

Cardiology update

Clinical Decision Seminar: Difficult ECG Interpretations

February 13th, 2013

Lars Eckardt
Firat Duru
Corinna Brunckhorst

1. Patient K.P., male, 68 years

- Fatigue
- Exercise intolerance for one year
- Echo: globally reduced LV Function:
 - EF 30%

I

aVR

C1

C4

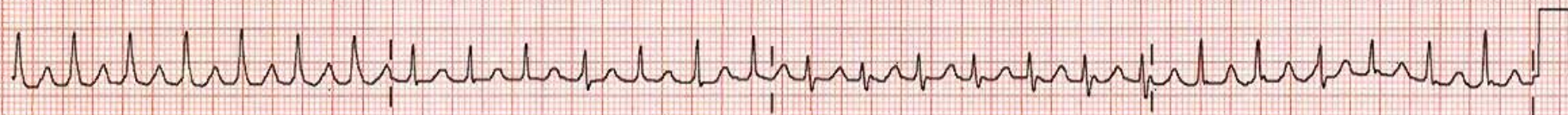


II

aVL

C2

C5

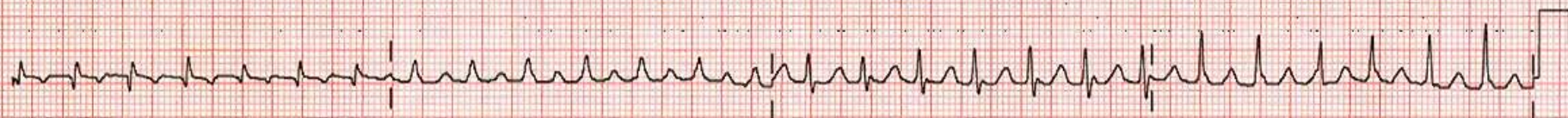


III

aVF

C3

C6

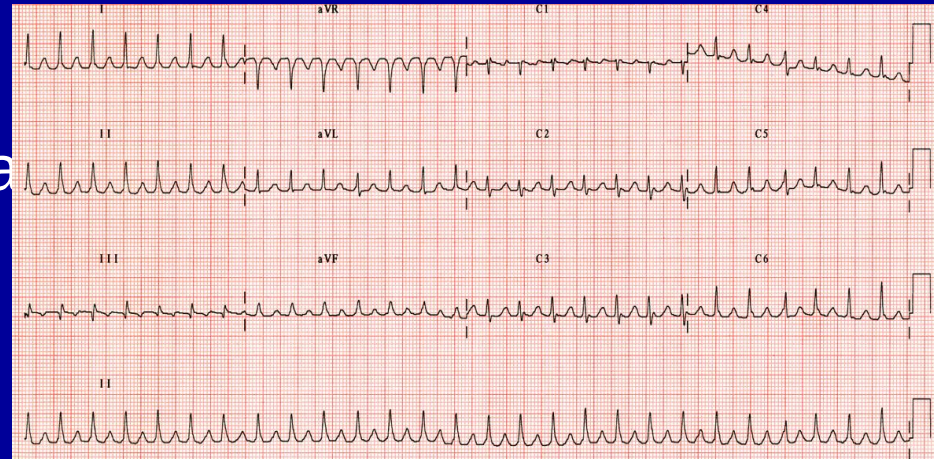


II



1a. What is the diagnosis?

1. Atrial Tachycardia
2. Permanent junctional reciprocating tachycardia
3. Atrial flutter
4. AVNRT
5. AVRT
6. Can be anything of the above



I

aVR

C1

C4

II

aVL

C2

C5

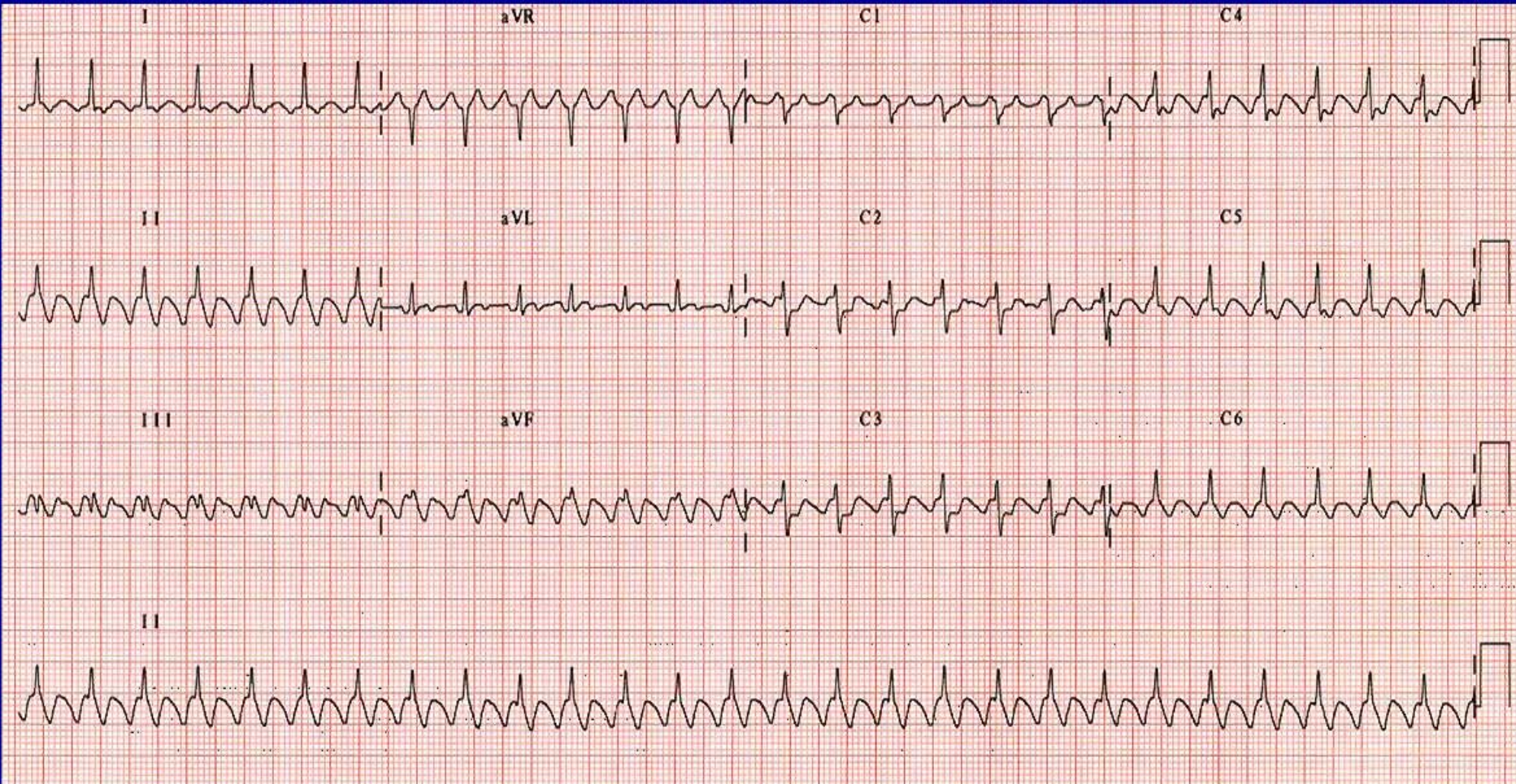
III

aVF

C3

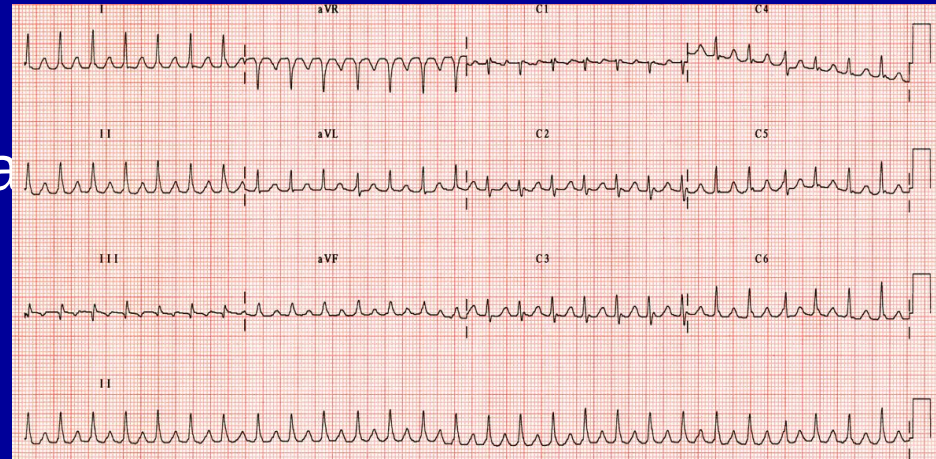
C6

II



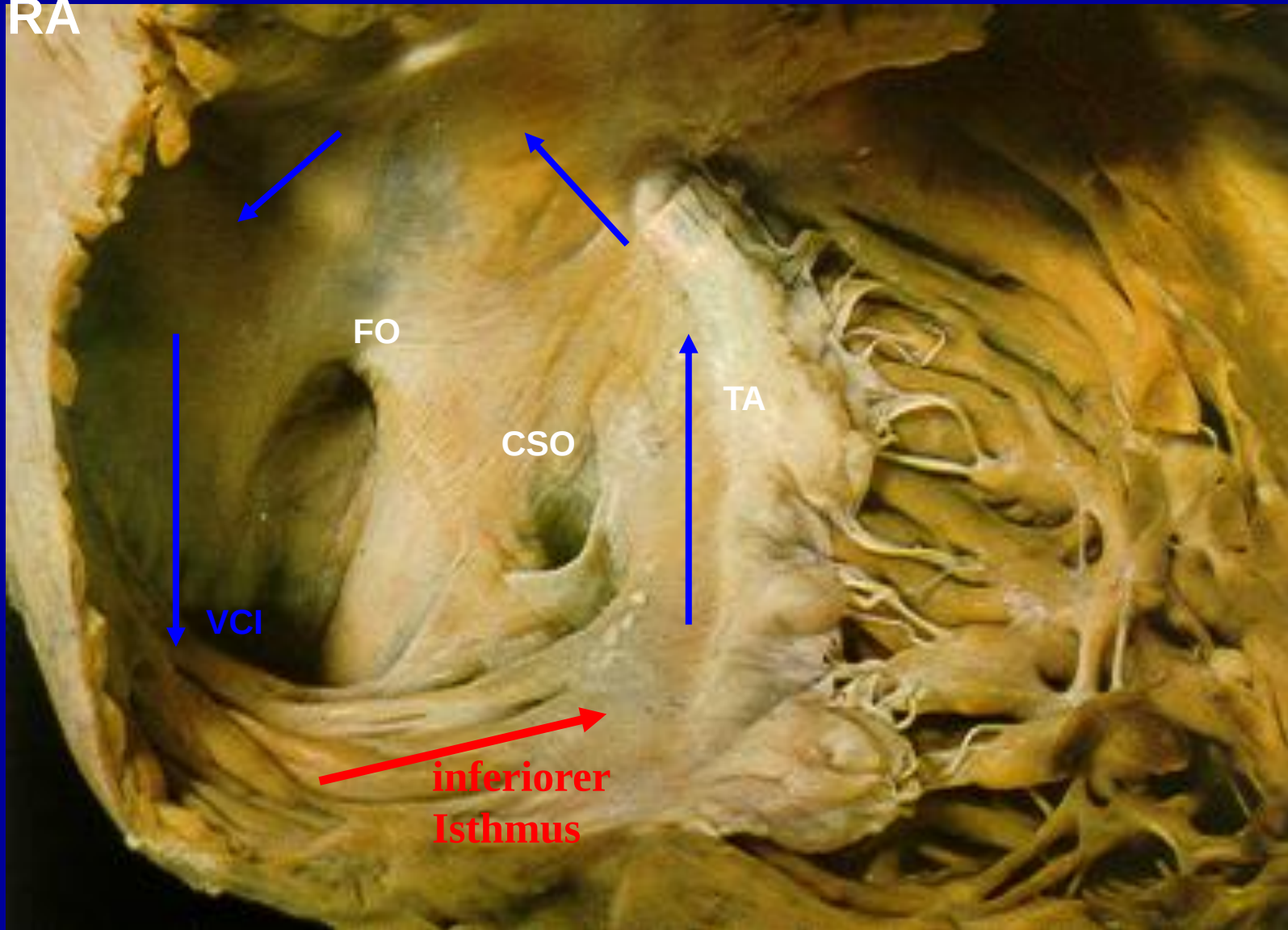
1b. What is the diagnosis?

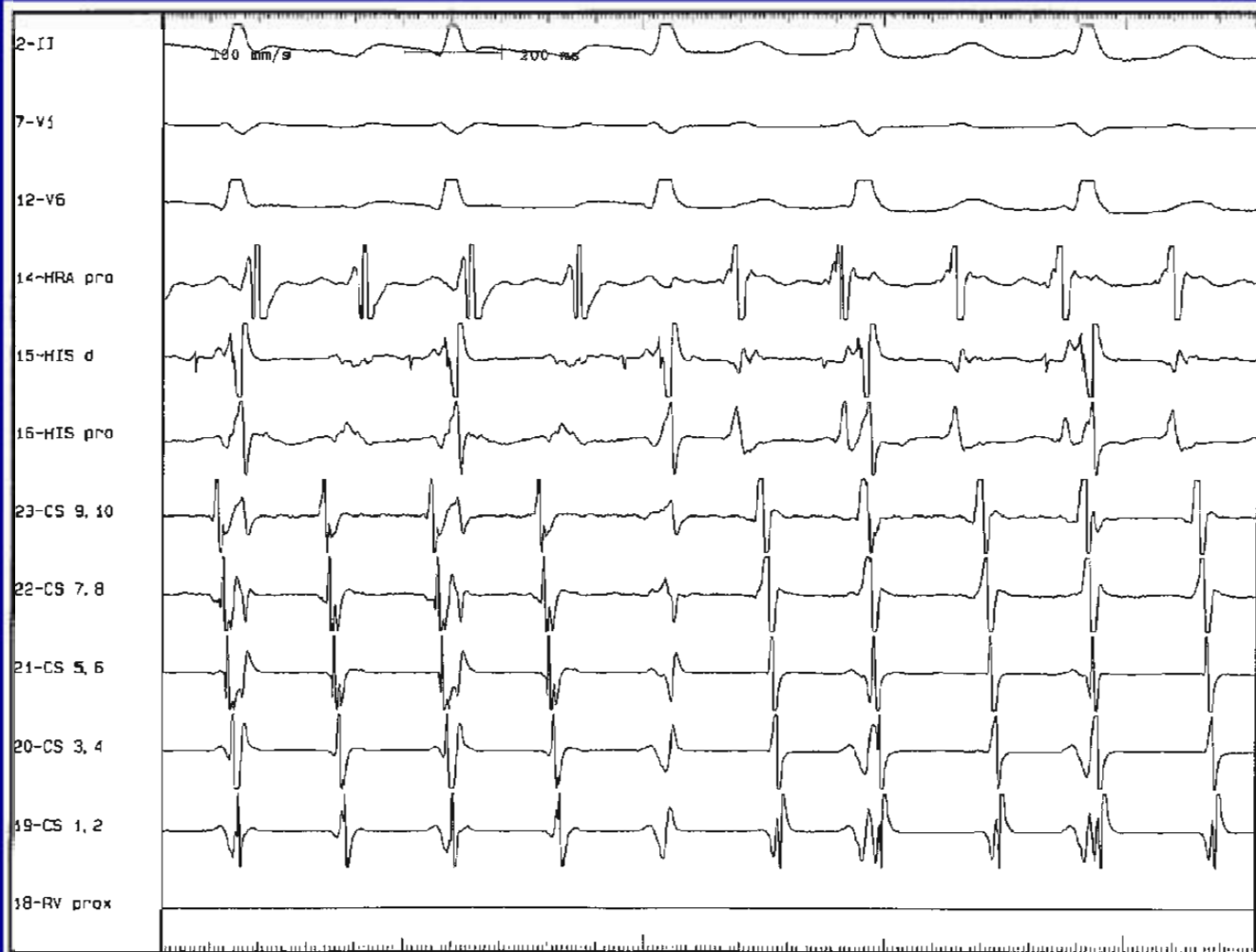
1. Atrial Tachycardia
2. Permanent junctional reciprocating tachycardia
3. Atrial flutter
4. AVNRT
5. AVRT
6. Can be anything of the above



