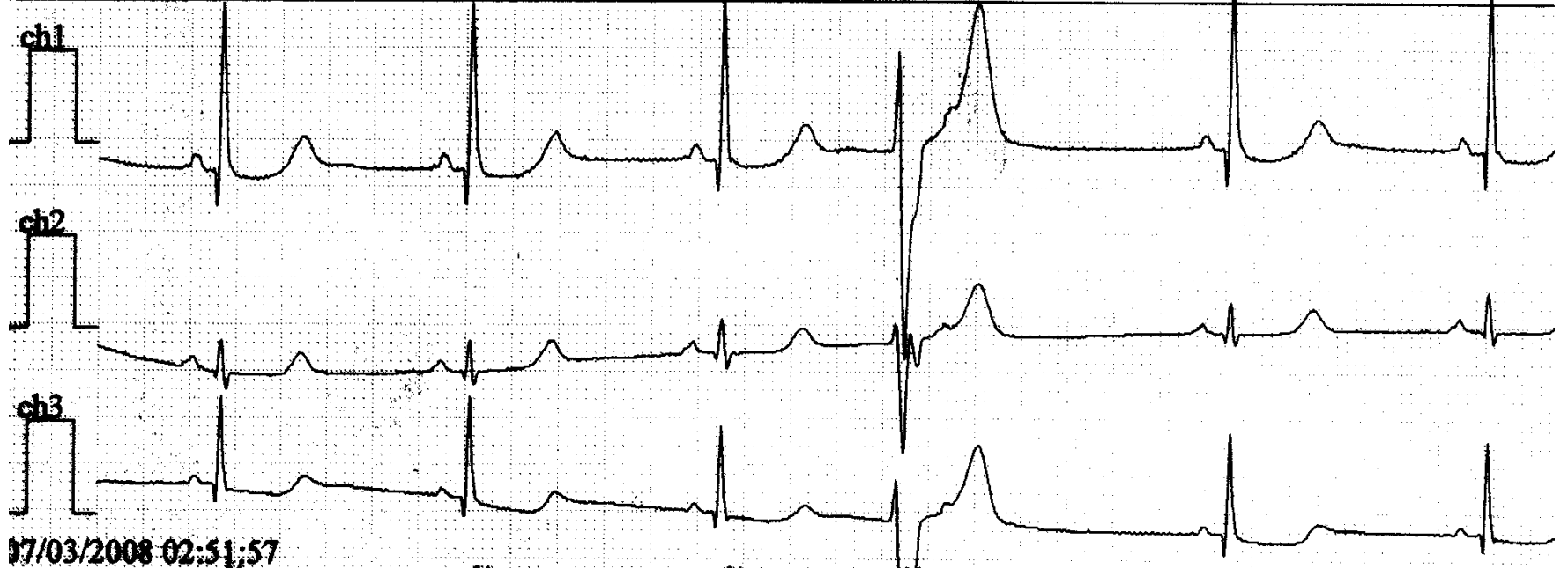
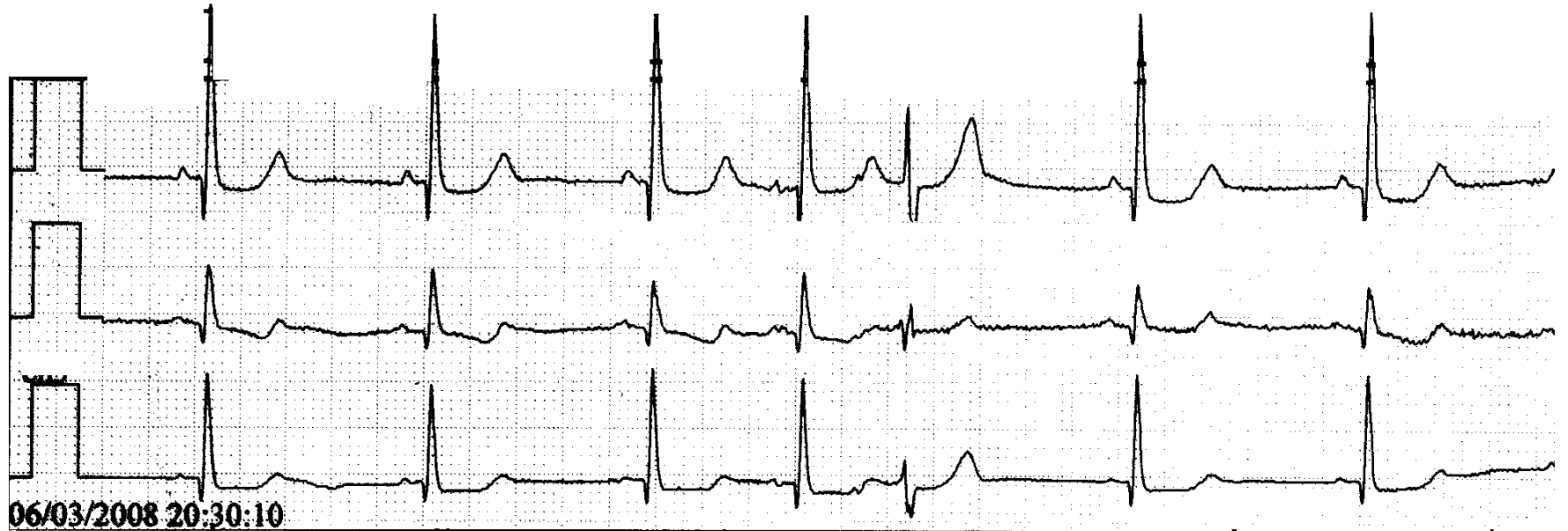
**Female/51. Three episodes of malignant syncope/2 years.**



