Sports cardiology: Pre-competition screening

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Klinik für Kardiologie

Content

- Interactive case presentation
- Background and theory
- Discussion

CLINICAL CASE

Background

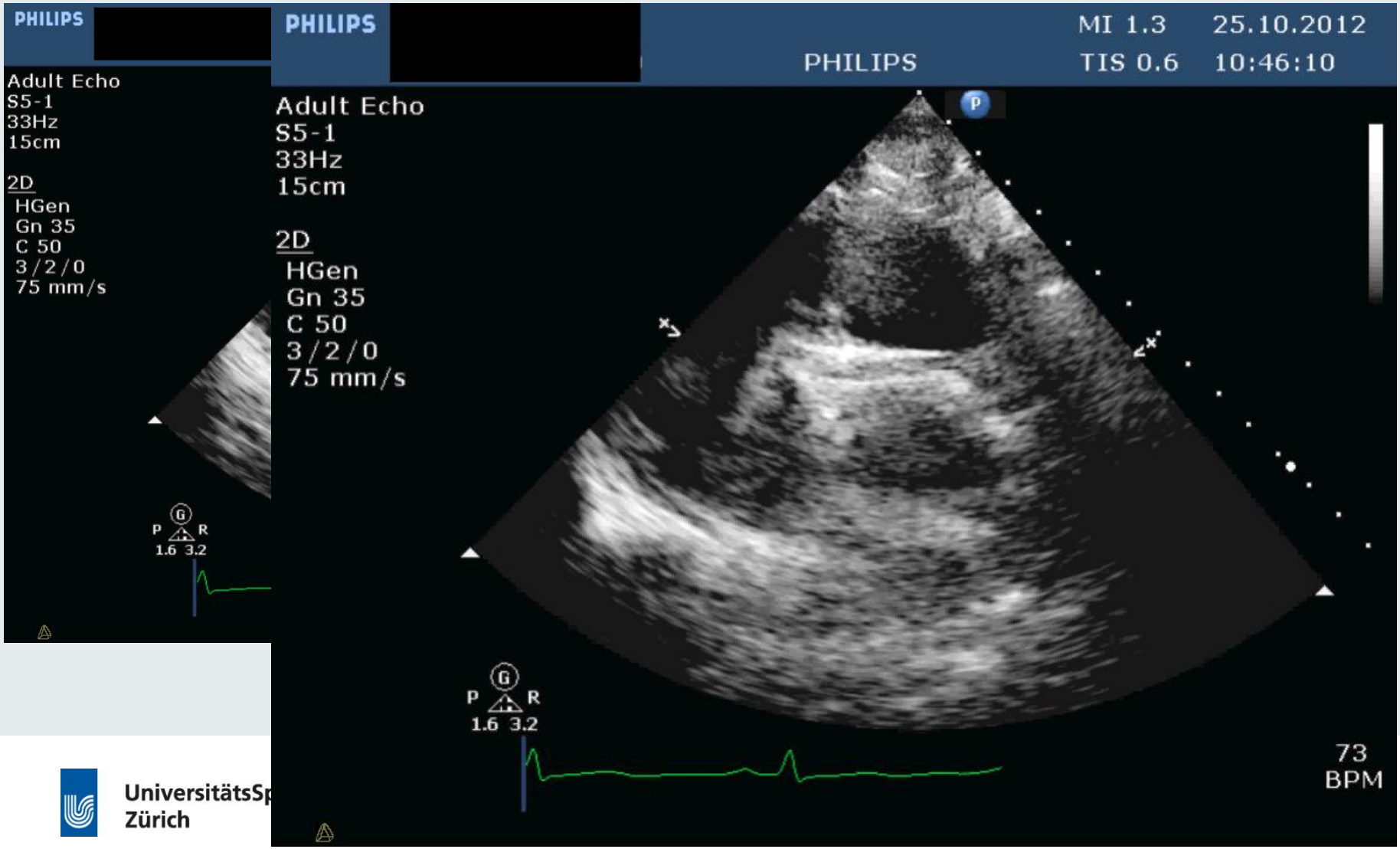
- Regular **pre-competition screening** for referees considered for Brazil 2014
- **Basic** screening
  - Medical history/ questionnaire
  - Clinical exam
  - ECG
- **Extended** screening
  - Echo
  - Others if necessary/ pathologic findings