Atrial Flutter

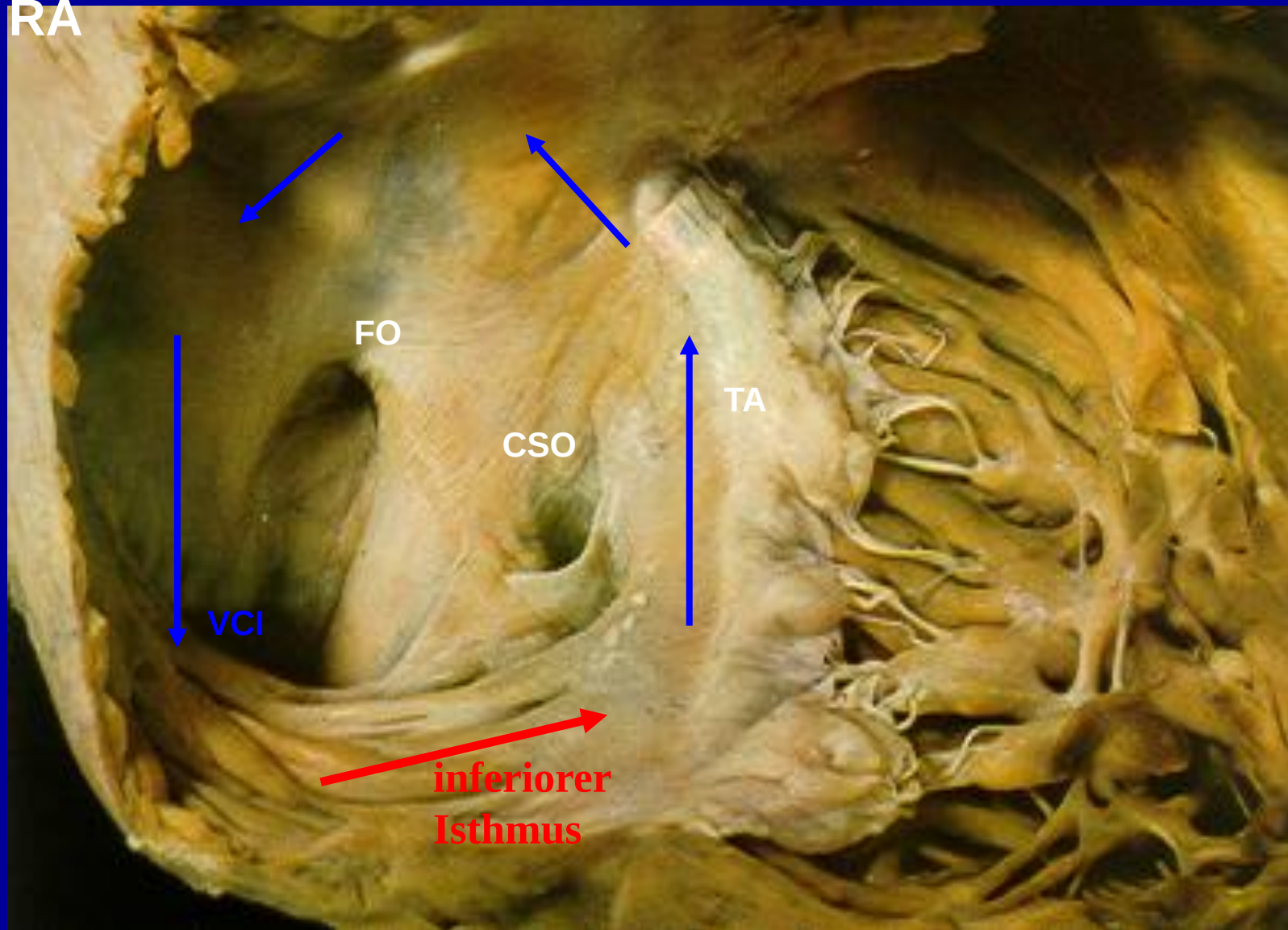
RA



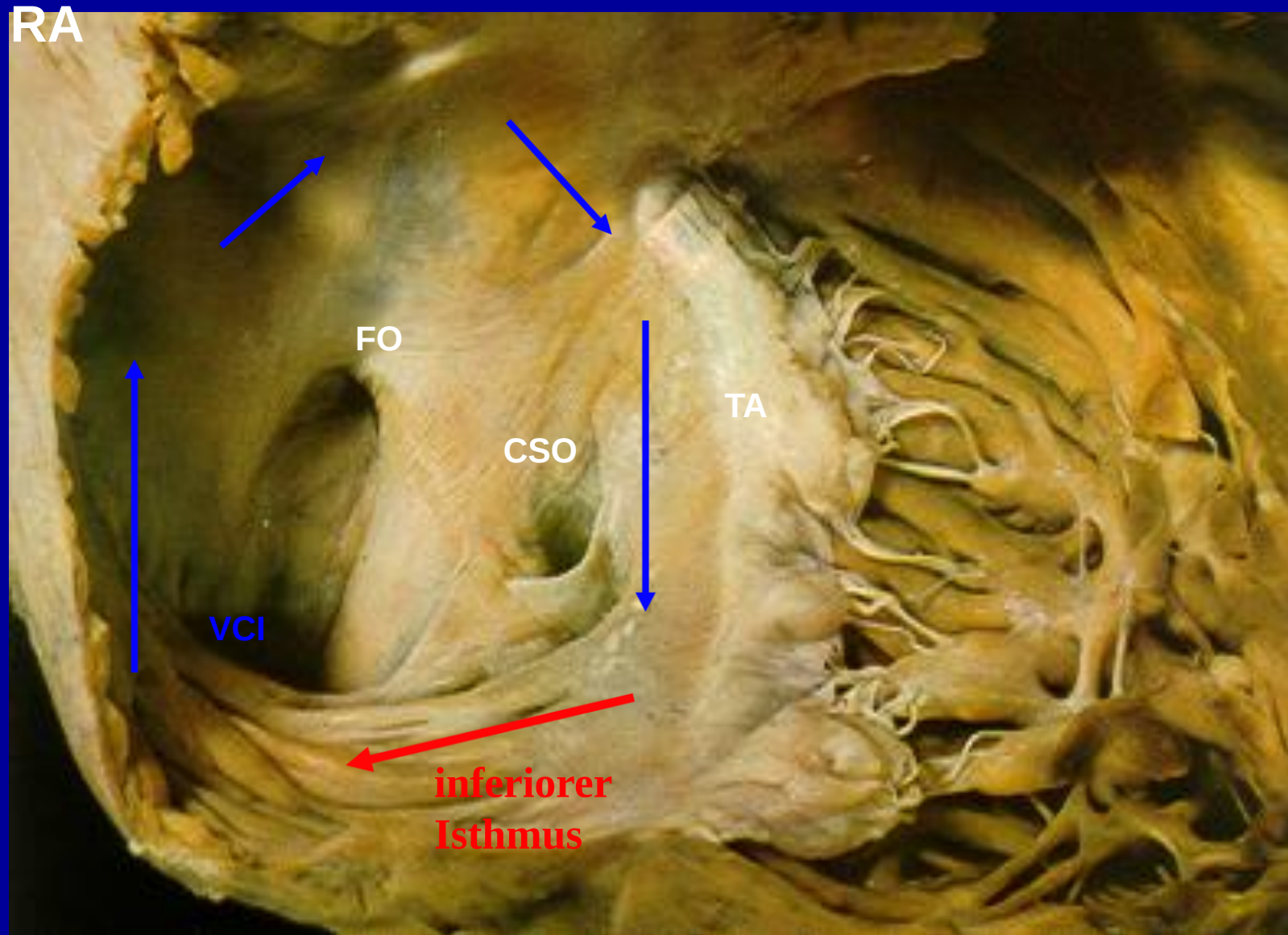


Typical Atrial Flutter Type I

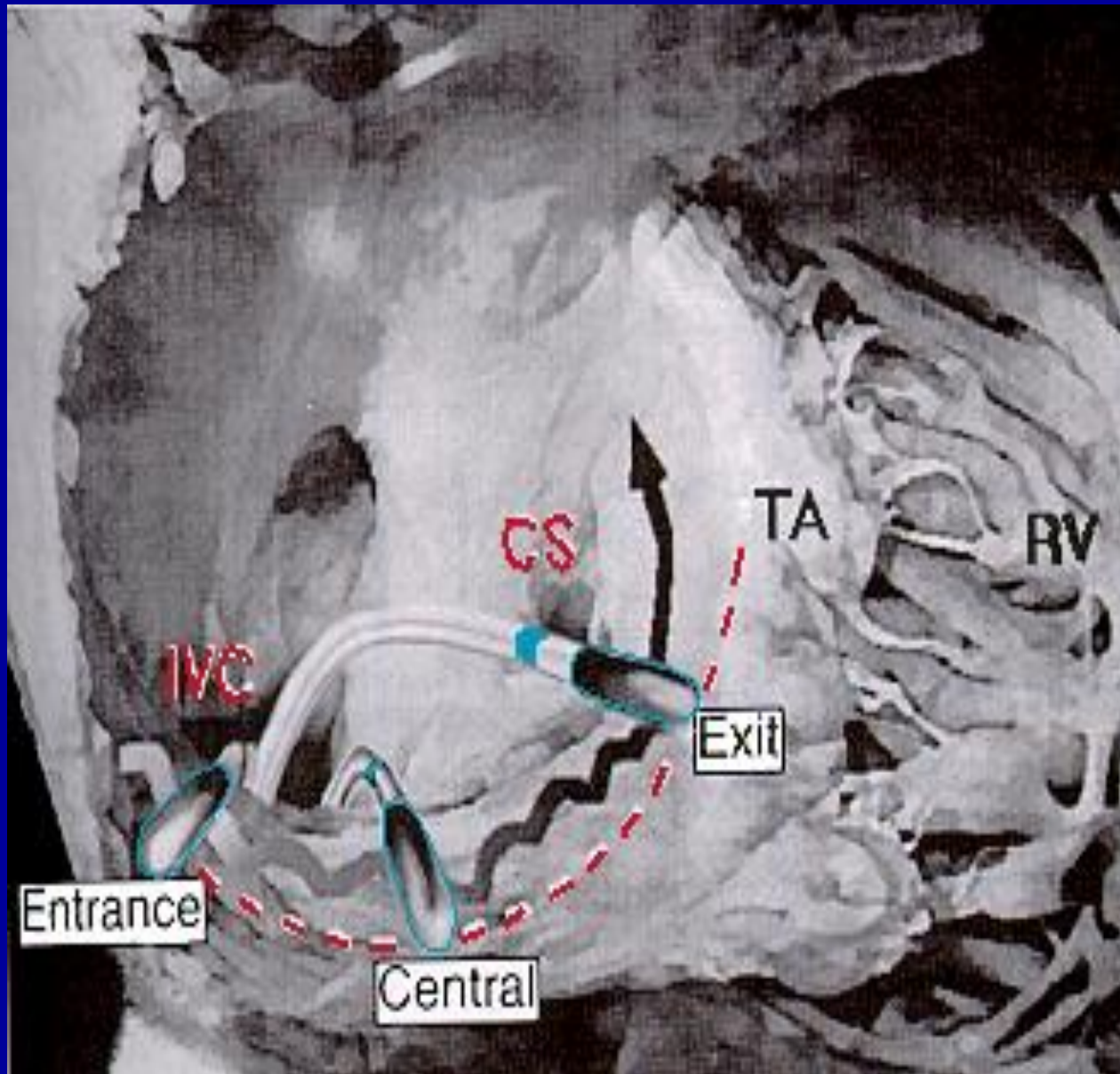
RA

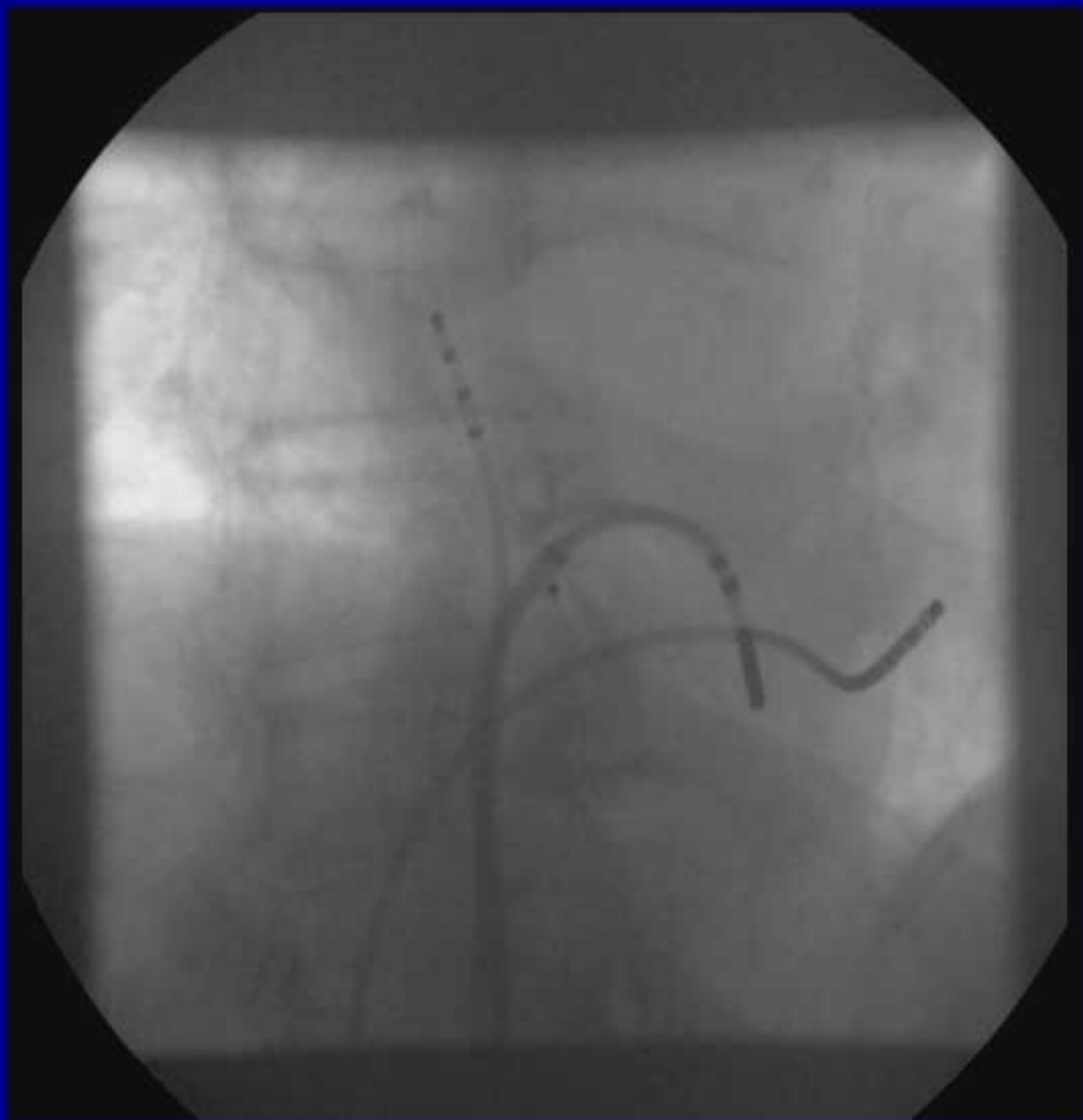


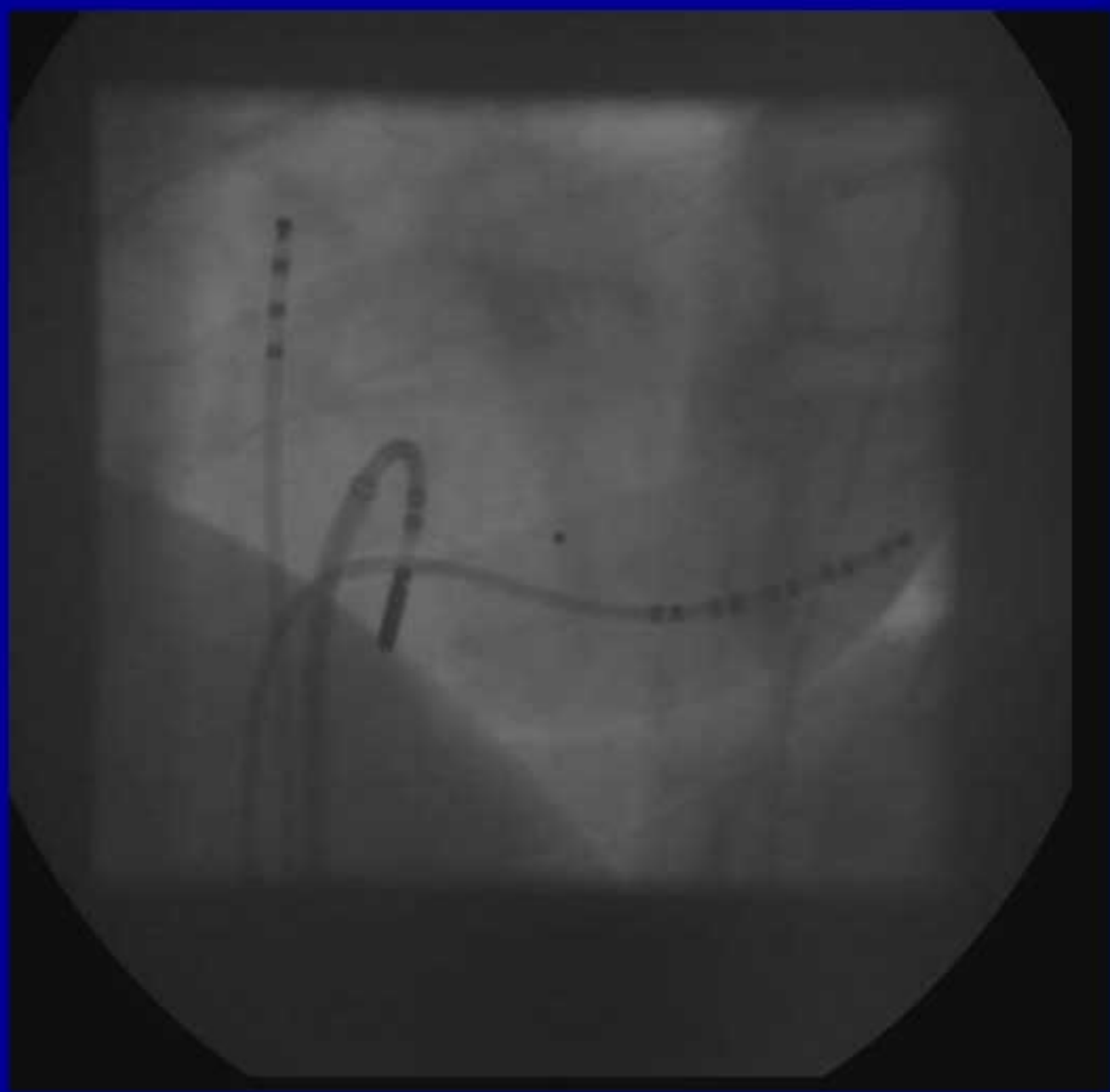
Typical Atrial Flutter Type II



Atrial Flutter





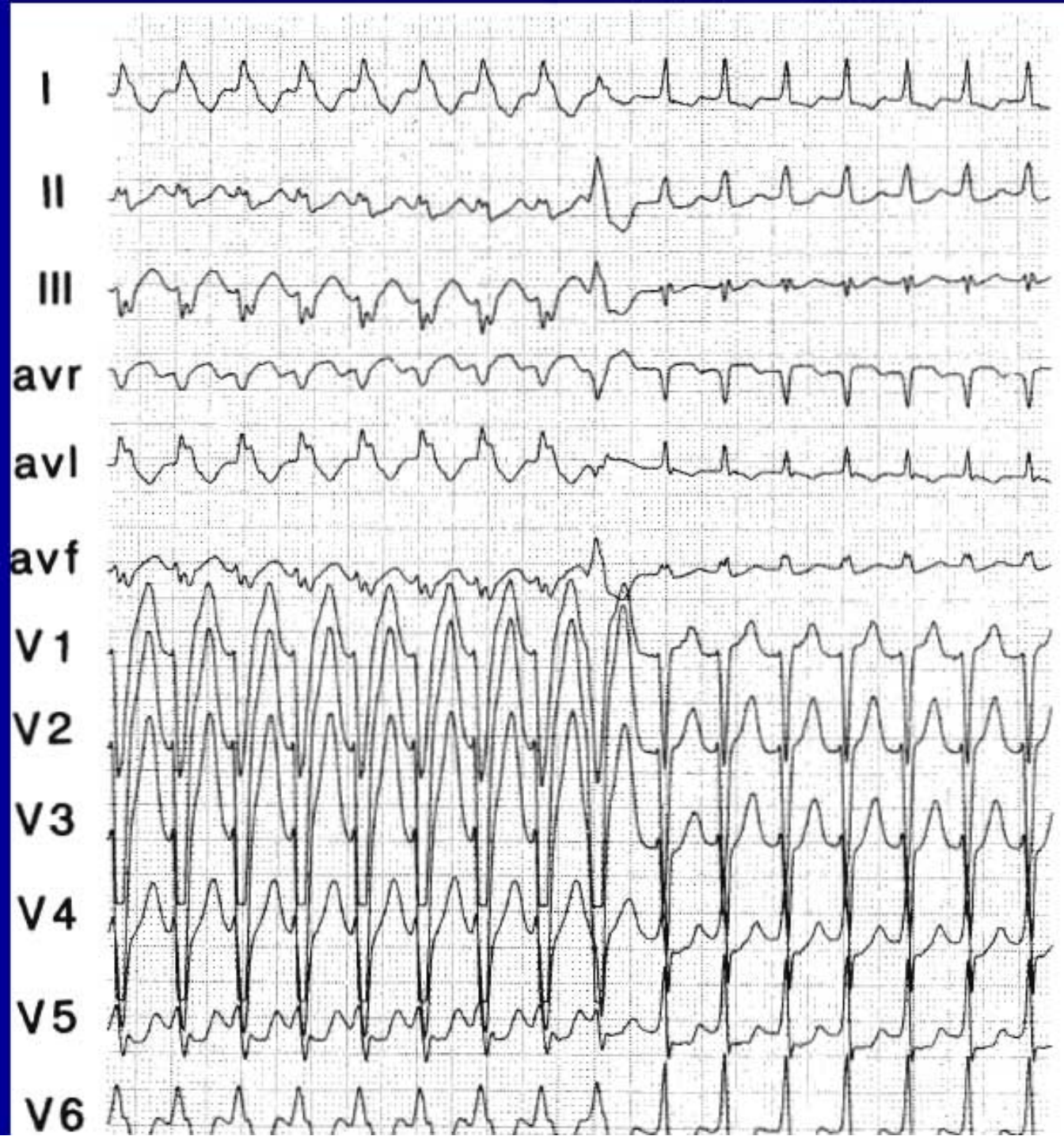


Patient K.P., male, 68 years

- Check-up 3 months after ablation:
- Symptoms resolved