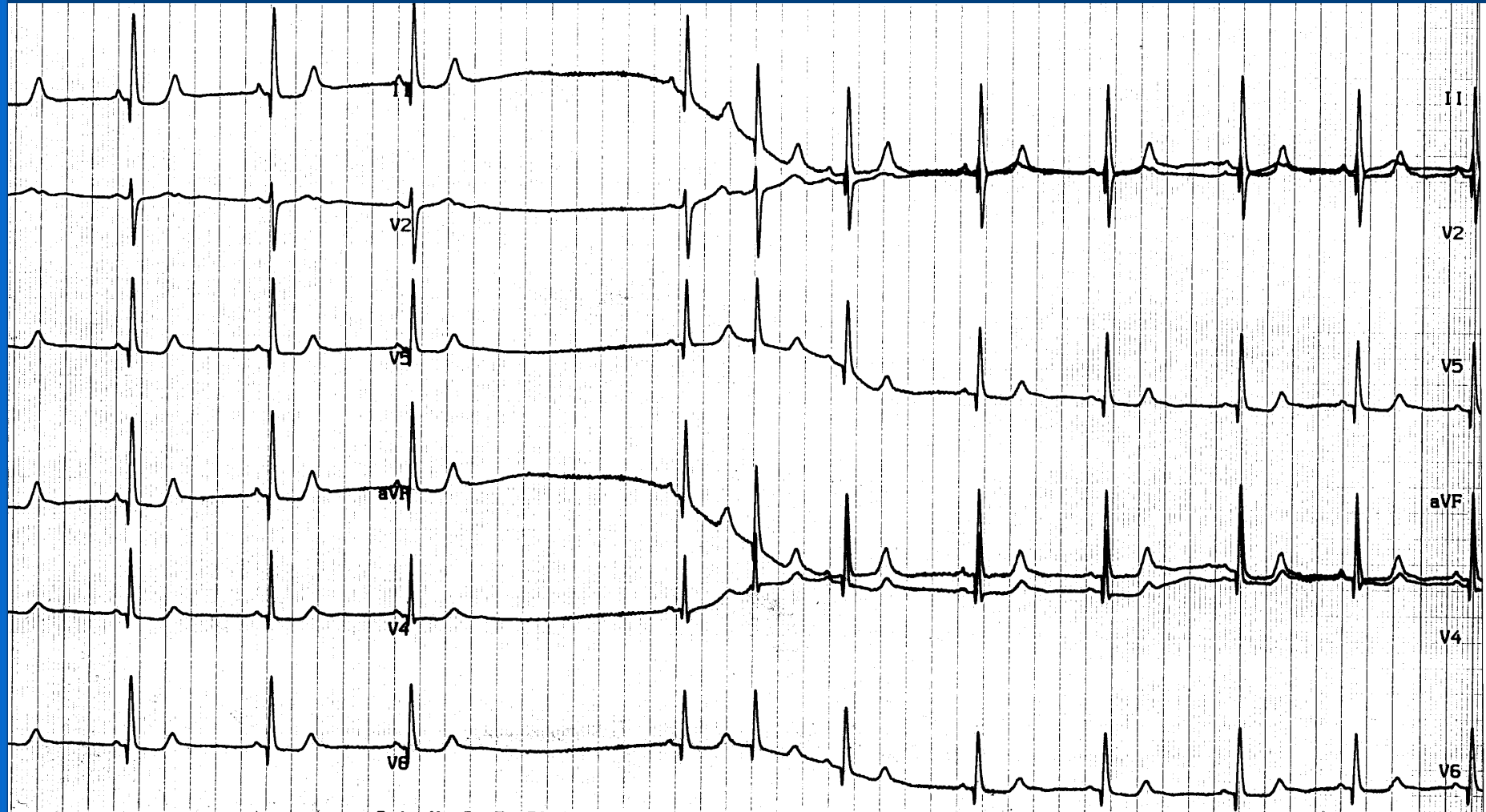
**.Heart rate 62/min, QTc 420 msec**

**Echocardiogram + Holter + exercise test = normal.**

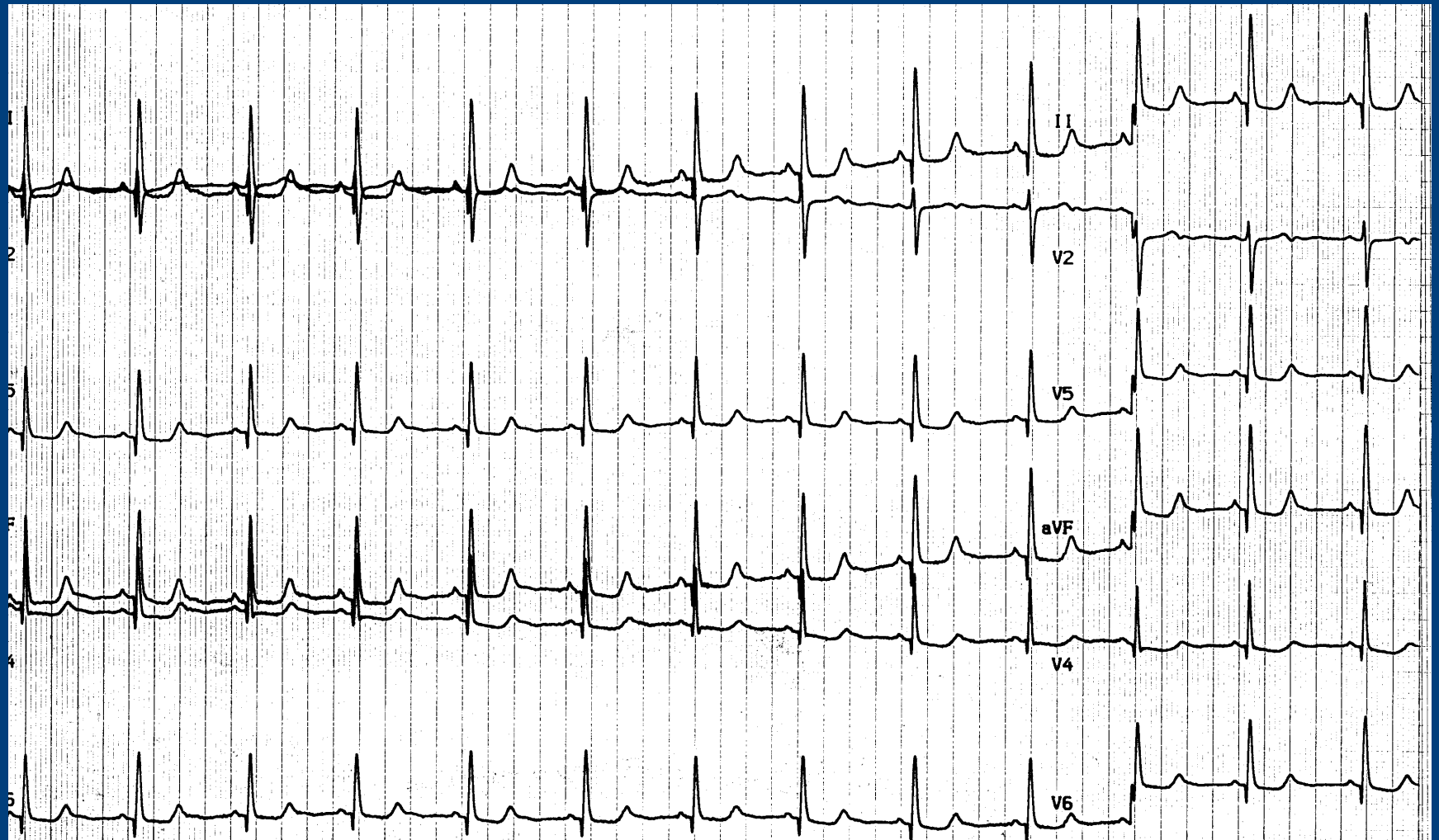
# Holter monitoring



# Adenosine test: bradycardia phase.



# Adenosine test: tachycardia phase.



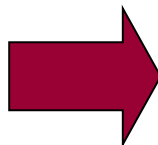
## Results so far:

- The clinical history is of malignant syncope. The patient turns blue, has tonic seizures but there is no postictal phase.
- The ECG, echo, Holter, exercise test and adenosine test are normal.
- Neurological evaluation is also negative.

*This is not vasovagal syncope....  
This is not epilepsy either....*

What next?.

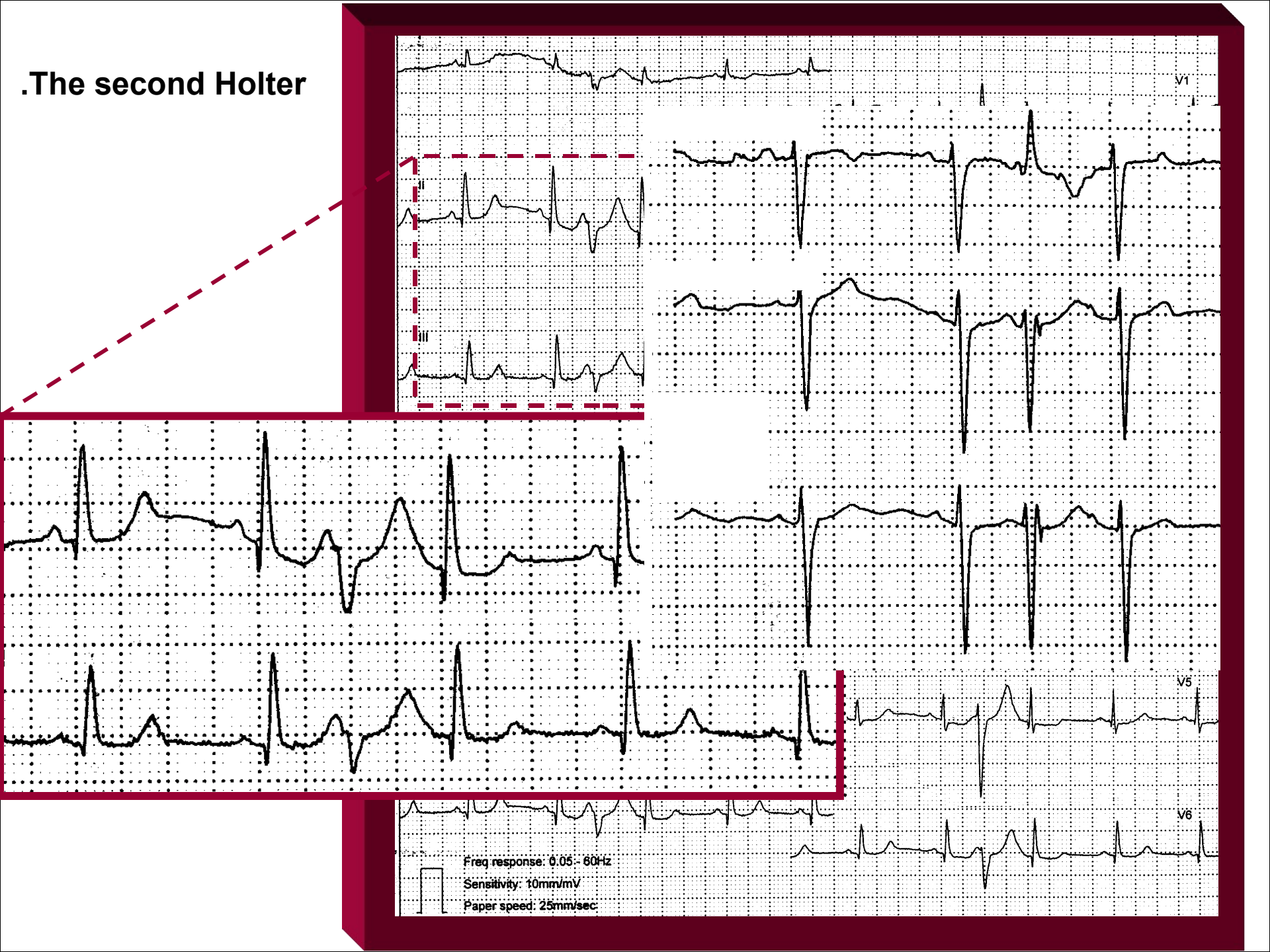
EP- study?

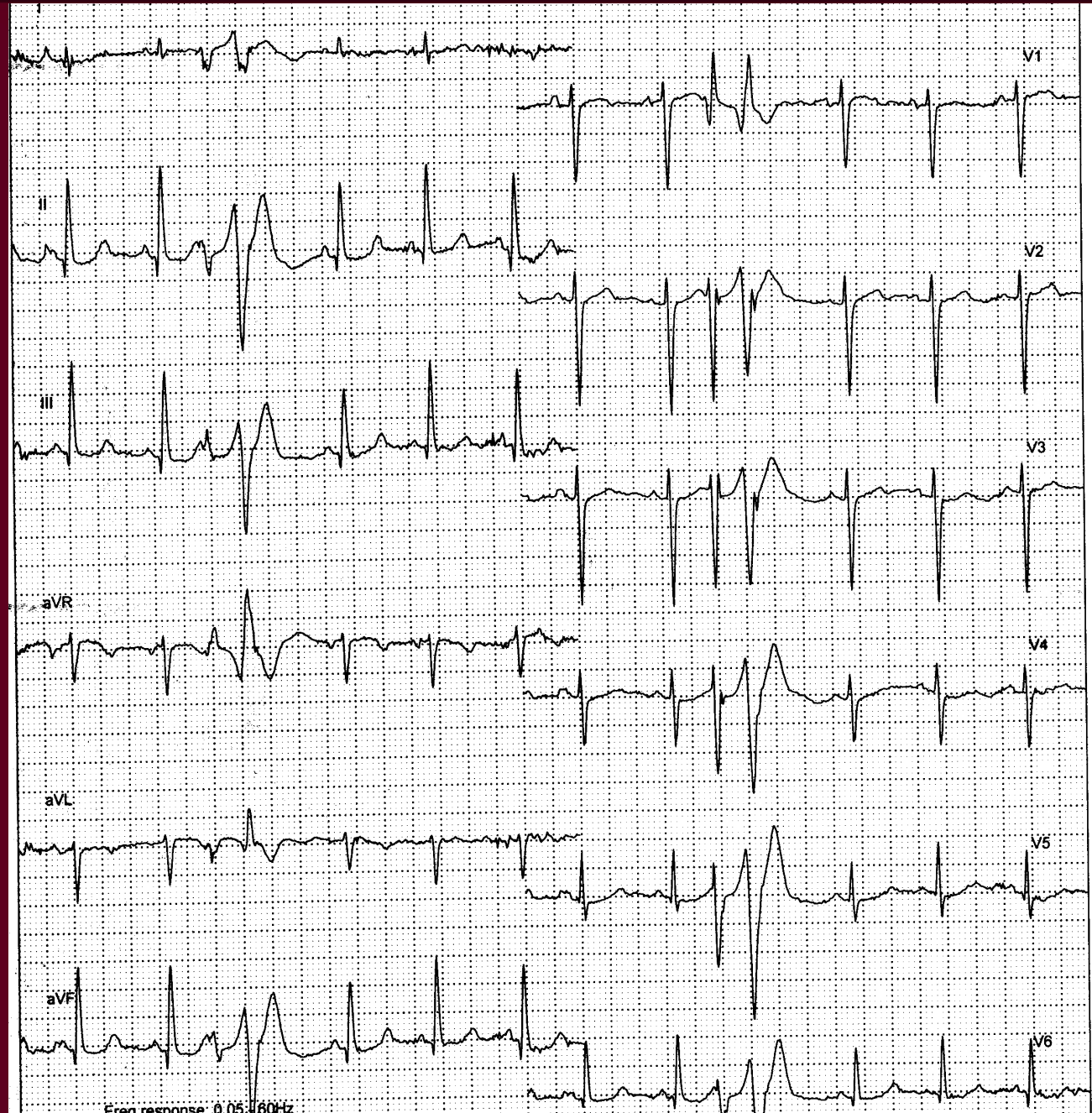


What if EPS is positive?

What if EPS is negative?

