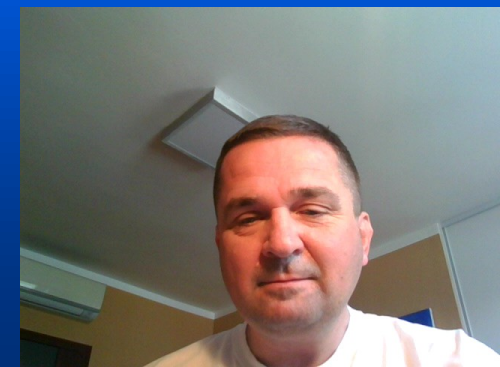
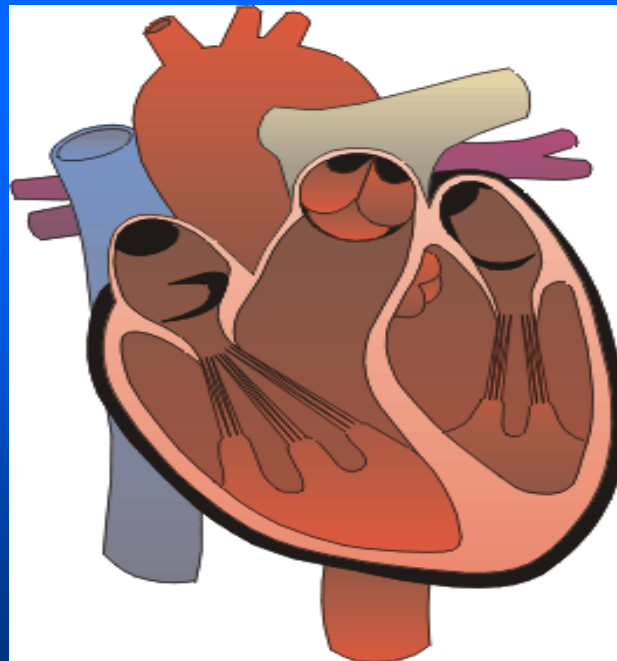


# Examination methods in cardiology

L.Křivan



# History

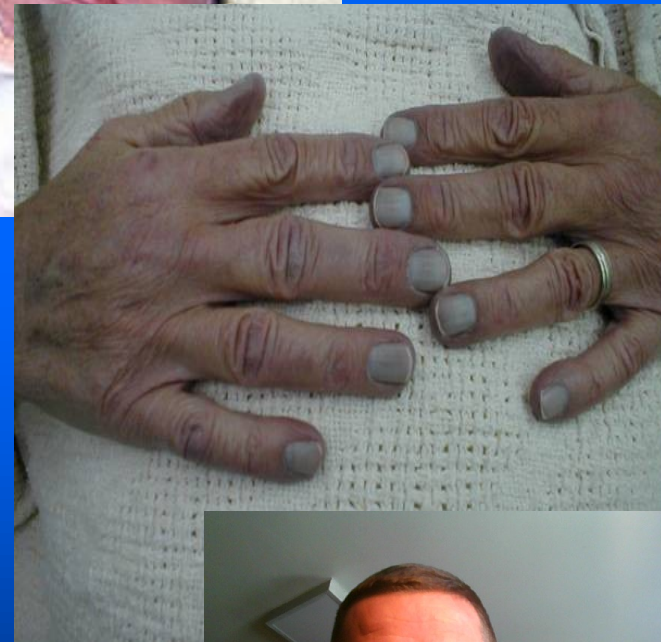
- Heart disease in patient's history
- Family history
- Risk factors ( gender, age, smoking, cholesterol, diabetes)
- Physical performance
- Syncope
- Arrhythmias
- Medication



# General inspection of the patient

- **Cyanosis**

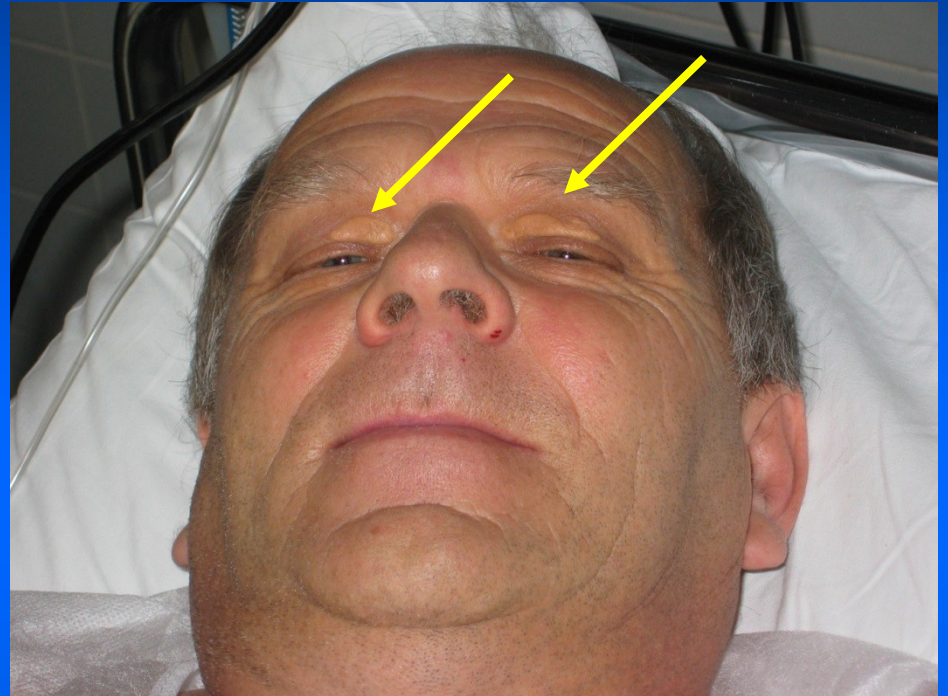
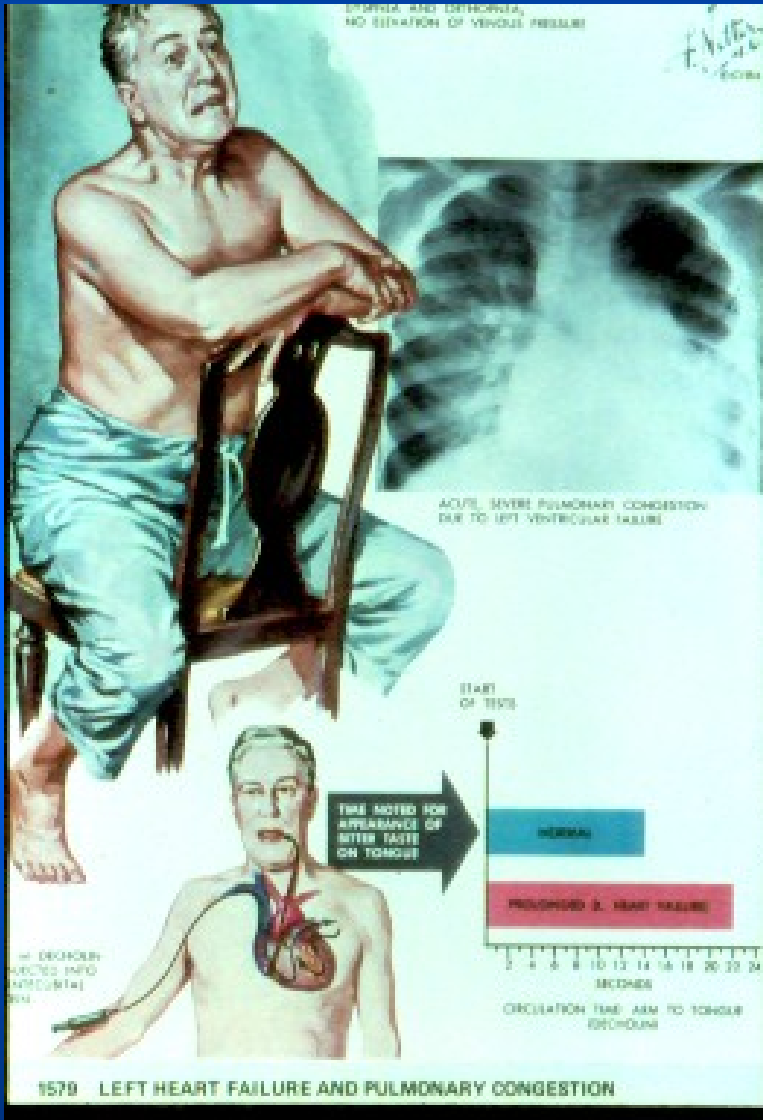
Children with Tetralogy of Fallot exhibit bluish skin during episodes of crying or feeding.



Reduced hemoglobin in capillary blood > 50g/l



# General inspection of the patient

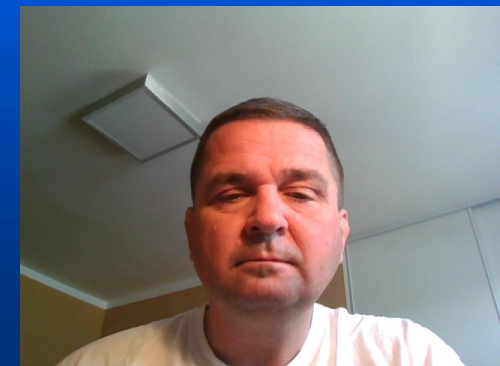
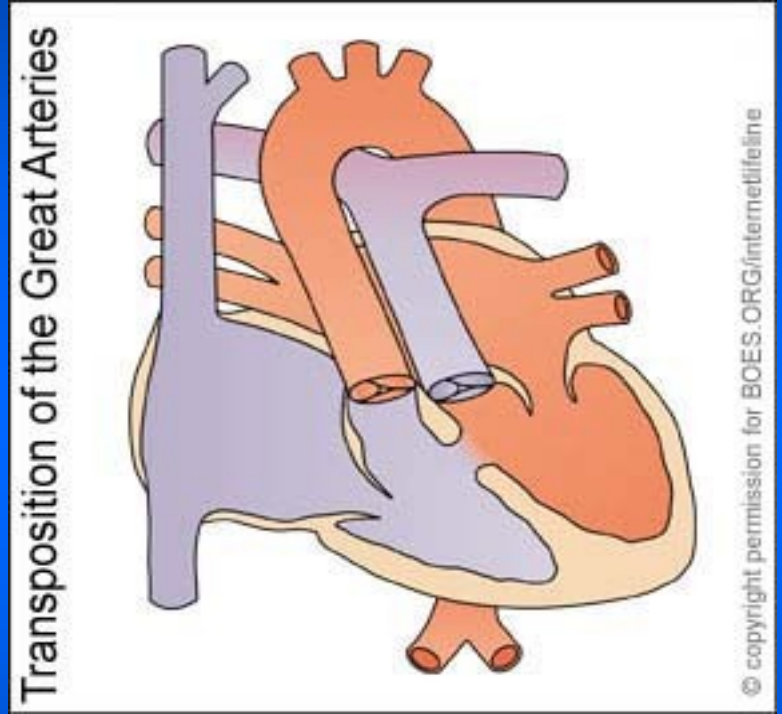




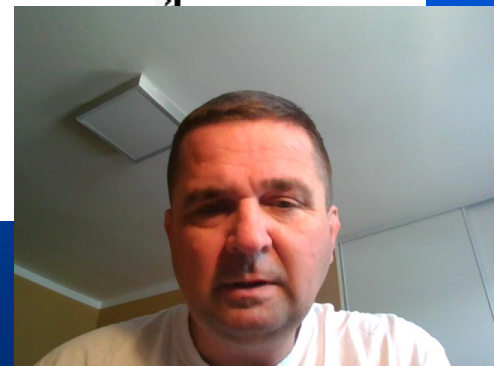
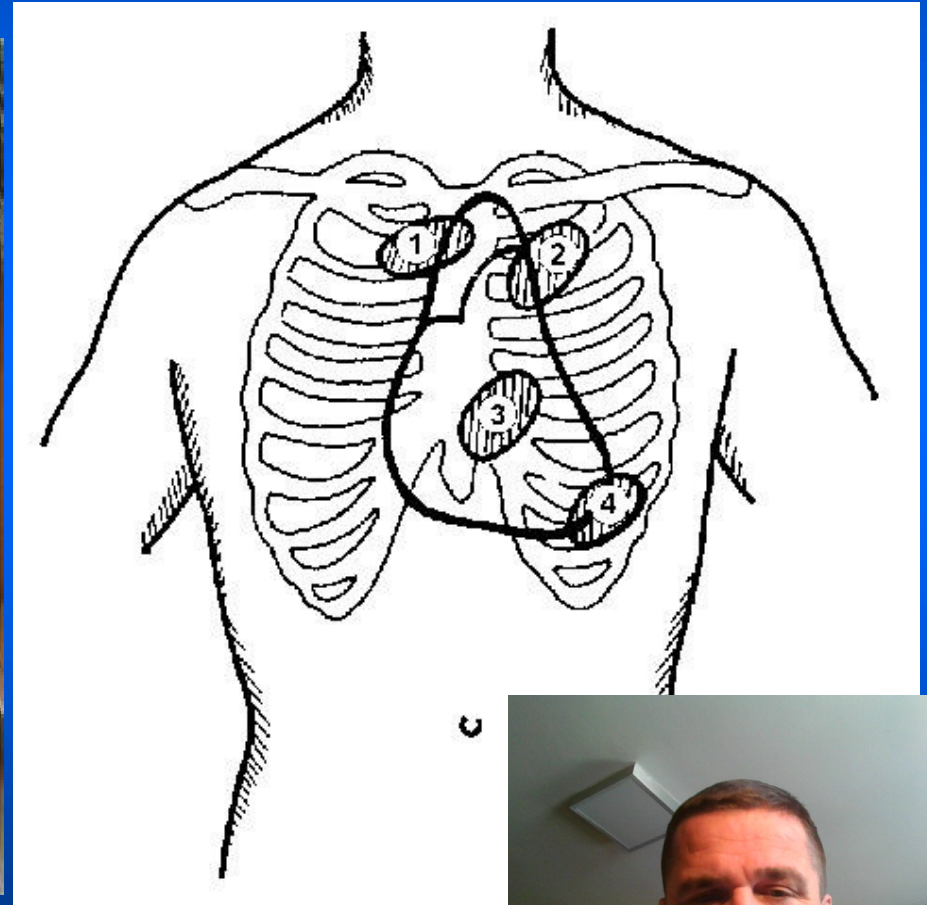
## General inspection of the patient