Our guest from the Seychelles

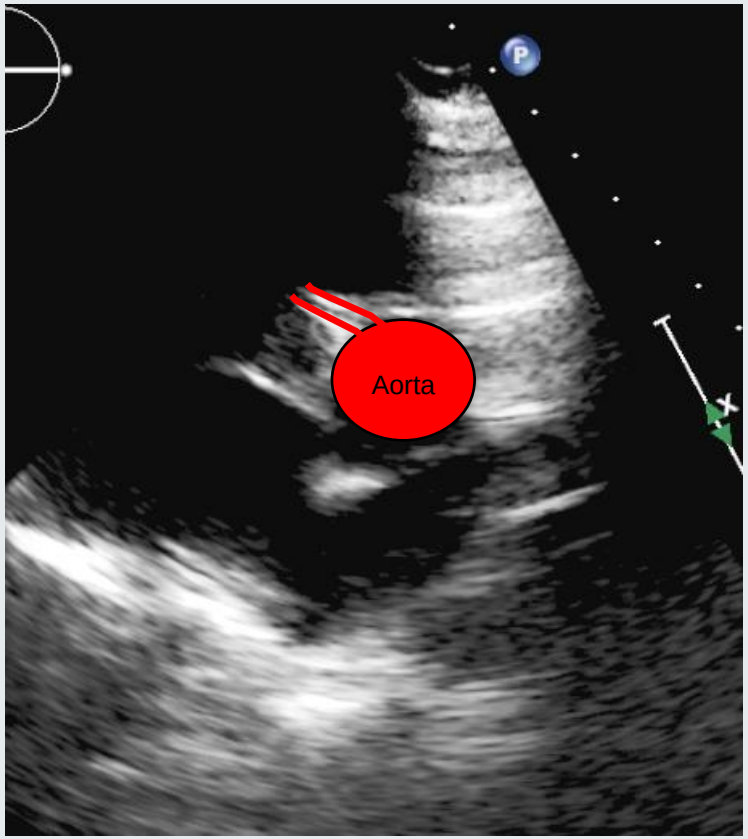
- Male, **37 years** of age
- **Asymptomatic** patient
- “Healthy”
- No drugs/ doping
- Negative family history
- Unremarkable clinical exam

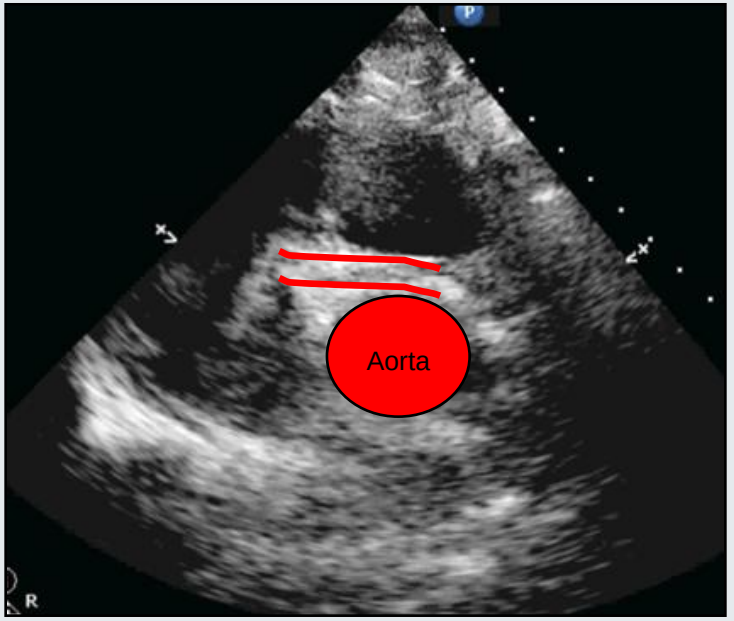
The EGC – Comments?