# .The second Holter





Freq response: 0.05-60Hz

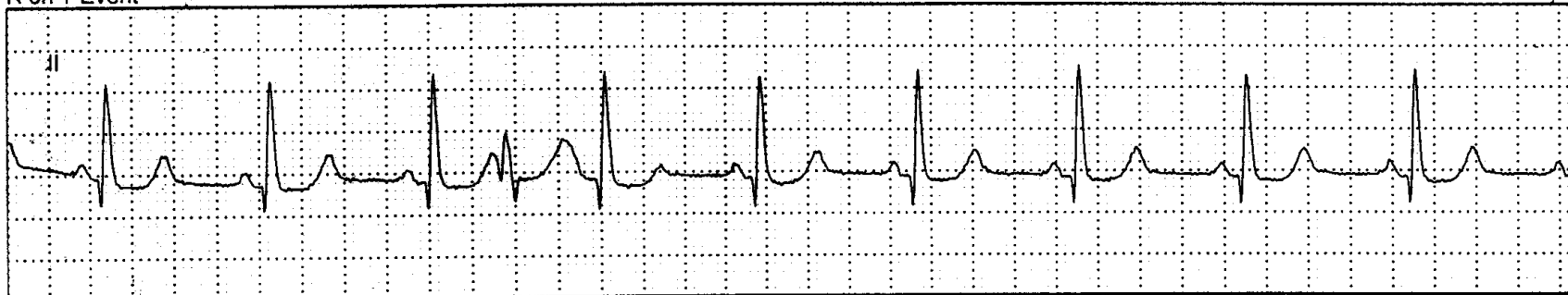
Sensitivity: 10mm/mV

Paper speed: 25mm/sec



R on T Event

Rate 86 10mm/mV 01:23:33 day 2



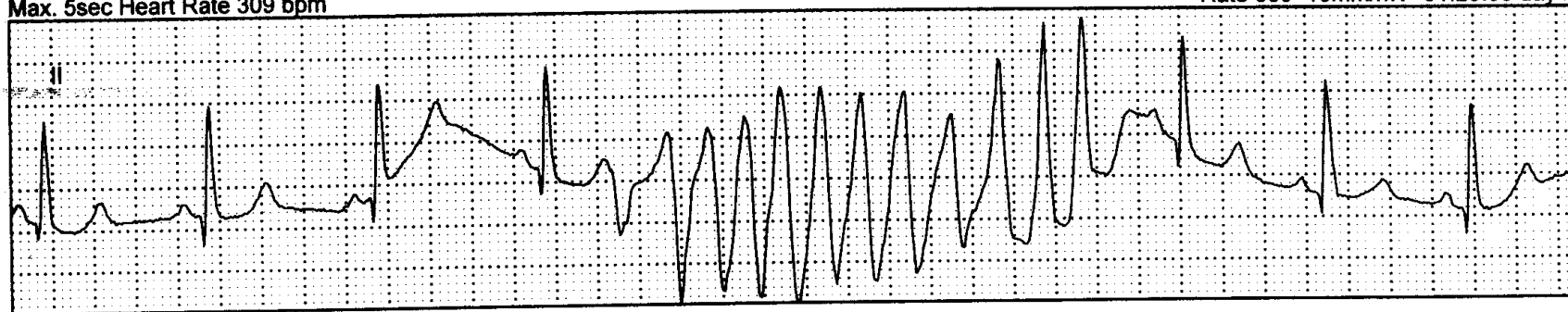
R on T Event

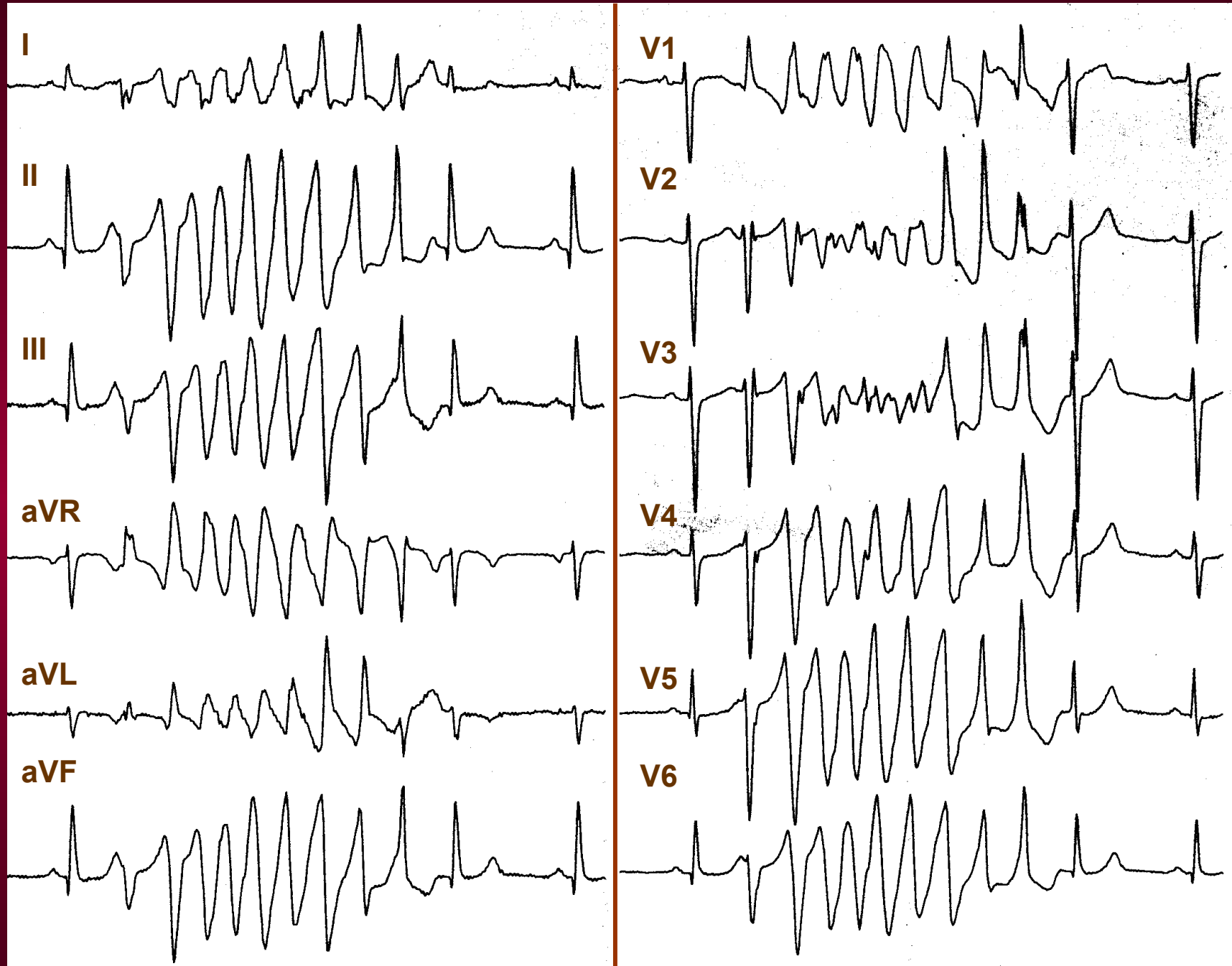
Rate 100 10mm/mV 01:23:56 day 2



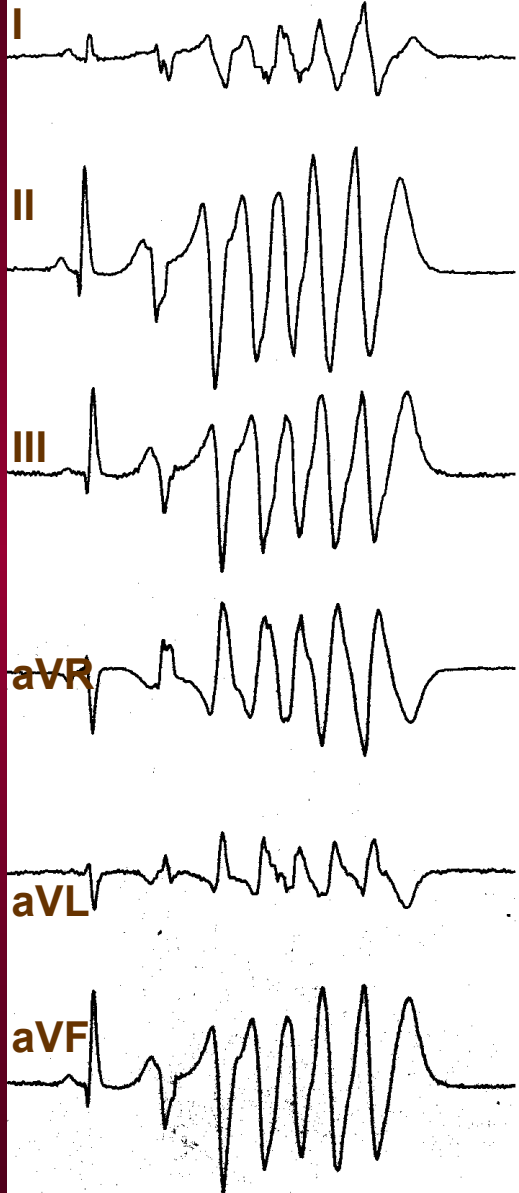
Max. 5sec Heart Rate 309 bpm

Rate 309 10mm/mV 01:29:50 day 2

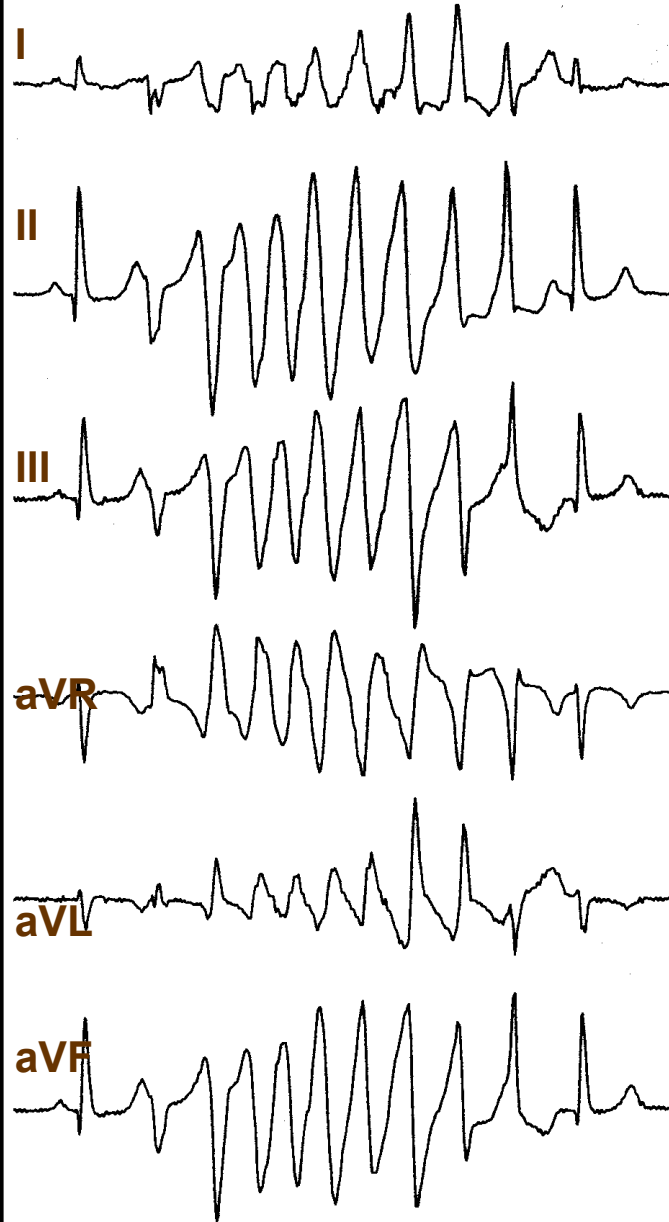




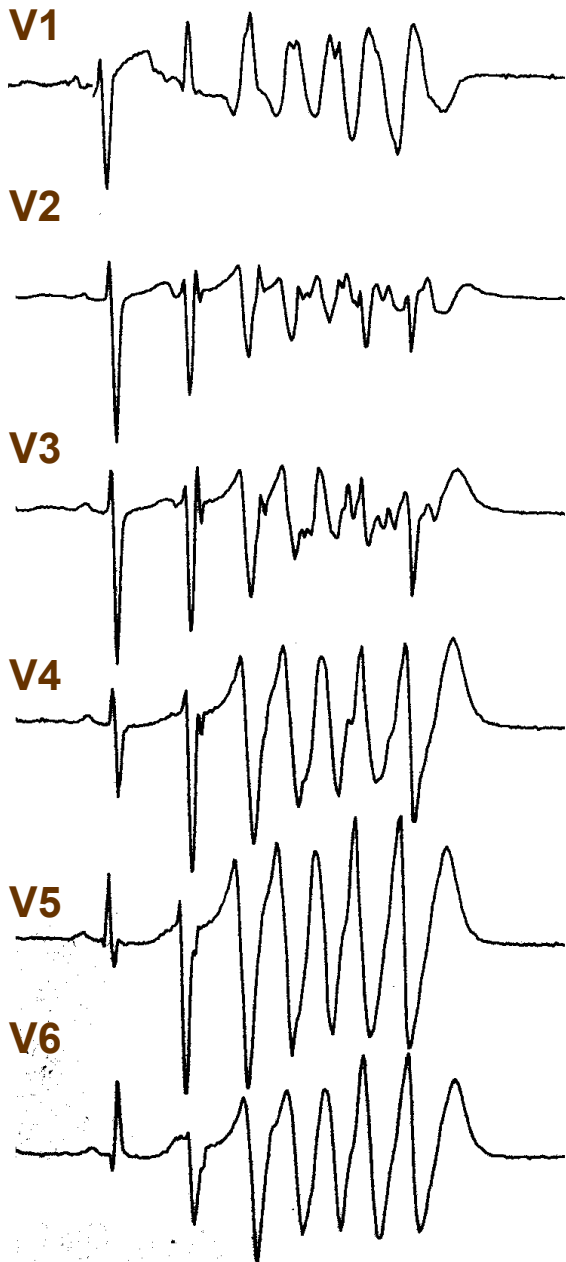
## First Episode



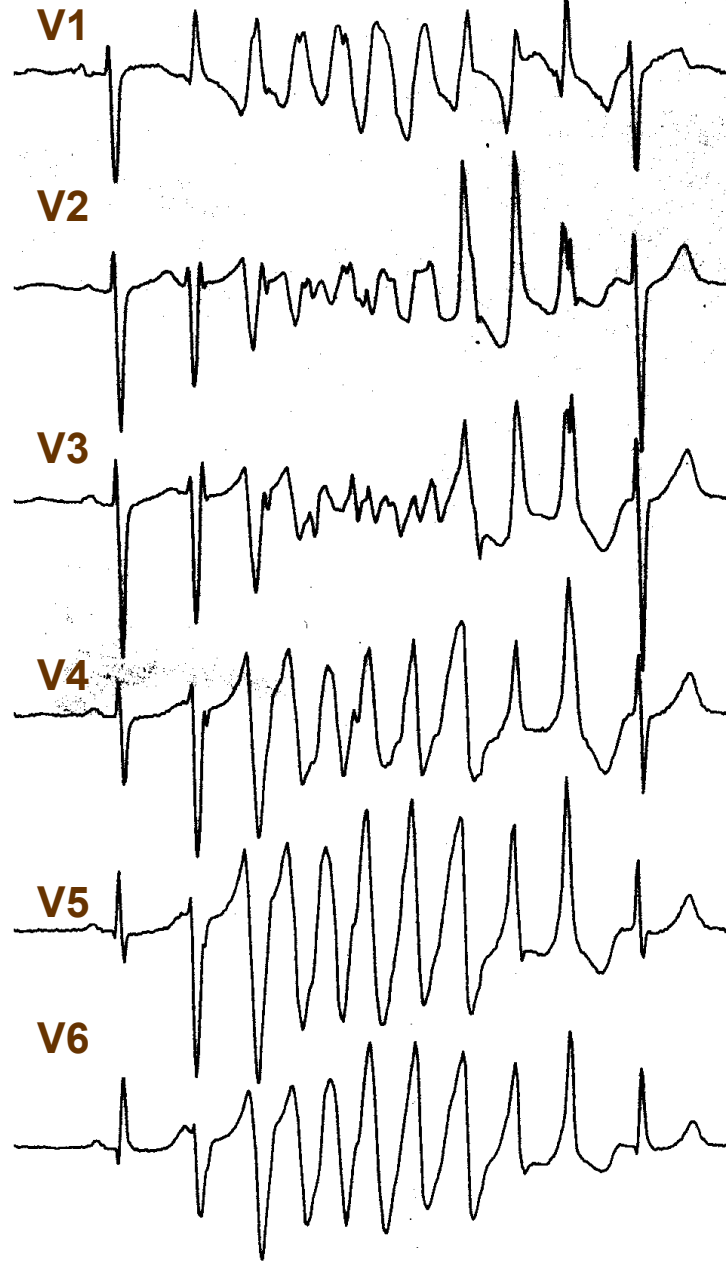