- Back to normal activity
- Echo: LV Function recovered: EF 55%

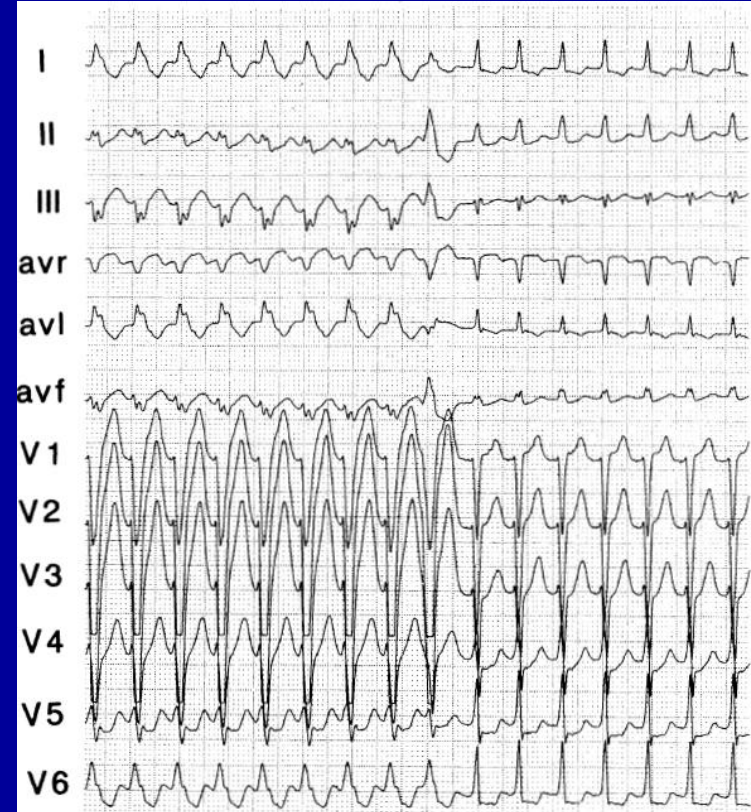
2. Patient S.K., male, 52 years

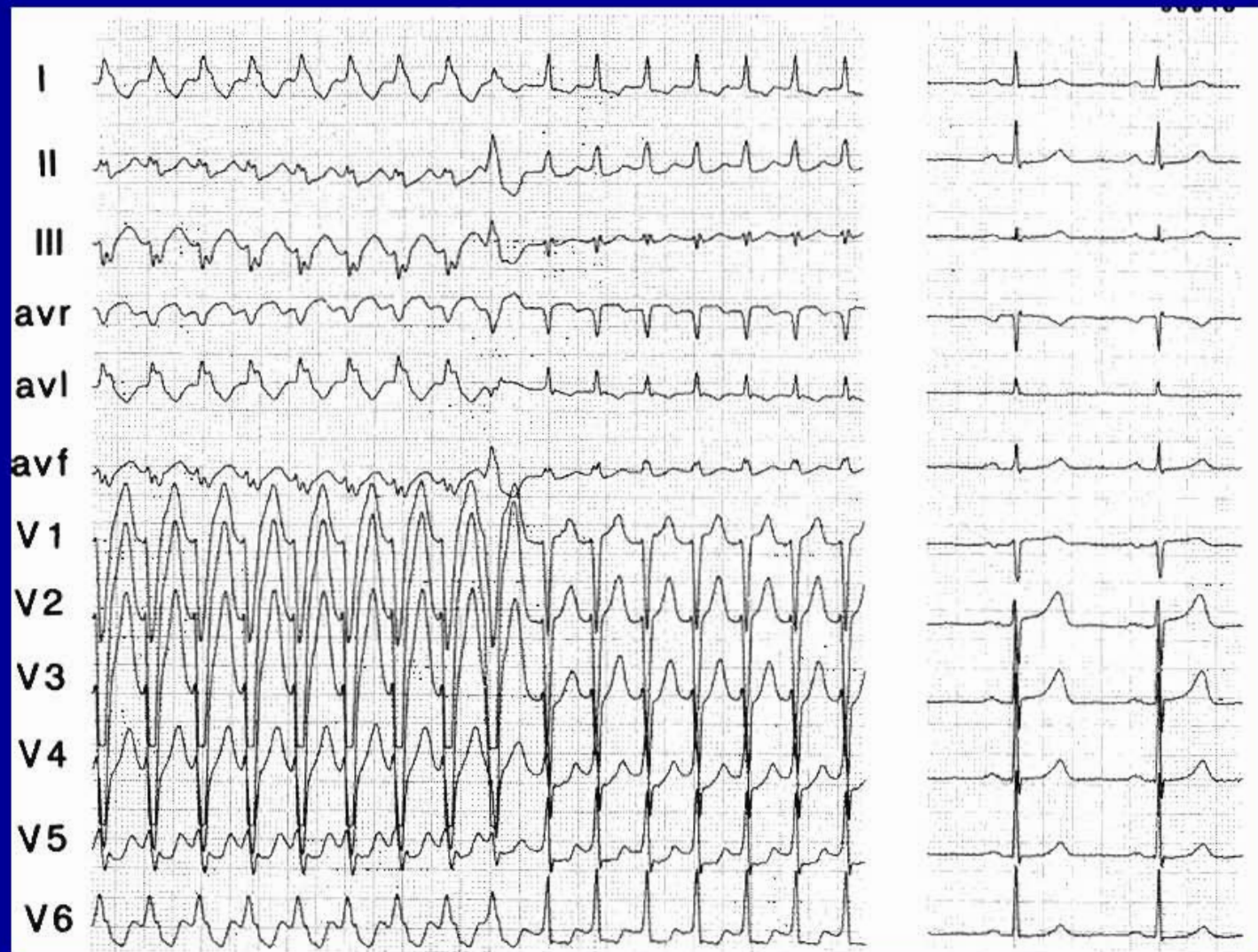
- Palpitations
- SOB
- Palpitations during Skitour which did not terminate by itself



2. Diagnosis

1. Polymorphic VT
2. Monomorphic VT and Sinustach
3. SVT with and without aberrancy
4. VT and SVT
5. Sinus Tach with BBB
6. SVT with and without linking
7. Don't know