The Echocardiography – Please comment…



Normal vs. abnormal RCA





Our «patient»

Next steps?

	Possible options	Reasoning
	• Wait and see?	• Patient has survived • He is asymptomatic
	• No more competitive sports?	• According to Guidelines
	• Further exams for clarification?	• Which exams to detect what ?

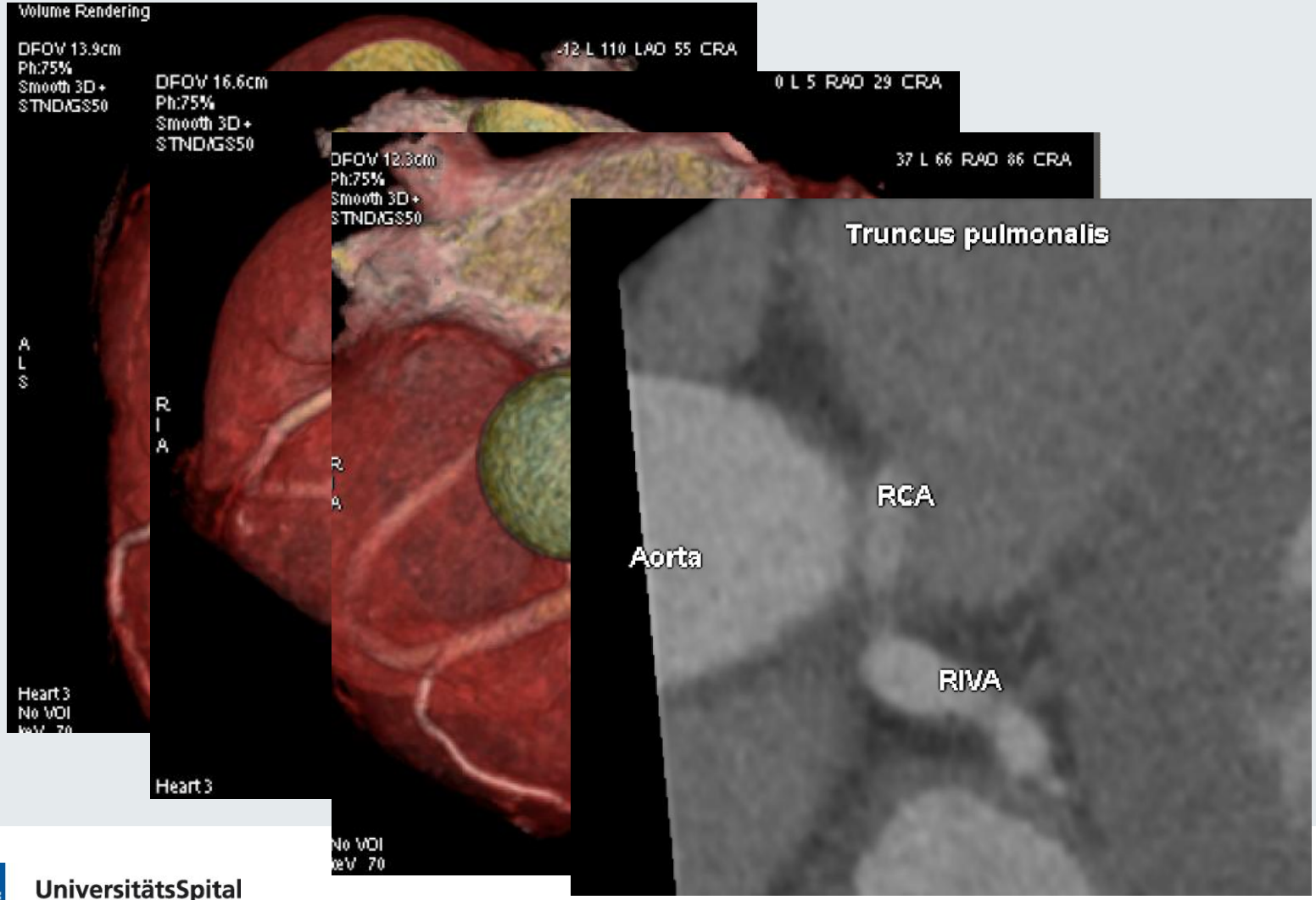
Don’t stop ‘til it’s over…

Further exams for thorough assessment

- **Disease extension/ associated structural disease?**
  - CT scan
  - MRI
  - Coronary angiogram

