

# Differential diagnosis of dyspnea and chest pain

## Part one: **DYSPNEA**

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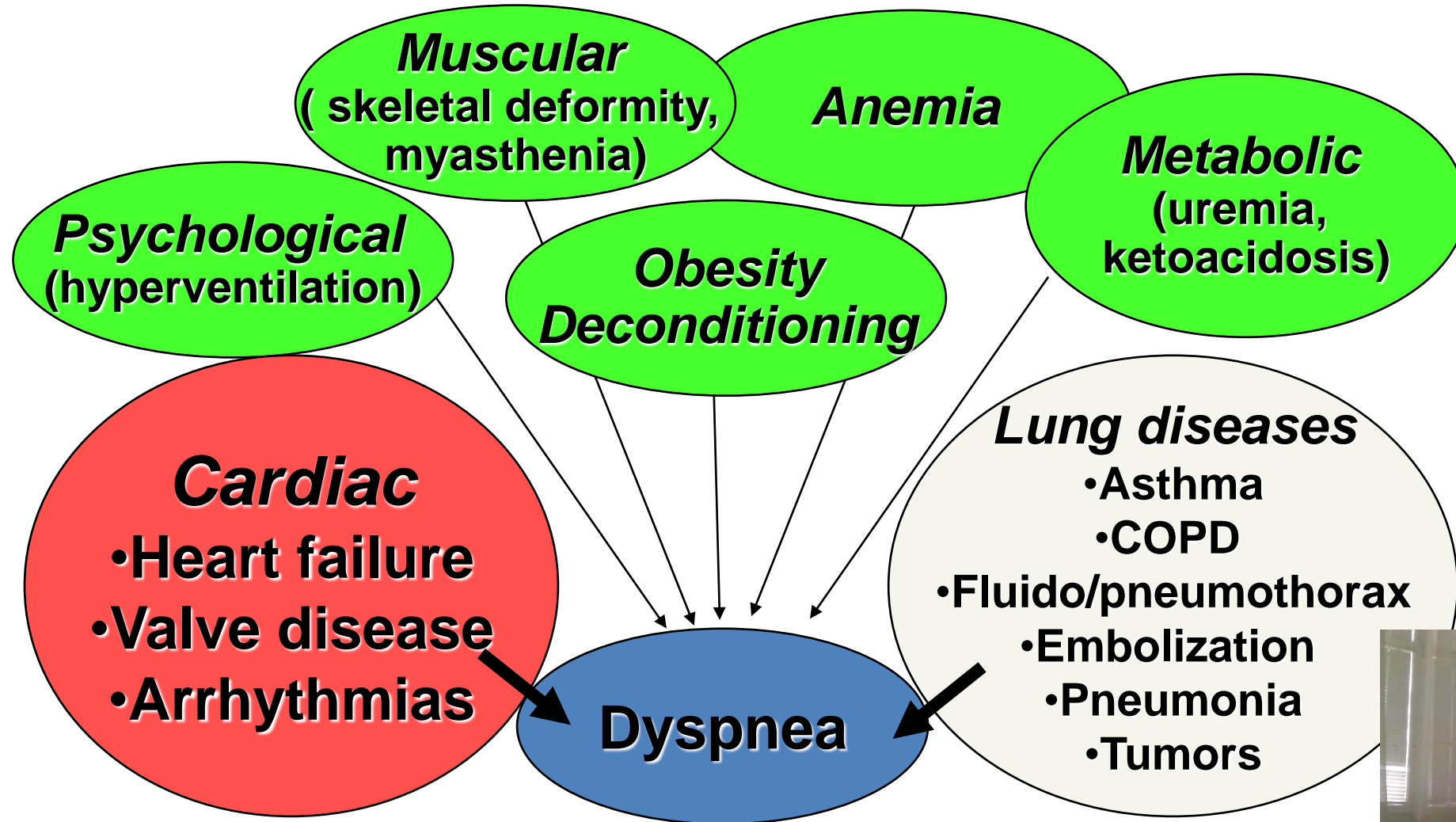


