# Tachycardias

Štěpán Havránek

Presentation is on websites.

# Case 1

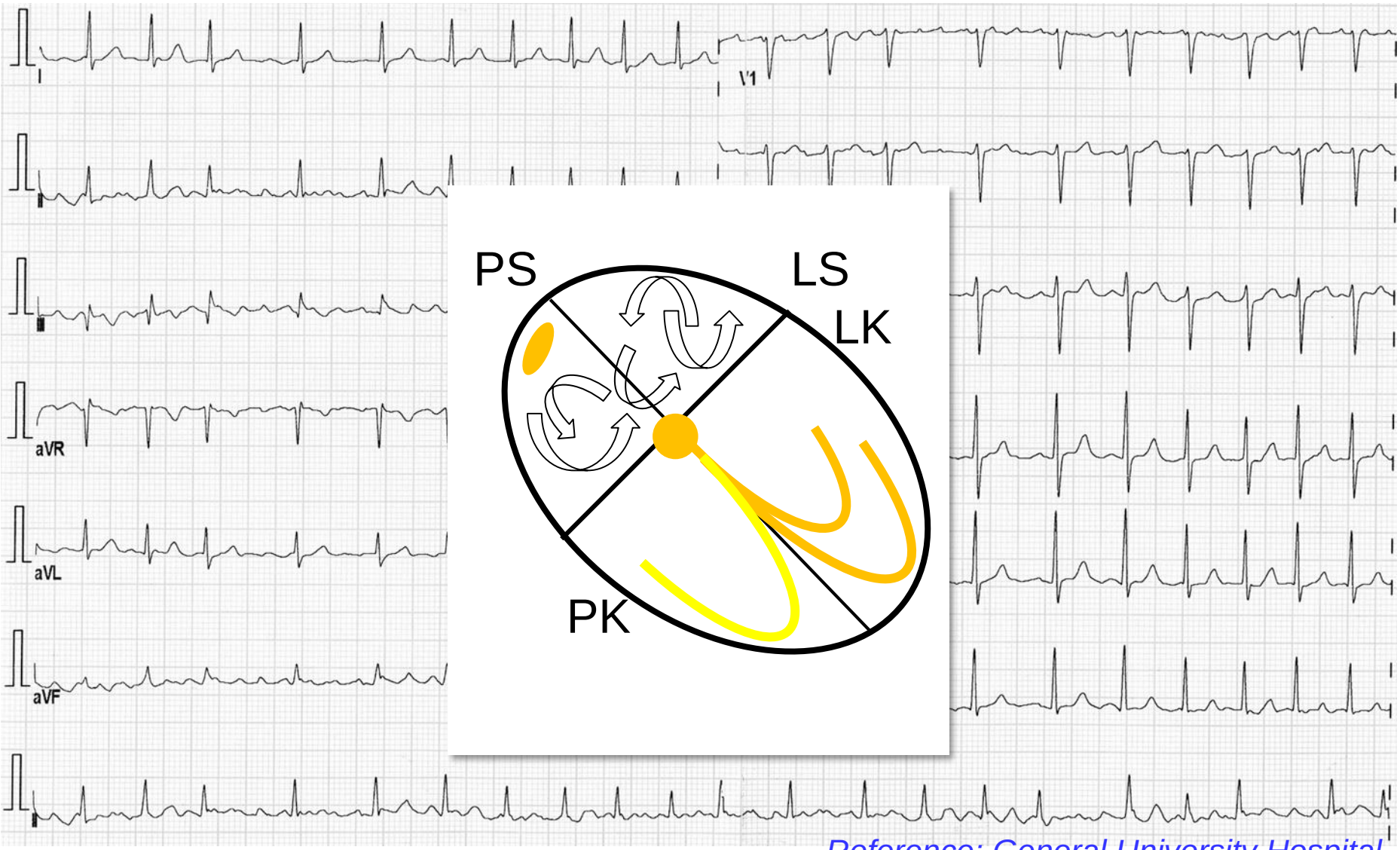
**Male, 50 years**

**History:** Arterial hypertension

**Symptoms:** Irregular and fast palpitations in combination with dyspnea and some chest pain. Many times per week.

He is feeling arrhythmia just now.

# ECG







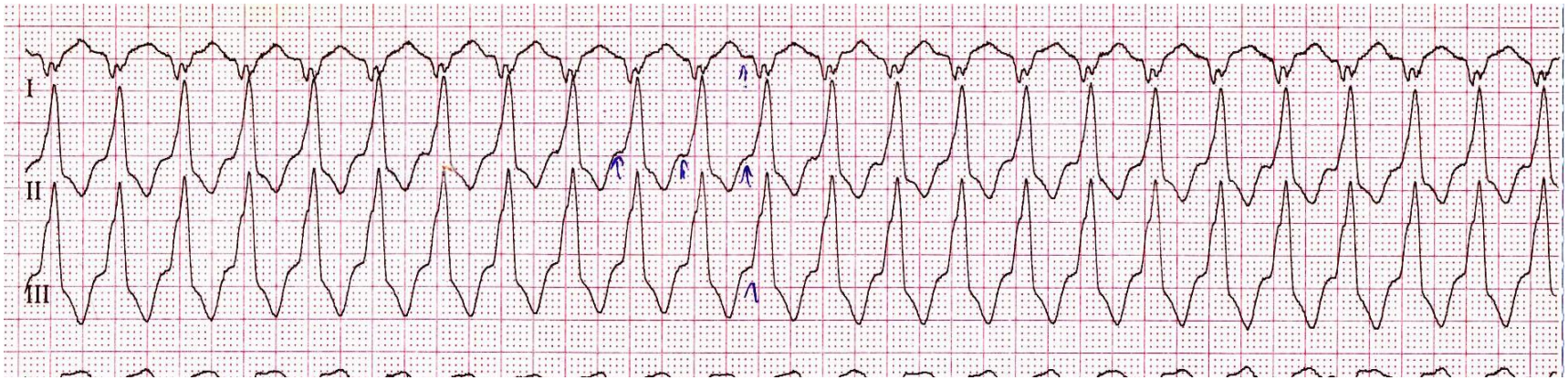
*Reference: General University Hospital*

# ECG


*Reference: General University Hospital*

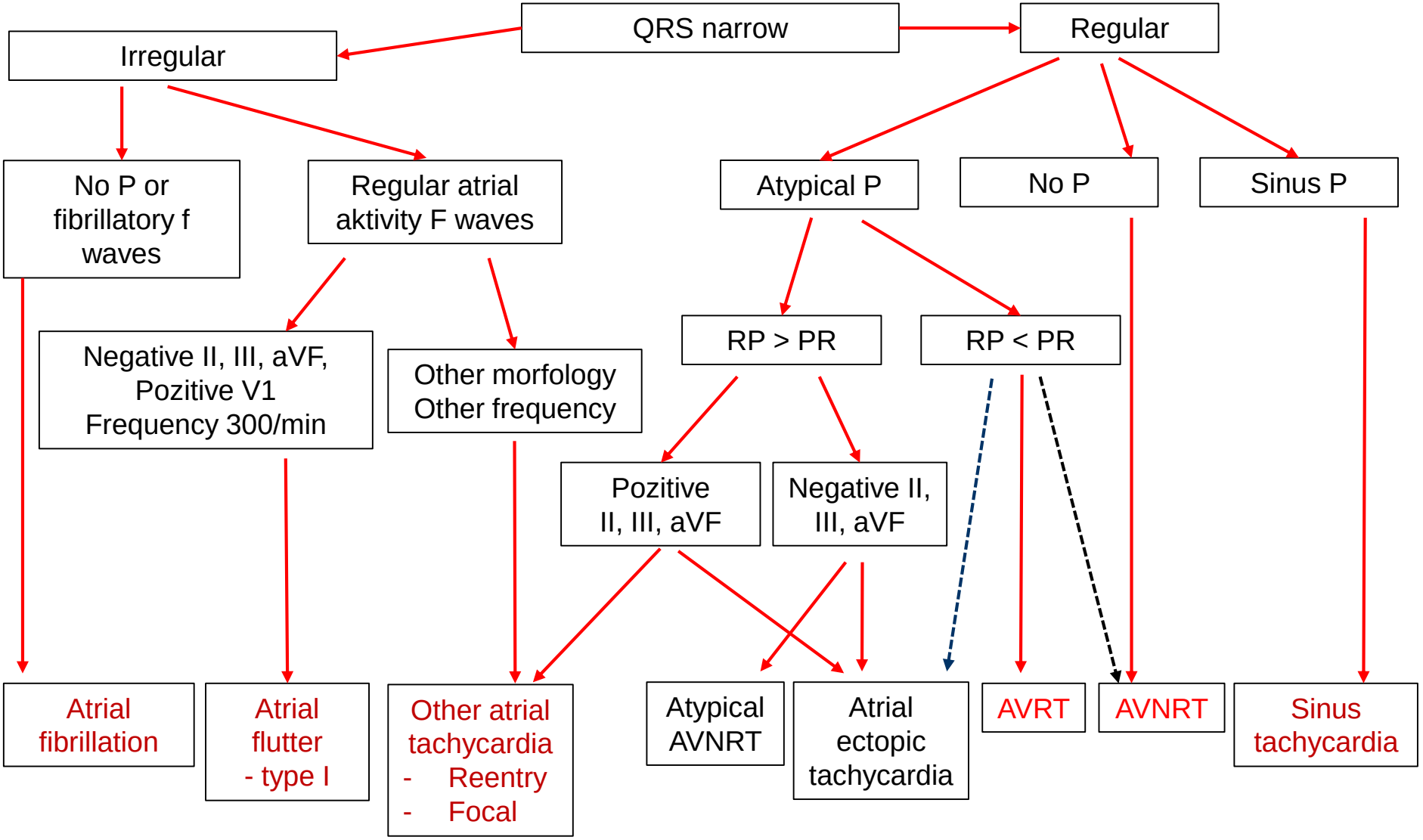
Narrow QRS – supraventricular

Wide QRS – VENTRICULAR (majority)
or supraventricular (rare)




*Reference: General University Hospital*

# Narrow complex tachycardia



# Management of arrhythmias

1) **Diagnosis (Which arrhythmia?)**
   - ECG, ECG monitoring
   - Personal and family history
   - EP study
2) **Underline condition (Why this patient?)**
   - Personal and family history (any cardiac disease)
   - Physical examination (murrmur, oedema, lung congestion…)
   - ECG
   - Cardiac imaging (ECHO, MRI, CT)
   - Stress testing, coronary angiography
3) **Symptoms (What does it mean for patient?)**
   - Palpitations, dizziness, syncopy, dyspnoea, chest pain, heart failure symptoms
4) **Risk stratification (What does it mean for patient?)**
   - Personal and family history / ECG / Cardiac imaging
   - Stress testing / coronary angiography

# Classiffication

| AF type | Clinical presentation |
|---|---|
| AF secondary to structural heart disease | AF in patients with LV systolic or diastolic dysfunction, long-standing hypertension with LVH, and/or other structural heart disease. The onset of AF in these patients is a common cause of hospitalization and a predictor of poor outcome. |
| Focal AF | Patients with repetitive atrial runs and frequent, short episodes of paroxysmal atrial fibrillation. Often highly symptomatic, younger patients with distinguishable atrial waves (coarse AF), atrial ectopy, and/or atrial tachycardia deteriorating in AF. |
| Polygenic AF | AF in carriers of common gene variants that have been associated with early onset AF. |

*ESC guidelines 2016*

# Classiffication

| AF type | Clinical presentation |
|---|---|
| Postoperative AF | New onset of AF (usually self-terminating) after major (typically cardiac) surgery in patients who were in sinus rhythm before surgery and had no prior history of AF. |
| AF in patients with mitral stenosis or prosthetic heart valves | AF in patients with mitral stenosis, after mitral valve surgery and in some cases other valvular disease. |
| AF in athletes | Usually paroxysmal, related to duration and intensity of training. |
| Monogenic AF | AF in patients with inherited cardiomyopathies, including channelopathies. |

*ESC guidelines 2016*

# Classiffication

| AF pattern | Definition |
|---|---|
| First diagnosed AF | AF that has not been diagnosed before, irrespective of the duration of the arrhythmia or the presence and severity of AF-related symptoms. |
| Paroxysmal AF | Self-terminating, in most cases within 48 hours. Some AF paroxysms may continue for up to 7 days.[a] AF episodes that are cardioverted within 7 days should be considered paroxysmal.[a] |
| Persistent AF | AF that lasts longer than 7 days, including episodes that are terminated by cardioversion, either with drugs or by direct current cardioversion, after 7 days or more. |

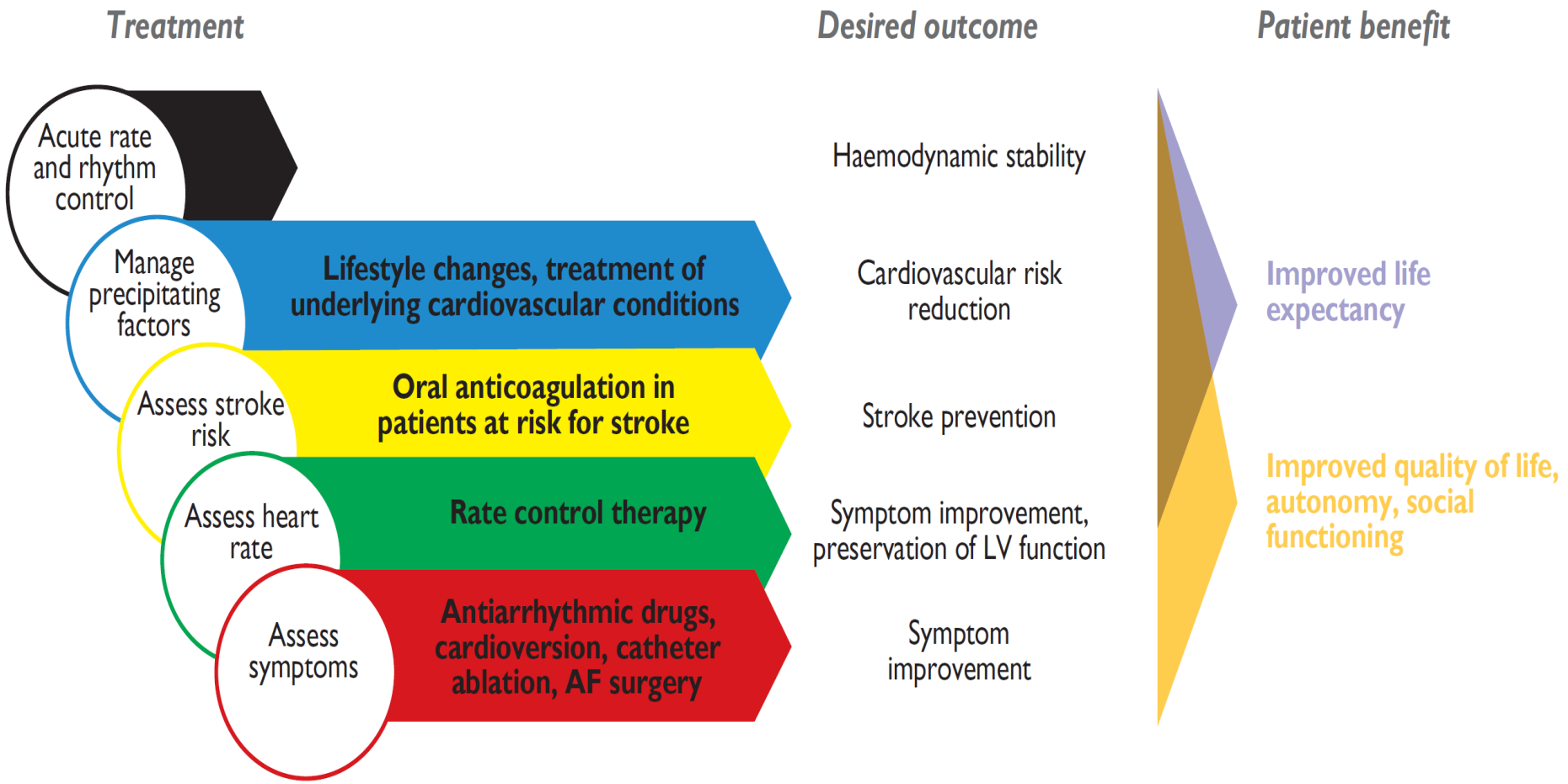
*ESC guidelines 2016*

# Classiffication

| AF pattern | Definition |
|---|---|
| Long-standing persistent AF | Continuous AF lasting for ≥1 year when it is decided to adopt a rhythm control strategy. |
| Permanent AF | AF that is accepted by the patient (and physician). Hence, rhythm control interventions are, by definition, not pursued in patients with permanent AF. Should a rhythm control strategy be adopted, the arrhythmia would be re-classified as 'long-standing persistent AF'. |