- **Relevance of the disease: Ischemia?**
  - **Stress-Echo**
  - **MRI**
  - **Szintigraphy**
  - **PET-scan**

Coronary CT-scan



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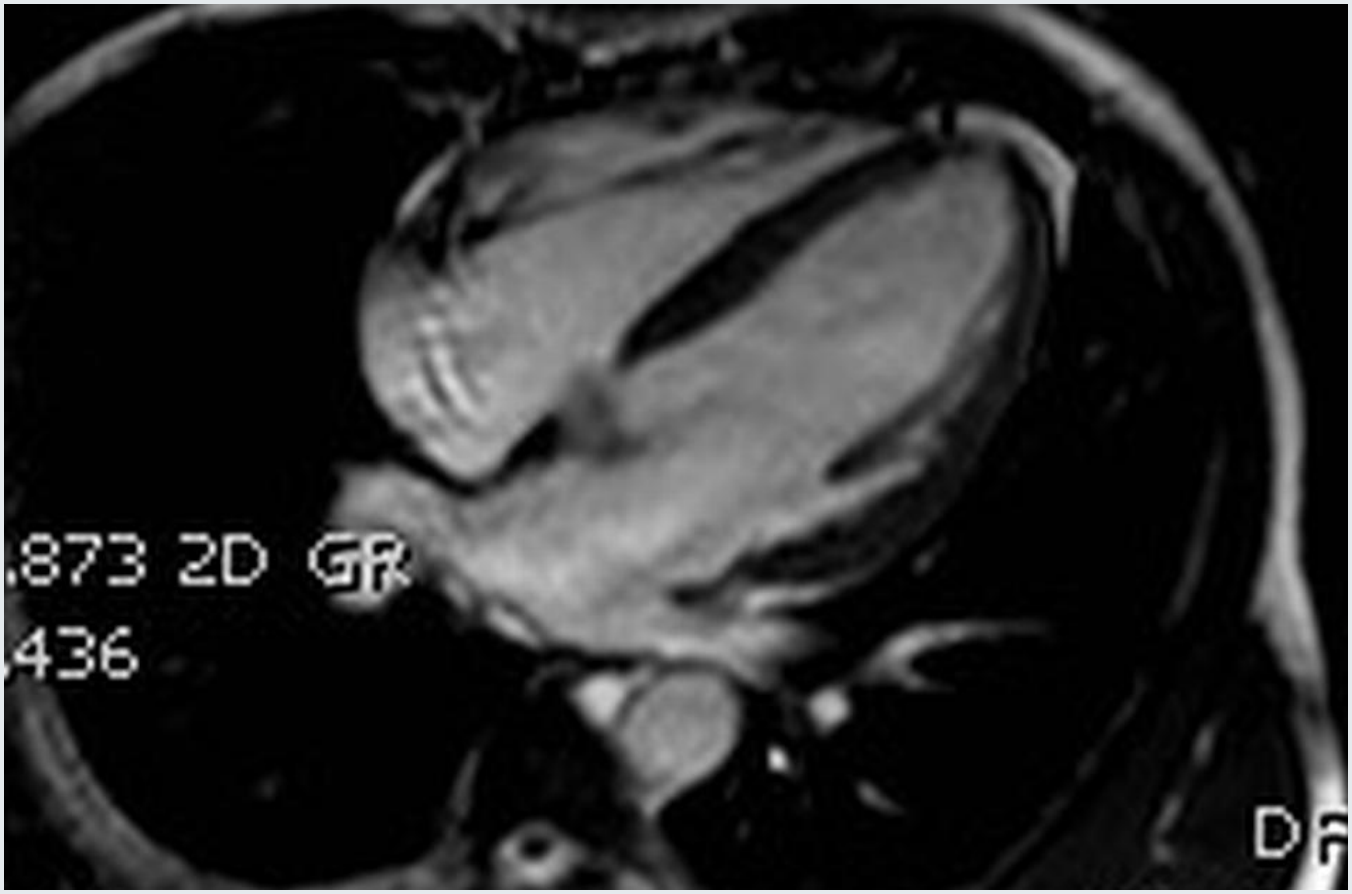
Further exams are necessary for assessment

