

# Acute dyspnea: how to disentangle COPD & Acute Heart Failure

---

Professor Christian Mueller

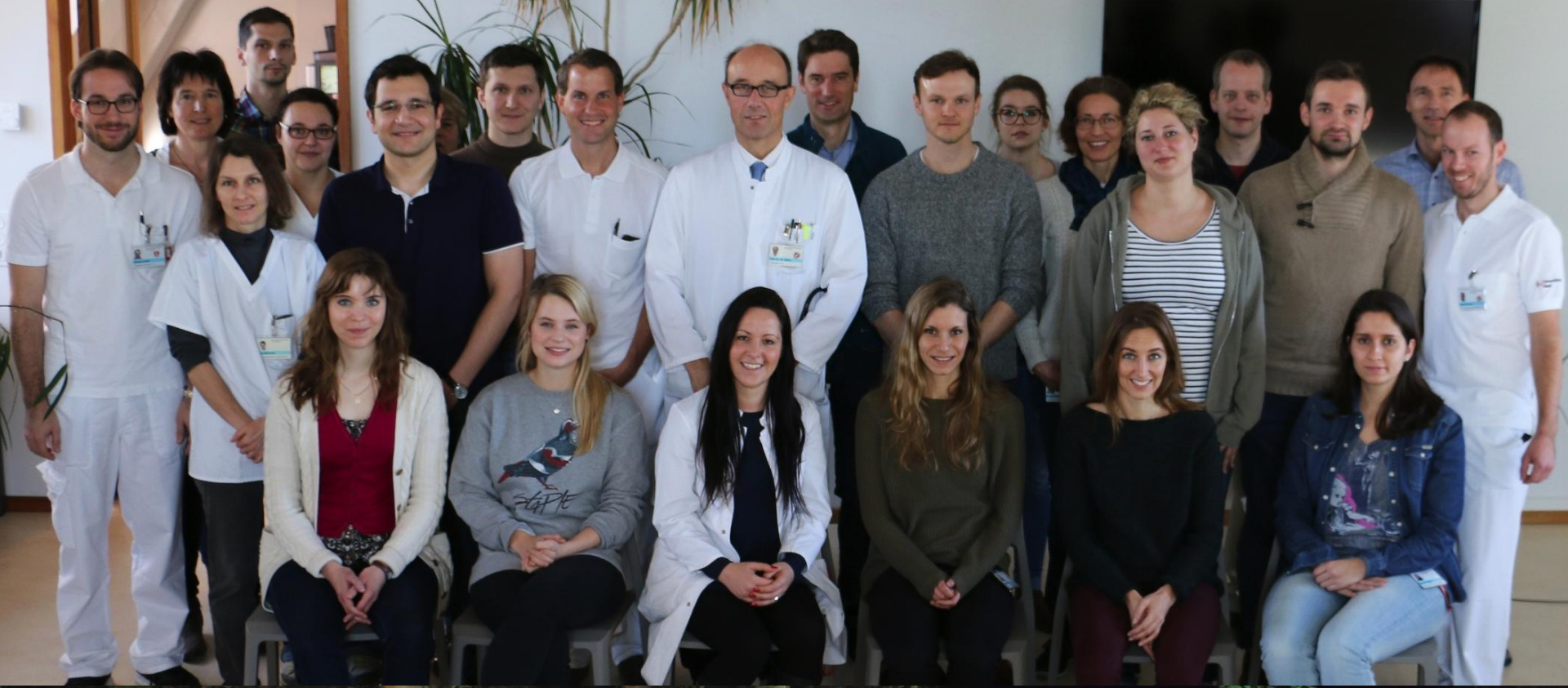
# Disclosures

---

- **Swiss National Science Foundation**



- Research support / travel support / consulting fees from several diagnostic and pharmaceutical companies



- 76y, male, **acute dyspnea, since 24h**

+ coughing, sputum↑

Previously: Exertional dyspnea, never at rest

- PH: CAD, CABG, persistent Afib, VVIR-PM, COPD,  
Chronic lymph edema (regular drainage)



Vitals:

RR 26, Temp 38,5°, Puls 60, BP 120/80, Oxy 94%

- Physical:

- Tachypnea, no rales, **Exspirium↑, Wheezing**
- Neck veins +/-, mild ankle edema (preexisting)
- barely hearable HS, no 3. HS

HF: **yes/no**

Ruhe EKG

Geb: 20.05.1928  
Alter: 78 J  
Geschl: männlich  
Grösse: 0 cm  
Gewicht: 0 kg  
Zimmer:  
Validiert:  
Inst./Abt.: KSB Klinikum II/Notfall  
Benutzer: Notfallstation 2