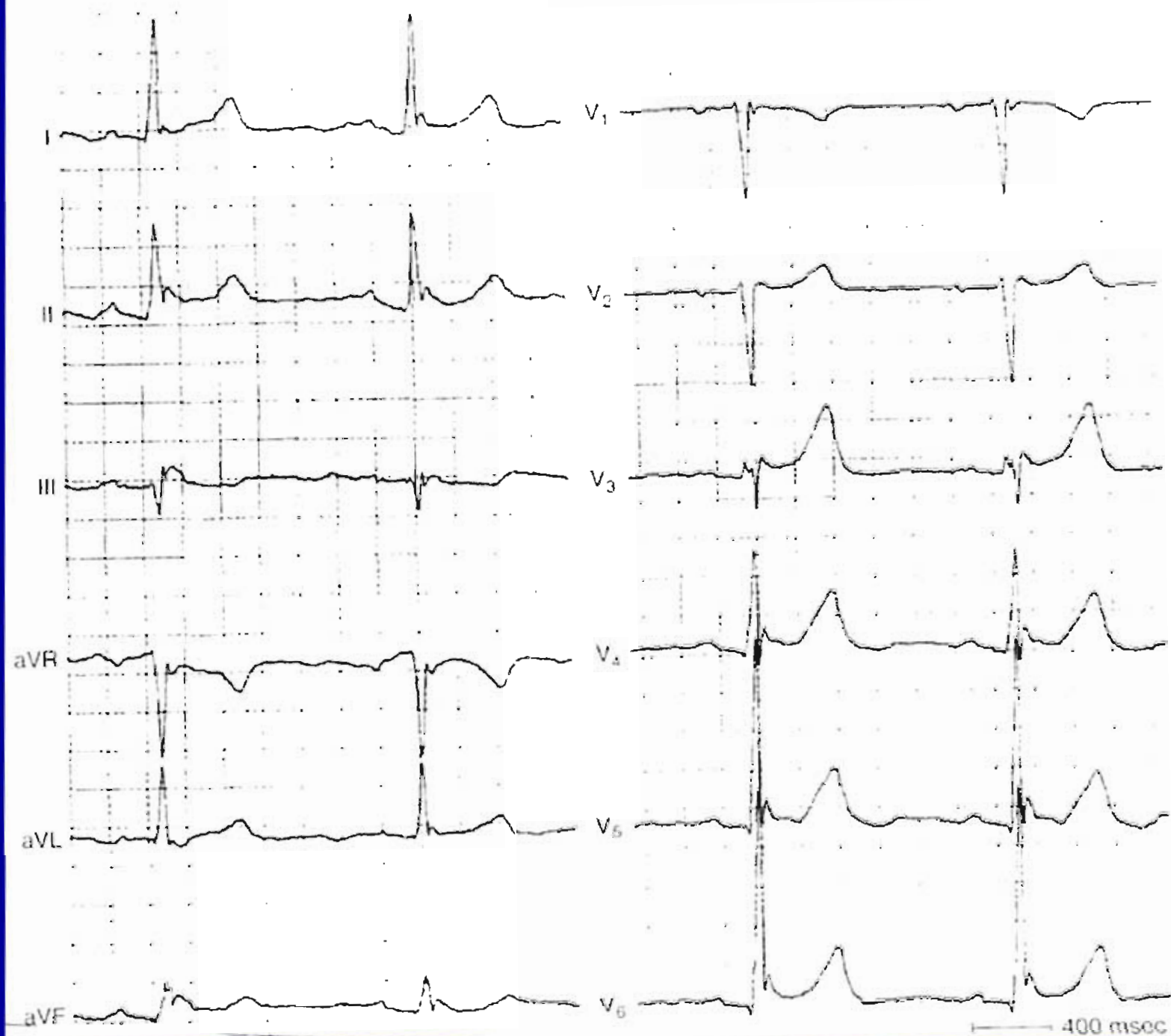
Treatment

- EP study:
- → AVNRT
- → Slow pathway modification

3. Patient E.H, male, 24 years

- Unresponsive at night on street
- Smell of alcohol





3a. What does this patient need ?

1. Calcium
2. Magnesium
3. Potassium
4. Slight cooling
5. Core warming
6. Glucose-Insuline



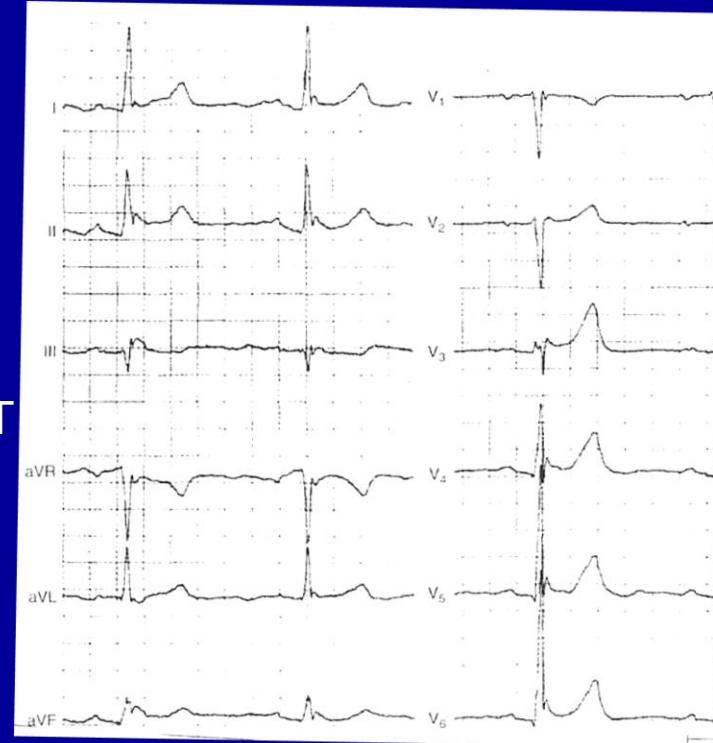
3b. What is the name of these waves?

1. Epsilon Wave
2. Delta Wave
3. Alpha wave
4. J wave
5. Osborne wave
6. 4 and 5



Typical ECG Features of Hypothermia

1. Sinus Bradycardia
2. P waves widened
3. QRS widened
4. Osborn waves (J waves):
Concave elevation at end of QRS-Beginning of ST
5. Prolonged QT



Complications

Myocardial damage (reversible)

Hypotension

AF

VF

Pulmonary

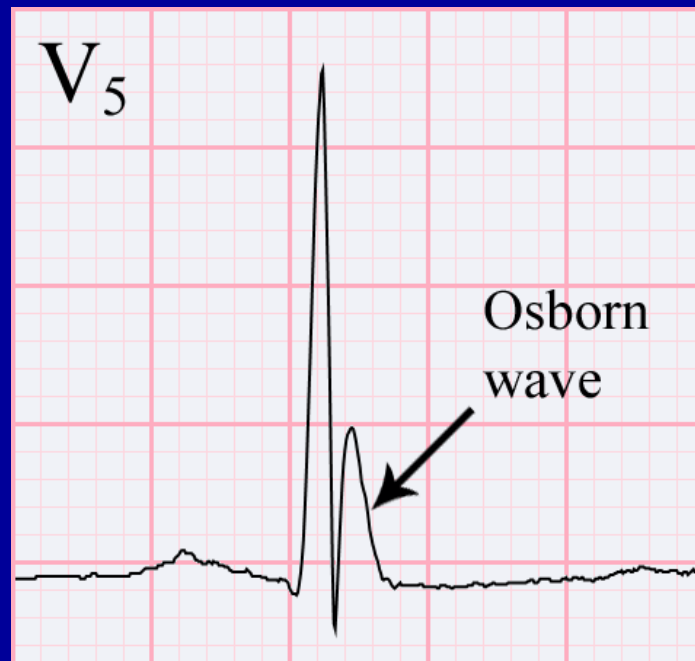
Hematologic

Renal



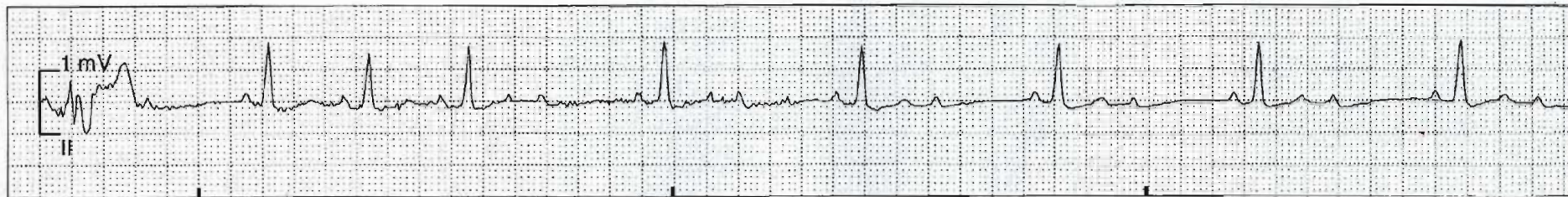
Prominent J deflection attributed to hypothermia first reported in 1938 by Tomaszewski.

J waves described in 1953 by John J. Osborn 1917 and named after him (American Journal of Physiology on experimental hypothermia)



4. Patient P.G, male, 54 years

- Prolonged URI
- Chest pain
- Otherwise healthy

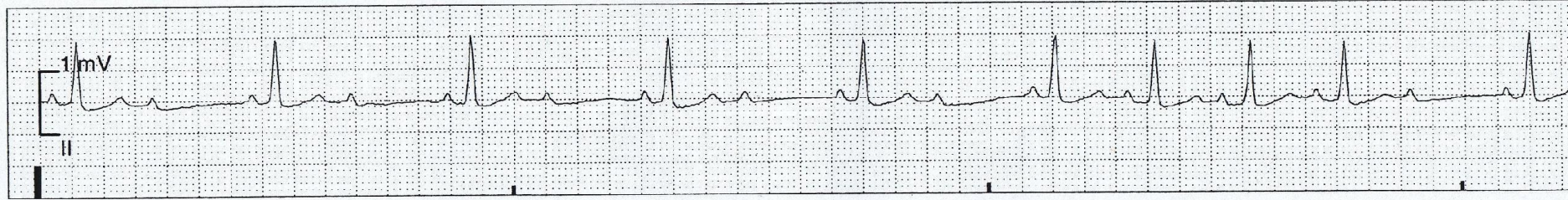


4a. Diagnosis

1. SA Block
2. AV Block I
3. AV Block II Type Wenckebach
4. AV Block II Type Mobitz
5. AV Block III
6. Don't know (indeterminate block)



Indeterminate Block



4b. What do we do?

1. Implant a pace-maker
2. Implant an event recorder
3. Reassure and send home
4. Exercise test
5. EP Study



5. Patient R.P., female, 57 years

- No previous medical history

Presenting complaint

- acute onset of palpitations, dizziness, pre-syncope, nausea
- spontaneous recovery
- recurrence of the same symptoms during afternoon walk 3h later

10 mm/mV

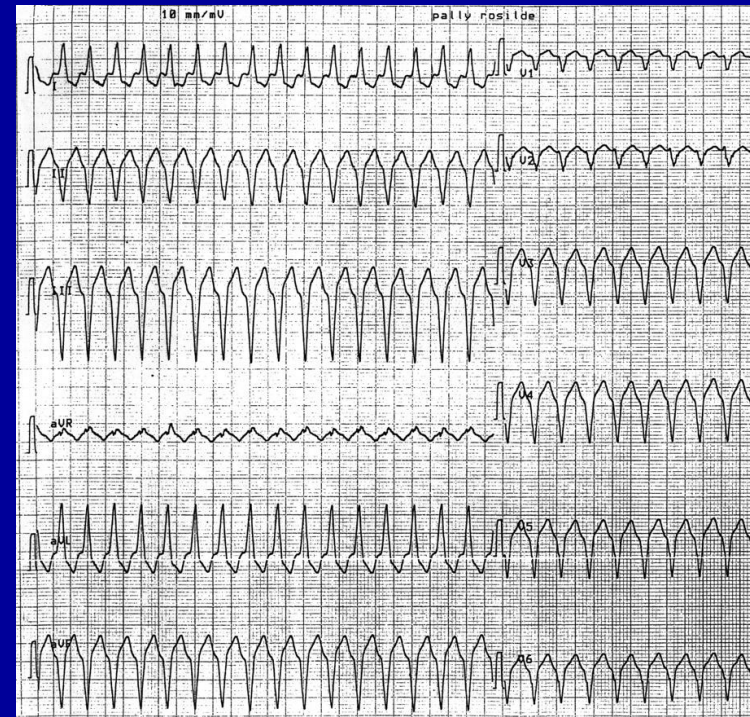
10 mm/mV

FC 200/min

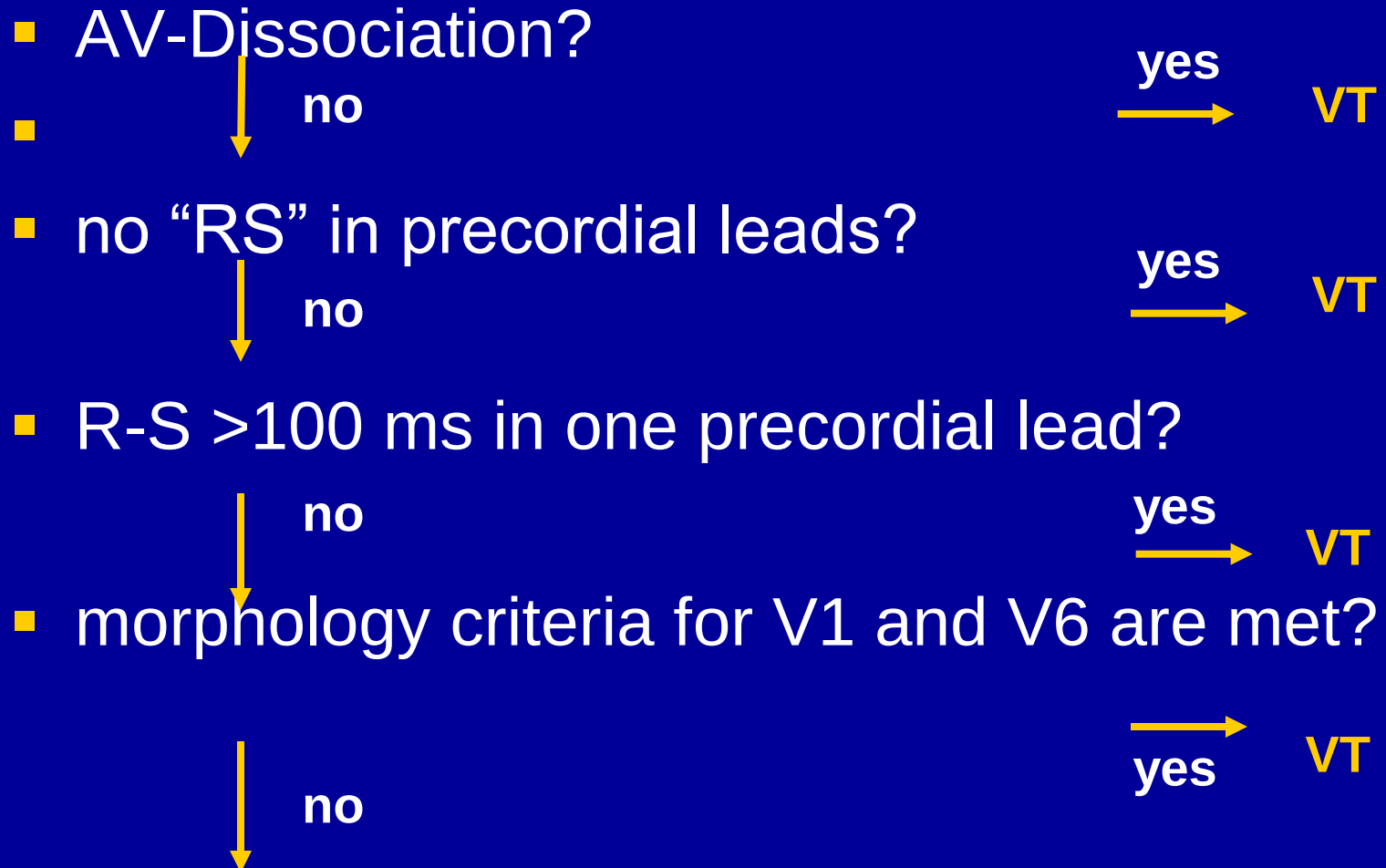


5a. Diagnosis of this WCT?