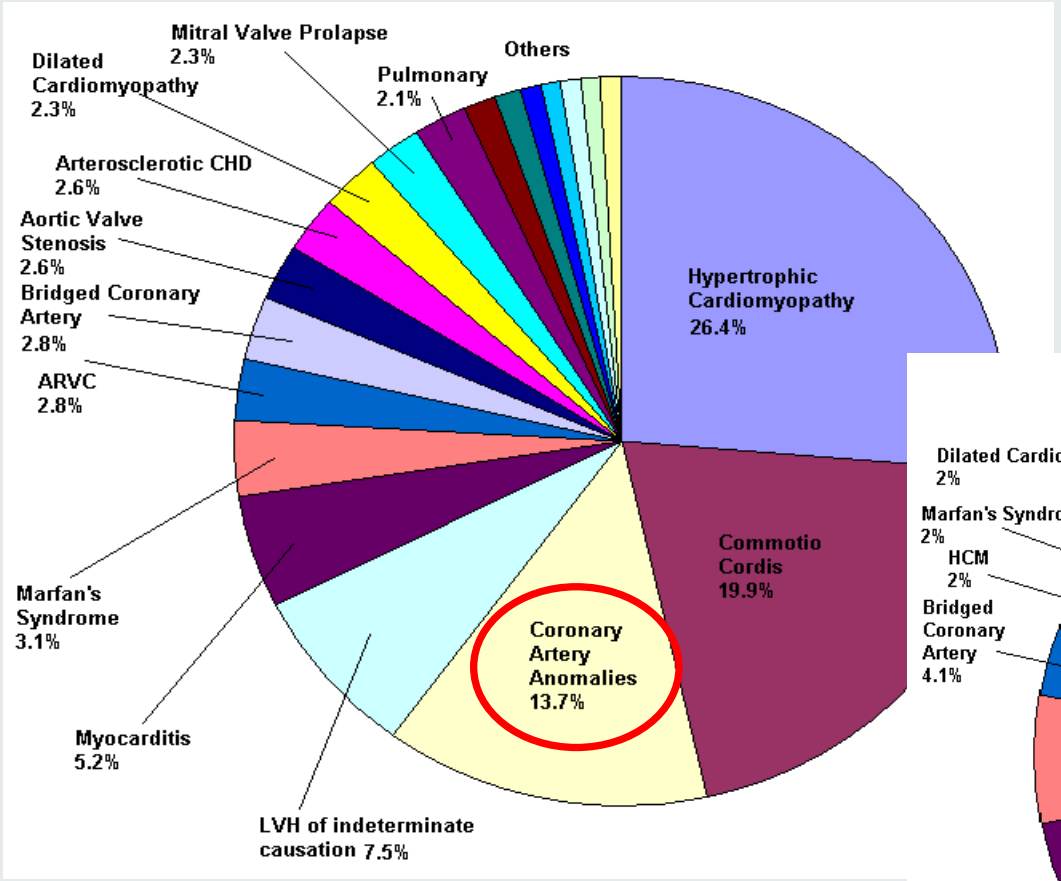
- **Disease extension/**
  Associated structural disease?
  - CT scan
  - MRI
  - Coronary angiogram