HF: 70 /min  
BD: 0/0 mmHg  
Achsen  
P: -90°  
QRS: 99°  
T: -79°

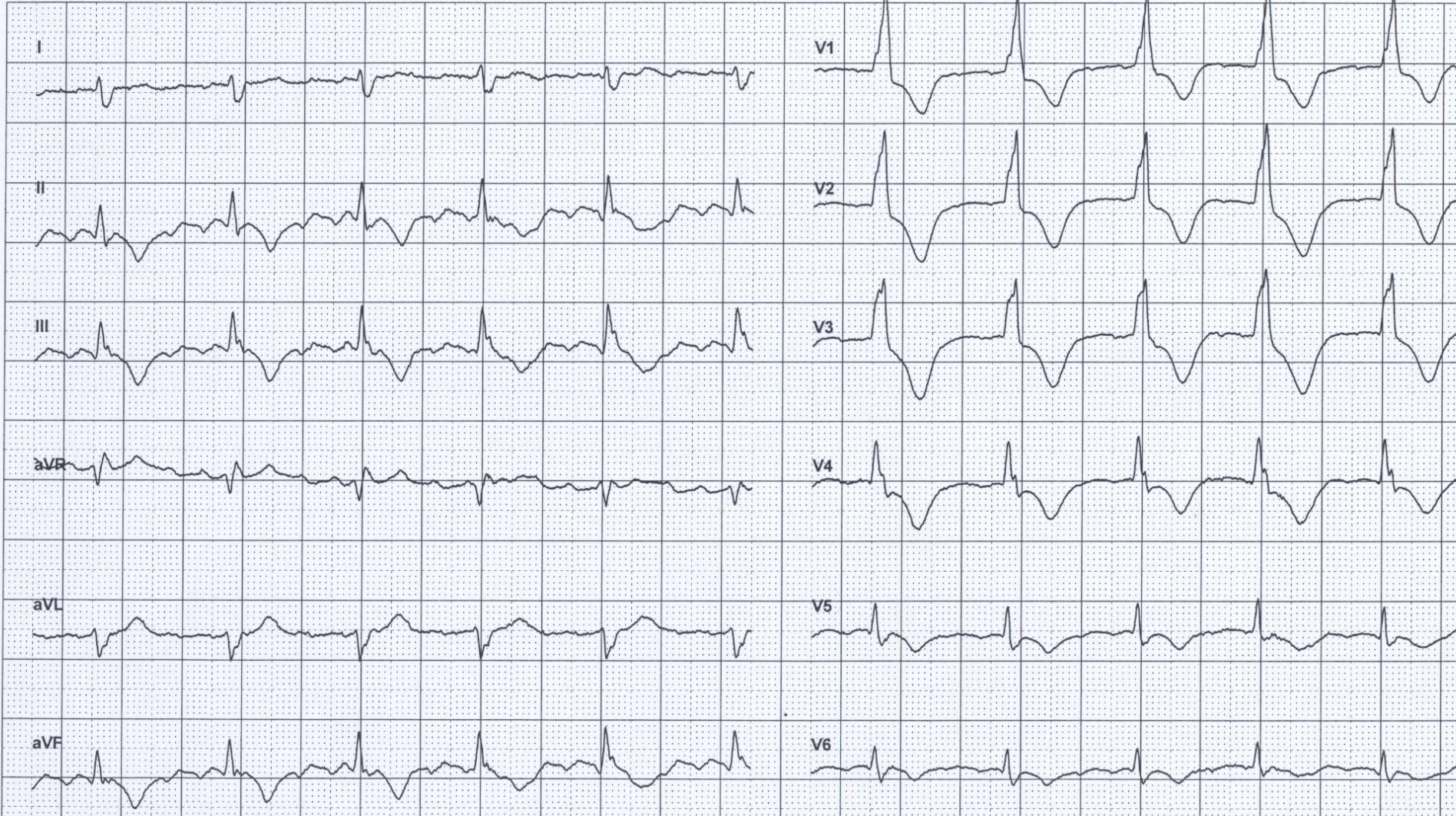
Intervalle  
RR: 855 ms  
P: 96 ms  
PQ: 156 ms  
QRS: 130 ms  
QT: 482 ms  
QTc: 520 ms

Interpretation

Med:

Ind:

Risikofaktor:



L

Lab:

**BNP 2'100 pg/ml (n<50)**

HF: **yes/no**

# What is the key symptom in HF?

**Dyspnea**

# Pathophysiology?

**Intracardiac filling pressures ↑**

# What are the key diagnostic tools?

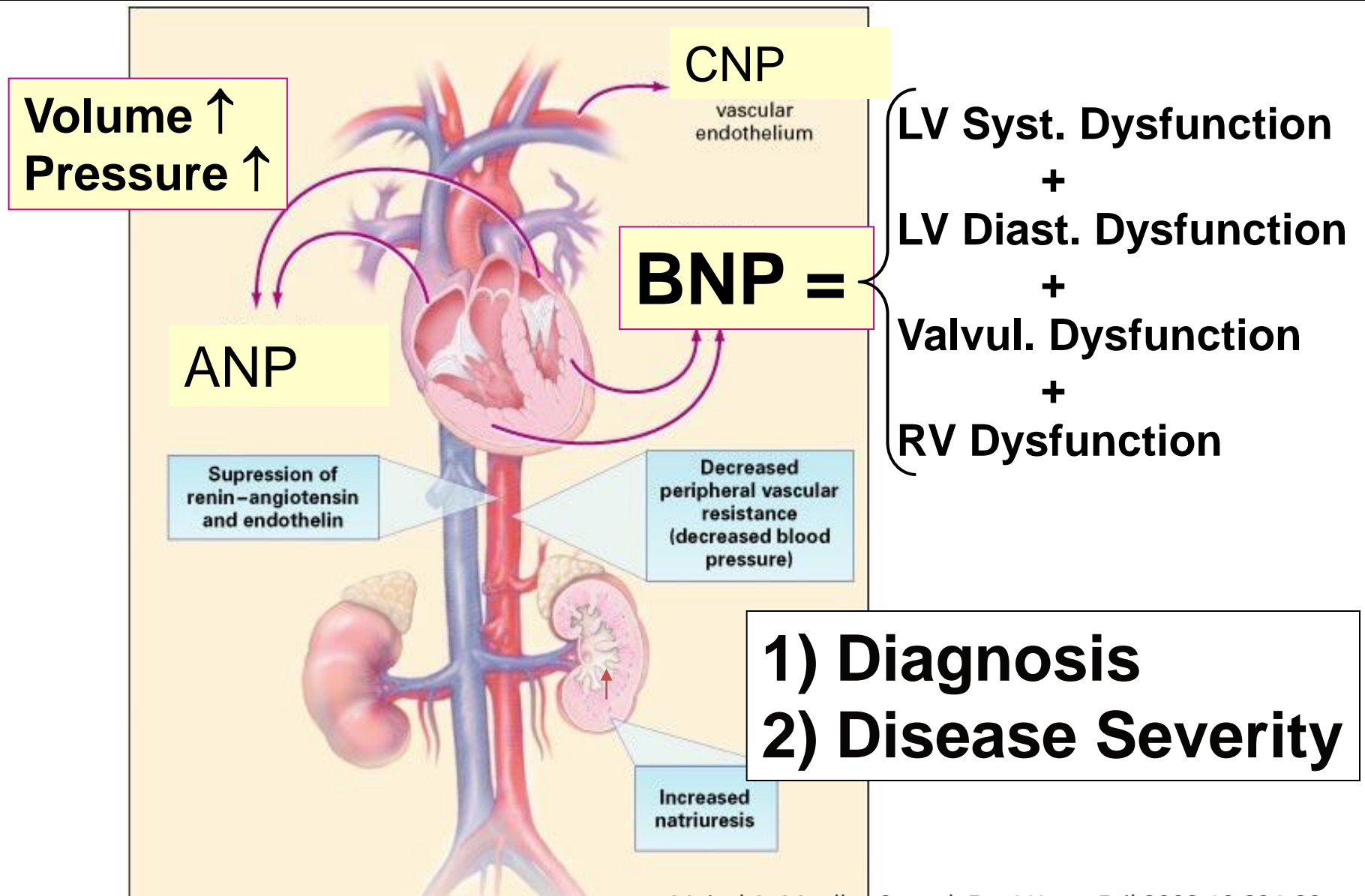
**Symptoms & signs**

**ECG, Chest x-ray, BNP**

**Echo**

| Recommendations   | Class <sup>a</sup> | Level <sup>b</sup> |
|---|--------------------|--------------------|
| Upon presentation a measurement of plasma natriuretic peptide level (BNP, NT-proBNP or MR-proANP) is recommended in all patients with acute dyspnoea and suspected AHF to help in the differentiation of AHF from non-cardiac causes of acute dyspnoea. | I                  | A                  |