## Second Episode

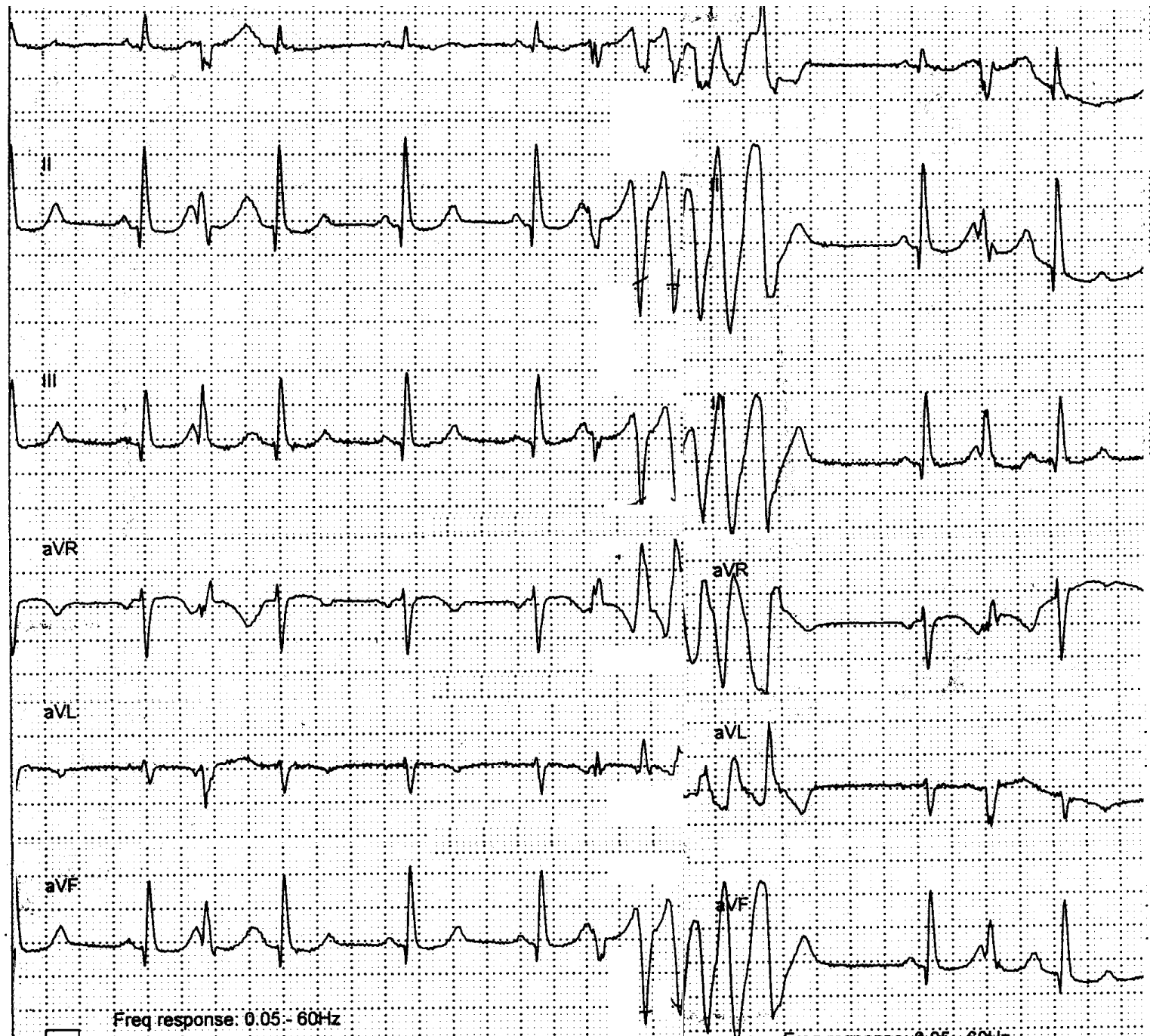


# First Episode



# Second Episode





Freq response: 0.05 - 60Hz

0.05 60Hz

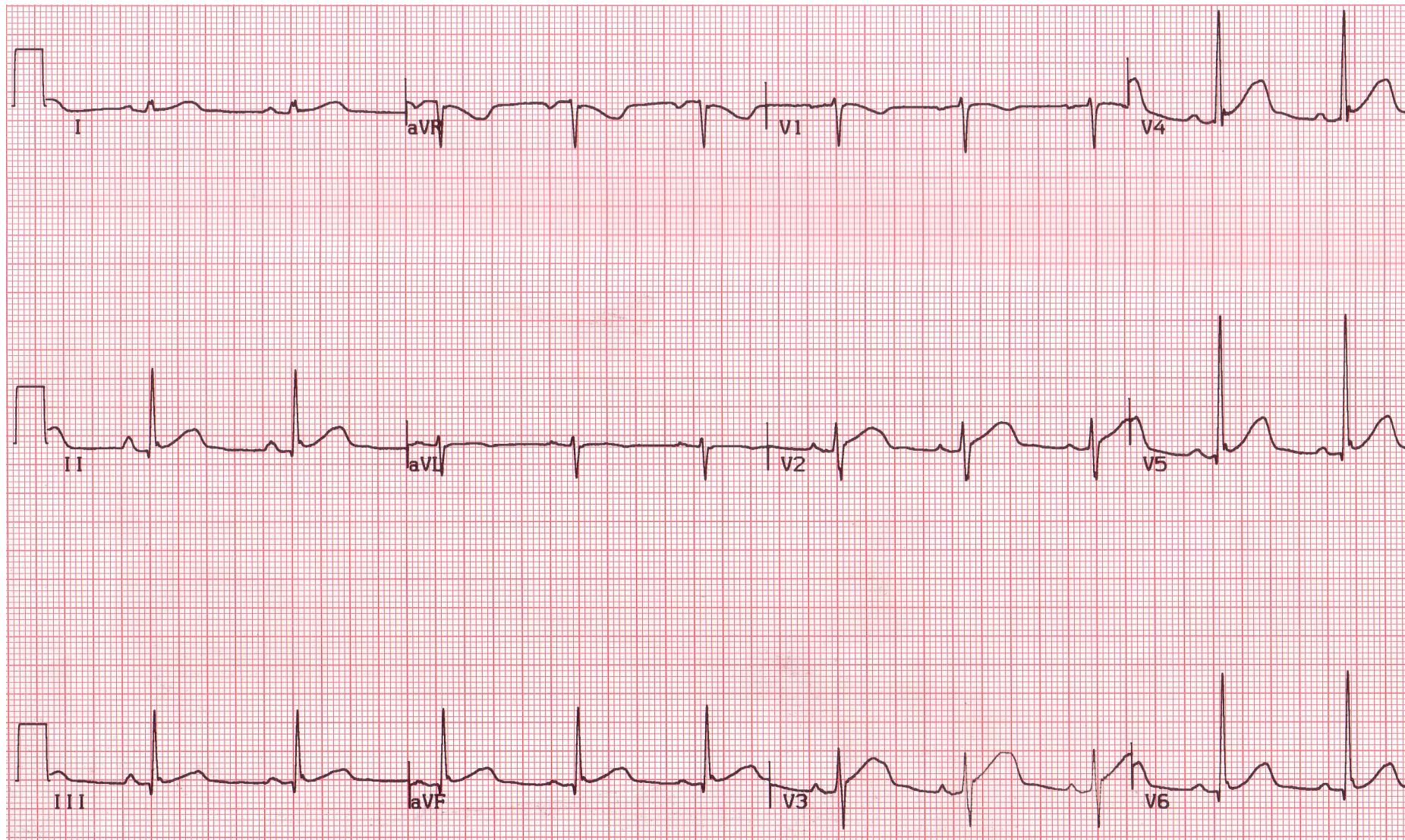
**By the way.....**

**The EPS was negative**

## Case #1

- Baby girl, 6 weeks old.
- Brought to the emergency room in the “the Metropolitan area” because of sudden apnea and cyanosis.
- Her father has LQT2.
- The baby was kept under “apnea monitoring” and was discharged.

# The father.





# The baby

Name: ████████ ID: ████████  