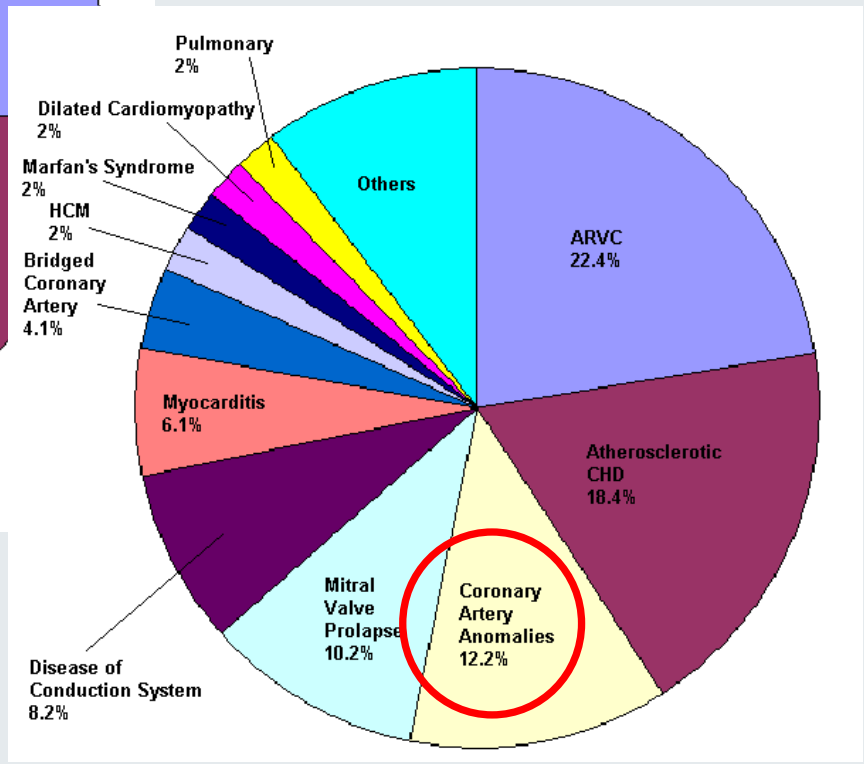
- **Relevance of the disease: Ischemia?**
  - **Stress-Echo**
  - **MRI**
  - **Szintigraphy**
  - **PET-scan**

Relevance? –> No ischemia



BACKGROUND AND THEORY





Maron BJ. NEJM 2003; 349: 1064–1075. Corrado, et al., New England Journal of Medicine, Volume 339:364-369.

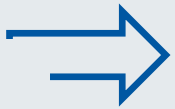
Congenital coronary artery abnormalities: Basis (1/2)

- Development of coronary arteries approx. on **day 32 of gestation**
- **Incidence:** approx. **0.64%** of births
- **Most common:** insignificant forms/ regular variants
  - Separate origins of the RCA and conal branch: 50%
  - Separate ostium of LAD/ CX: 1%
- **Left-**sided
- **Right-**sided: origin from the pulmonary artery
  - *Coronary insufficiency* (low perfusion pressure, low oxygenation)
  - Left-right *shunt with steel* syndrome
- **Complex** anomalies (Fallot, Transposition, Truncus arteriosus)

Cheitlin et al, Circulation 1974; 50: 780. Barth et al. J Am Coll Cardiol 1986; 7: 366. Lorenz et al. Rev Cardiovasc Med 2006;7: 205. Edwards et al. Circulation 1964; 29:163. Wright et al. J Thorax Cardiovasc Surg 1970; 59:461.

Congenital coronary artery abnormalities: Basis (2/2)

- **Left-side forms**:
  - Main stem/ **LAD from right Sinus** of valsalvae or RCA-ostium
  - **RCA from left Sinus** of valsalvae/ ostium of main stem



