Cardiomyopathy Myocarditis

Petr Lokaj, MD.,Ph.D.

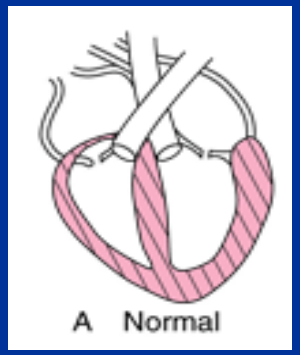
DEFINITION

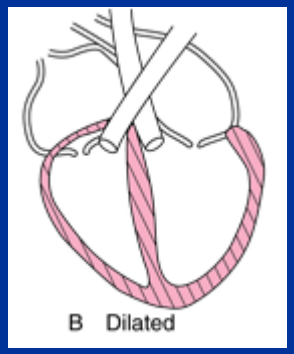
- a myocardial disorder in which the heart muscle is structurally and functionally abnormal

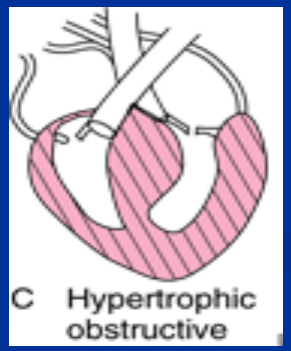
- in the absence of coronary artery disease, hypertension, valvular disease and congenital heart disease

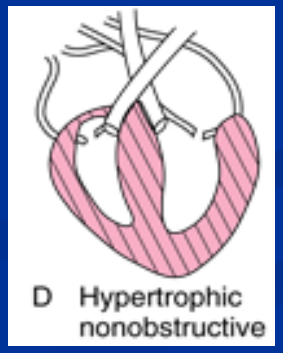
CLASSIFICATION

- Dilated CMP – the most common form
- Hypertrofic CMP – innapropriate LV hypertrophy
- Restrictive CMP – impaired diastolic filling
- Arrhytmogenic right ventricular cardiomyopathy
- Unclasiffied: Tako Tsubo CMP

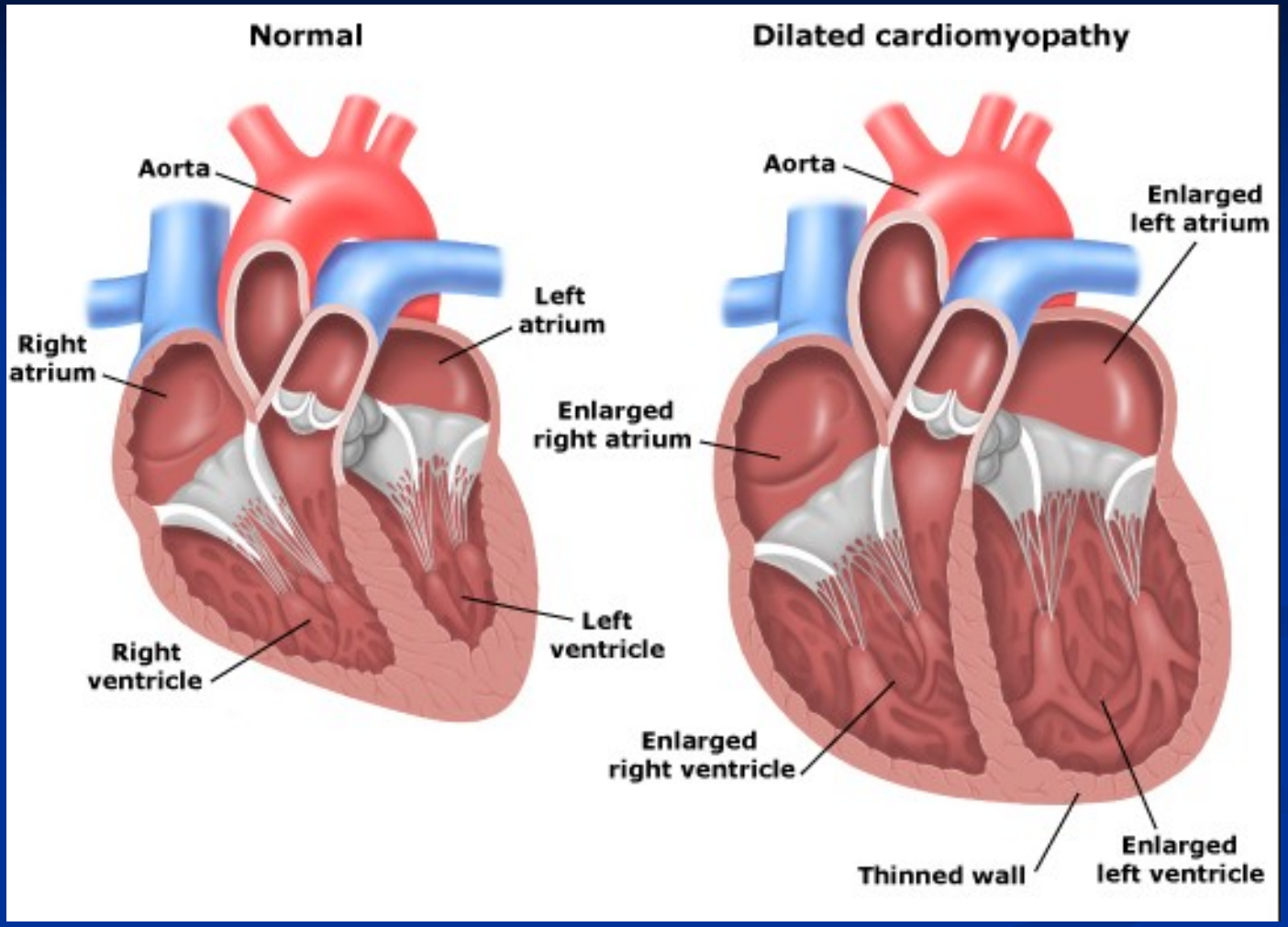








DCMP



defined by the presence of ***left ventricular dilatation and left ventricular systolic dysfunction***

right ventricular dilatation and dysfunction may be present but are not necessary for the diag

Aetiology of DCMP

- **Familial** (idiopathic)
- **Non familial**
  - * myocarditis – late stage following cardiac infection
  - * pregnancy – peripartum cardiomyopathy
  - * cardiotoxic drugs
  - * alcohol
  - * tachycardia induced CMP (Atrial fibrilation)
  - * ischemic CMP
- **Inflammatory CMP**

  chronic **inflammatory cells** in myocardium +

  left ventricular dilatation and reduced ejection fraction (< 35 %)