**VFN PRAHA**  
VŠEOBECNÁ FAKULTNÍ  
NEMOCNICE

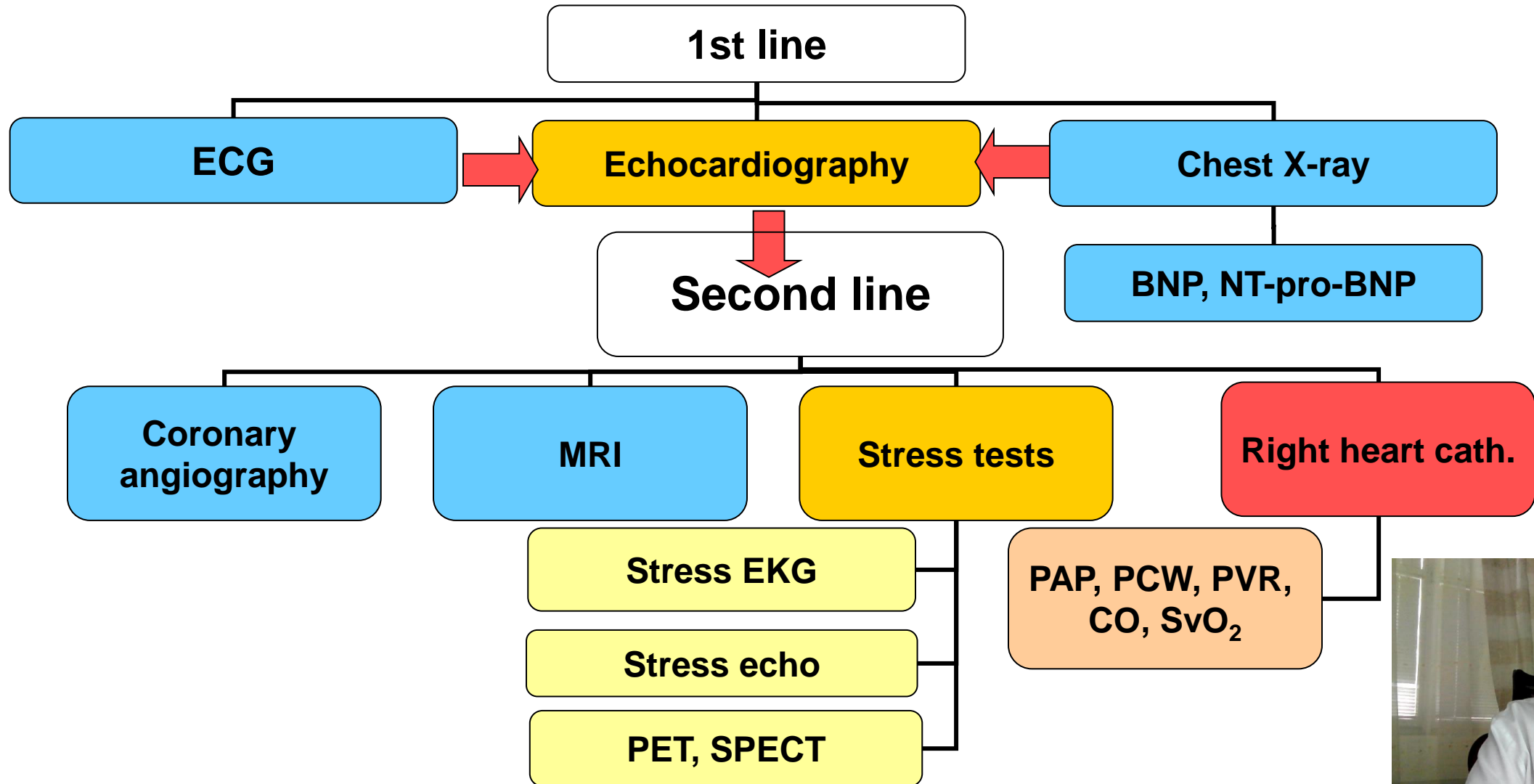
# Dyspnea



# Differential diagnosis of dyspnea



# Exploration methods in patients with cardiac shortness of breath



# Heart failure signs and symptoms

## Shortness of breath

Orthopnea  
Paroxysmal nocturnal dyspnea

## Fatigue

Depression  
Confusion

## Bendopnea

## Palpitations

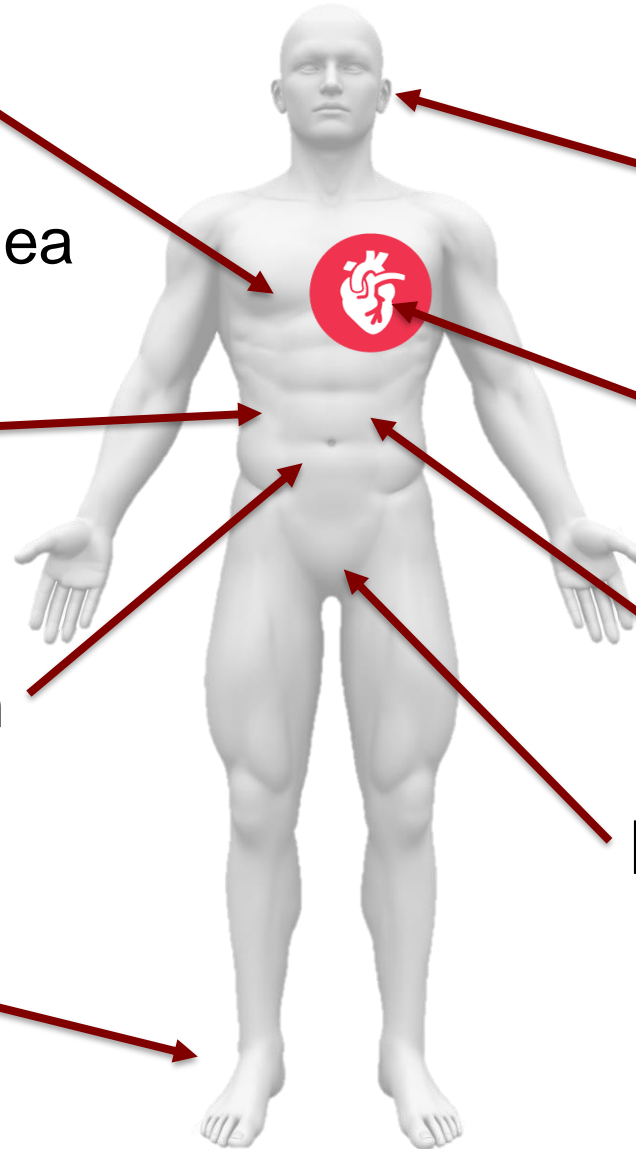
Syncope