- **Different *risk categories***, depending on the course of the artery

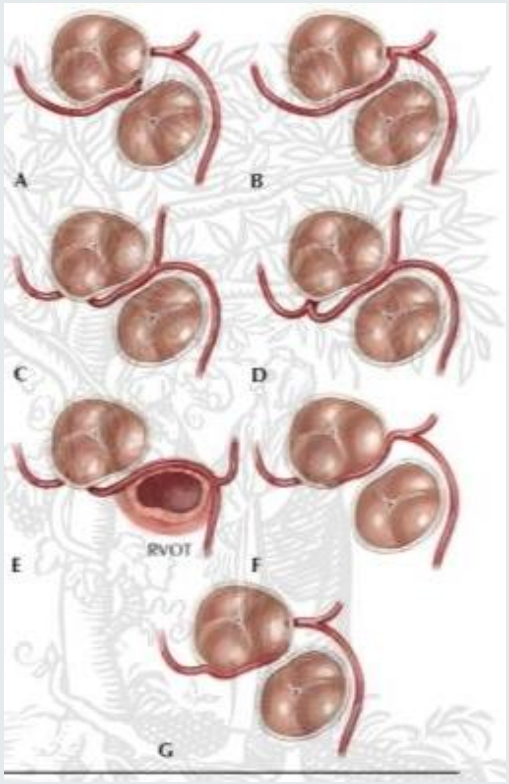
  - ***Critical:*** course between the Aortic root and pulmonary artery
  - ***Critical*****:** Angle of take off
  - ***Critical*****: I**ntramural course

Kaushal et al. Ann Thorax Surg 2011: 92:986. Kimbiris et al. Circulation 1978; 58:606.

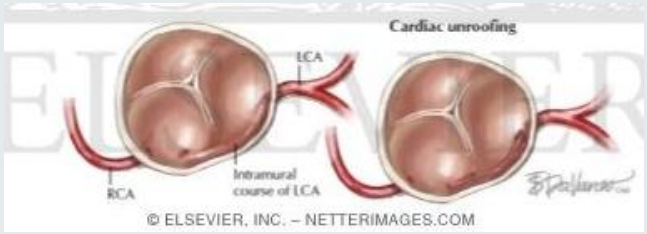
Risk-stratification for coronary anomalies

Low-Risk

High-Risk



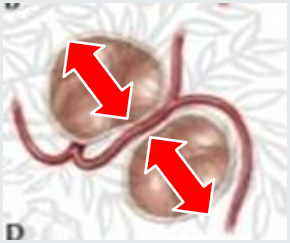
Intramural course



Reasoning

Compression of coronary arteries

- Dilatation of Aorta/ pulmonary trunk with increased blood pressure



- Direct compression by muscular contractions (for intramural course)

Increased O_2 need during physical exercise

- Ischemia
- Arrhythmia
- SCD

From,elt et al. J am Coll Cardiol 2003; 42:148. Taylor et al. Circulation 2000; 101:1670. Datta et al. Radiology 2005; 235:812.

Screening

- **Objective:**
  - Detection of potential harmful anomalies

- **Methods**:
  - ECG: no specific findings (unless past infarction)
  - Echocardiography
  - Coronary CT
  - Cardiac MRI
  - (Coronary angiogram)

From,elt et al. J am Coll Cardiol 2003; 42:148. Taylor et al. Circulation 2000; 101:1670. Datta et al. Radiology 2005; 235:812.

Treatment methods

- **All** arteries arising **from the pulmonary artery**:
  - Surgical correction

- Depending on symptoms:
  - **Probably no therapy necessary in asymptomatic patients** without ischemia
    - No controlled outcome studies
    - Potentially beneficial for left main from right ostium
  - **Surgical** intervention **for symptomatic** patients
    - Documented ischemia
    - SCD, arrhythmia

Brothers et al. Pediatr Cardiol. 2009; 30:911. Gersony J Am Coll Cardiol 2007; 50:2083. Mainwaring et al. Ann Thorac Surg. 2011; 92:691.

Summary: Congenital coronary malformation

- **Rare, with wide spectrum**
  - Asymptomatic
  - Symptoms of ischemia (angina)
  - Sudden cardiac death

- **Prognosis depends** on
  - Form of malformation
  - Physical activity
  - Concomitant disease (e.g. atherosclerosis)

- **Treatment**
  - For athletes (no competitive sports)
  - In patients with symptoms -> surgery
  - In patients with involvement of pulmonary artery -> surgery

If it was not for the disease…

DISCUSSION