*ESC guidelines 2016*

# Management of atrial fibrillation




*ESC guidelines 2016*

# Antitrombotic treatment

**Anticoagulation**

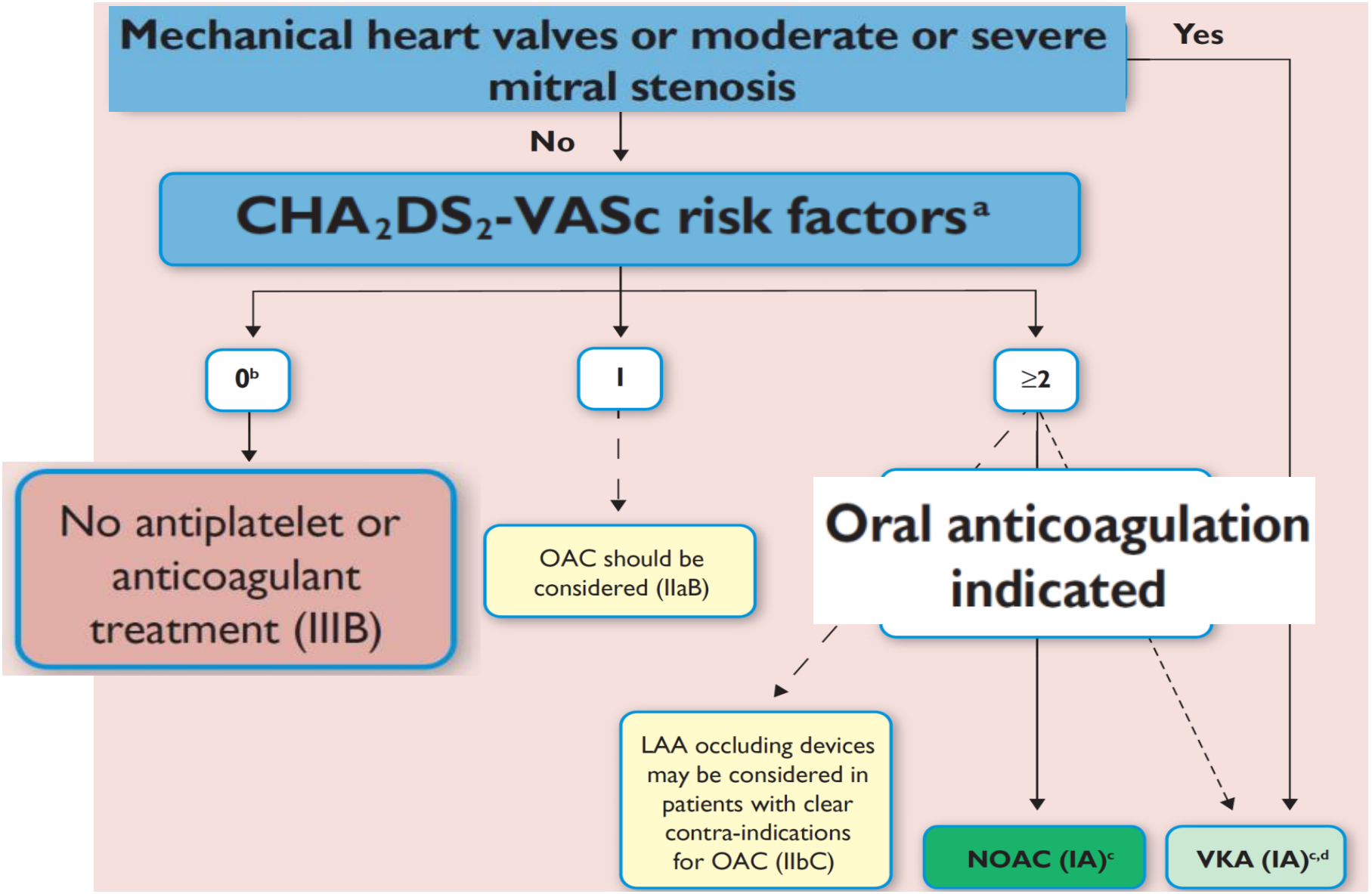
Warfarin - INR 2-3.0
Dabigatran 110/150mg 2 x d
Rivaroxaban 15/20mg 1 x d
Apixaban 2.5/5mg 2 x d

**None**

# $CHA_2DS_2VASc$ score

| Risk factor | Score |
|---|---|
| Congestive heart failure/LV dysfunction | 1 |
| Hypertension | 1 |
| Age ≥75 | 2 |
| Diabetes mellitus | 1 |
| Stroke/TIA/thrombo-embolism | 2 |
| Vascular disease[a] | 1 |
| Age 65–74 | 1 |
| Sex category (i.e. female sex) | 1 |
| **Maximum score** | **9** |

*ESC guidelines 2016*




*ESC guidelines 2016*

# Rate control & Symptom management

**Rhythm control:**

1) Ic – propafenone, flecainide

2) Amiodaron, sotahexal

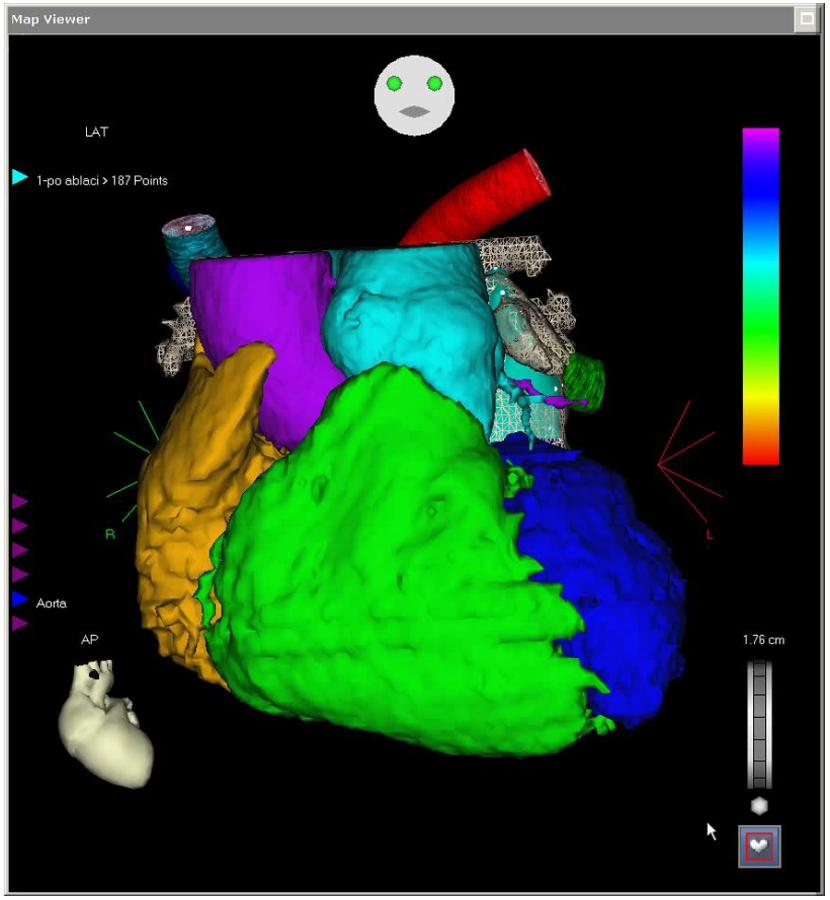
**Rate control:**

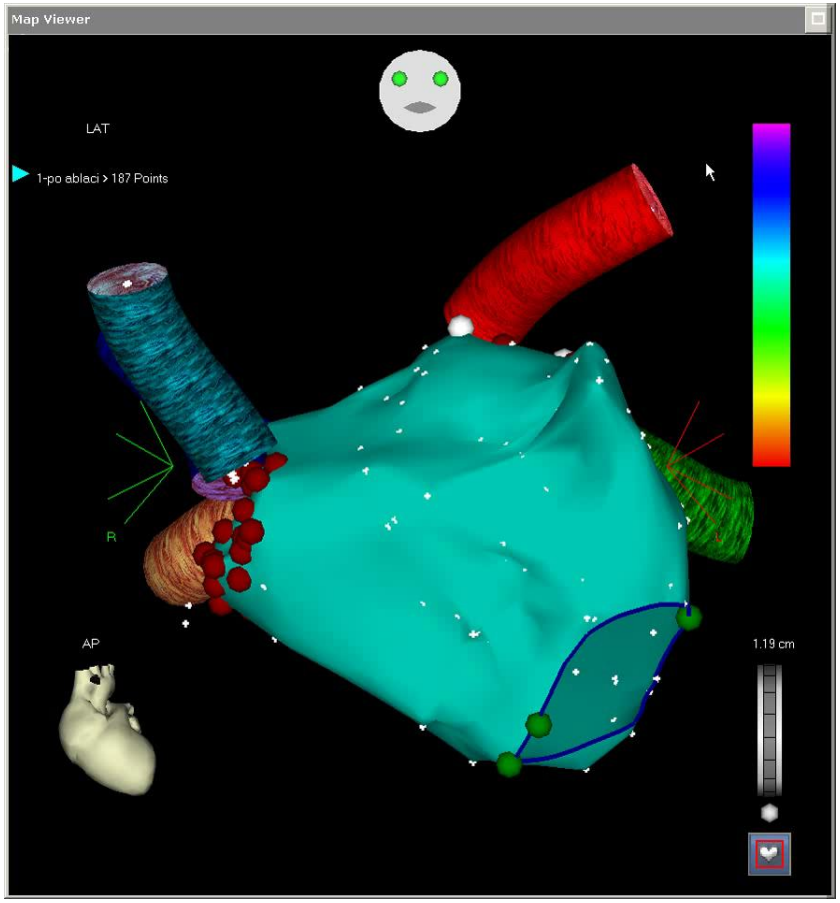
1) β blockers (metoprolol, bisoprolol, betaxolol)

2) Non-dihydropyridinové Ca block (verapamil, diltiazem)

3) Digoxin

# Catheter ablation AFIB

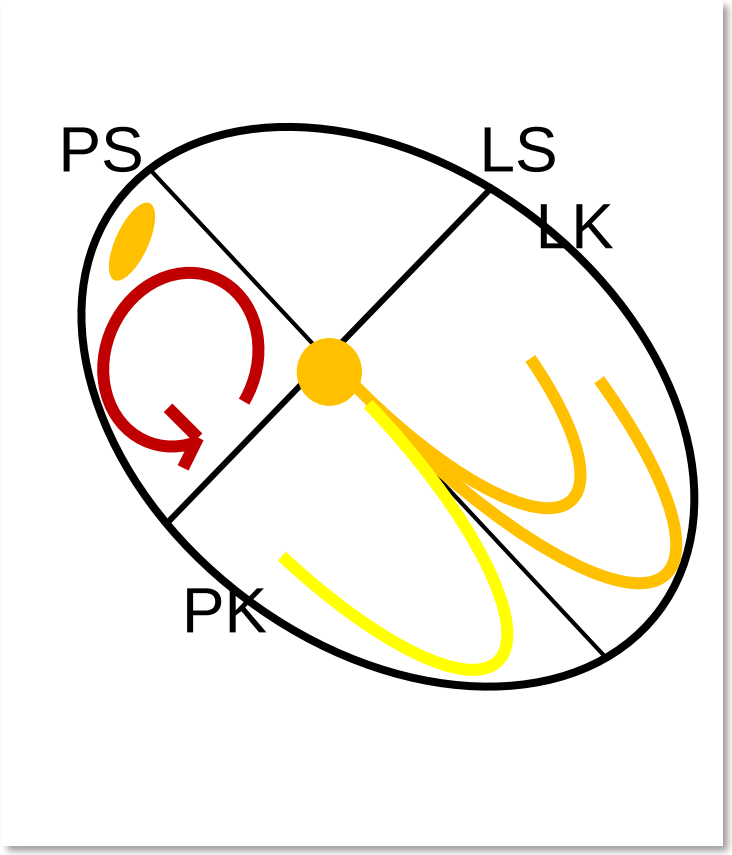


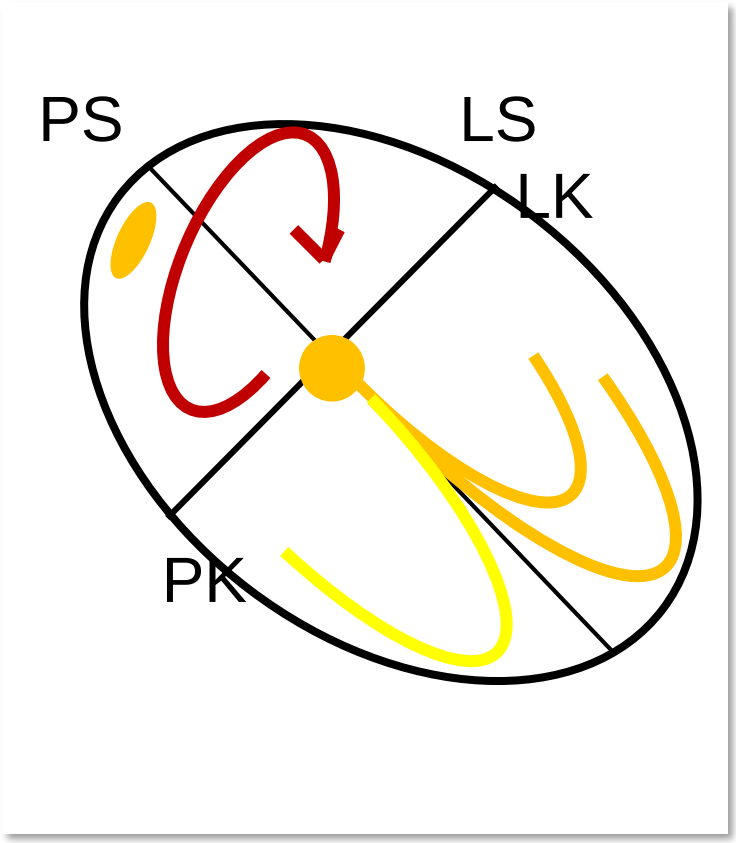

*Reference: General University Hospital*

# Atrial flutter – similar arrhythmia

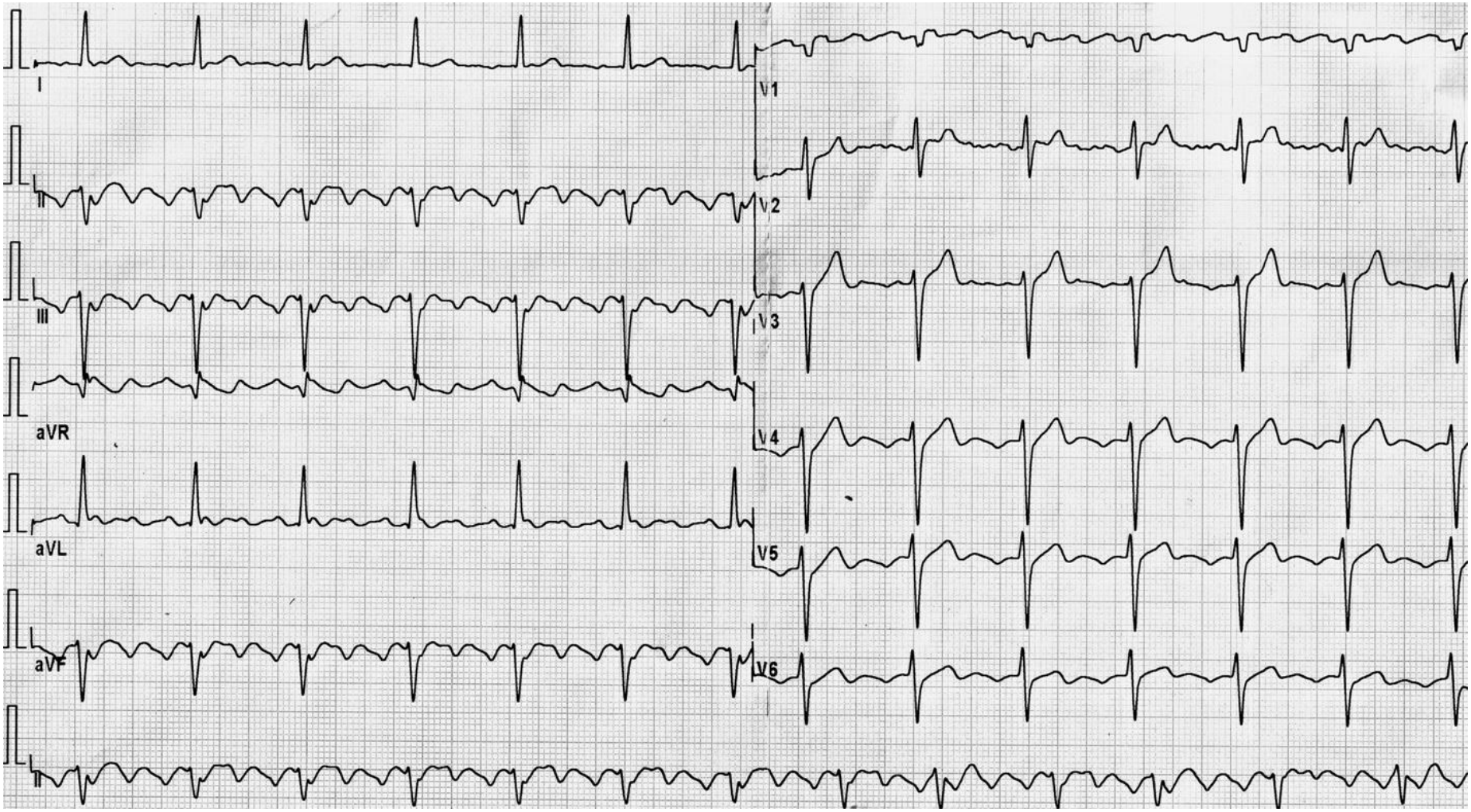
**Type I –** cavo-tricuspidal istmus dependency. Right atrium.