Diagnosis of DCMP

- **Symptoms + anamnesis**

* **left ventricle failure**: shortness of breath , hemoptysis, cough

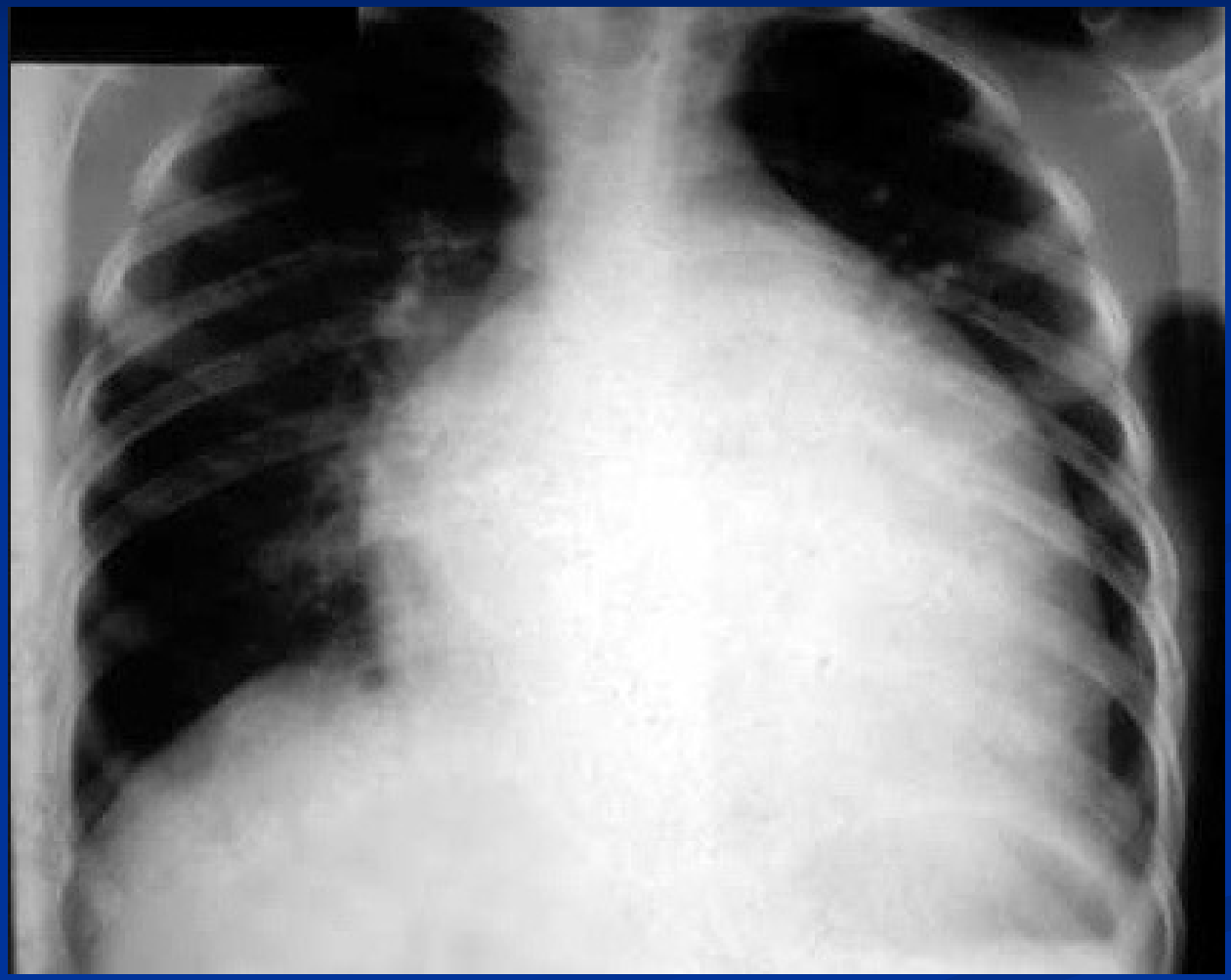
* **right ventricle failure**: abdominal swelling or enlargement, swelling of legs or ankles, absence of appetite, abdominal pain

* **low cardiac output**: temporary and brief loss of consciousness, decreased ability to tolerate physical exertion, palpitations, dizziness, fatique , low amount of urine during the daytime, but a need to urinate at night