# General inspection of the patient

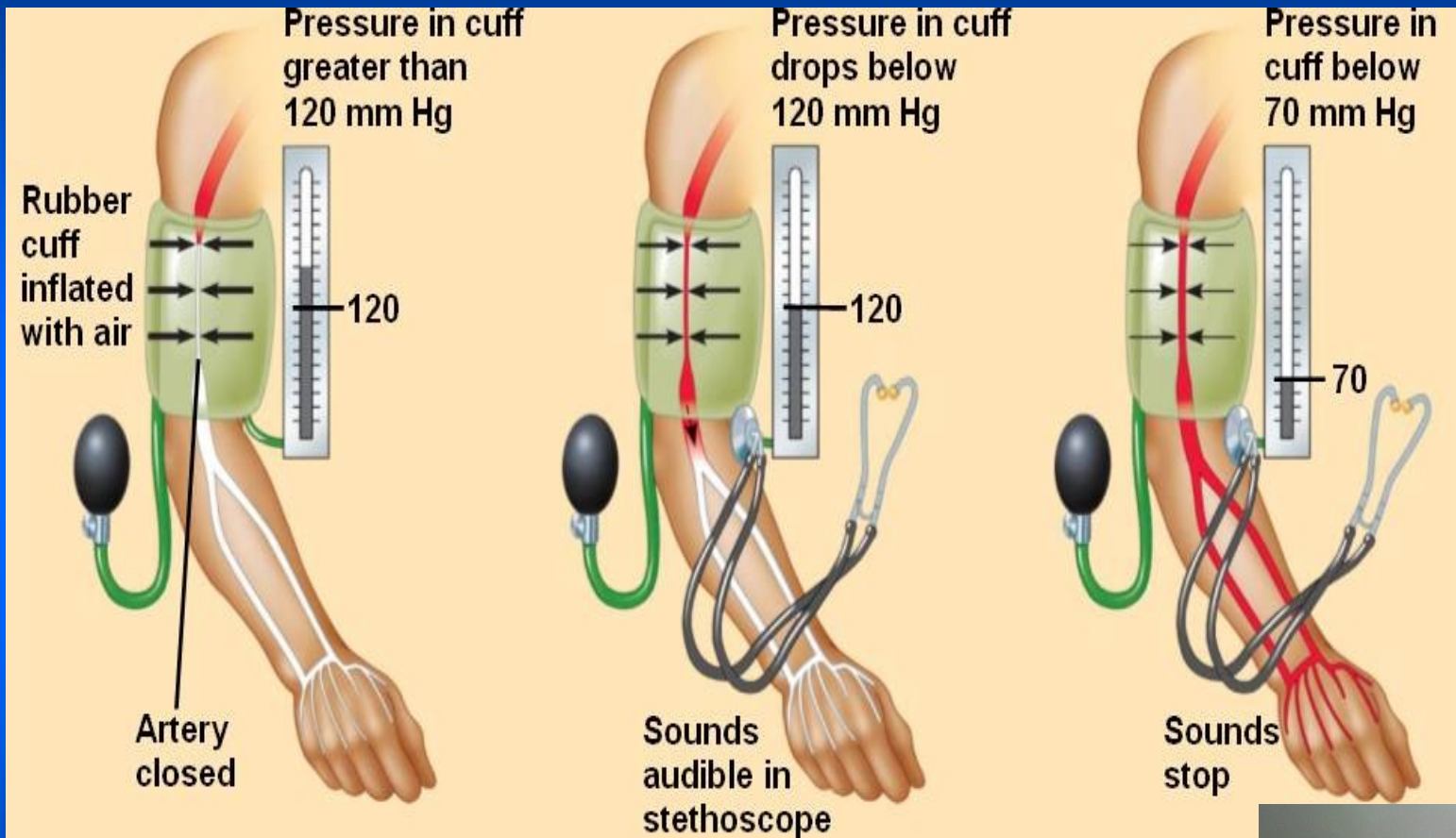


# Auscultation of the heart



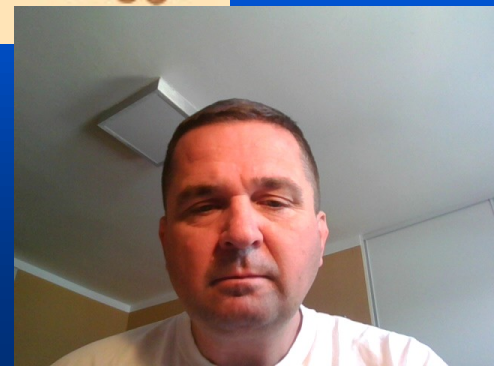


# Blood pressure



Hypertension BP > **140/90** mmHg

Hypotension SBP < **100** mmHg



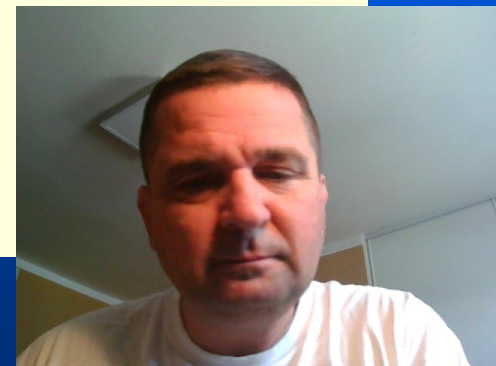
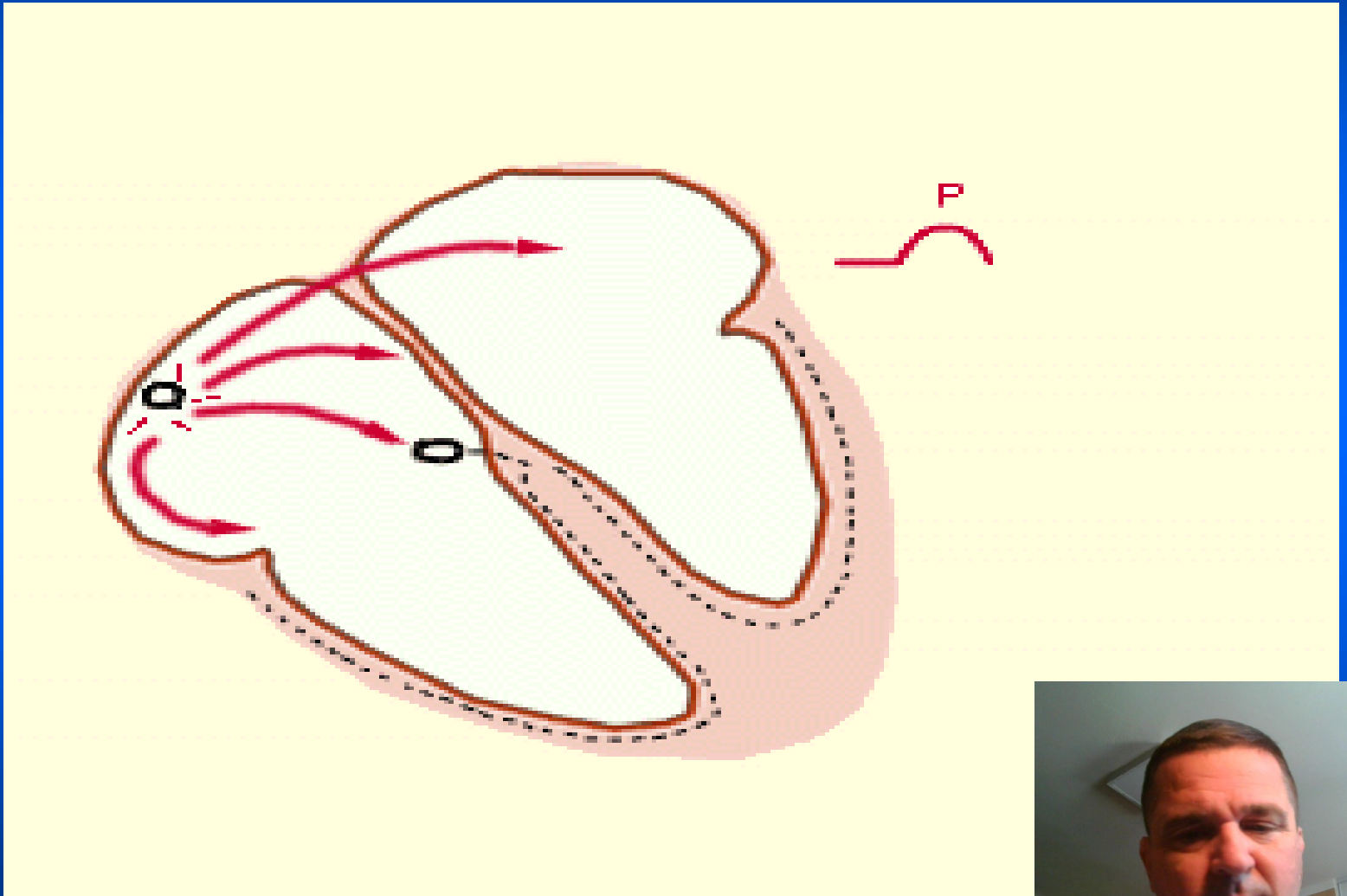


## Noninvasive

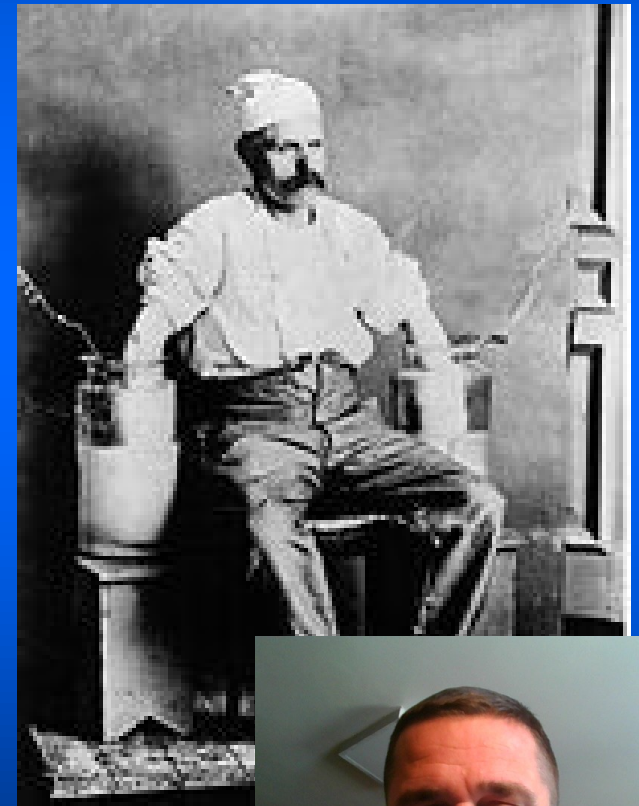
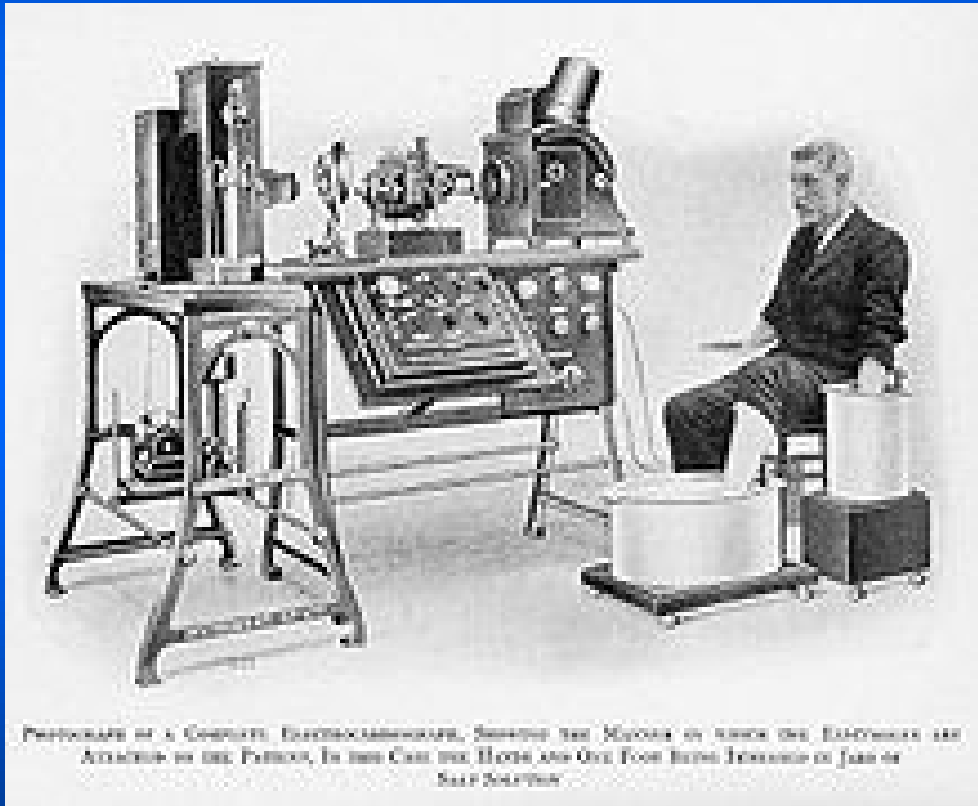
- **ECG** – arrhythmias, ischaemia, previous MI, LV hypertrophy, ionic disorders
- **X - RAY** – CT index, lung congestion, valvular diseases



# ECG (Willem Einthoven 1893)

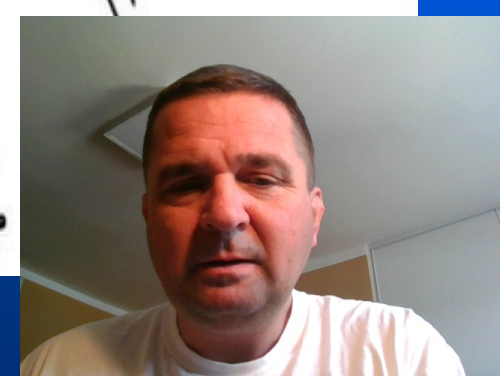
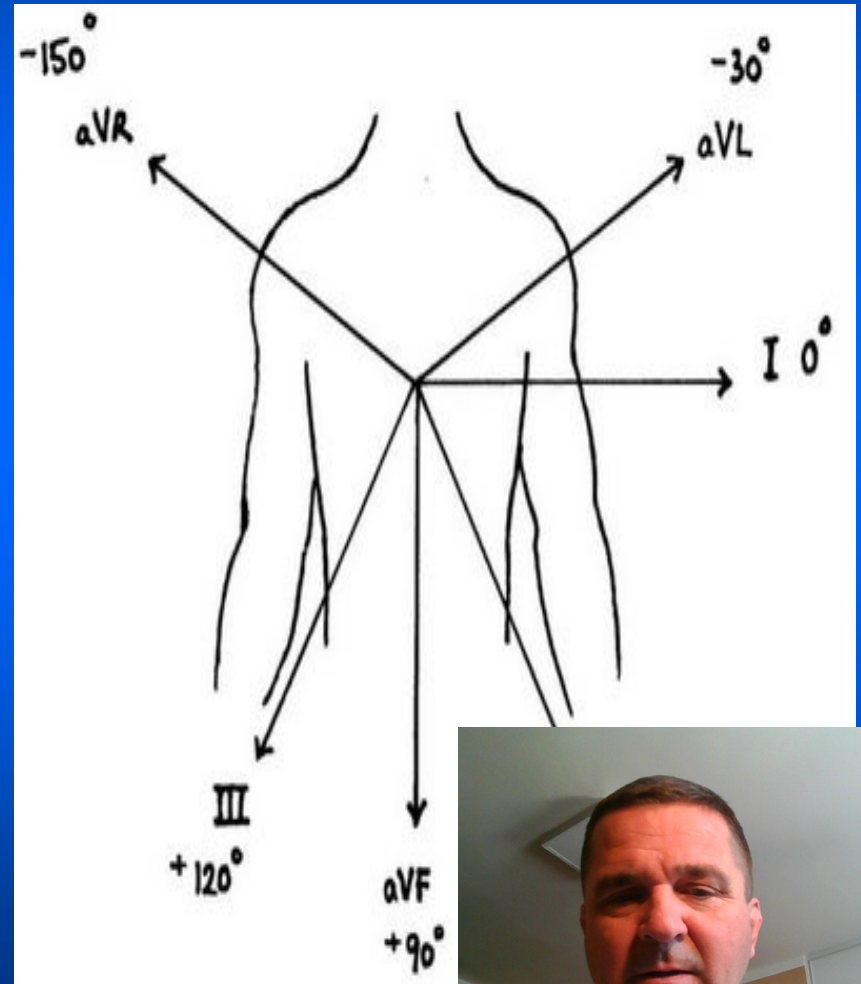
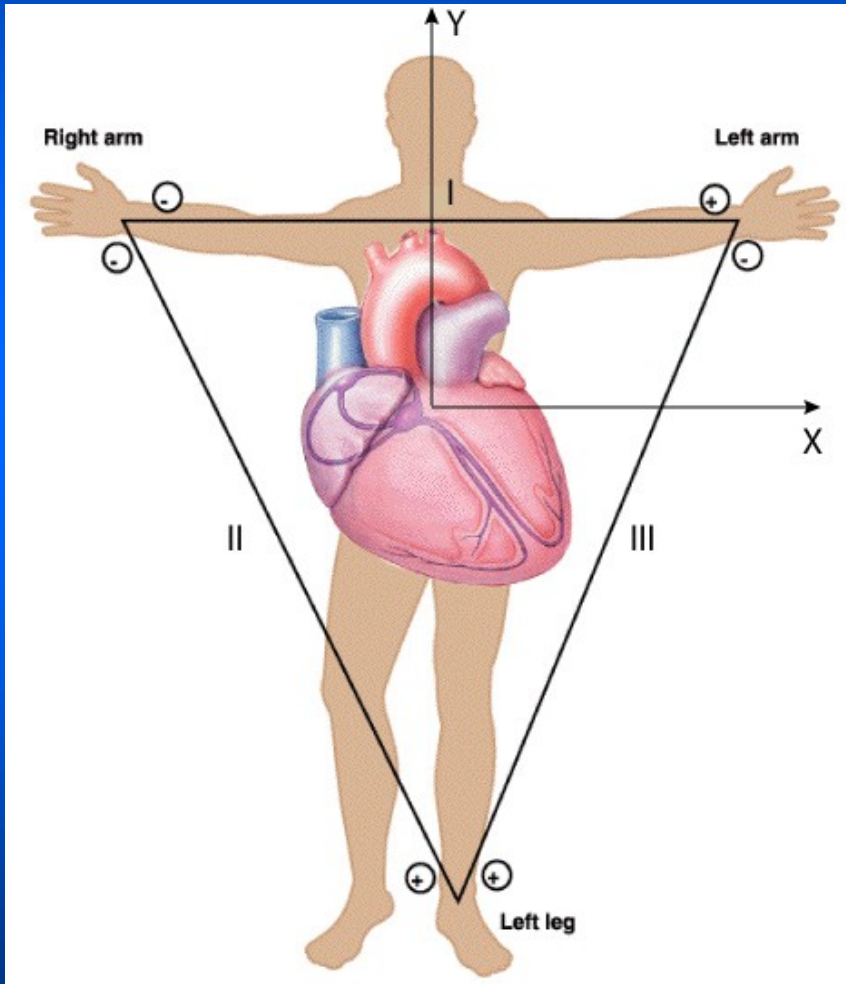