## Abdominal distension

## Lack of appetite

## Nycturia

## Leg oedema



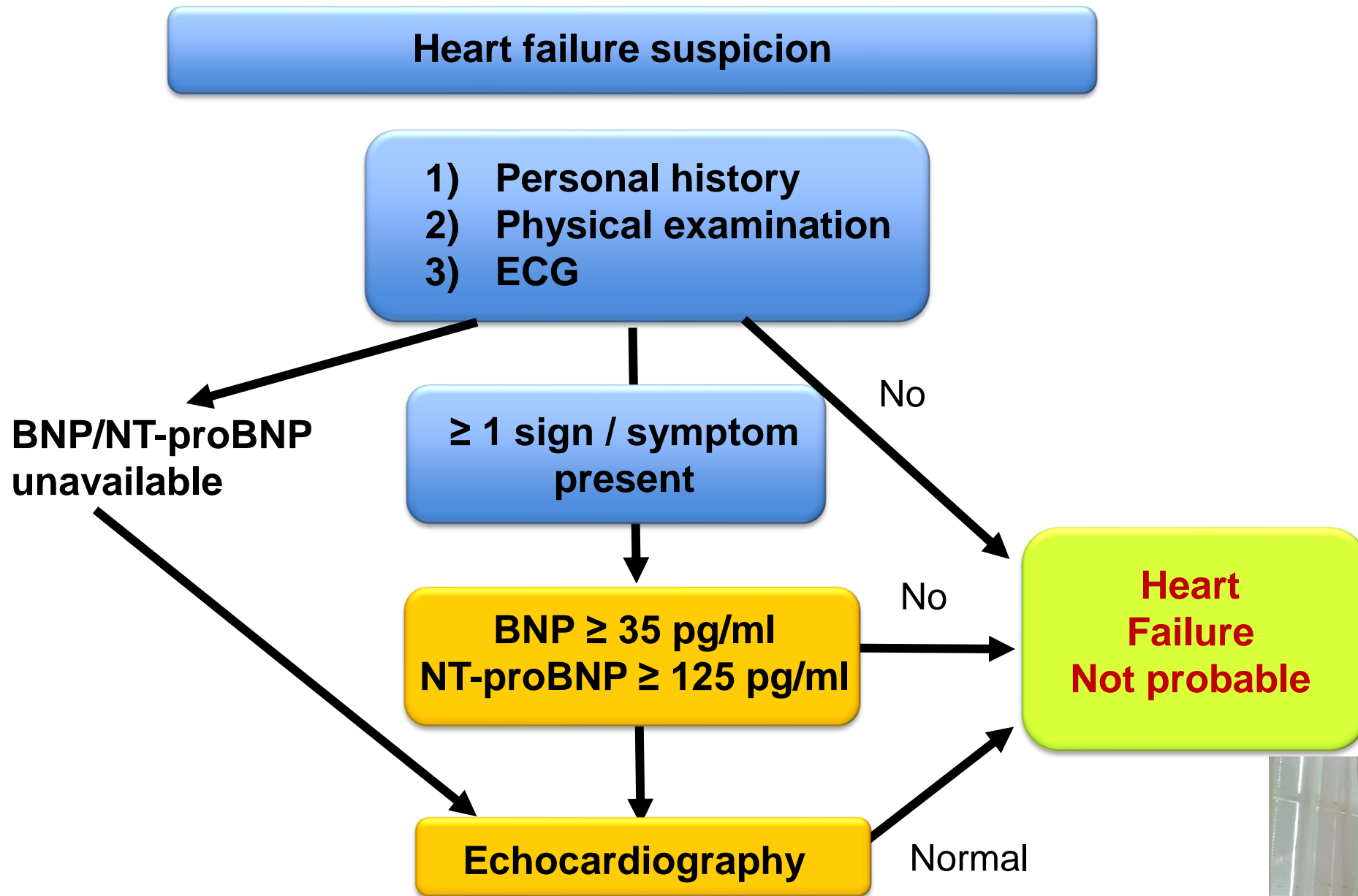
# Bendopnea

- Dyspnea when bending over (even from sitting position) – begins within 30 s
  - Pts with HF-rEF having bendopnea have higher right atrial pressures - RAP and pulmonary capillary wedge pressure PCWP<sup>1</sup>
  - Should be named - Kamptopnea ?.... kamptos = bending over (Gr)<sup>2</sup>

Thibodeau et al. *JCHF*. 2014;2(1)