# NP: Quantitative Marker of HF



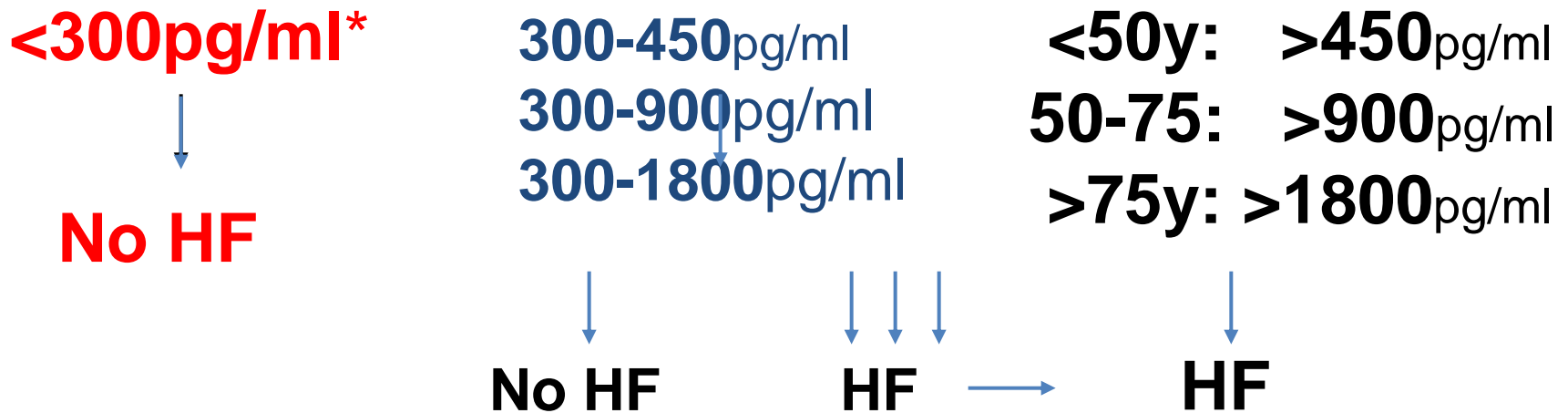




# Interpretation of NT-proBNP in dyspnea

1) Quantitative variable

2) Always conjunction with clinical information



\*Cave: a) Obesity

Diuretics  
Nitrates  
ACE-Inhibitor