 Sex: Male Birth date: ████████ years

mm/mV 25 mm/s Filter 100 Hz H 50 d

Room 10

UCFV658 49  
 ילדים-19 23:22 10/03/08  
 קבה 2008

PM 163 bpm

21686711-9  
 47700 49  
 UCFV658  
 ילדים-19 23:22 10/03/08  
 קבה 2008

1103.0  
 09:30

1103.0  
 09:30

$$QT_c =$$

$$QT_c =$$

$$QT$$

$$\frac{QT}{\sqrt{RR}}$$

$$\sqrt{RR}$$

$$\frac{3 \times 0.04}{\sqrt{7 \times 0.04}}$$

$$\frac{3 \times 0.04}{\sqrt{7 \times 0.04}}$$

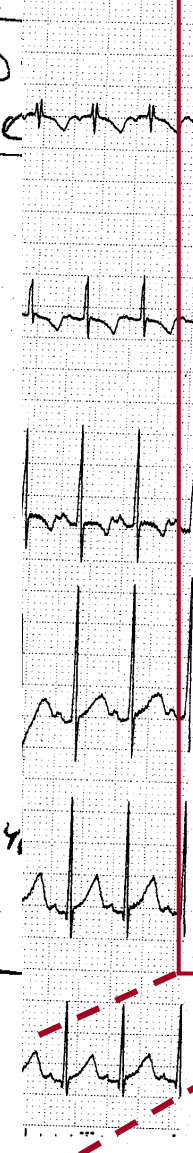
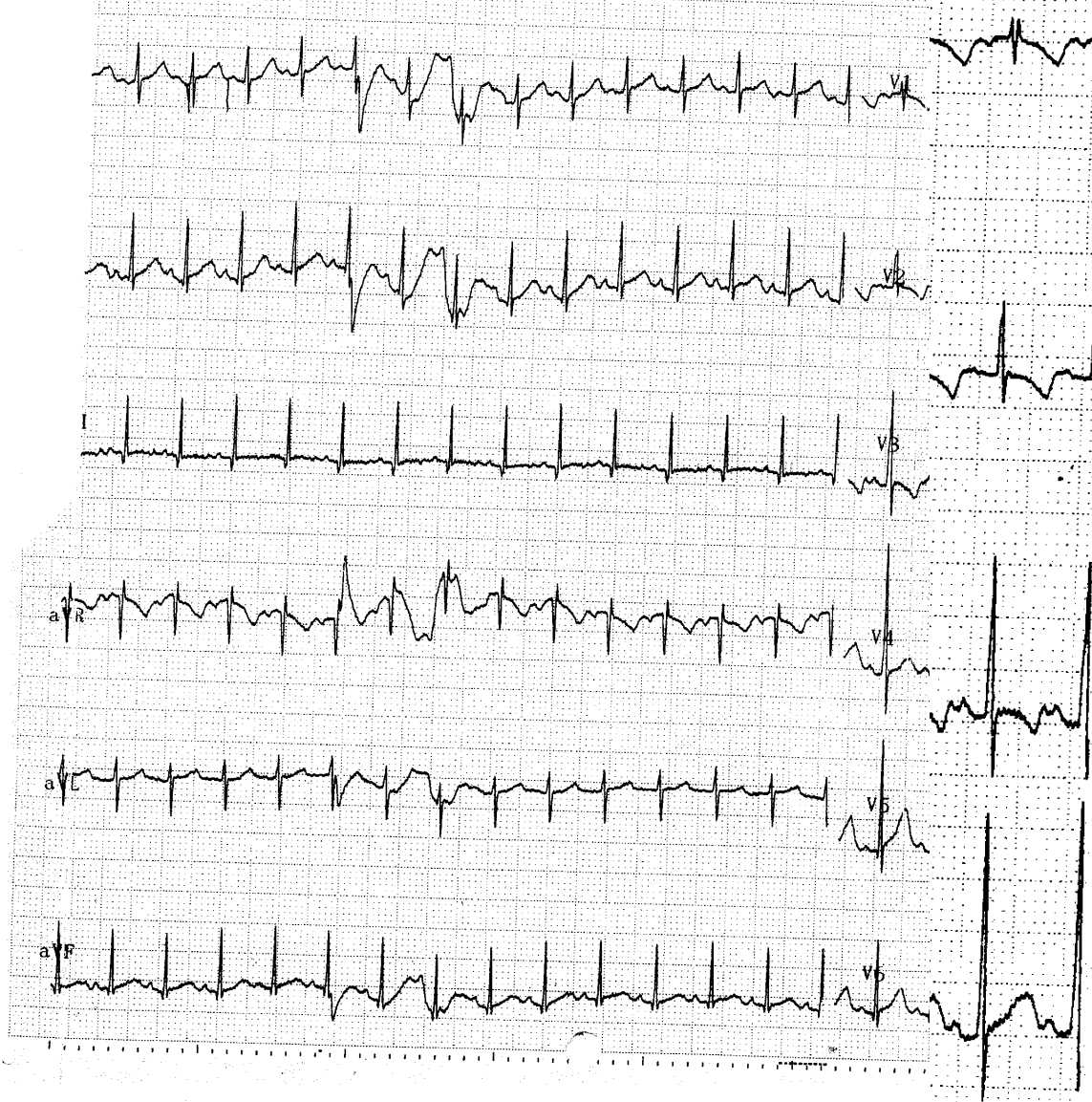
$$\frac{0.28}{0.6} = 0.47$$

