

Case

- August 2009 – acute admission General Surgery
- Mr L.I. aged 40 presents with 2 week history of “bloated” abdominal discomfort and dyspnea
- 7 Kg weight loss prior 4 months
- Past History: Hypertension on inhibace



Admission findings

- Jaundiced with tender hepatomegaly
- Mild diffuse thickening gallbladder wall U/S
- Laboratory findings
- Bilirubin 30 (0-24)
- GGT 142 (0-60)
- AST 72 (0-45)
- Diagnosis
- ?
- Treatment
- Iv fluids & analgesia - appt gastro outpatients



- **OP clinic 8 days later**
- **Liver function tests improving**
- **Diagnosis**
- **Self-limiting hepatitis**



- **Second admission 8 days later**
- **Increased SOB**
- **JVP +4 cm, cardiomegaly but no failure CXR**
- **BNP 741**
- **Echo: moderate concentric LVH**
- **Severe LV impairment, EF 15%, mild MR**
- **Moderate RV impairment**



Question

What is the significance of his weight loss?



Question

Does this show LVH?



- **Treatment**
- **Furosemide 40mg**
- **Cilazapril 2.5mg**
- **Spironolactone 12.5mg (creatinine 113, egfr 63)**



Question

What's missing from this treatment?



Heart Failure Nurse clinics

- Doubled cilazapril to 5mg (BP 147/101)
- Carvedilol started 3.125mg B.D.
- Three weekly follow-up
- Carvedilol reached 25mg B.D. 11 weeks later



- **Repeat echo March 2010**
- **Mild LV impairment, EF 48%, no MR**
- **Mild concentric LVH**
- **Moderate RV impairment**



Comparison

Date	EF%	MR	RV	LVEDD	LVESD	LAc ^m ²
08/09	15	mild	mod	6.1	5.6	24
03/10	48	none	mod	5.4	3.9	11



Learning points

- Look at the JVP
- Have a plan to titrate up heart failure medications
- Recheck LV function after at least 3 months on full heart failure treatment



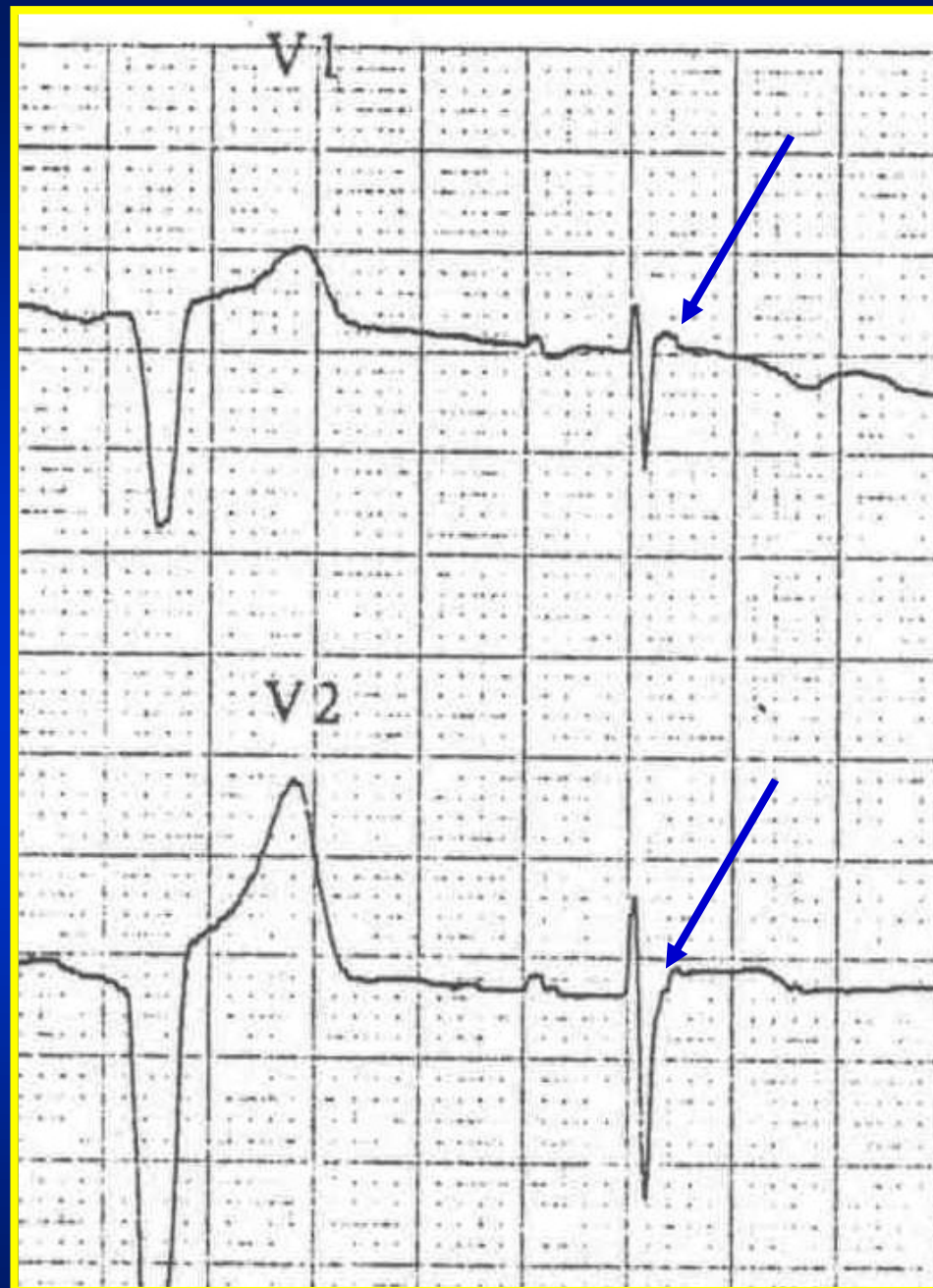
Case

- 50 year old man involved in a MVA
- Felt dizzy and thought he grabbed the steering wheel but daughter said he grabbed his head
- Rolled into a ditch with comminuted fracture R humerus
- Subsequent nonsustained LBBB morphology VT in hospital
- Family history of mother found dead in bed, father died ? MI age 60 and 2 brothers died age 40 and 60 ? MI
- Also diabetes, asthma and hypertension
- Chronic AF



- **Strongly positive SAECG**
- **Probable epsilon wave on ECG**
- **Poor echo views but enlarged RV outflow tract**
- **TOE partial AV canal defect with mild MR**
- **Trivial L to R shunt on catheter study**
- **MRI suggests early cardiomyopathy despite preserved Lv & RV ejection fractions**





- **Primum ASD closed followed by implantable defibrillator**
- **Meets task force criteria for arrhythmogenic right ventricular cardiomyopathy**



Case

- 48 year old female hospital worker
- Around midday on a Friday am began to feel unwell. By 4:30 pm really tired, light-headed, eyelids heavy. Drove home, began to feel “weird”, almost home. Opened the sunroof and wound down windows. About 500 metres from home came to with an airbag in her face
- Had run into a stationary truck, no recollection of impact
- One prior faint with mole removal and presyncope with blood tests



- No family history of premature death
- Normal examination, normal ECG (QTc 0.406sec)
- Normal 2-D echo
- 8 mins after GTN spray progressive hypotension to 58mmHg.
- Diagnosis of vaso-vagal syncope



Learning points

- Vaso-vagal mechanism cause of 3 out of 4 syncope
- Usually prodrome but loss of consciousness may be sudden
- Absence of structural heart disease supports diagnosis
- History more important than tilt testing



Case

- Mr SG 60 year old male came to NZ November 2009
- Presented with increasing SOB without chest pain, ?MI
- Past History
- Asthma 5years
- Rheumatic fever and heart murmur 5 yrs
- Hodgkins lymphoma chemo & radio-therapy 35 years ago
- DVT after plane flight 10 yrs ago, warfarin 2 months
- Examination
- Loud systolic ejection murmur
- Normal JVP, No oedema



- **BNP 267**
- **D-dimer 540 (0-500)**
- **Diagnosis, ? PE**
- **Treatment**
- **Blood gas, CTPA, Clexane**



Echo

- Severe LV impairment, EF 25-30%, mild MR
- Severe aortic stenosis, gradient 41mmHg, area 0.9cm²
- LVEDD 7.1, ESD 6.1
- Normal wall thickness



- **St Jude aortic valve replacement 3 weeks later**
- **Inhibace 5mg**
- **Betaloc CR 190mg**
- **Spiroonolactone 25mg**
- **Warfarin**



ECHO April 10

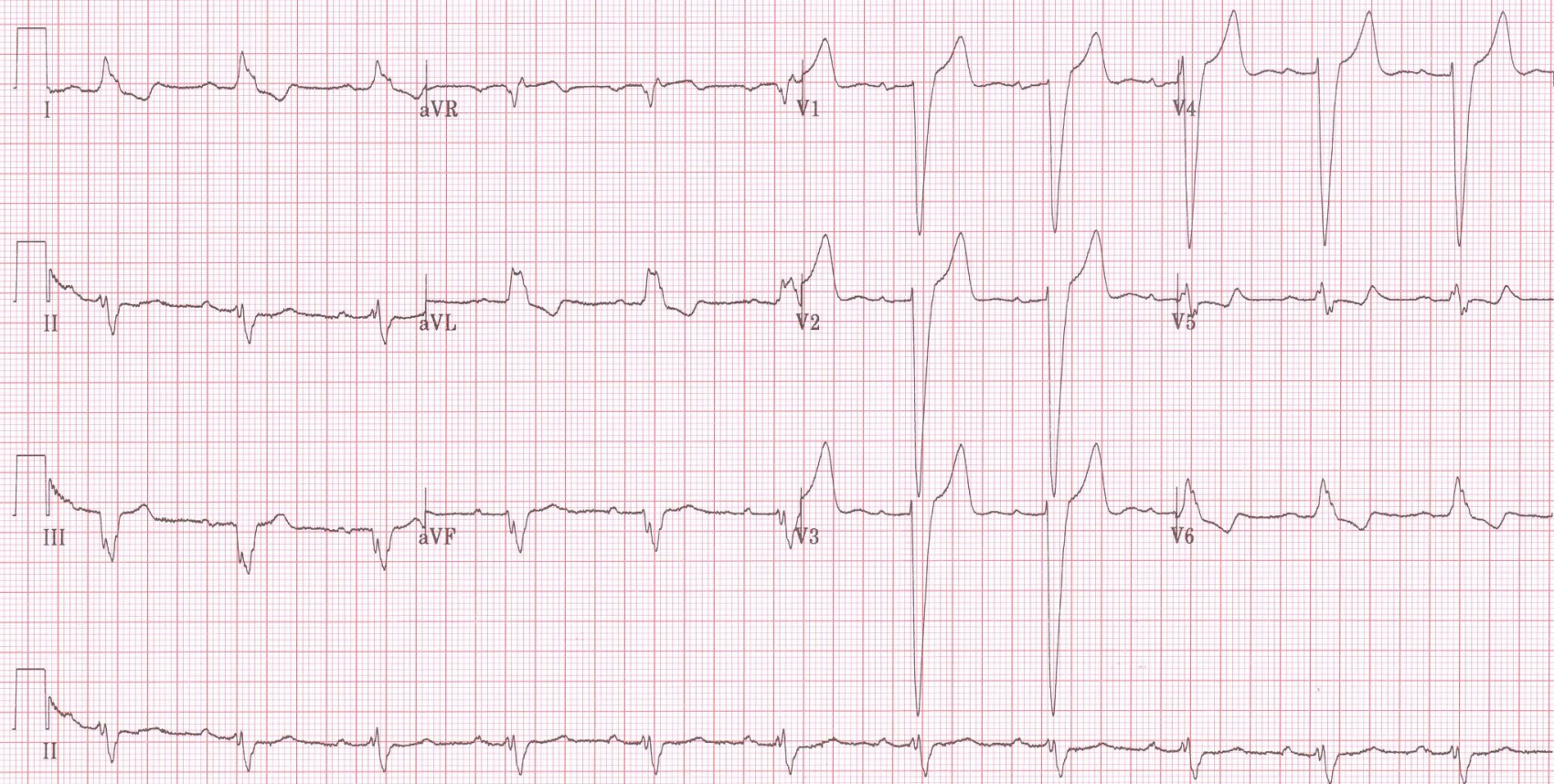
- Moderate LV impairment, EF 35-36%
- Trivial-mild MR



Clinic: Cardiology

Comments:

Unconfirmed



150 Hz

25.0 mm/s

10.0 mm/mV

4 by 2.5s + 1 rhythm ld

MAC5K 008B

12SL™ v237



Green Lane Cardiovascular Service, Auckland City Hospital, Auckland, NZ

Learning points

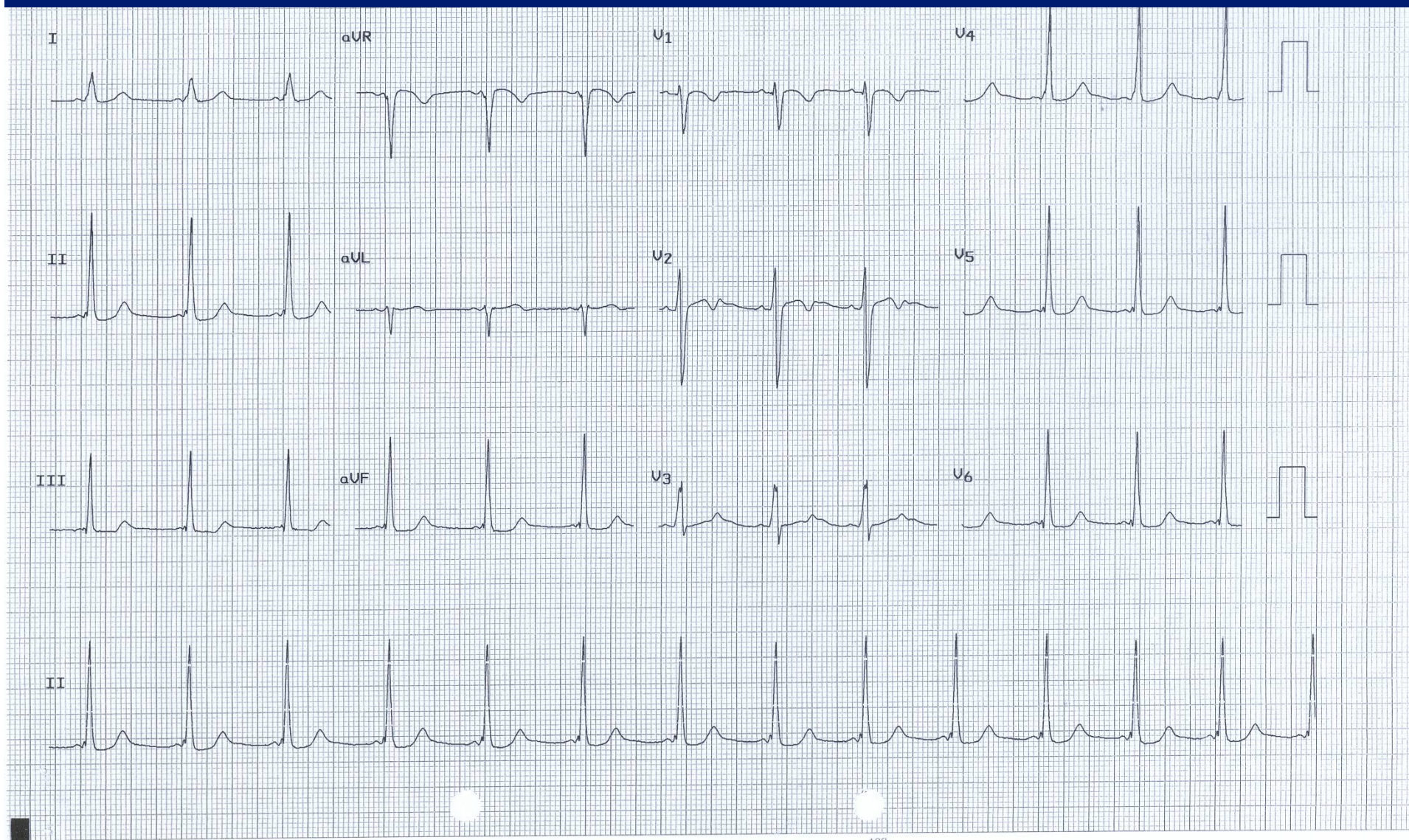
- Severe AS may present as a cardiomyopathy
- Improvement in LV function expected in most cases, but may continue >12 months
- Important to treat with full heart-failure meds while following response
- Implantable defibrillator should be considered if EF still $\leq 30\%$ after 6 months

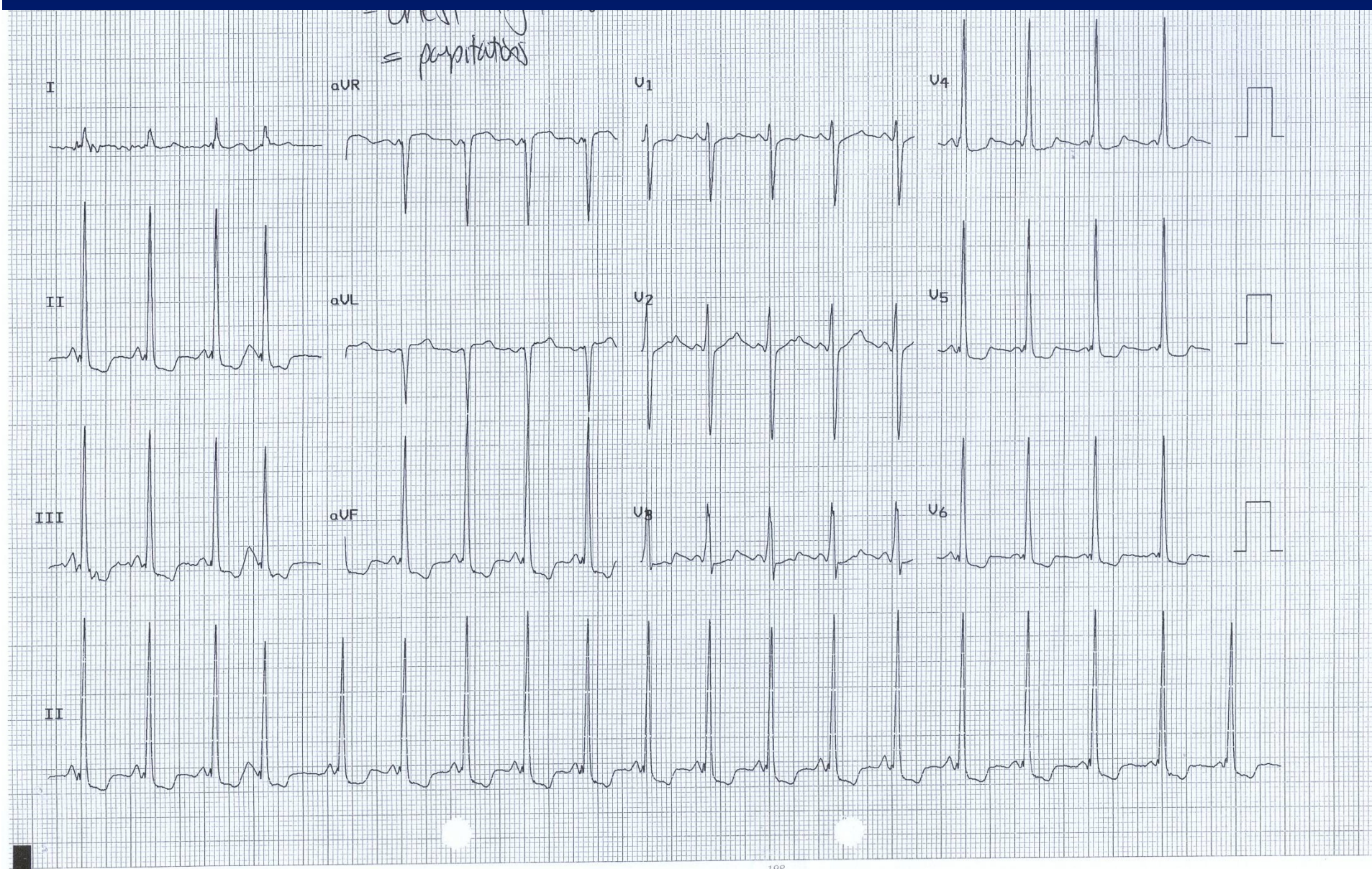


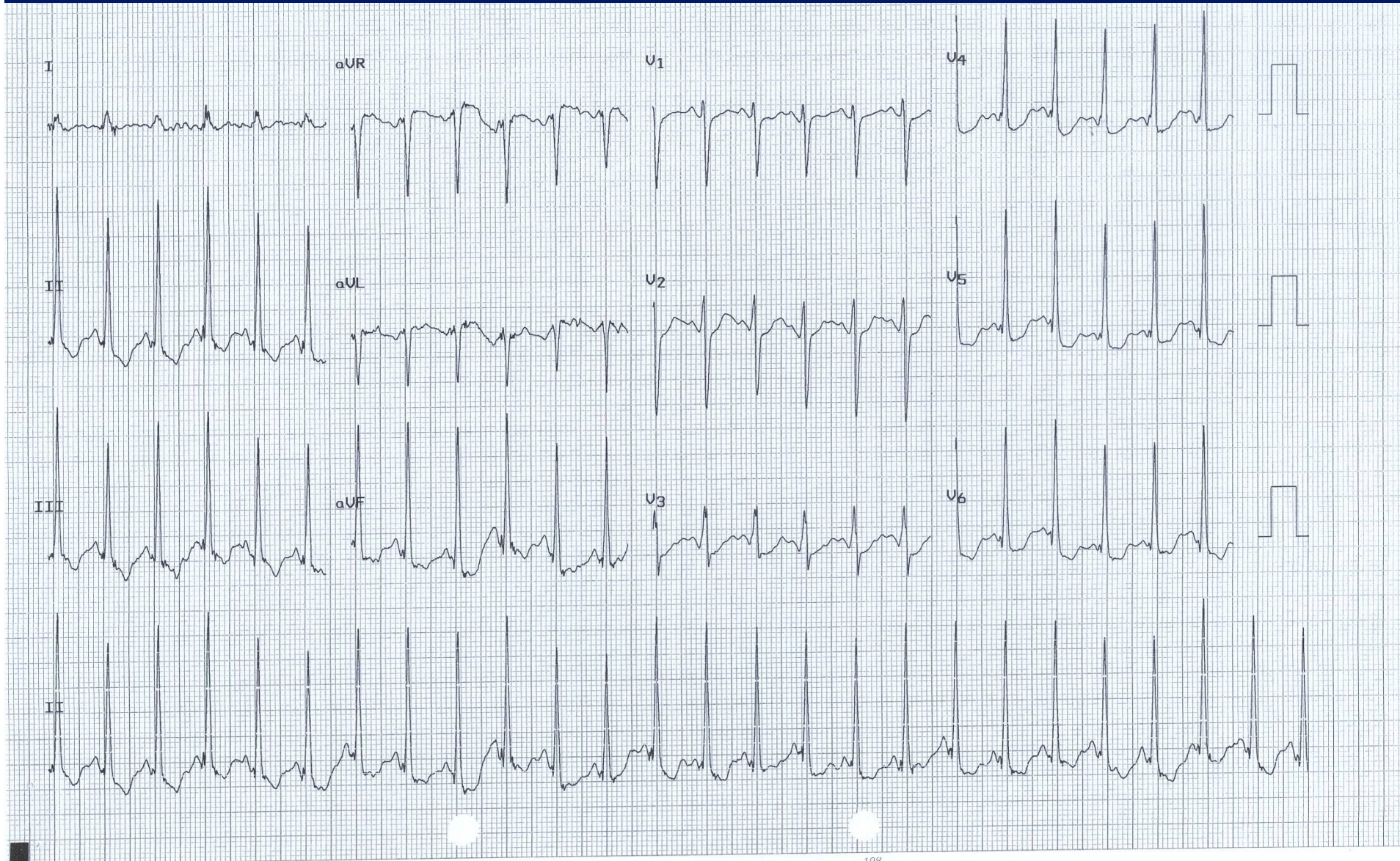
Case

- 21 year old surf life-saver with exertional chest pain and syncope, chronic fatigue
- Positive exercise test 11mins 52 sec
- ST depression with pain during Holter
- Normal MRI scan
- Bradycardia with 2:1 AV block with tilt table test
- Normal urinary catecholamines