1. SVT with Aberreny?
2. Ventricular tachycardia?
3. WPW with antidromic AV Tachycardia?



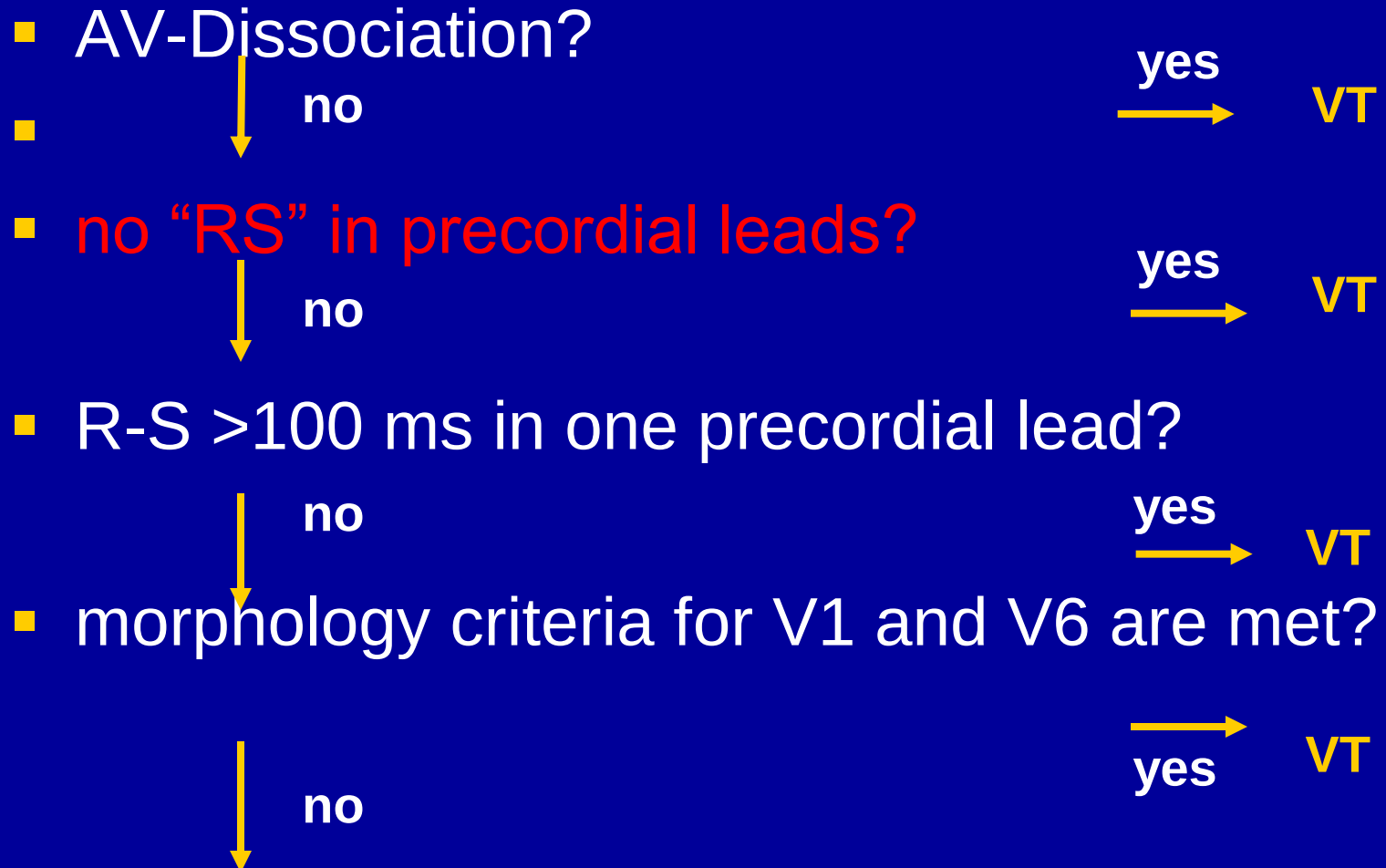
SVT-VT Differential Diagnosis



SVT with Aberration

Brugada, Circulation 1991;83(5):1649-59

SVT-VT Differential Diagnosis

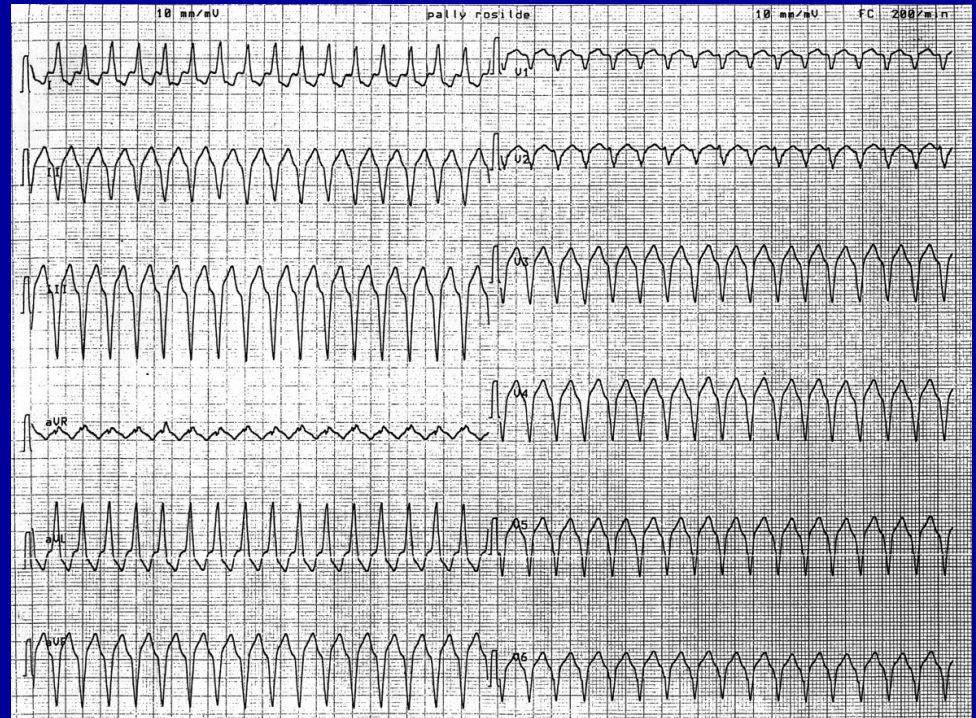


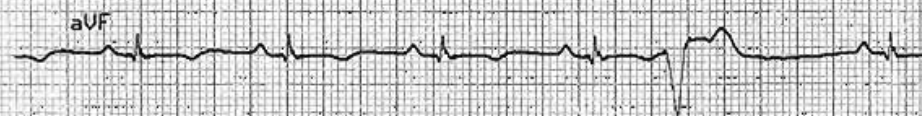
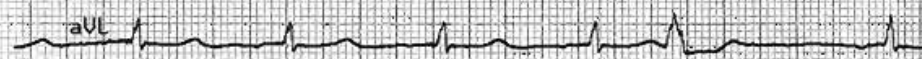
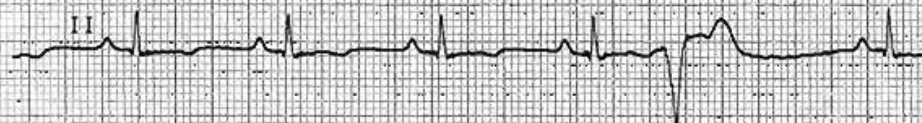
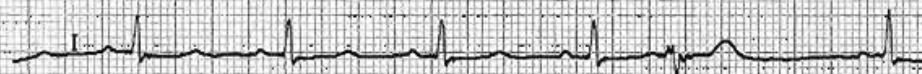
SVT with Aberration

Brugada, Circulation 1991;83(5):1649-59

5b. Origin of this VT

1. LV base
2. LV apex
3. RV base
4. RV apex
5. Can't tell





Major criteria ARVC

- Severe structural abnormalities of the RV
- Fibrofatty replacement of myocardial tissue
- Epsilon waves at right precordium (V1-V3)
- Familial disease (necropsy or surgery)

Minor criteria ARVC

- Mild structural abnormalities of the RV
- Inverted T waves at right precordium (V2, V3)
- Late potentials (SAECG)
- LBBB type VT or frequent VES (>1000/d)
- Family hx of SCD or ARVD

ARVC Program Zurich

- Founded in June 2011
- National and international collaboration:
Research and clinical of according subspecialties

6. Patient H.F., male, 67 years

- «Not feeling well» for one month
- Fever
- UTI
- Now: nausea, insomnia

Fall-Nr.:

V1

V2

V3

V4

V5

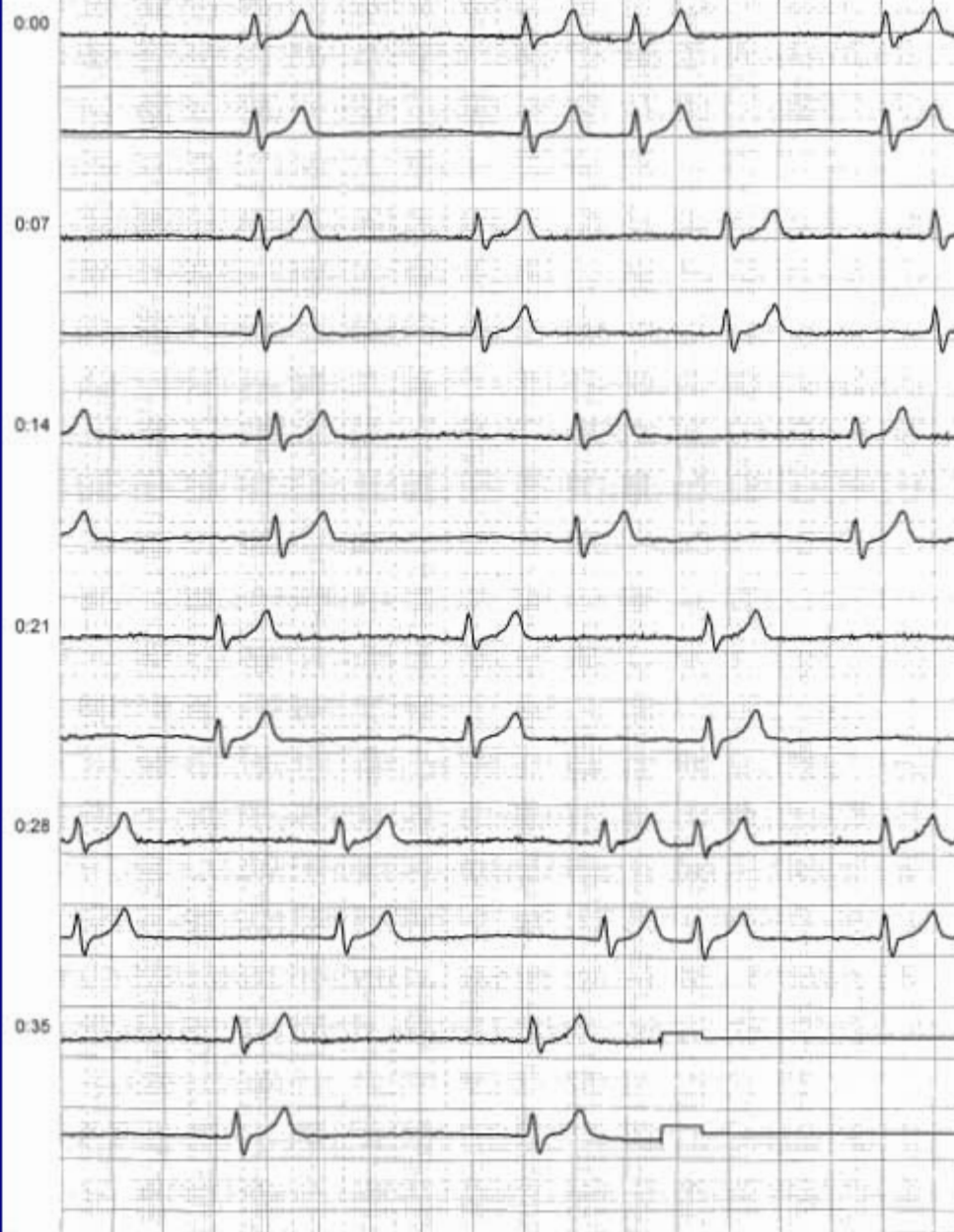
V6

25 mm/s 10.0 mm/mV

50 Hz

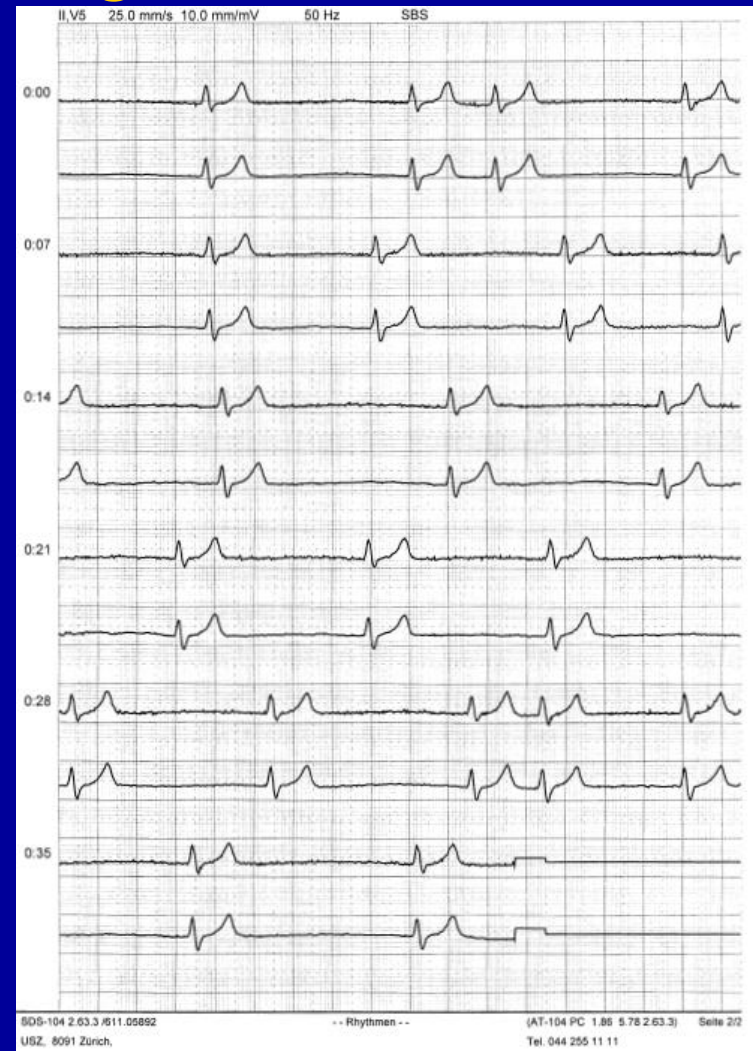






6. What is the diagnosis?

1. Ischemia
2. Myocardial Infarction
3. Hypertrophy
4. Hypertensive crisis
5. Hyperkalemia
6. Hypokalemia



Hyperkalemia

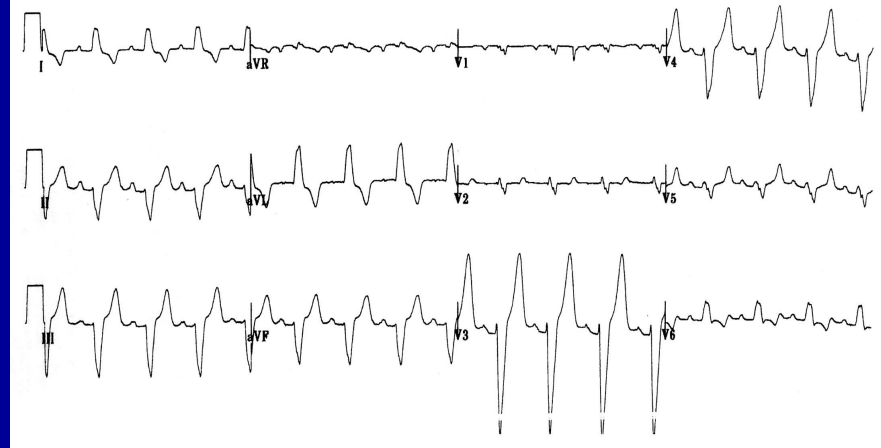
- 2% of Potassium extracellular
- Ratio: $K(\text{intra}) : K(\text{extra})$ determines Membranepotential
- Hyperkalemia: Ratio: $K(\text{intra}) : K(\text{extra})$ decreases
- → Hyperkalemia decreases Membranepotential
- Moderate Hyperkalemia:
Depolarisation, increased excitability (Nernst-equation)
- Severe Hyperkalemia:
Depolarisation → Sodium System stays inactivated

Hyperkalemia

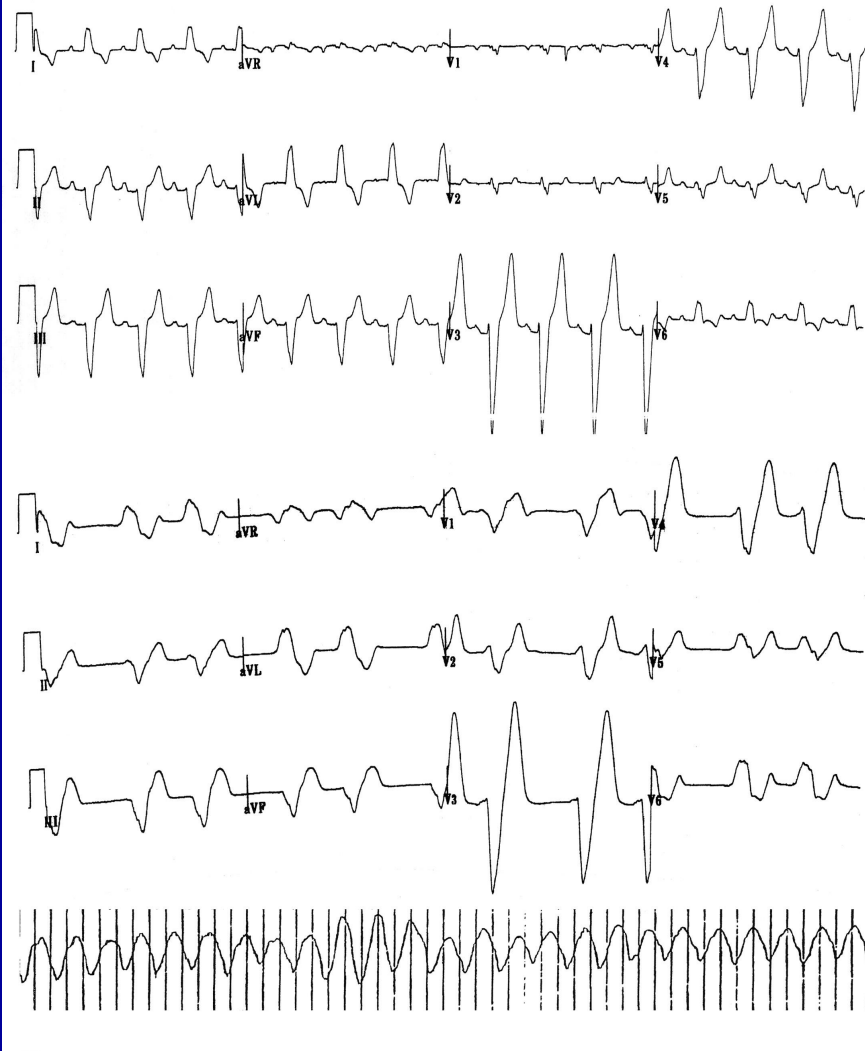
- Cave:
 - Arrhythmias (sinusoidal, VT, Asystolie)
 - Pacing Threshold increases!
 - Negativ inotrope
 - Negativ dromotrope
- Principle of cardioplegic solution

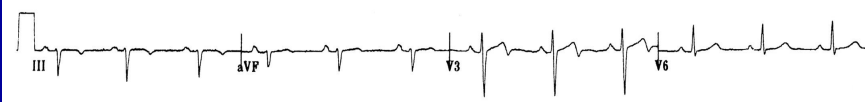
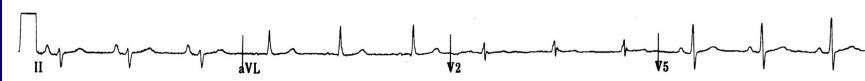
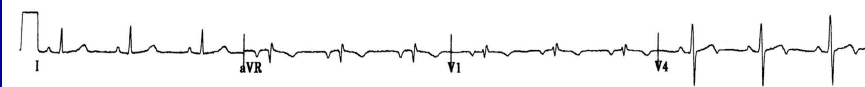
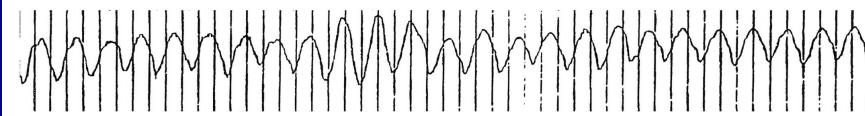
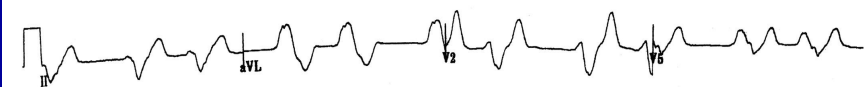
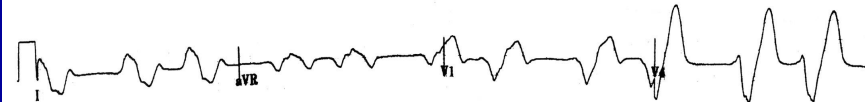
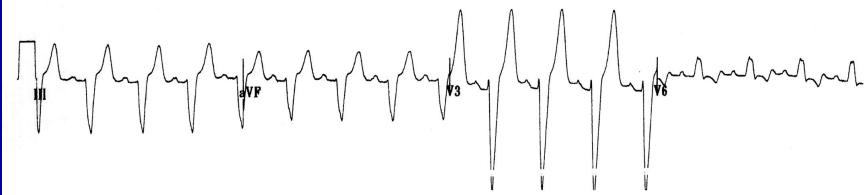
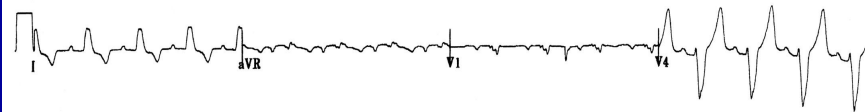
Hyperkalemia

- 5.5-7.5 mmol/l:
 - Peaked T-Waves
 - QRS Widening
 - PQ-Prolongation, AV Block
- >7.0 mmol/l:
 - no P-Waves
 - Extremely wide QRS
 - VT (“sinusoidal”)
 - Asystolie