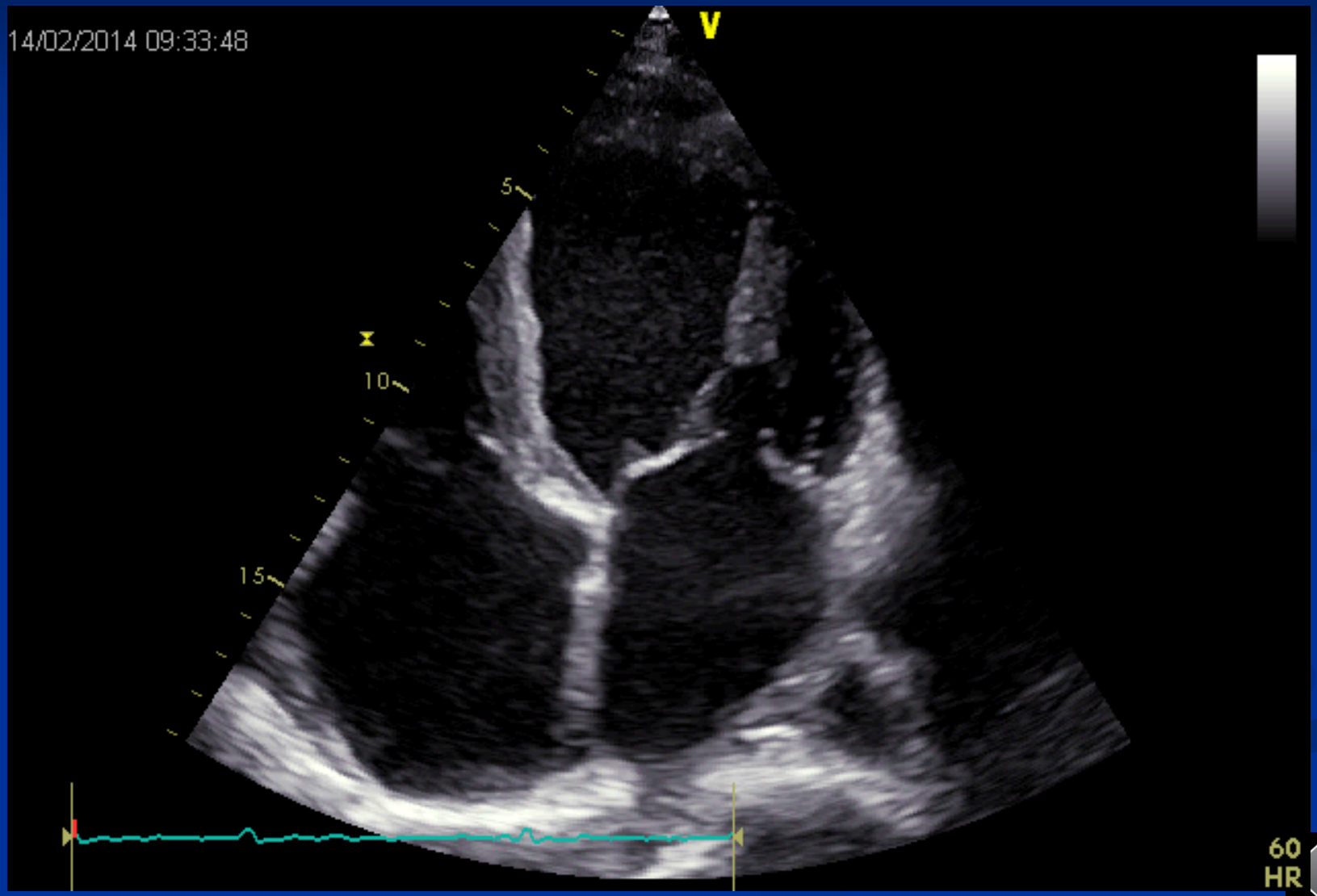
Diagnosis of DCMP

- **Physical signs**:
  * **left ventricle failure**: basilar rales, pulmonary edema, gallop, pleural effusion, Cheyne – Stokes respiration
  * **right ventricle failure**: peripheral oedema, jugular venous distention, hepatomegaly, ascites
- **Diagnostic methods**:
  * laborathory (BNP)
  * ECG
  * chest X -ray
  * Echocardiography
  * MRI
  * cardiac catheterization
  * heart muscle biopsy

Chest X ray



Echo in DCMP



Therapy of DCMP

Complex:

- regime
- Pharmacotherapy (ACEI, BB, diuretic)
- cardiostimulation or resynchronization therapy
- LVAD (left ventricle assist devices)
- orthotopic heart transplantation

- = therapy of chronic heart failure

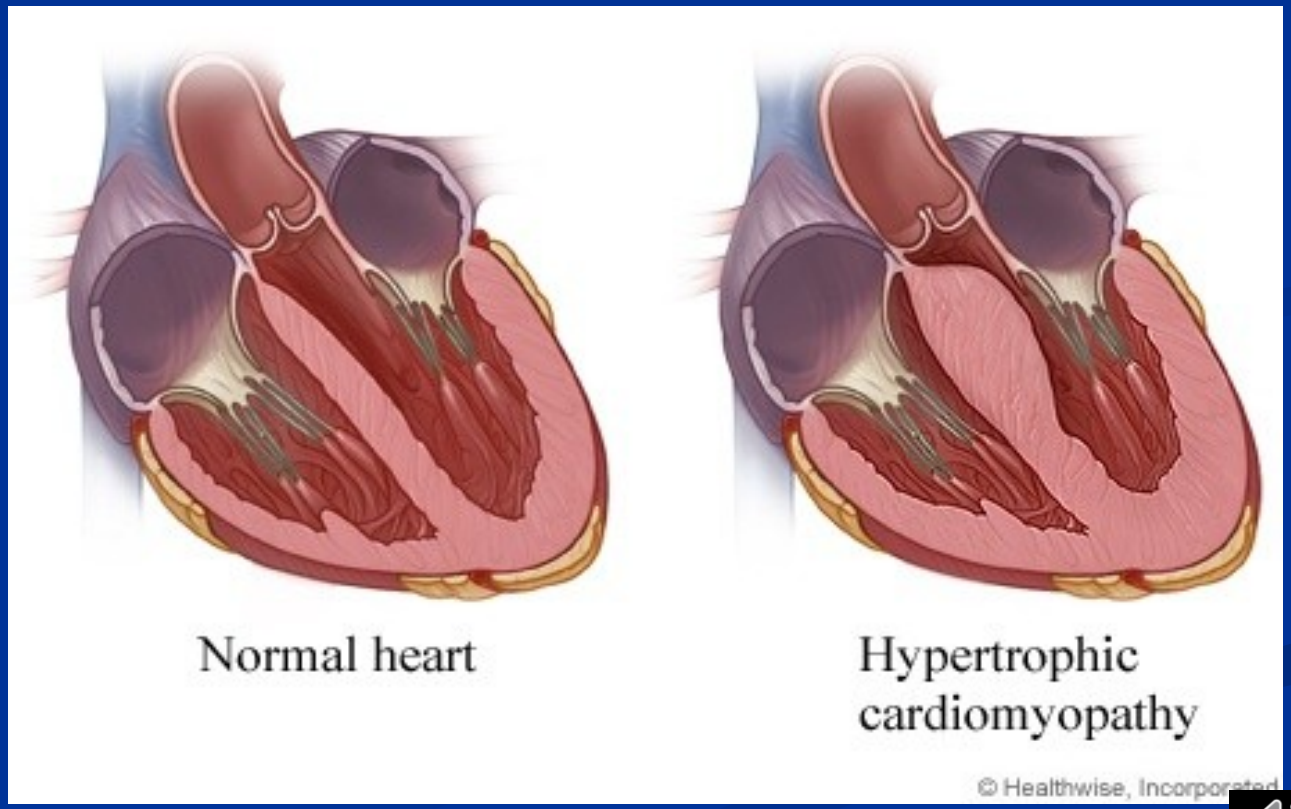
Prognosis of DCMP

- Prognosis of patients with CHF is poor.
- 50% of patients with CHF die in five years!!!
- Young patients up to 65 years have i big chance in OTS (orthotopic heart transplantation)