**MR cardiac stress perfusion scan shows
confluent attenuation of gadolinium
uptake throughout the left ventricle.**



**No improvement vasodilators, possible
response to sildenafil**



48 Yr old male

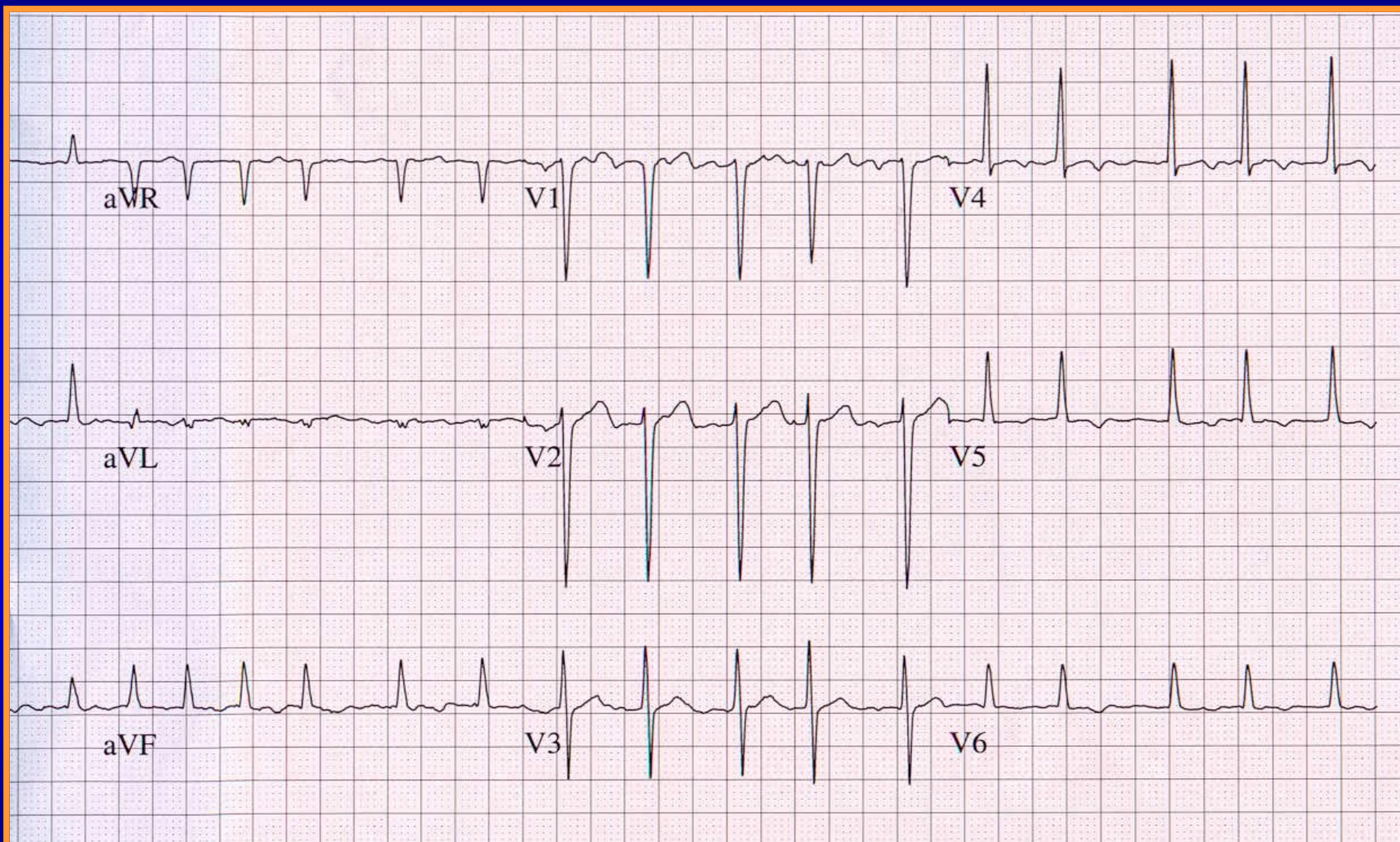
First admission 22.11.05 (Tuesday)

- Intermittent palpitations since Sunday
- shared 3 bottles of wine Sunday night (usually 1)

On arrival HR 139 bpm

Past history

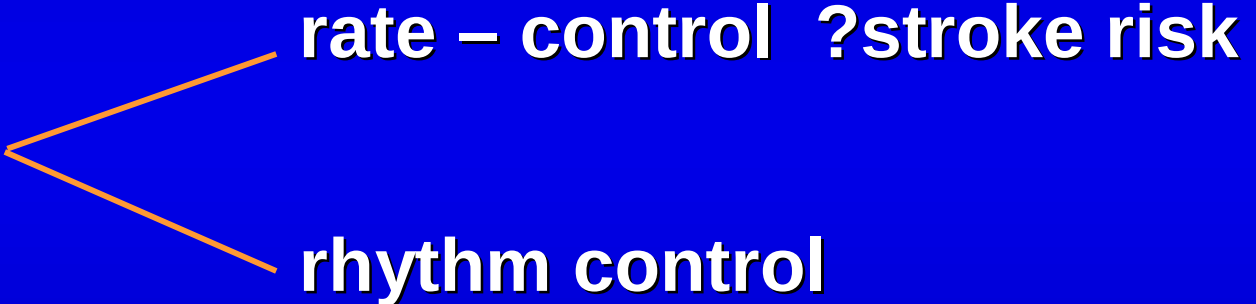
- Treated hypertension (bendrofluazide + felodipine)
- Subarachnoid haemorrhage clipped aneurysm age 10
- Family history premature IHD



What are the options?

- Immediate
 - cardioversion ?risks
 - rate - control

What are the options?

- Long-term 
 - rate – control ?stroke risk
 - rhythm control

Echo

- Mild/moderate global LV dysfunction (EF 40-45%)
- LA moderately dilated (27 cm²)
- Normal valvular function

Treatment Plan

- Oral metoprolol for rate-control
- Felodipine halved
- Reduce alcohol
- Outpatient echo
- Plan OP cardioversion

Warfarinisation

- 10 mg Wednesday
- 5mg Thursday
- See GP Friday

**What drug as maintenance
post cardioversion?**

Elective Cardioversion 23.12.05

- Accelerated CV - on diltiazem
- TOE – no thrombus

Spontaneous contrast LA and RA

- Failed 50 J
Success 100 J
- Discharged on sotalol 40 mg b.d. with ward review 4 days
- Outpatient Holter

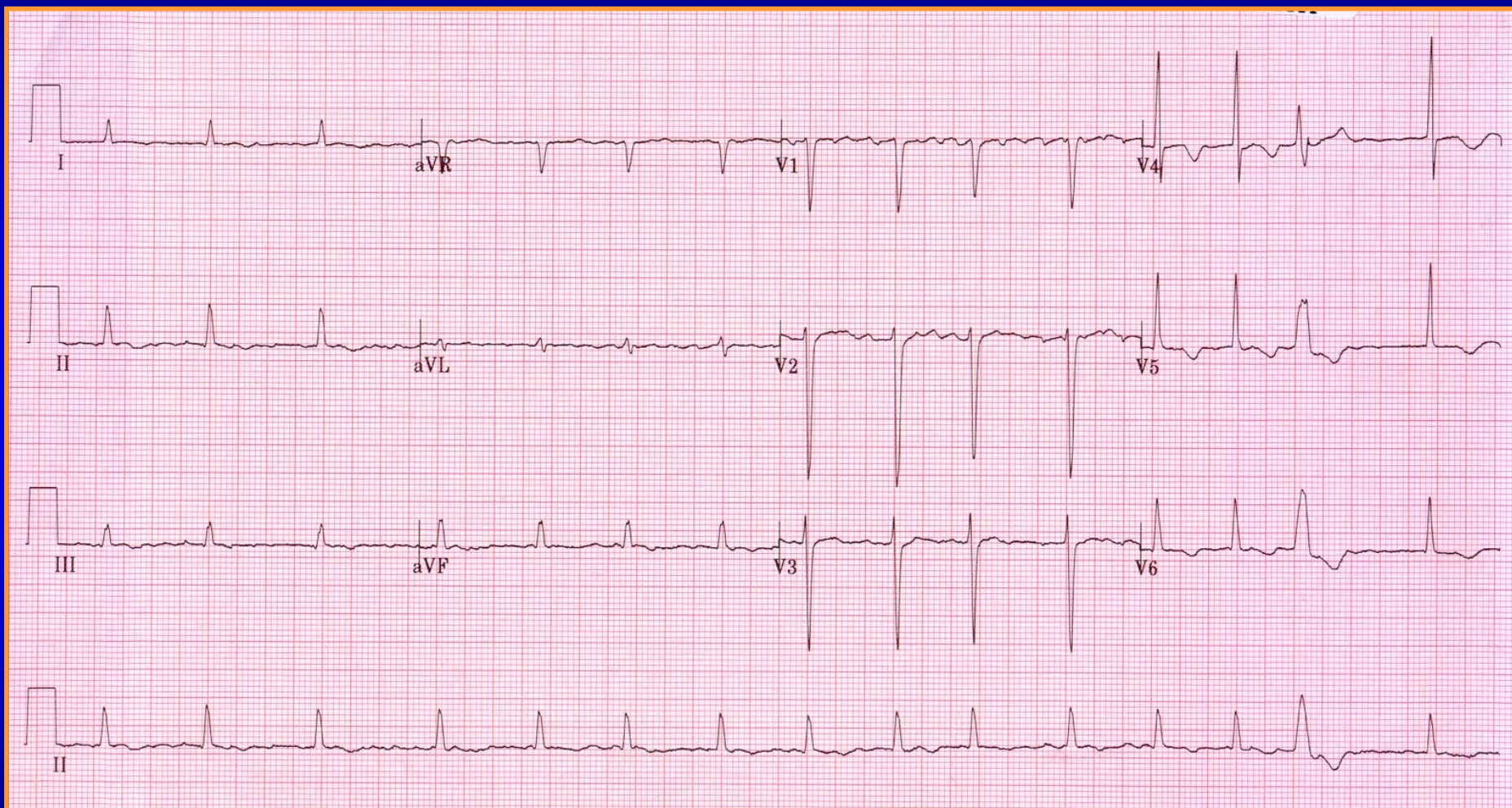
Second admission

Second admission 04.01.06

- AF 100-130bpm on sotalol 80 mg b.d.
- Repeat cardioversion 150 J

Sotalol increased to 120 mg b.d.

Cilazapril with-held ("sedation = lethargy") until BP
>110/70



Third admission

Third admission 10.02.06

- PAF since 08.02.06- INR 1.8
- Holter 03.02.06
 - initially sinus rhythm
 - short episode AF 9 seconds
 - persistent AF from 02:35□0846 am
 - rate 100-140 bpm

Management Options?

Repeat TOE and cardioversion no. 3 100 J

- **Sotalol 160 mg b.d.**

Inhibace 0.5 mg

Warfarin

Antiarrhythmic drug therapy is simplified to:

- **Beta blockers, metoprolol and atenolol**
- **Calcium blockers diltiazem (verapamil)**
- **Sotalol**
- **Flecainide**
- **Amiodarone**

Sotalol

- Prolongs action potential duration and effective refractory period myocardium
- Weak beta-blocker
- Commonly associated with fatigue symptoms
- Dosage 80–320 mg - avoid larger doses in elderly women (renally excreted)
- Check an ECG for excessive QT prolongation (QTc > 0.5 secs)
- Not suitable for rate control in AF

Your patient; watch out for

- Excessive QT prolongation
- Renal function

Flecainide

- Slows conduction velocity, small increase in effective refractory period
- Occasionally causes dizziness, flickering vision
- Dosage 100-300 mg, halve if also amiodarone
- Avoid if ventricular impairment, myocardial infarction, LBBB
- Must also have AV nodal blocking drug if atrial flutter
- Check serum level and ECG for excessive QRS widening

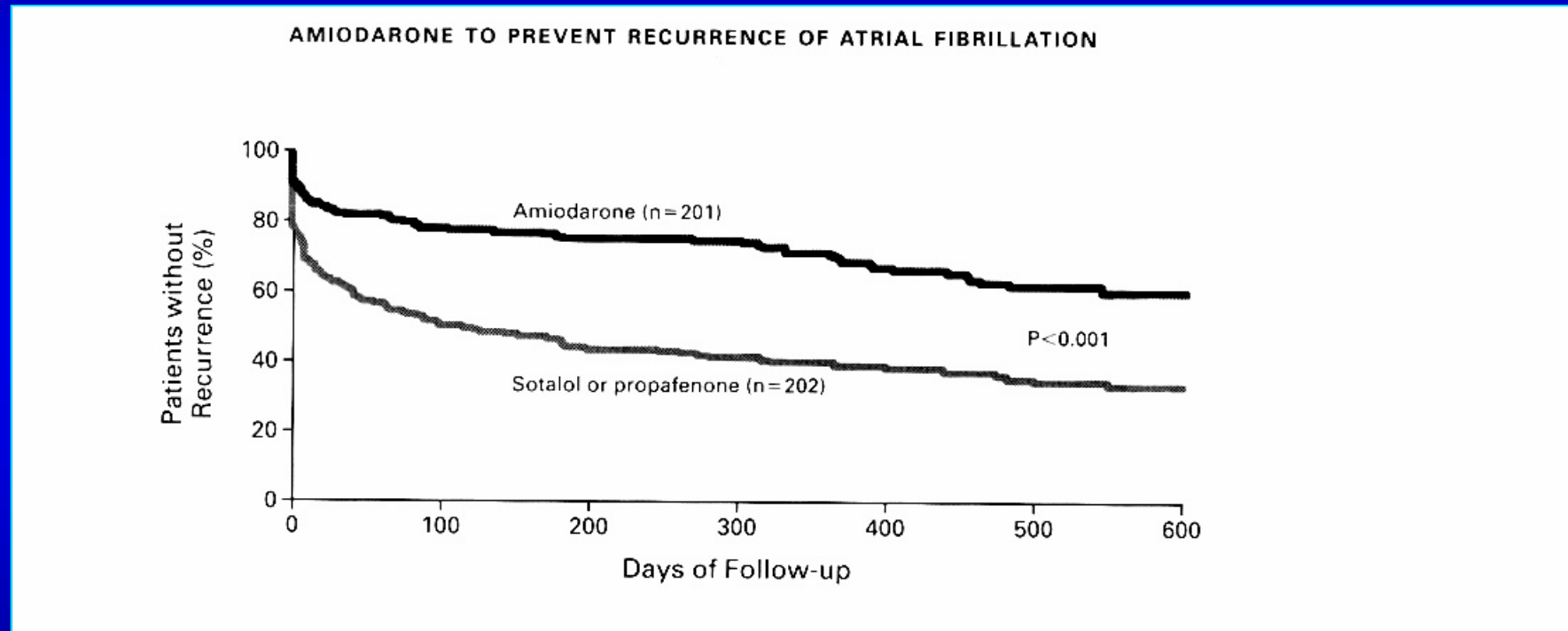
Your patient, watch out for:

- **Development of LBBB**
- **Heart failure**

Amiodarone

- Prolongs action potential duration; sodium, calcium channel, beta- blocking actions
- Maintenance dosage 100-200 g, interactions digoxin, warfarin, liver metabolised drugs
- Chronic toxicity especially hyperthyroidism, pulmonary fibrosis, ataxia
- Very low proarrhythmic potential, minimal negative inotropic effect

Freedom from AF



Your patient, watch out for:

- **Digoxin or warfarin toxicity**
- **Hyperthyroidism**

**Proarrhythmia =
net ↑ in mortality
compared to placebo**

Lingual Lasciviousness



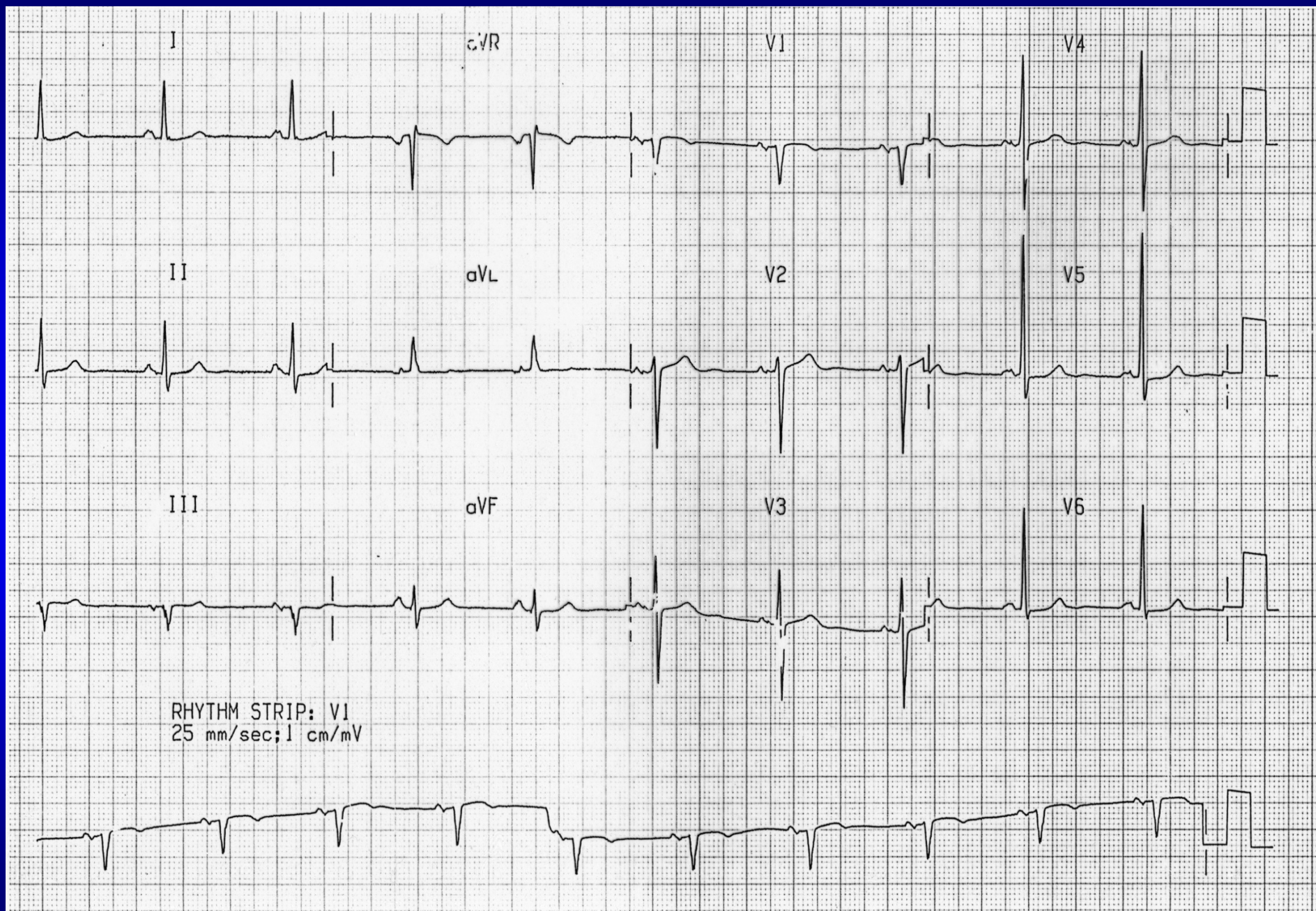
**If it's irregular it's atrial fibrillation
– it ain't necessarily so**



CASE STUDY: STICK SINUS SYNDROME 77 YEAR OLD FEMALE

- **History: Fast palpitations twice weekly
‘Giddy head’ several times daily ?heart
stops then races. Occur lying, sitting,
walking. Never lost consciousness.**

- **Physical Examination :**
 - (R) carotid bruit (investigated 1990 - minimal narrowing internal arteries).
- **2 D - Echo:**
 - No evidence of structural heart disease.