Falk *JCHF*. 2014;2(4):4

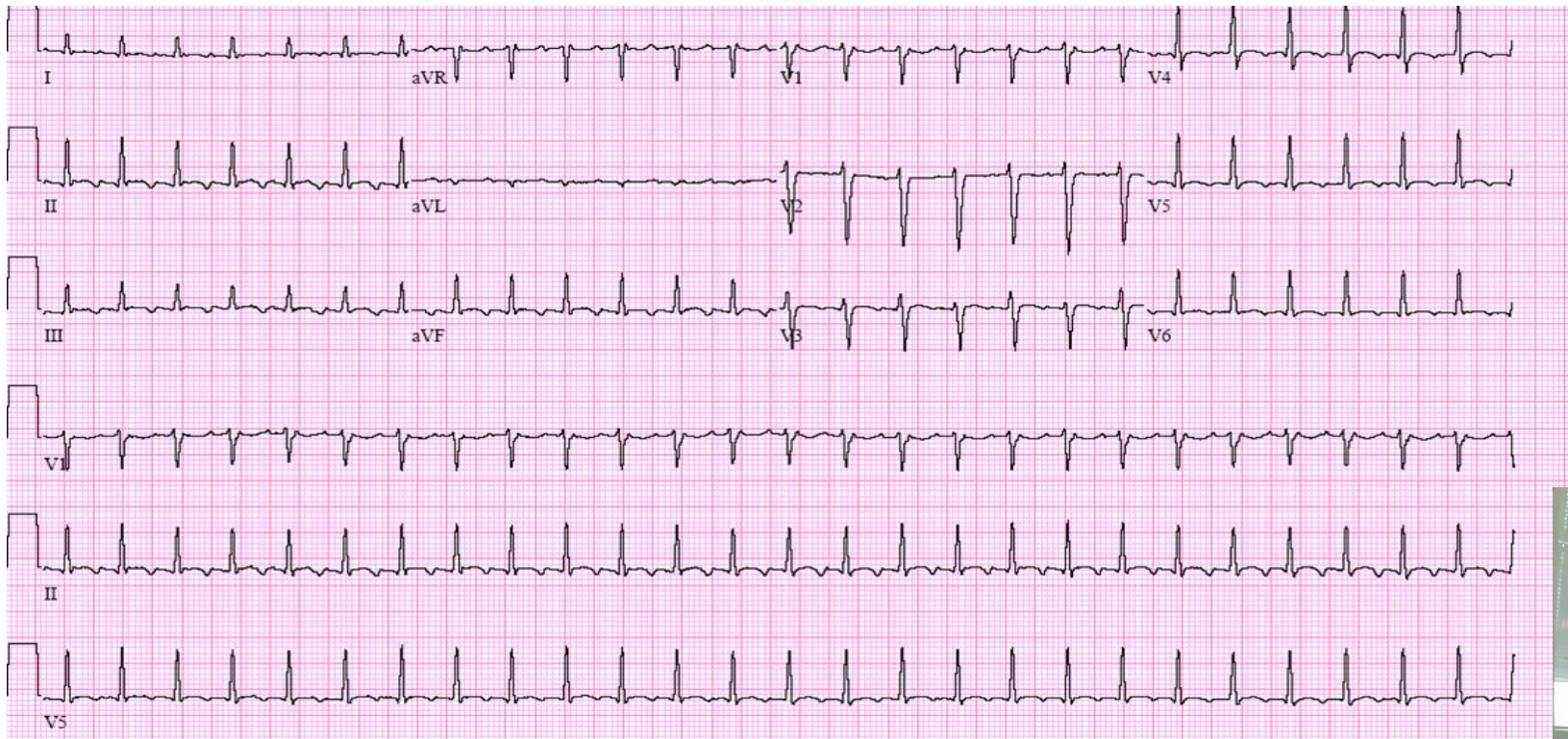






# Why ECG ?

- **Probability of heart failure in presence of normal ECG**
  - **New onset acute** < 2%
  - **New-onset non-acute** <10-14%





# Threshold levels of BNP and NTproBNP

Valid for HF-rEF and HF-pEF

## New-onset acute HF

**NT-proBNP < 300 pg/ml**

**BNP < 100 pg/ml**