Hypertrophic cardiomyopathy

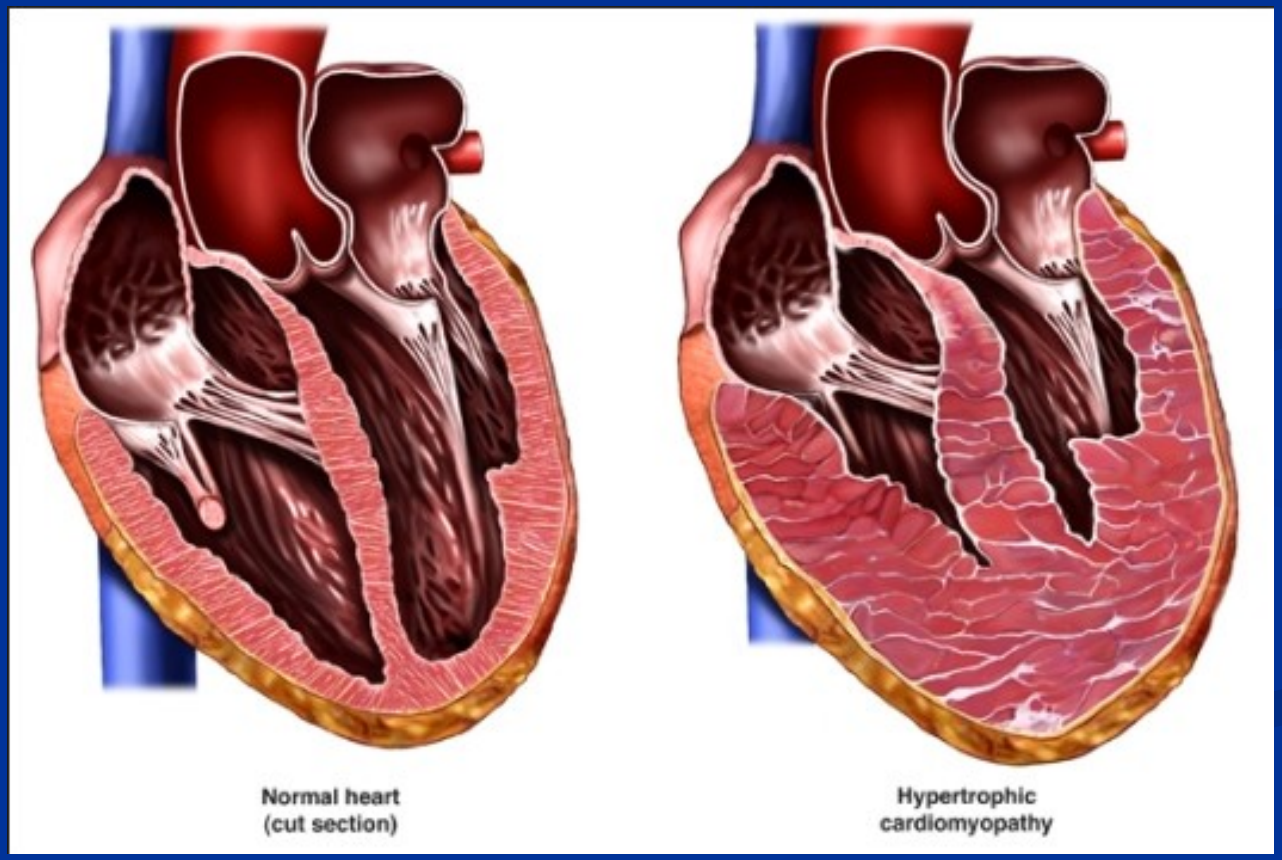
- the majority of patients have **asymmetrical** pattern of hypertrophy, with a predilection for the interventricular septum