# ECG history

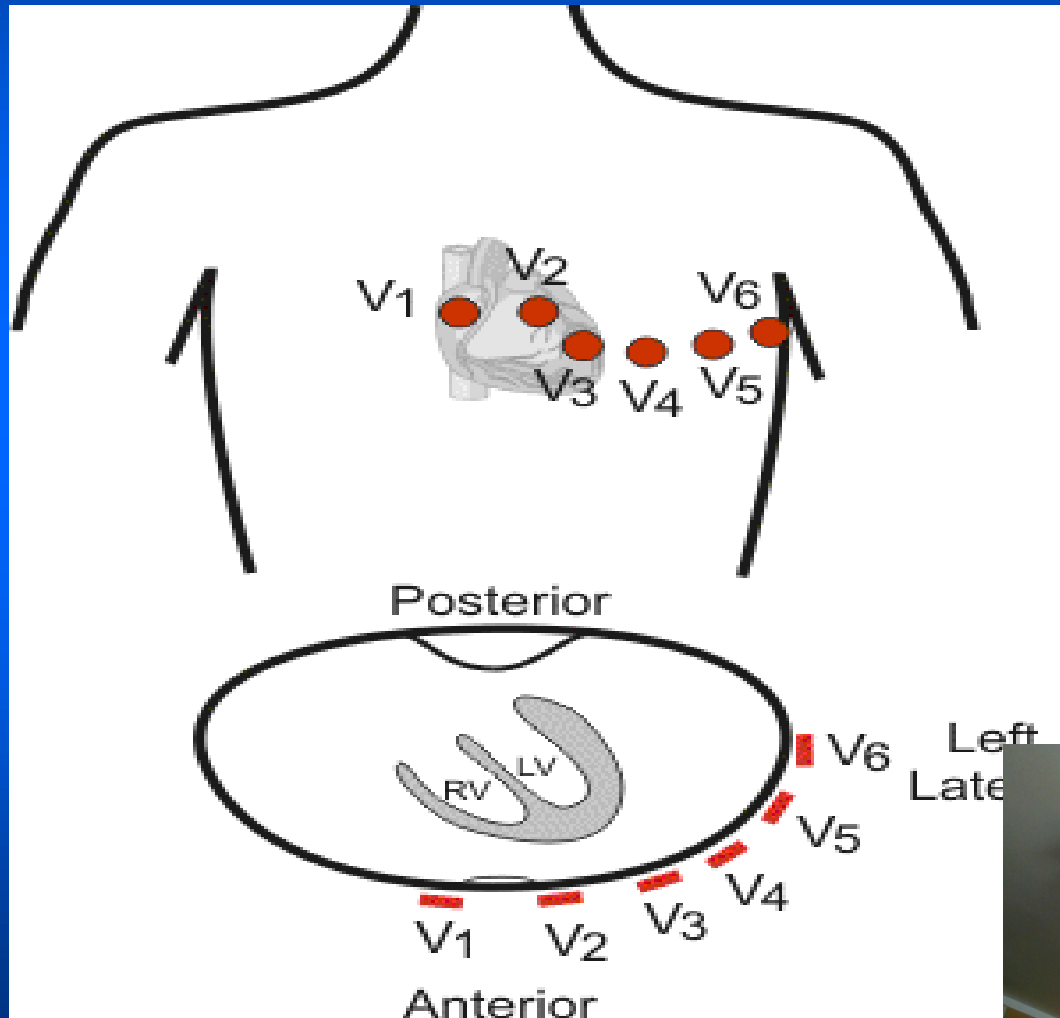


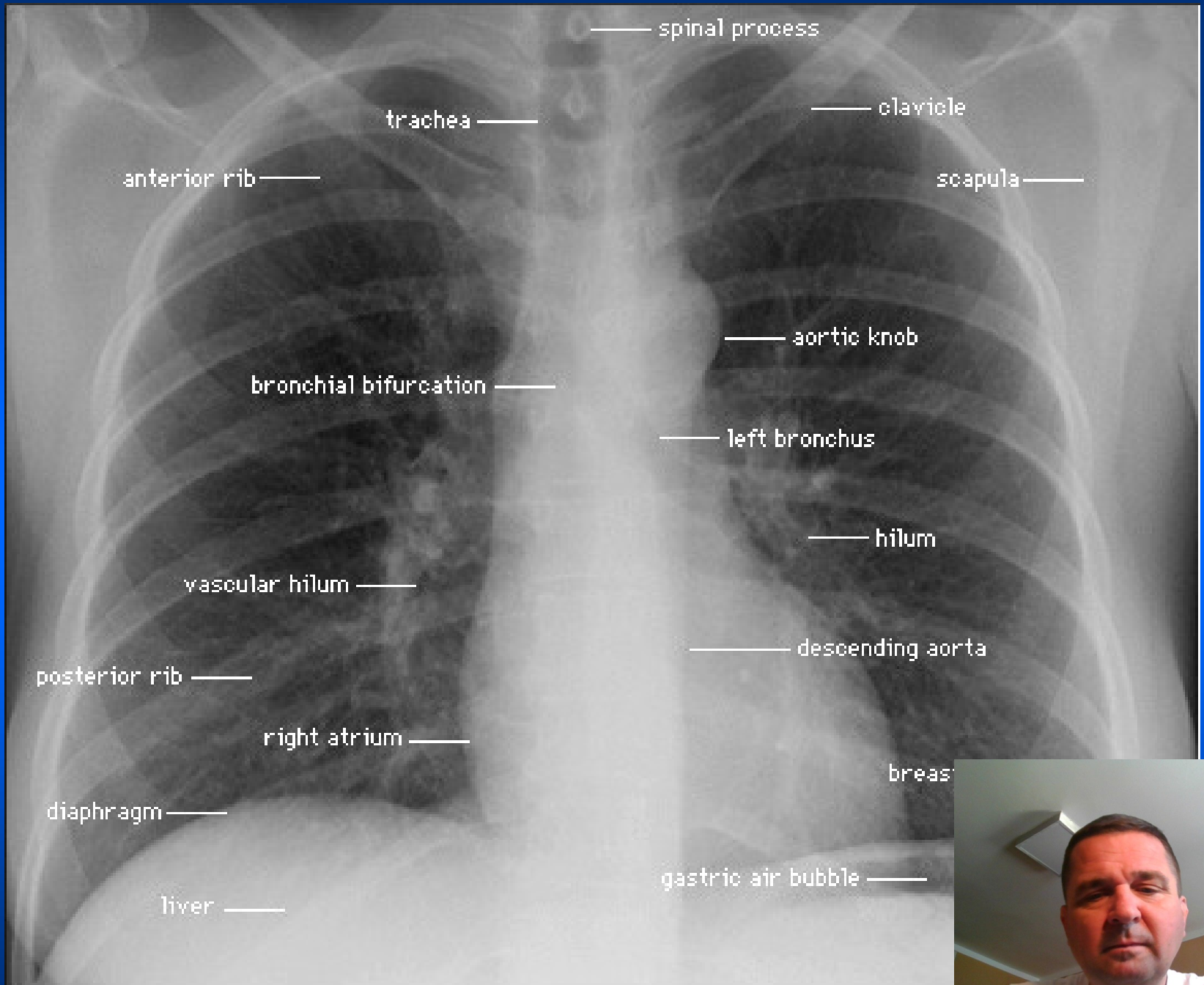


# ECG – limb leads



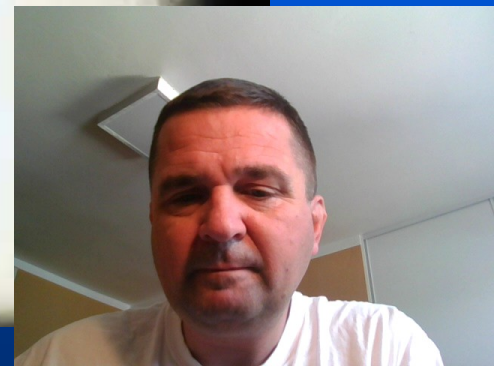
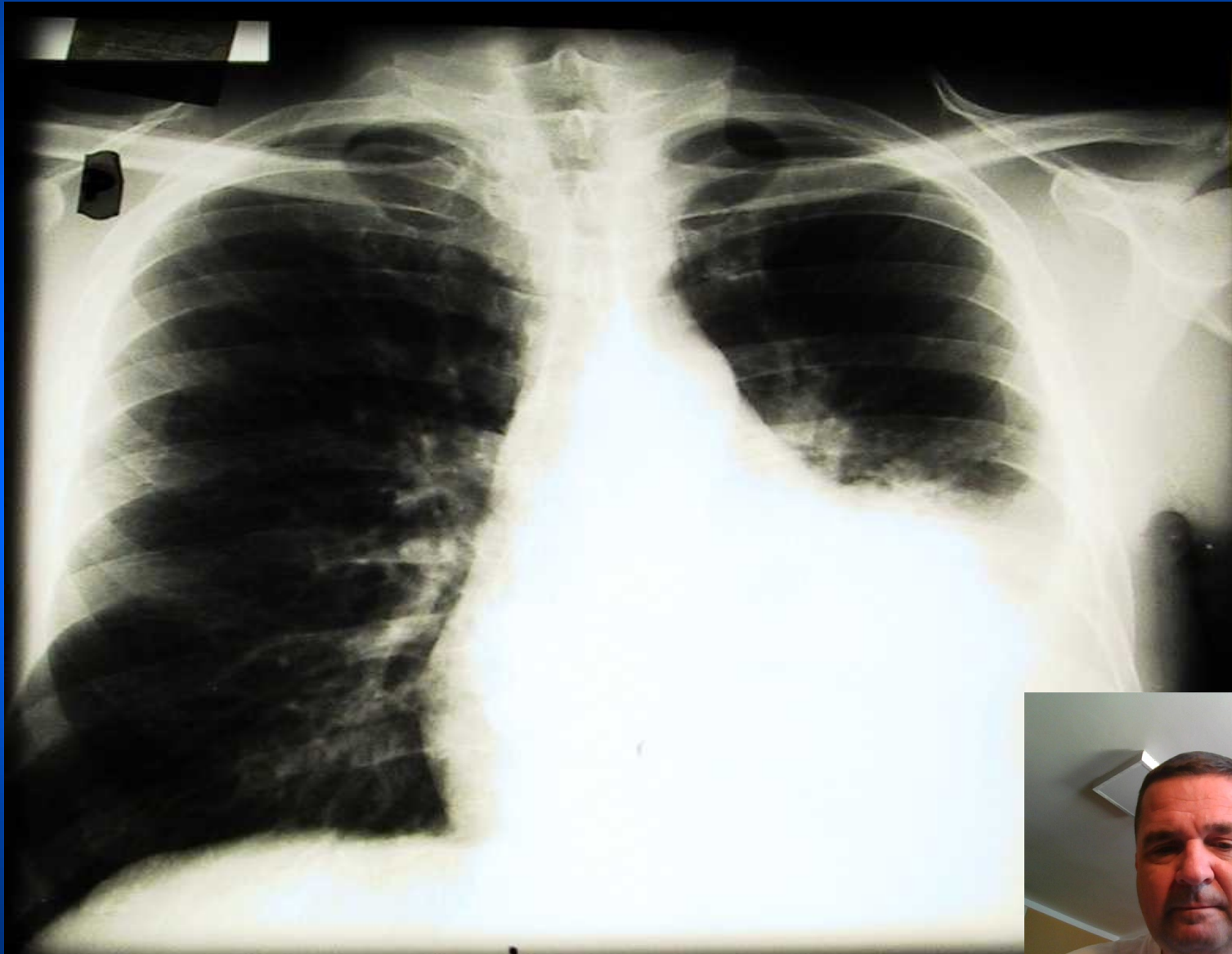
# ECG- precordial leads



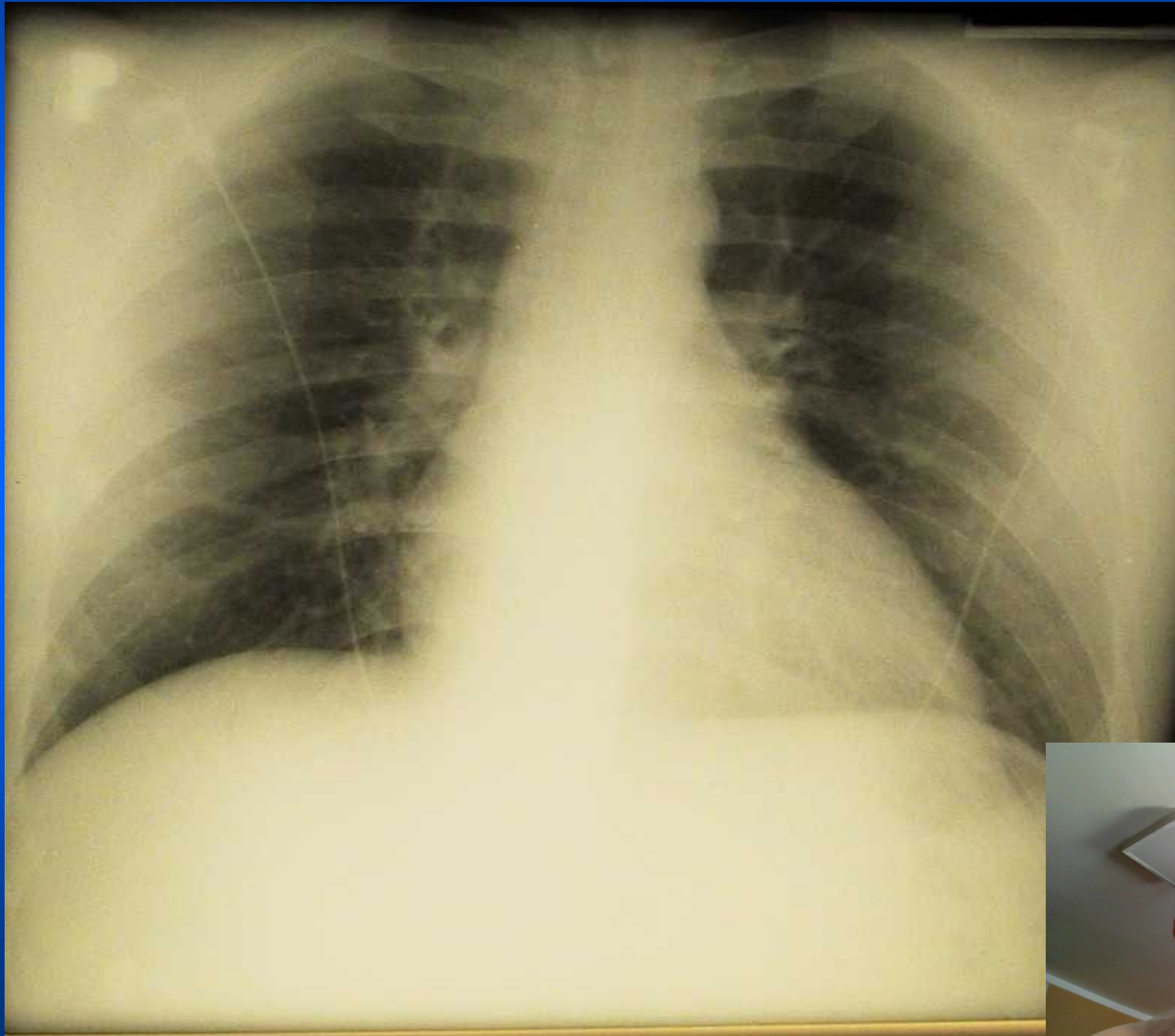




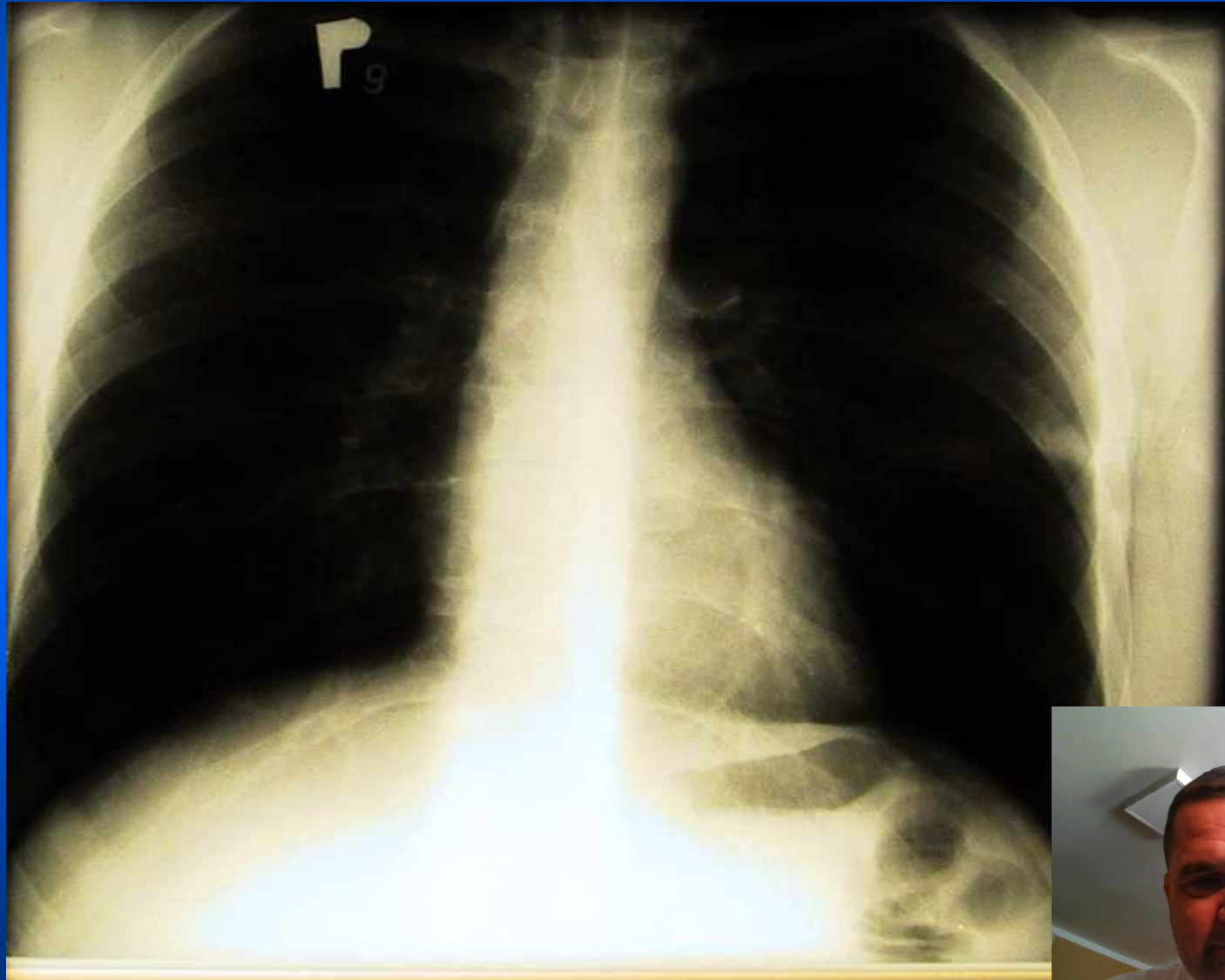
# Tumor in left hemithorax



# Cardiac tamponade

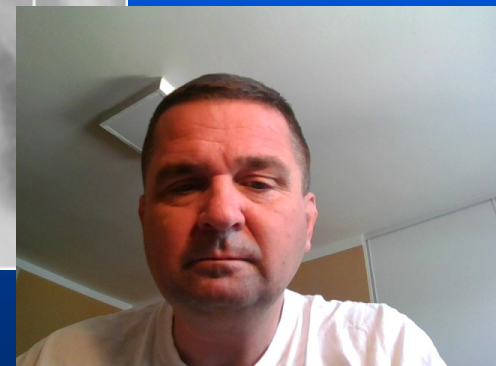
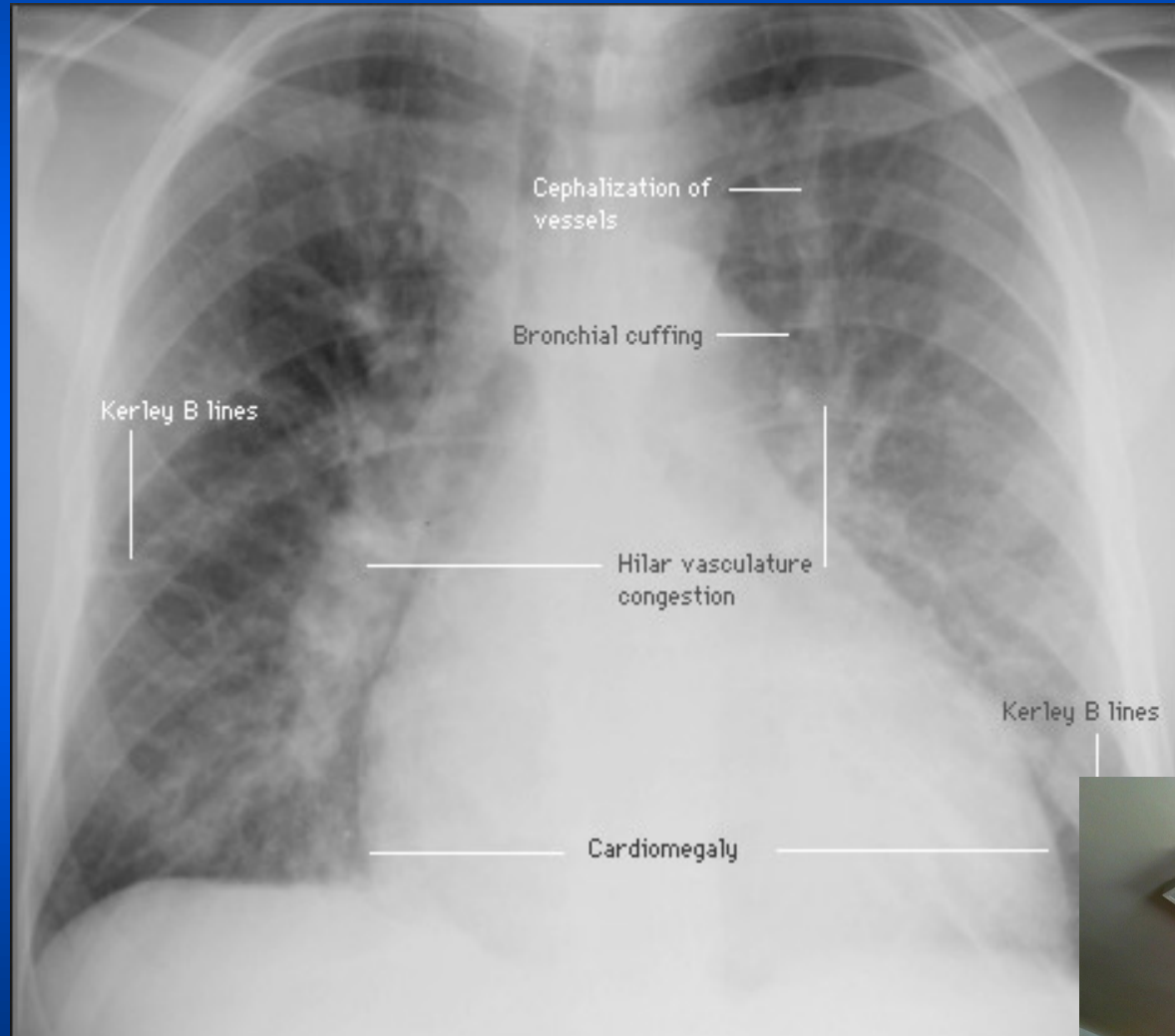