**Type II –** the others atrial macroreentrant arrhythmias

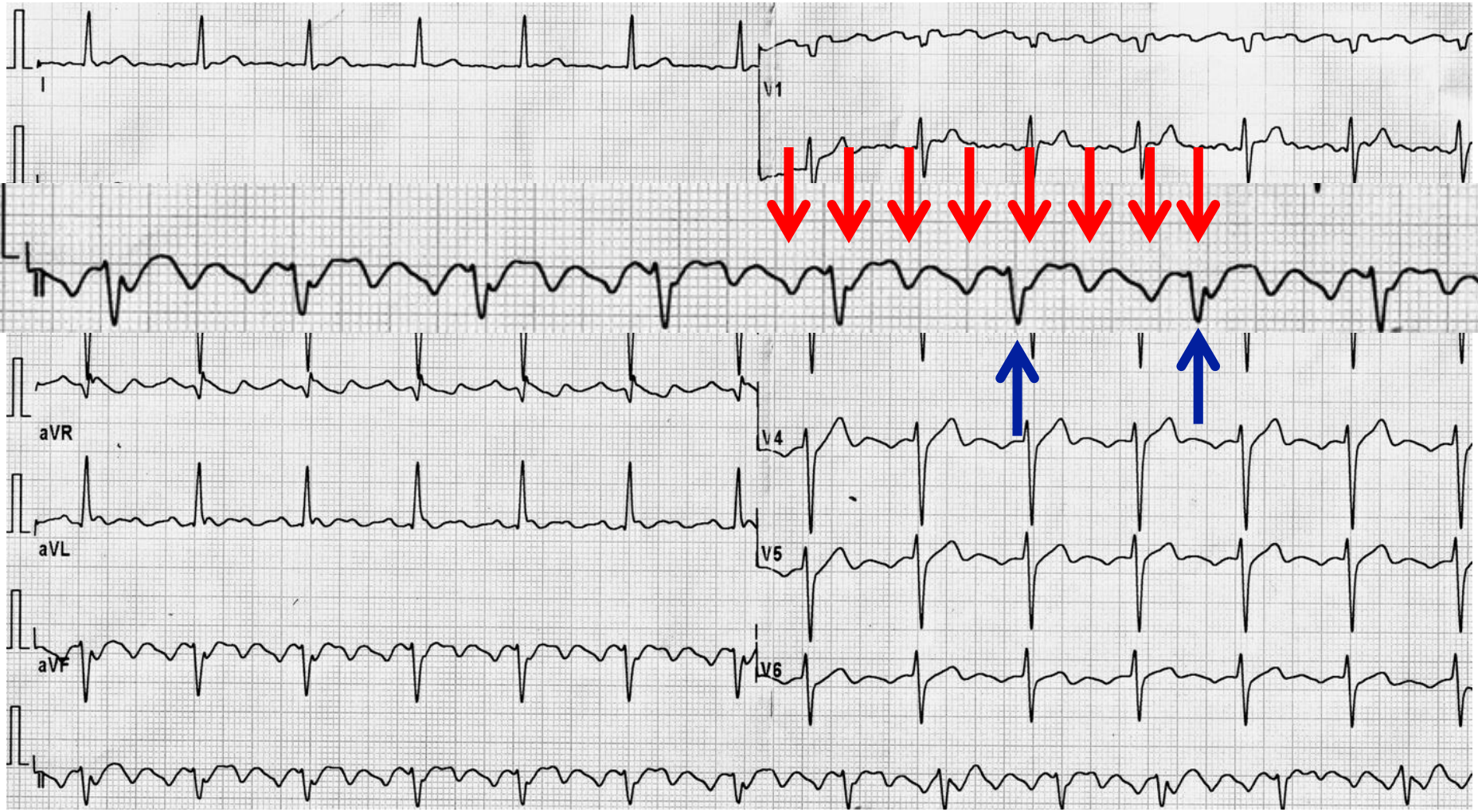


# ECG



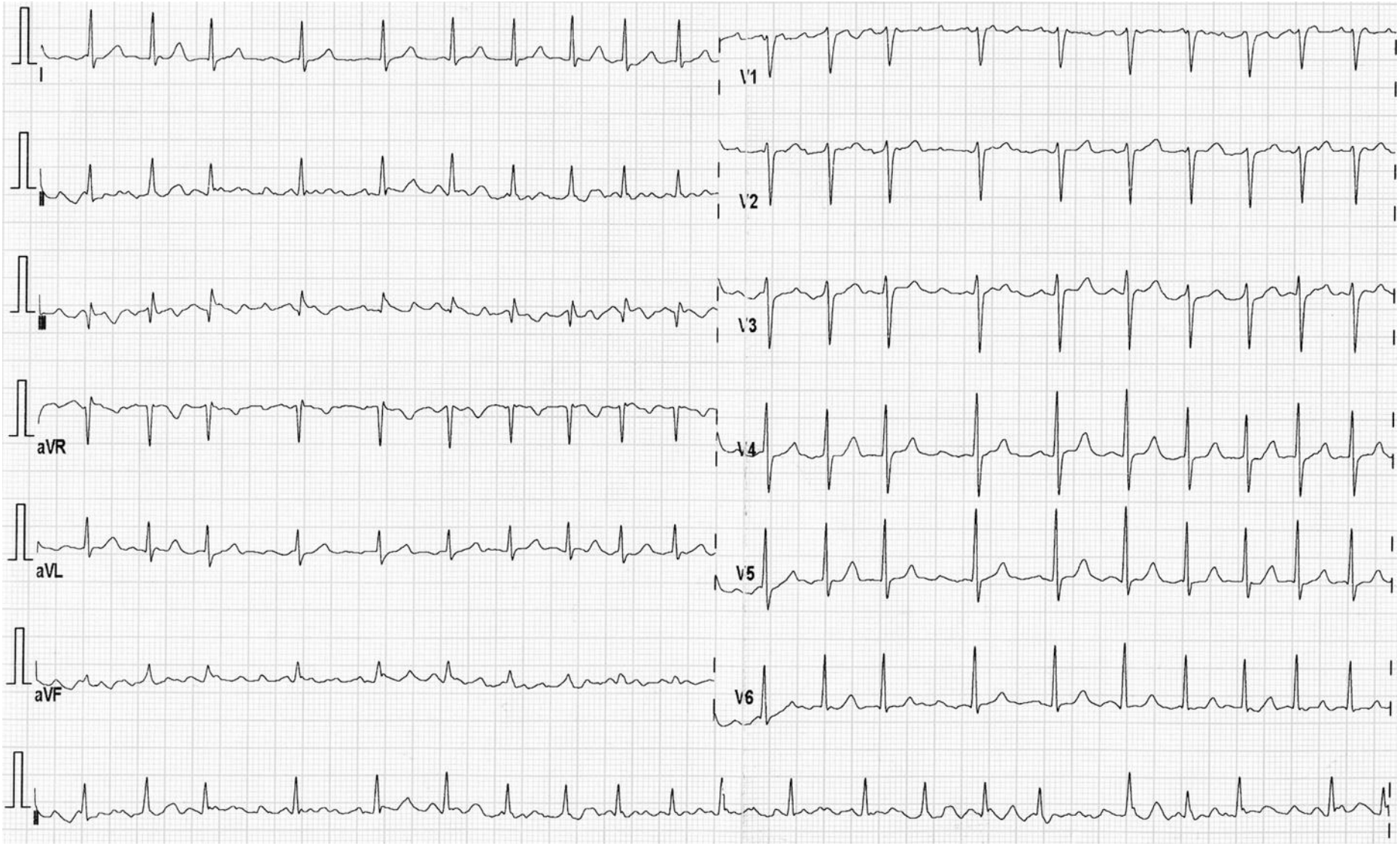

*Reference: General University Hospital*

# ECG



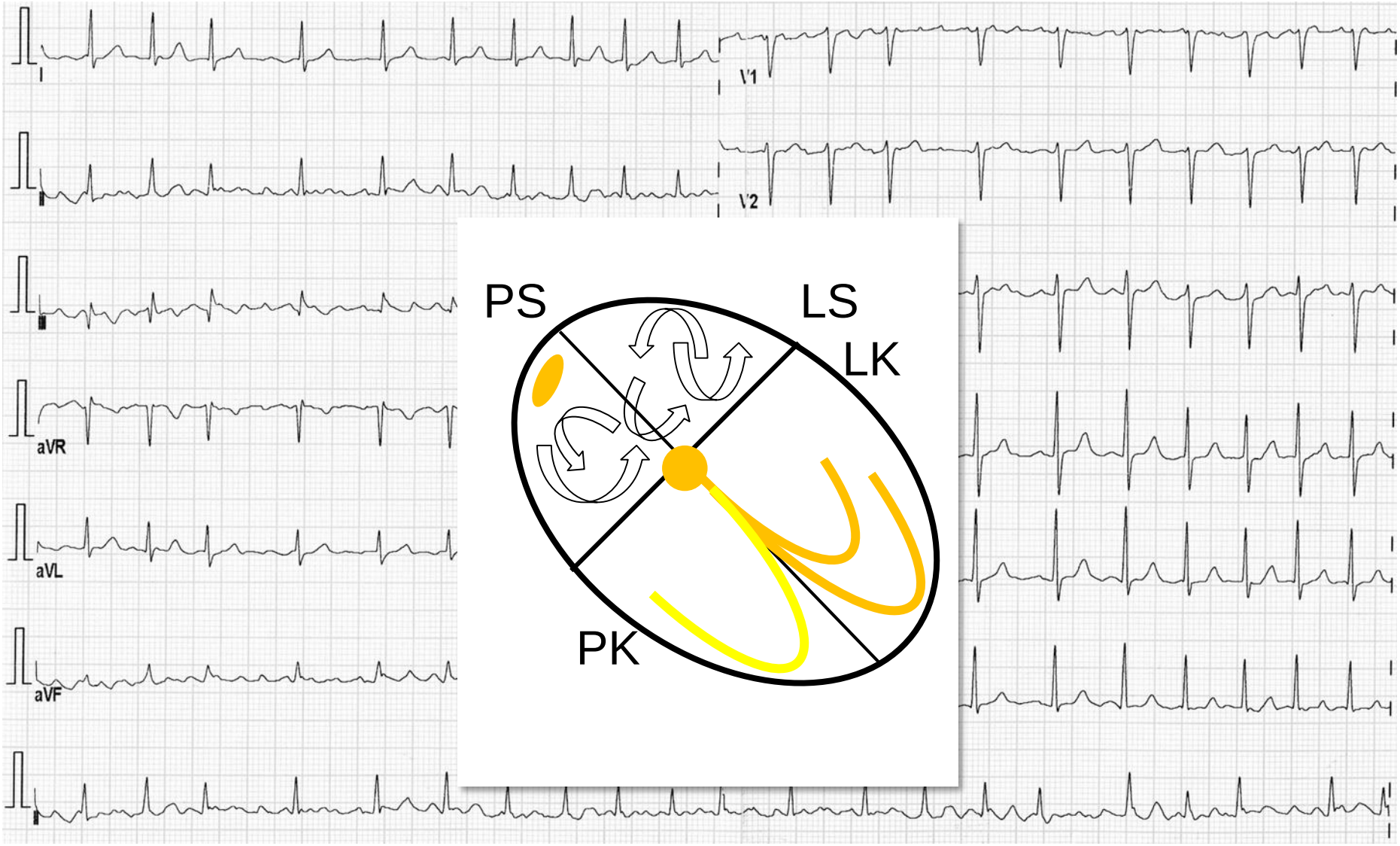

*Reference: General University Hospital*

# ECG

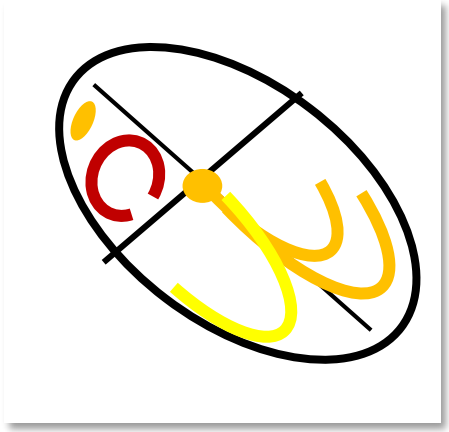


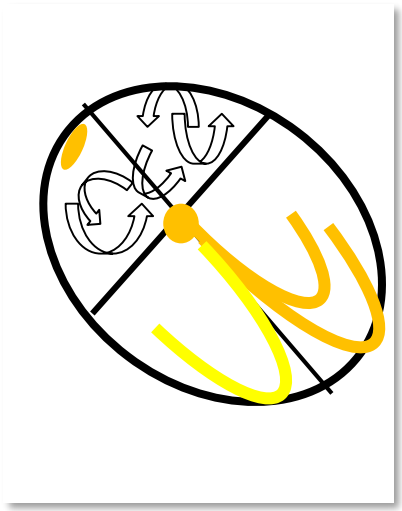

*Reference: General University Hospital*

# ECG




*Reference: General University Hospital*





*Reference: General University Hospital*

# Management of atrial flutter

**Management of atrial flutter is similar to atrial fibrillation**

- Acute treatment in prevention of heart failure
- Treatment of underline cardiovascular diseases
- Antithrombotic treatment
- Rate control
- Control of symptoms

**Type I atrial flutter**

- Catheter ablation is first choice treatment

# Case 2

**Young nurse. 25 years.**

**History:** 0.

**Symptoms:**

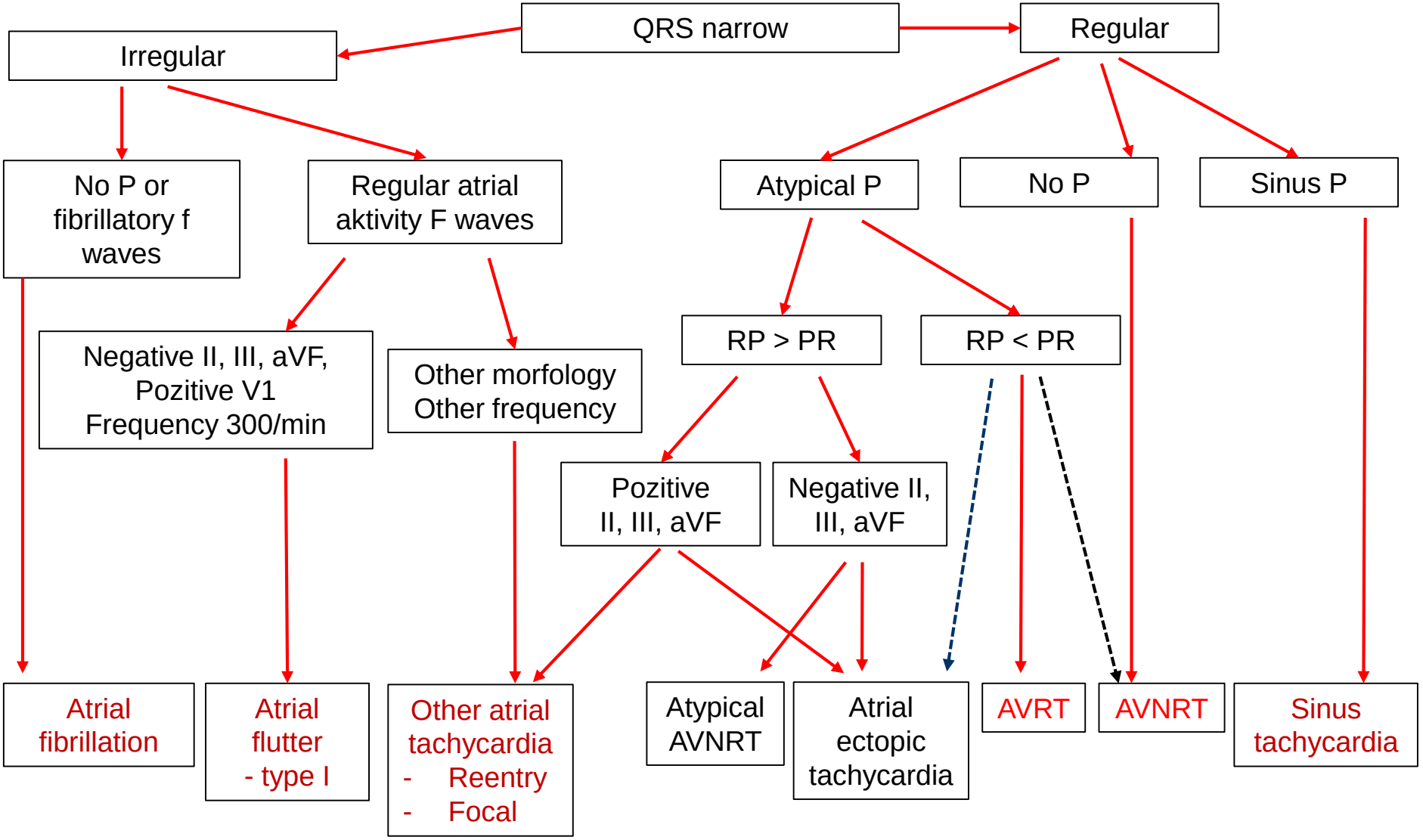
→ Palpitations, sudden onset and termination.
Very fast, regular.