- anteroseptal
- apical

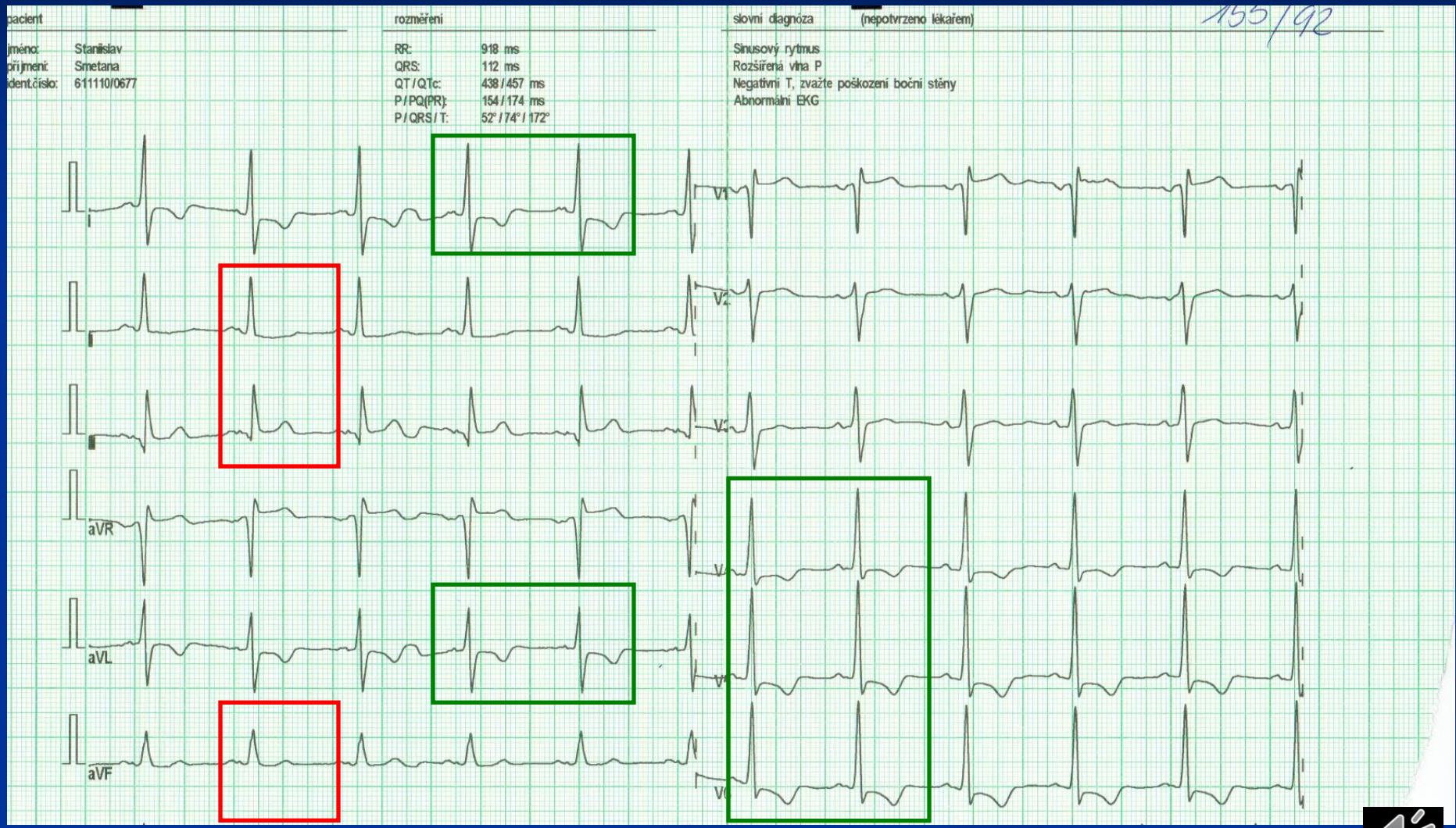


Hypertrophic cardiomyopathy

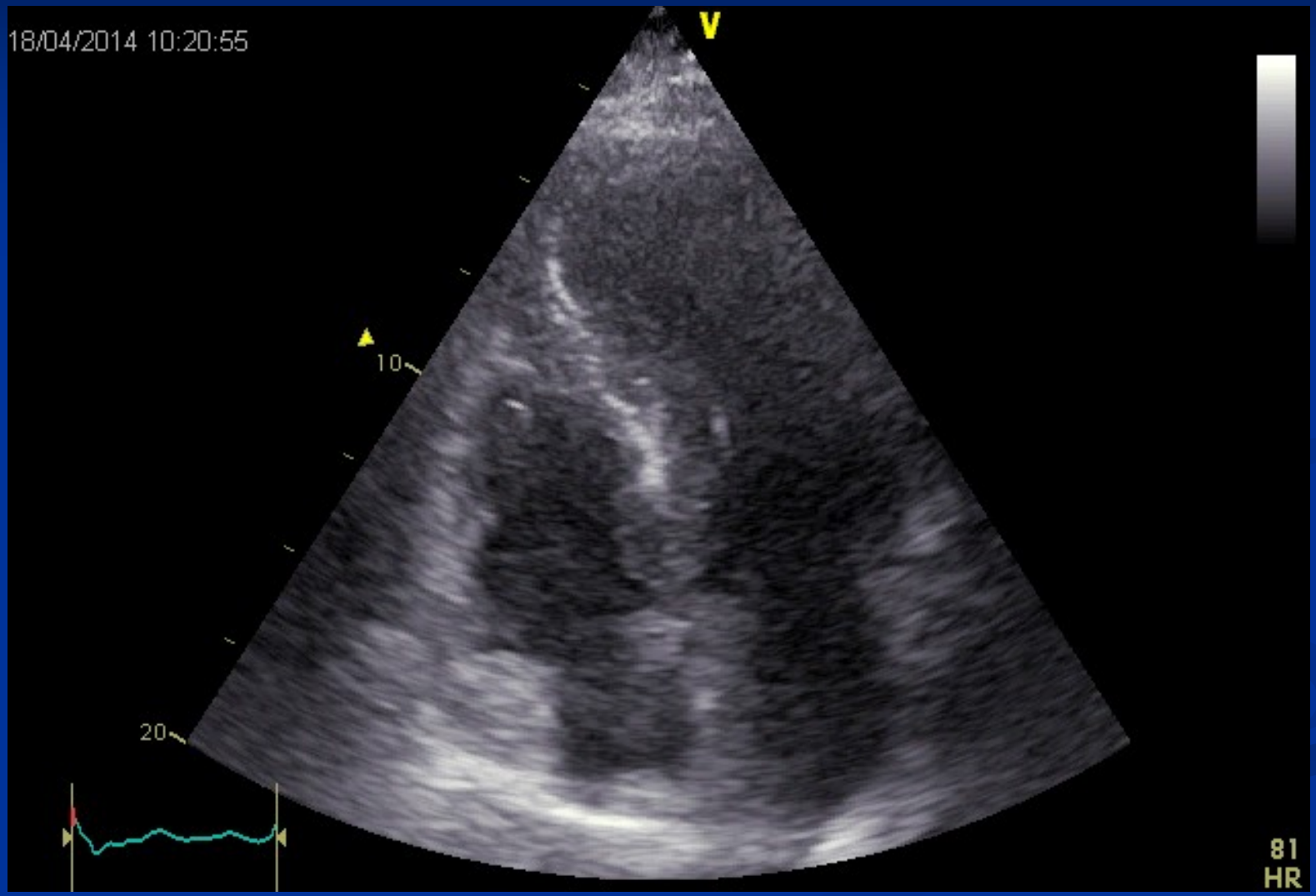
- **concentric hypertrophy** is more frequent in patients with metabolis disorders and hypertension.



ECG in HCMP


pacient
jméno: Stanislav
příjmení: Smetana
ident.číslo: 611110/0677
rozměření
RR: 918 ms
QRS: 112 ms
QT / QTc: 438 / 457 ms
P / PQ(PR): 154 / 174 ms
P / QRS / T: 52° / 74° / 172°
slovní diagnóza (nepotvrzeno lékařem)
155/92
Sinusový rytmus
Rozšířená vlna P
Negativní T, zvažte poškození boční stěny
Abnormální EKG
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

Echo in HCMP



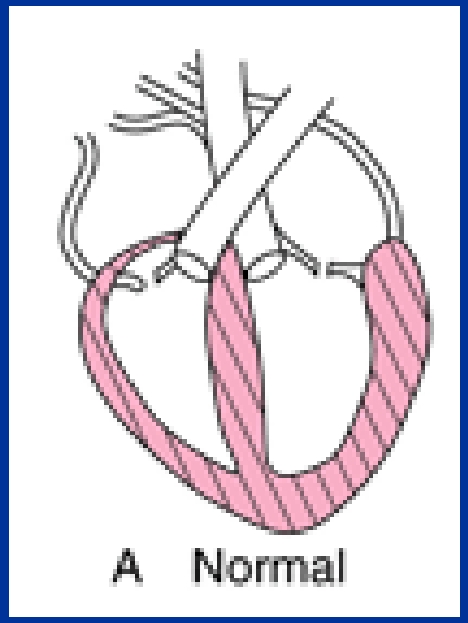
Hypertrophic CMP

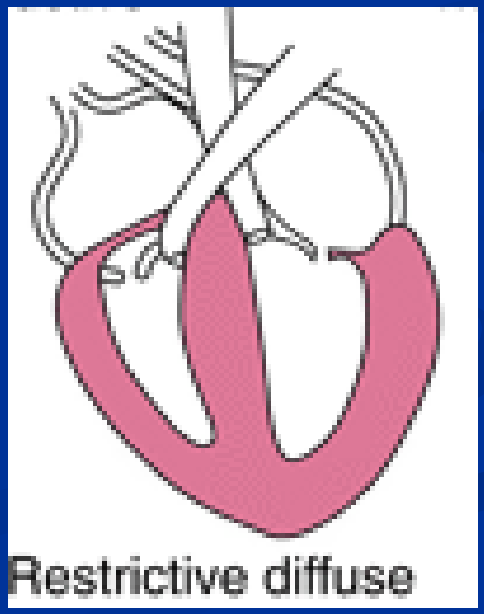
Treatment – in symptomatic patients

- Betablockers, calcium antagonists antiarrhythmic
- DDD stimulations, ICD therapy in high risk patients
  - posit. FH
  - septum > 30mm
  - occur. of VT, syncopy, CPR
  - decrease of BP during stress test
- Alcoholic septal ablations
- Surgical treatment- myectomy