## After pericardial puncture

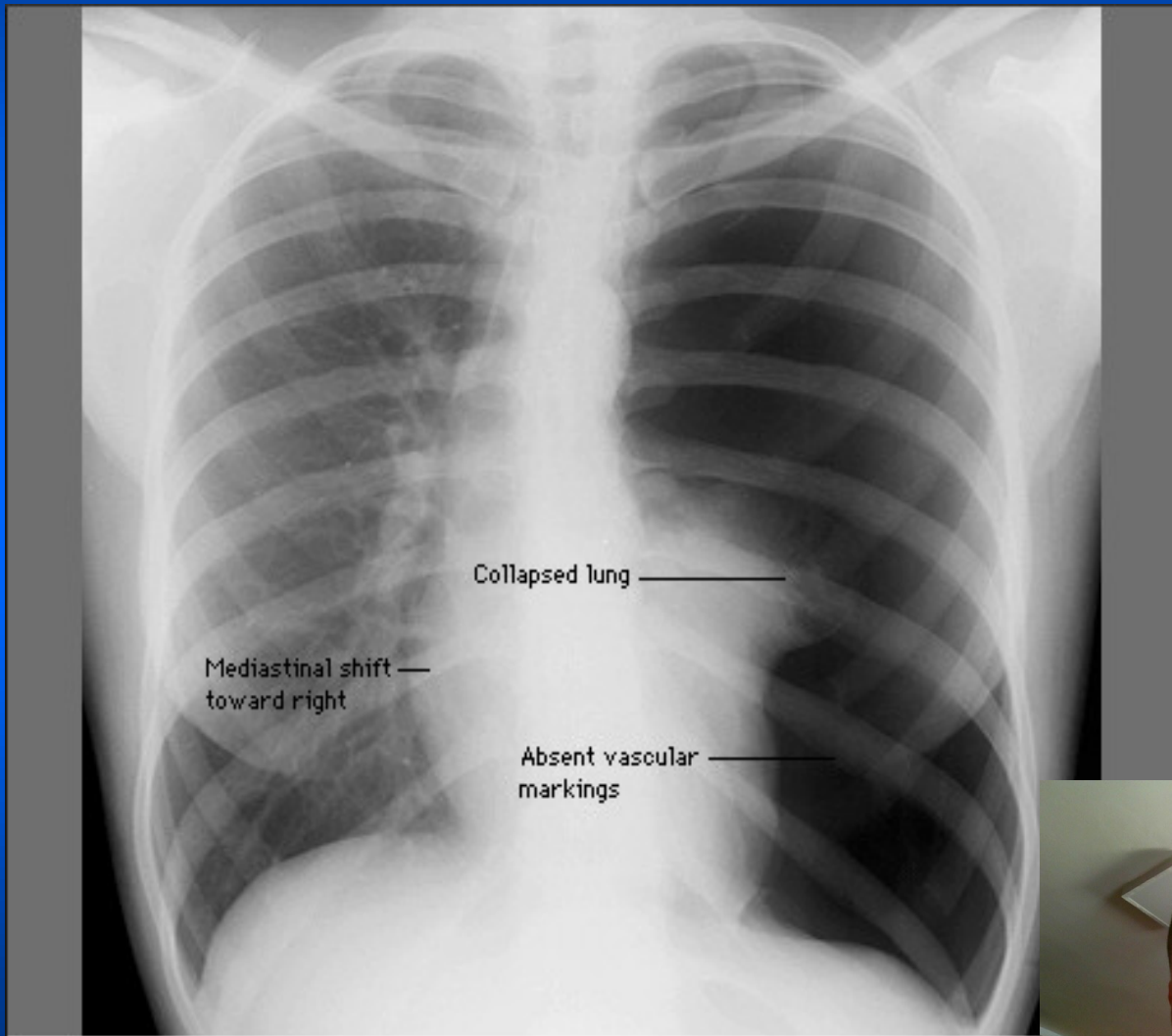




# Pulmonary oedema



# PNO



## Noninvasive assessment of CAD

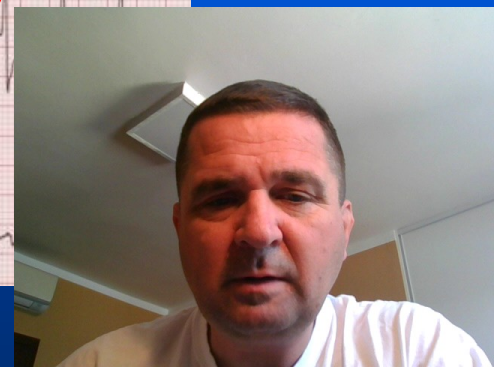
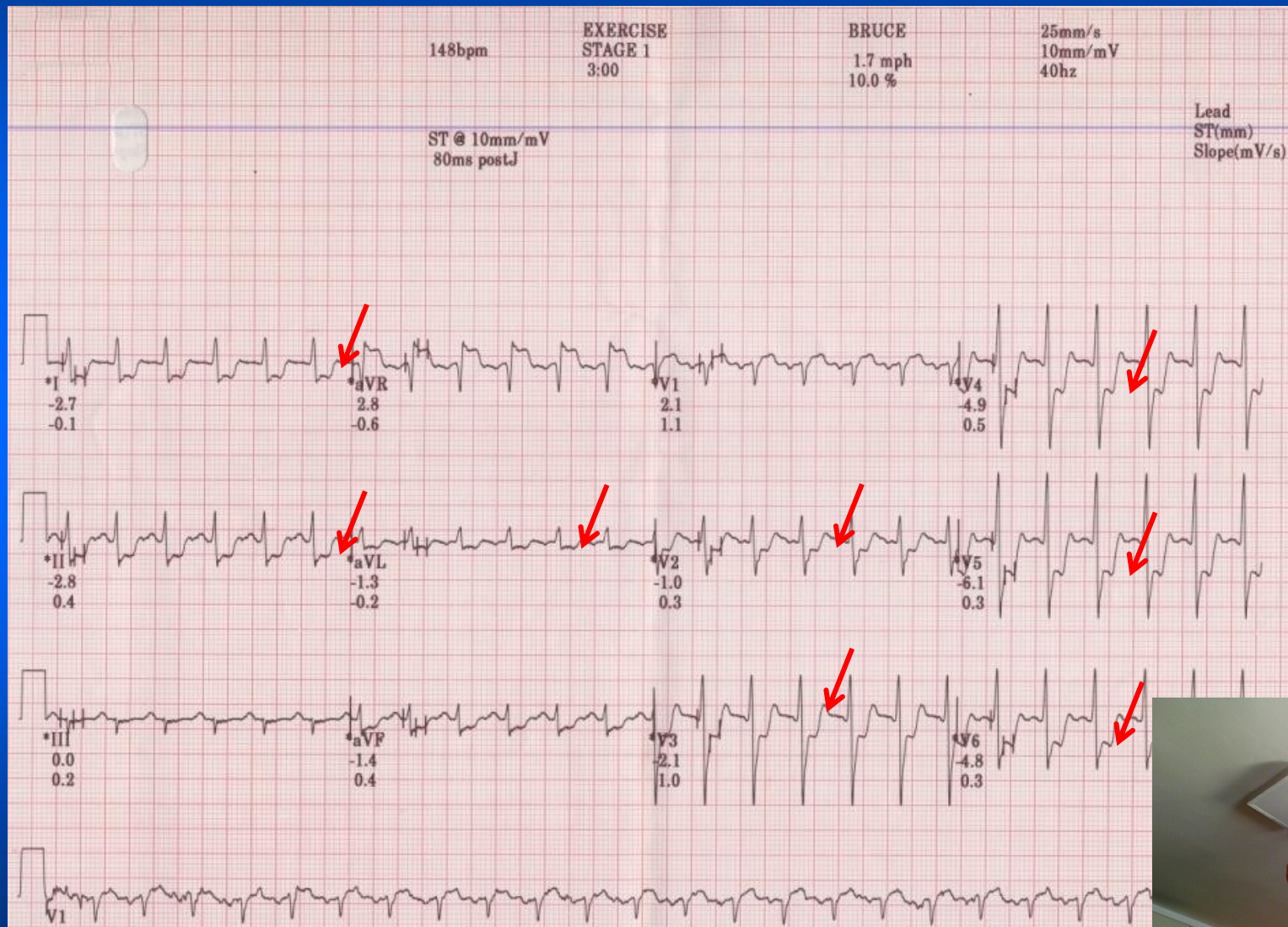
- **Bicycle treadmill test** – submaximal aerobic frequency (200 – age) depressions and elevations of ST .
- **Treadmill echocardiography** – segmental hypokinesis during hypoperfusion
- **Dobutamin. echokard.** – farmacologic tachycardia





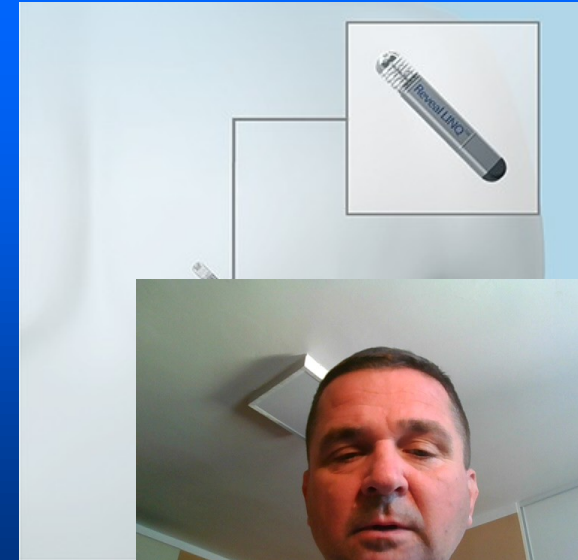
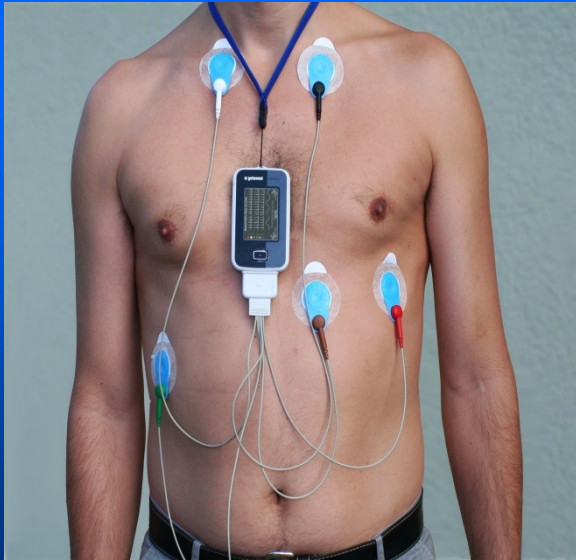


# Positive treadmill test



# Noninvasive assessment of arrhythmias

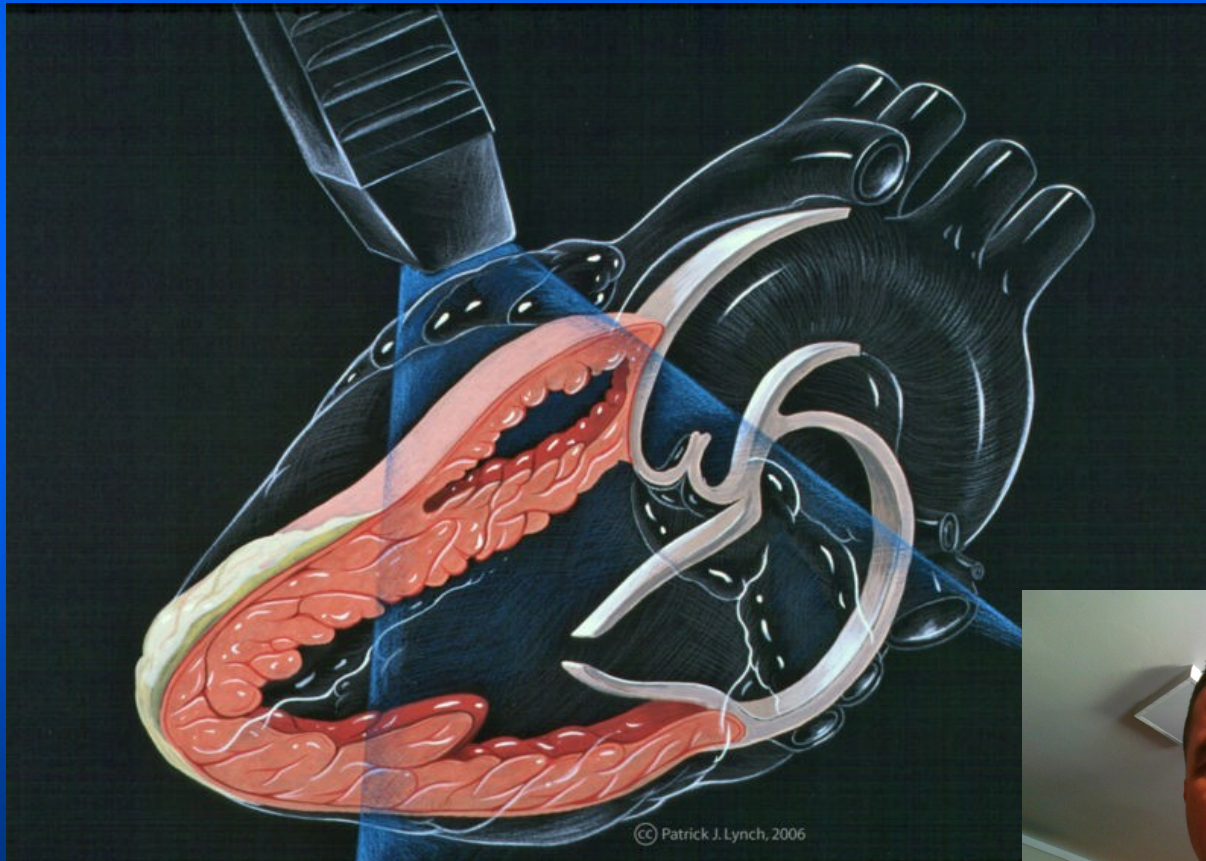
- **ECG Holter** – detection of arrhythmia in 24 h (up to 7 days)
- **R – test, rhythm card** – 5 days – 3 months monitoring
- **ILR** – 3 years monitoring in pts with arrhythmias, unexplained syncope

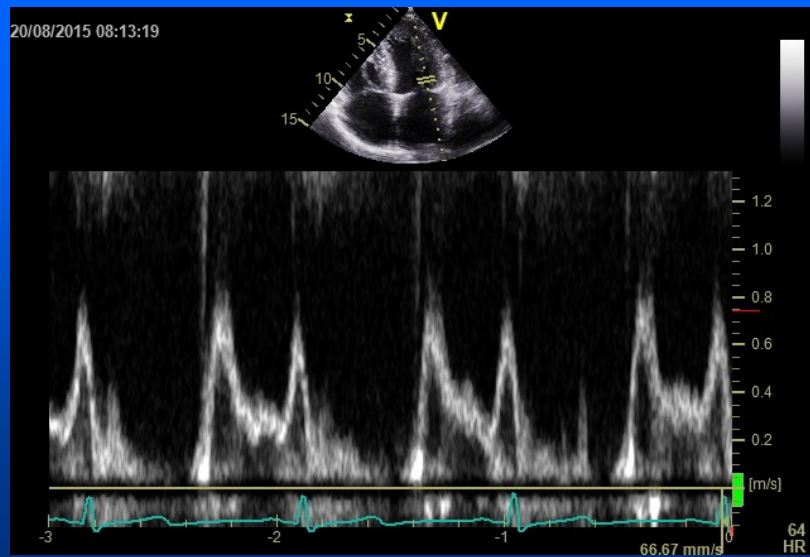
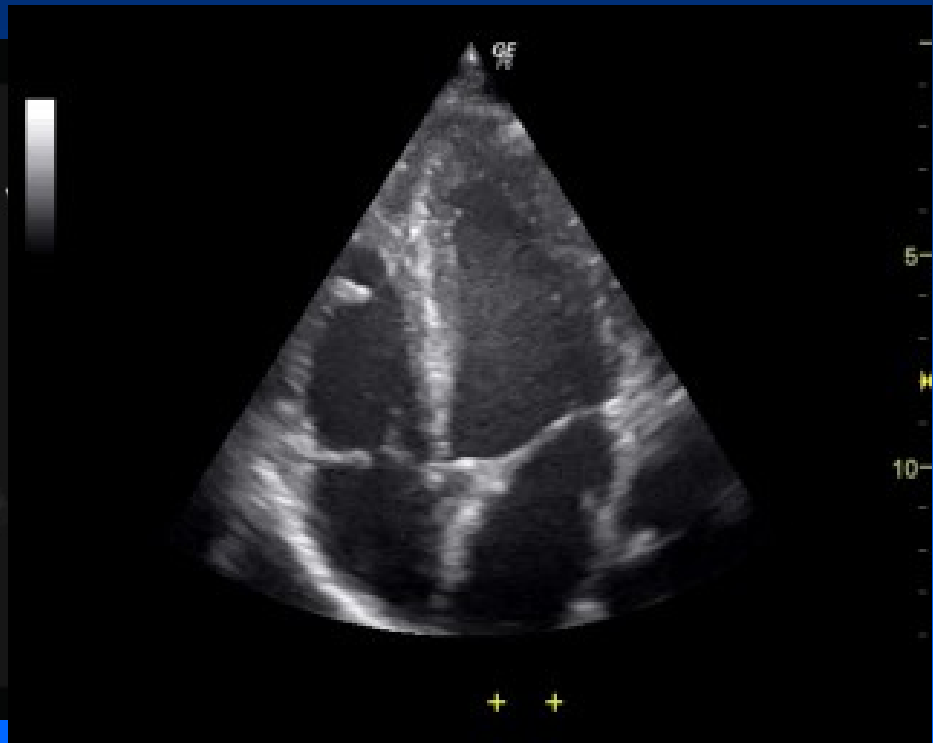
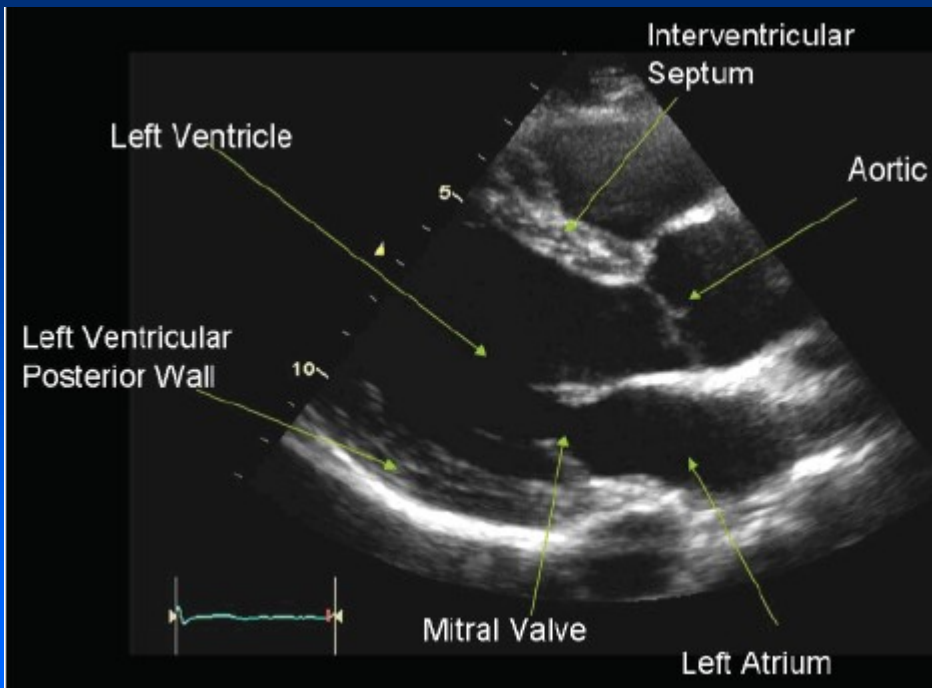