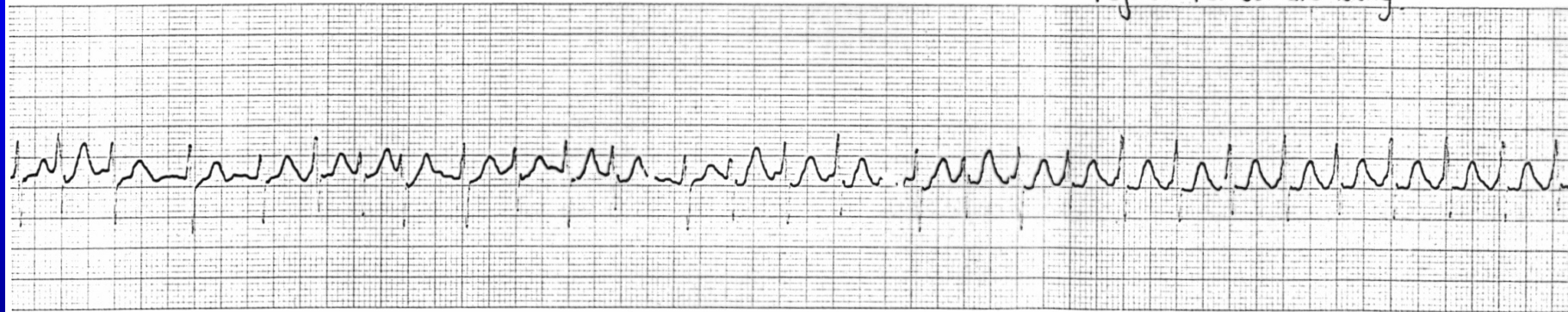
AF min RR = 320ms HR = 188bpm

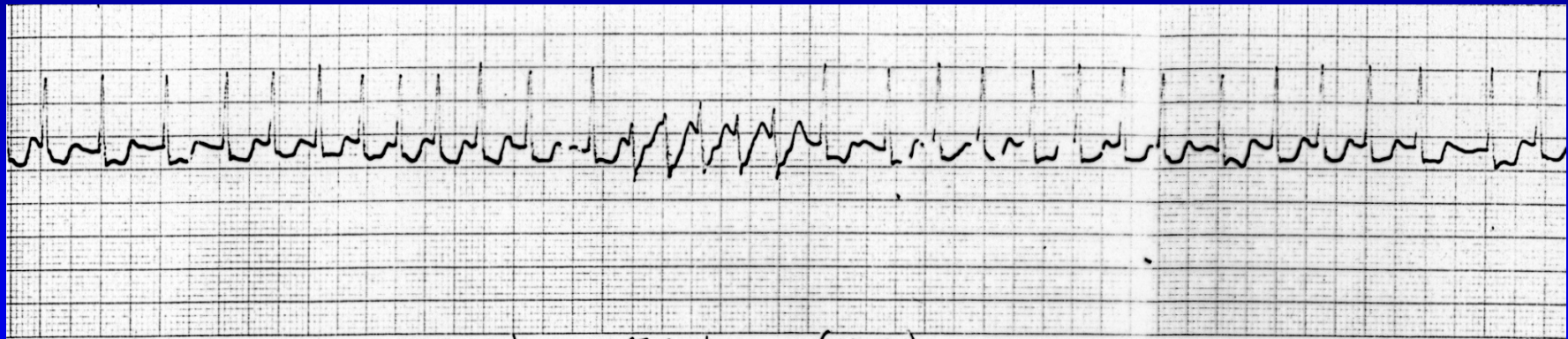
→

Atrial flutter

RR = 400ms

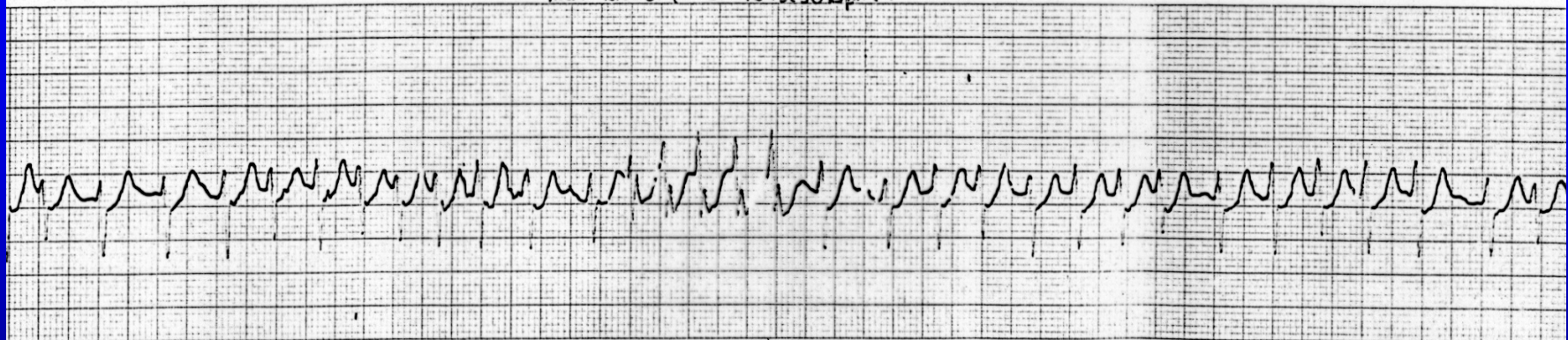
regular narrow QRS tachy.



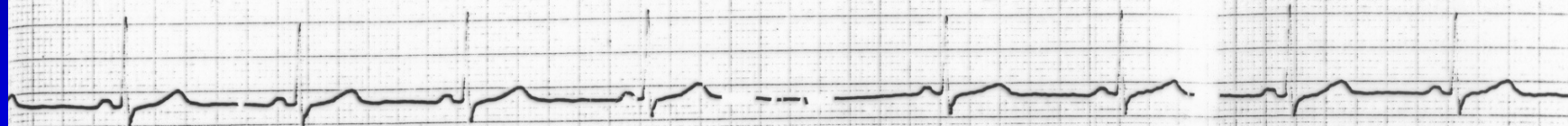


AF min RR = 280ms HR = 214bpm AF & aberrancy (5 beats)

min RR = 240ms HR = 250bpm.



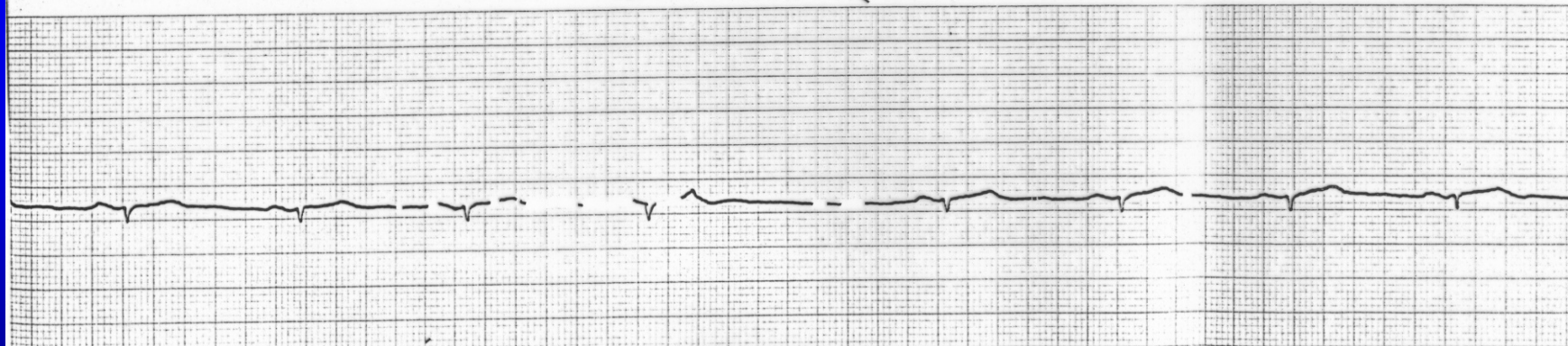
0554

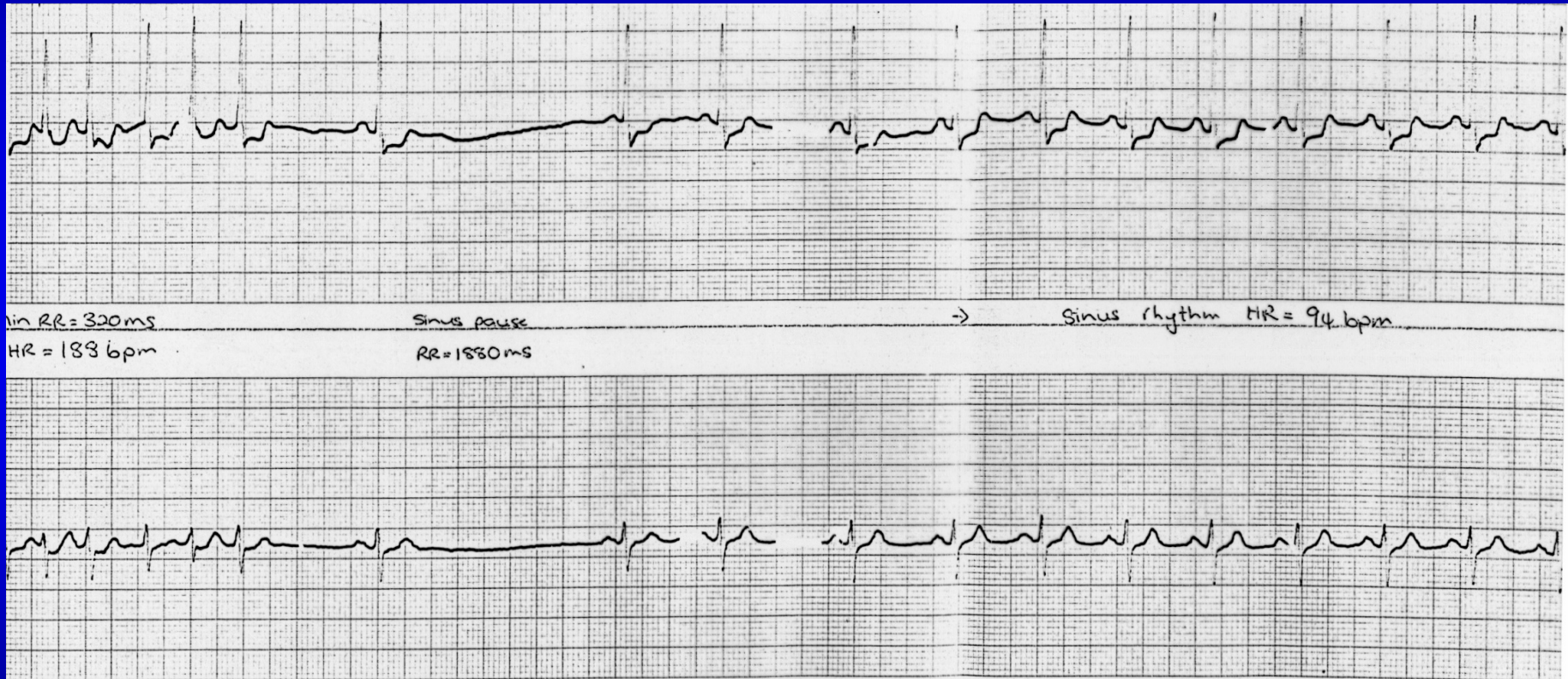


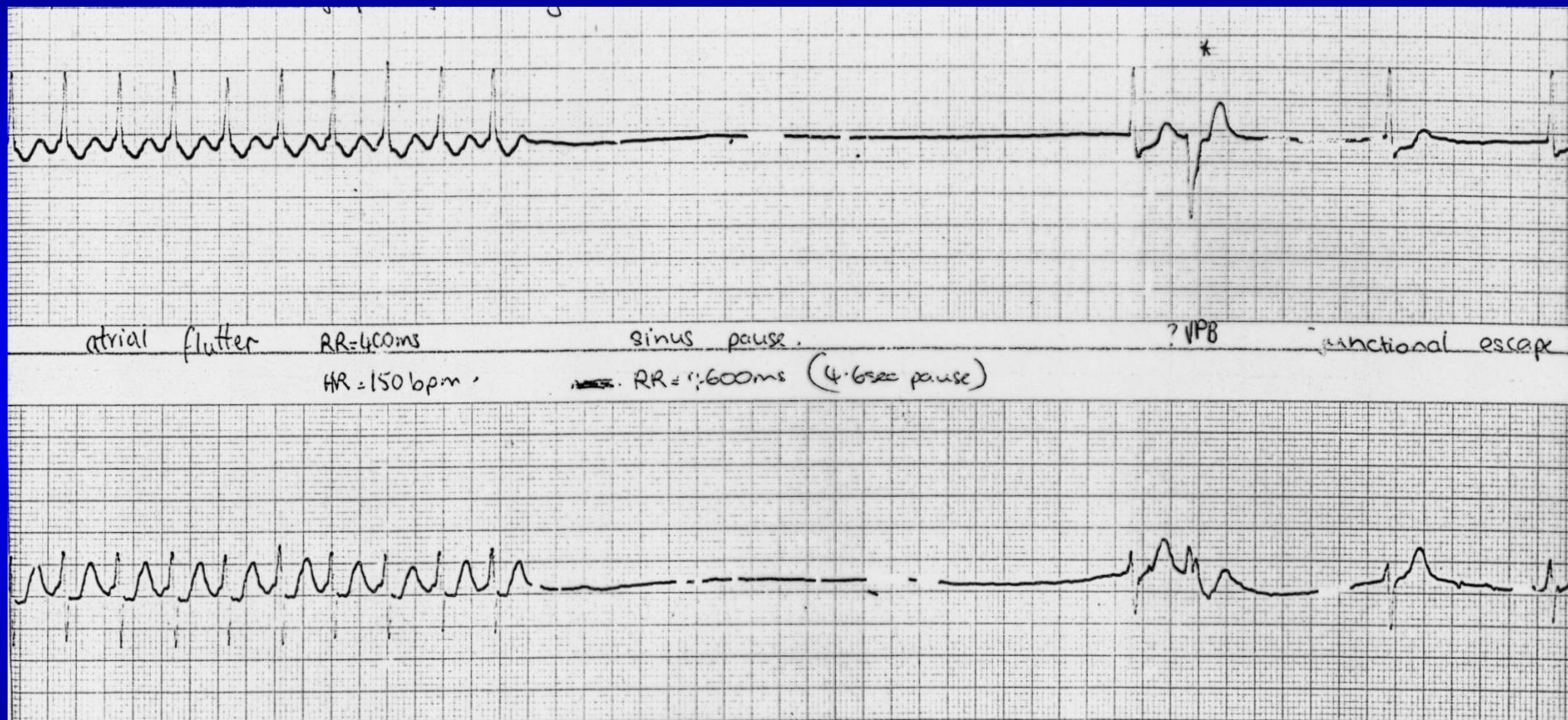
Sinus bradycardia HR = 52 bpm

Sinus pause
max RR = 2000 ms

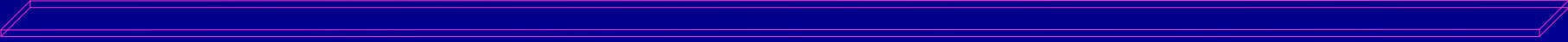
Sinus bradycardia





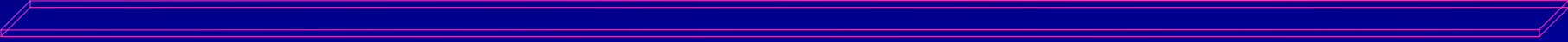


Case Study



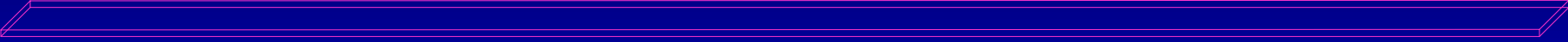
- 62 yr old man - recent slight effort breathlessness
- Physically fit, regular yoga, weight training, sailing
- Moderate alcohol intake
- In AF with uncontrolled heart rate - ↑ venous pressure
- Echo - severe global systolic impairment, EF 23%
- LA mildly enlarged (27 cm²), mod/severe functional MR
- Mild RV impairment, moderate/severe tricuspid regurgitation

Case Study



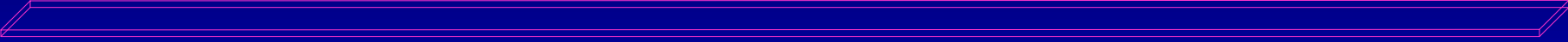
- Rate controlled with metoprolol CR 118.75 mg and digoxin 0.25 mg
- Warfarinised and ACE inhibitor started
- TOE guided cardioversion to sinus rhythm 6 wks after presentation
- Normal LV systolic function, normal LA size and absent MR repeat echo 12 wks post cardioversion
- Remains in sinus rhythm 6 mths later on no specific treatment

Case Study



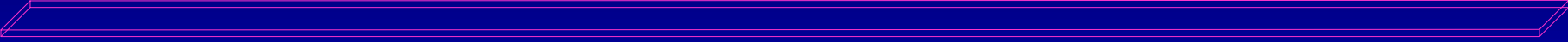
- 42 yr old man - AF at routine GP visit
- Echo showed global LV impairment, EF 30-35%, LA 28 cm², mild/moderate MR
- Difficult to rate control with metoprolol, diltiazem and digoxin
- Cardioverted to sinus rhythm 4 wks post warfarin, 2 relapses and repeat conversions

Case Study



- Started on amiodarone with continued paroxysmal AF
- Echo 6 mths later normal LV function, competent MV
- Pulmonary vein isolation procedure 8 mths post presentation
- 2 early brief relapses, maintained sinus rhythm since on no drugs

What is 'Adequate' Rate control



AFFIRM TARGET

- Resting rate <80 bpm and rate <110 bpm during a 6 min walk

OR

- Average heart rate <100 bpm on a 24 hr Holter monitor with no rate >110% avg predicted heart rate

STROKE RISK

CHADS Score	Annual stroke risk (%)
0	1.9
1	2.8
2	4
3	5.9
4	8.5
5	12.5
6	18.2

SCHADS Score

Medical condition	No. of points
C ongestive heart failure	1
H igh blood pressure	1
A ge 75 or older	1
D iabetes	1
S troke previously	2



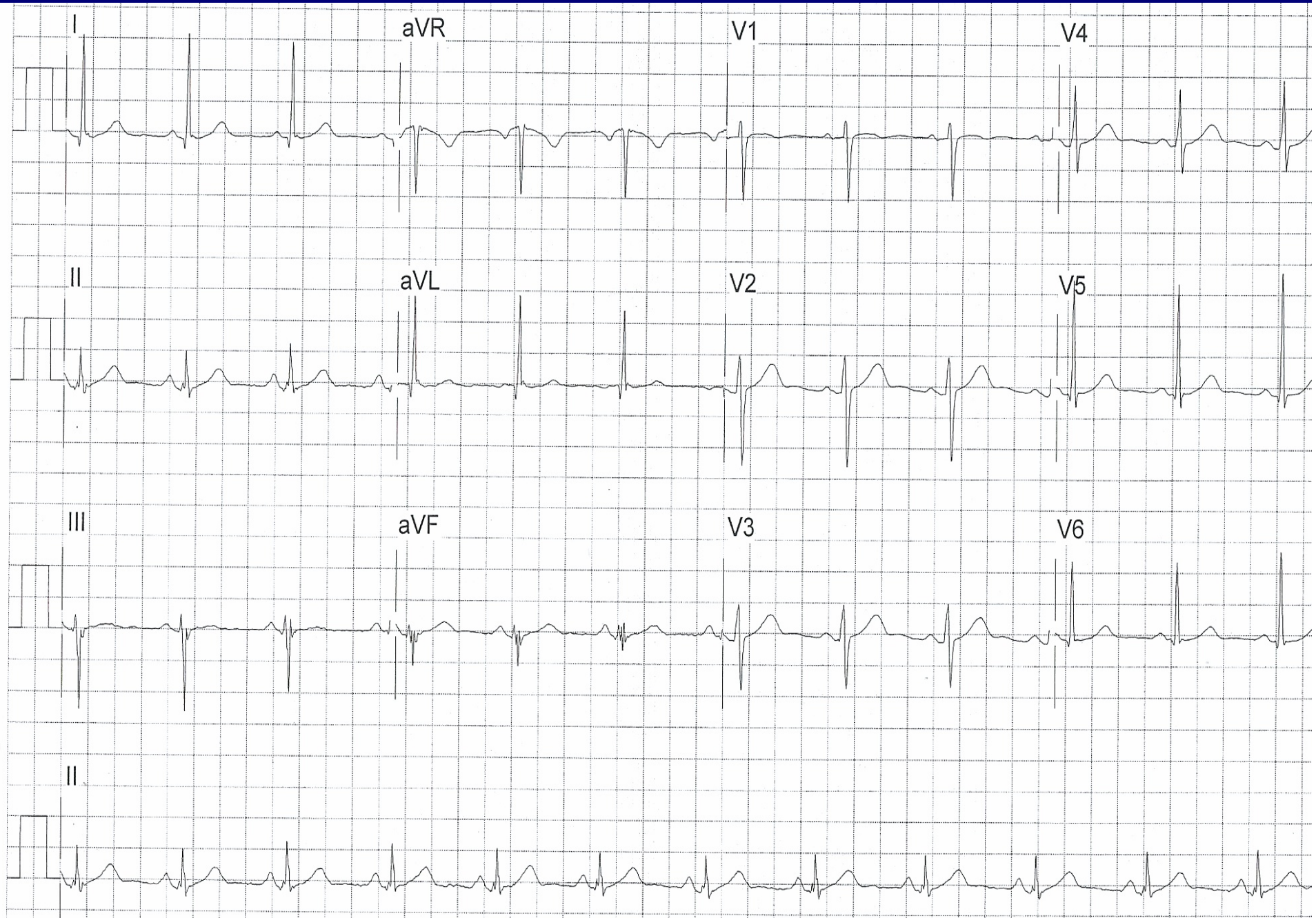
The Normal ECG

- Correct paper speed 25mm/s
- Calibrated machine
- Correct lead positioning
- Minimal background interference
- 3 complexes/lead
- Rhythm strip