$$\frac{0.28}{0.6} = 0.47$$

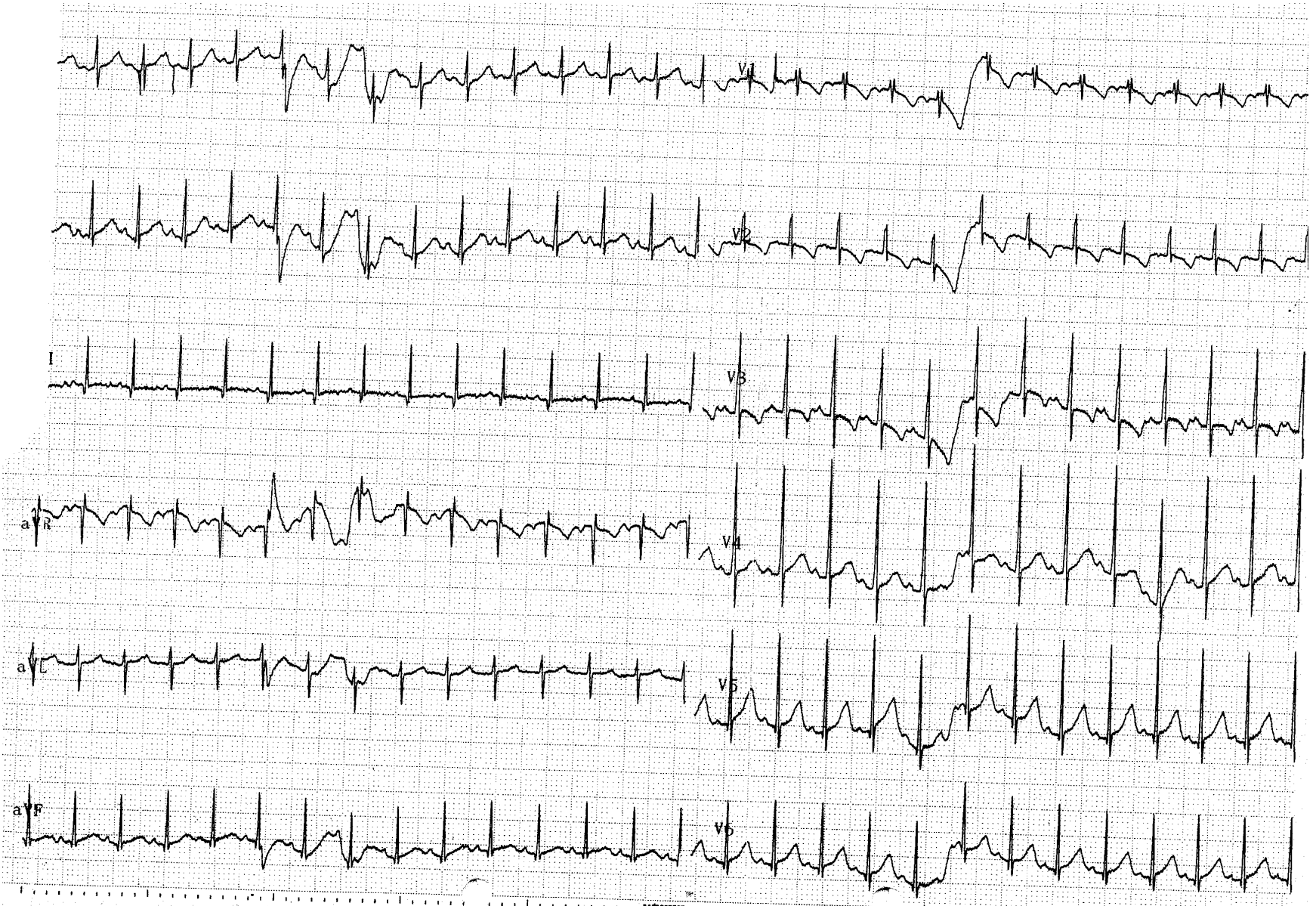
$$\leq 0.45$$

$$\leq 0.45$$

3/27



**Sinus rate 170/min, QT=240 msec, QTc = 400 msec.**

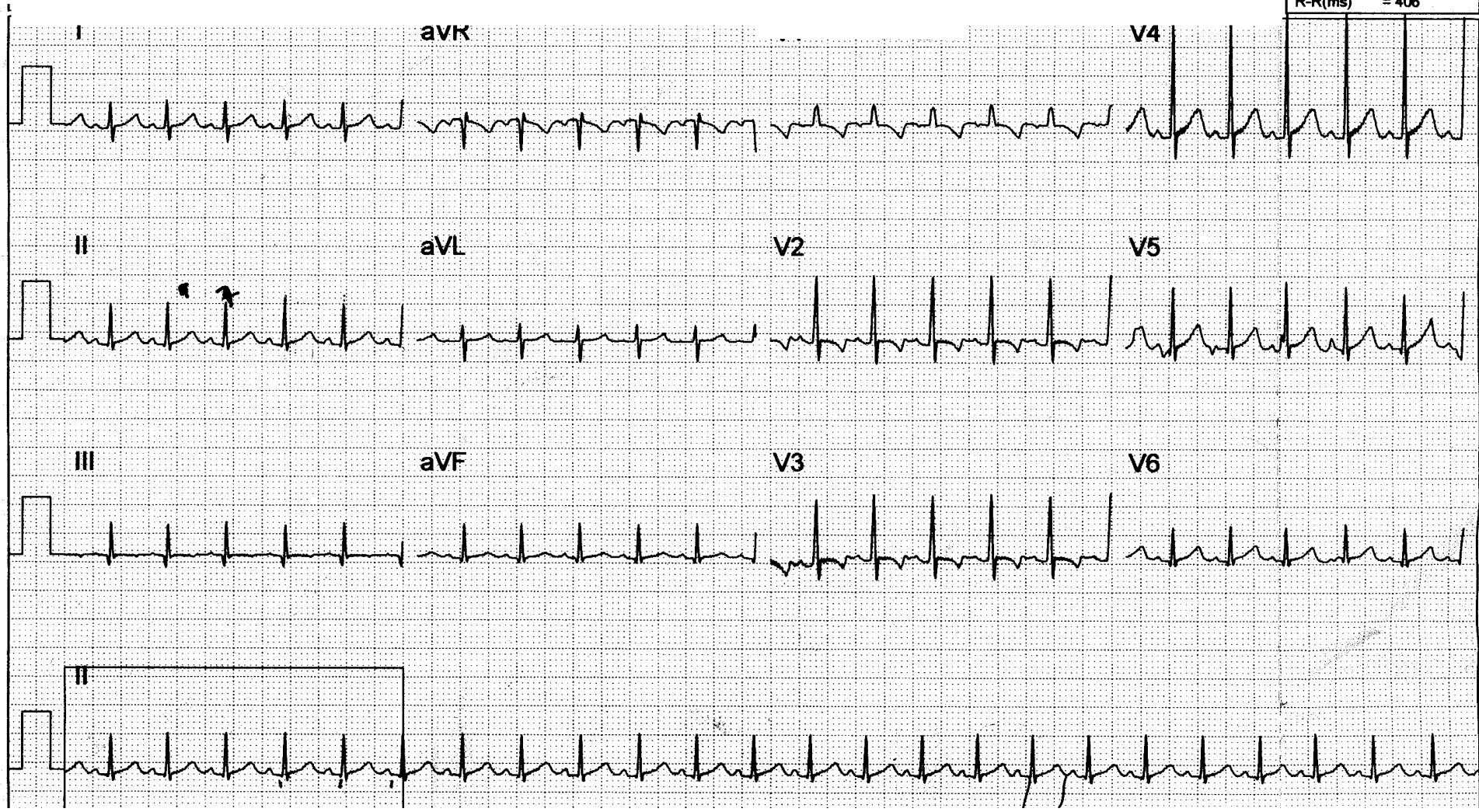


Heart rate 150/min  
QT = 250 msec  
QTc = 400 msec

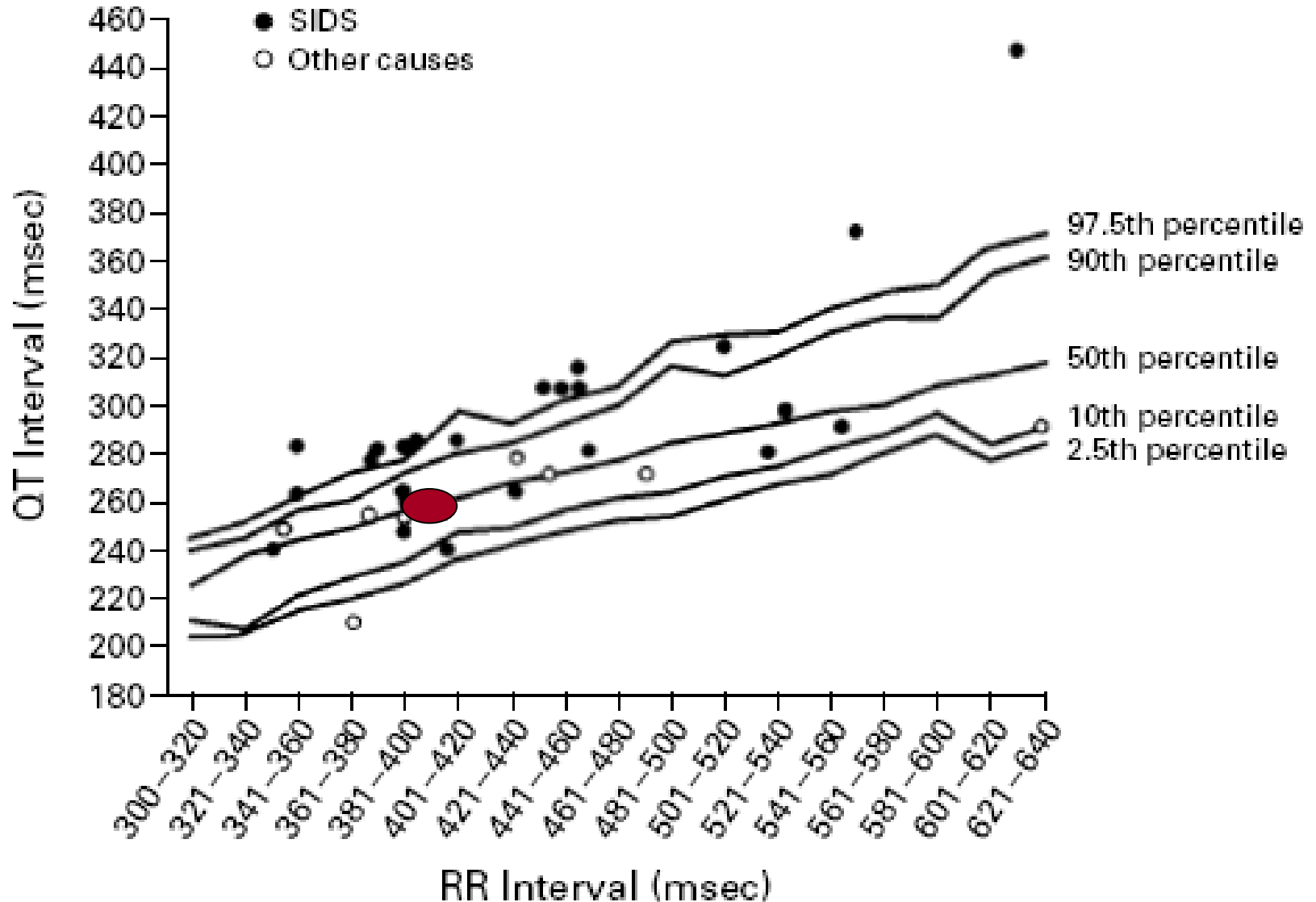
QTc = 399 msec

HR: 148

QRS Axis	= 65
P Axis	= 13
T Axis	= 19
QRS(ms)	= 54
P(ms)	= 104
PR(ms)	= 120
QT/QTc(ms)	= 254/399
R-R(ms)	= 406