→ She has had a symptoms for 30min.

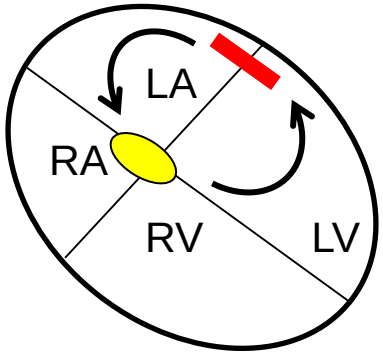
# ECG

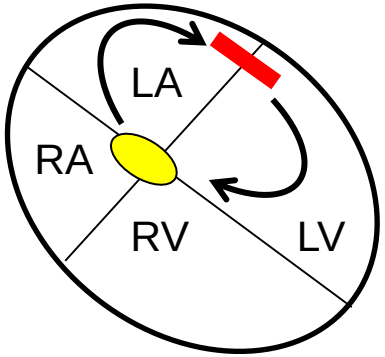

*Reference: General University Hospital*

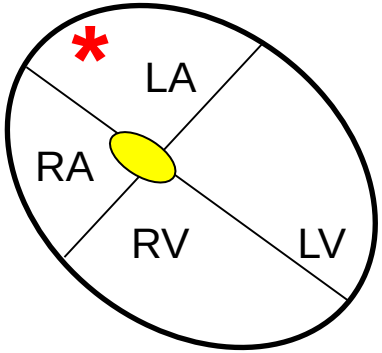
# Narrow complex tachycardia

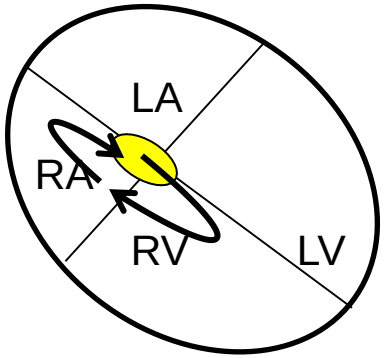


# Supraventricular tachycardias

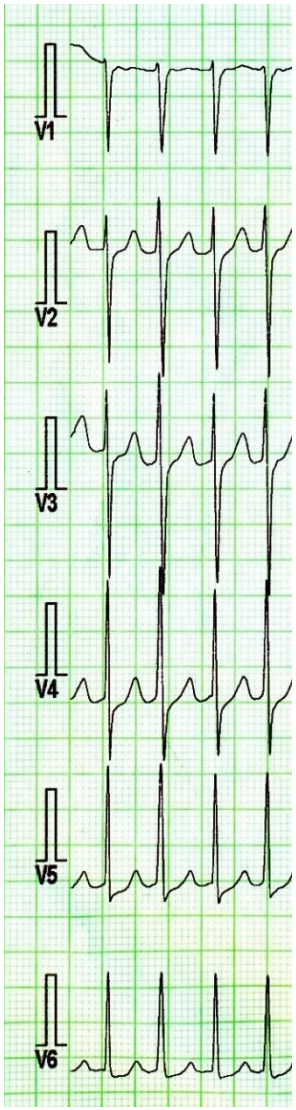


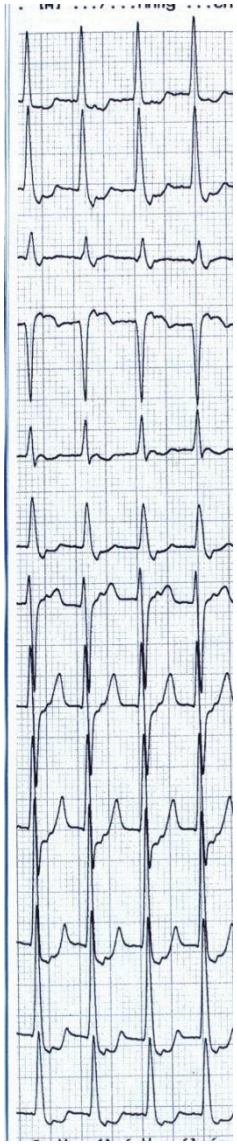



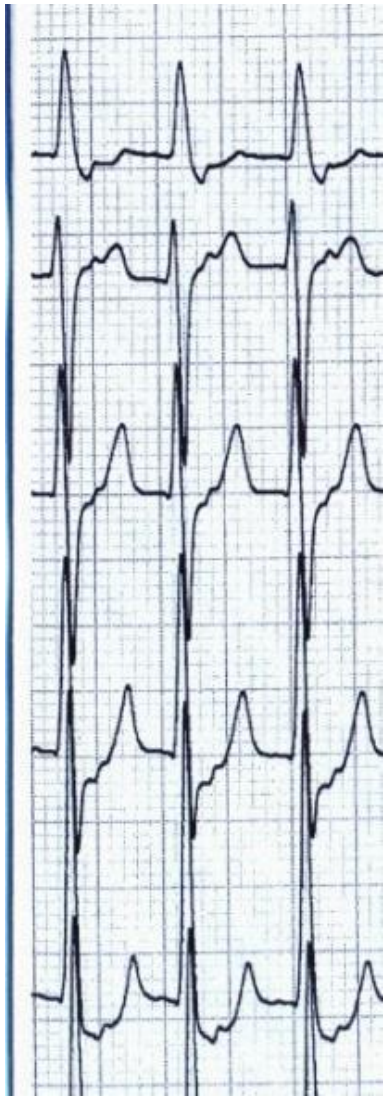



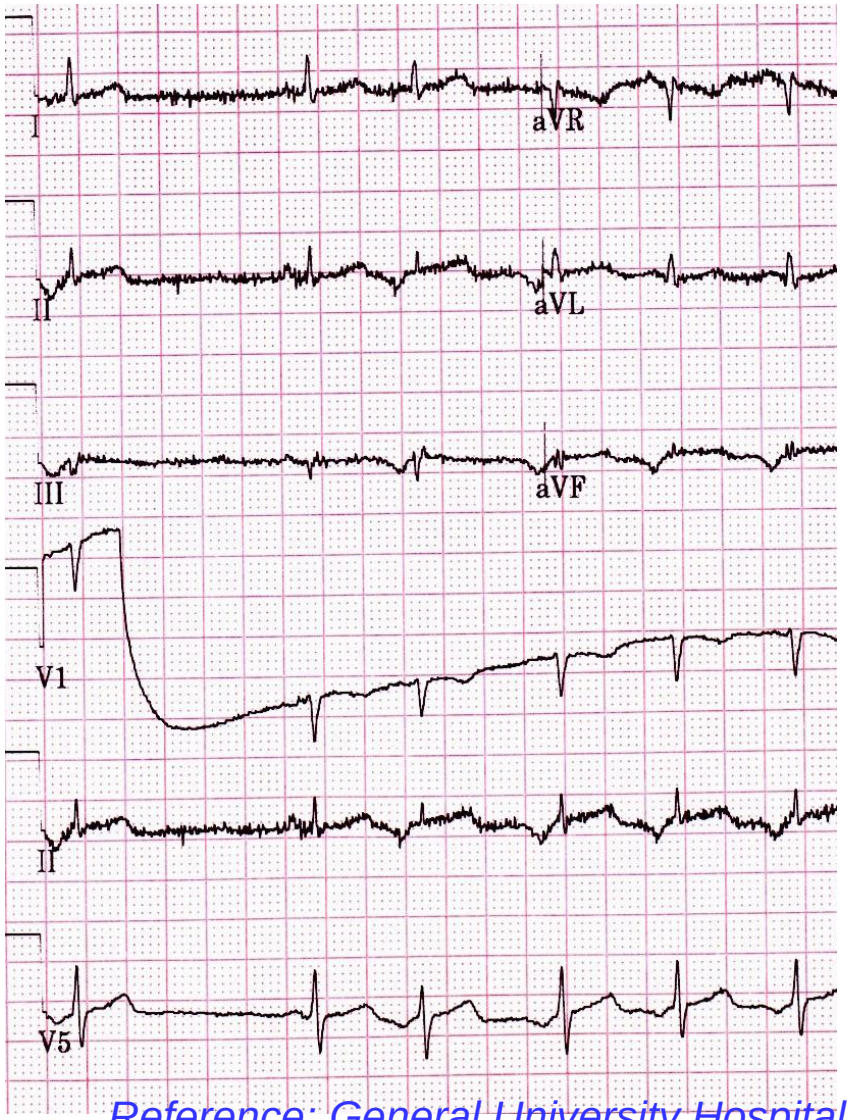



# Dif. dg. of regular narrow complex tachycardia








*Reference: General University Hospital*

# Therapy

**Acute:**

→ Vagal maneuvers.

→ Adenosin 6-18 mg iv.

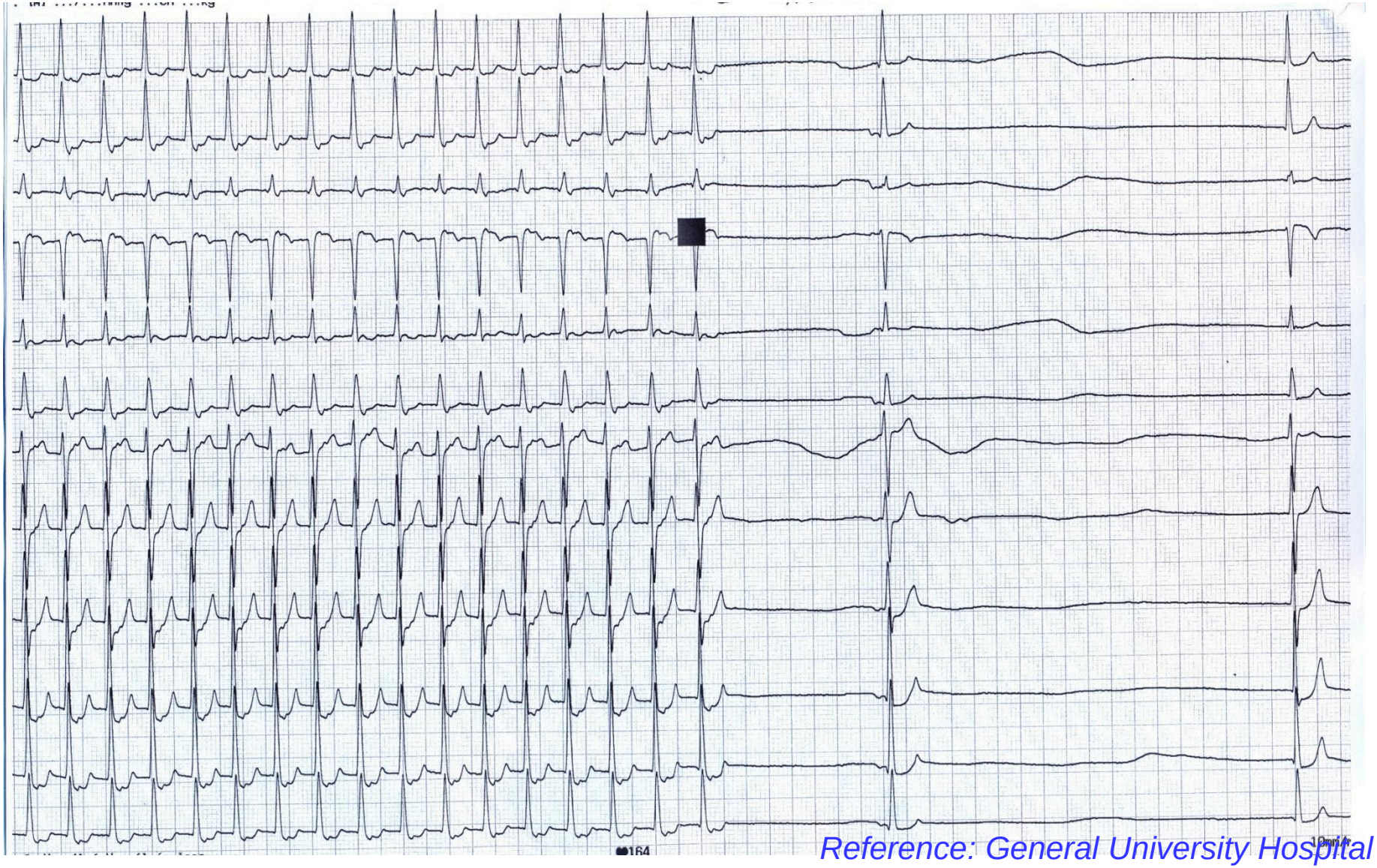
**Definitive treatment:**

**Catheter ablation**

→ Beta blockers

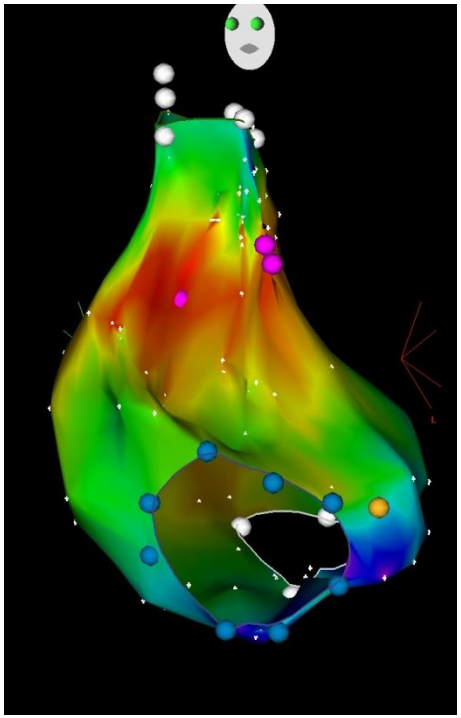
→ Verapamil

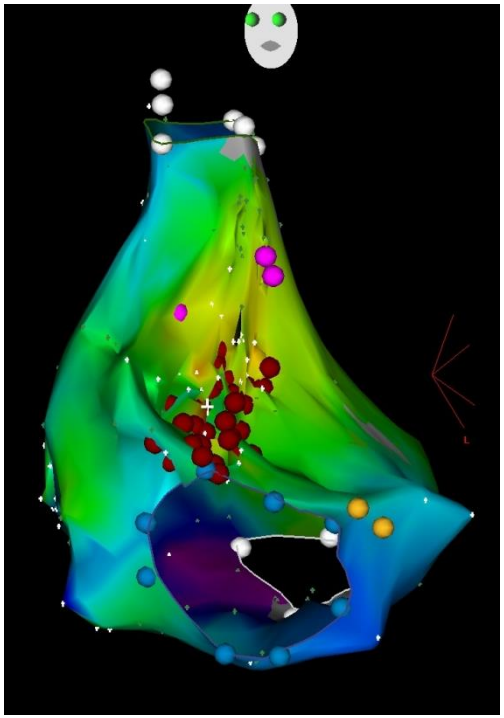
# Adenosin

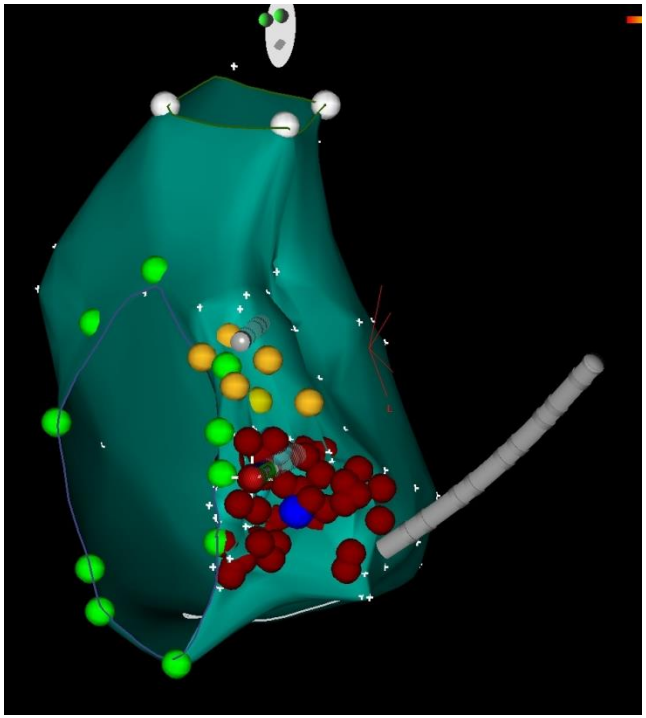


*Reference: General University Hospital*

# Catheter ablation







*Reference: General University Hospital*

# Case 3

**60year old male.**

**History of MI 20 years ago.**

- Arterial hypertension
- Smoker
- Dysplipidemia

At this moment, he is reffering chest pain. Onset of pain was 30min ago.