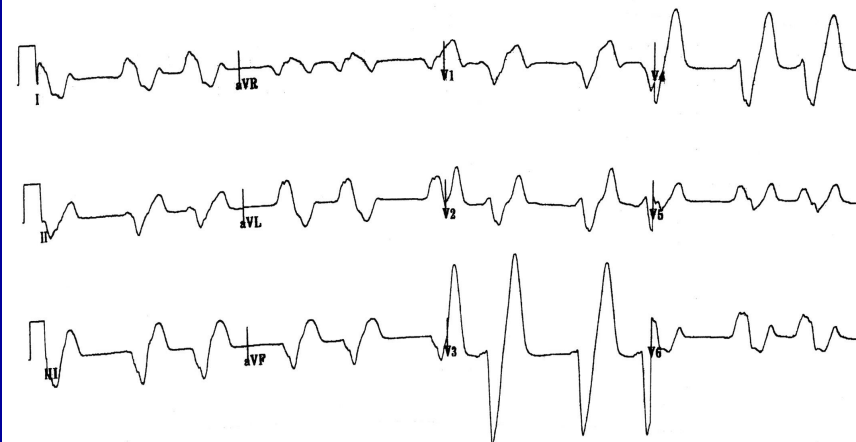




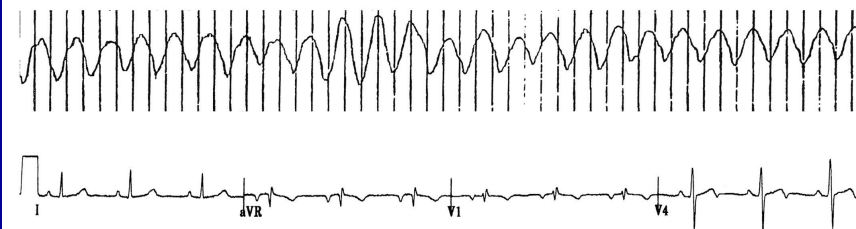
K 6.8 mmol/l



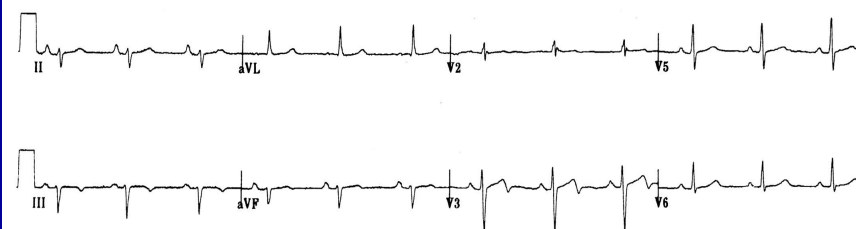
K 7.5 mmol/l



K 8.5 mmol/l



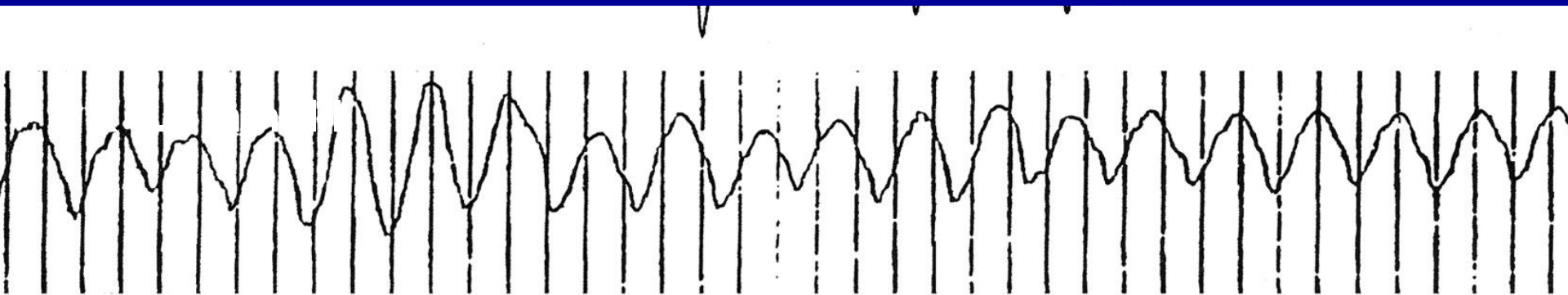
K 4.8 mmol/l

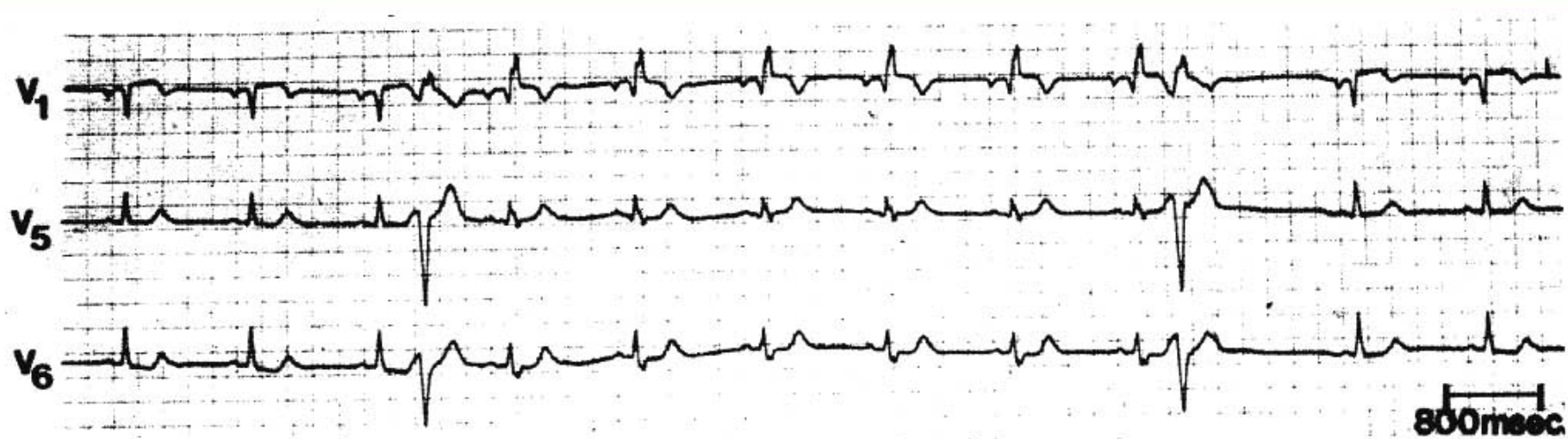


**68 y/o
male Patient
CAD
St. p. CABG**

**barely
responsive**







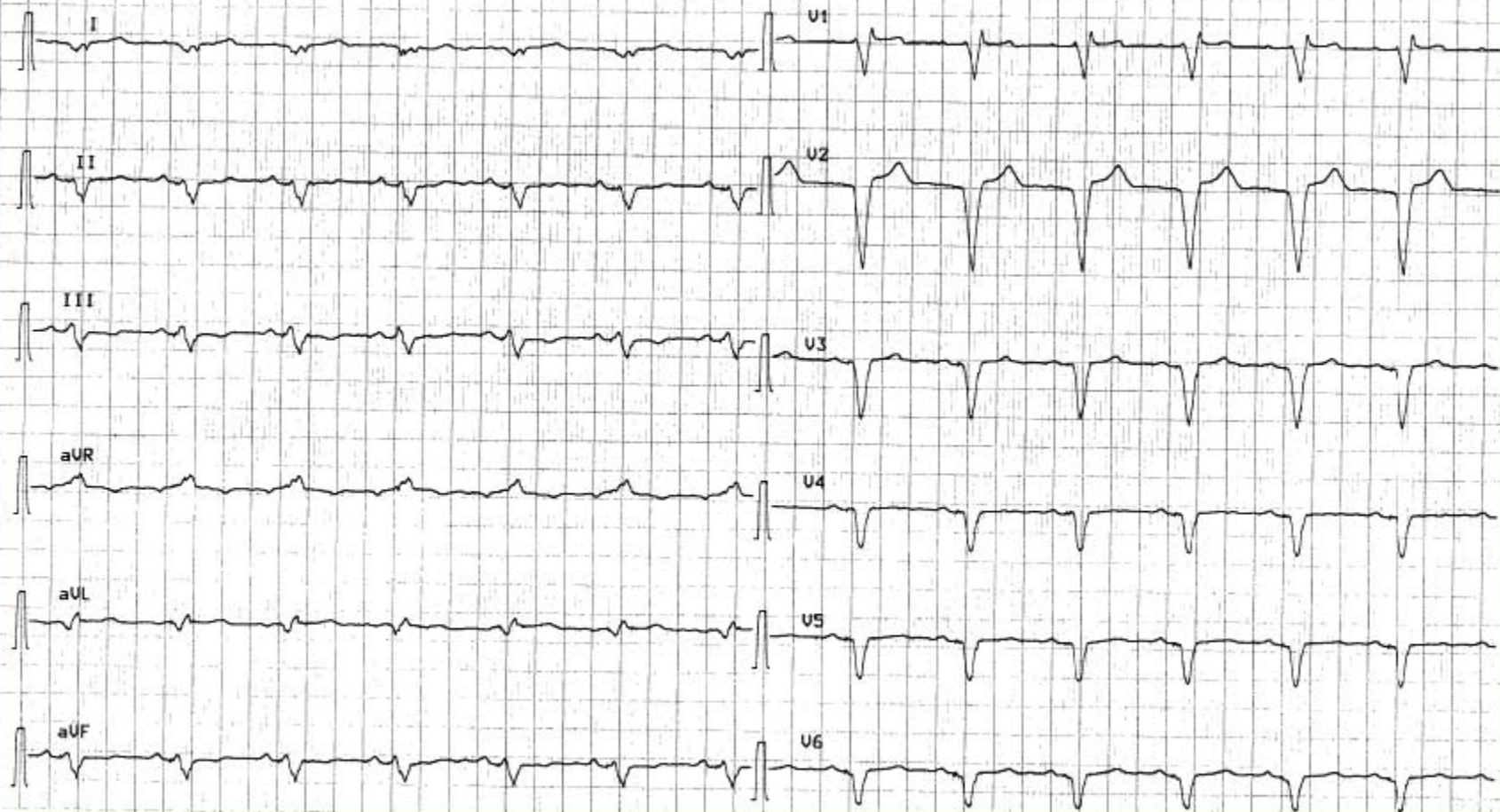
Patient M.L., female, 38 years

- AV Block III congenital
- Very active lifestyle
- Exercise Intolerance

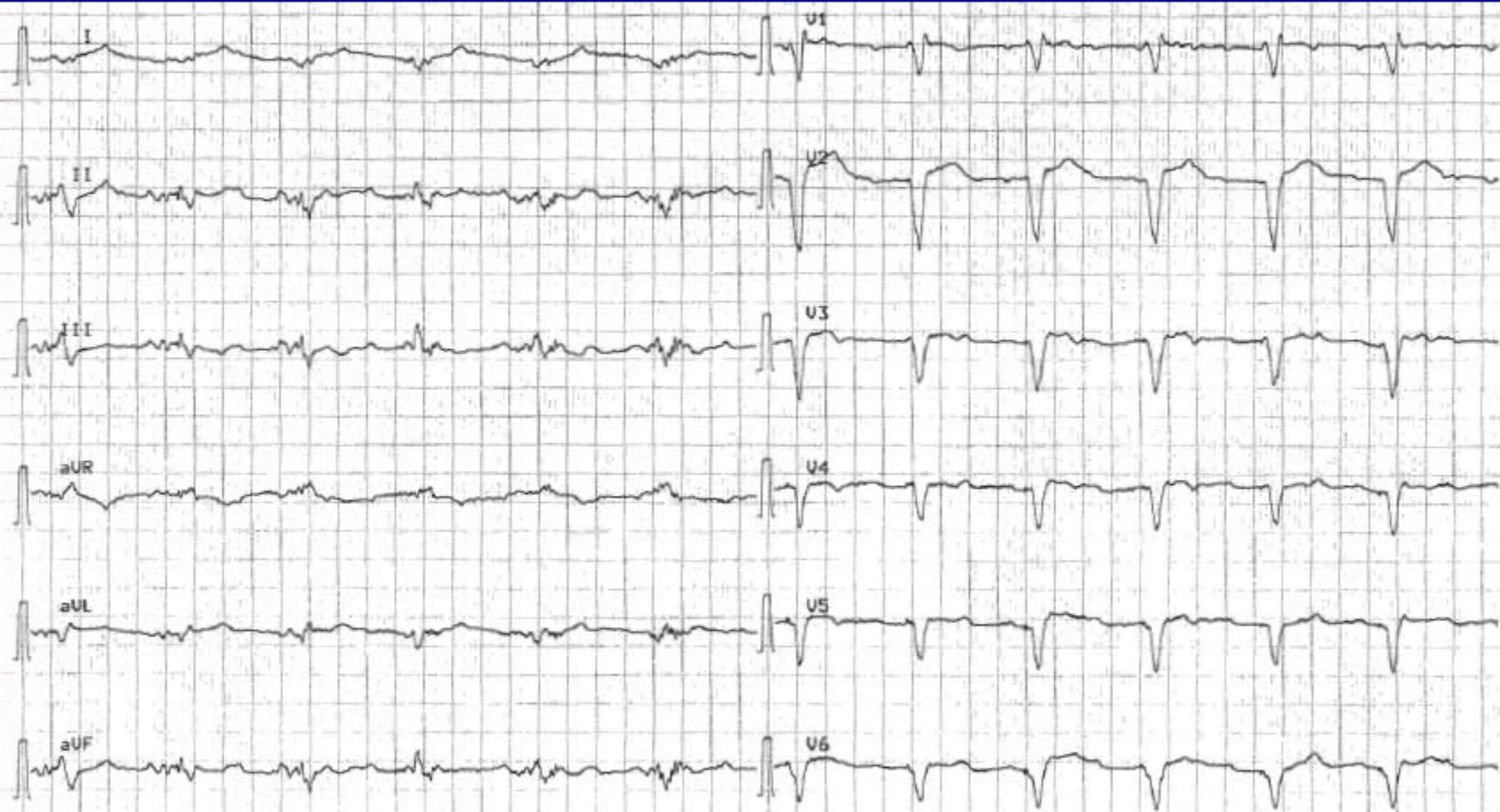


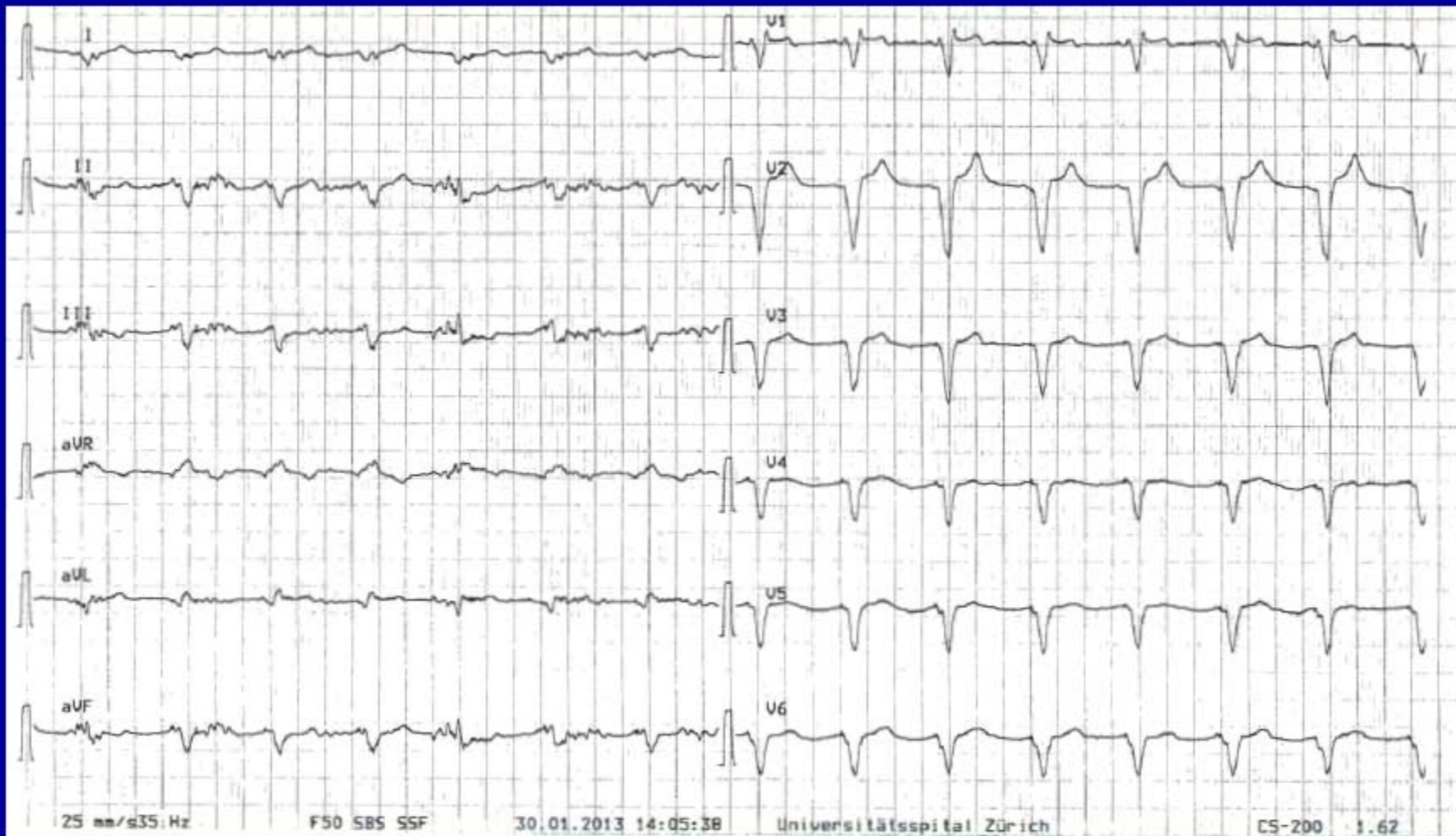
10 mm/mU

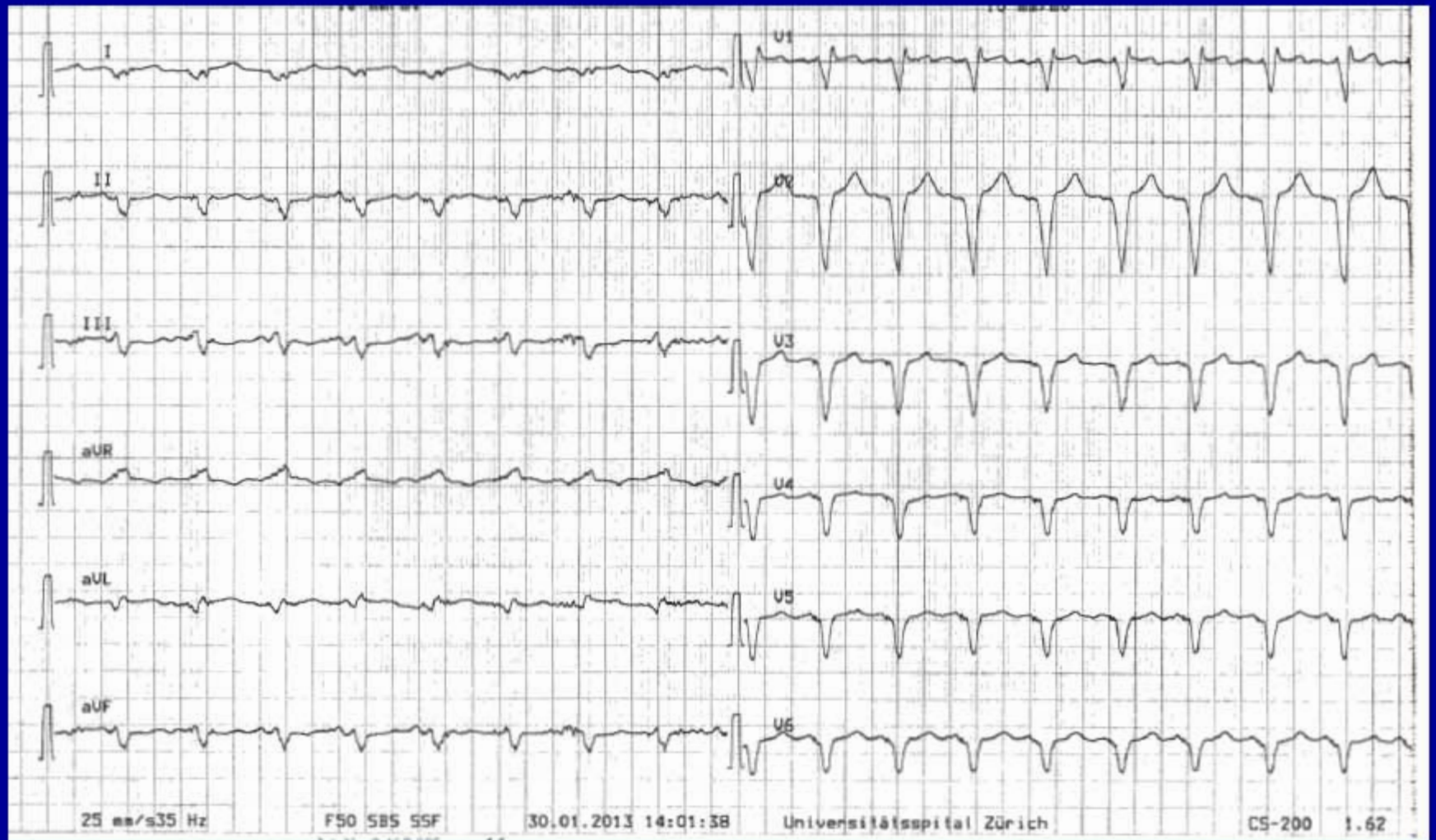