Normal ECG

- Rate
- Rhythm
- Intervals PR, QRS (BBB), QT
- Axis
- Other changes

Normal ECG



ECGs - Rate

Normal

50 – 90

Fast

>90

Slow

<50

ECG - Normal Rate

Rhythm

Regular

Sinus

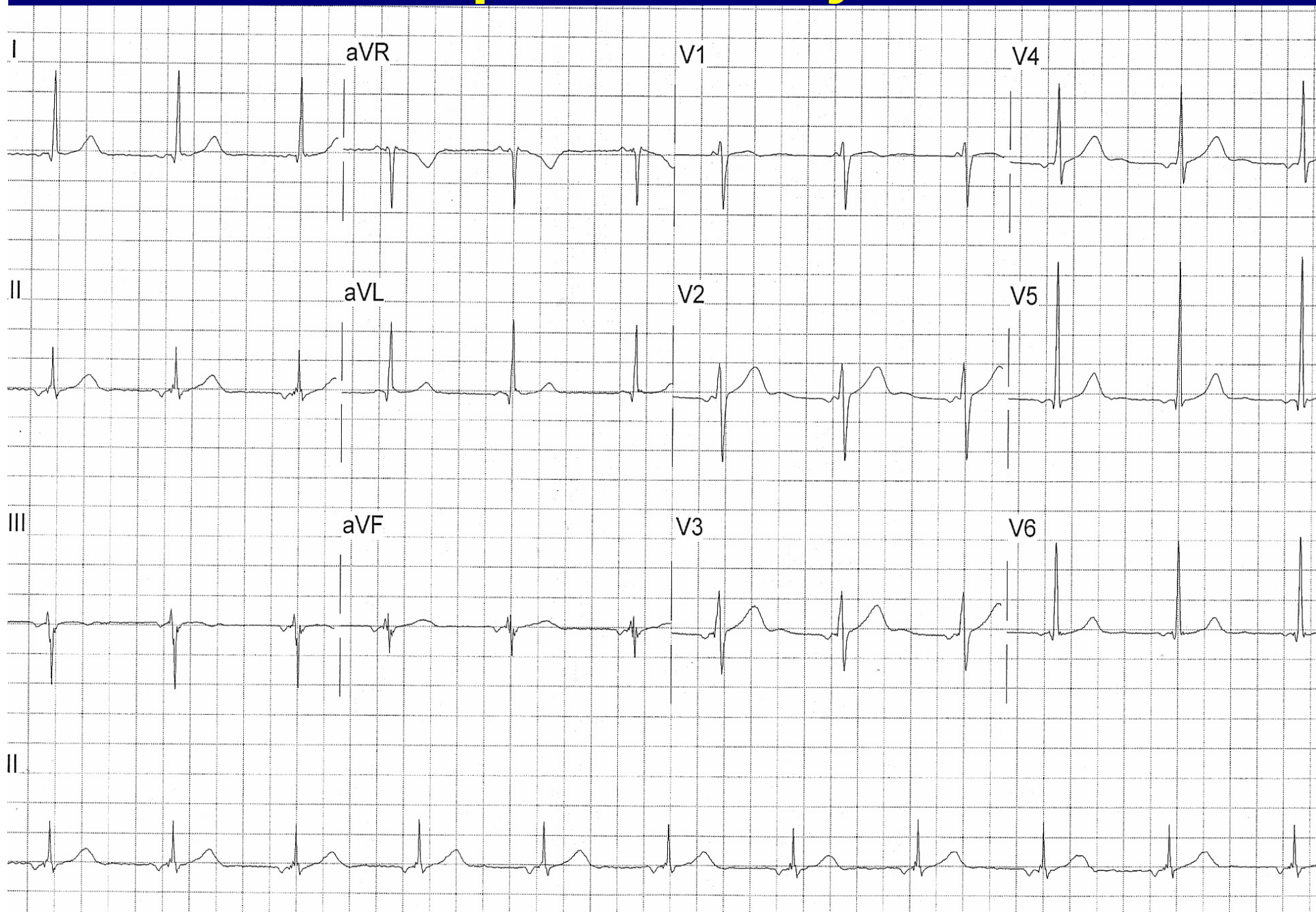
Ectopic atrial

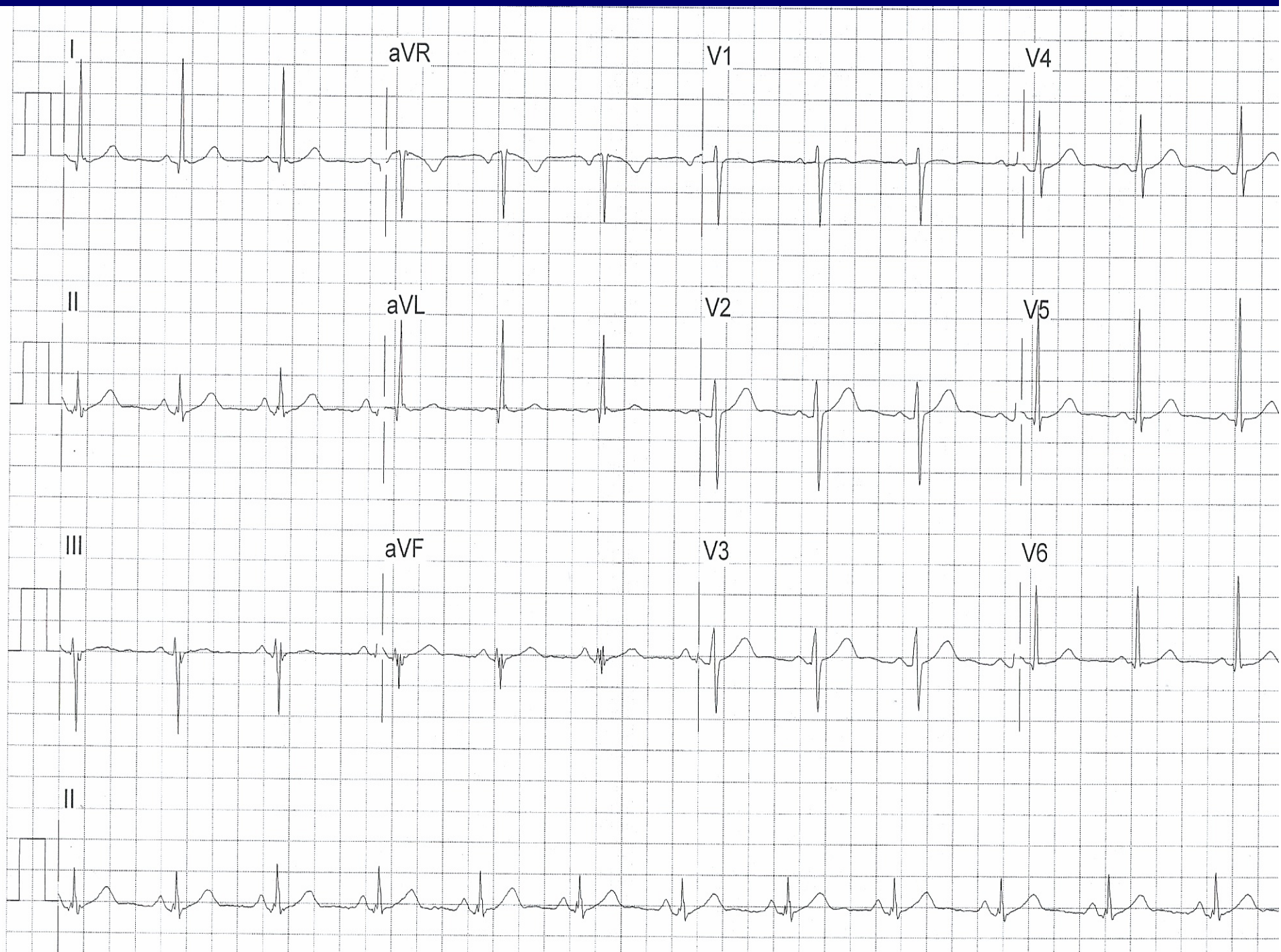
Irregular

Ectopics

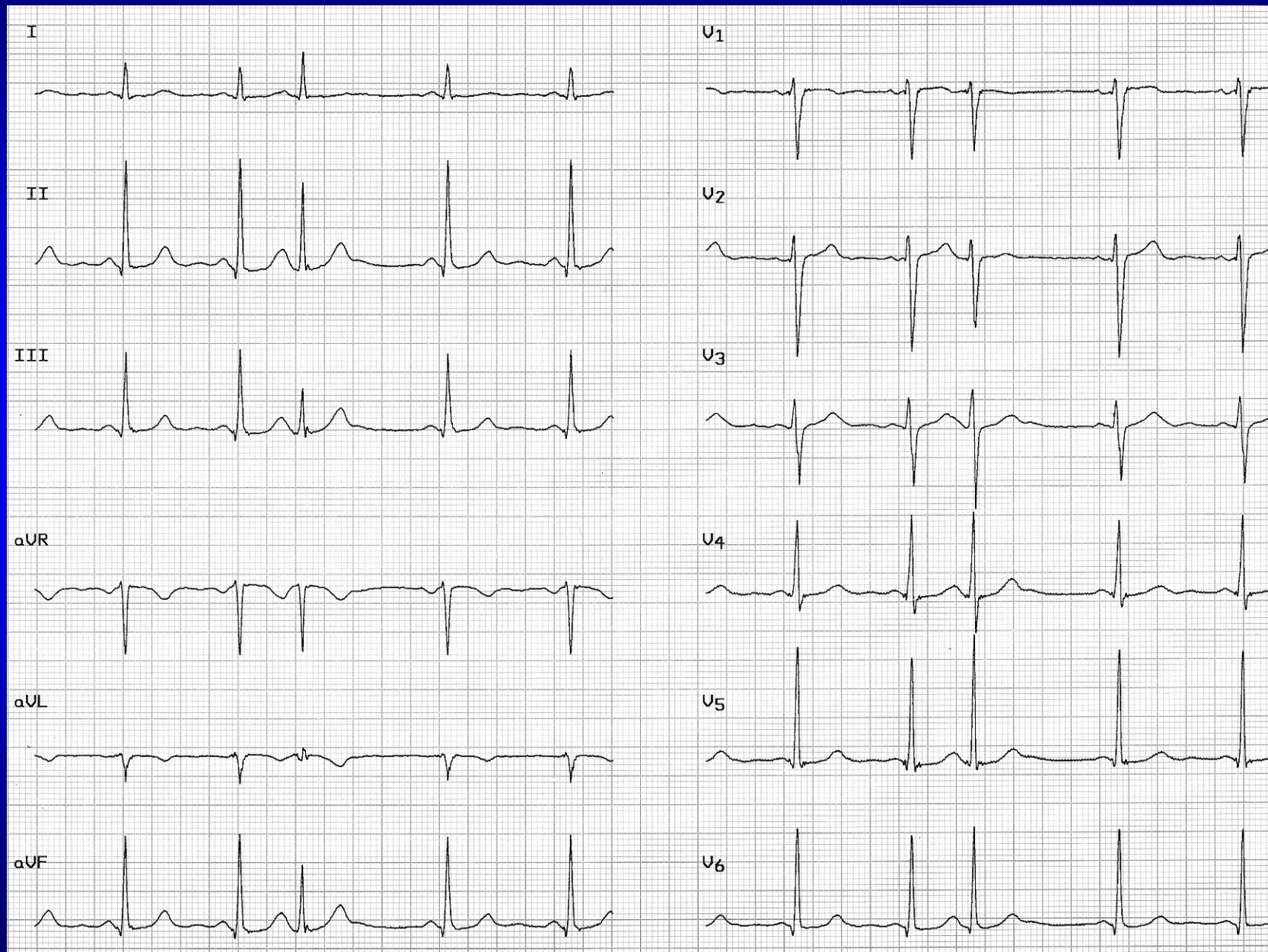
Atrial fibrillation

Ectopic atrial rhythm





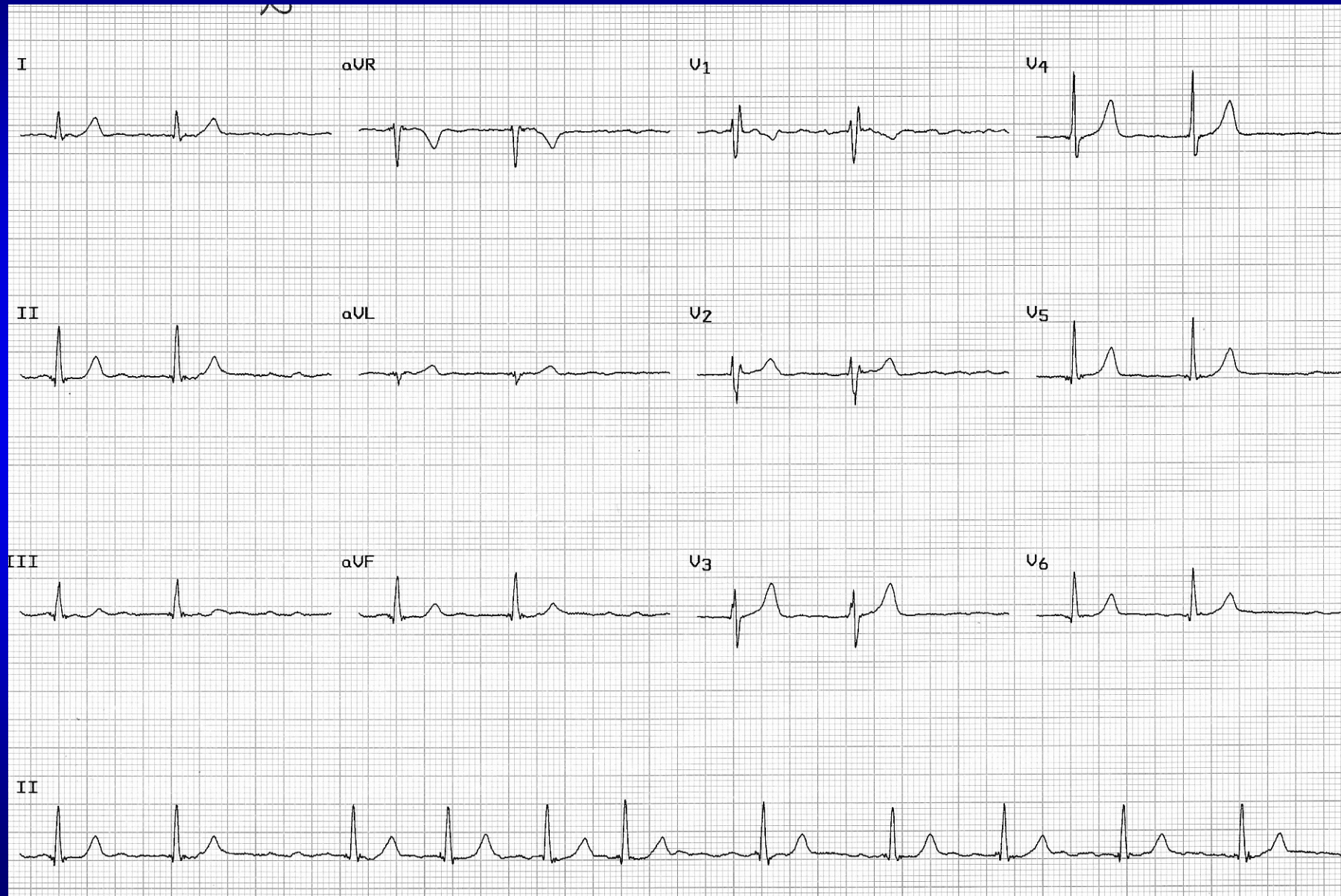
APB



VPBs



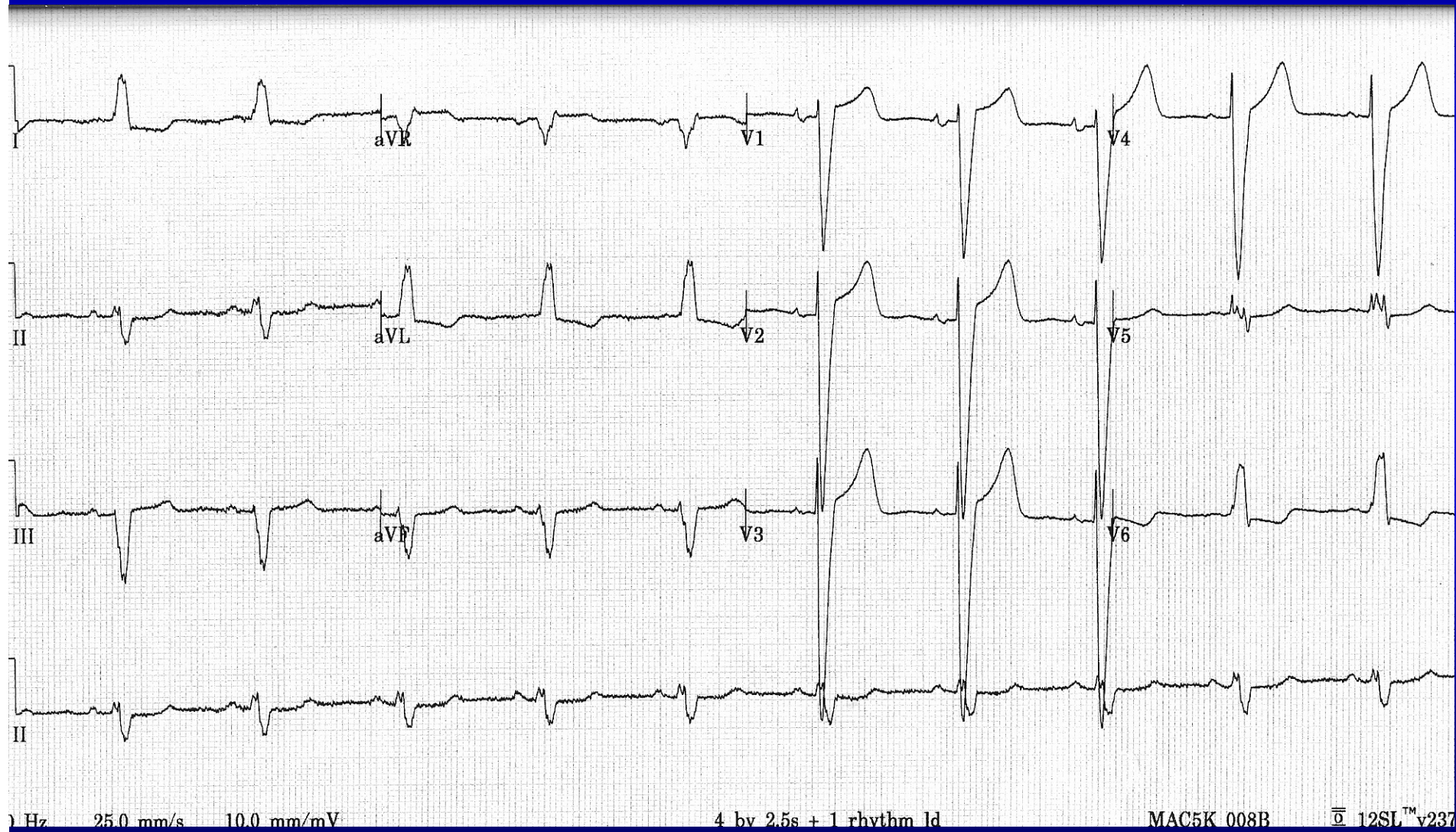
Atrial Fibrillation



Intervals

- Is the PR interval normal?
- Prolonged 1°HB
- Is the QRS normal? (0.12s)
 - Prolonged LBBB/RBBB
- Is the QT normal?