*Reference: General University Hospital*

# Ventricular tachycardia

Organised ventricular activity > 3 beats > 100 bpm.

ECG: wide compex (QRS > 120 ms).

**Classification:**

**ECG:** Monomorphic, polymorphic

**Hemodynamic impact:** Sustained: > 30 s or cardiac arrest
Nonsustained: < 30 s

# Ventricular tachycardia

**!!!!!!!!!!  Clinical and prognostic view  !!!!!!!!:**

1. Idiopatic VT – no structural heart disease – **BENIGN**
2. VT with structural heart disease – **MALIGNANT**

→ **Idiopatic VT – treated when symptoms are present**

→ **Malignant – must be treated**

# VT with structural heart disease / malignant potential

Coronary artery disease – acute or chronic forms

Dilatative cardiomyopathy

Hypertrofic cardiomyopathy

Arhythmogenic right / left ventricle dysplasia

Postmyocarditic scarring

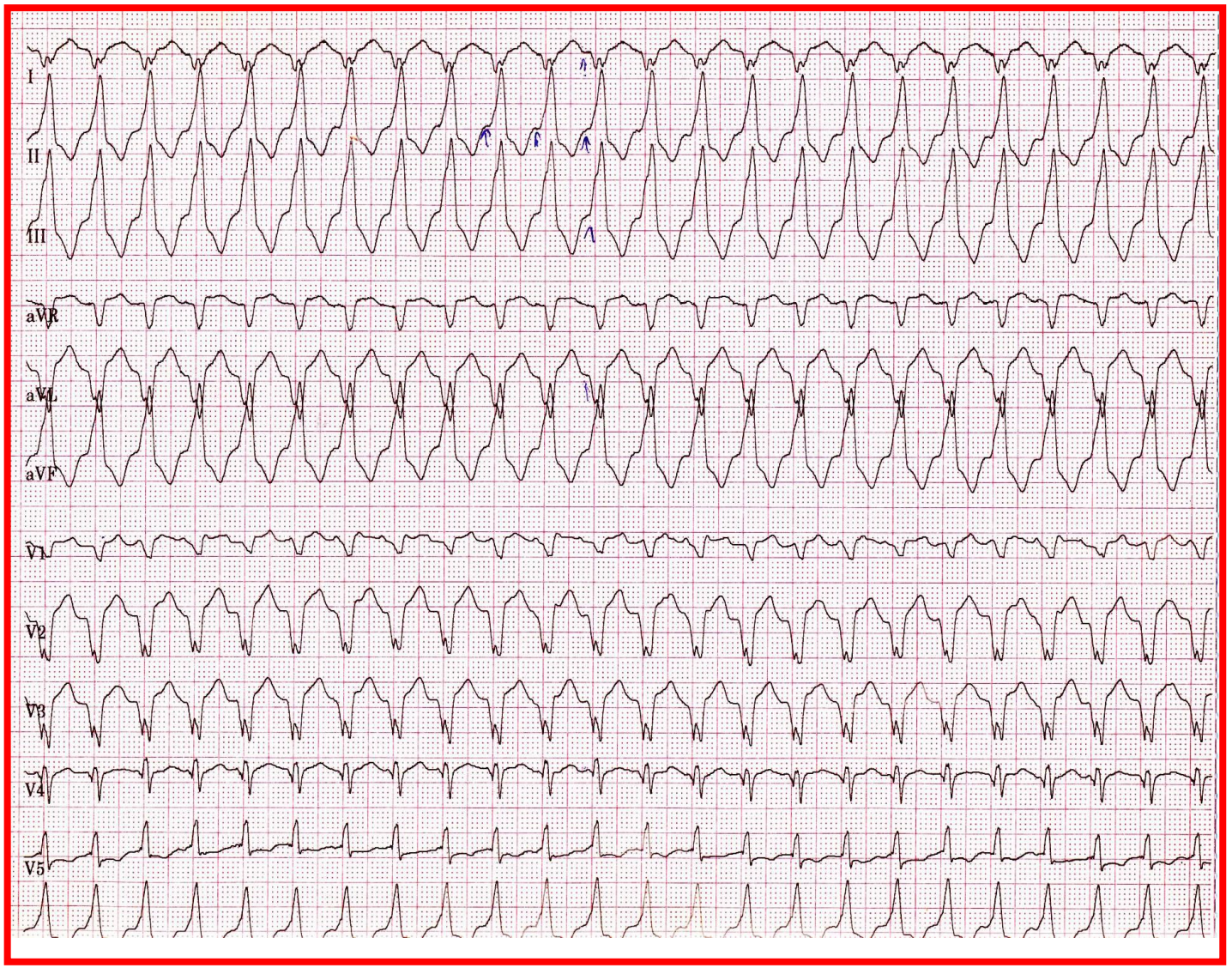
Long QT syndrome

Short QT syndrome

Brugada syndrome

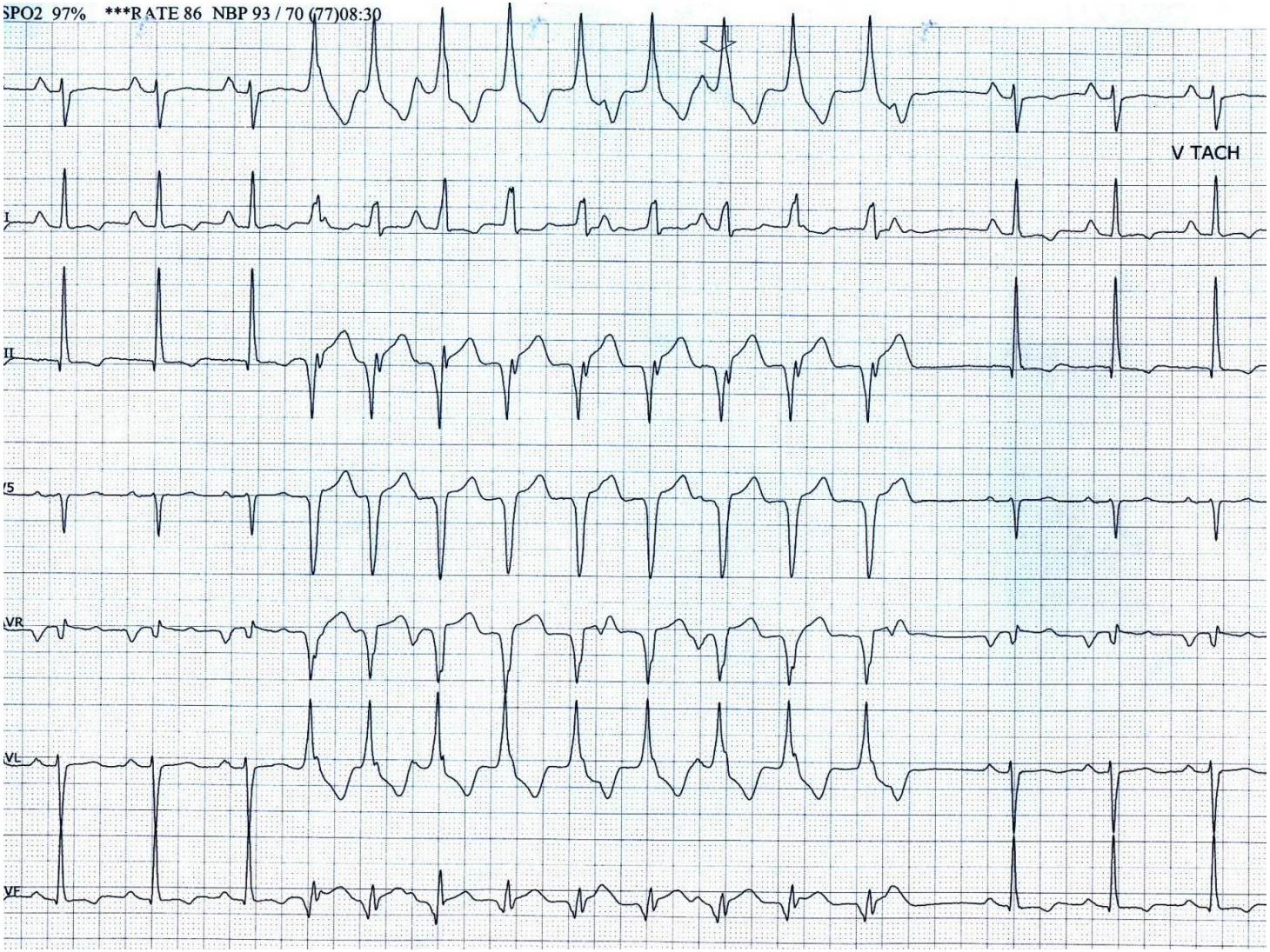
*Reference: General University Hospital*