10 mm/mU













25 mm/s 1 mV

F50 585 55F

30.01.2013 14:03:38

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C5-200 1.62





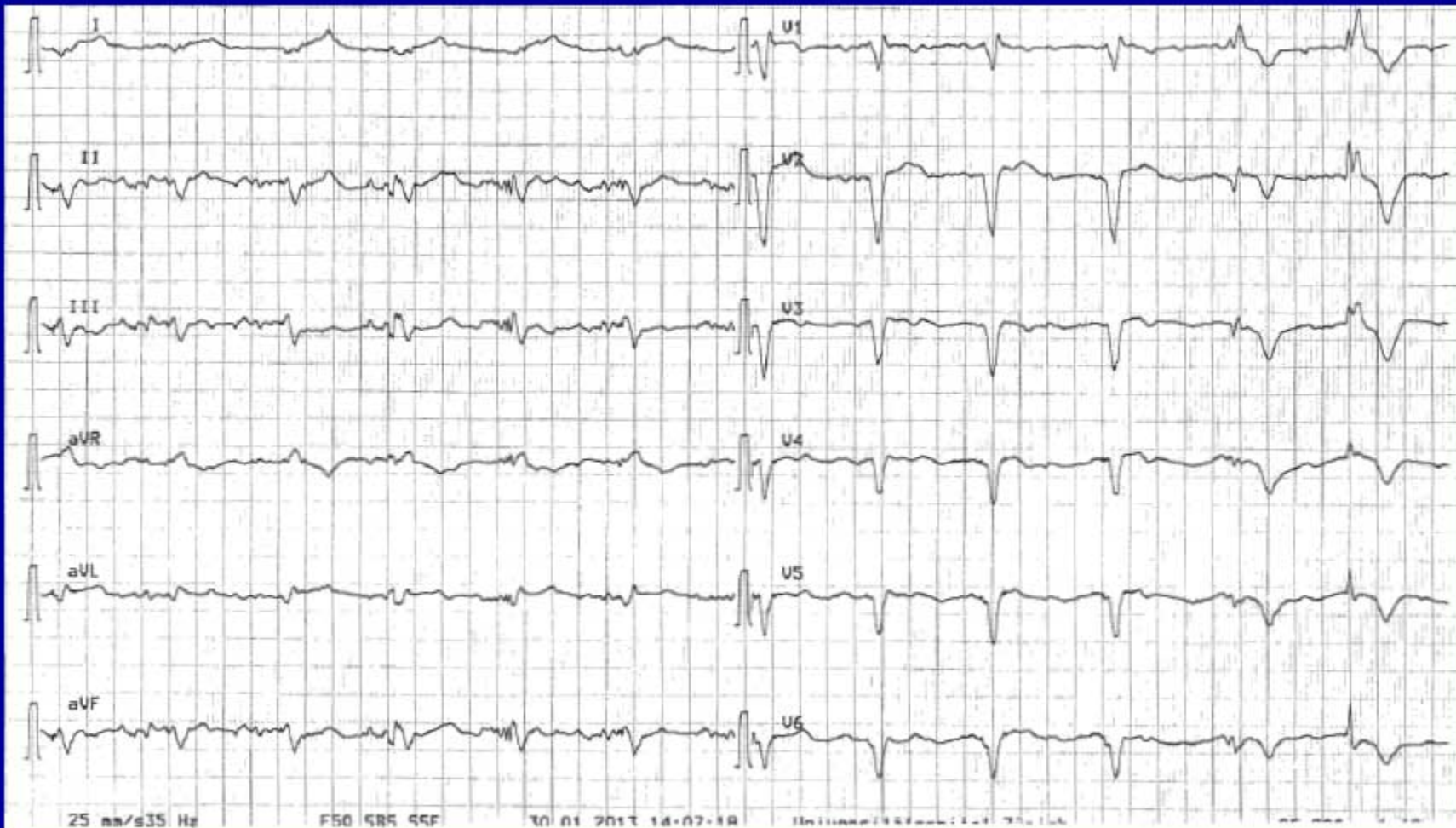
25 mm/s 35 Hz

F50 SBS SSF

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Universitätsspital Zürich

CS-200 1.62



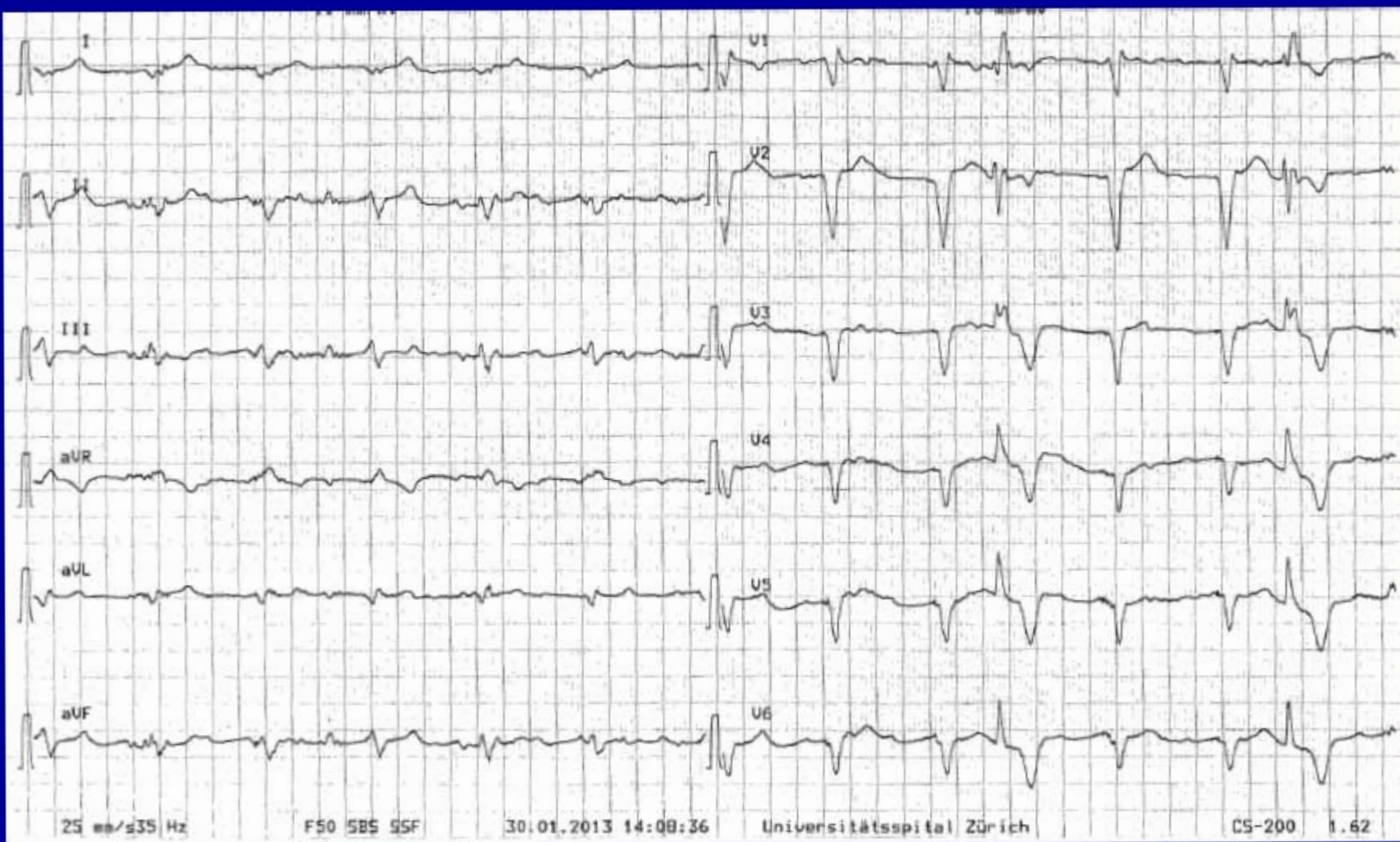
25 mm/s 35 Hz

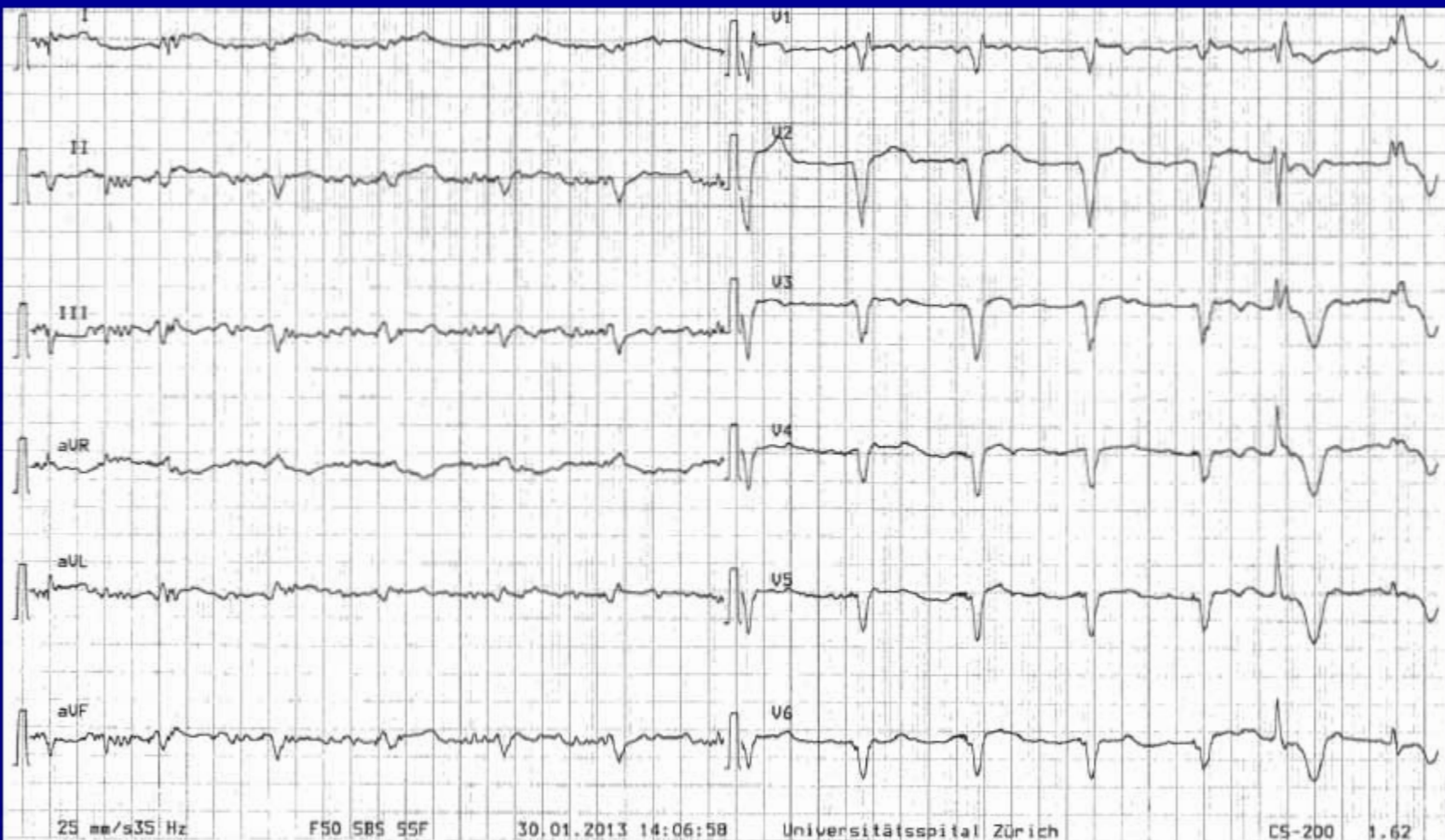
F50 GR5 55F

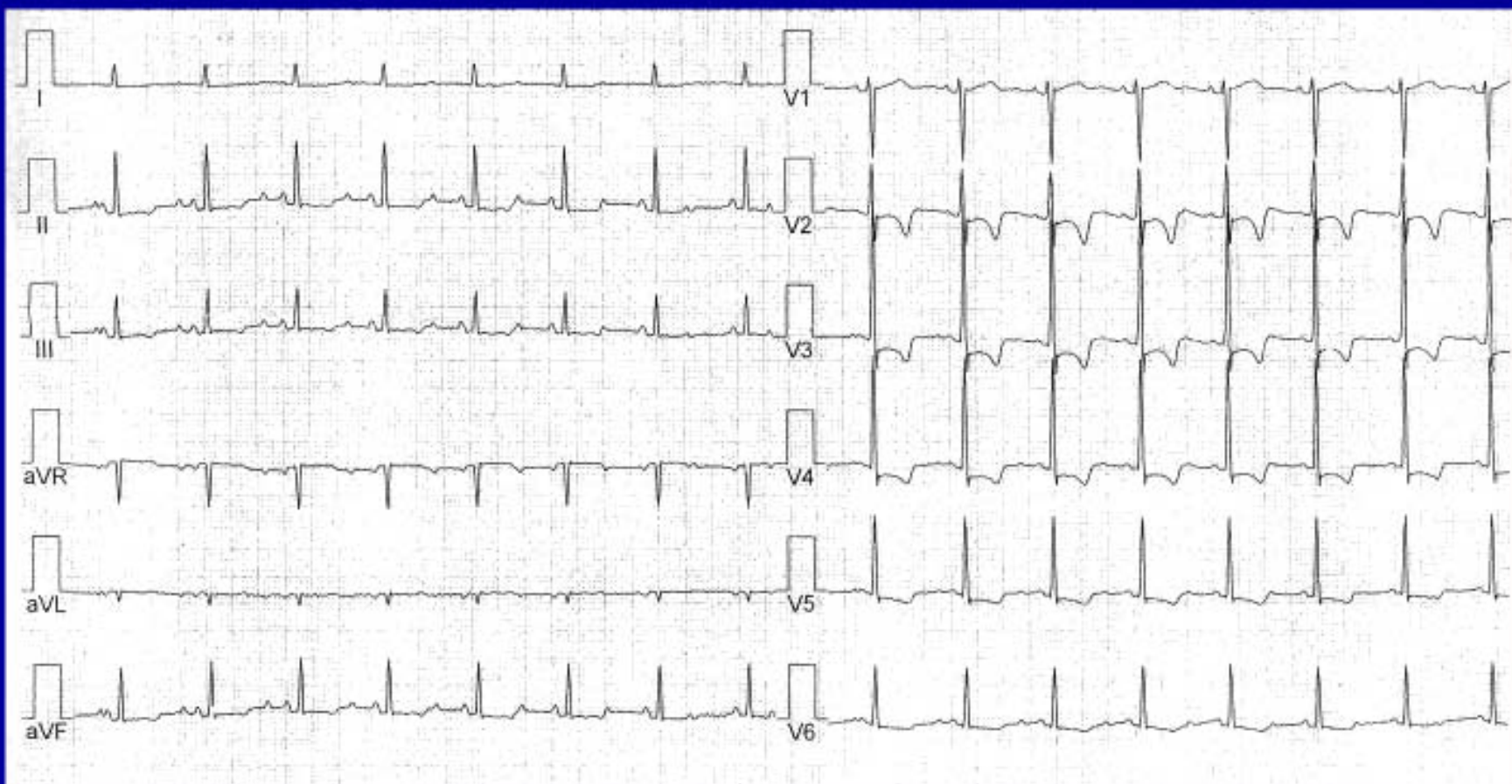
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11m 11s 11m 11s 11m 11s 11m 11s 11m 11s 11m 11s

11m 11s 11m 11s 11m 11s 11m 11s 11m 11s 11m 11s







Intrinsic ECG