LBBB



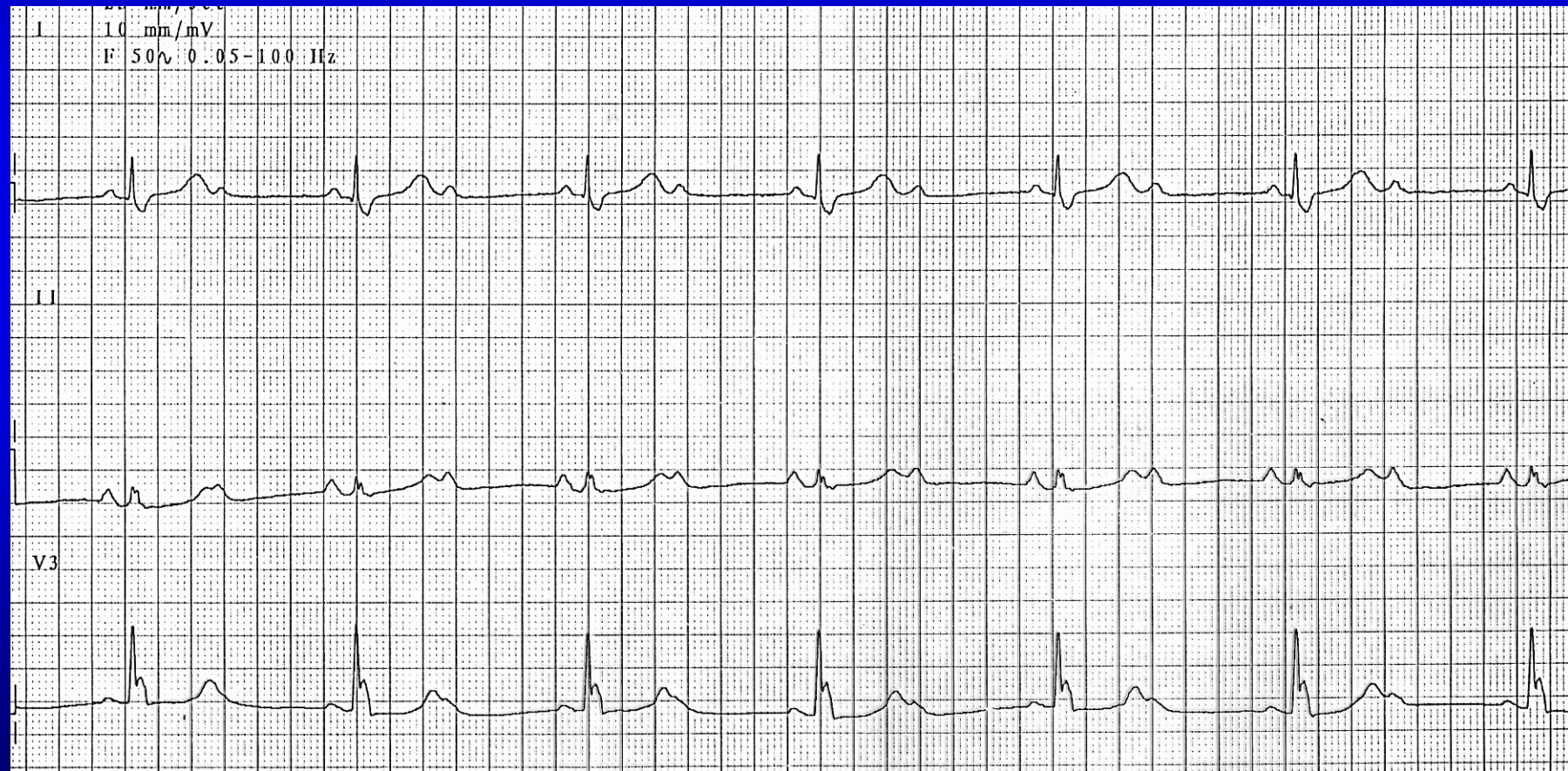
RBBB LAH 1°HB



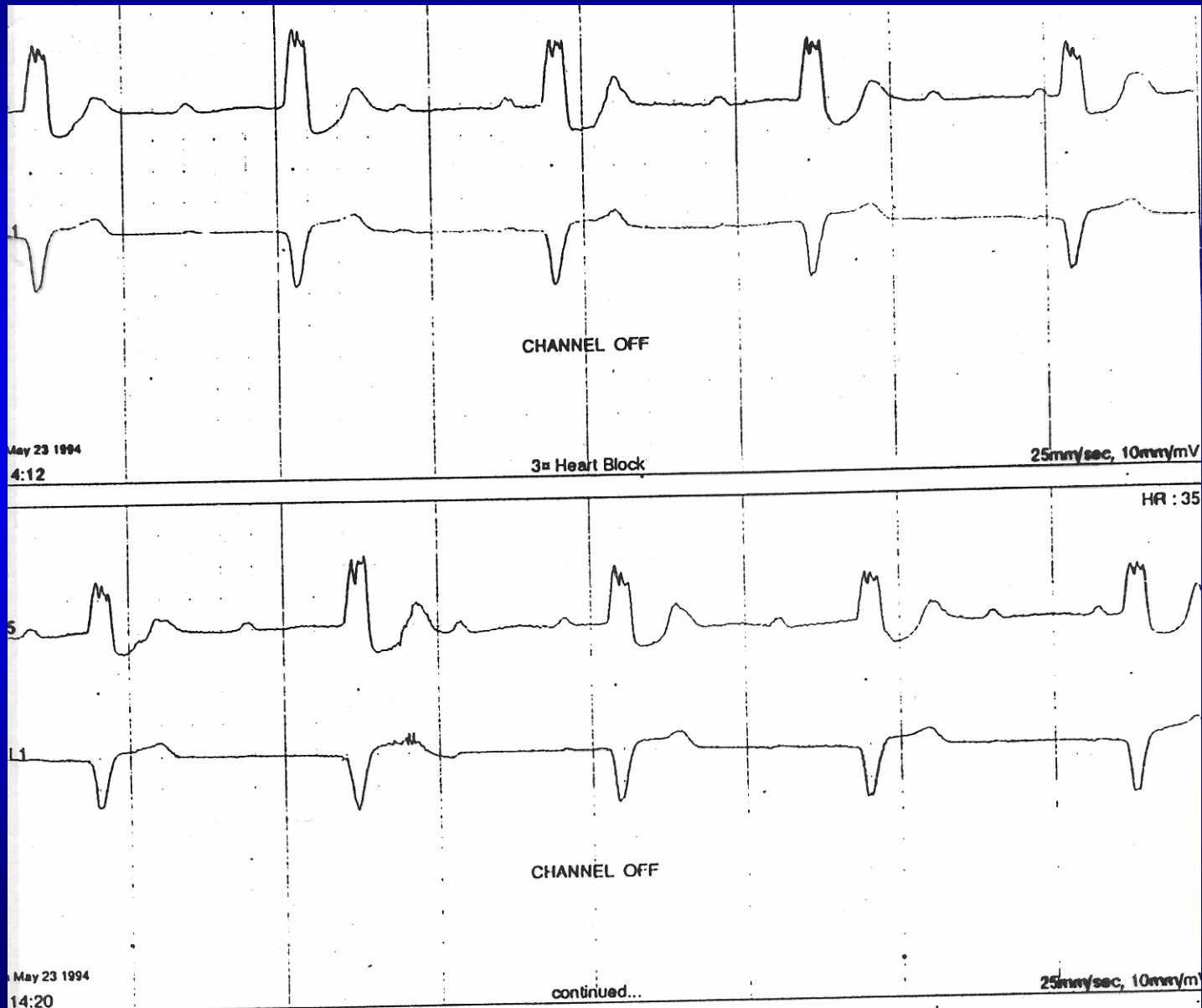
Bradycardia

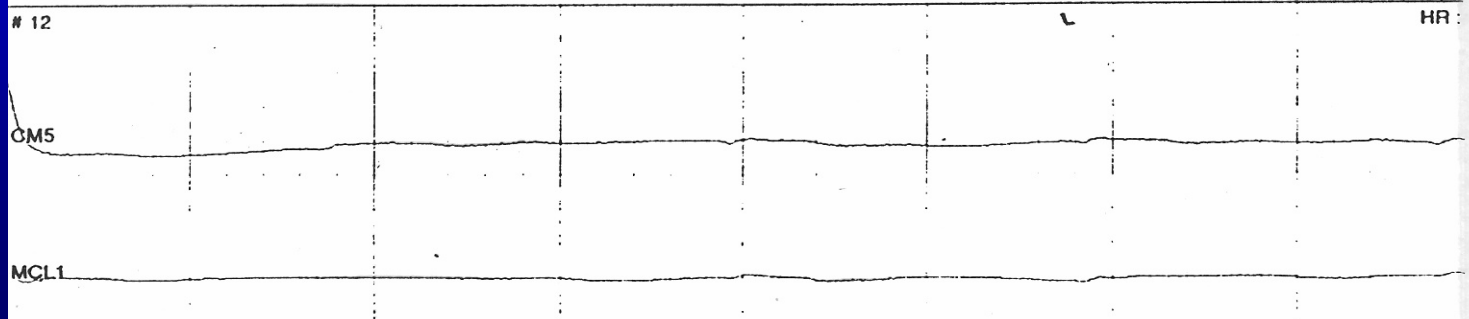
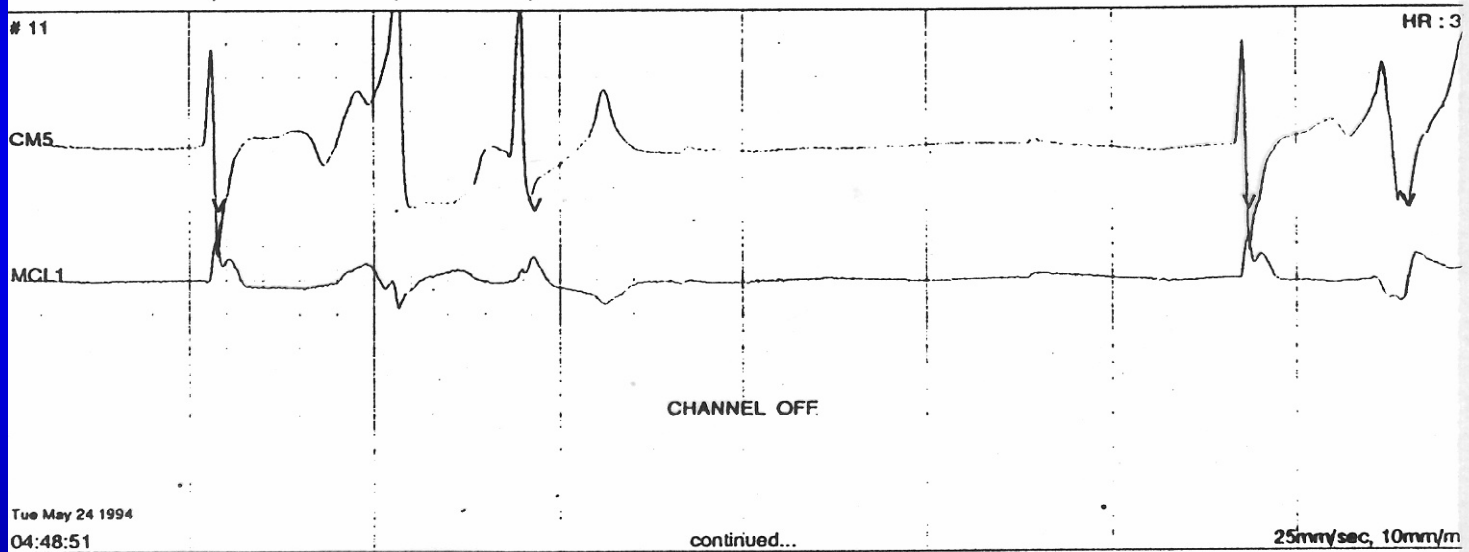
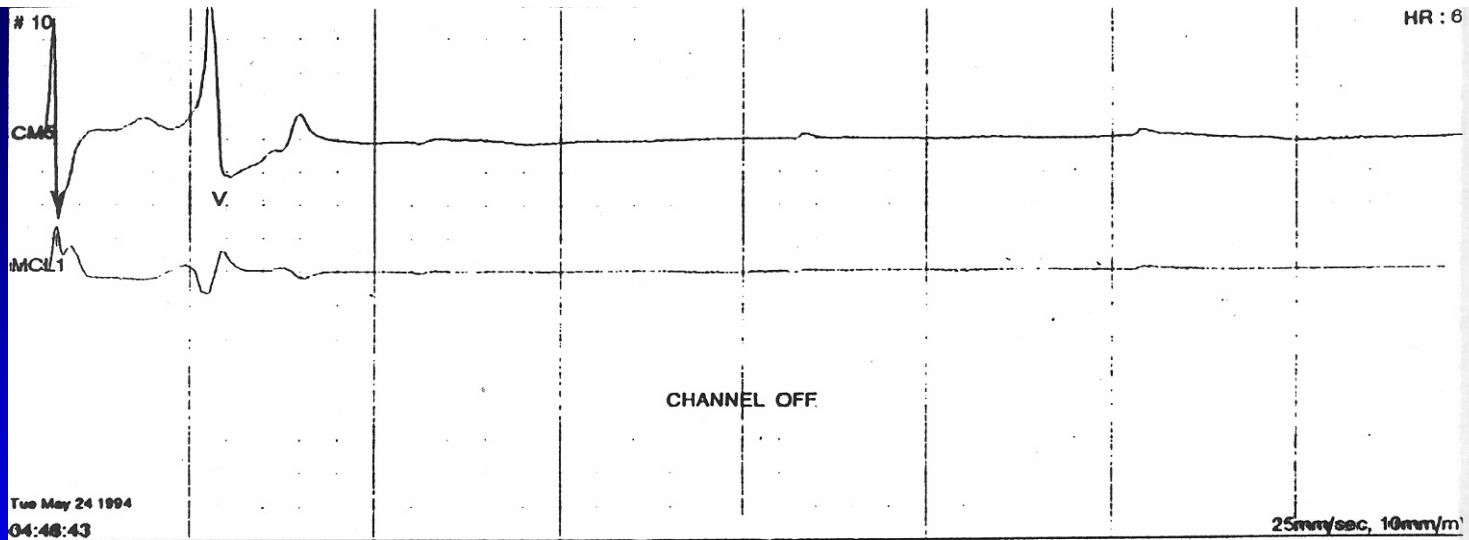
- Sinus bradycardia
- Heart Block

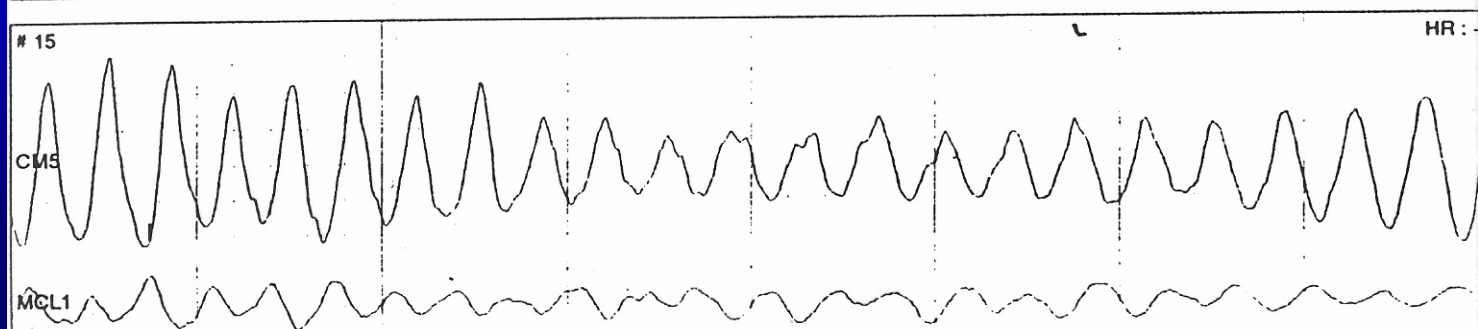
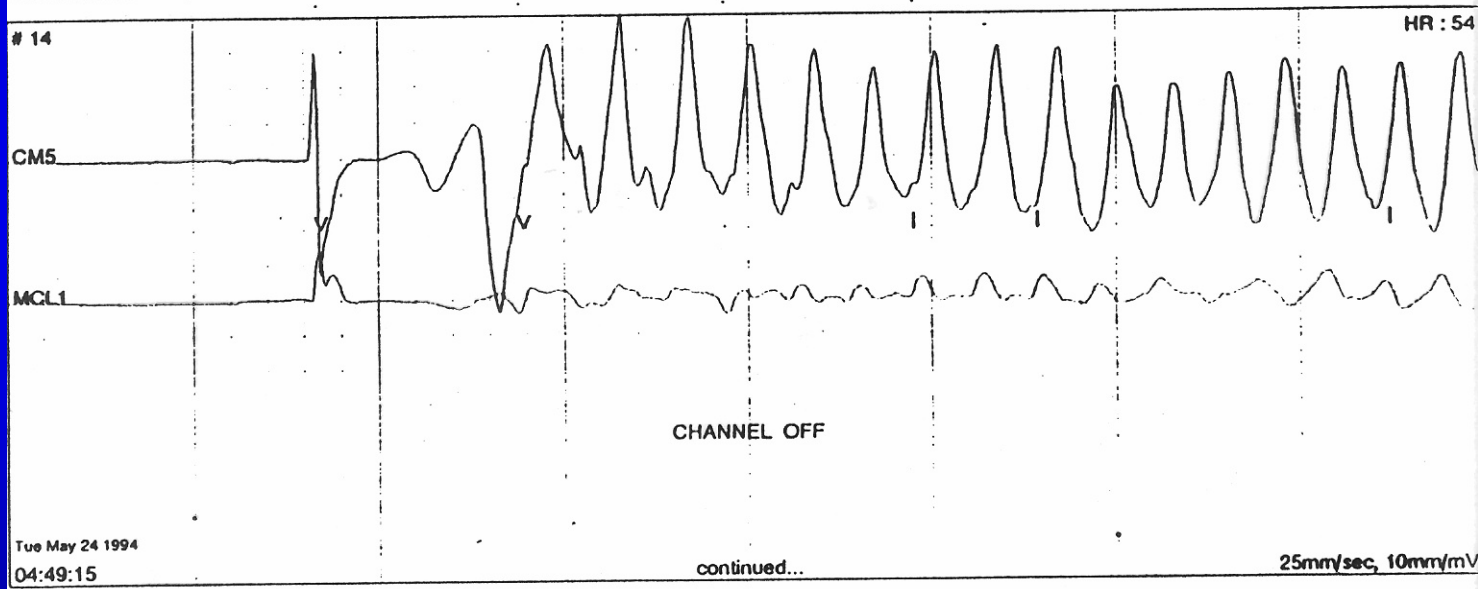
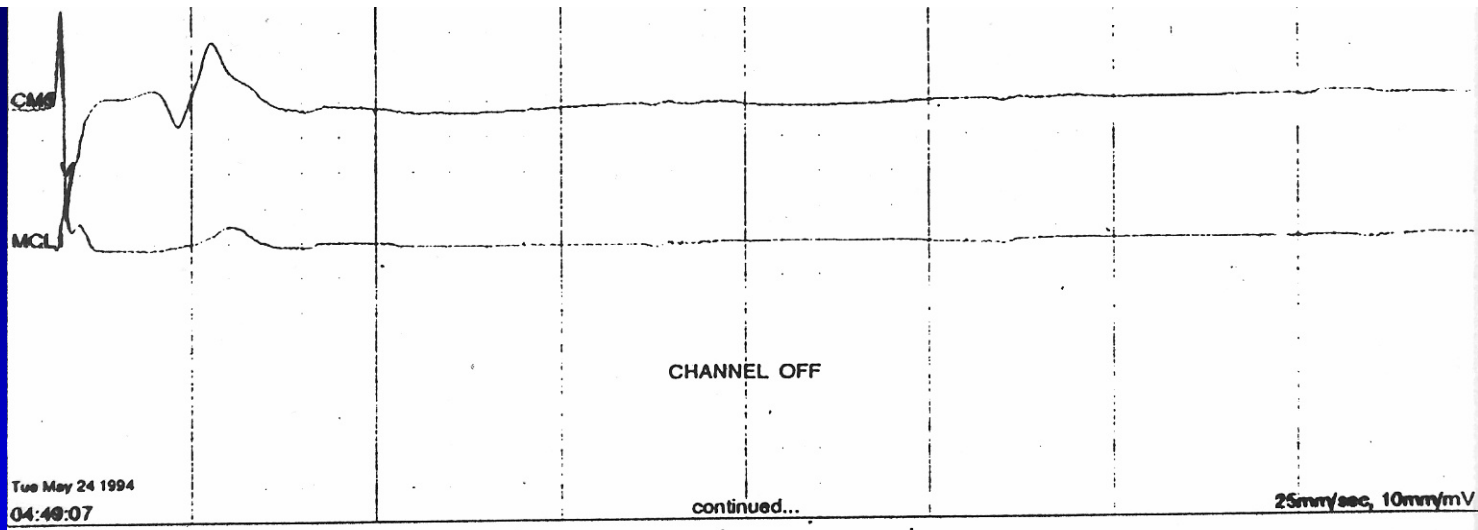
2nd Degree Heart Block



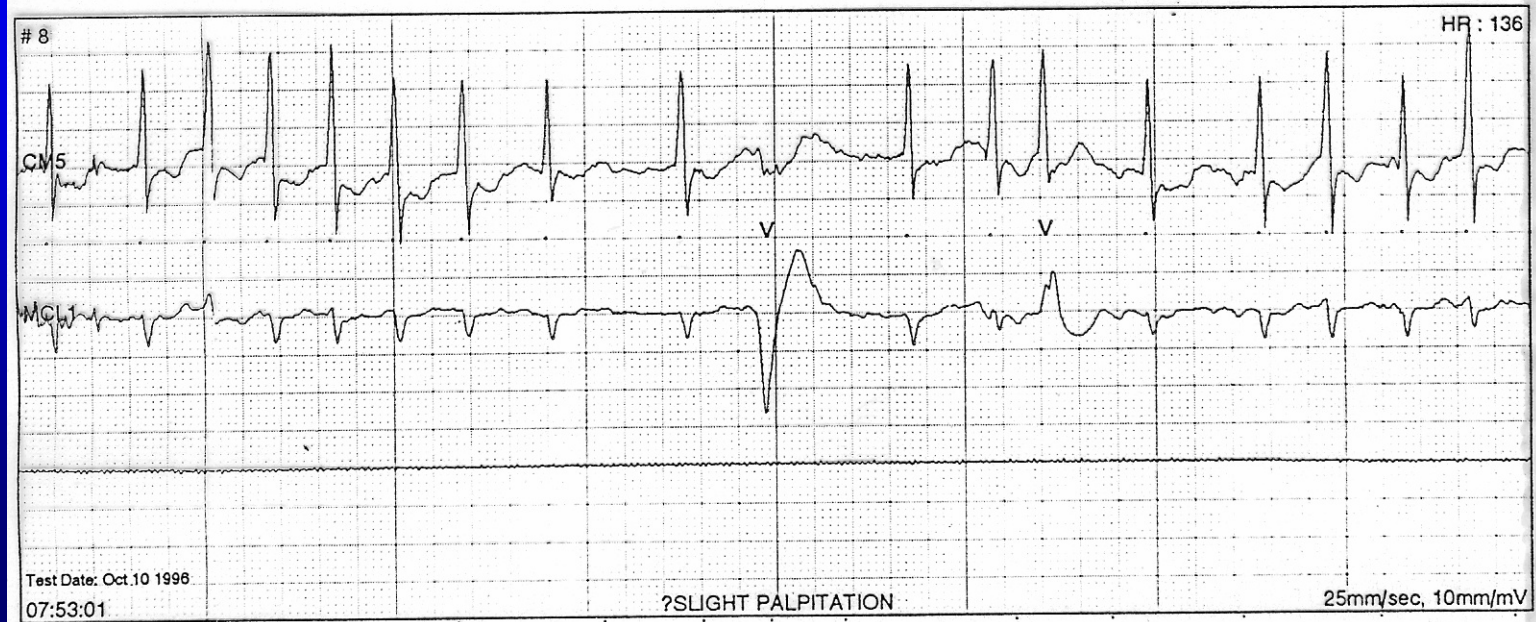
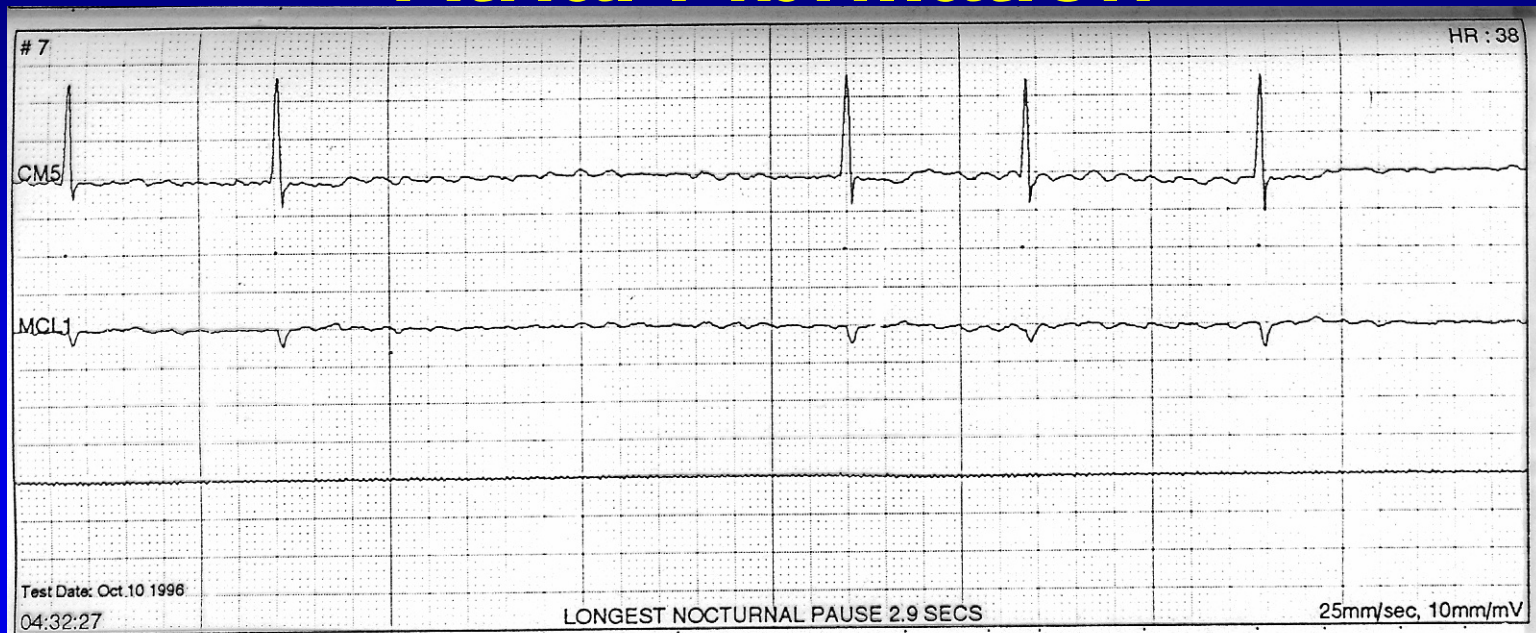
Complete Heart Block