# Monomorphic sustained VT



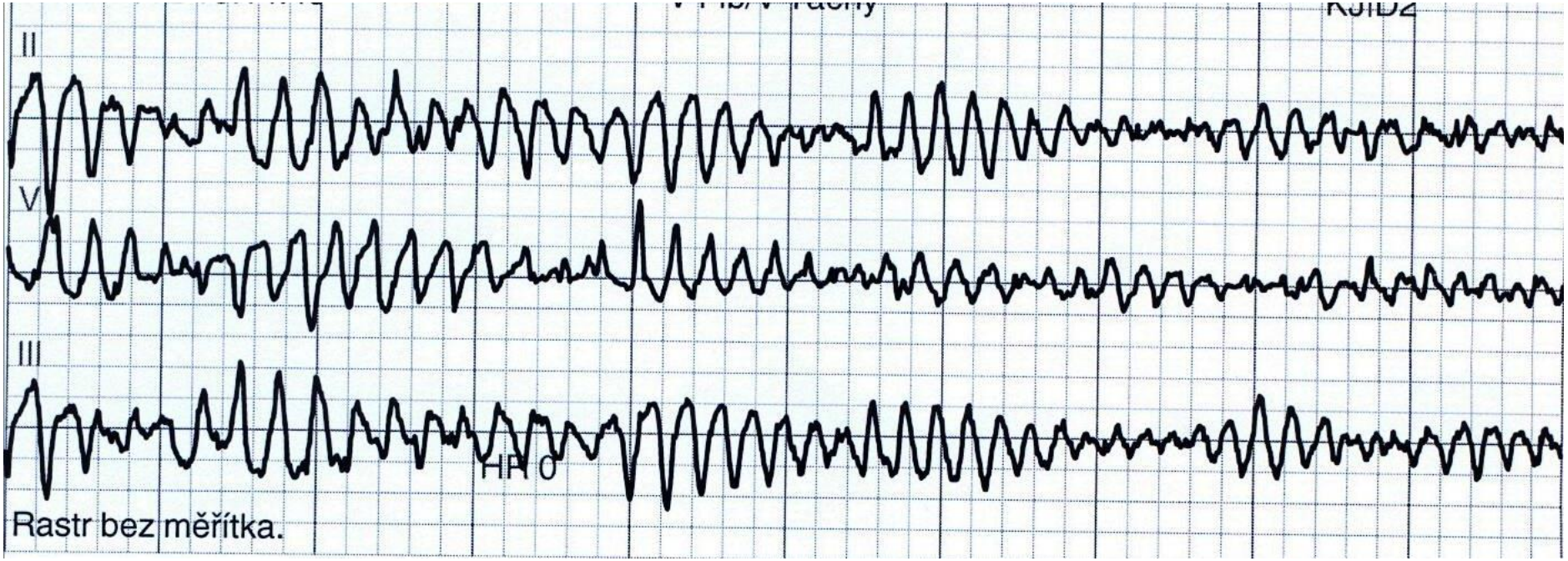

*Reference: General University Hospital*

# Monomorphic unsustained VT



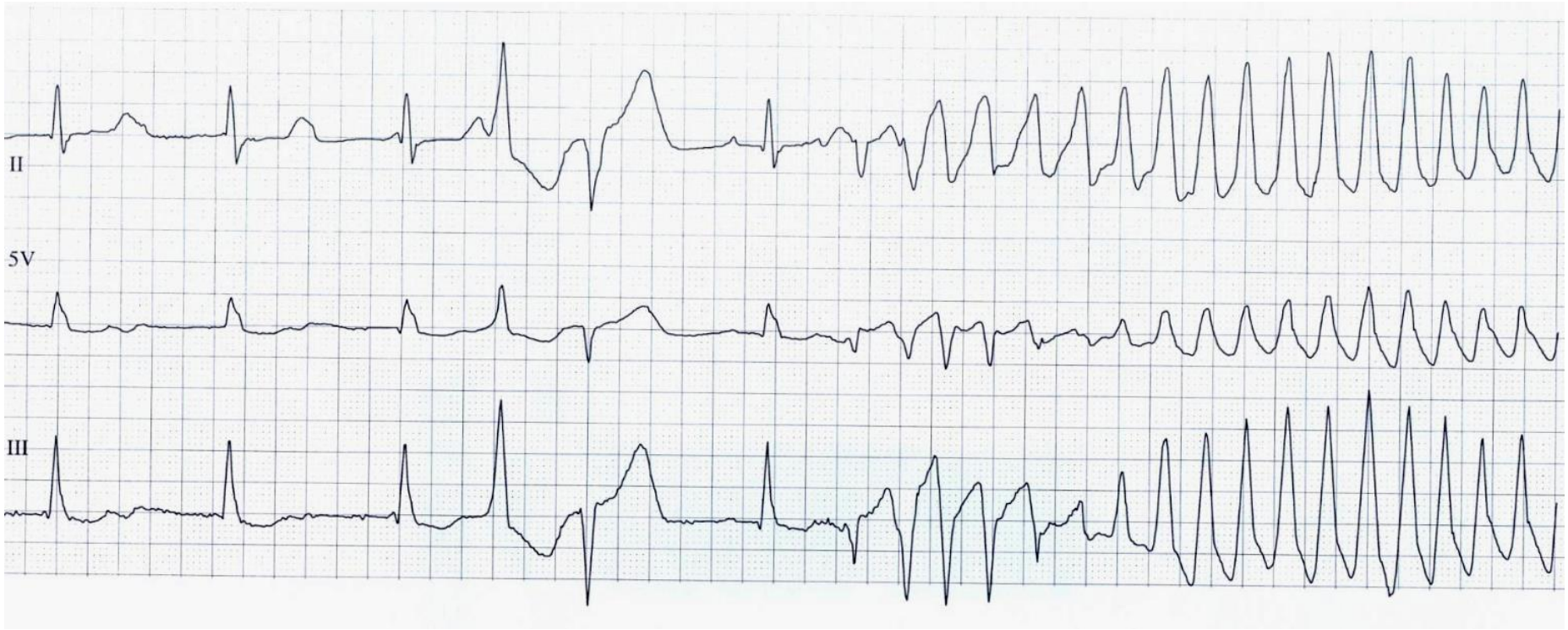

*Reference: General University Hospital*

# Polymorphic sustained VT



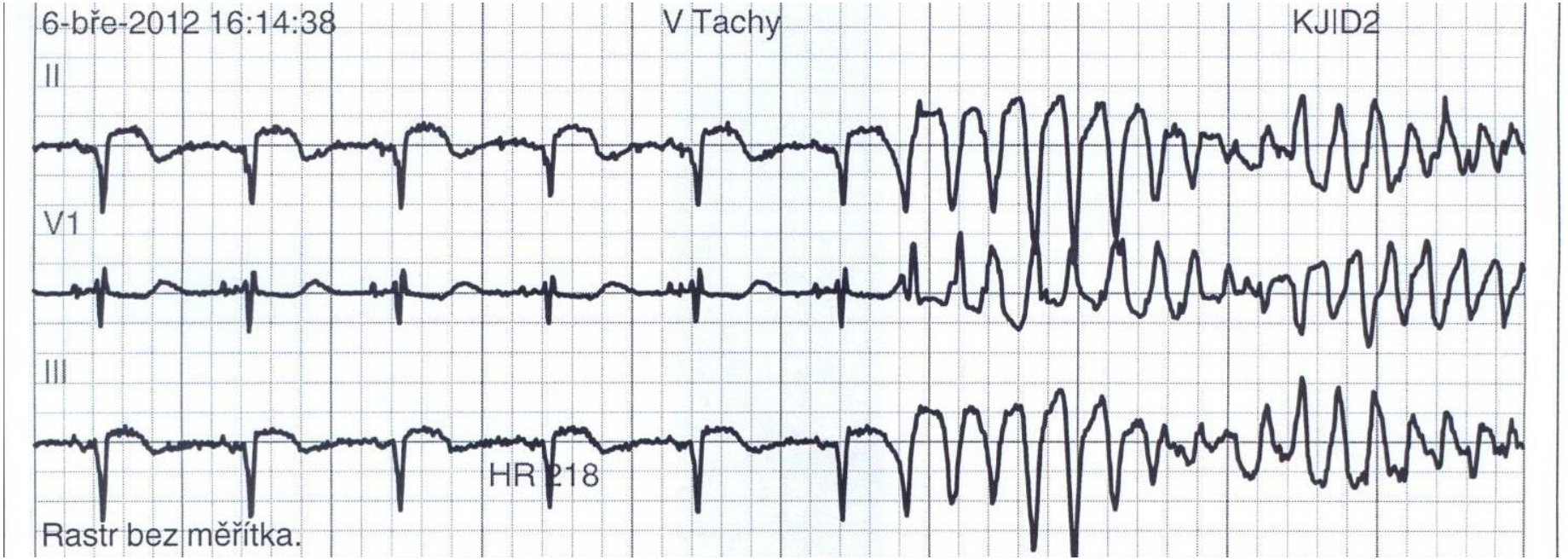

*Reference: General University Hospital*

# Polymorphic sustained VT



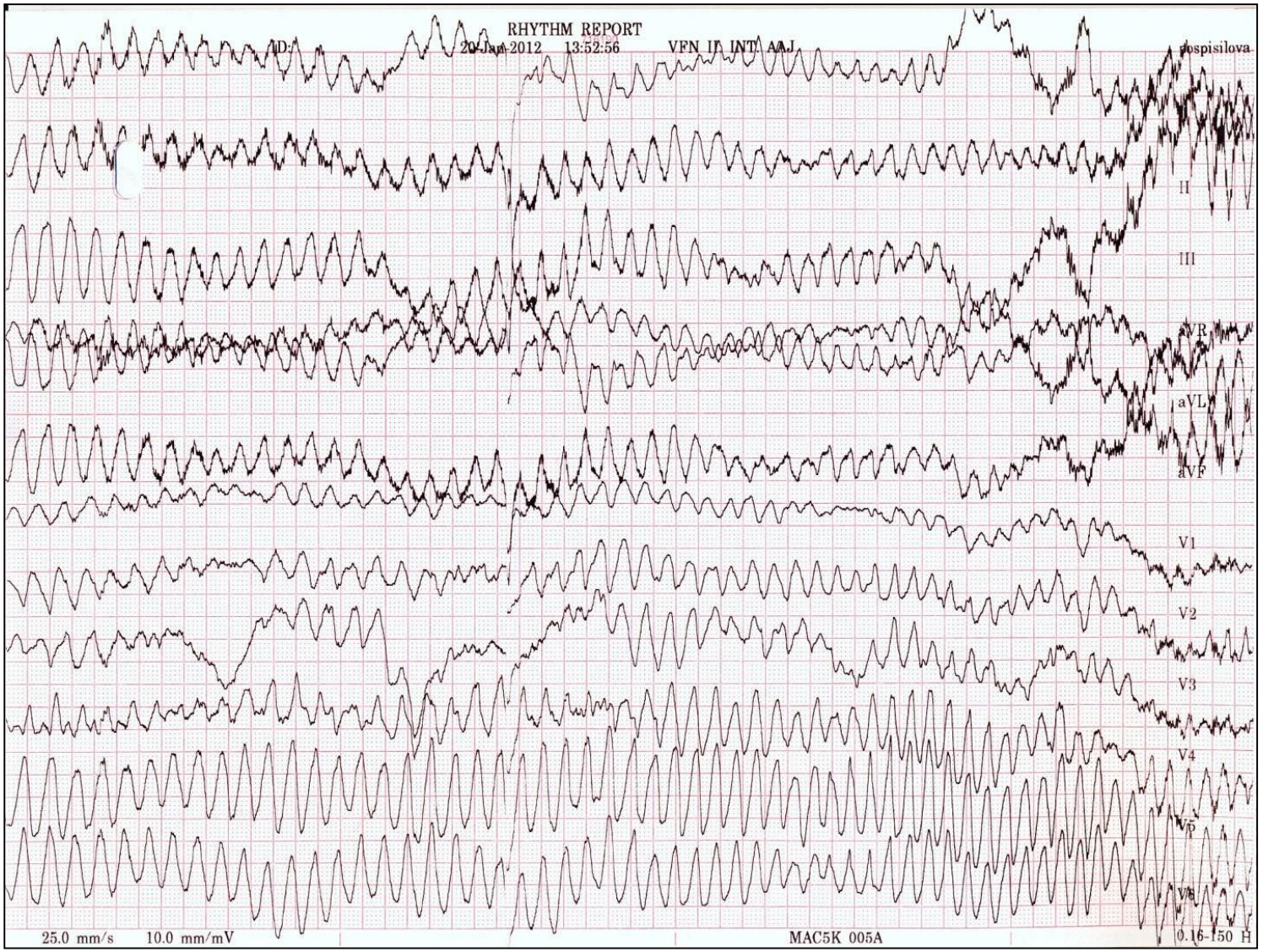

*Reference: General University Hospital*

# Polymorphic sustained VT



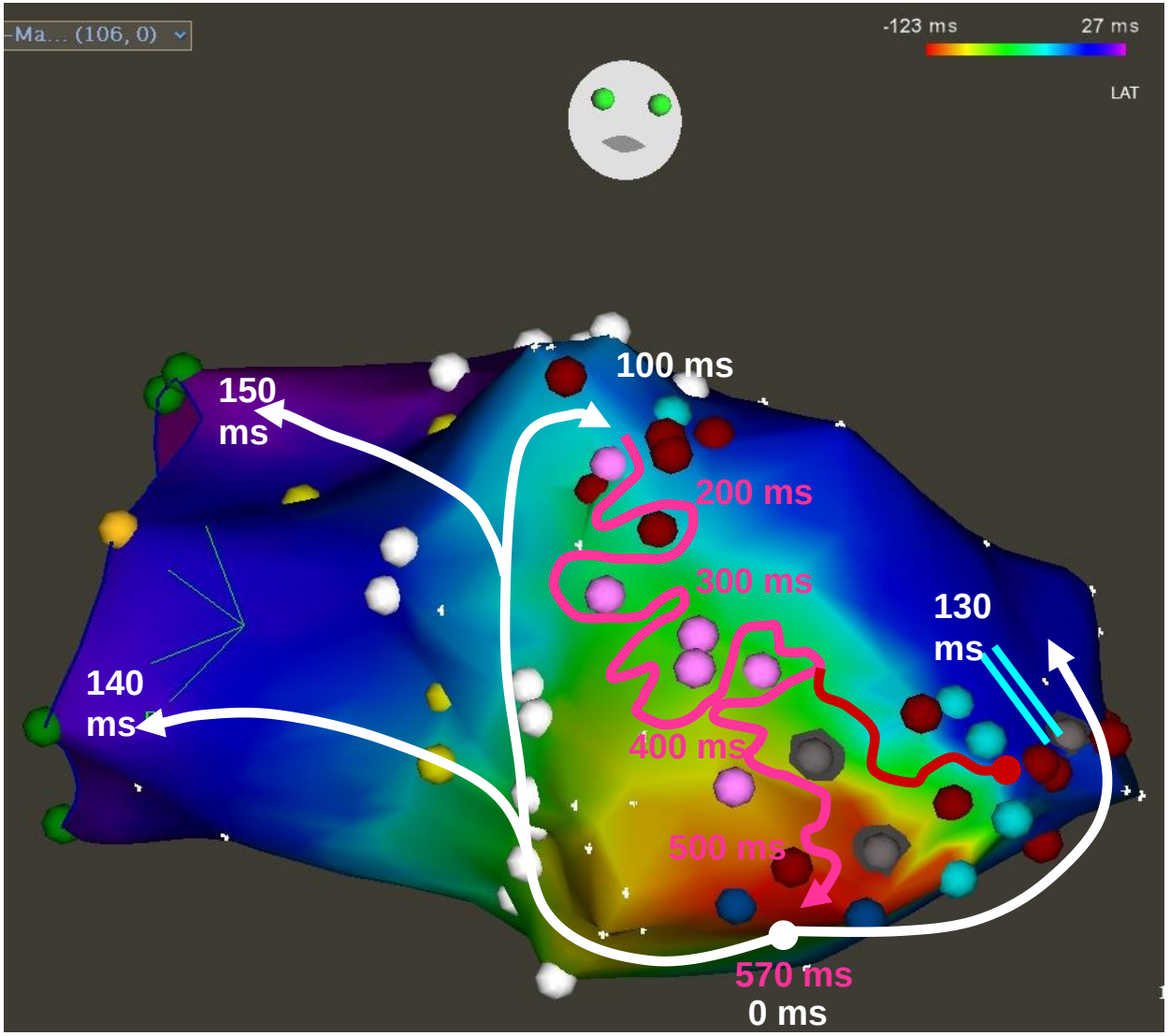

*Reference: General University Hospital*

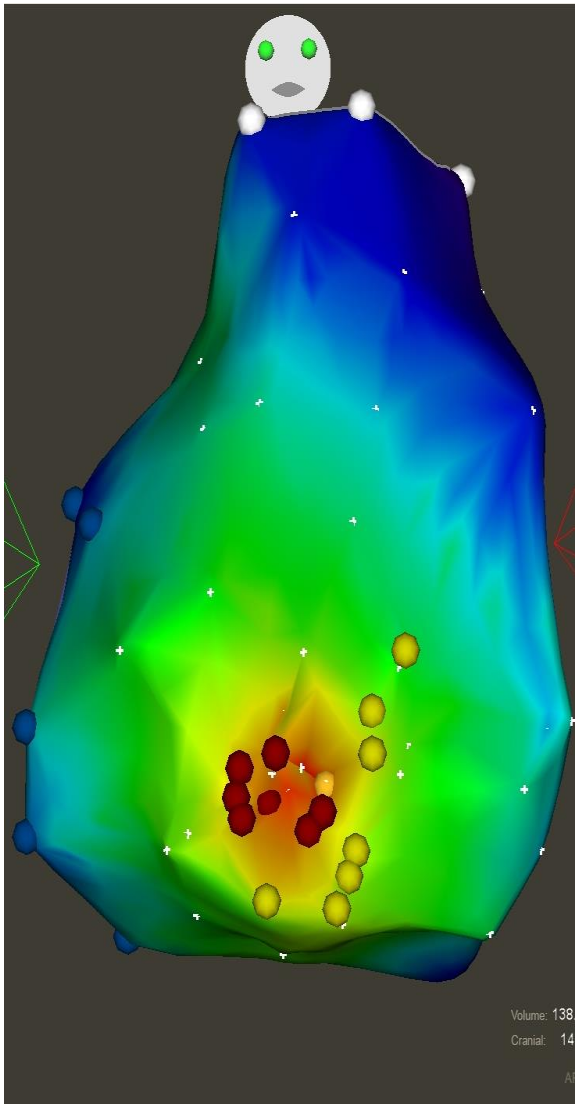
# Ventricular fibrillation




*Reference: General University Hospital*

# Mechanisms: reentry or focal



*Reference: General University Hospital*

# Clinical manifestation of all VT

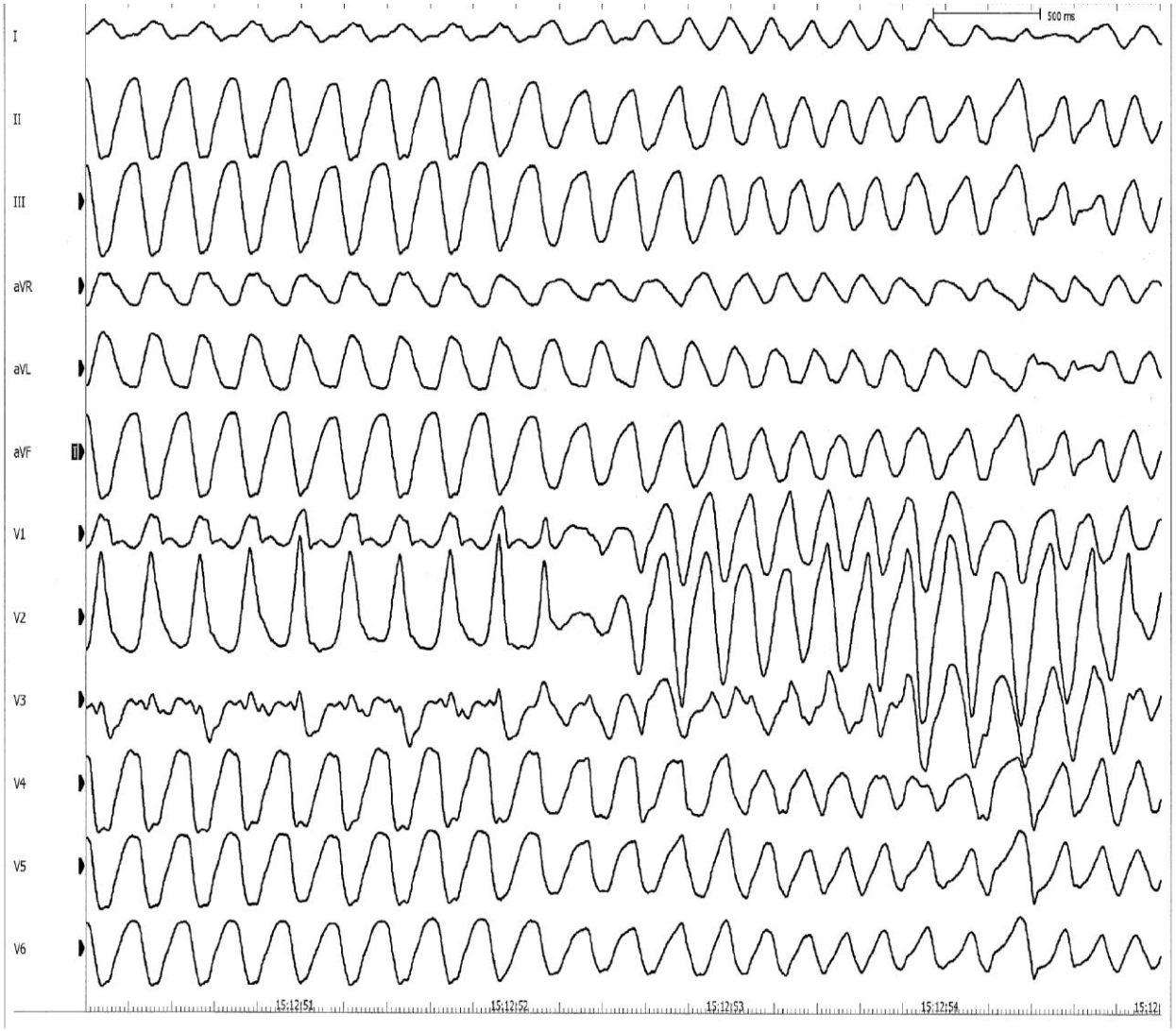
**Manifestation:**

Sudden cardiac death – **pulsless VT, progression to VF**
Syncope – non-sustained, self-terminating
Dyspnea, chest pain
Asymptomatic

**All ventricular tachycardia must be terminated (even tolerated):**

VT can terminates spontaneusly
VT can progress to ventricular fibrillation
VT can cause acute heart failure with syndrom of low cardiac output

# VT progression to Ventricular fibrillation




*Reference: General University Hospital*

# Therapy of VT or VF

**Acute and initial therapy according to clinical status:**

1. Cardiac arrest – VF or pulsless VT
   - CPR + urgent defibrillation

2. Tolerated VT
   Antiarythmics iv. – prokainamid, amiodaron, sotalol
   DC cardioversion

**Next step:**

Exclusion of all conditions leading to VT or VF

# Management of VT / VF - I

**<u>If patient has manifested VT – looking for:</u>**

Family history of sudden cardiac death
- chanelopathies – long / short QT
- ARVC / D
- Brugada syndrome

Personal history
- CAD, AMI, cardiomyopathies

Warning symptoms
- syncope

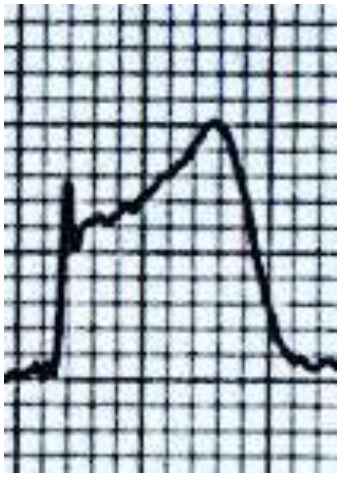
# Management of VT / VF - II

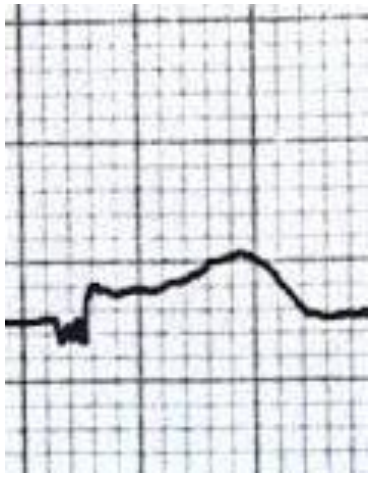
**12 – lead ECG**

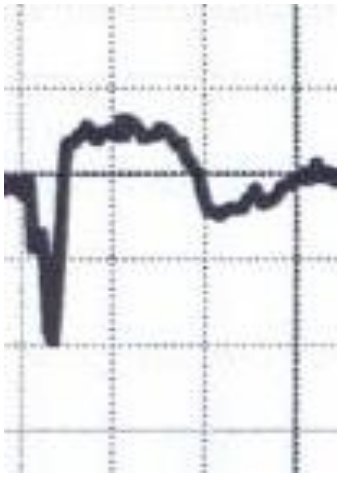
- evidence of acute / old MI
- LBBB (DCMP)
- left ventricular hypertrophy
- repolarization changes
- long QT