## Noninvasive assessment of LV function

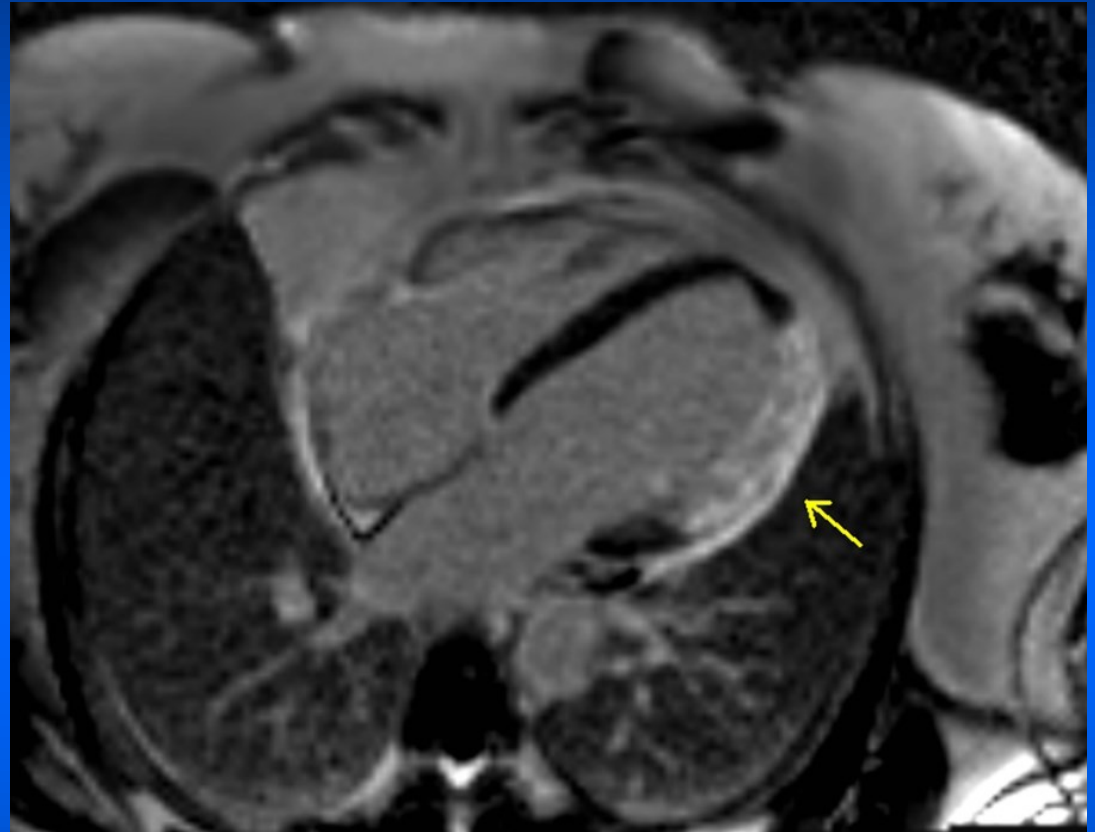
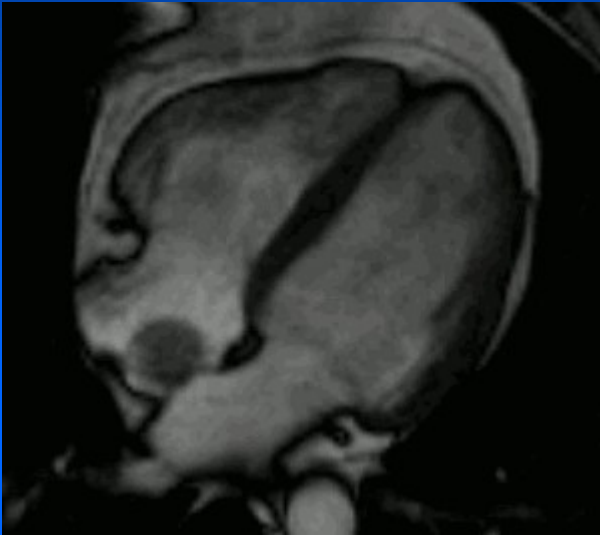
- **ECHO** – kinetics of the heart chambers, pericardium, valves, valvular diseases, detection of thrombi , atrial and ventricular septal defects







# Cardiac MRI

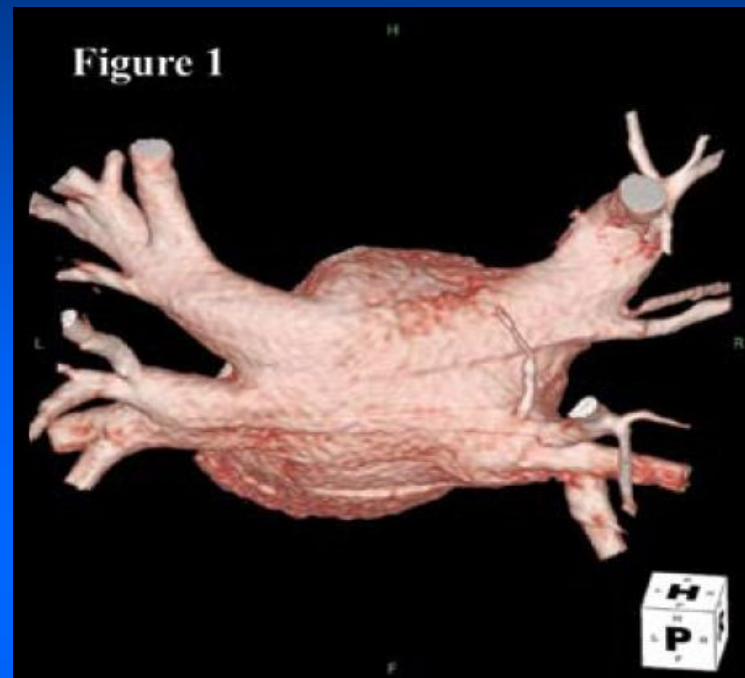


## Structure of the heart wall

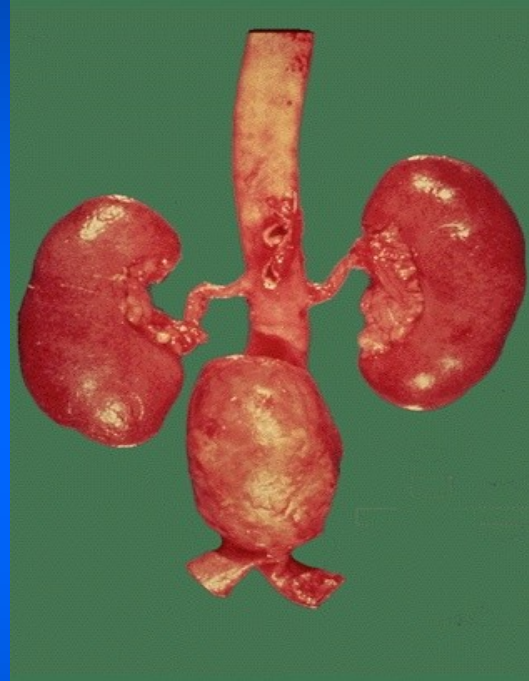
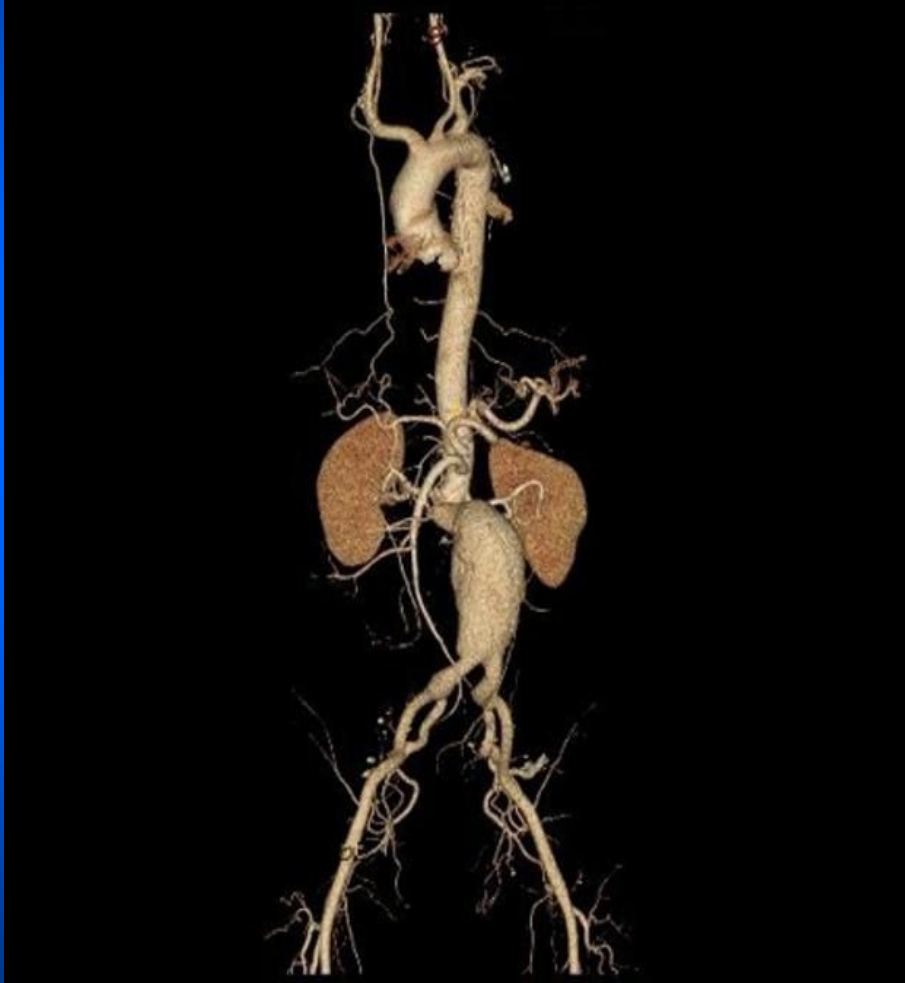
- Scars
- Myocarditis
- ARVC



# CT of the heart

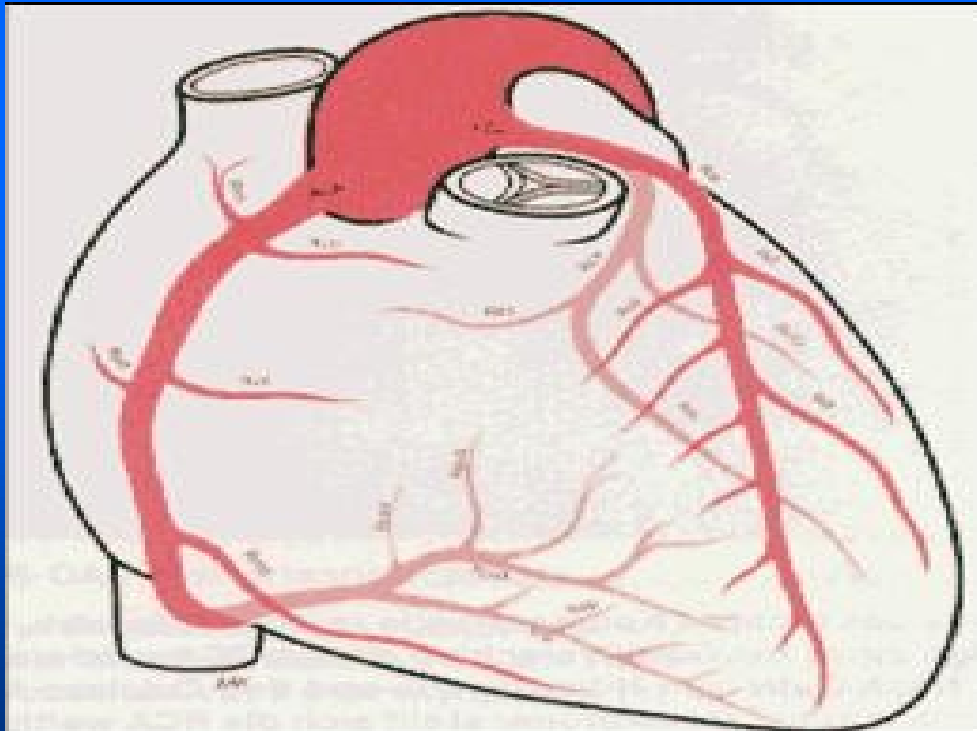


# CT AG of aorta



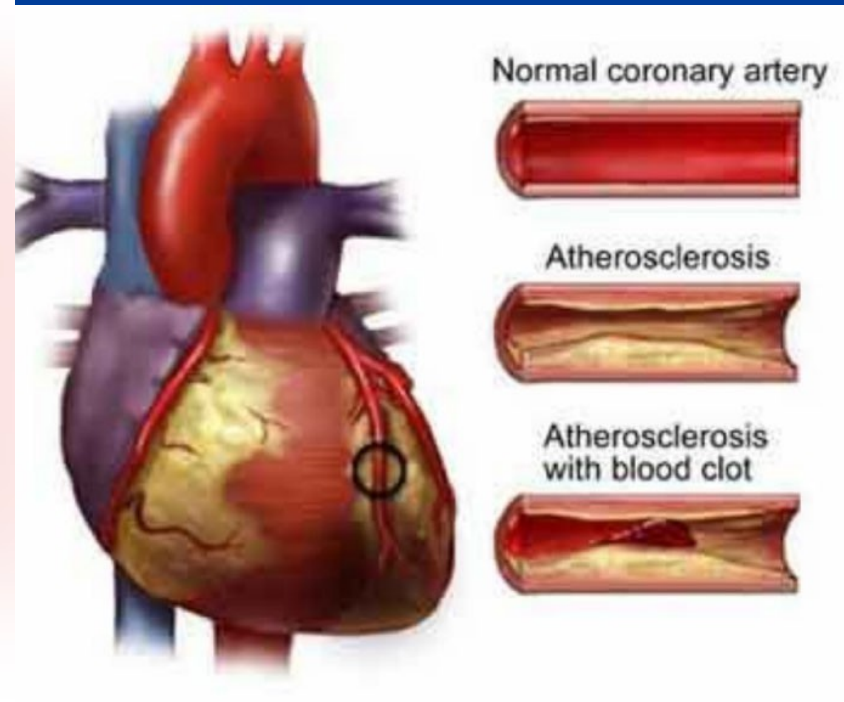
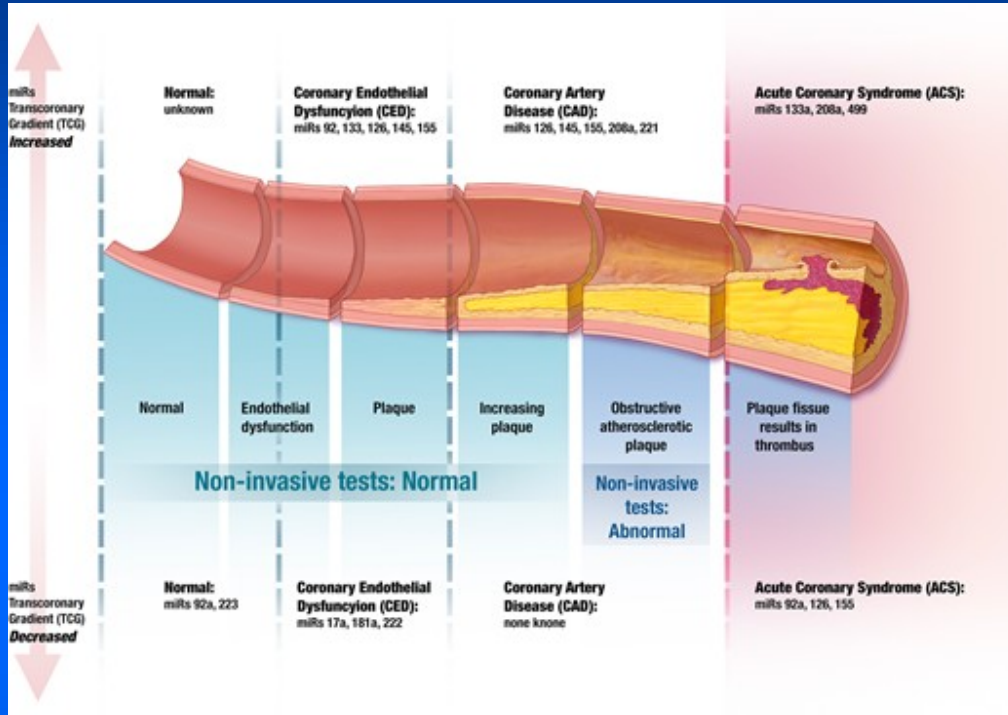
## Invasive CAD assessment

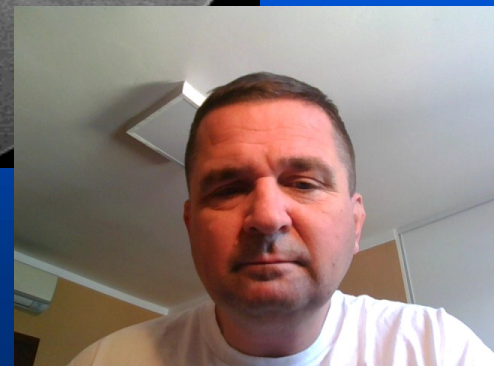
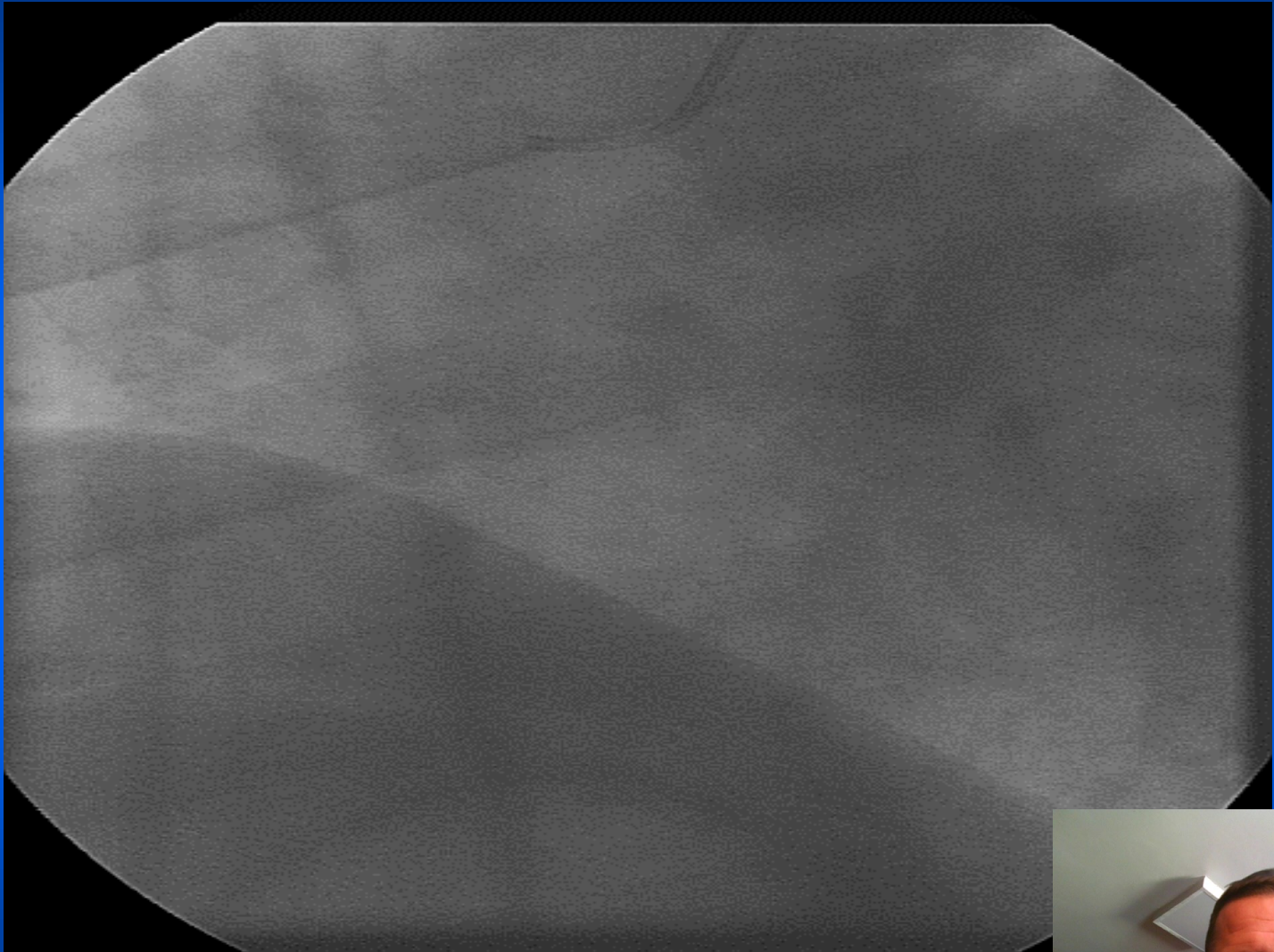
- **Selective angiography** – examination of coronary artery stenoses with high accuracy