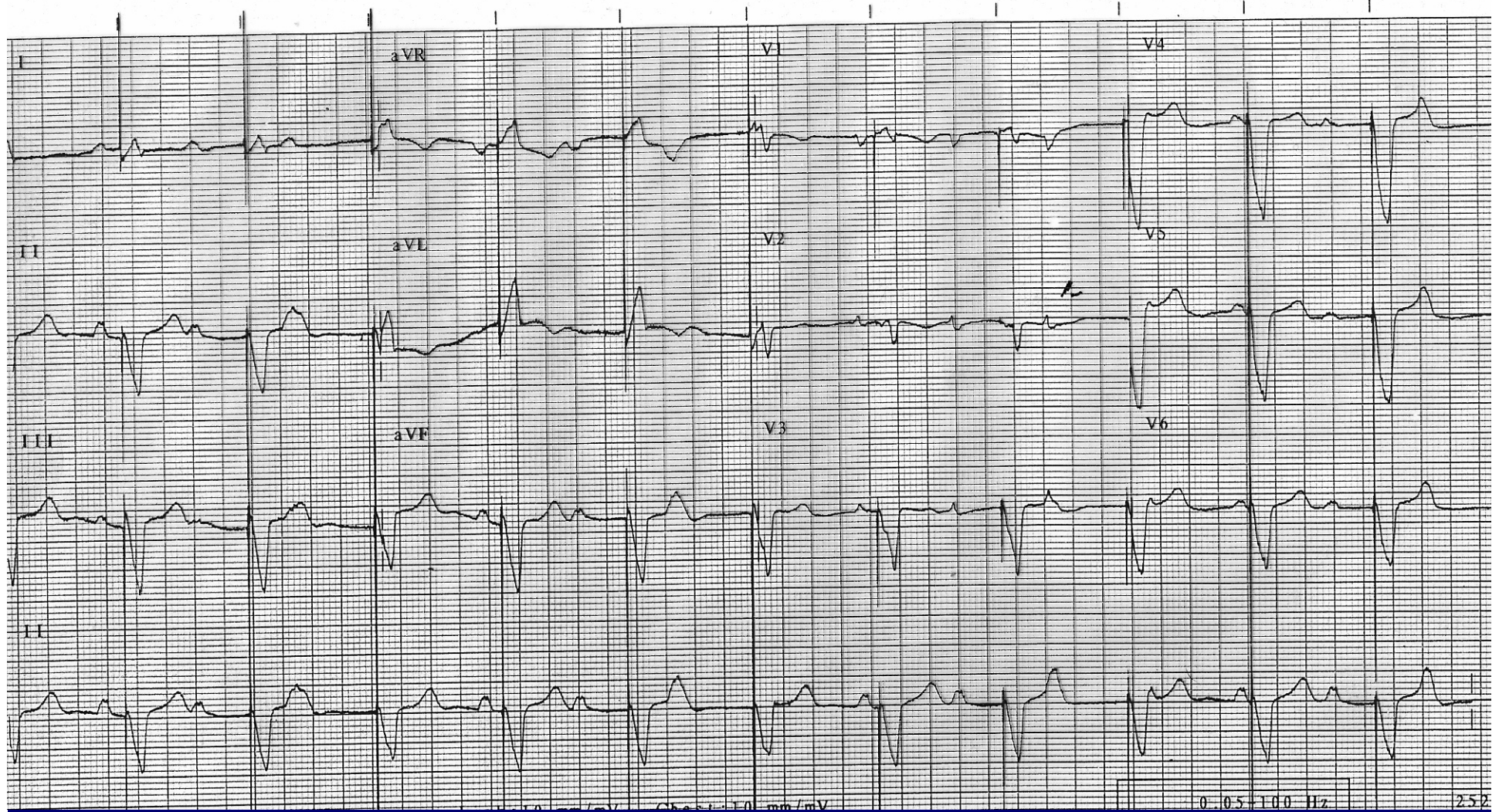




Atrial Fibrillation



Ventricular Pacemaker



ECGs - Fast Rate Narrow Complex

Regular

Sinus tachycardia (appropriate or inappropriate)

Ectopic atrial tachycardia

SVT (re-entrant tachycardia)

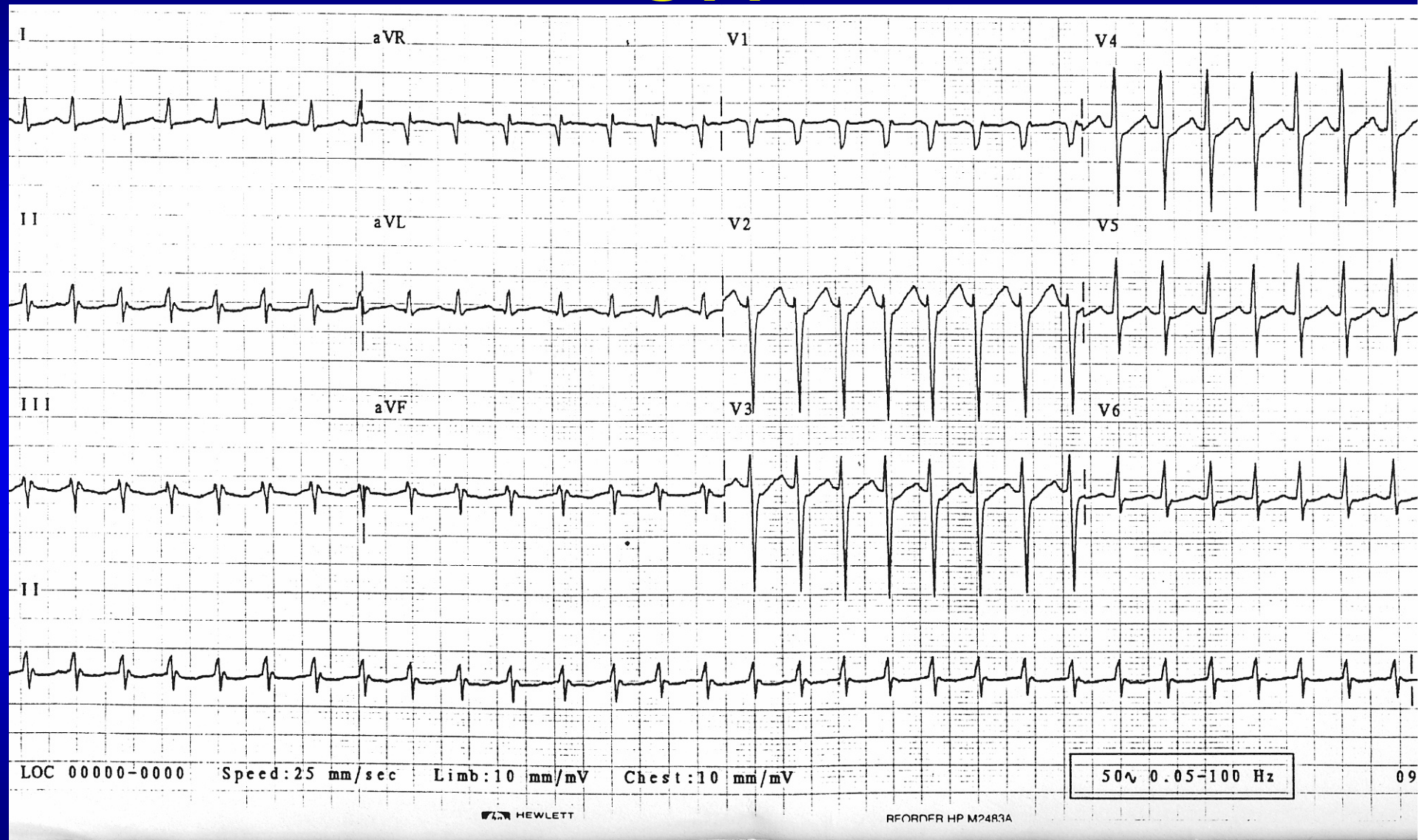
Atrial flutter

Irregular

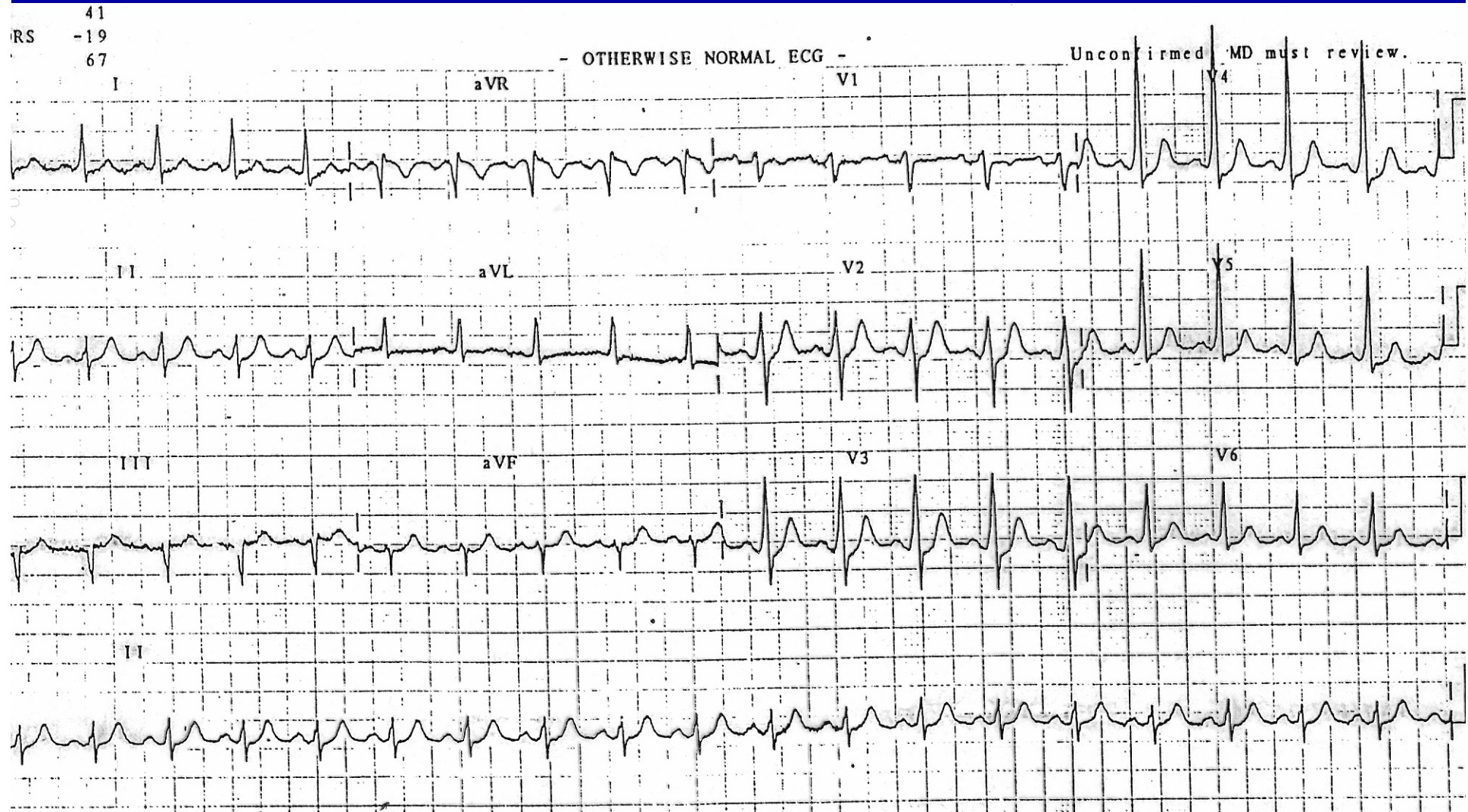
Atrial fibrillation

Atrial flutter with variable block

SVT



Post Adenosine



Rate 134 . Junctional tachycardia, rate 134.....Absent P waves, rate ≥ 100
PR 0 . Nonspecific Inferior ST depression.....ST -0.10 mV II,III,aVF
QRSD 89
QT 313
QTc 467

--Axis--

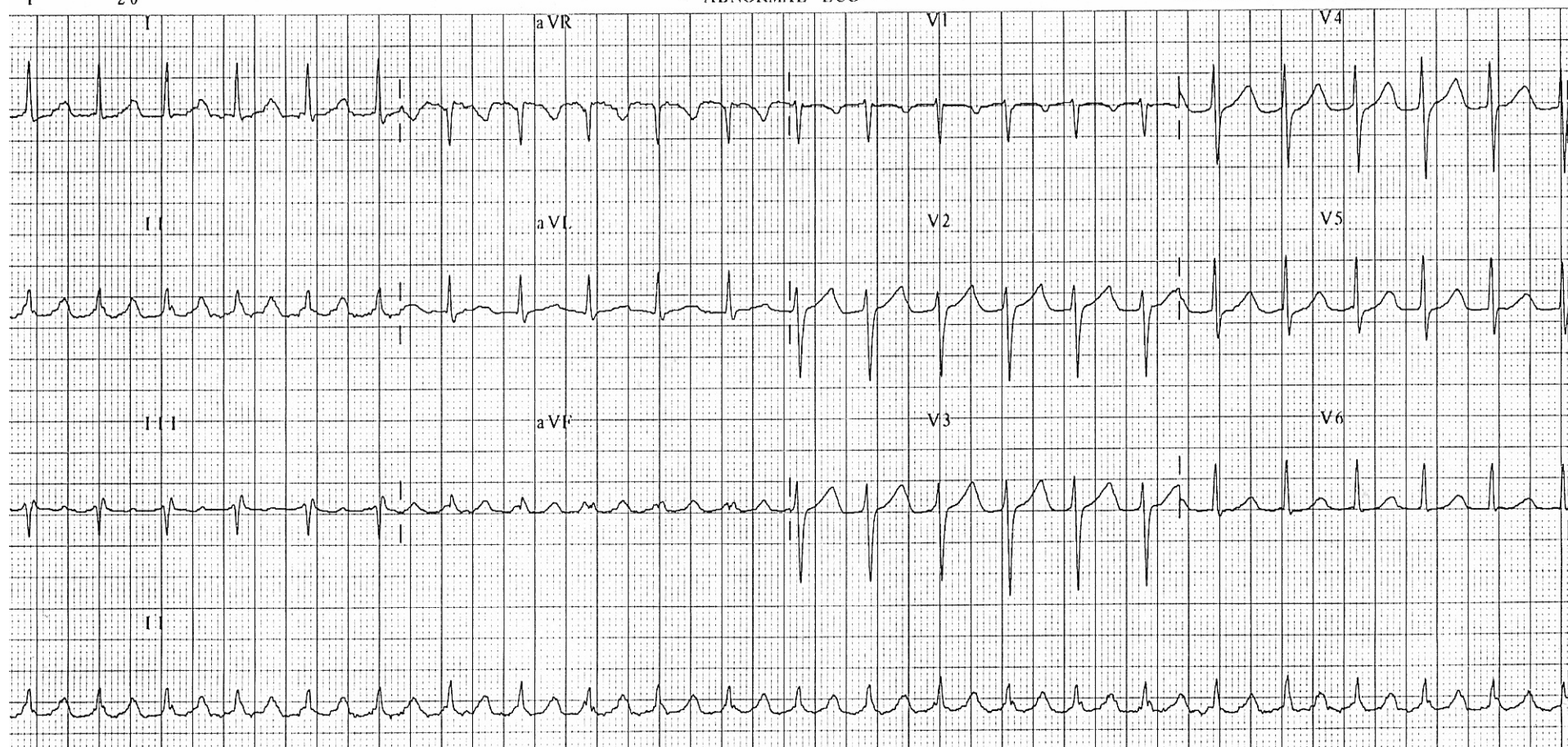
P

QRS 14

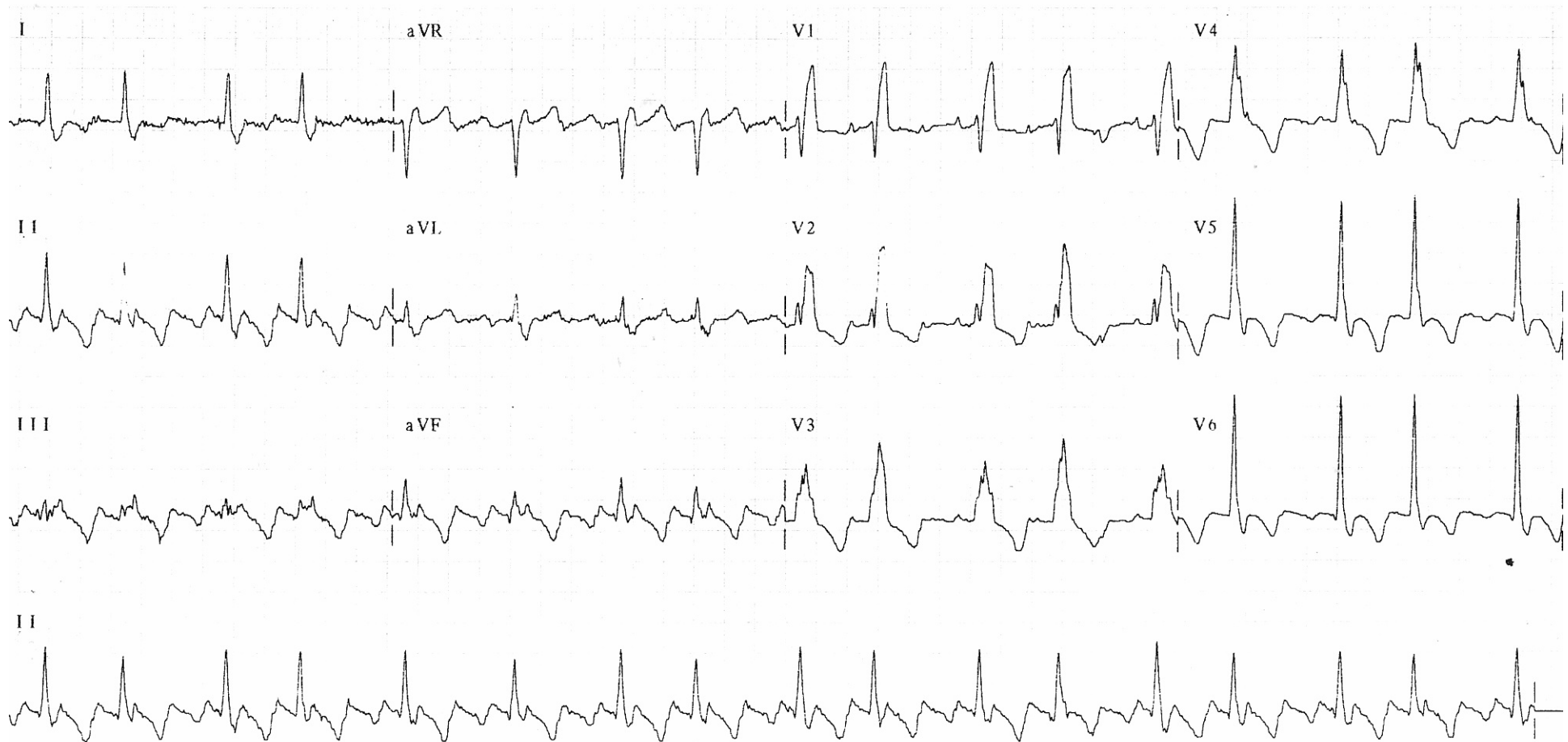
T 20

- ABNORMAL ECG -

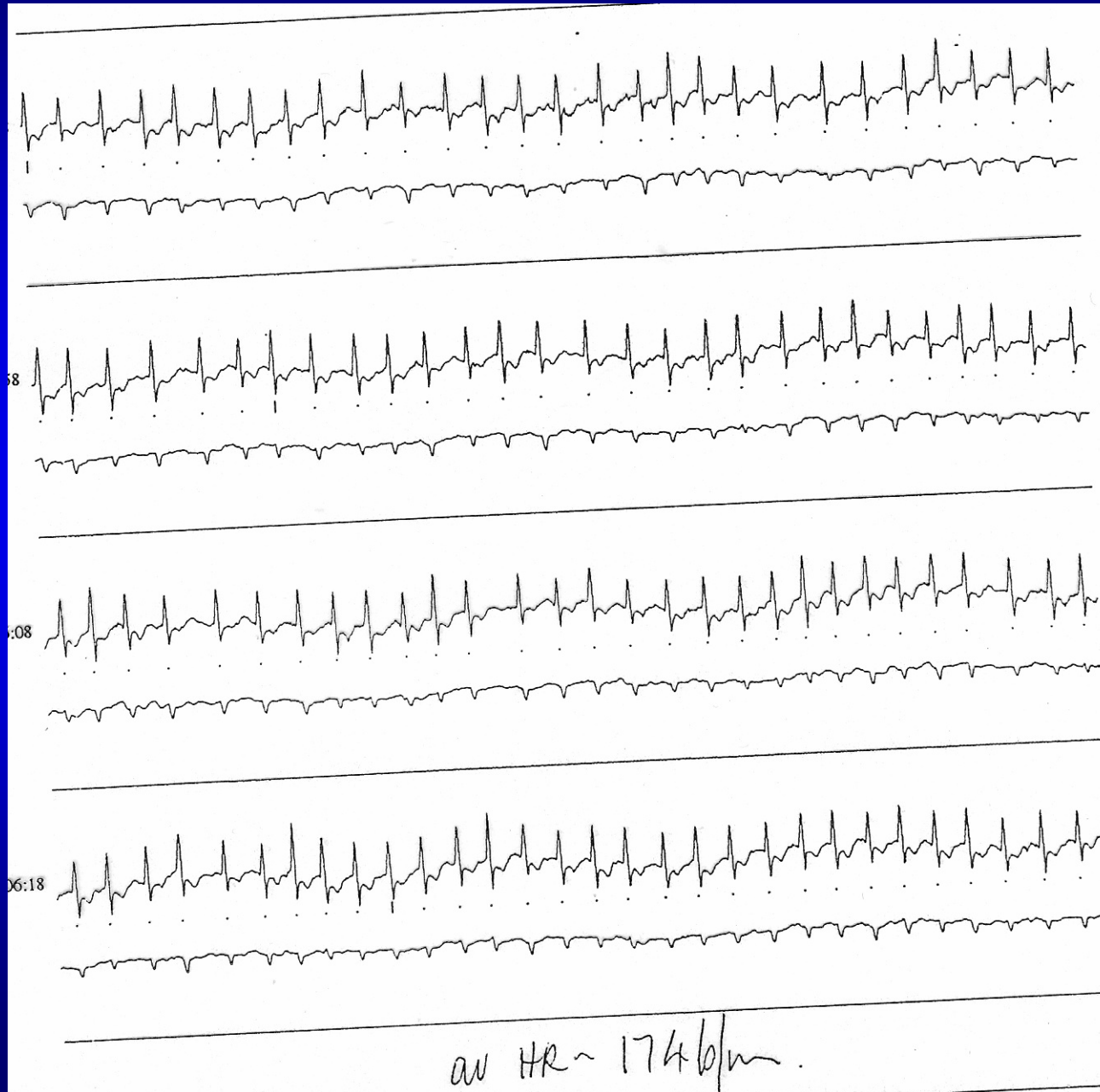
Unconfirmed. MD must review.