Restrictive Cardiomyopathy

- is defined functionally - not morphologically
- normal or reduced diastolic volumes
- normal or reduce systolic volumes
- normal ventricular wall thickness



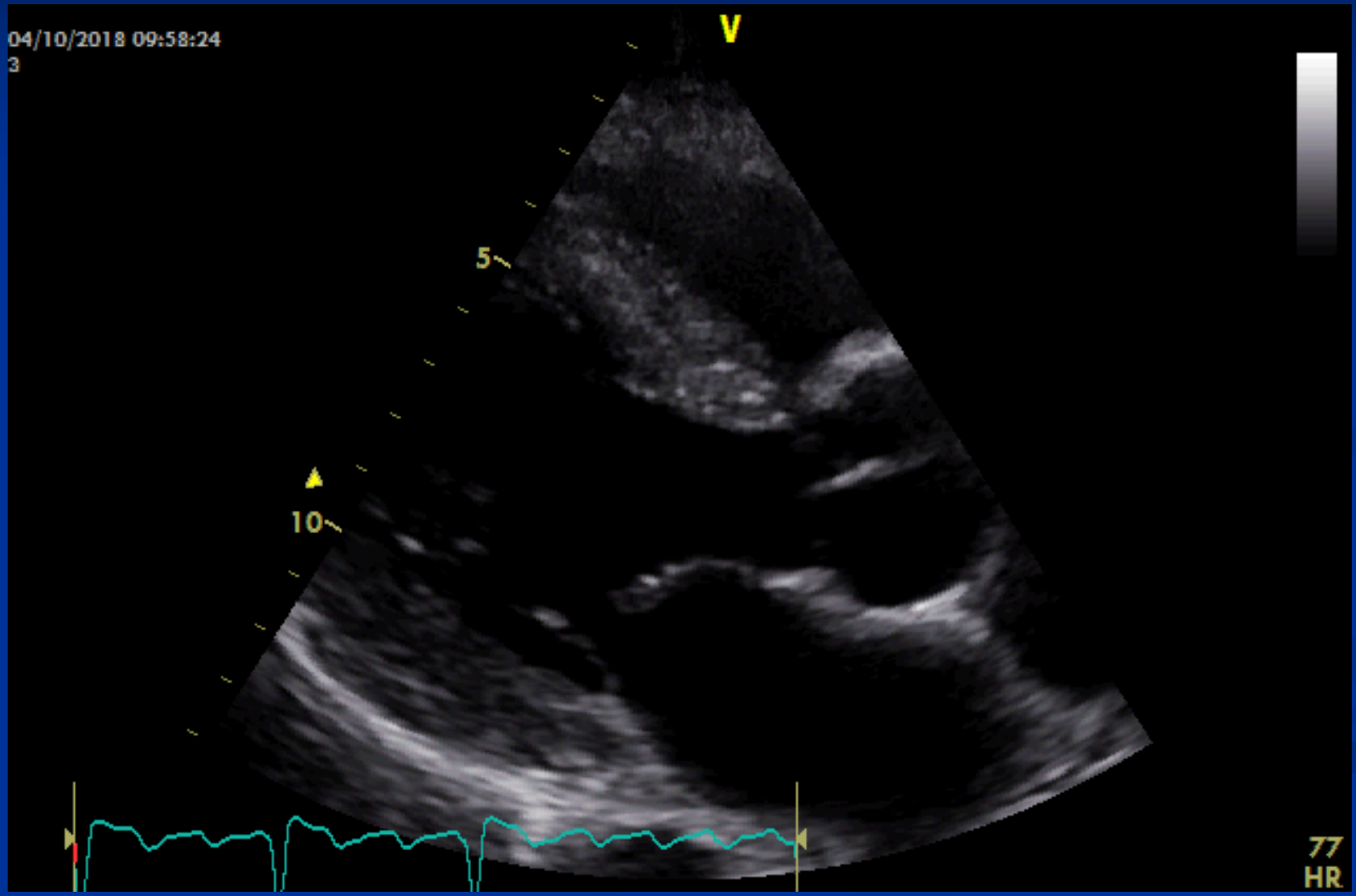


Restrictive Cardiomyopathy

- **EASY definition**: rigid heart walls with diastolic (and systolic) dysfunction due to increase stiffness
- **high pressure rise to a smal increase in volume**

- **Causes**:
  - * familial: sarcomeric protein mutation, familial amyloidosis, hemochromatosis, ..
  - * nonfamilial : amyloidosis
    sarcoidosis, scleroderma
    carcinoid heart disease, metastatic cancers
    drugs (anthracycline toxicity), radiation

Restrictive Cardiomyopathy



Restrictive Cardiomyopathy

- **Symptoms**: exercise intolerance, dyspnea, weakness, chest pain, peripheral edema, enlarged liver, ascites, anasarca (symptoms of CHF)
- Diagnostic: ECG – low voltage on ECG
  ECHO – restrictive filing of LV
  MRI
  myocardial biopsy
- Therapy: only symptomatic

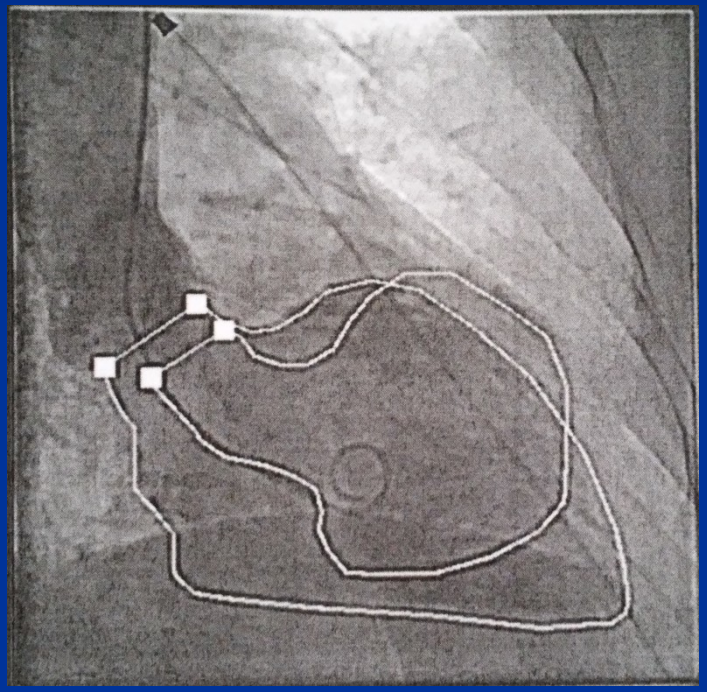
Tako Tsubo CMP

- **Definition**: transient regional systolic dysfunction involving the left ventricular apex and or mid ventricle