**Probability**

**< 2%**

## New-onset non-acute

**NT-proBNP < 125 pg/ml**

**BNP < 35 pg/ml**

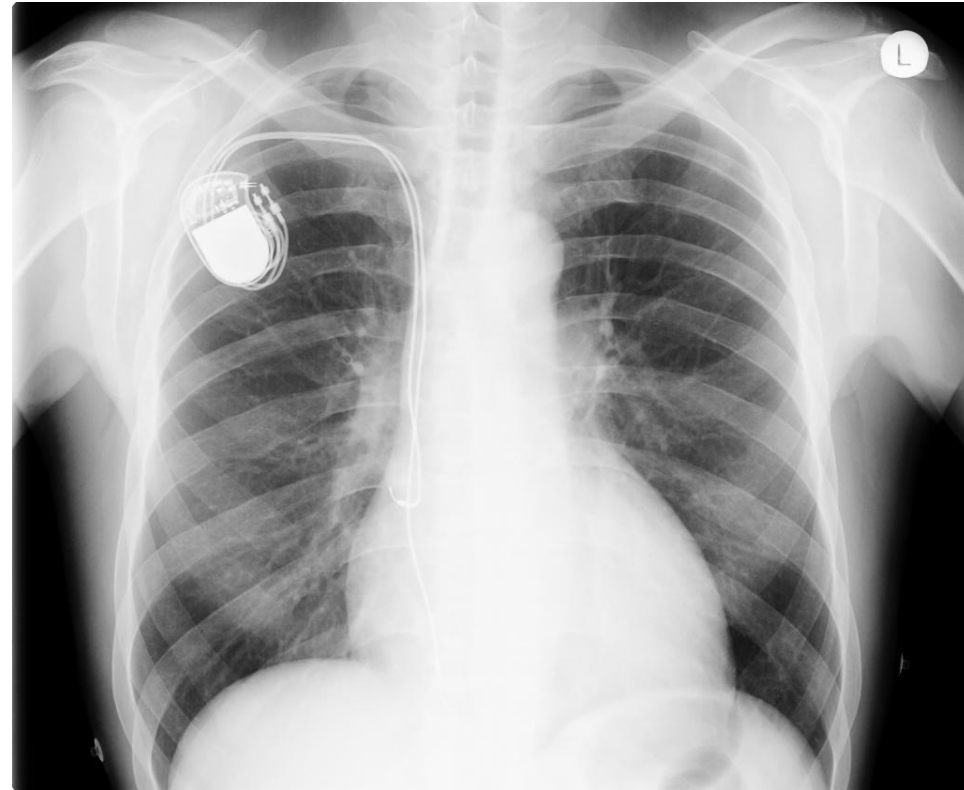
**Probability**

**<10%**



# Chest X-ray

- Heart size and configuration
- Pulmonary venous congestion
- Interstitial / alveolar pulmonary oedema
- Pleural effusions
- Pulmonary artery dilatation
- Implanted devices