# Relation of QT and RR interval in newborns by percentiles.

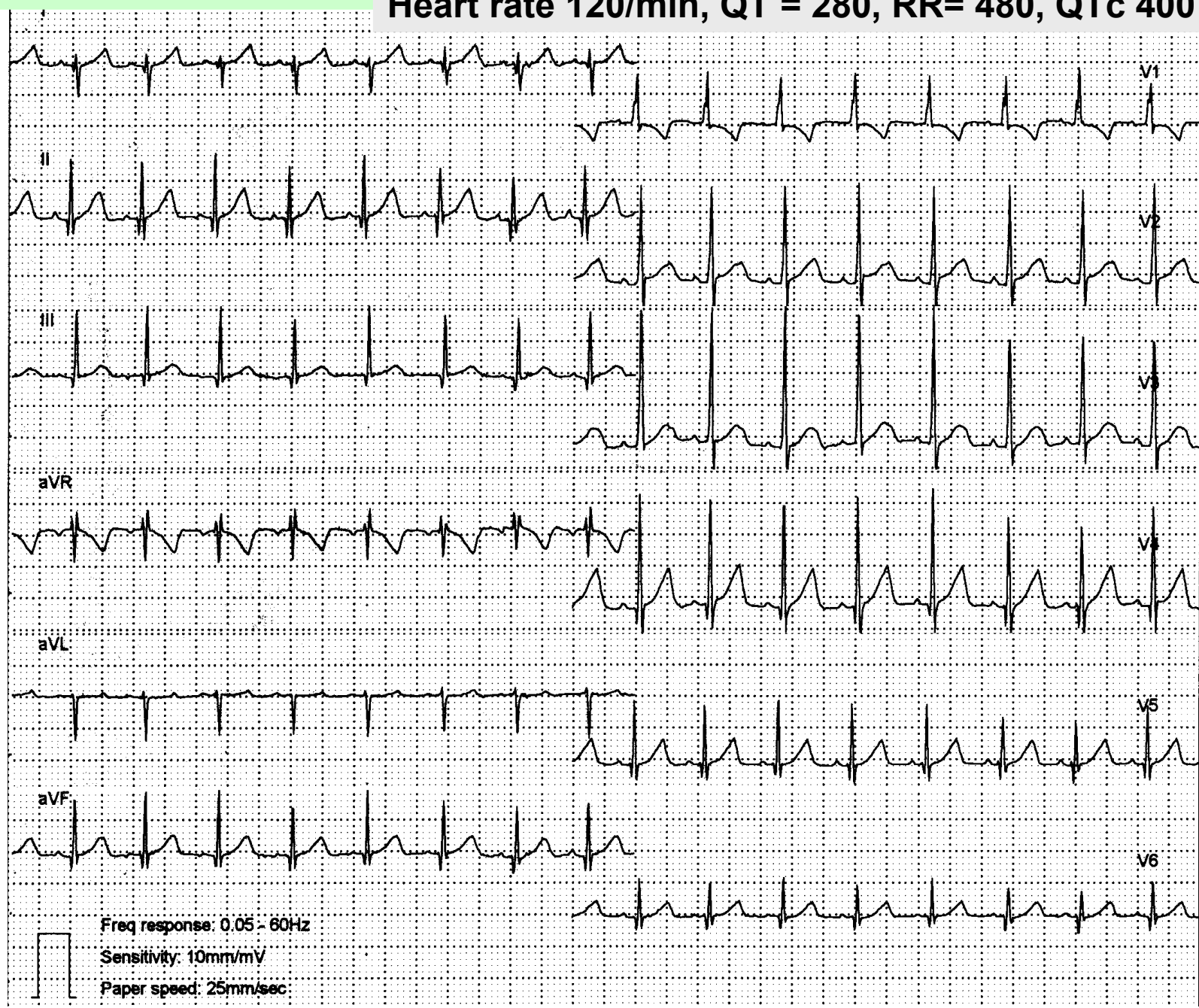


Data from >30,000 neonates. P.J.Schwartz, *NEJM* 1998

?