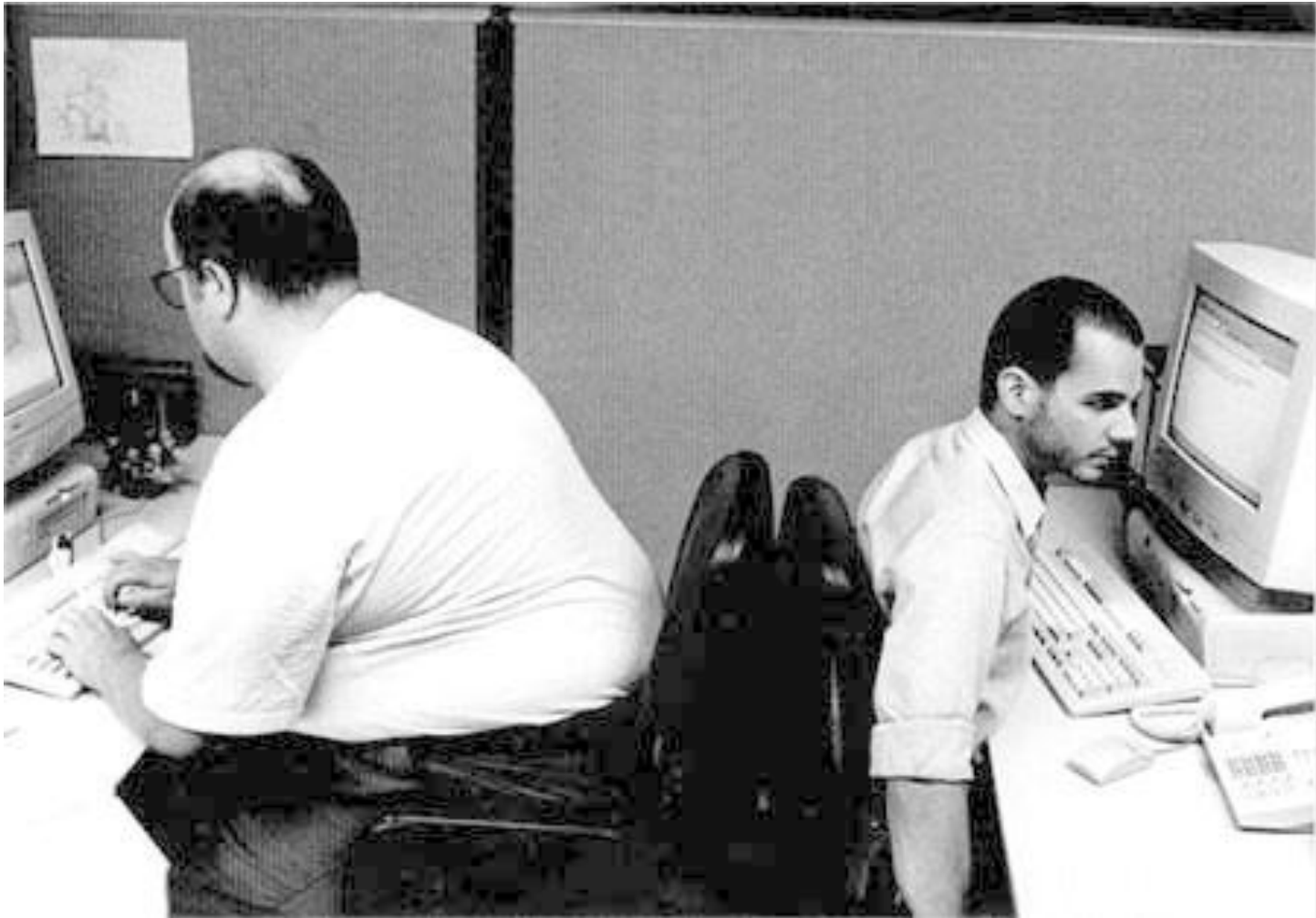


# NP & HF diagnosis: Question

Cut-off levels: The accuracy of NP can be increased by adjusting for:

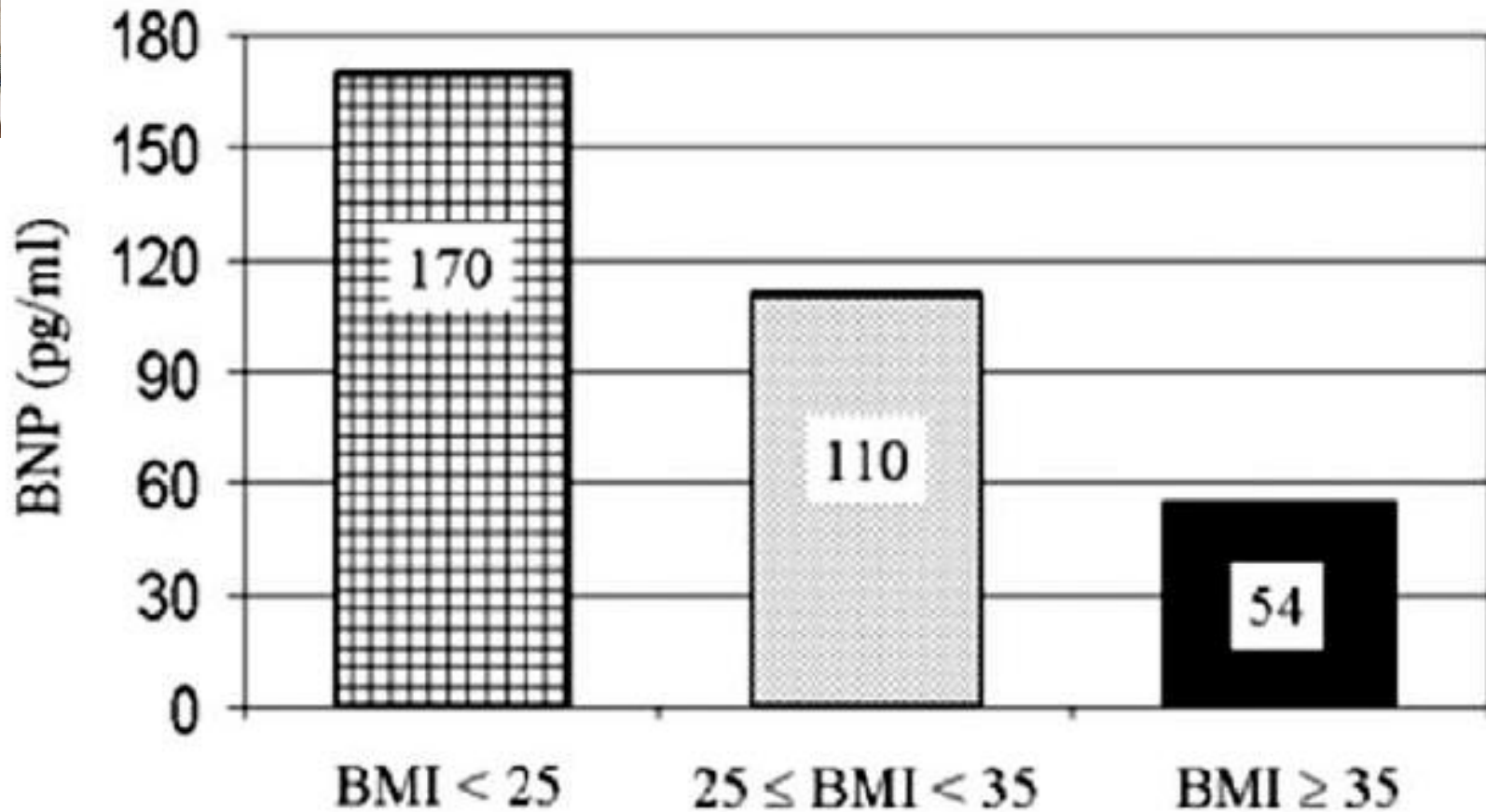
1. Gender
2. Coronary artery diseases
3. Obesity

# Obesity: does it matter?



Courtesy of Alan Maisel, M.D.