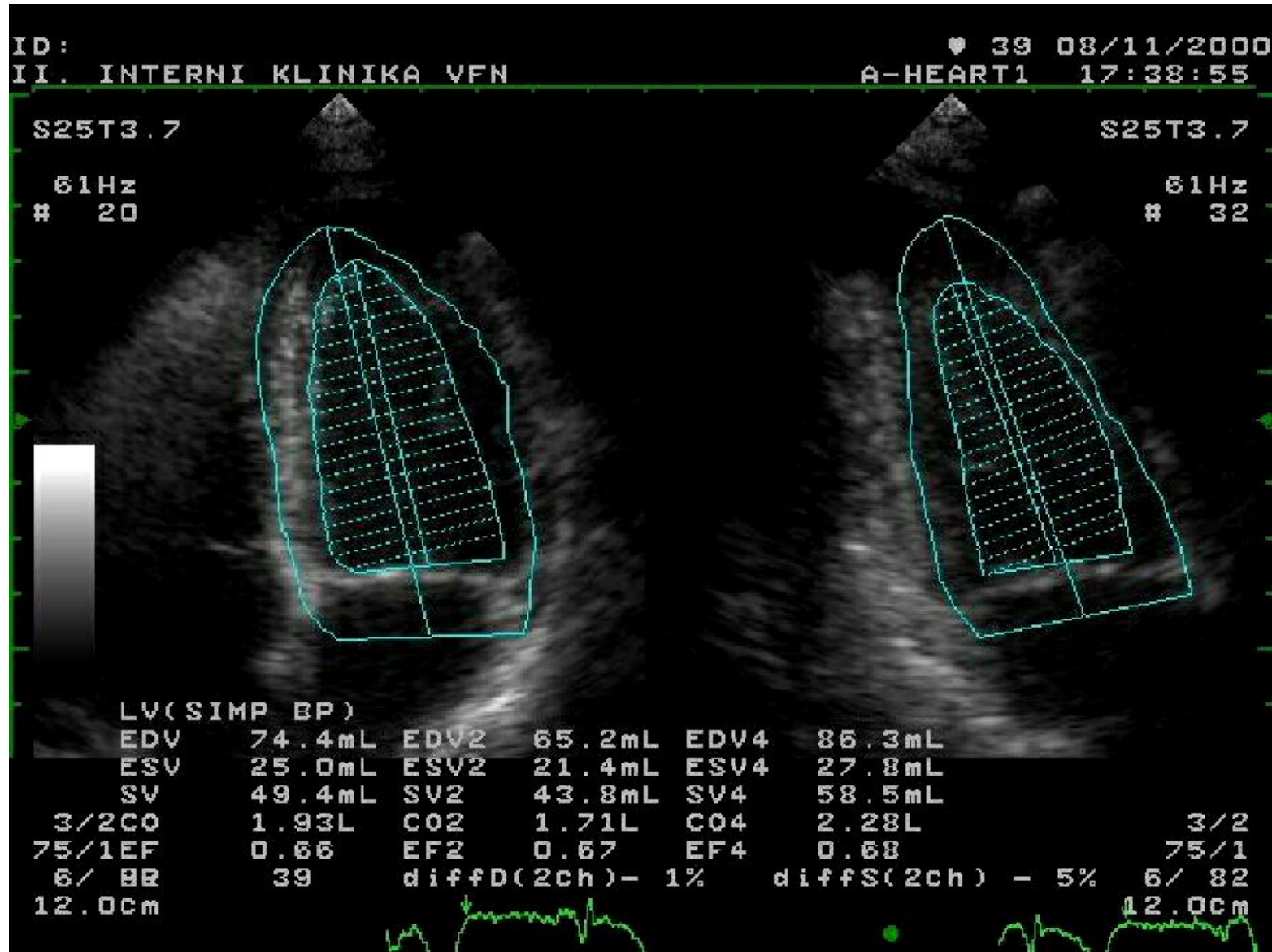


Source – VFN, P

**Normal chest X-ray does not exclude heart failure**



# Ejection fraction (Echocardiography)



# Left heart failure

All types = symptoms ± clinical signs of heart failure

**HFmrEF**

(heart failure with mid-range EF)



**HF – REF**

(heart failure with reduced EF)

**EF <40%**

**HF-PEF**

(heart failure with preserved EF)

**EF ≥ 50%**

**Elevation of BNP/NT-proBNP**

Structural LV involvement

Signs of diastolic dysfunction



# Remember

- Heart failure = symptoms!!!
- About 50% of HF cases have **NORMAL EJECTION FRACTION**
- HF  $\neq$  decreased EF !!!
- Important tools: History, Physical Exam, ECG, natriuretic peptides, echo, (chest X-ray)





# HF-pEF + HF-mrEF Guidelines 2016

**BNP >35 pg/mL and/or NT-proBNP >125 pg/mL**

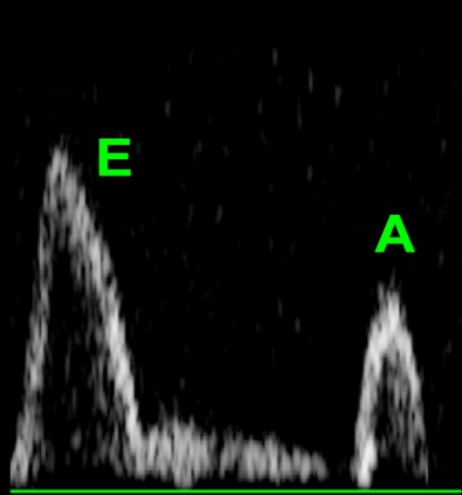
- **Structural abnormalities**

- Left atrial volume index(LAVi)  
>34 mL/m<sup>2</sup>
- Left ventricular mass index  
(LVMI)
  - ≥115 g/m<sup>2</sup> in men
  - ≥95 g/m<sup>2</sup> in women