Atrial Flutter – Variable Block



Atrial Fibrillation



ECGs – Tachycardia Broad Complex

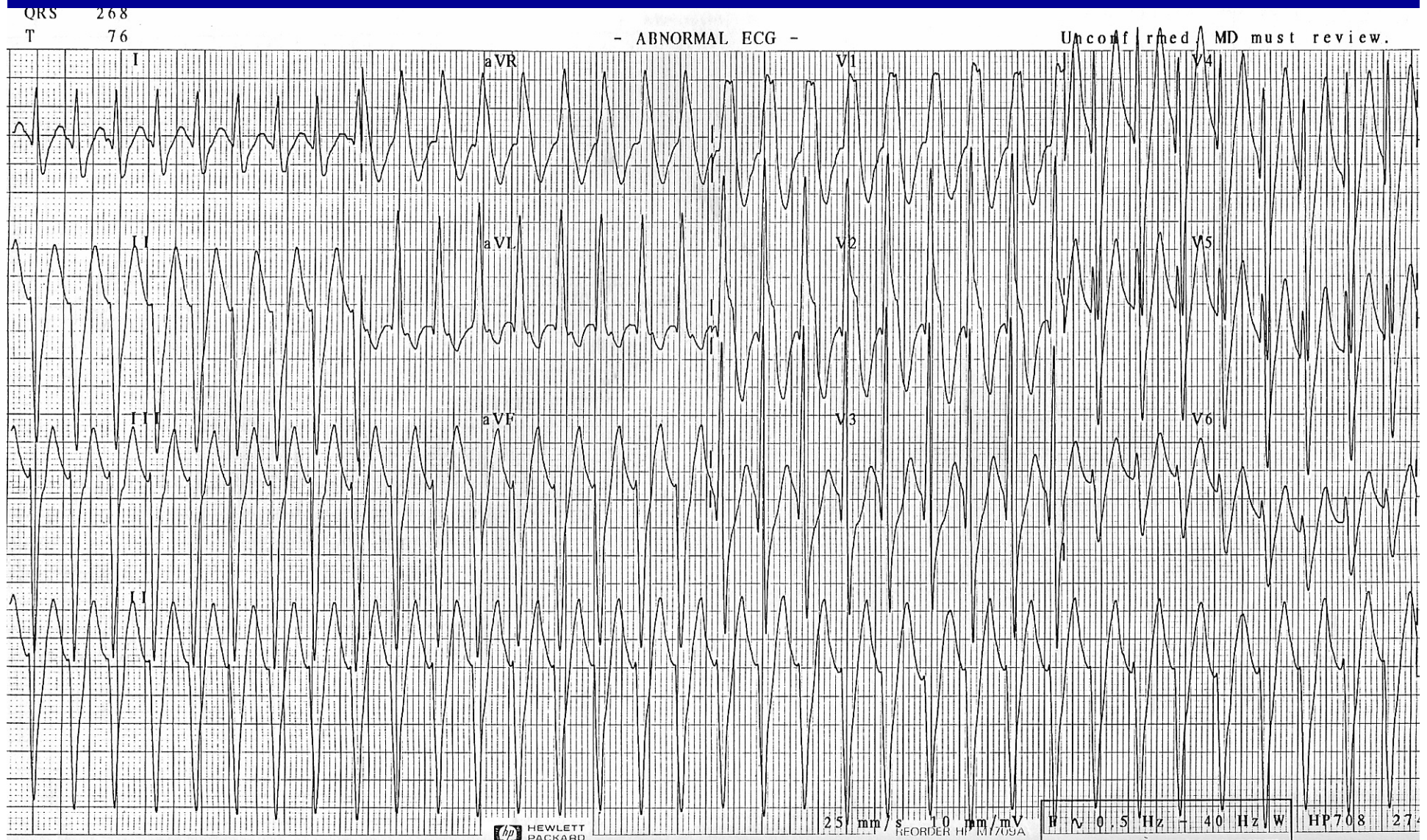
Ventricular Tachycardia

SVT with aberrancy

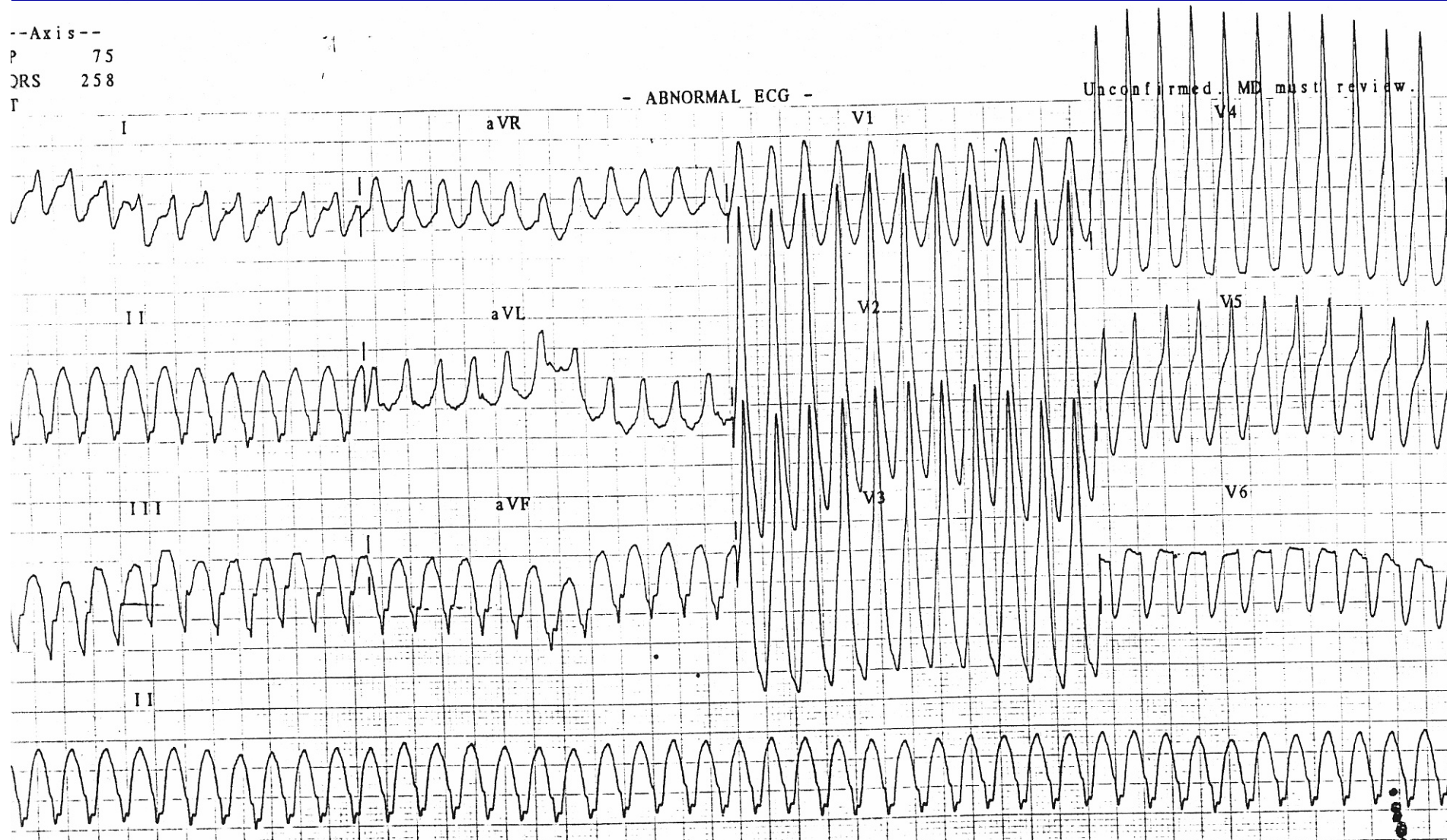
Conduction over an accessory pathway

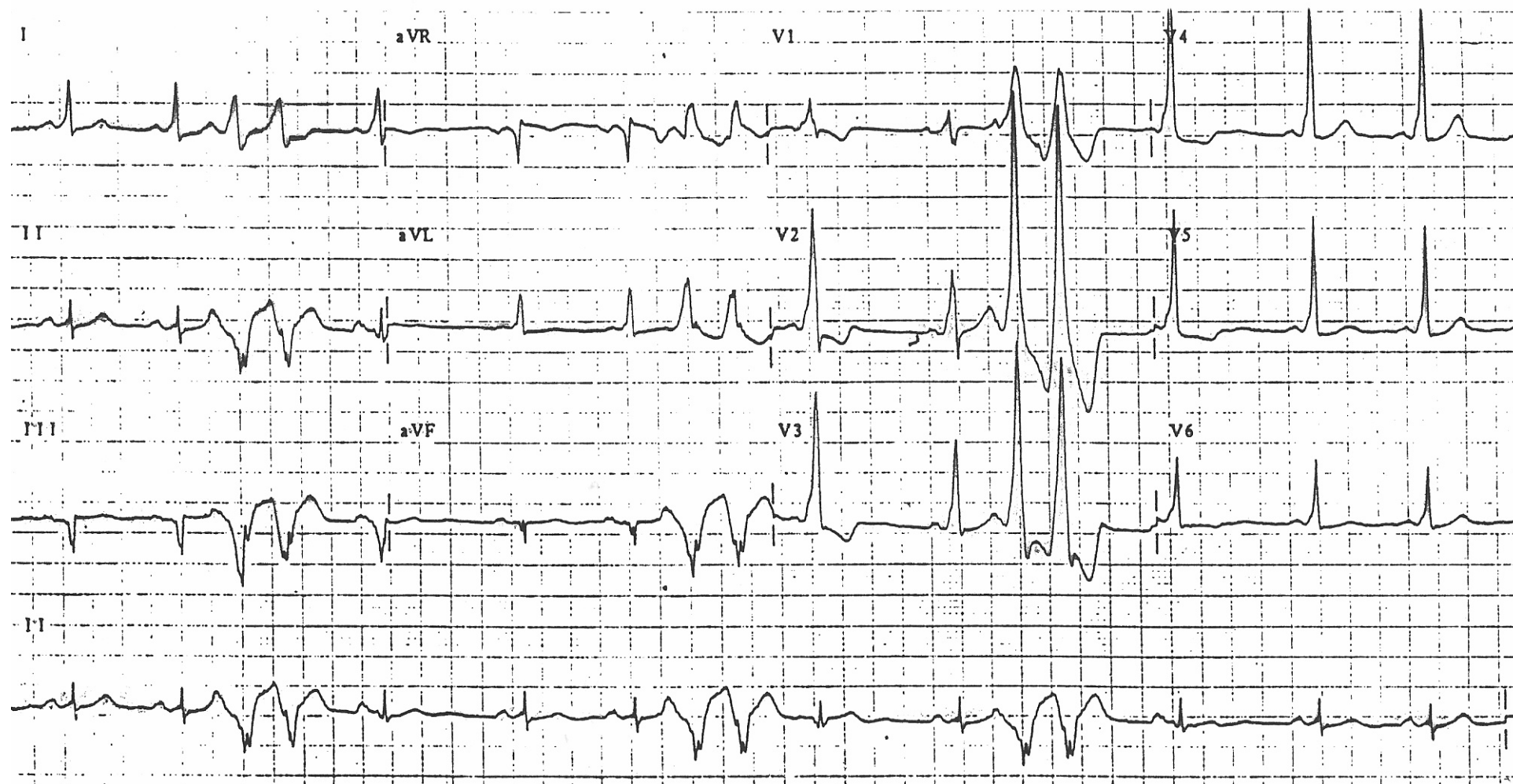
(suspect this when irregular broad complex tachycardia)

Ventricular Tachycardia



Broad complex tachycardia

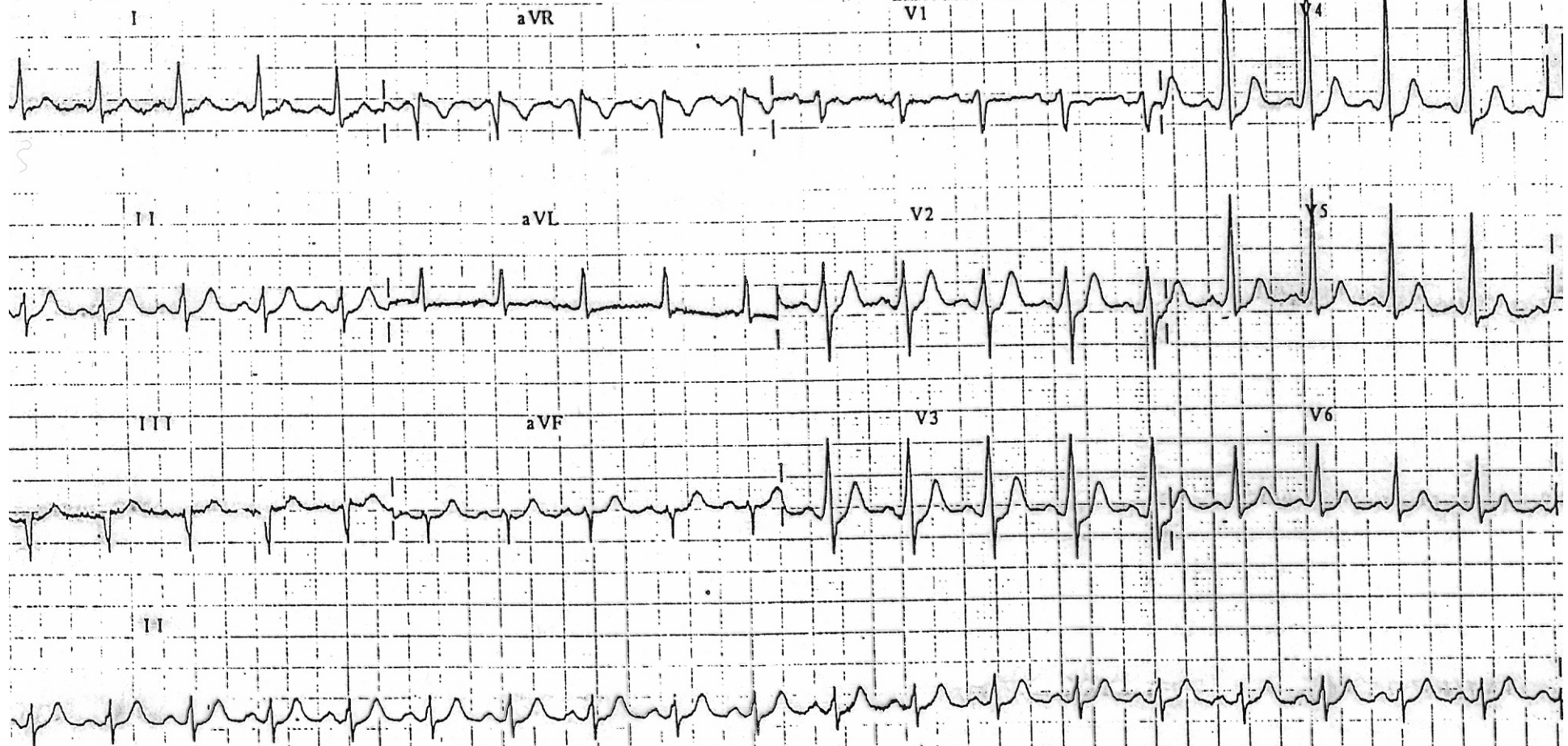




P 41
QRS -19
T 67

- OTHERWISE NORMAL ECG -

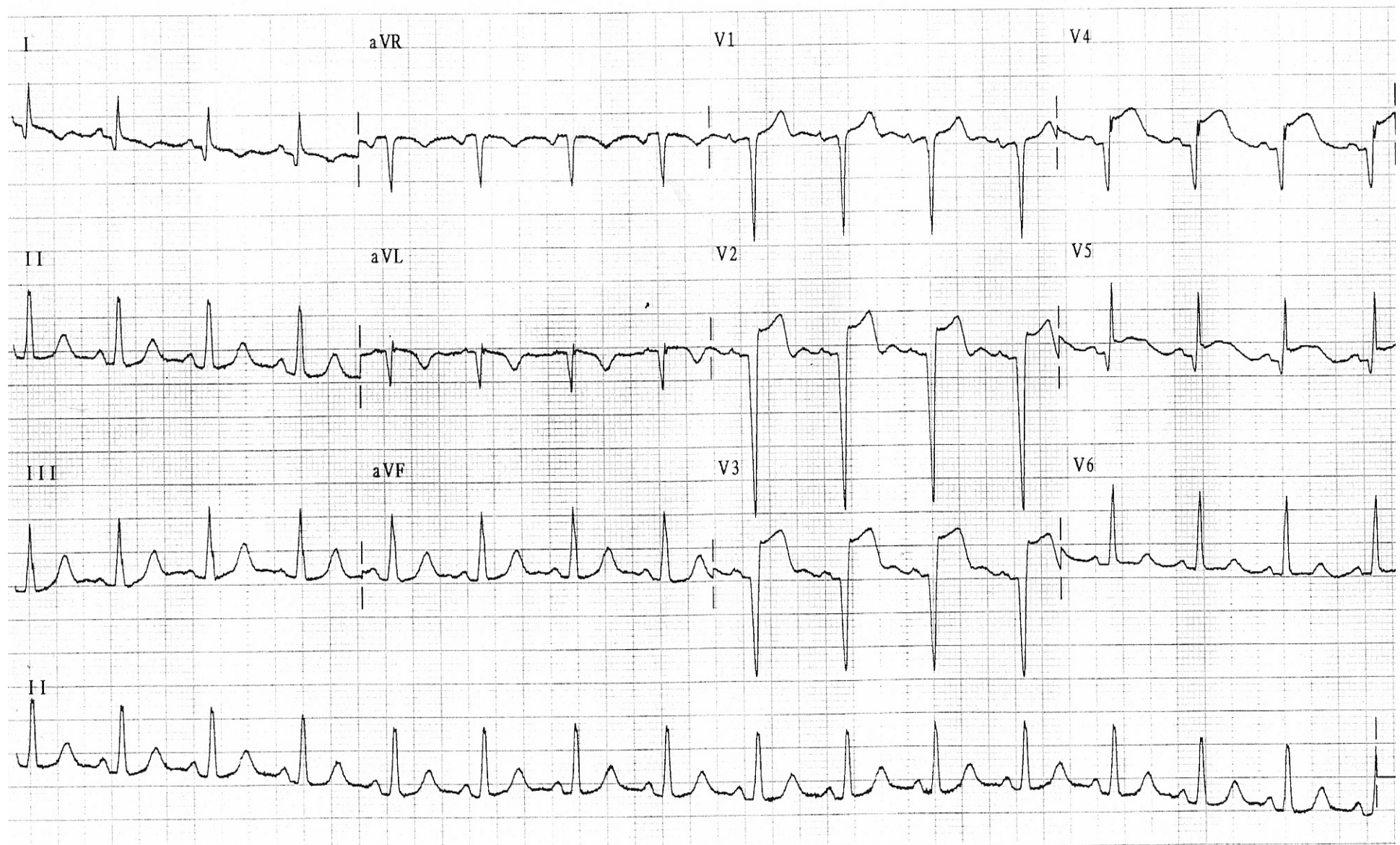
Unconfirmed MD must review.