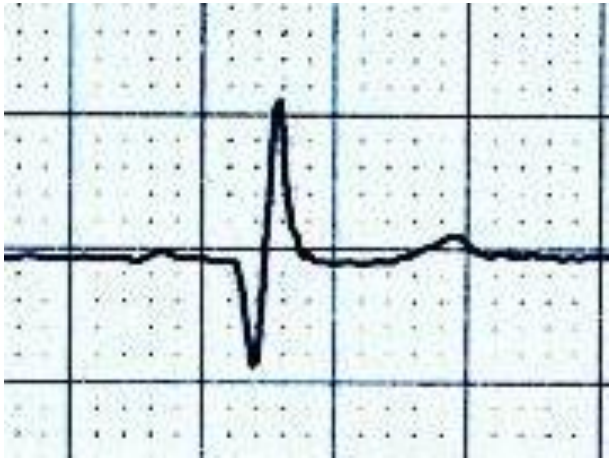
**Evidence of structural heart disease:**

- ECHO
- MRI
- Coronary angiography

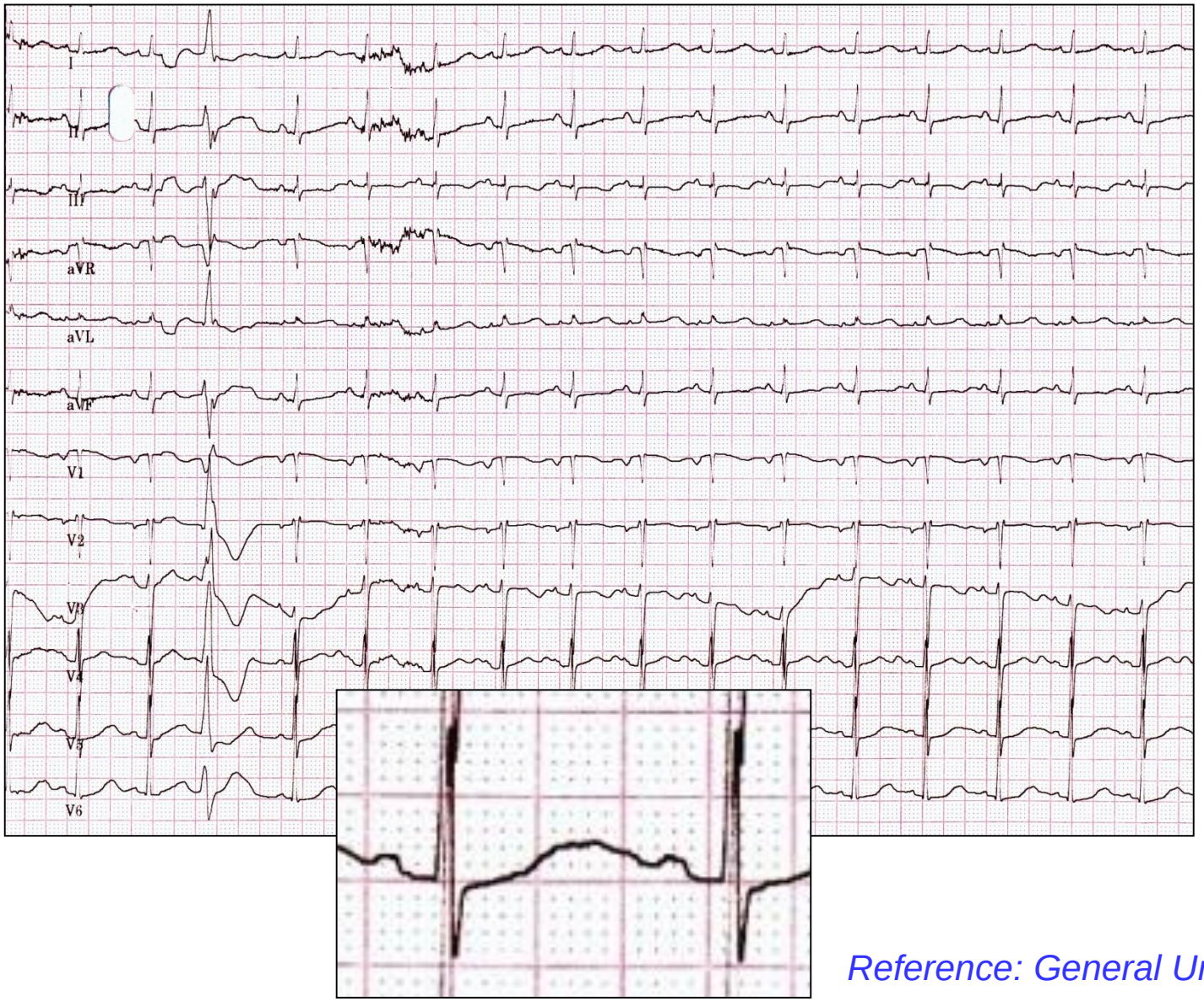






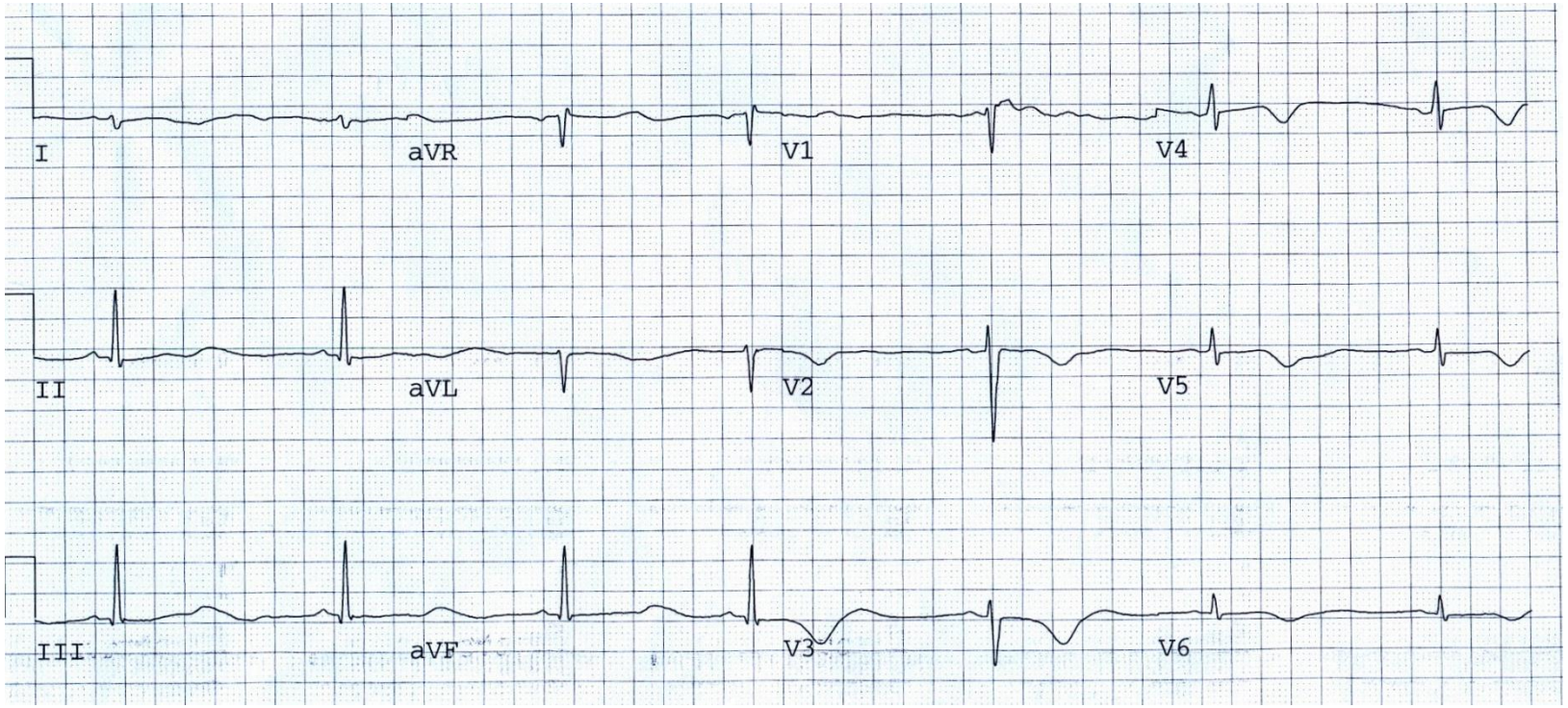


*Reference: General University Hospital*

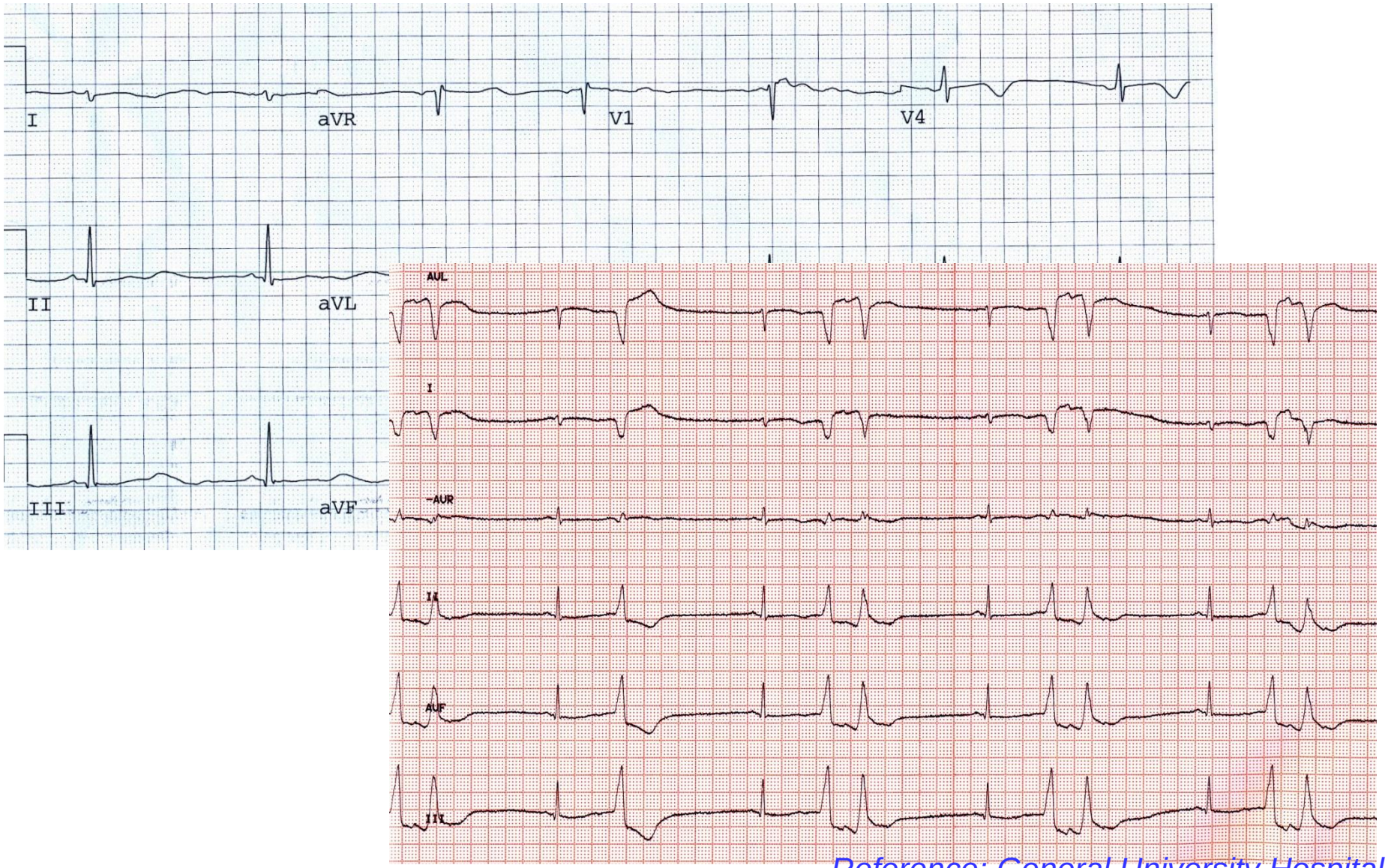



*Reference: General University Hospital*

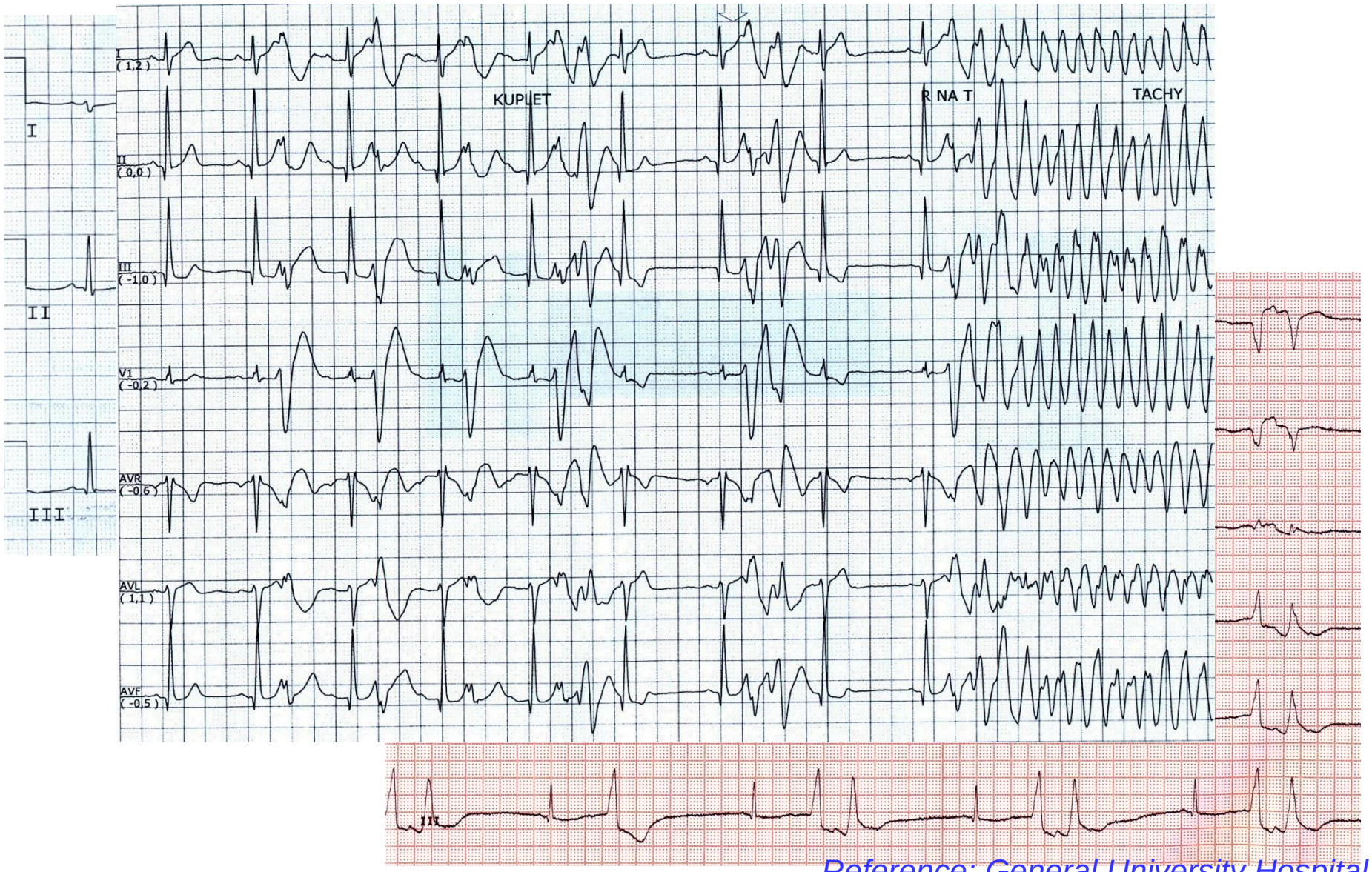
# Long QT and polymorphic VT




*Reference: General University Hospital*




*Reference: General University Hospital*




Reference: General University Hospital

# Therapy of malignant VT / VF - I

**Definitive treatement:**

**1.Implantation of implantable cardioverter defibrilator**

2.Antiarrhythmic drugs – amiodarone

B. Catheter ablation

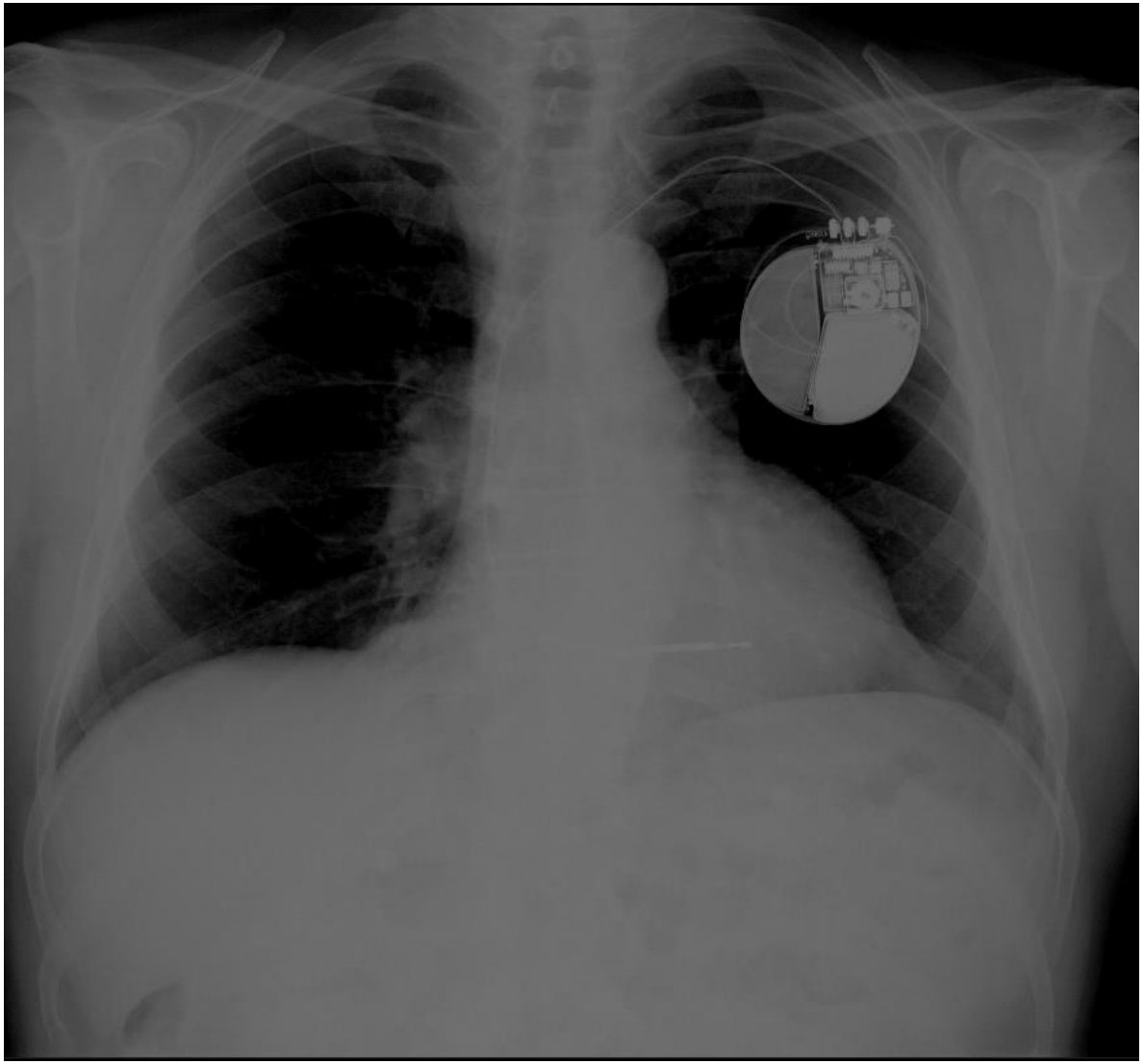
# Impantable cardioverter-defibrilator

**Primary prevention:**
Patient without manifestaion of VT/VR yet
**BUT** who are in severe risk of VT/VF

**Risk:**
Structural heart disease

**Secondary prevention:**
Patient who survived episode of VT/VF

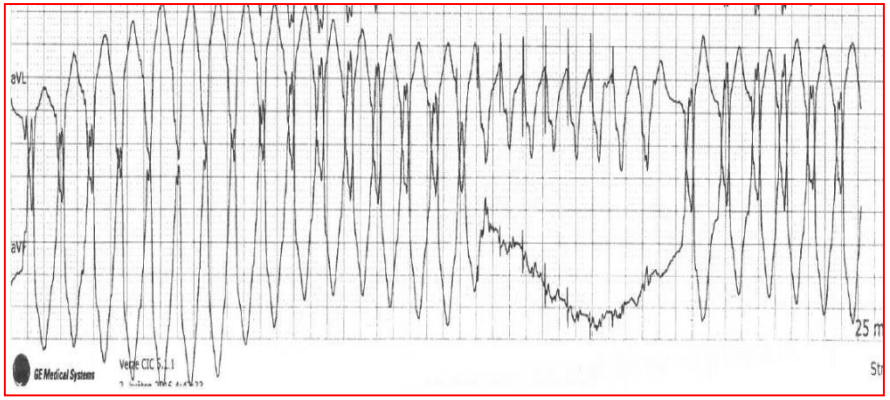