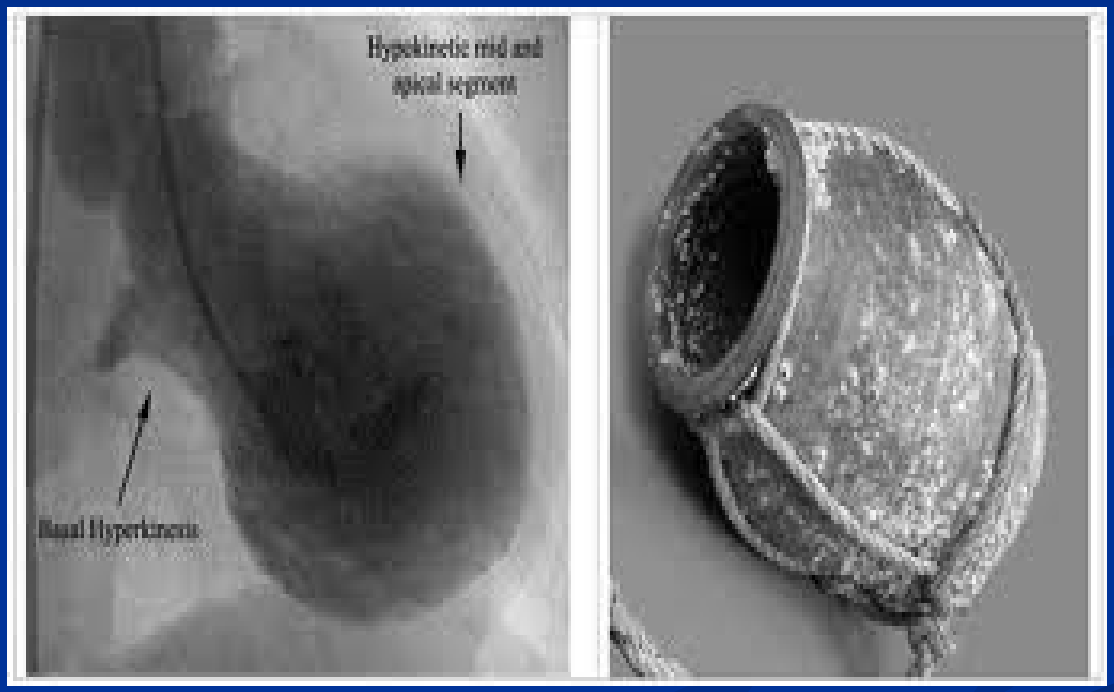
- **in the absence of obstructive coronary disease on coronary angiography**

Tako Tsubo CMP

- In this syndrome, the heart (left ventricle) takes the shape of an octopus trap



mid-ventricular form



apical form

Tako Tsubo CMP

- **Symptoms**: patients present with an abrupt onset of **angina like chest pain** - **like acute myocardial infarction**

- diffuse T waves inversion, sometimes proceded by ST segment elevation, QT-interval prolongation
- mild cardiac enzyme elevation

- **Diagnosis**: coronarography - negative
- **Incidence**: post - menopausal women (the most often)
- symptoms are often proceded by emotional or physical stress
- left ventricular function usually normalizes over a period of days to weeks

Perimyocarditis

- Myocarditis - inflammatory disease of the myocardium
- Inflammatory cardiomyopathy - myocarditis in association with cardiac dysfunction (histological , functional diagnosis)
- Dilated cardiomyopathy – is a clinical diagnosis characterized by dilation and impaired contraction of the left or both ventricles

Perimyocarditis

- Definition: inflammatory disease of the myocardium

- Causes: * infectious myocarditis
  - viral
  - bacterial
  - protozoal
  - fungal
  - parasitic

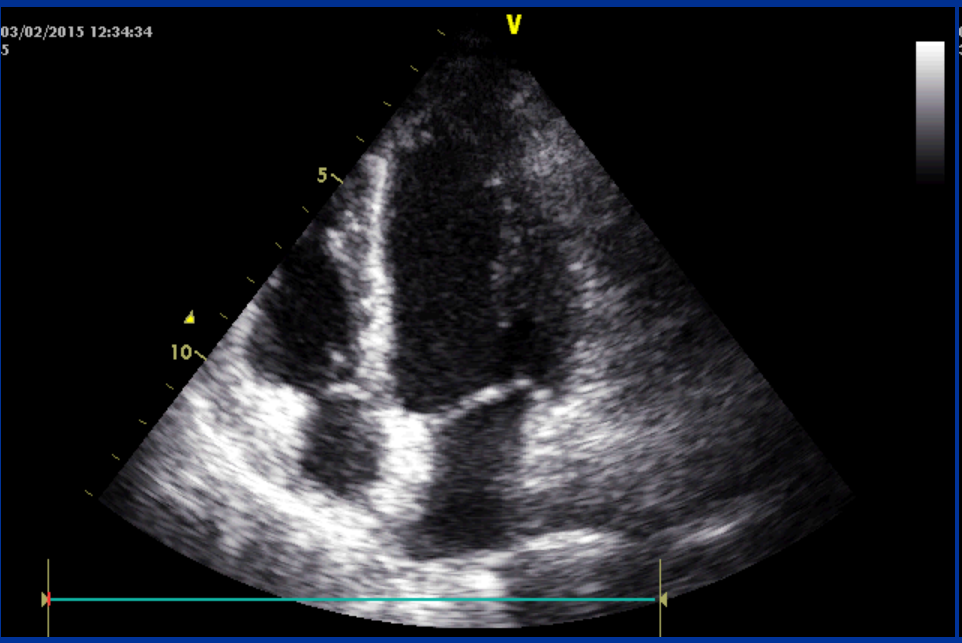
  * immune mediated myocarditis
  * toxic myocarditis –drugs, heavy metals, hormones, radiation, electric shock