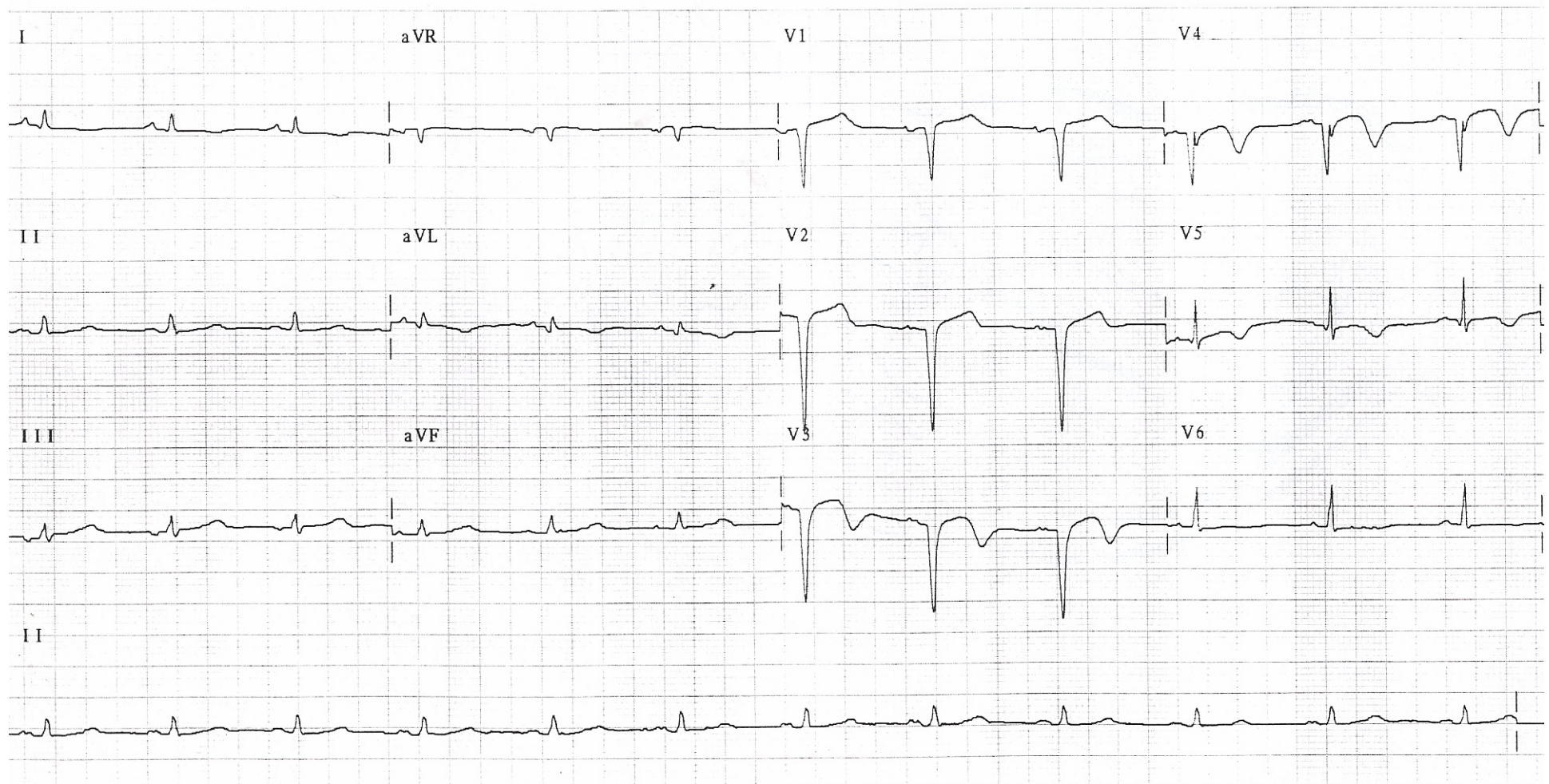
Ischaemia

- STEMI
- NSTEMI
- Ischaemia

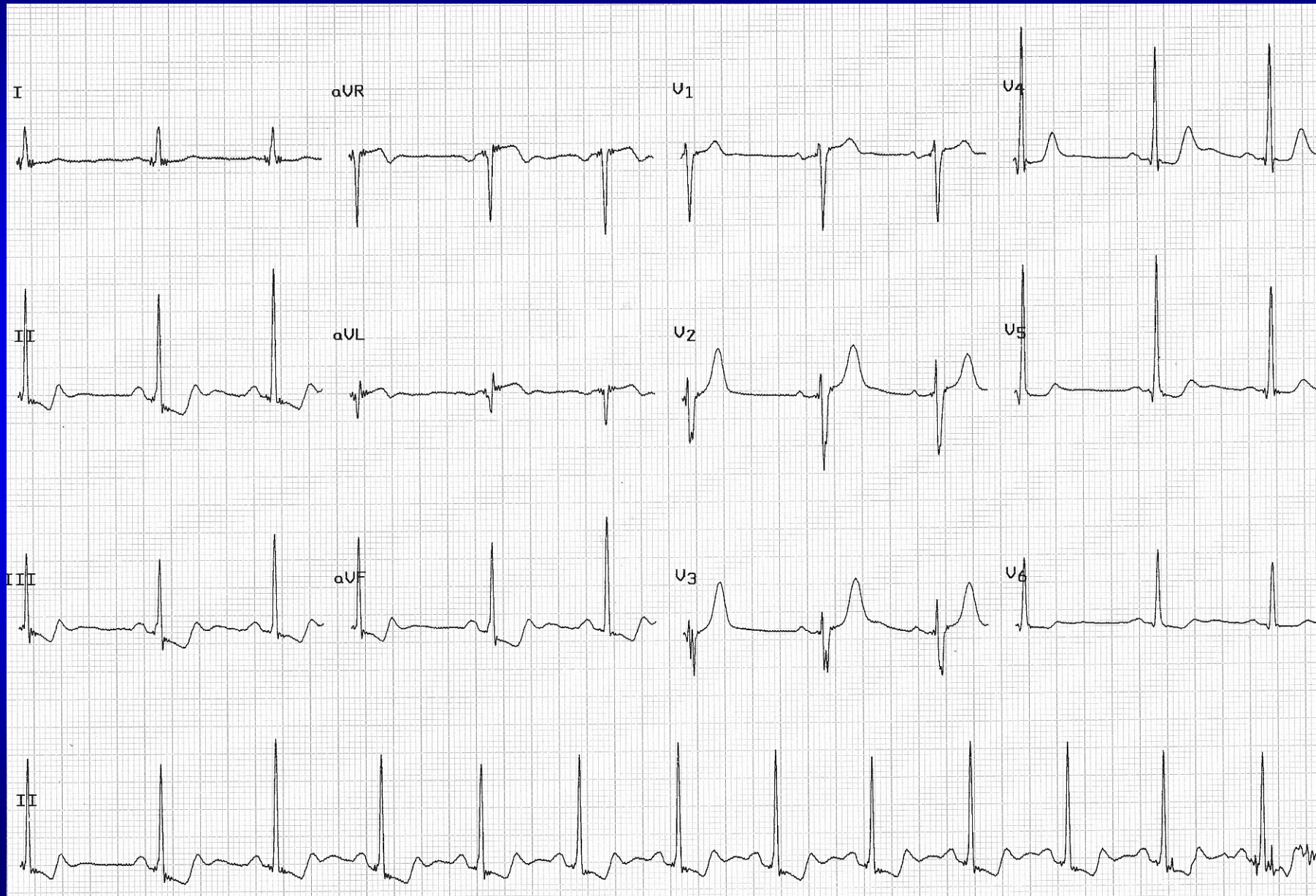
Ant STEMI



Ant STEMI



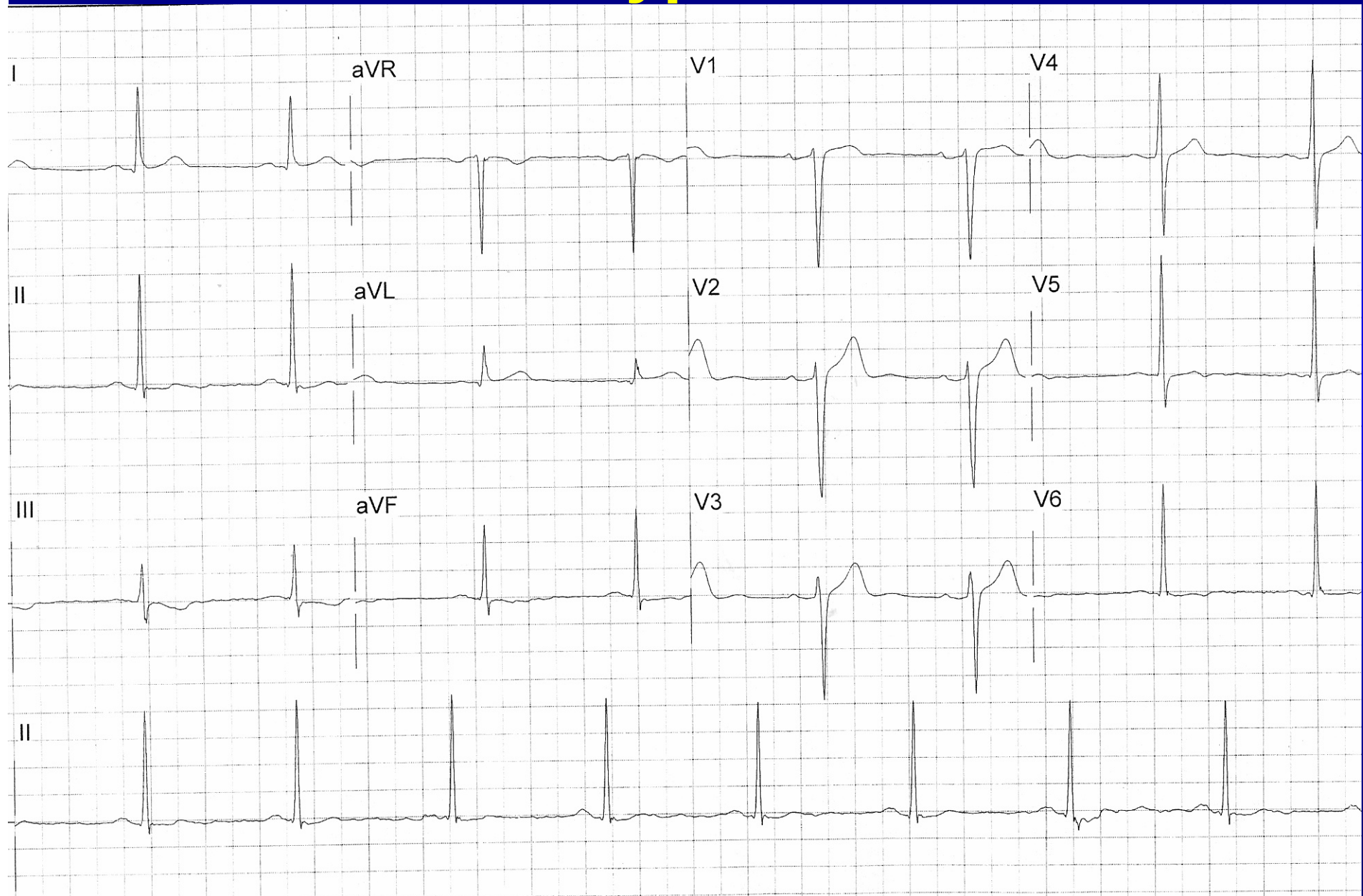
Ischaemia



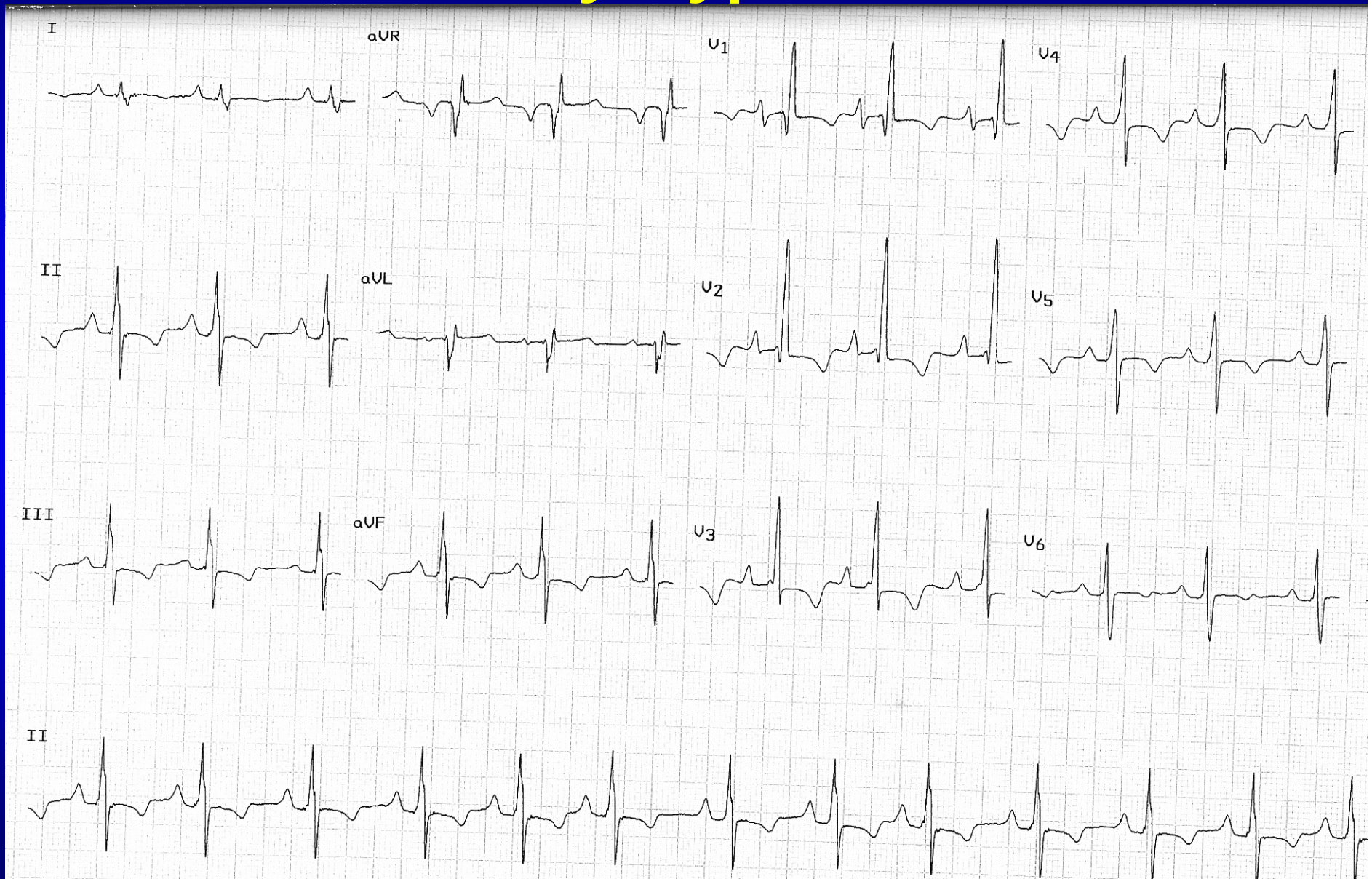
Other ECG abnormalities

- Hypertrophy
- Pericarditis
- Electrolyte abnormalities
- Drug toxicity
- Thyroid abnormalities

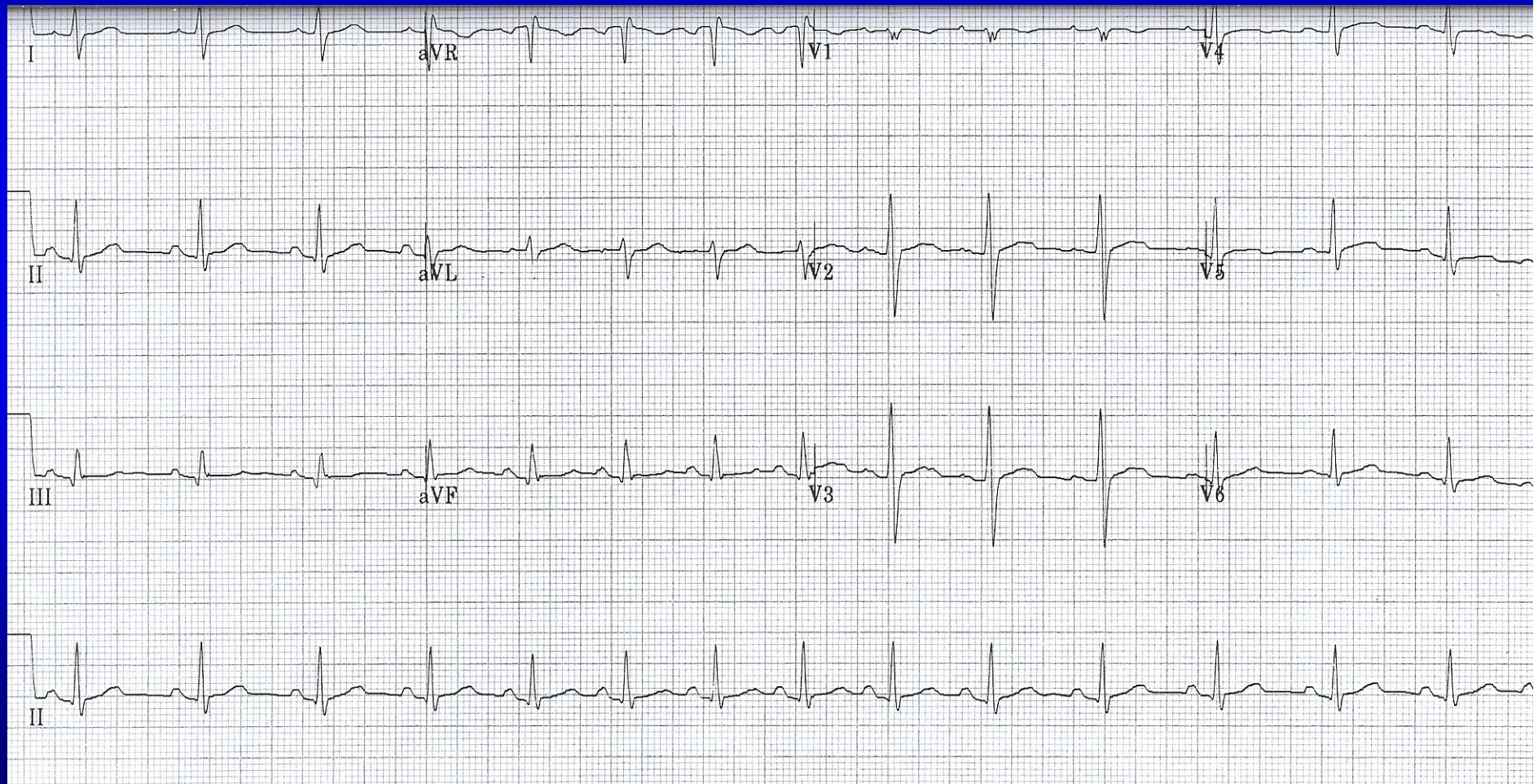
LVH - Hypertension



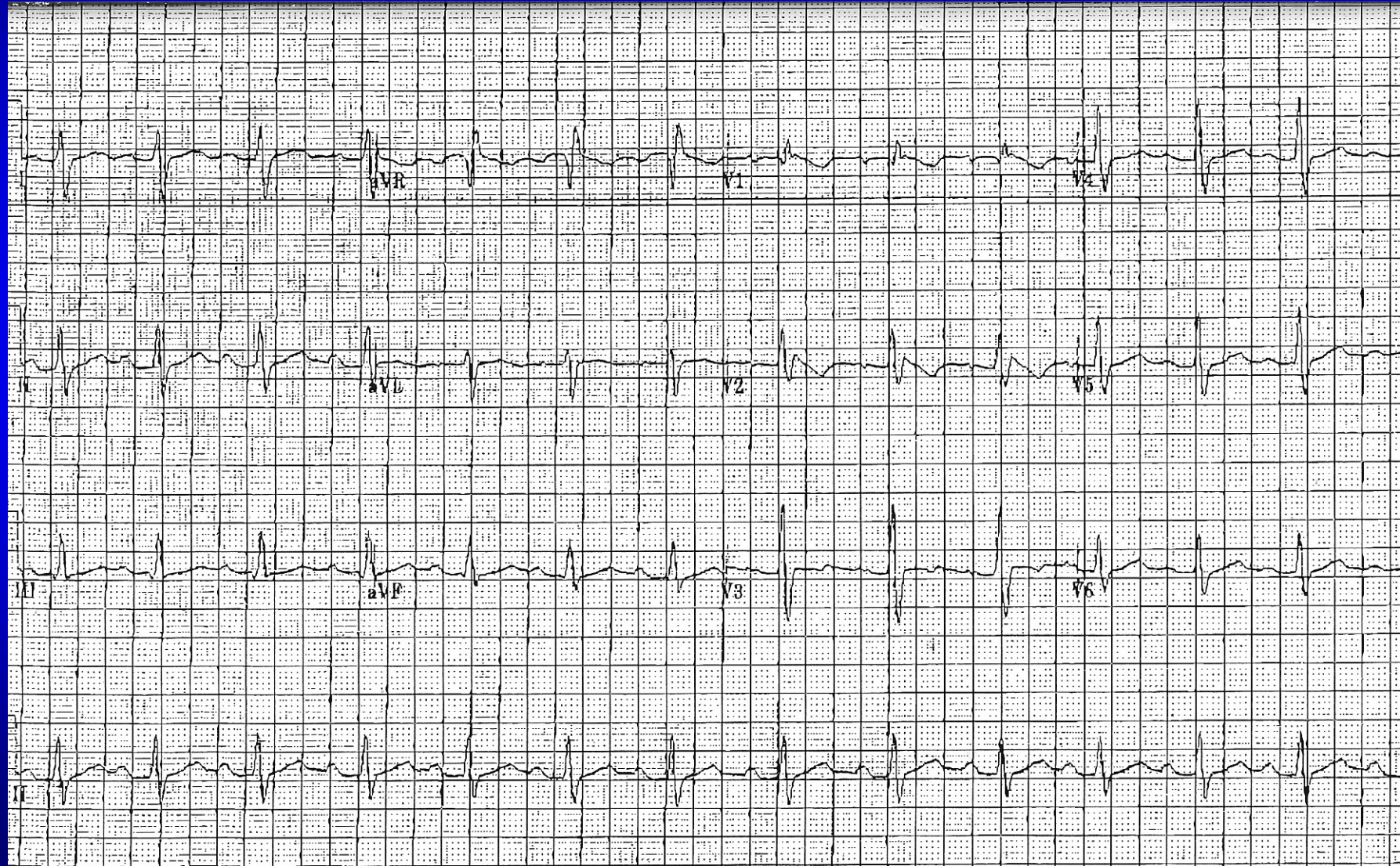
Pulmonary Hypertension



Flecainide 100mg/d



Flecainide 300mg/d



Flecainide 300mg/d