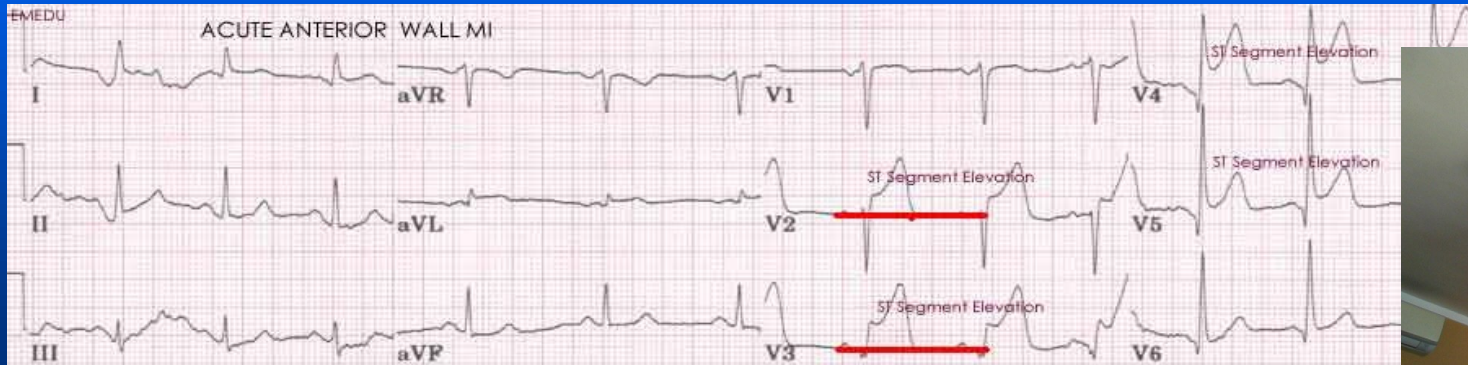
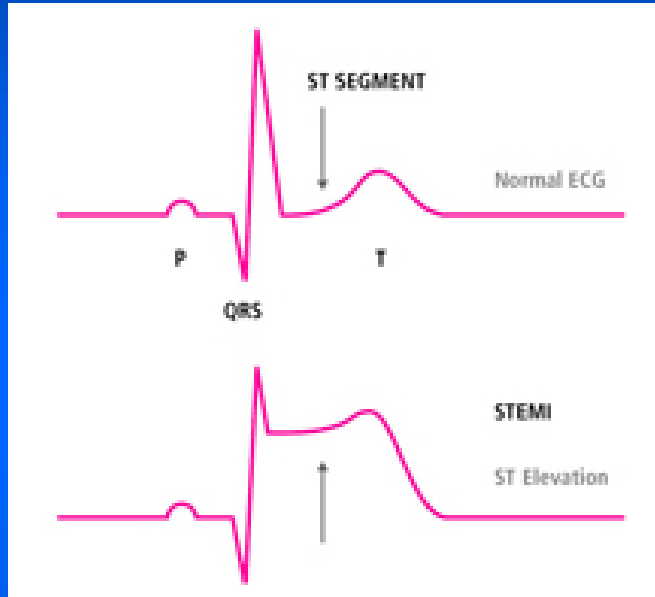


# Coronary artery disease



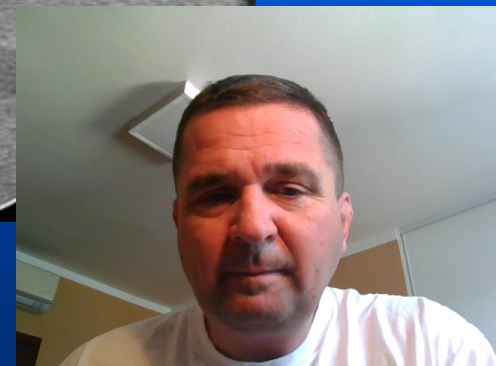
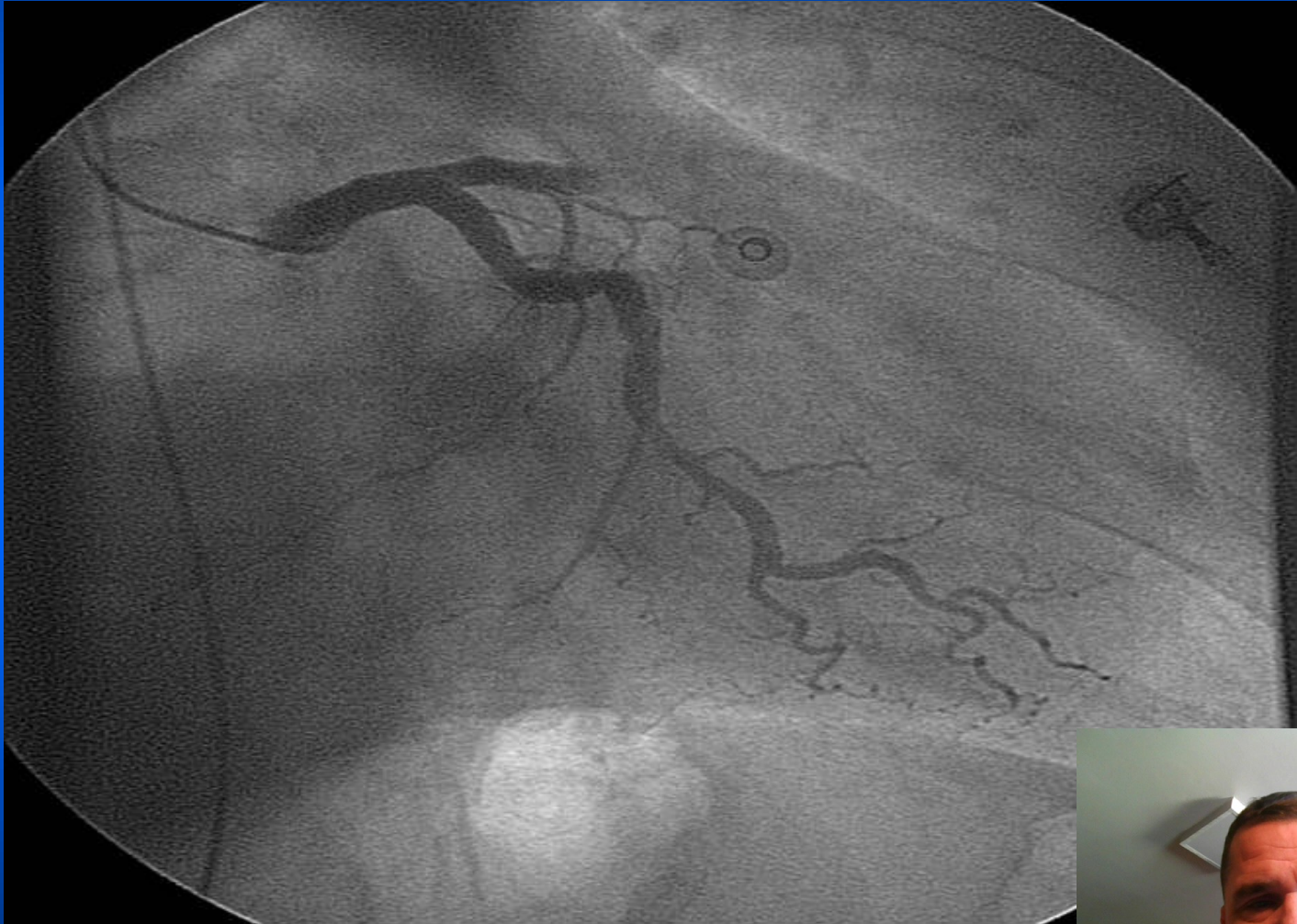


# Chest pain STE MI

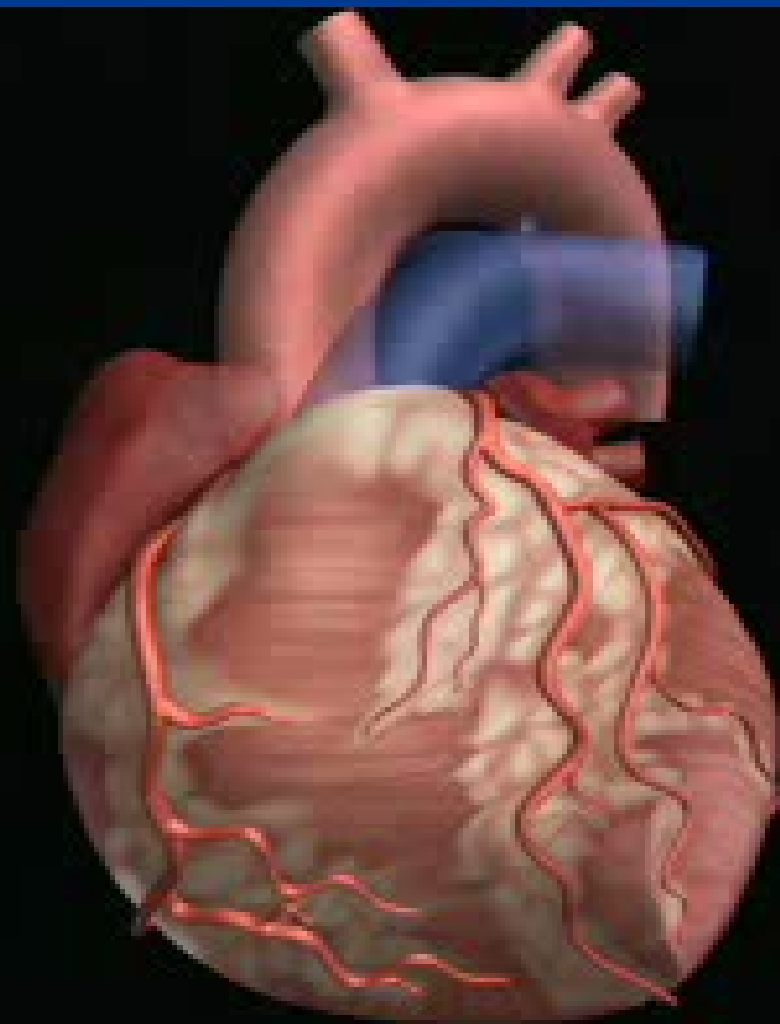




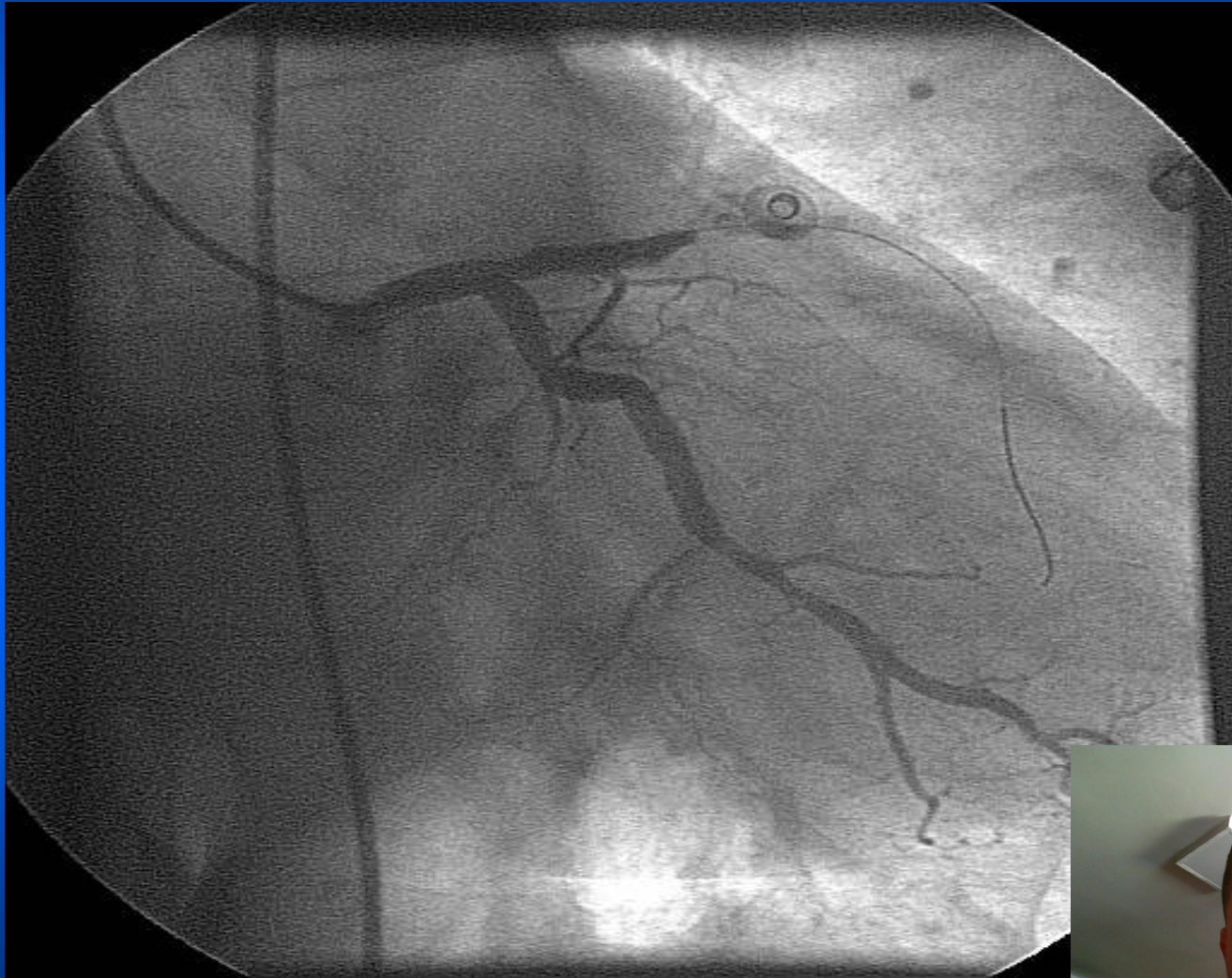
# Total occlusion of left descending artery



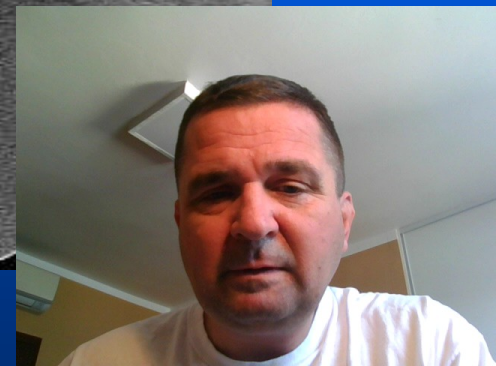
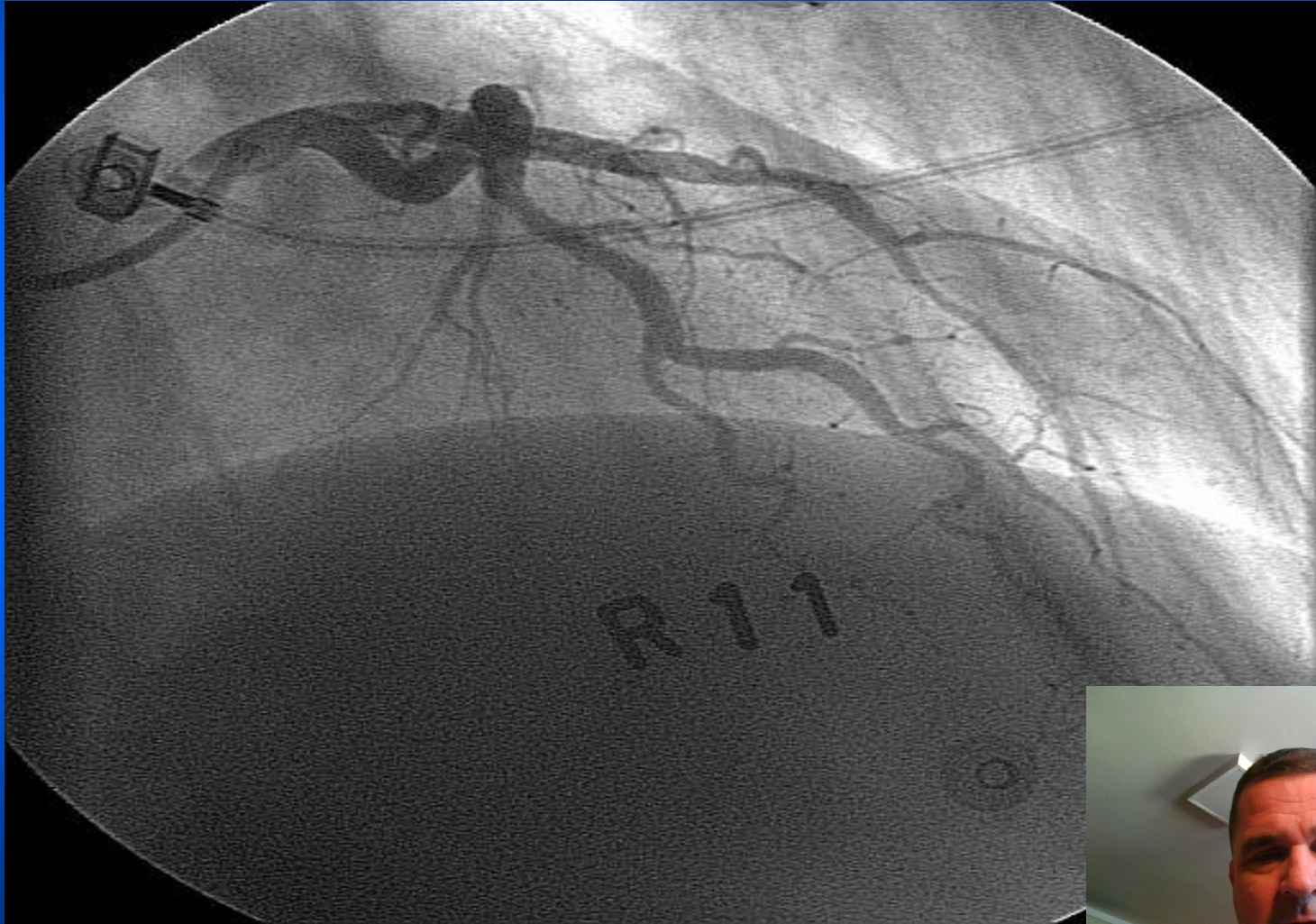




# PCI guiding wire in the artery



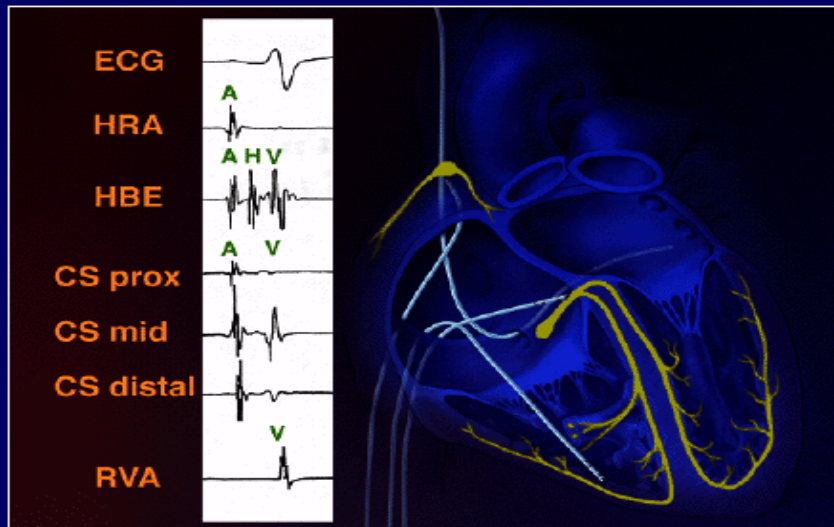
## After treatment with PTCA



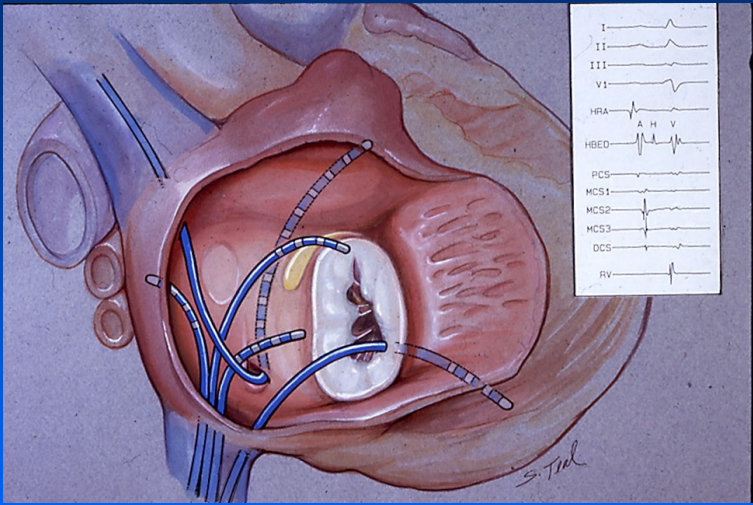
# Invasive assessment of arrhythmias

- **Electrophysiology** – capacity of the conduction system, induction and precise classification of arrhythmias – followed by RFA