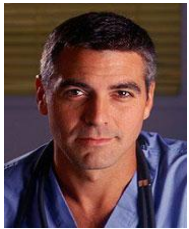
# Obesity: Optimal cut-off levels to rule out HF



# Common errors



~~Pulmonary disease is the most common cause of acute dyspnea~~



~~I am done once HF is diagnosed~~



~~HF can nearly always be reliably diagnosed clinically by a HF expert~~

# HF: Diagnosis

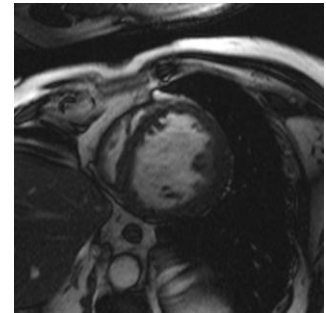
---

## 1. Is it HF?

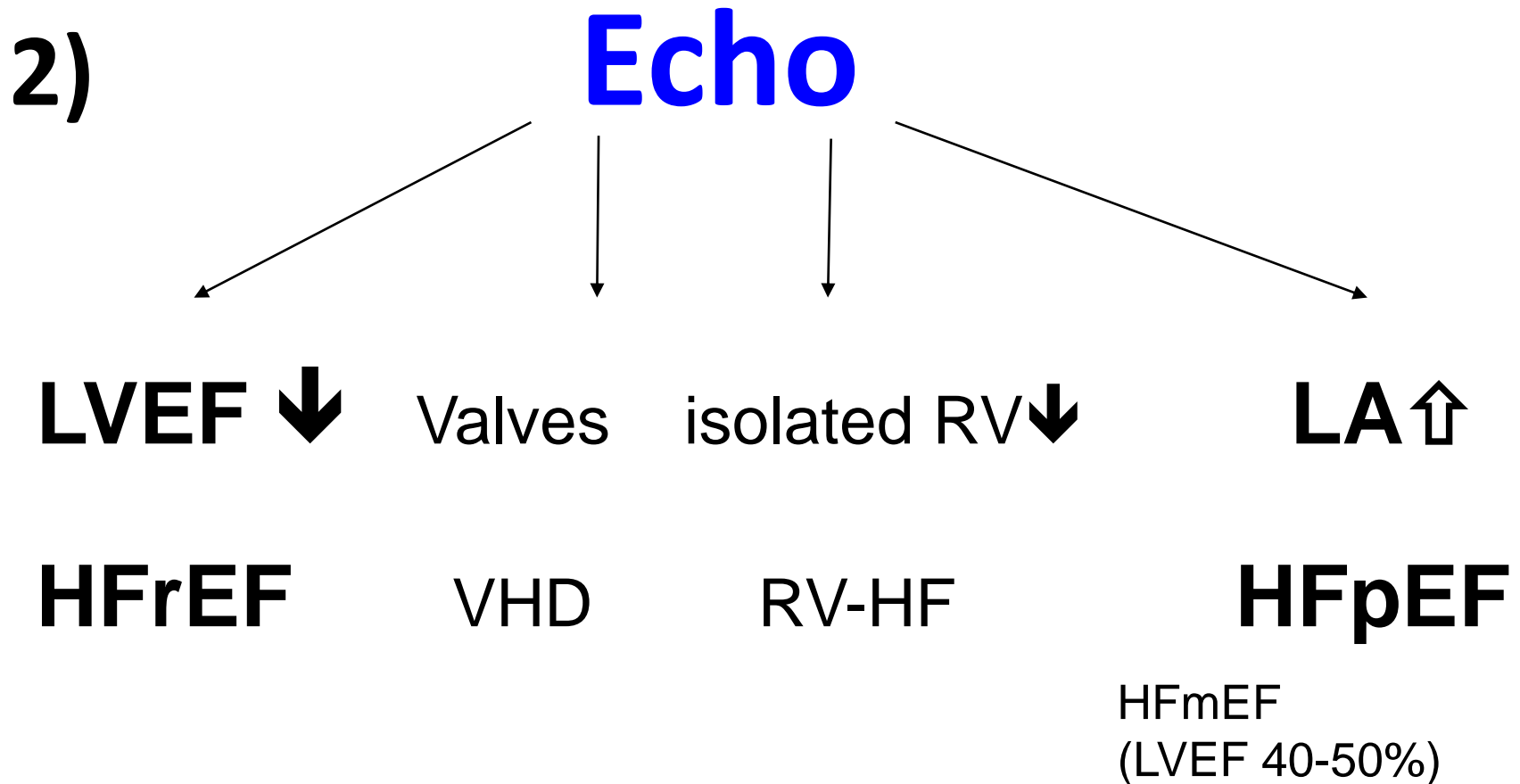
History, physical, ECG  
Chest x-ray, BNP ✓