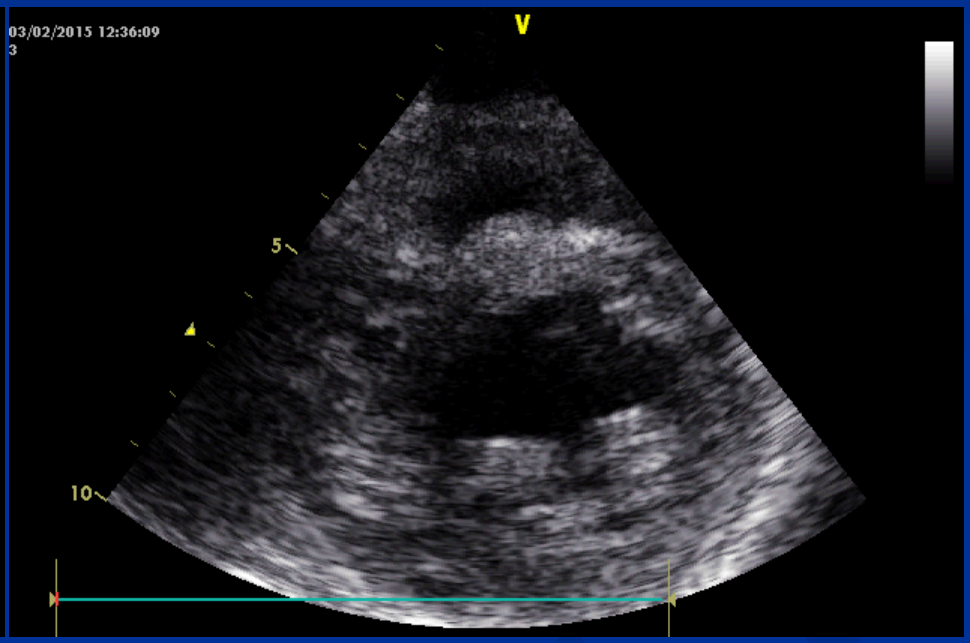
Perimyocarditis

presents in many different ways ranging from mild to life threatening

- **clinical presentation**:
- acute chest pain (starting within 1-4 weeks of a respiratory or gastrointestinal infection) , **mimic MI**
- new onset or worsening HF (in the absence of CAD)
- chronic heart failure
- life threatening arrhytmias and sudden cardiac death
- cardiogenic shock

Fulminant Perimyocarditis



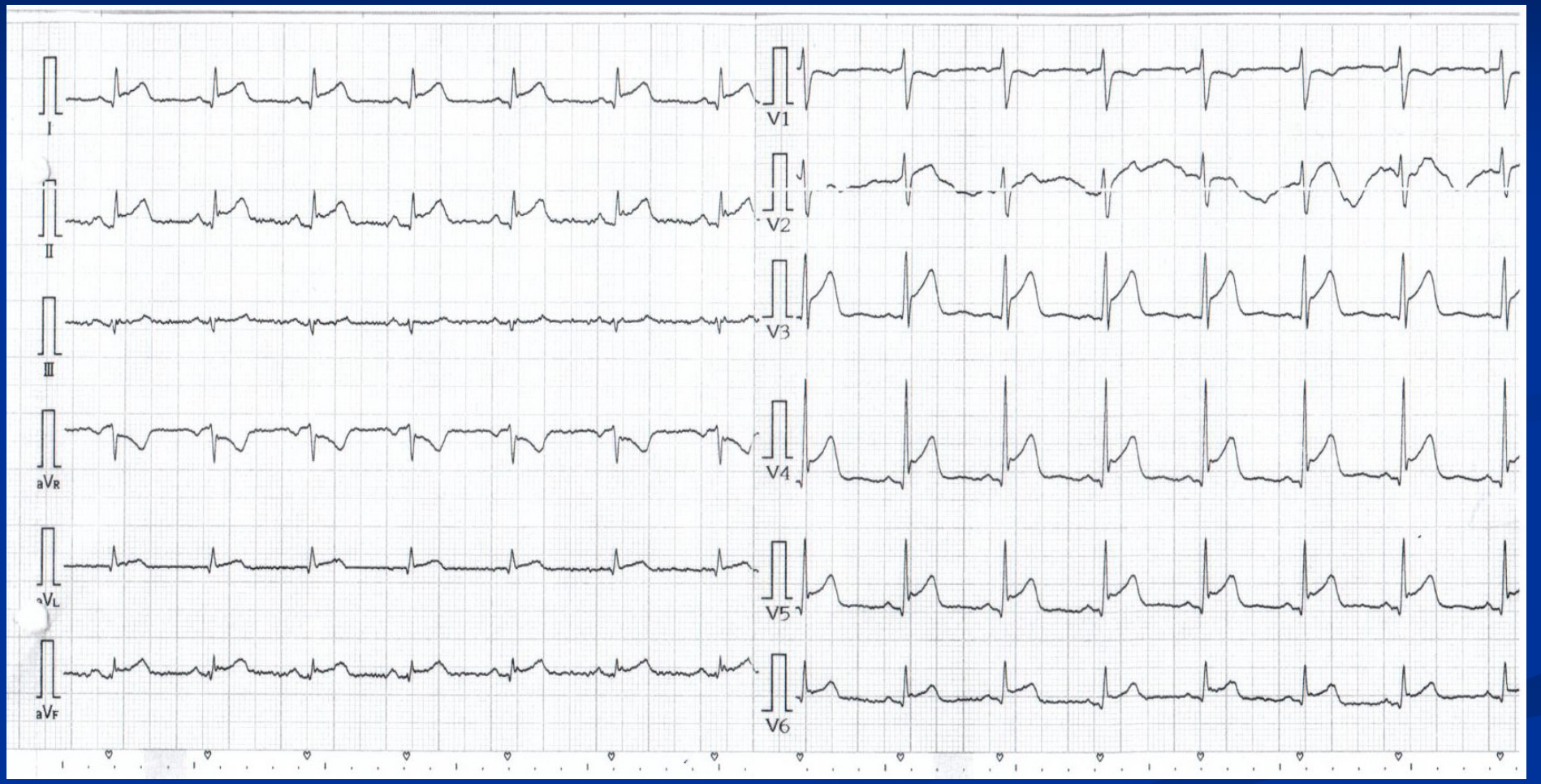


Perimyocarditis

- **Diagnosis:**
- **Symptoms + anamnesis**
- **Laborathory: nonspecific**; Trop T, BNP, CK, Leu, CRP
- **ECG: nonspecific**- inversion of T wave, ST changes, VT, AVB, ...
- **ECHO:** physiological, low EF, segmental hypokinesis, global hypokinesis
- **MRI:** inflammatory changes

- **Endomyocardial biopsy:** gold standard, invasive ☹

Perimyocarditis



Perimyocarditis

Treatment

- Conventional medical treatment of heart failure
  - rest (3 months)
  - pharmacotherapy (ACEI, BB)
  - ICD + CRT
  - LVADs, OTS
- Immunosuppressive therapy (eosinophile, lymes boreliosis, great-cell myocarditis)

Perimyocarditis

Prognosis (acute myocarditis)

- depends on aetiology , clinically presentation and disease stage
- 50% resolves in the first 2-4 weeks
- 25% will develop persistent cardiac dysfunction
- 12-25% deteriorate, die or progress to end stage DCMP with a need for OTS