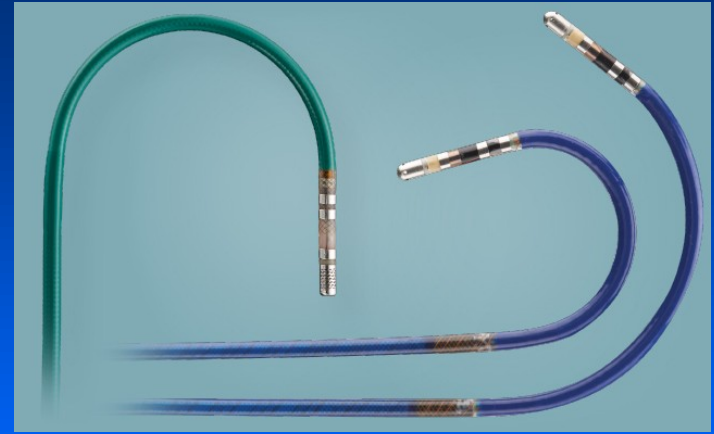
## Catheter Placement





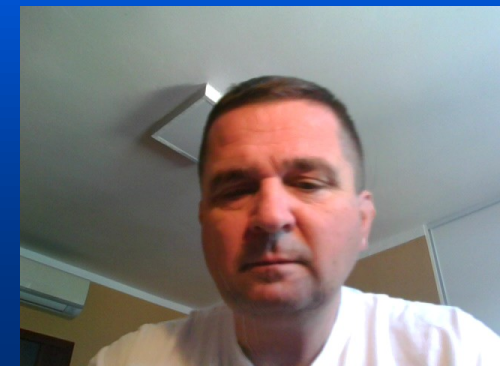
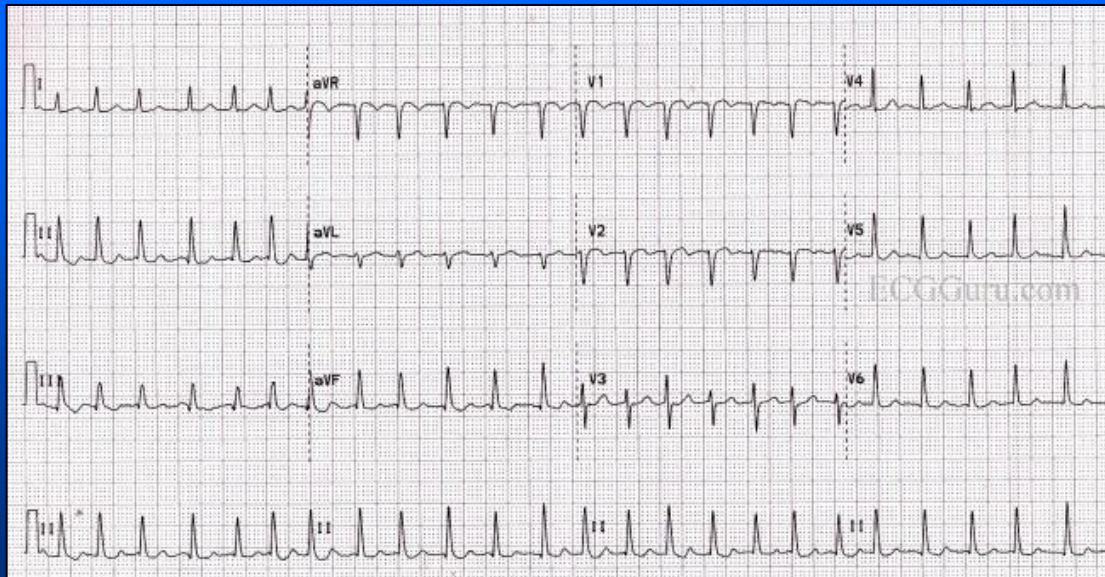
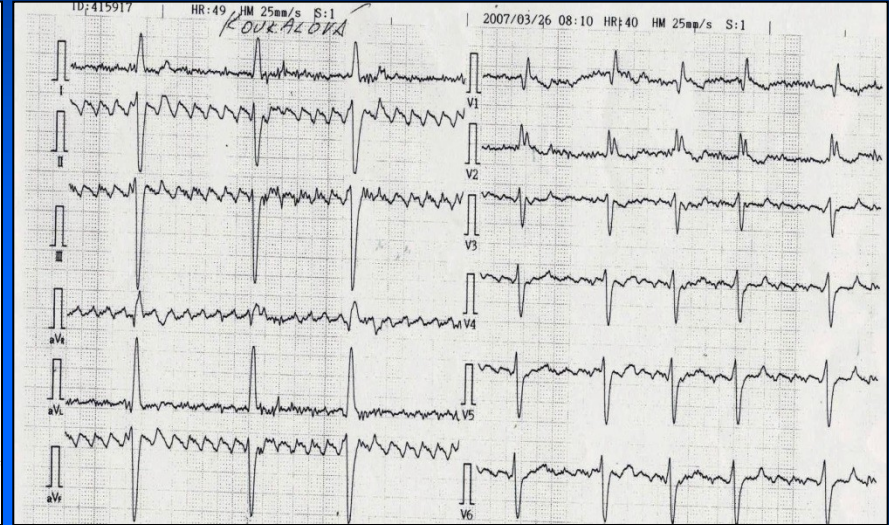
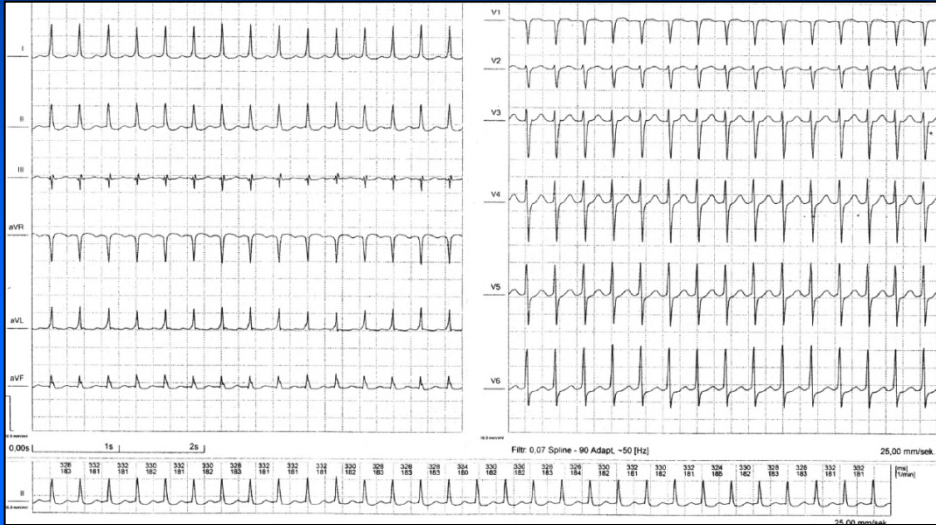


# IKEG



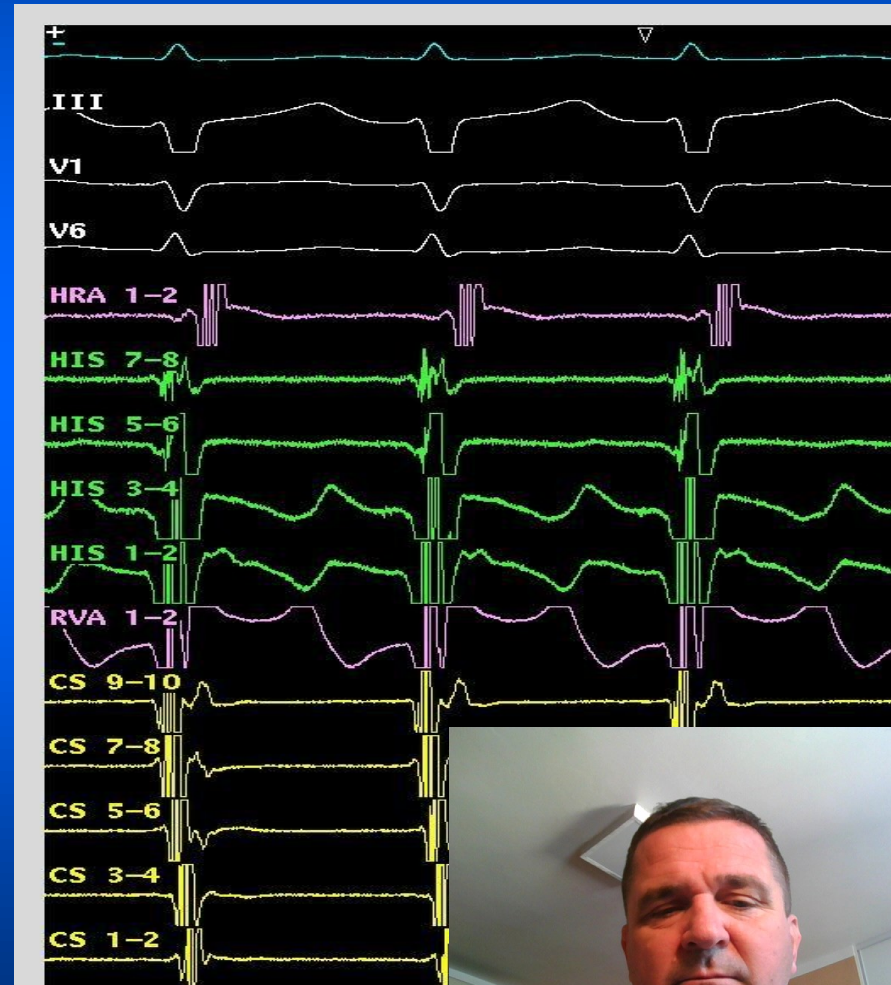
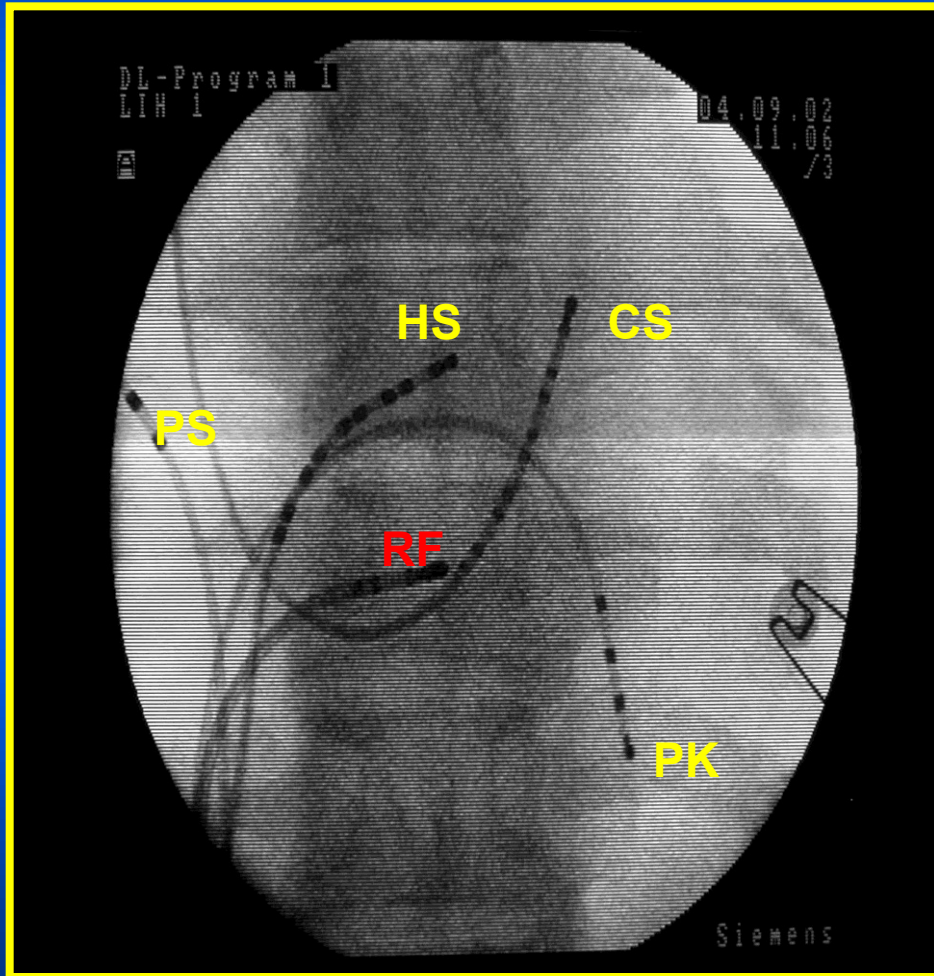


# Most common SVTs

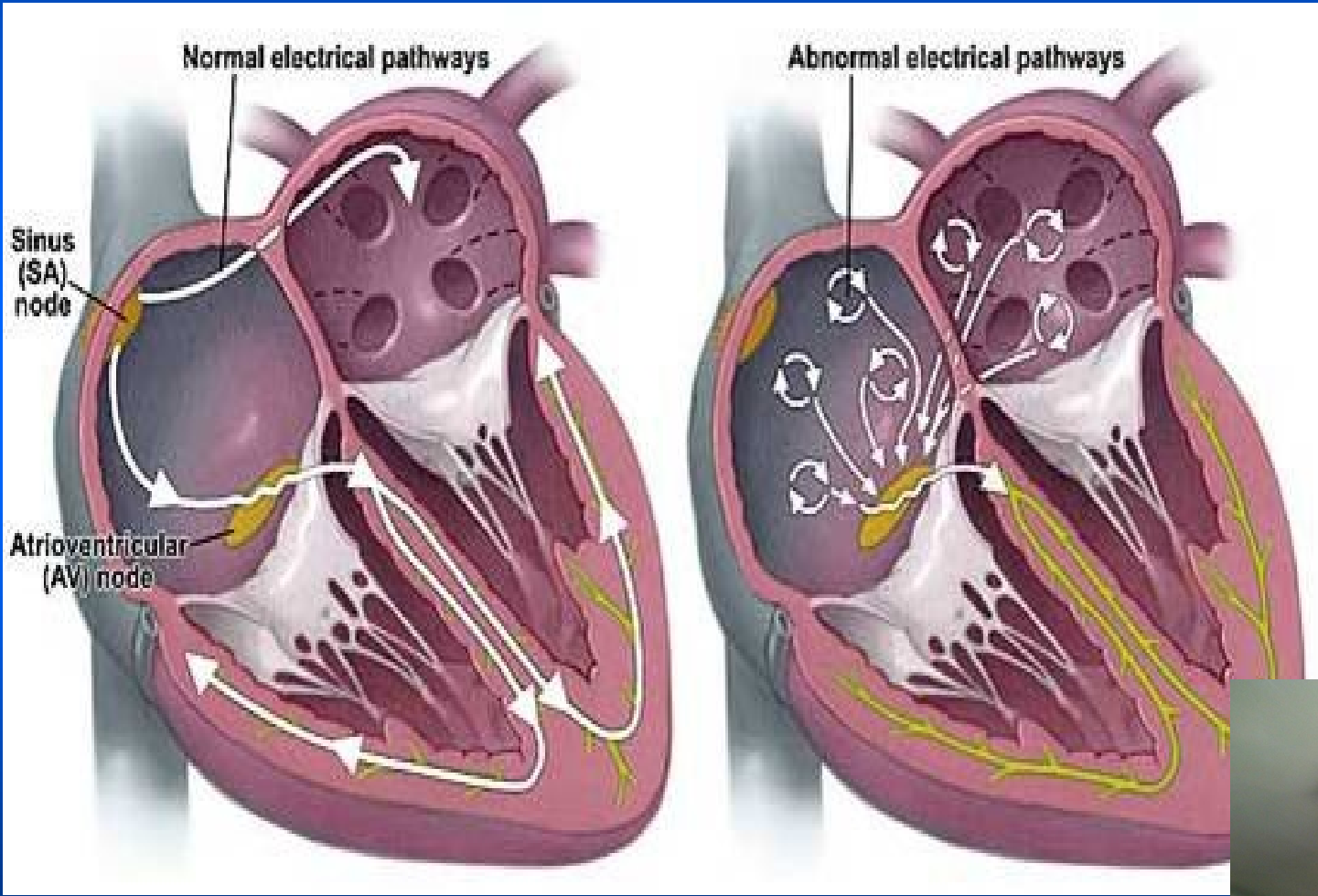




# Catheter placement during AVNRT ablation

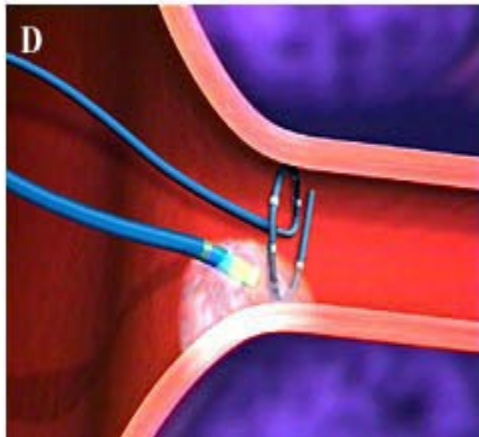
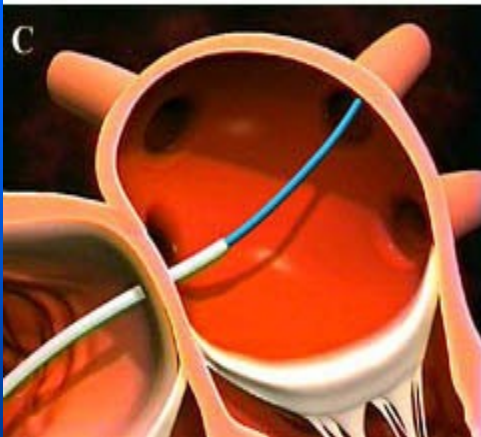
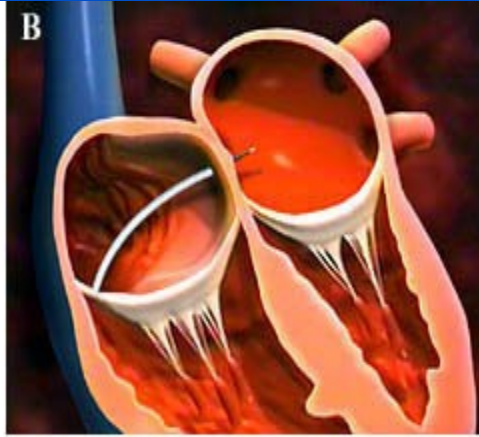