## 2. Cardiac disease?

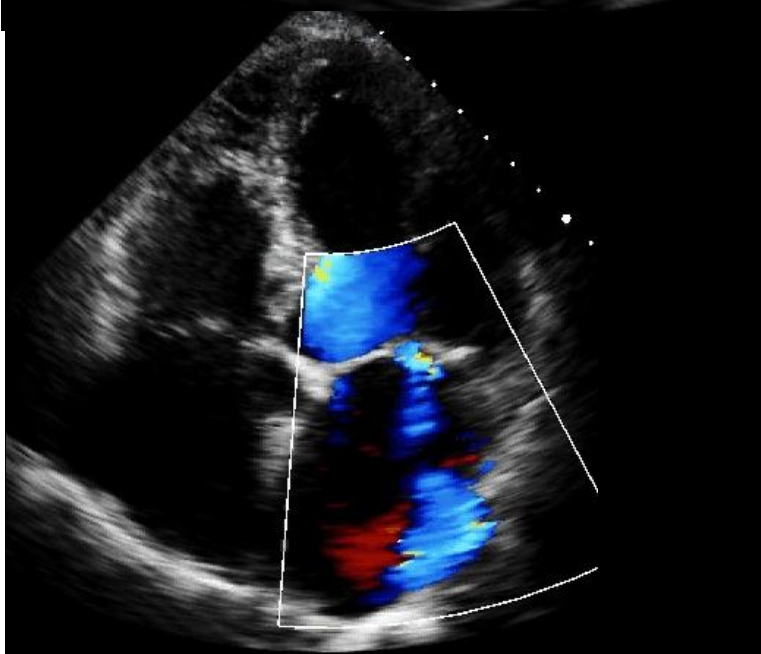
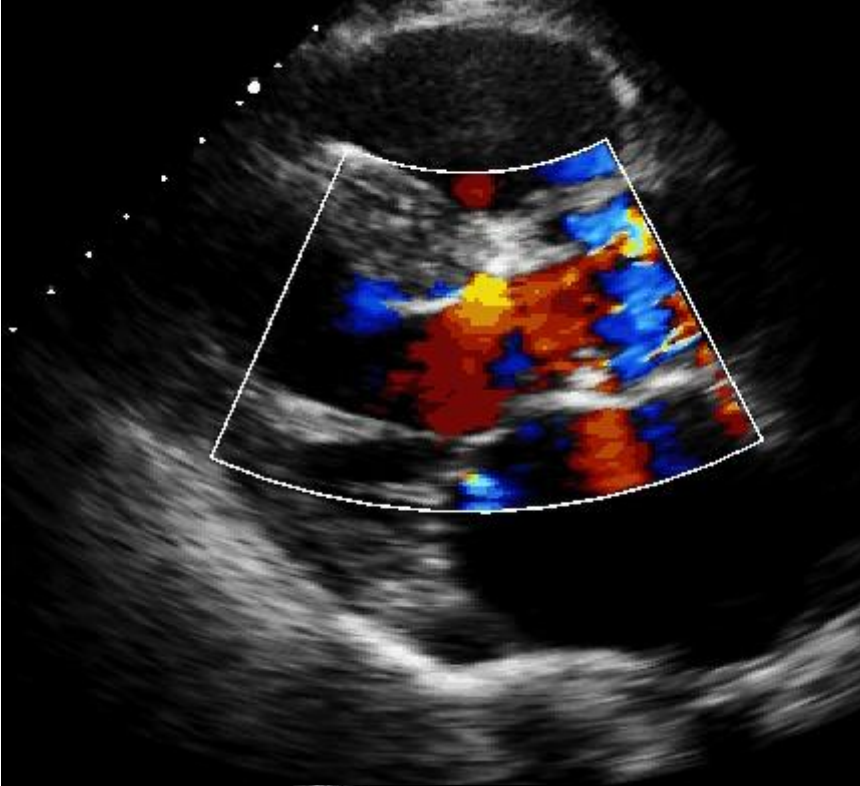
## 3. Trigger?