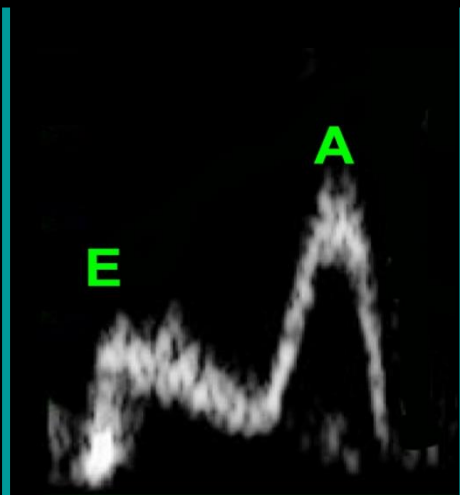
- **Functional impairment –  
diastolic dysfunction**

- E/e' ≥13
- Septal and lateral e' <9 cm/s

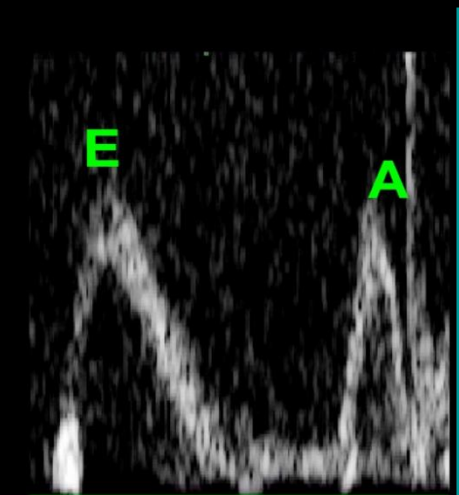
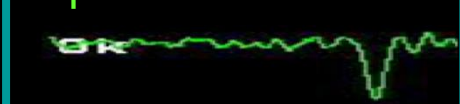




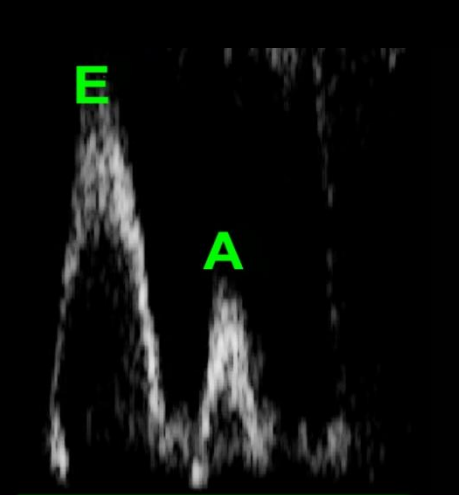
Normal



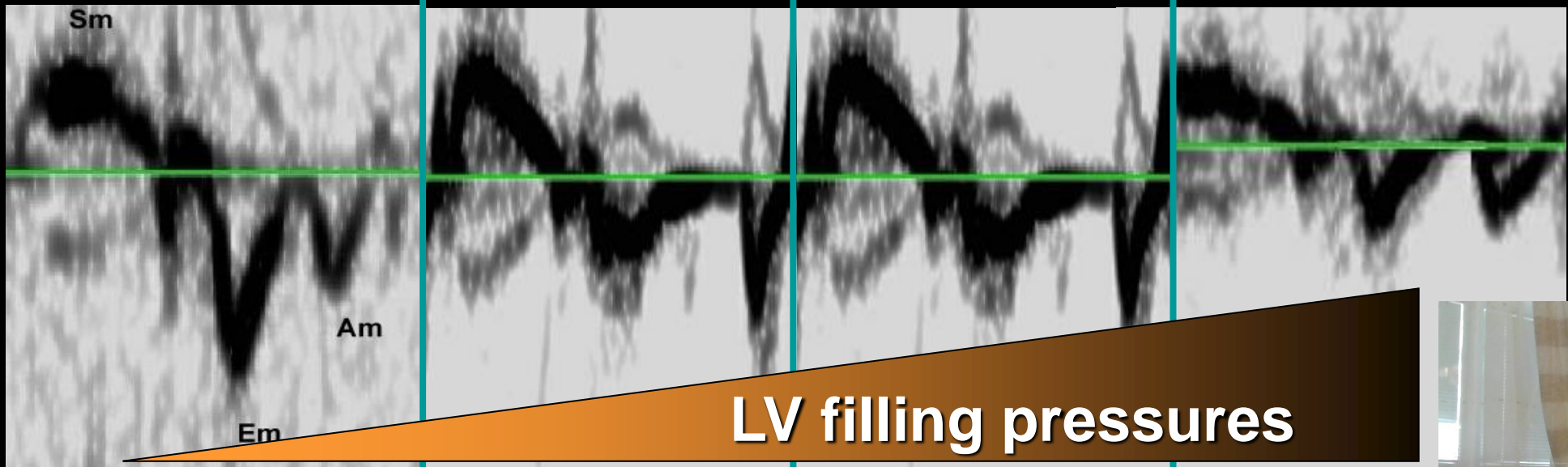
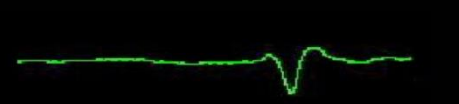
Impaired relaxation