# Impantable cardioverter-defibrilator



*Reference: General University Hospital*

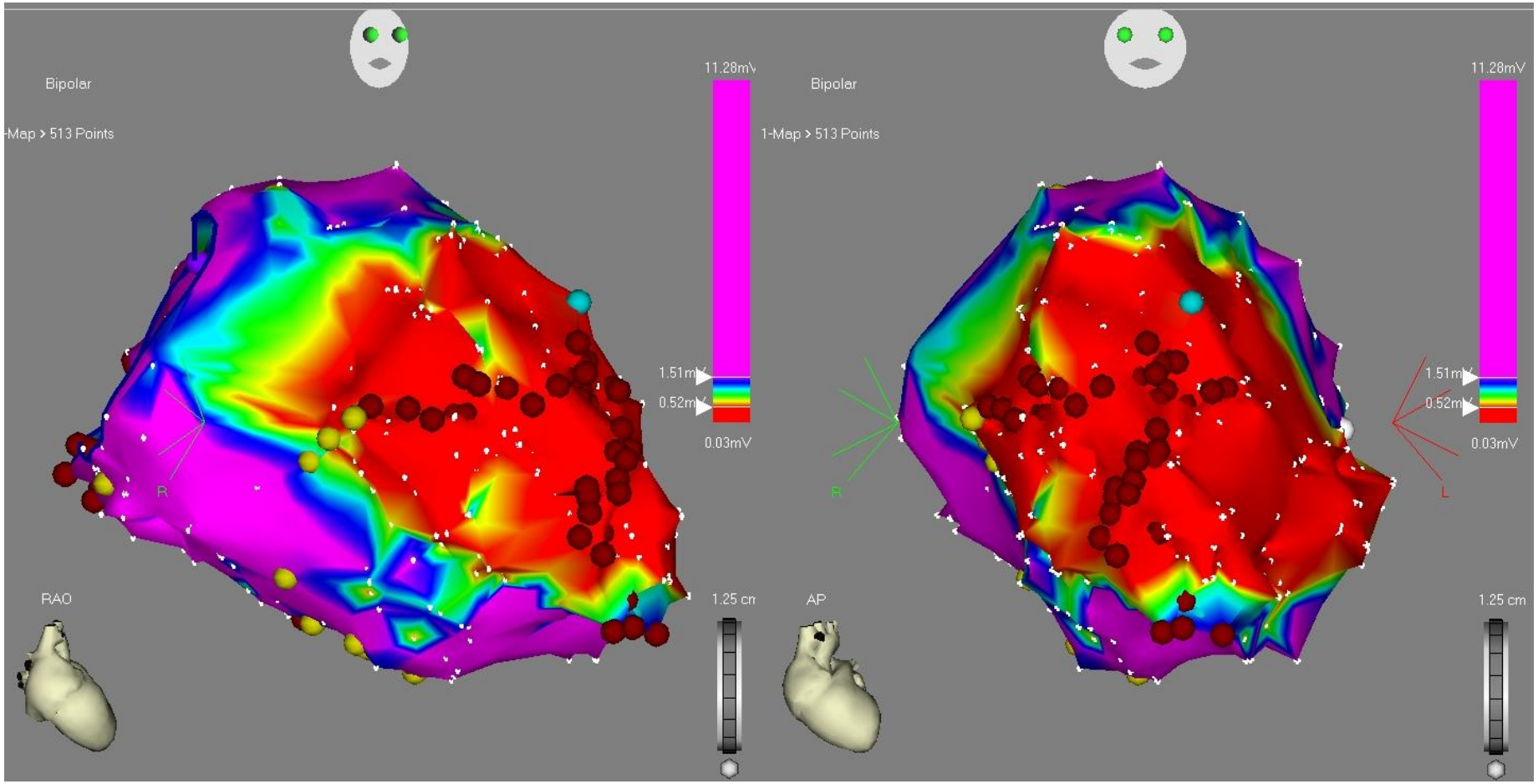
# Impantable cardioverter-defibrilator

- **Therapy with ICD**
  - ATP – antitachycaria pacing
  - Shock 15 – 40J
  - Combination of ATP and shock




*Reference: General University Hospital*

# Catheter ablation




*Reference: General University Hospital*

# Case 4

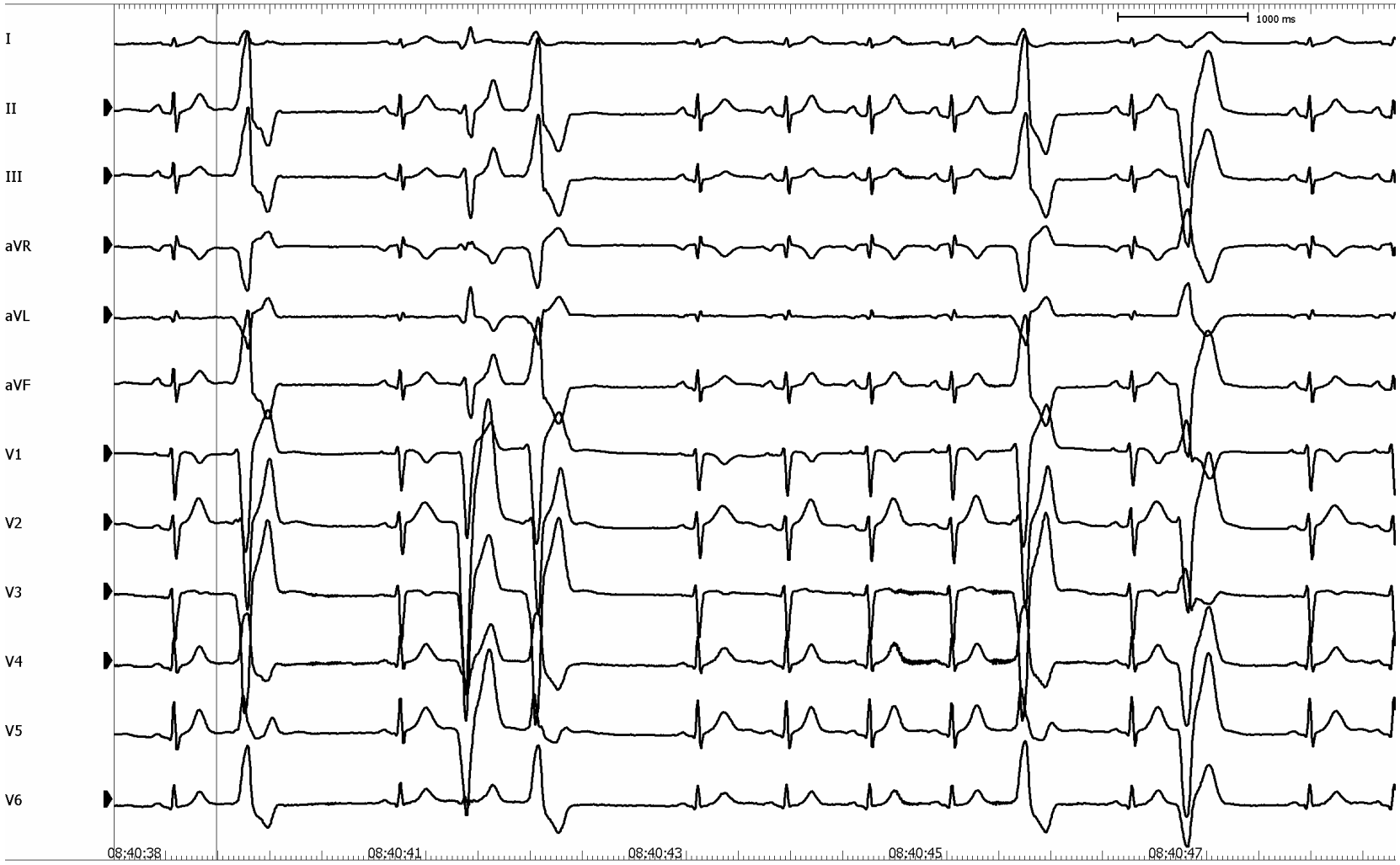
**35 year old male**

**No history of any relevant disease**

- Smoker

**Symptoms:** Frequent palpitations, iregular beats. Symptoms about one second but repeating caousing sleeping problems.

# Ventricular premature beats




*Reference: General University Hospital*

# Ventricular premature beats

Frequent finding in cardiological practice

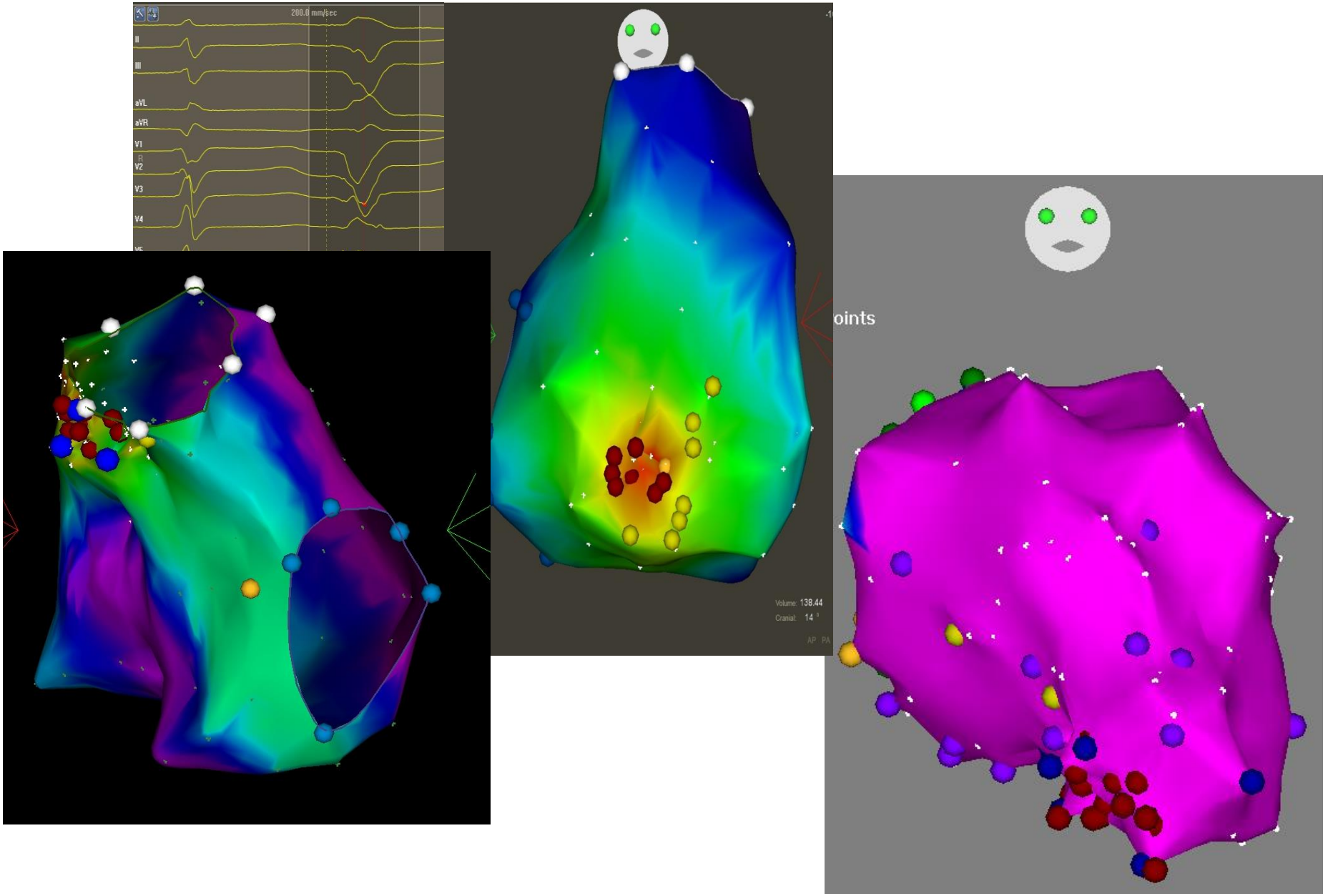
**Symptoms:**

- Asymptomatic, symptomatic
- Palpitations (irregular and slow)

**VPB → exclude structural heart disease**

**Therapy:**

- Underline disease
- Symptoms
  - β-blockers
  - Antiarhythmics – propafenone, amiodaron
  - Catheter ablation




*Reference: General University Hospital*

The end!