# Atrial fibrillation



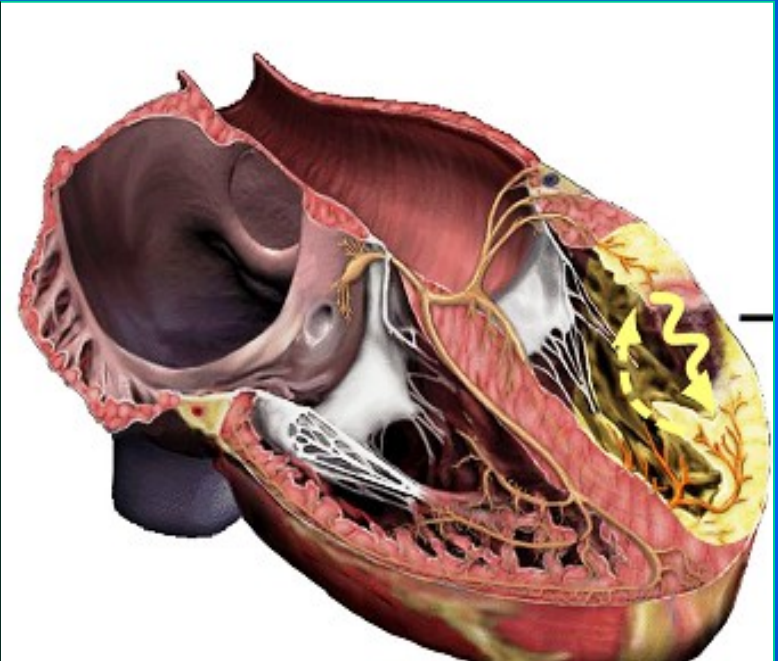
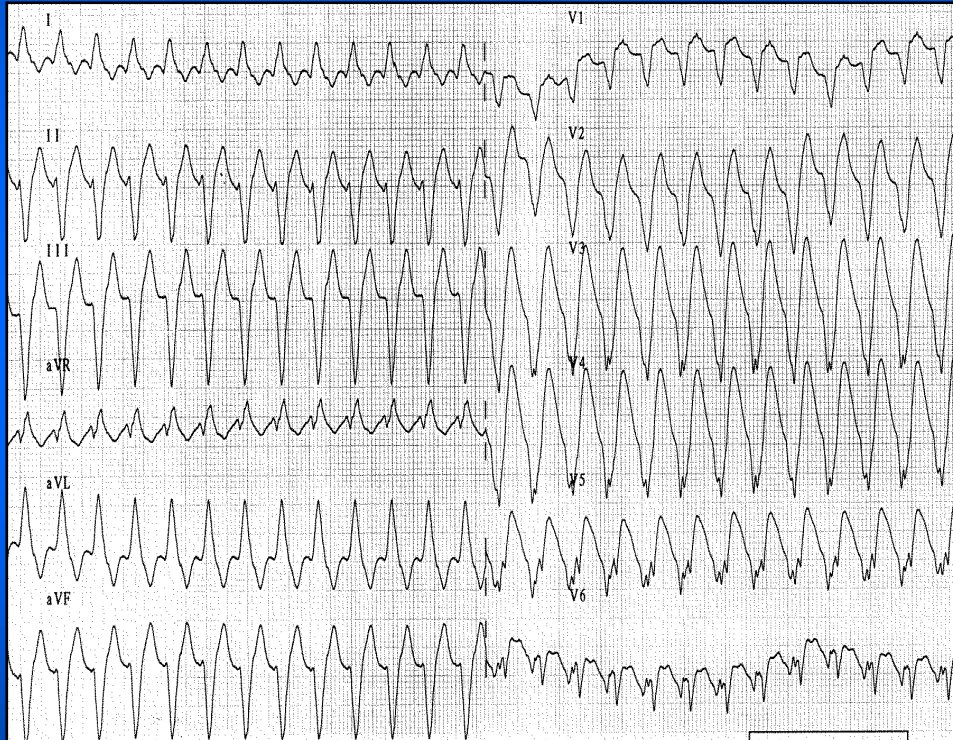


# RFA x Cryoablation



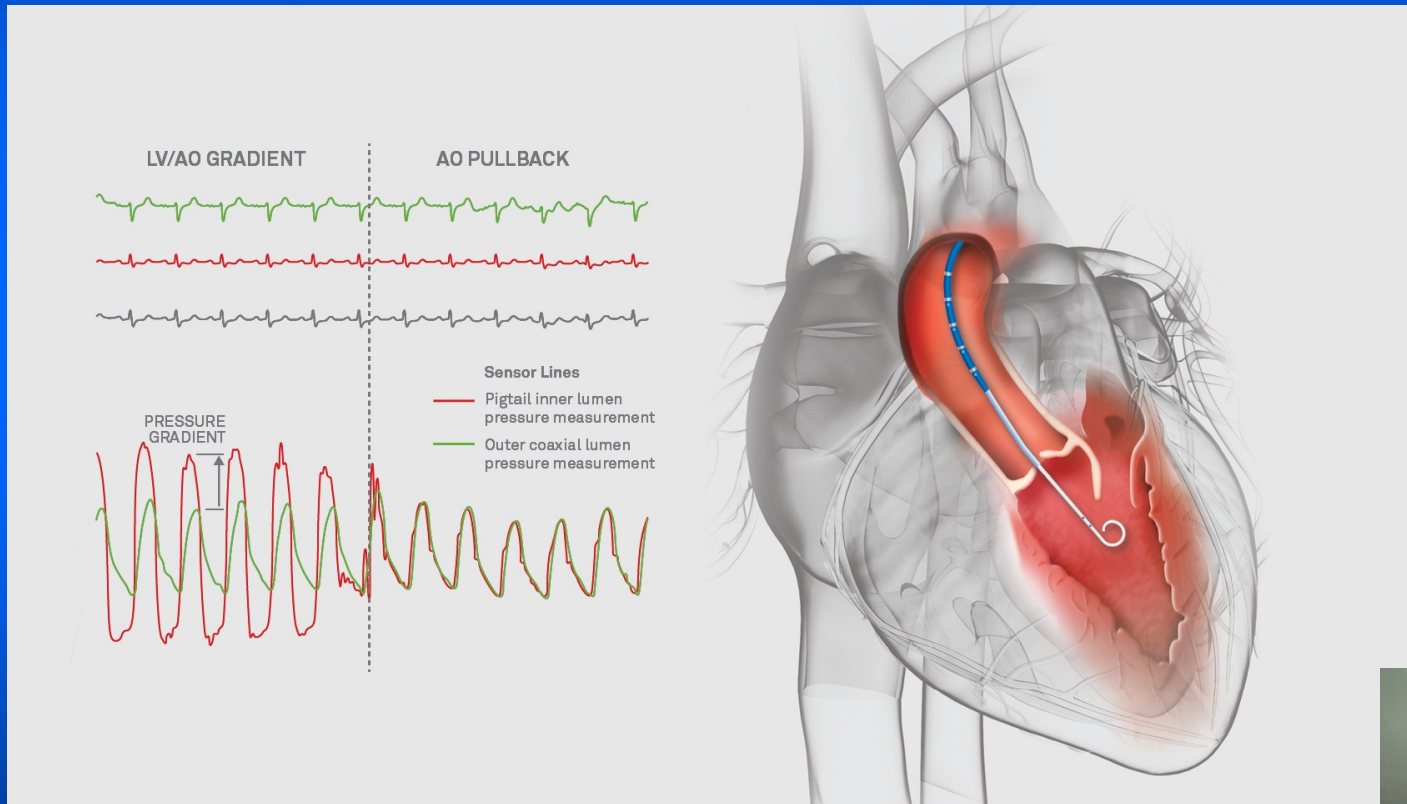
# VT in structural heart disease

Reentry – possible in tissues with different conduction time



# Invasive assessment of ventricular function

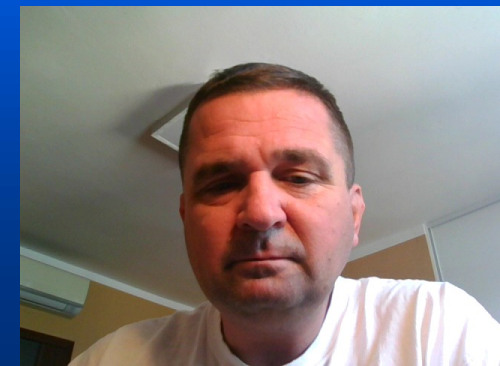
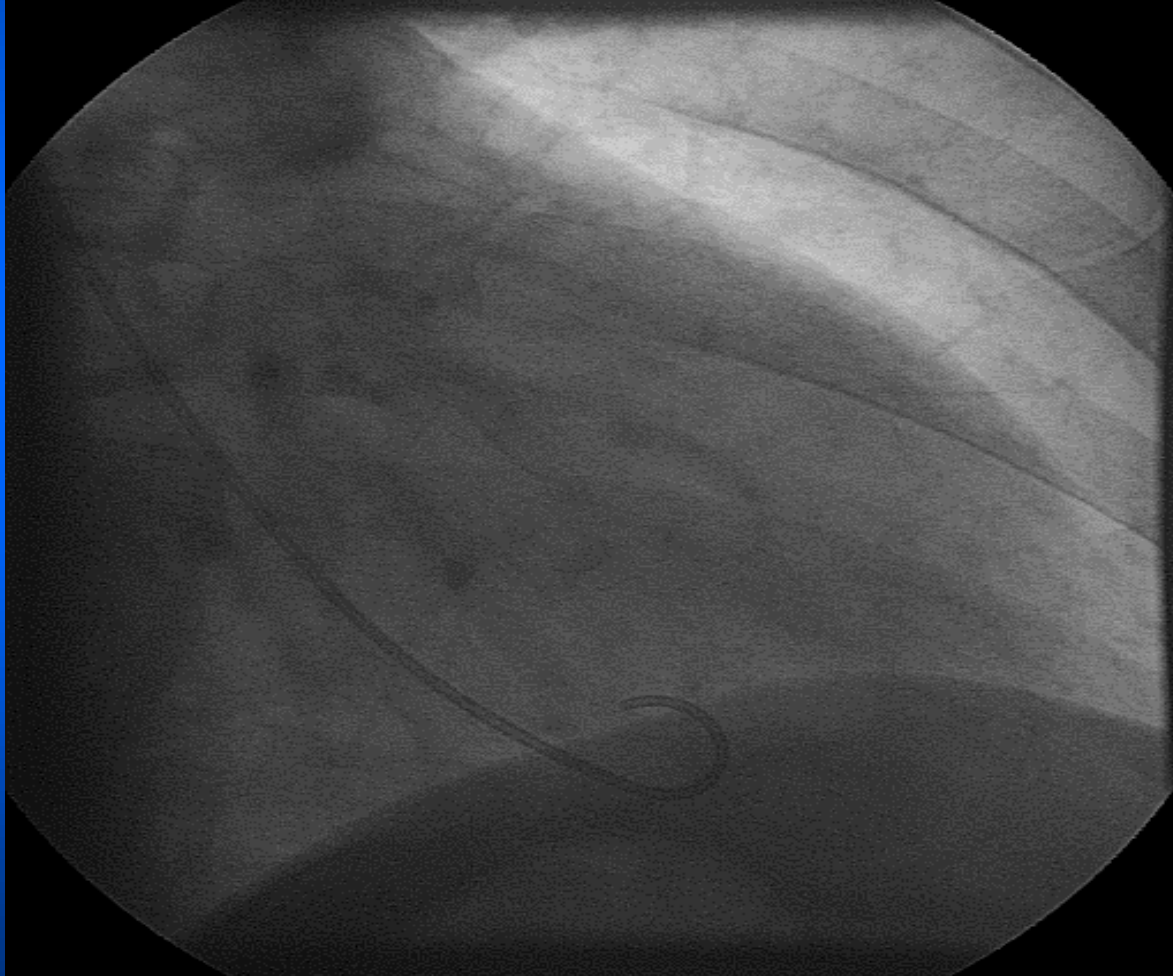
- **Ventriculography** – 2D imaging of ventricular function





## Invasive assessment of ventricular function

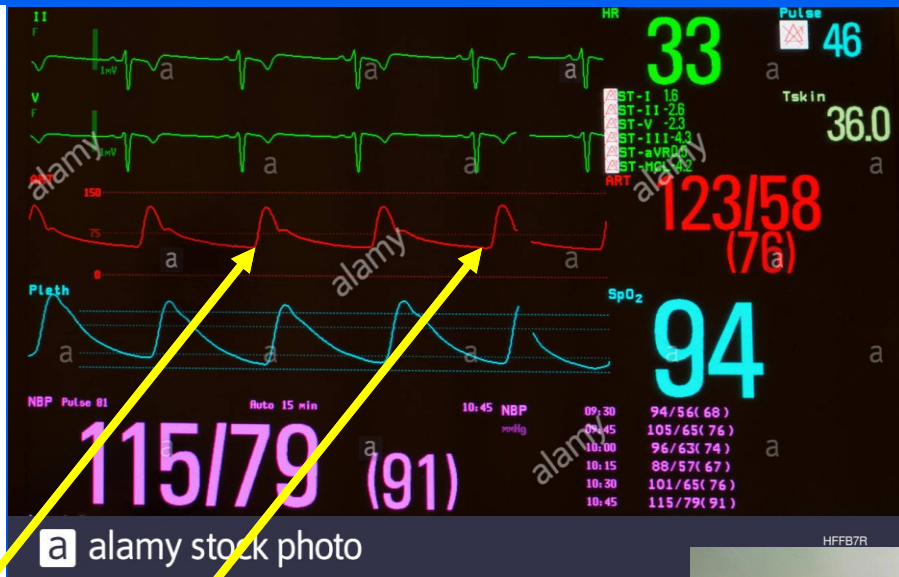
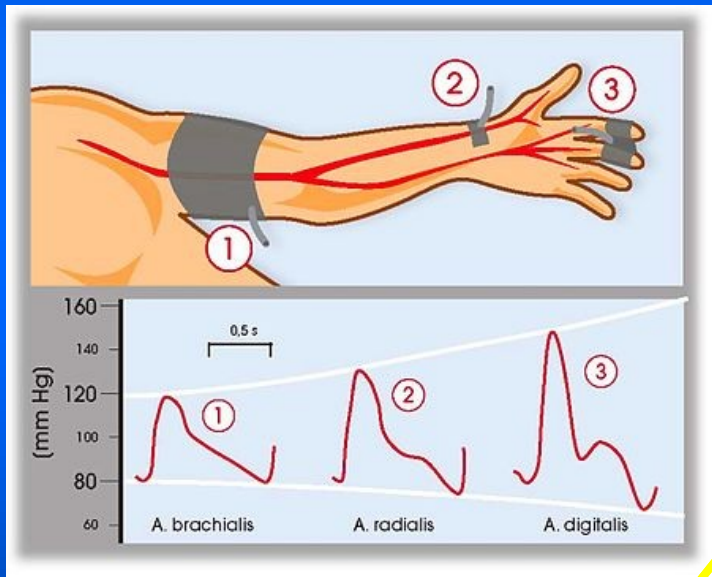
- **Ventriculography** – 2D imaging of ventricular function



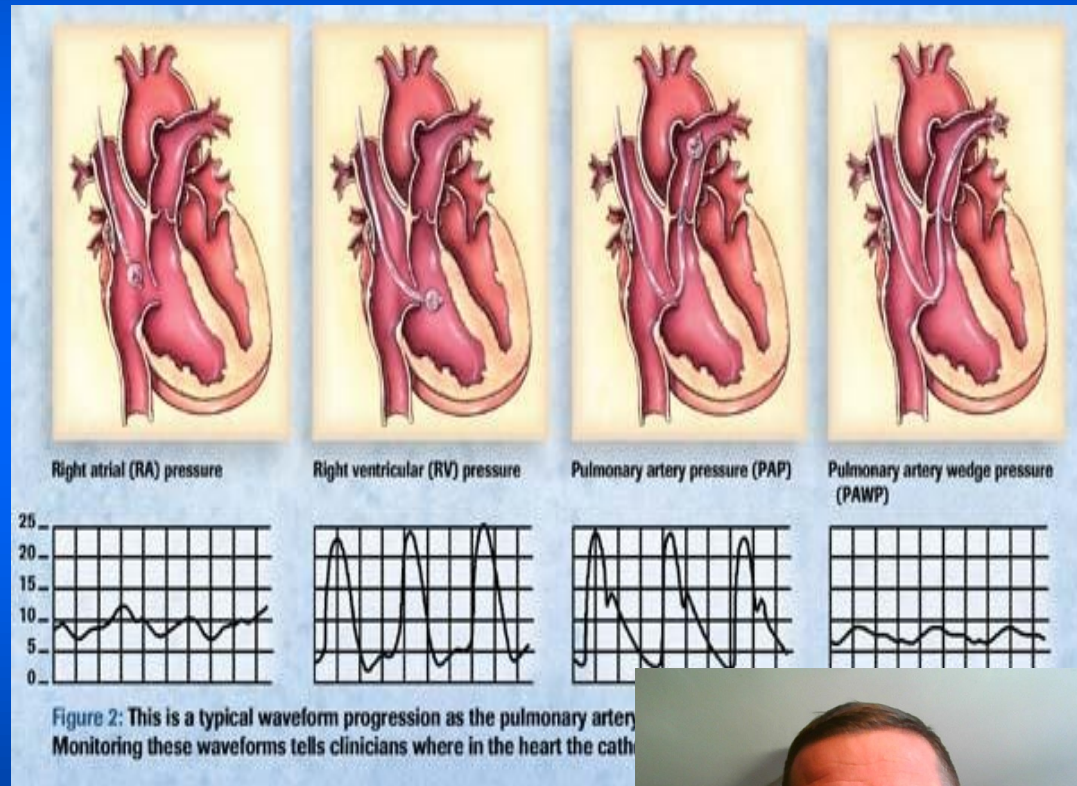
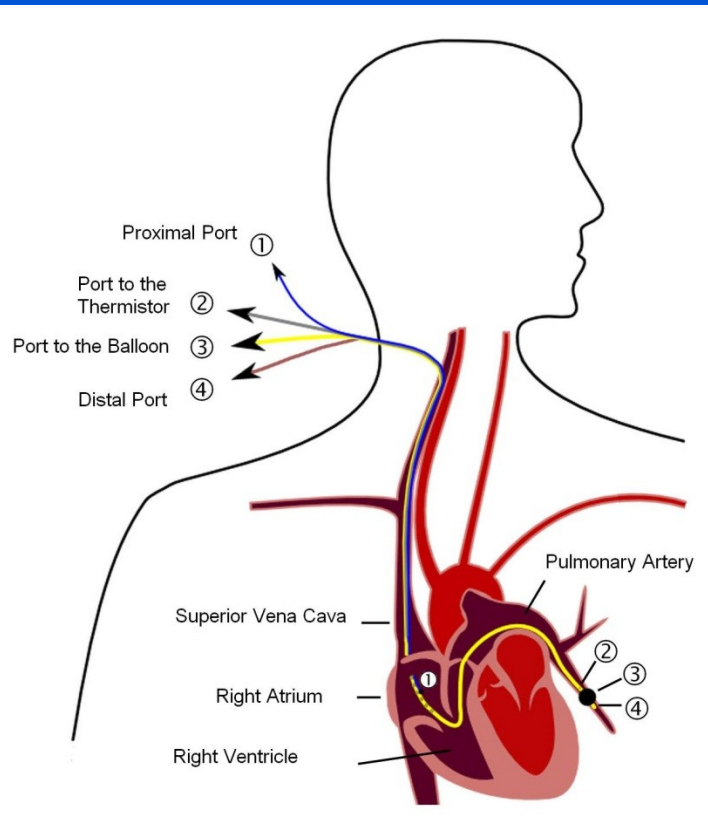


# Invasive cardiac monitoring

- **Swan-Ganz catheter** – measurement of pressure in PA, cardiac output
- **Arterial blood pressure** – beat to beat BP monitoring



# Invasive monitoring of PCW, cardiac output



# Invasive monitoring of PCW, cardiac output