Pseudonormal



Restriction

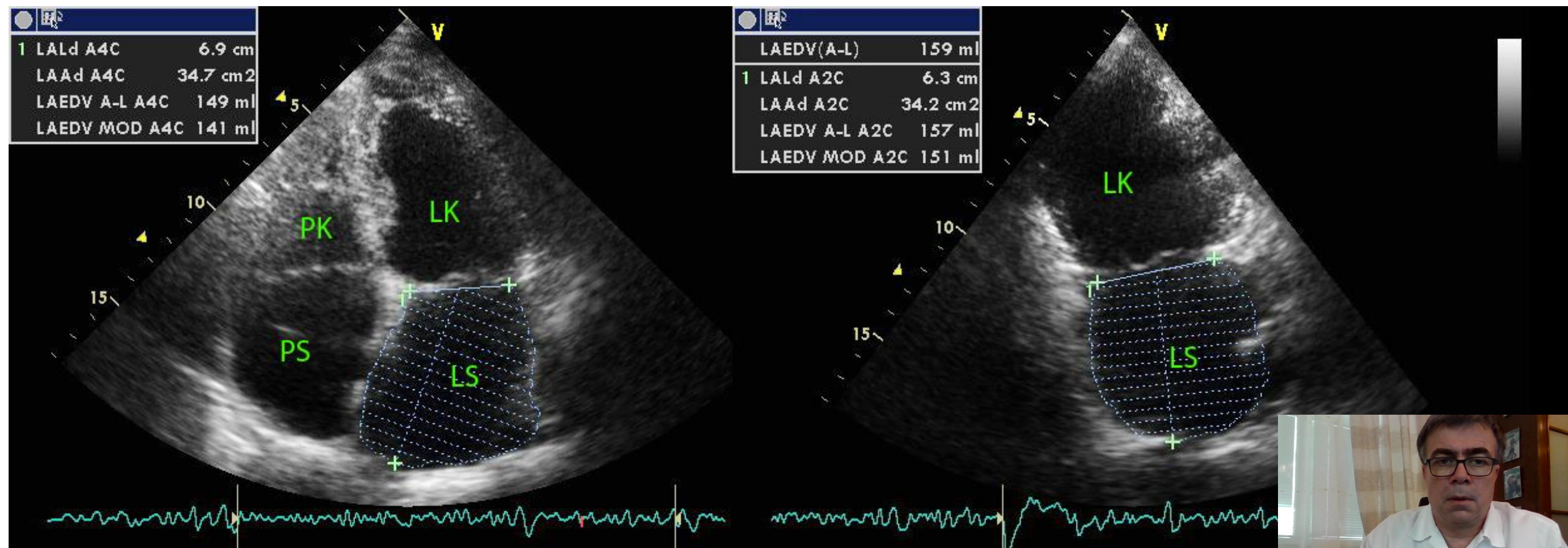


## LV filling pressures



# Left atrial volume index (LAVi)

- For men and women – upper limit 34 ml/m<sup>2</sup>



# Conclusions

- In acute settings consider life threatening causes
  - Heart failure – auscultation, ECG, chest X-ray, BNP/NT-pro BNP, echo
  - Acute coronary syndromes – add troponins
  - Asthma / COPD / pneumonia – auscultation, chest X-ray, CRP, WBC
  - Pneumothorax – auscultation, chest X-ray
  - Severe anemia
- In chronic settings – similar causes apply, the approach may be staged, in lung diseases use functional tests