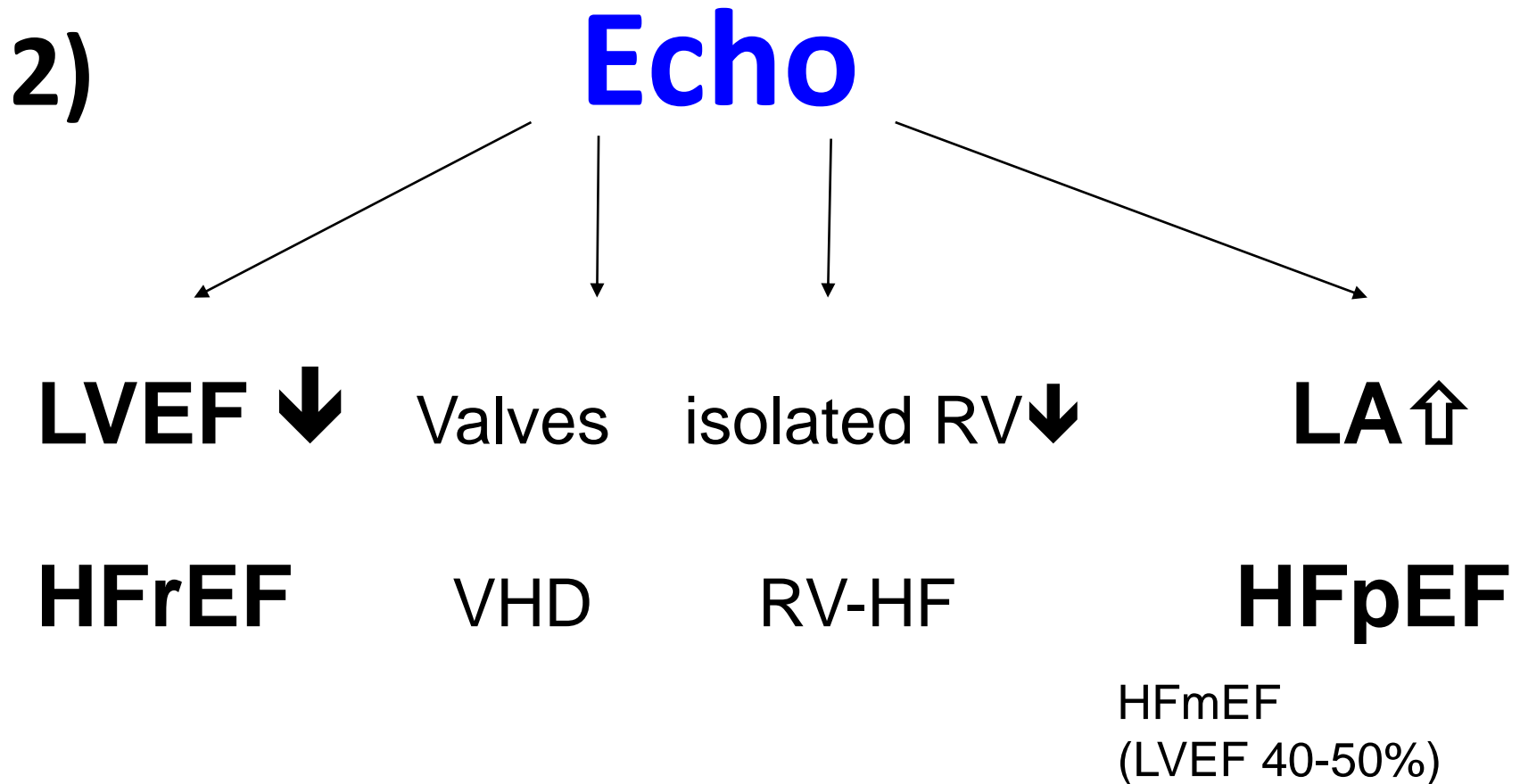
# 1) Diagnose HF: Clinical + ECG + BNP







# 1) Diagnose HF: Clinical + ECG + BNP



# HF: Diagnosis

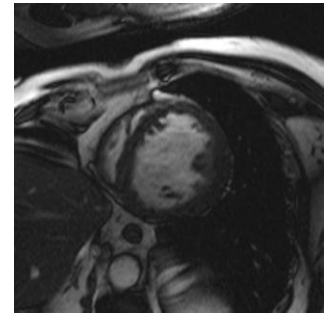
---

## 1. Is it HF?

History, physical, ECG  
Chest x-ray, BNP ✓

## 2. Cardiac disease?

## 3. Trigger?



# Biomarkers in HF: Diagnosis

---

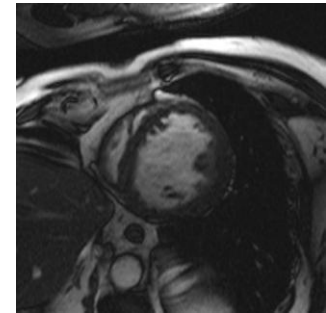
## 1. Is it HF?

History, physical, ECG

Chest x-ray, **BNP** ✓

## 2. Cardiac disease?

## 3. Trigger?



**cTn, D-Dimers, CRP/PCT, Hb, TSH**

**Ferritin, Transferrin saturation**