# Holter on beta-blockers.

Heart rate 120/min, QT = 280, RR= 480, QTc 400 msec



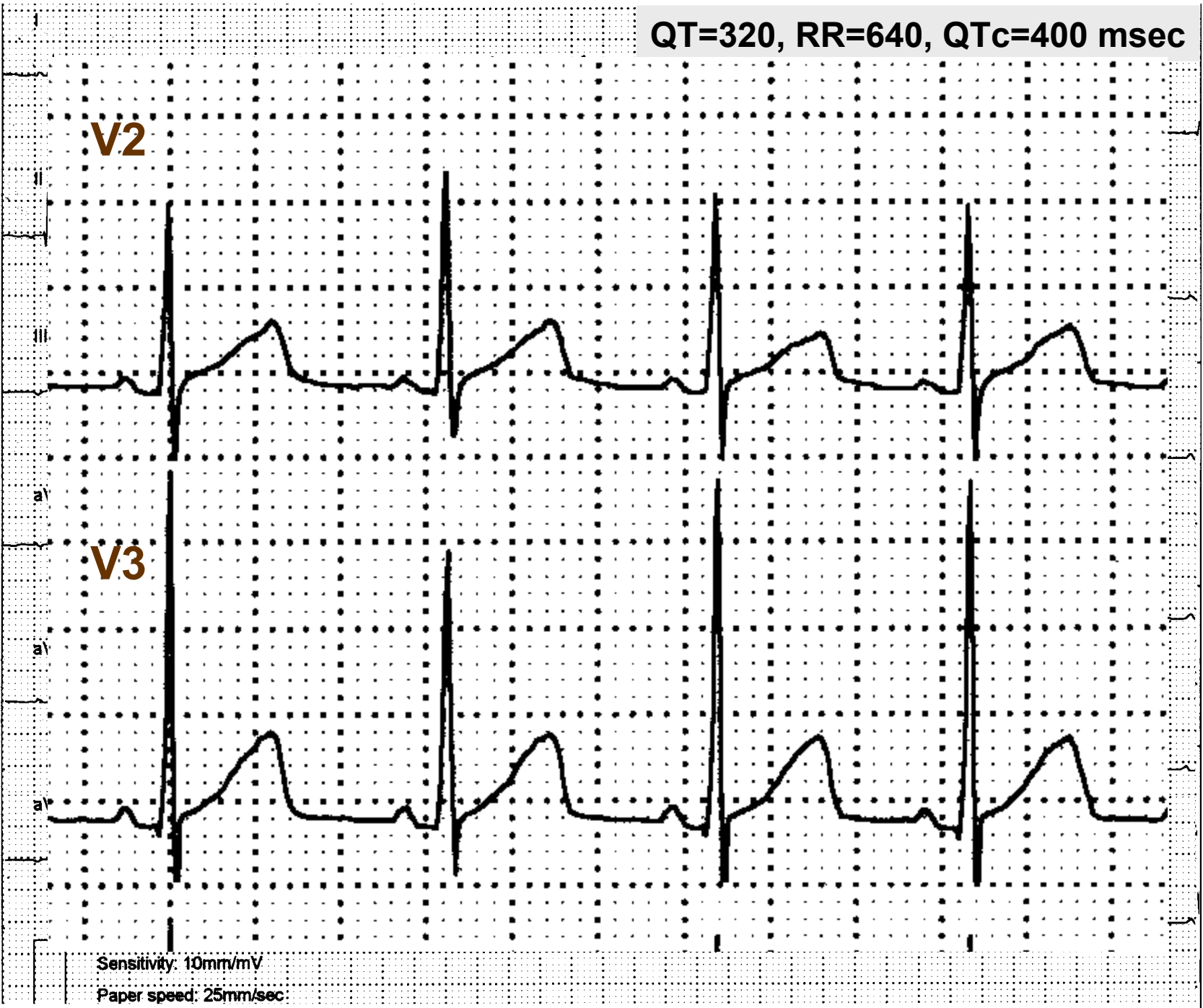
QT=320, RR=640, QTc=400 msec

V2

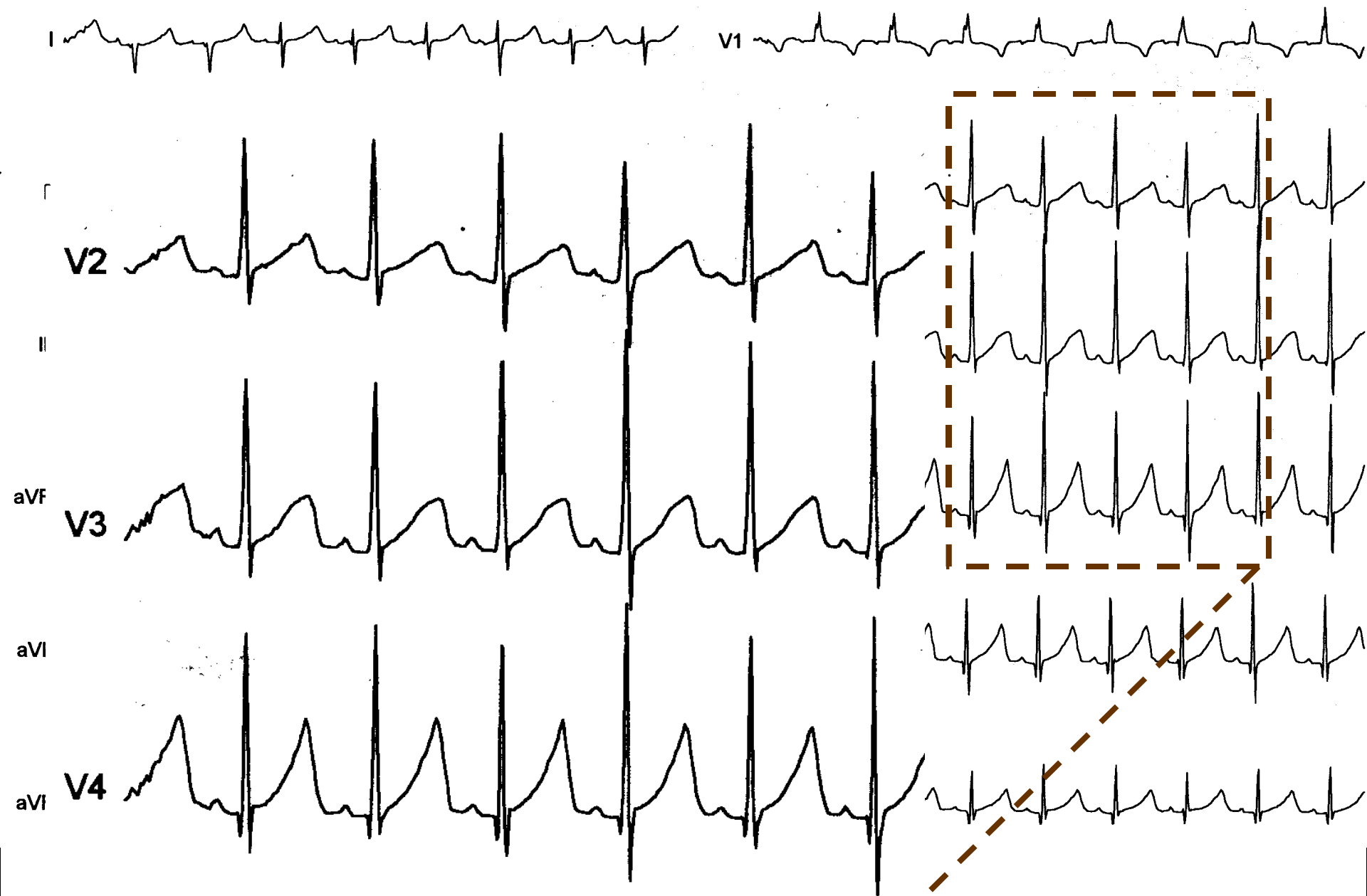
V3

Sensitivity: 10mm/mV

Paper speed: 25mm/sec

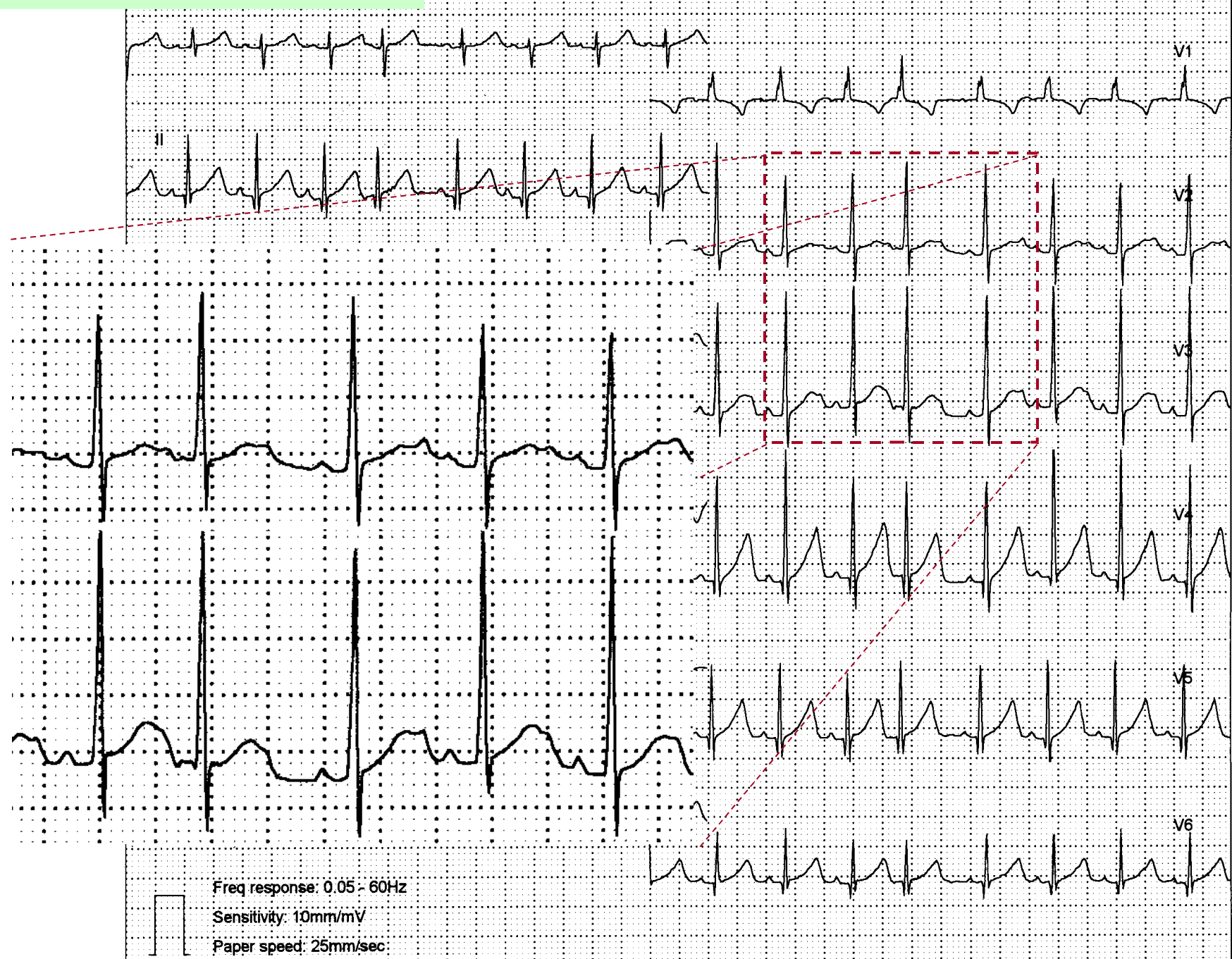


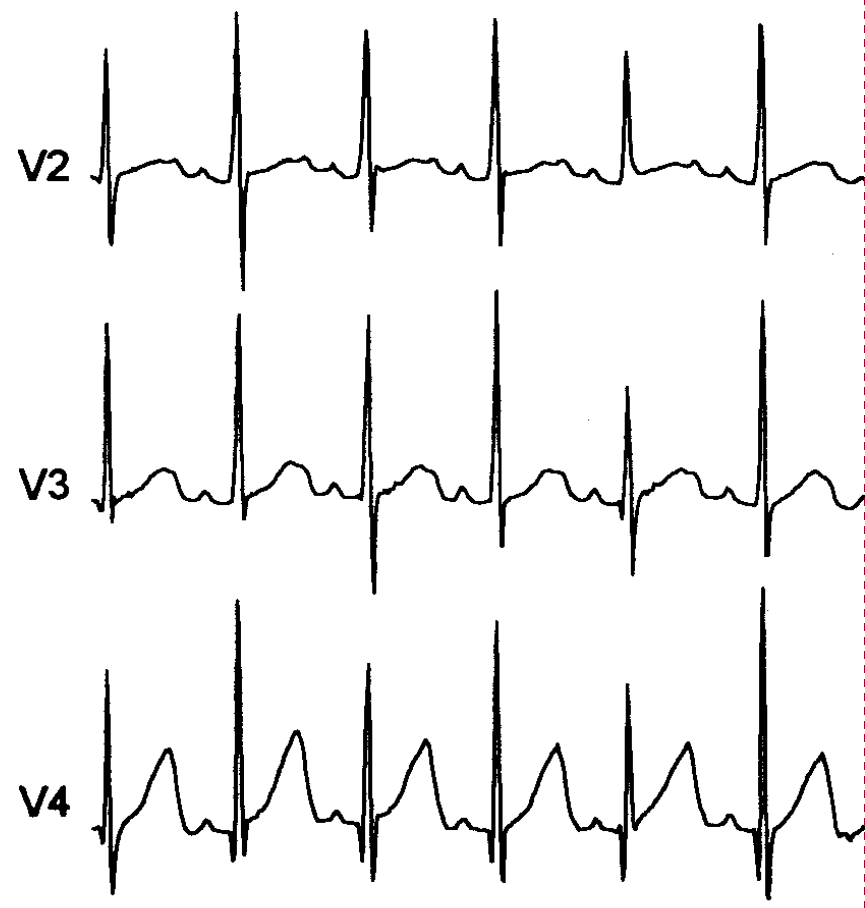
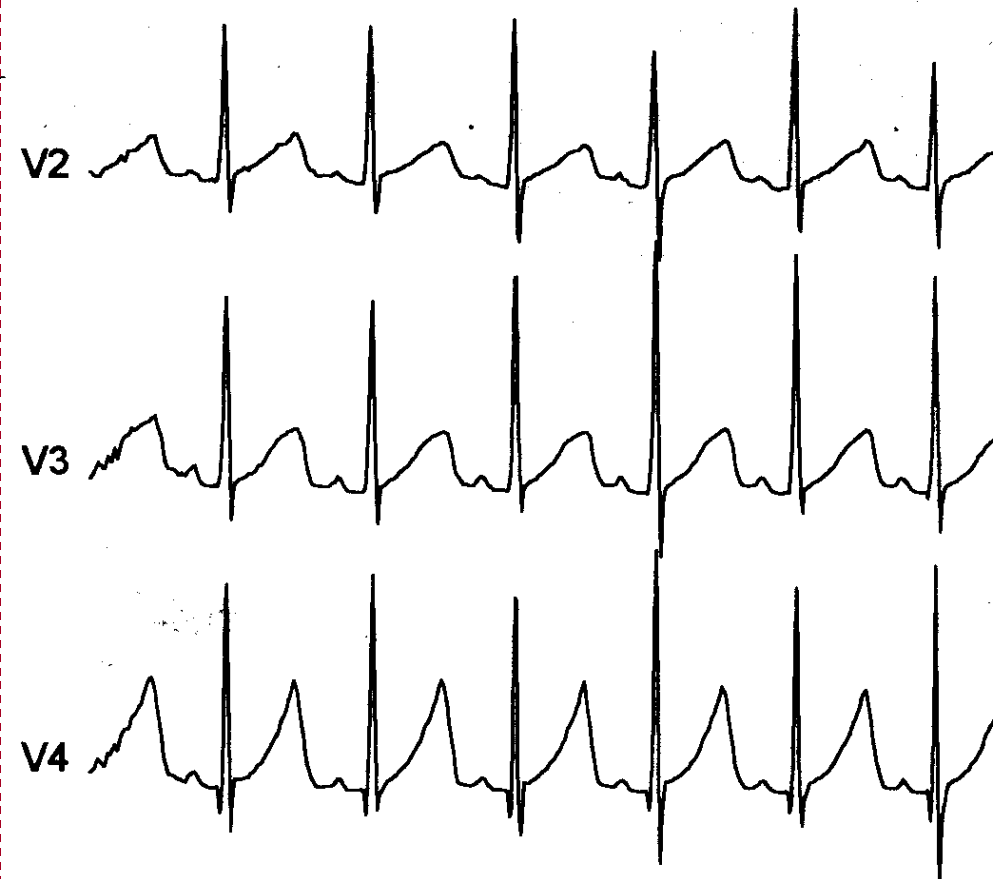
Heart rate 120/min, QT = 320 msec, QTc 450 msec.

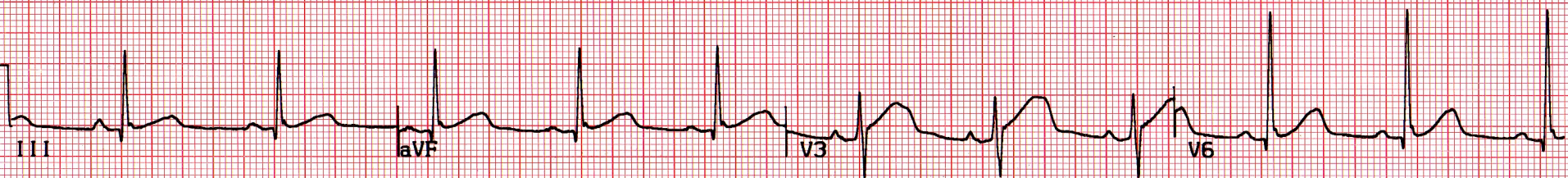
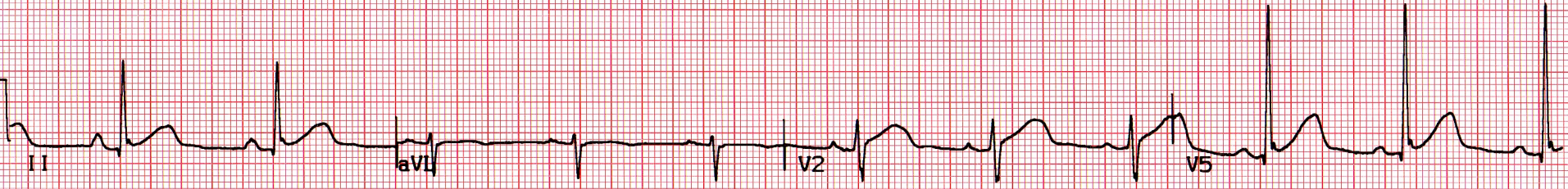




# Holter on beta-blockers.















Se:1  
Im:1 (FB/9)  
Primary Angle:0.11  
Secondary Angle:0.13

SUBTRACTION

O.TAL  
Study Date:26/08/2007  
Study Time:09:02:34  
MRN:

