

Heart Disease

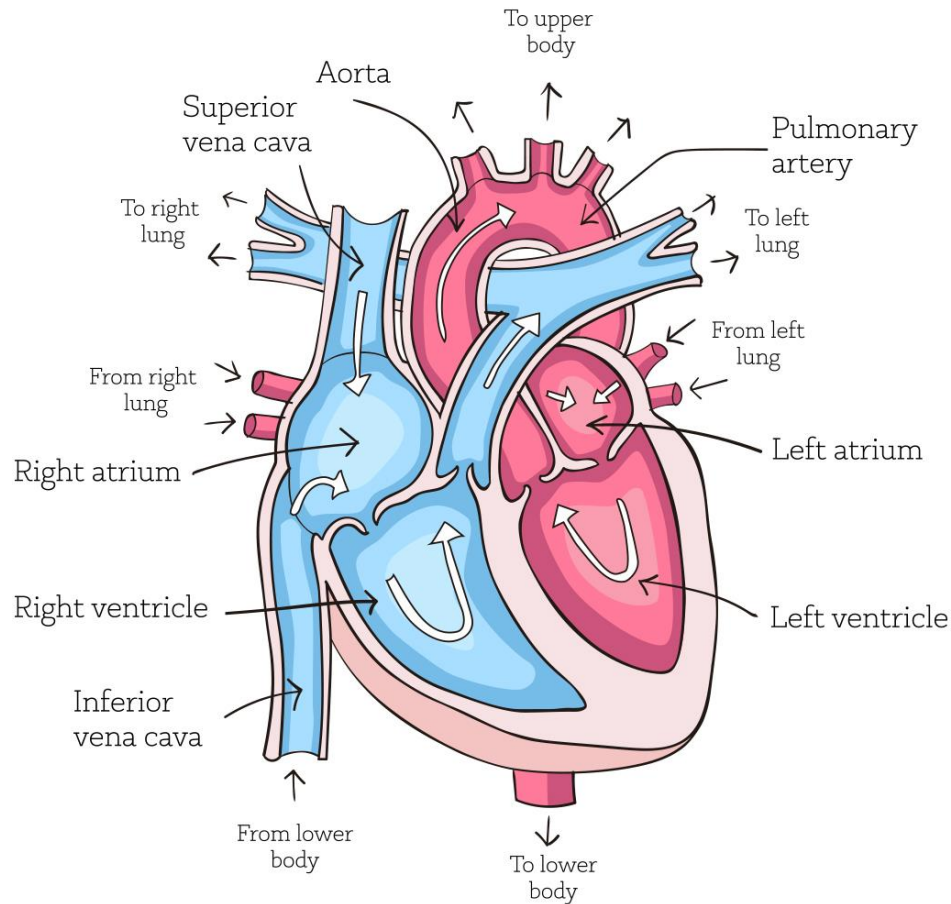
Mini Medical School
Loren Oh
February 3, 2020



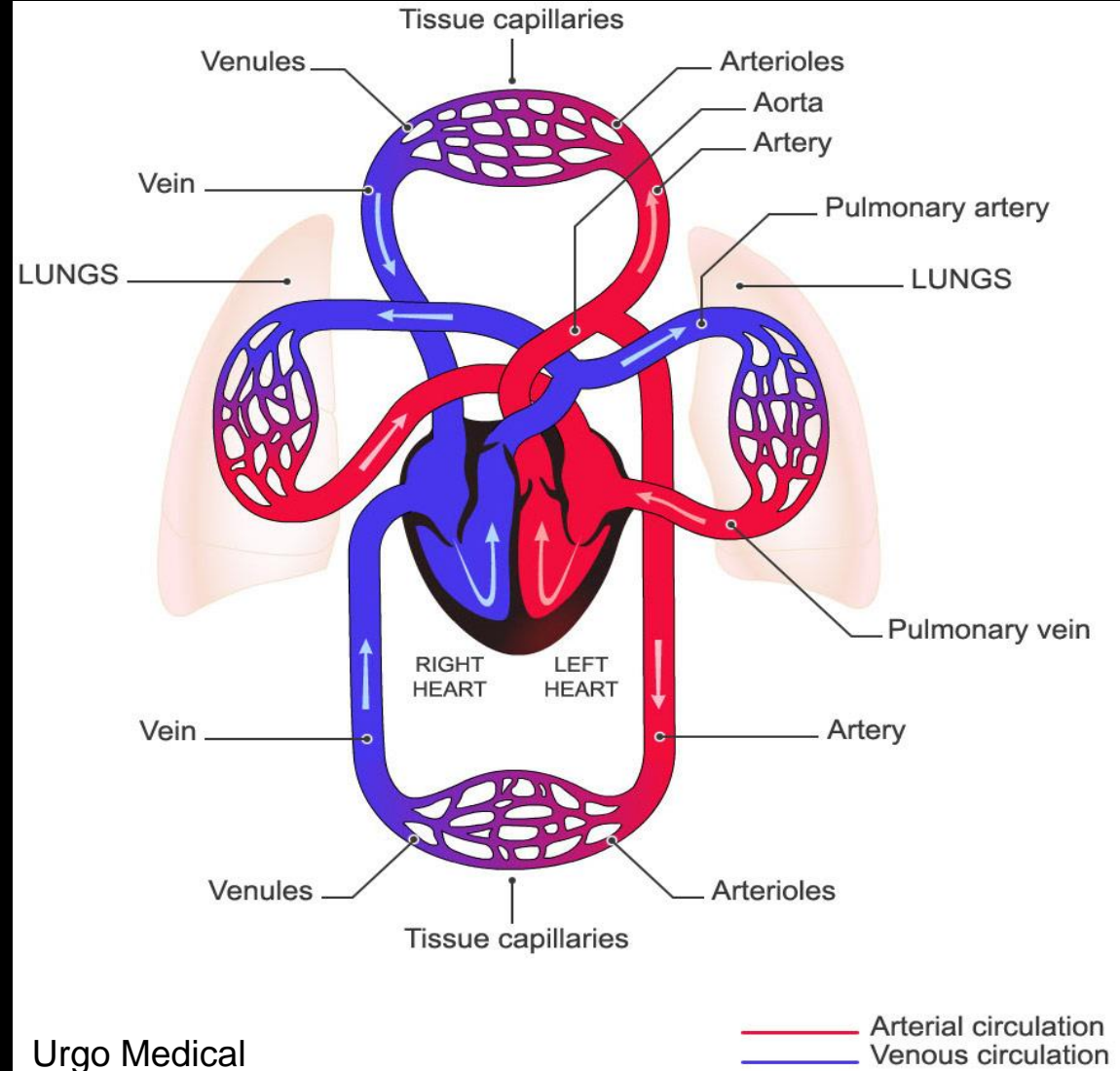
Learning Objectives

- To be familiar with the anatomy of the heart and basic heart functions
- To understand the different causes of heart disease
 - Arrhythmias
 - Valvular disease
 - Cardiomyopathies
 - Ischemia
- To know the various tools available to doctors to assess heart disease

The Circulatory System

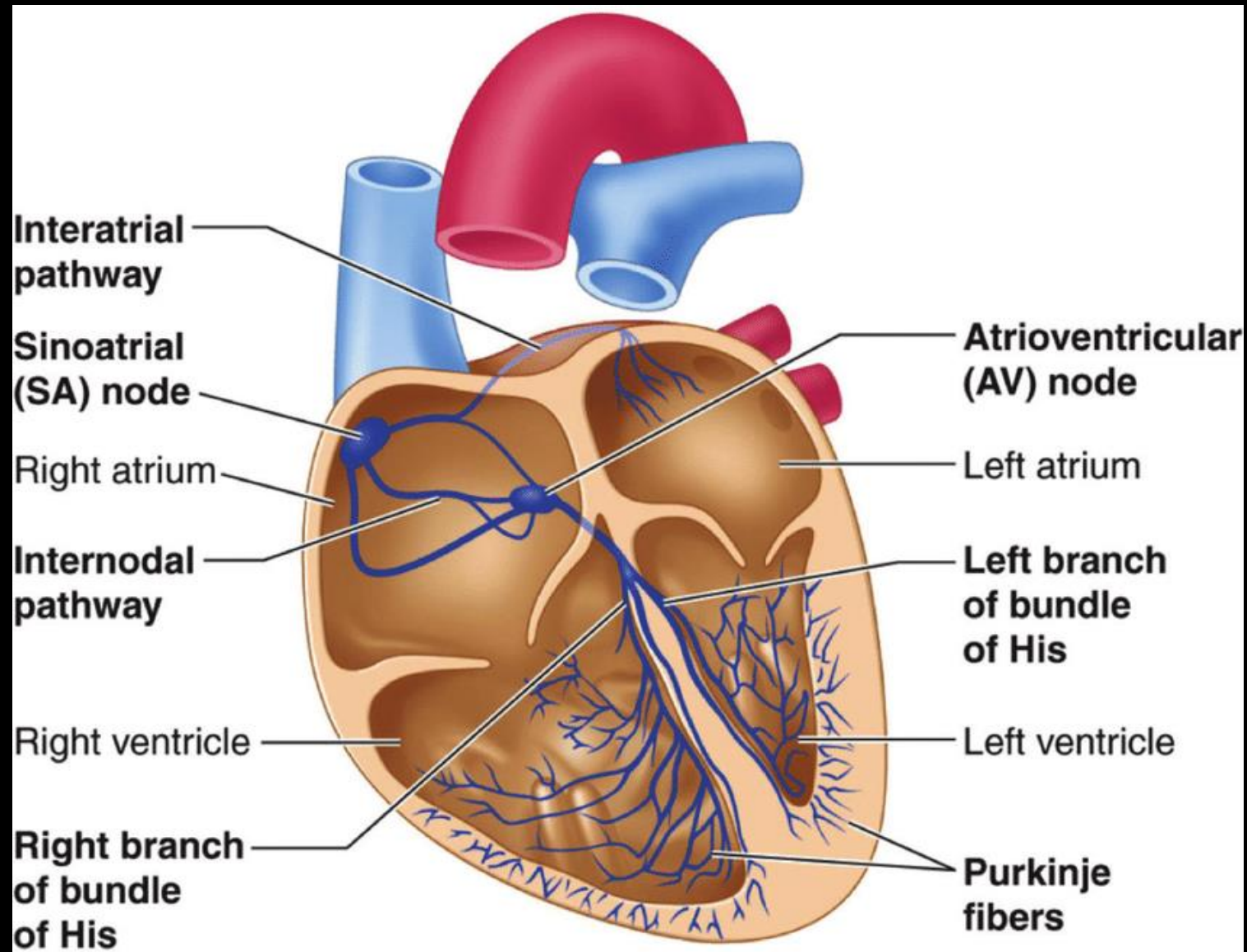


Lara Fields Illustration

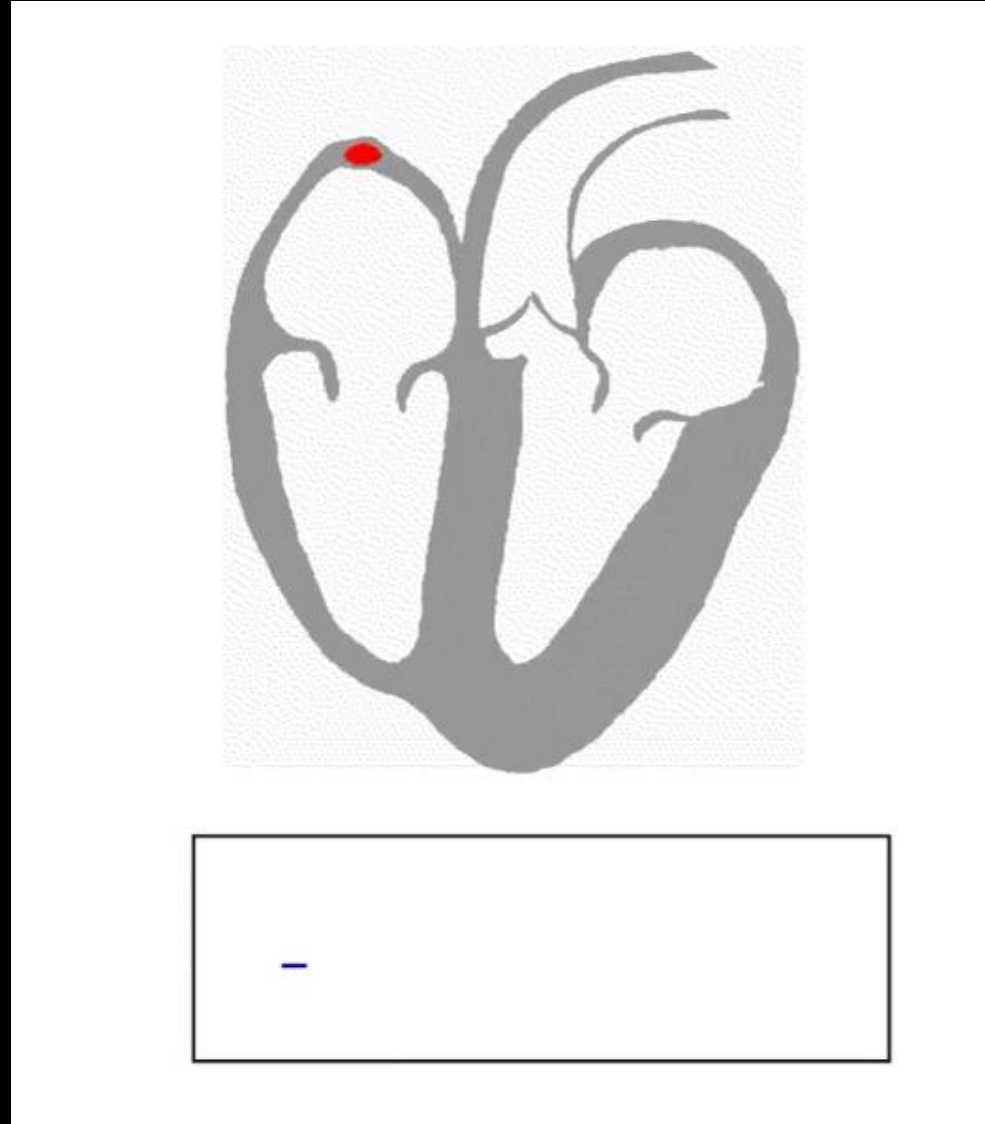


Urgo Medical

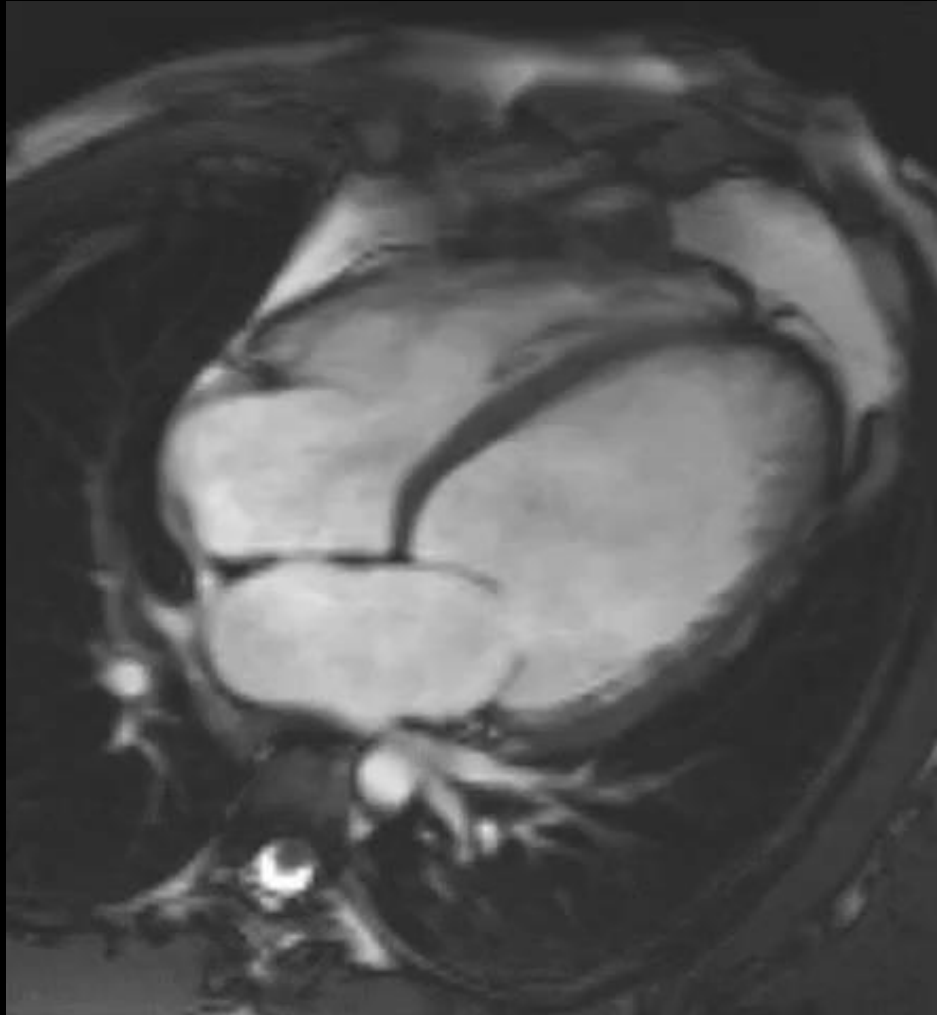
Electrical Signaling of the Heart



Electrical Signaling of the Heart



The Heart in Action

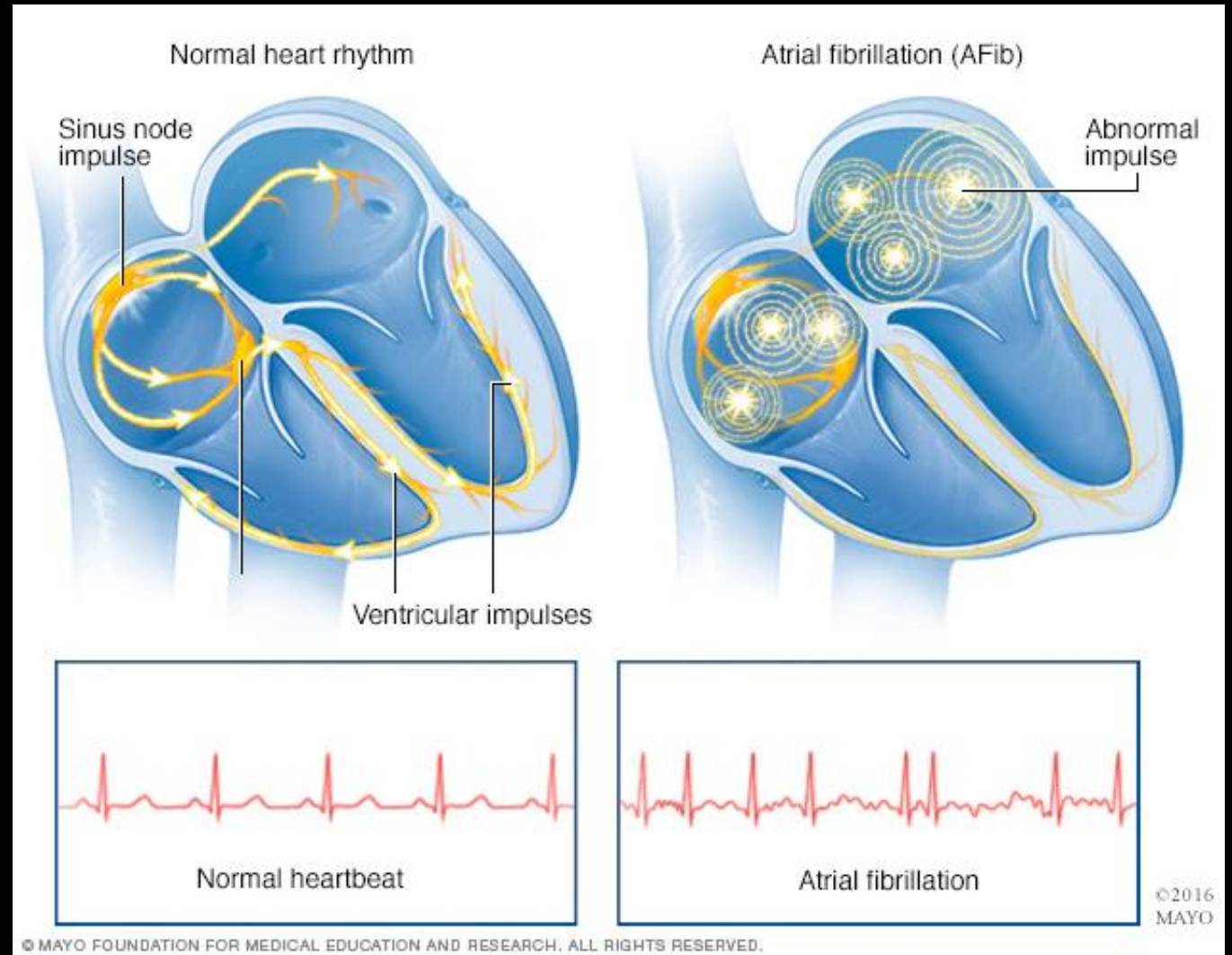


Arrhythmias

- Problem with the rate or rhythm of the heart, often due to problems with the electrical signaling (or conduction system)
- Rate:
 - **Bradycardia**: Slow rate
 - **Tachycardia**: Fast rate
- Rhythm:
 - Regular
 - Irregular

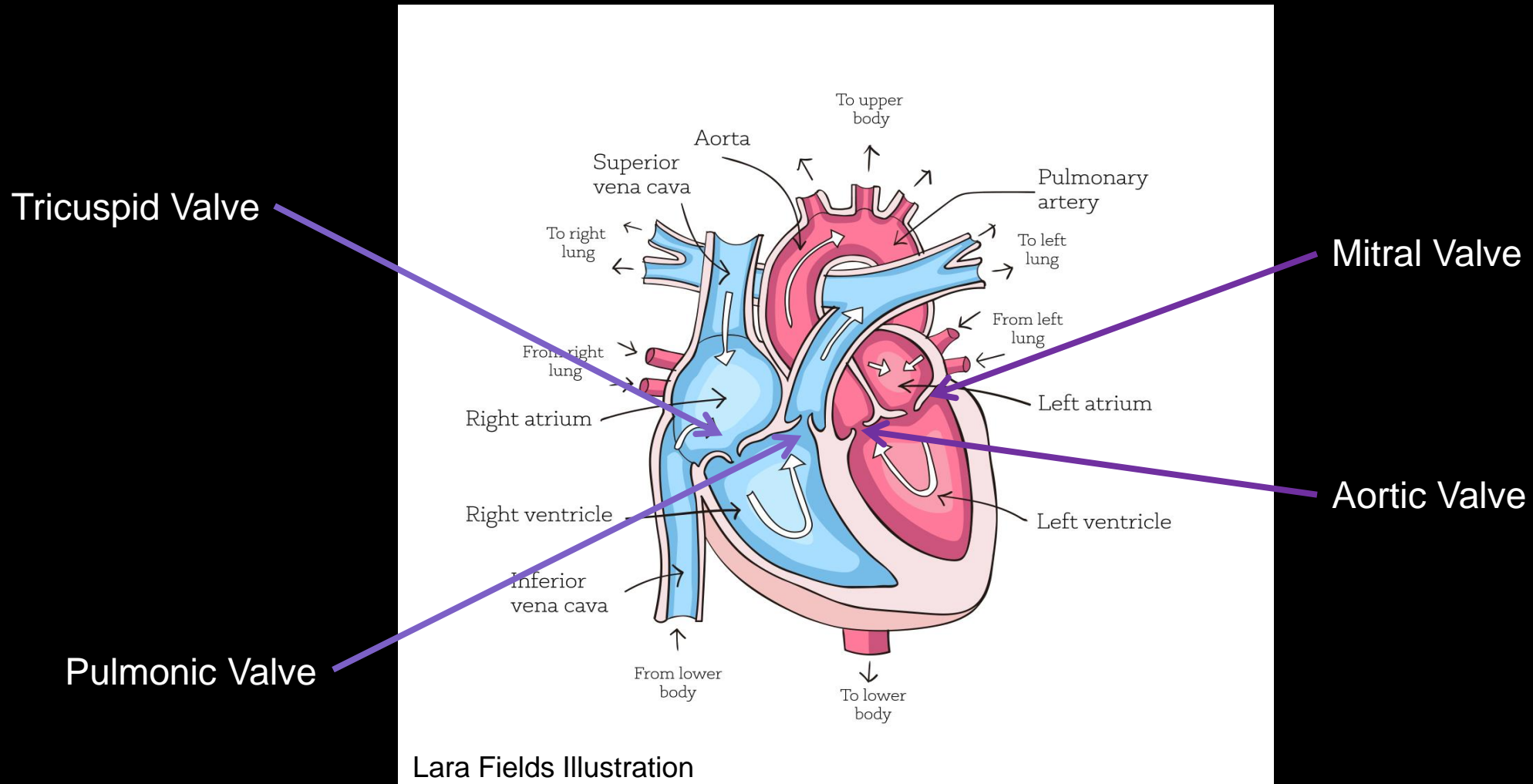
Atrial Fibrillation

- Quivering or irregular fast heartbeat
- Increased risk for:
 - Stroke



Valvular Disease

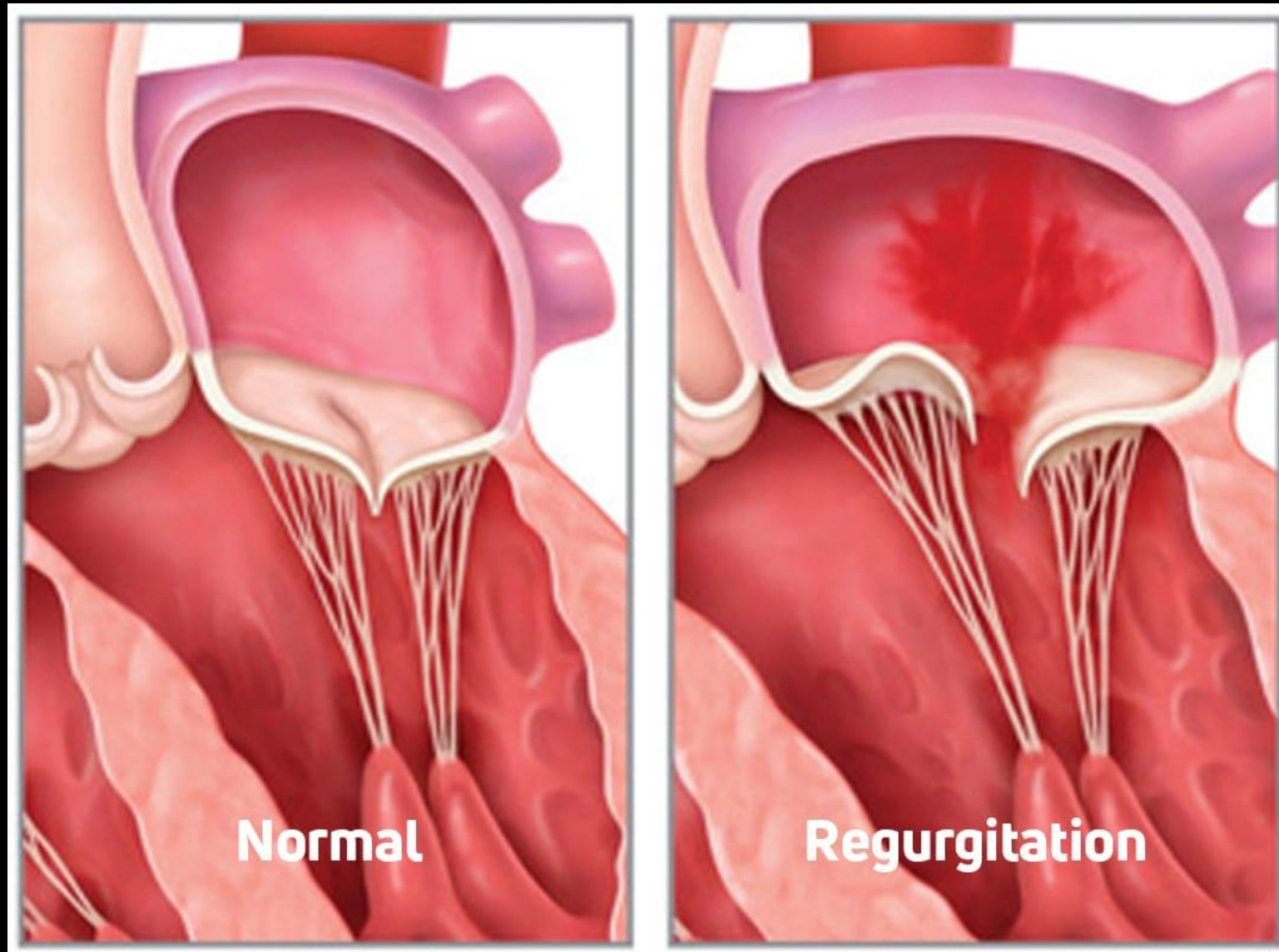
- Problems with the valves of the heart



Valvular Disease

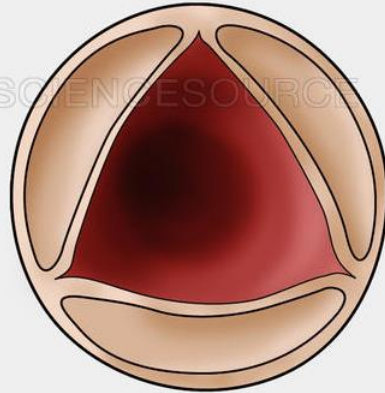
- Problems with the valves of the heart
 - Left side: Mitral, Aortic
 - Right side: Tricuspid, Pulmonic
- Types of issues:
 - **Regurgitation**: Floppy or loose valve → Backward flow of blood
 - **Stenosis**: Narrowing due to "hard" valve → Slow, impeded flow of blood

Mitral Regurgitation

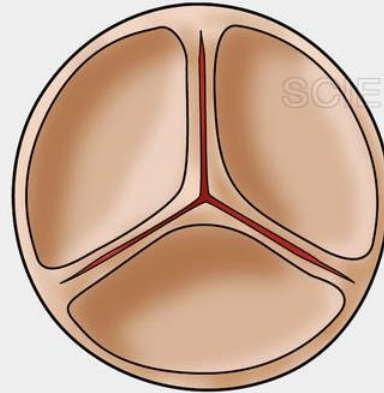


Aortic Stenosis

Normal Aortic Valves

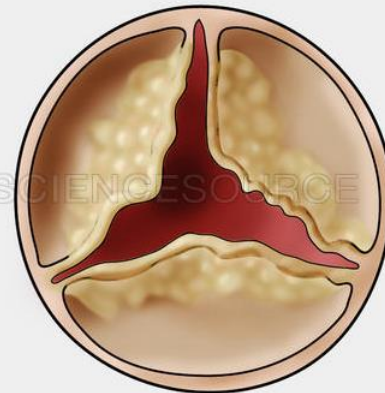


open



closed

Aortic Valve Stenosis



open



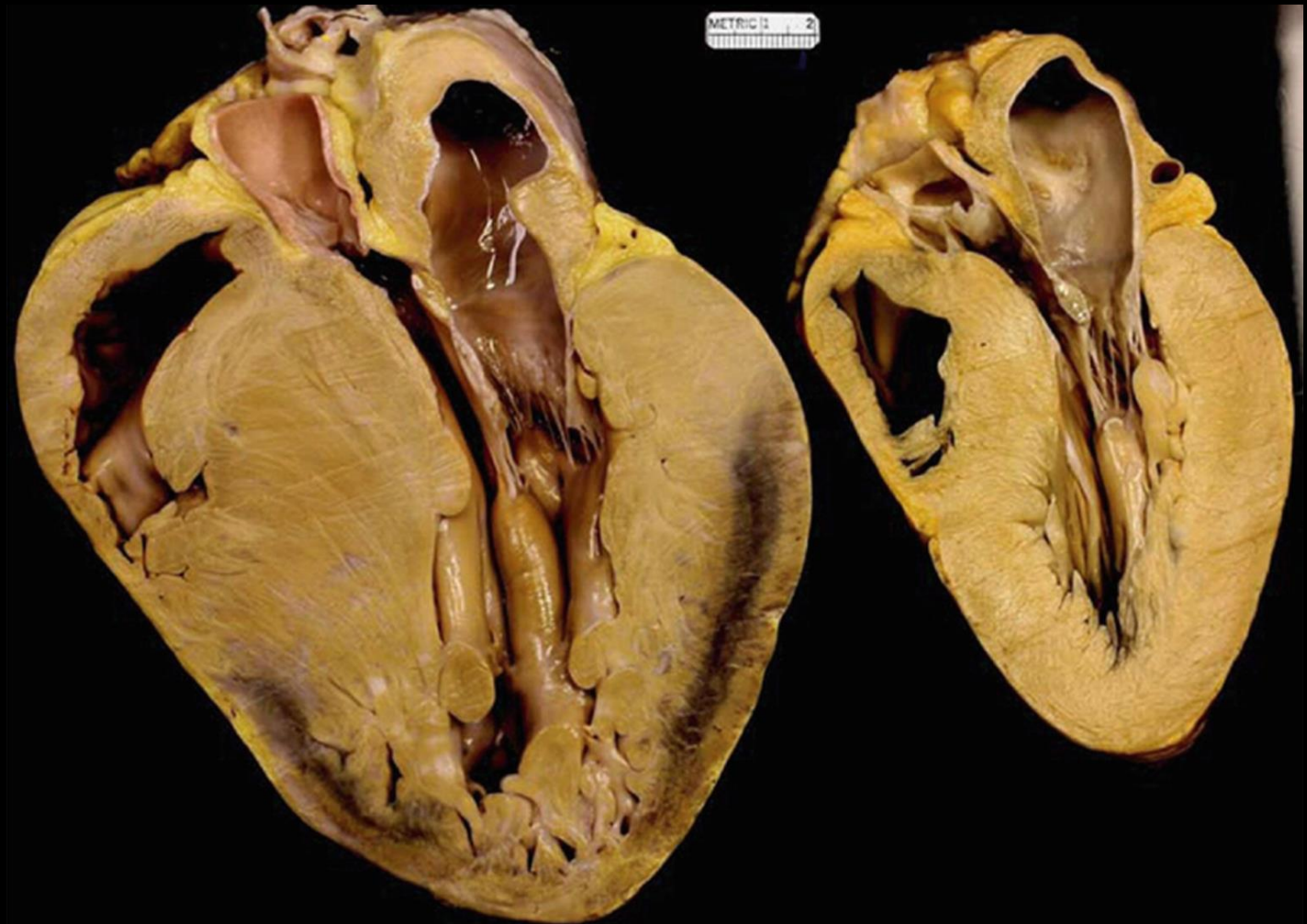
closed

Cardiomyopathies

- Cardio = “heart” + myopathy = “disease of muscle”
- Types of cardiomyopathies:
 - **Hypertrophic**: Thickened muscle
 - **Dilated**: Weakened, “stretched” muscle

Hypertrophic Cardiomyopathy

- Thickened muscle
- Causes:
 - Hereditary
 - Hypertension
 - Aortic stenosis
- Complications:
 - Sudden cardiac death
 - Arrhythmias
 - Heart failure



Dilated Cardiomyopathy

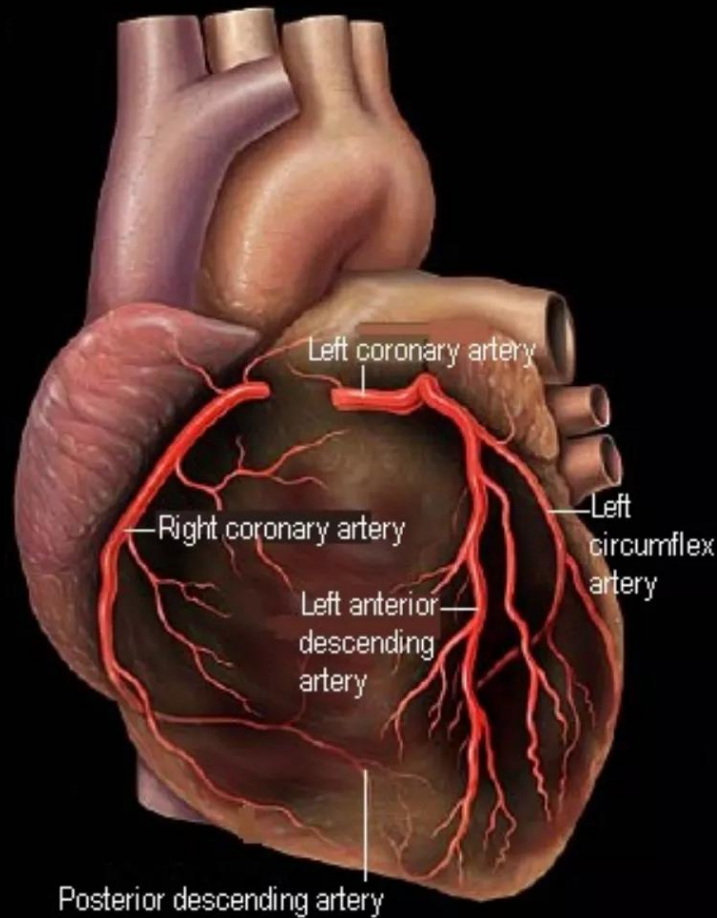
- Weakened, floppy muscle
- Causes:
 - Hereditary
 - Drugs
 - Infections
- Complications:
 - Arrhythmias
 - Heart failure
 - Regurgitation



Ashworth, M. (2019). Examination of the Heart. In *Pathology of Heart Disease in the Fetus, Infant and Child: Autopsy, Surgical and Molecular Pathology*

Ischemic Heart Disease

- Ischemia: Not enough delivery of oxygen to the tissue



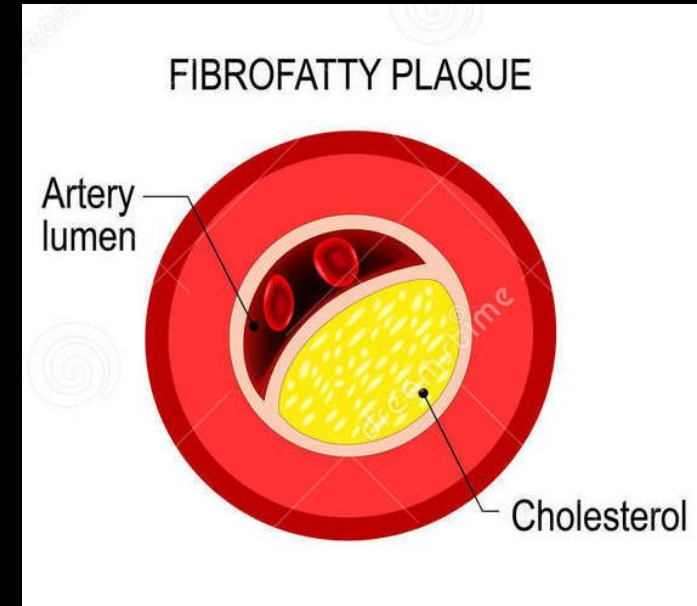
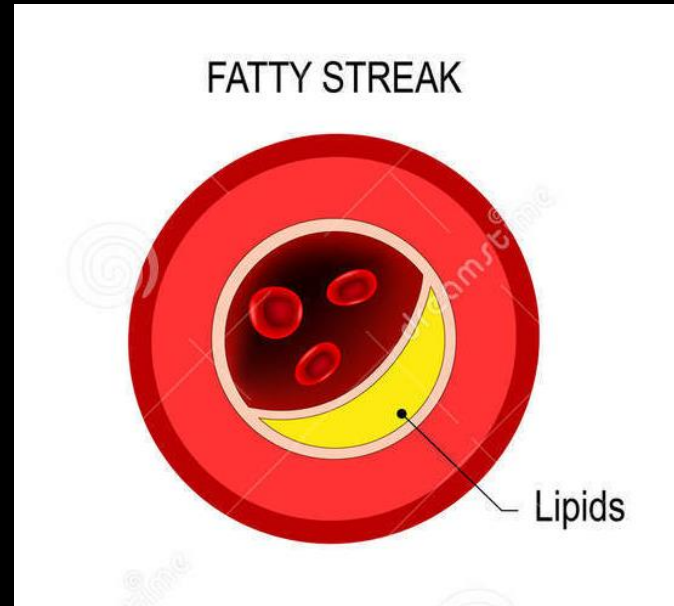
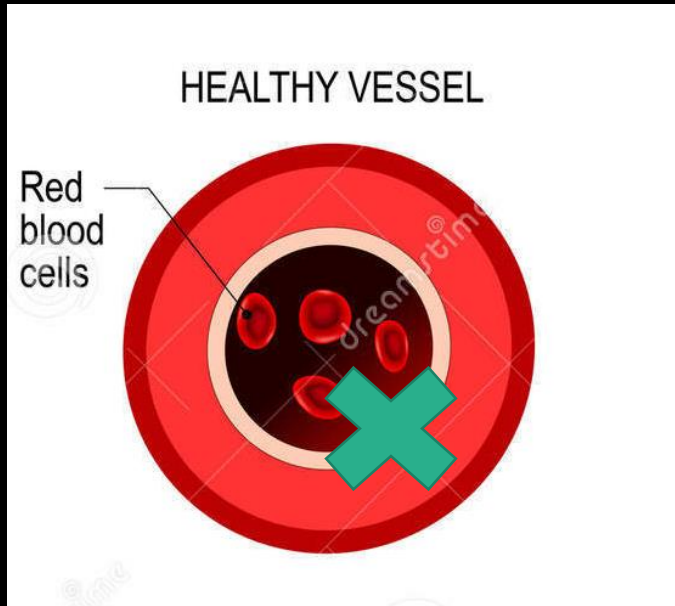
- Also known as **coronary artery disease** or coronary heart disease

Ischemic Heart Disease

- Mechanism of disease:

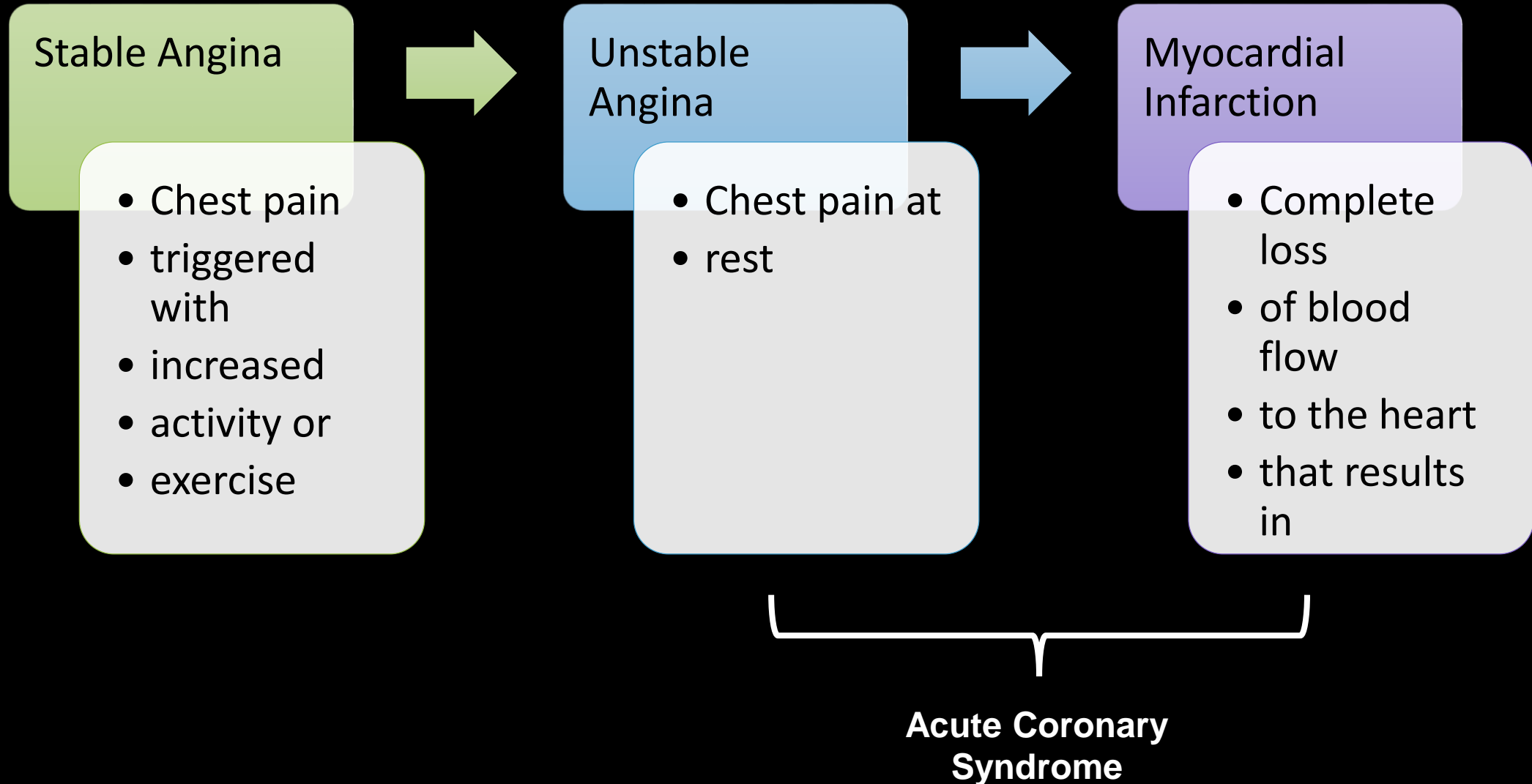
Atherosclerosis or “hardening of the arteries” with fatty buildup on blood vessel walls

Ischemic Heart Disease

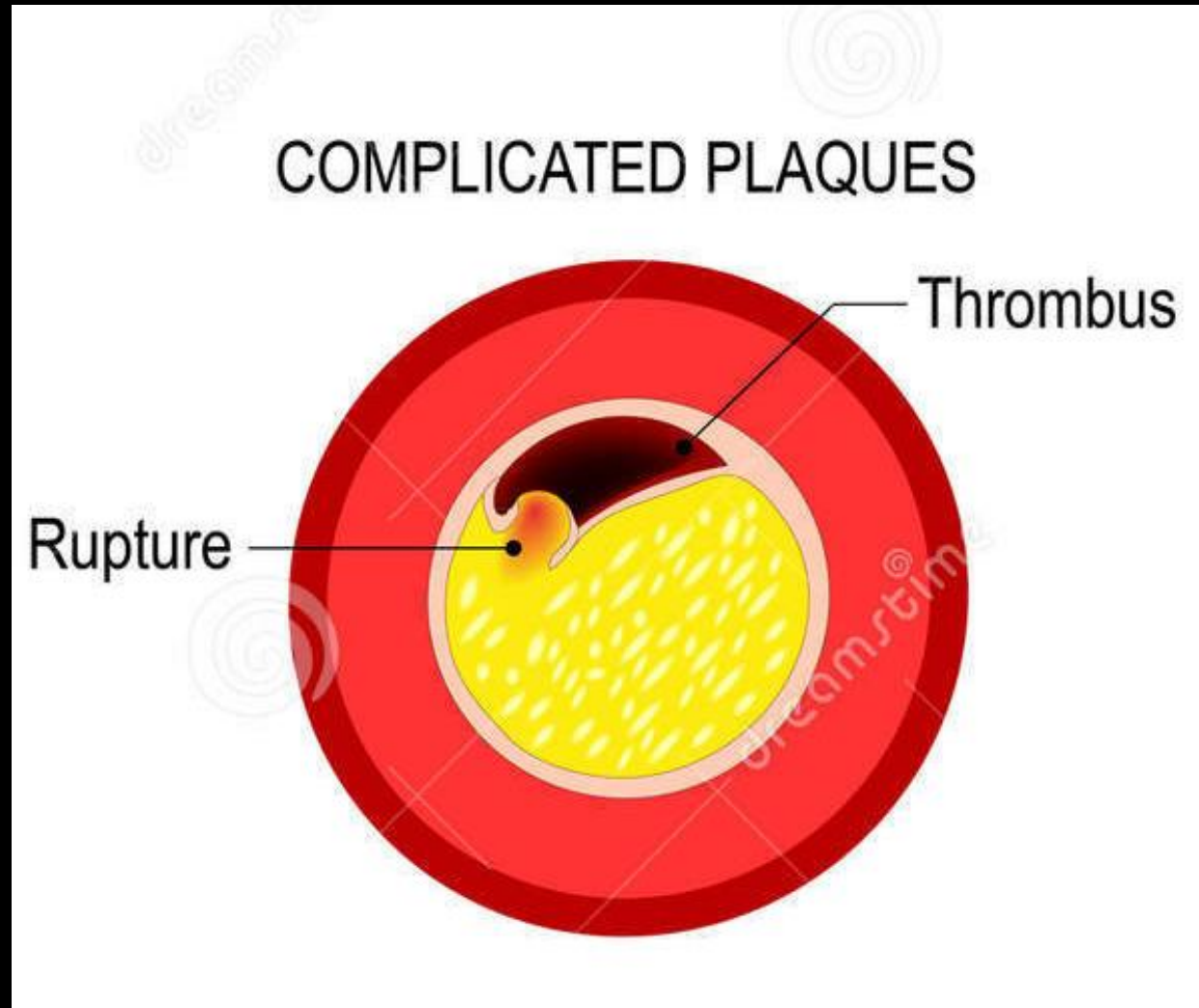


Smoking
Hypertension
Diabetes

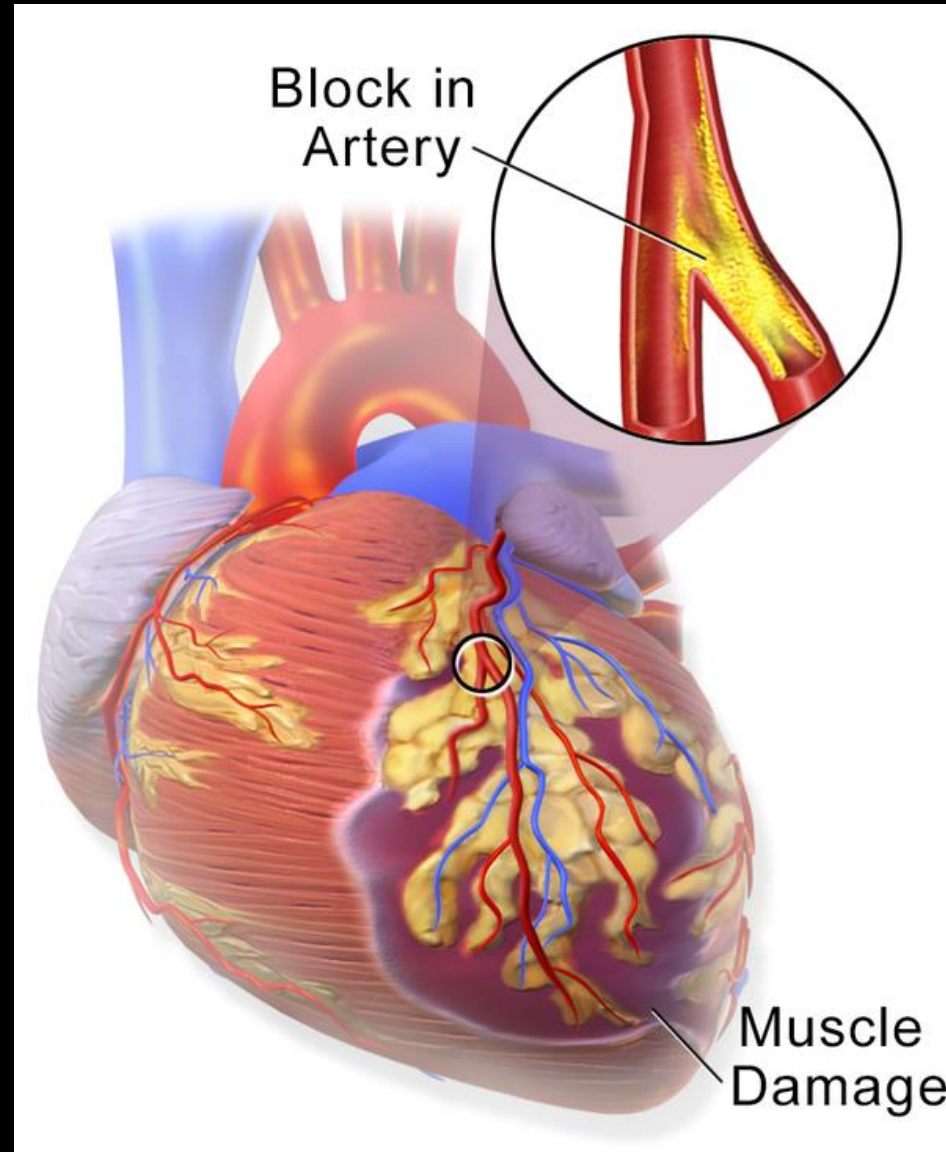
Ischemic Heart Disease



Acute Coronary Syndrome



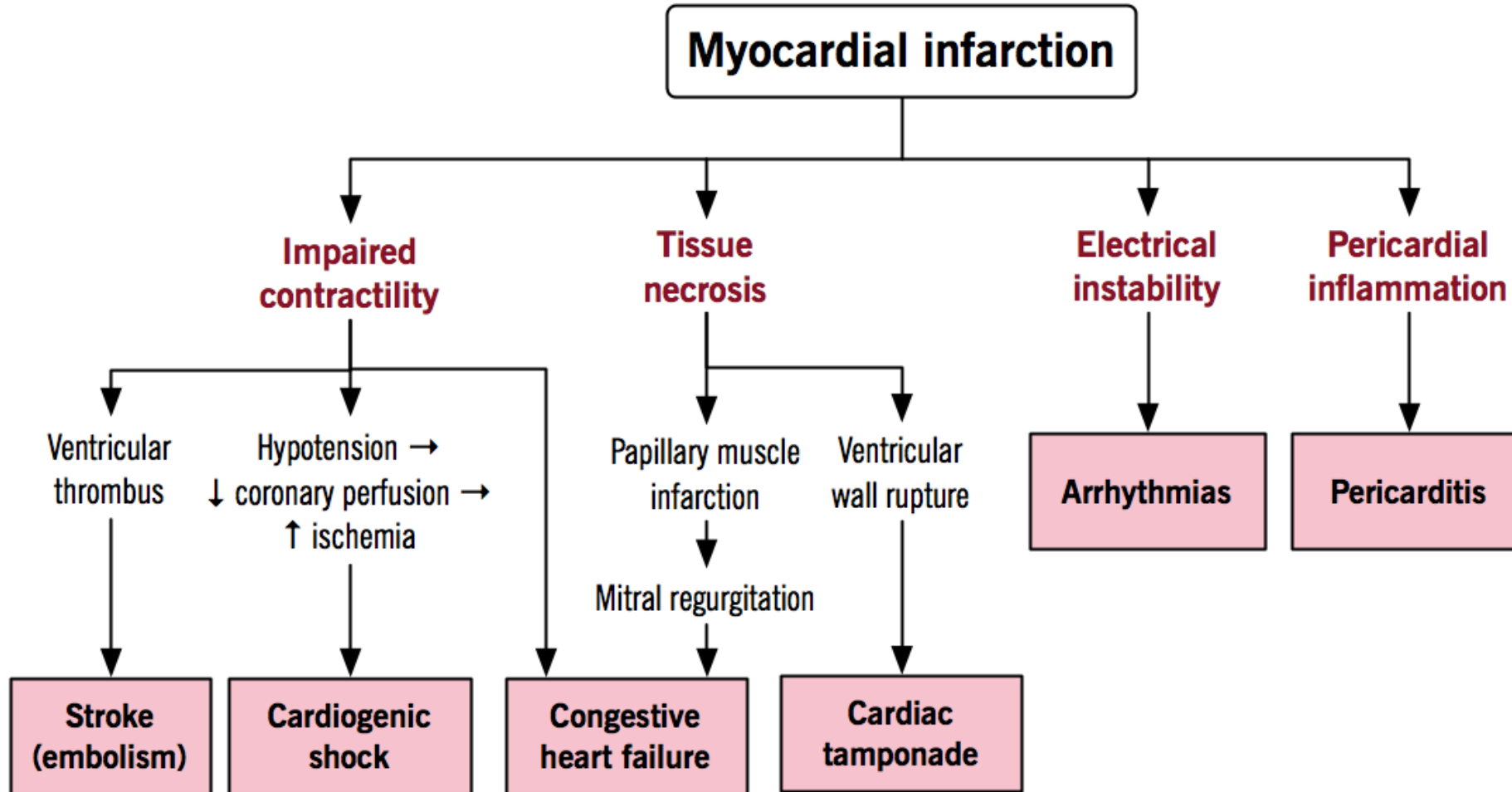
Myocardial Infarction



Myocardial Infarction

Complications of myocardial infarction

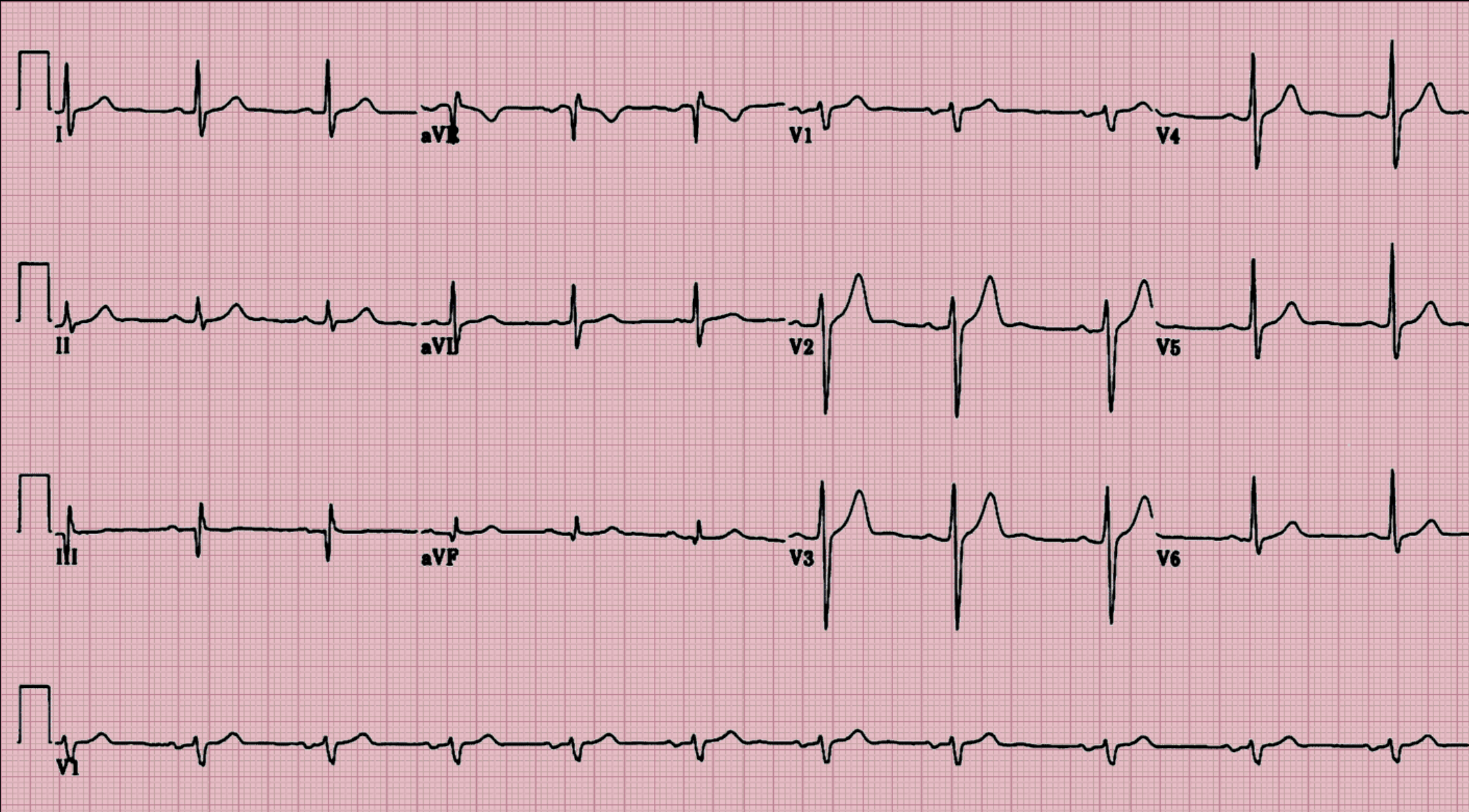
Dominique Yelle



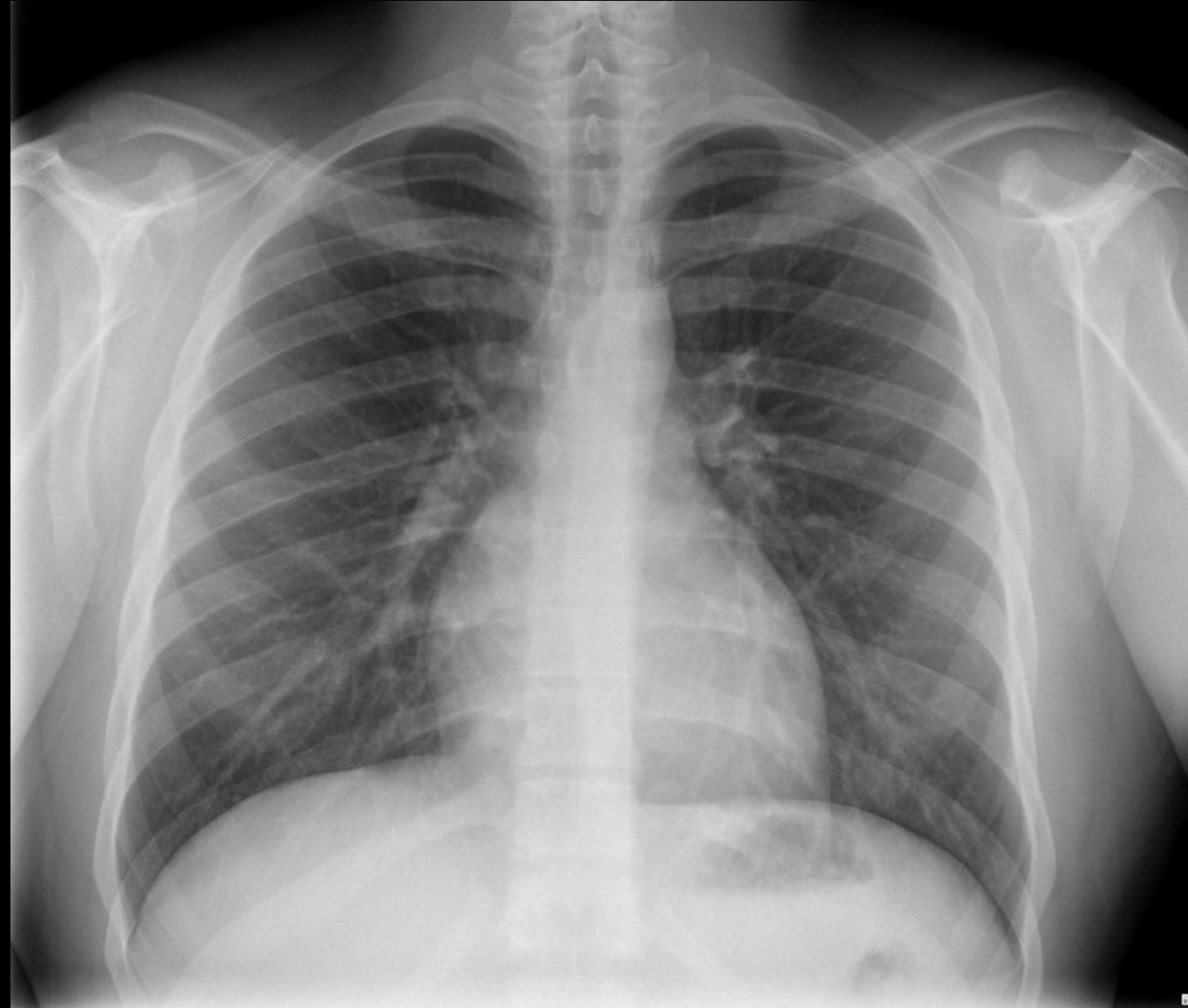
A Doctor's (very brief) Approach

- History & Physical Exam
- Blood work:
 - Cardiac Enzymes: Troponins, Creatinine kinase
 - Basic Metabolic Panel: Electrolytes, Sugar
- Imaging:
 - EKG/ECG: Electrocardiogram
 - Chest X-ray
 - Cardiac Ultrasound: Echocardiogram
 - Angiography
 - MRI: Magnetic Resonance Imaging

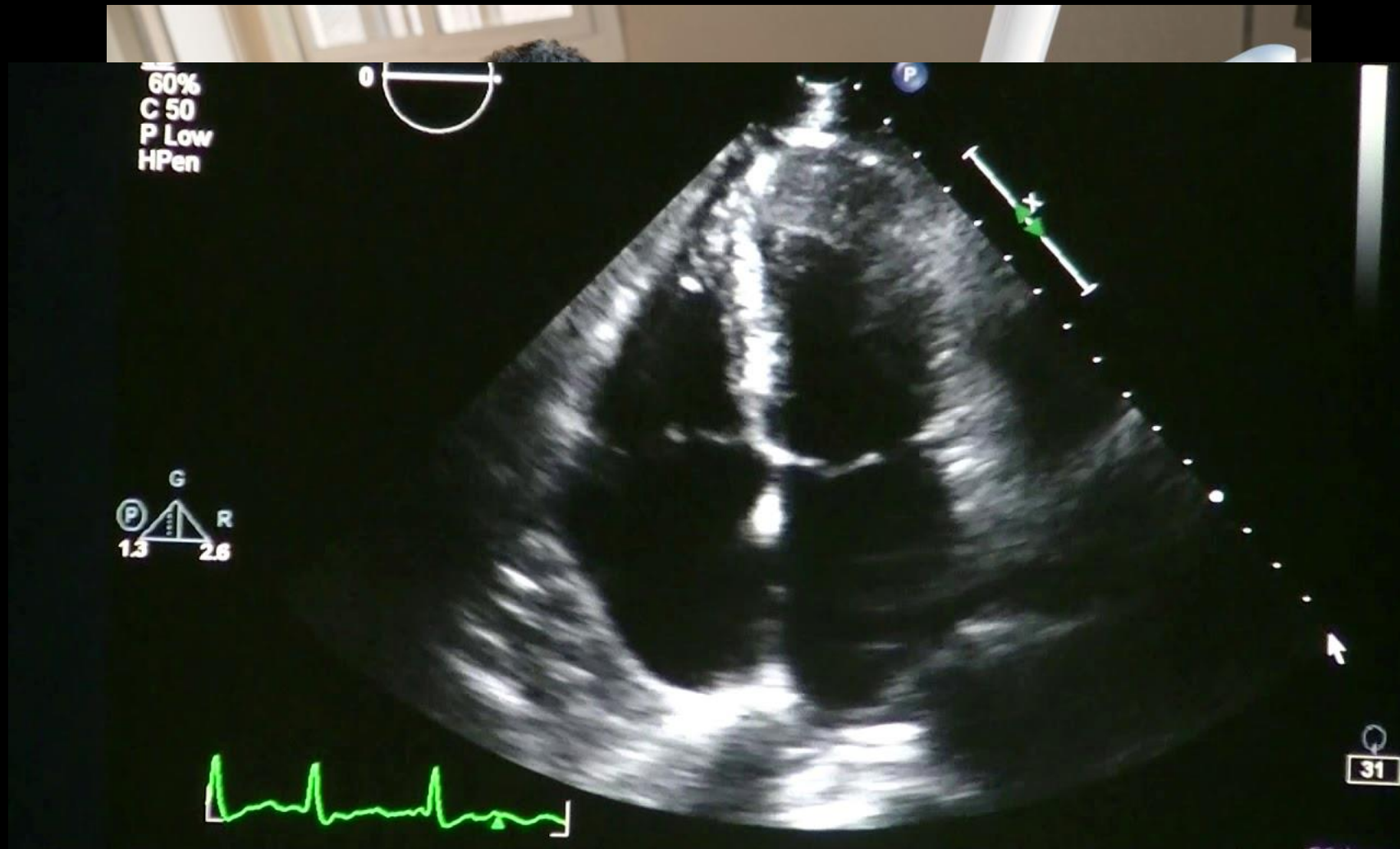
Electrocardiogram



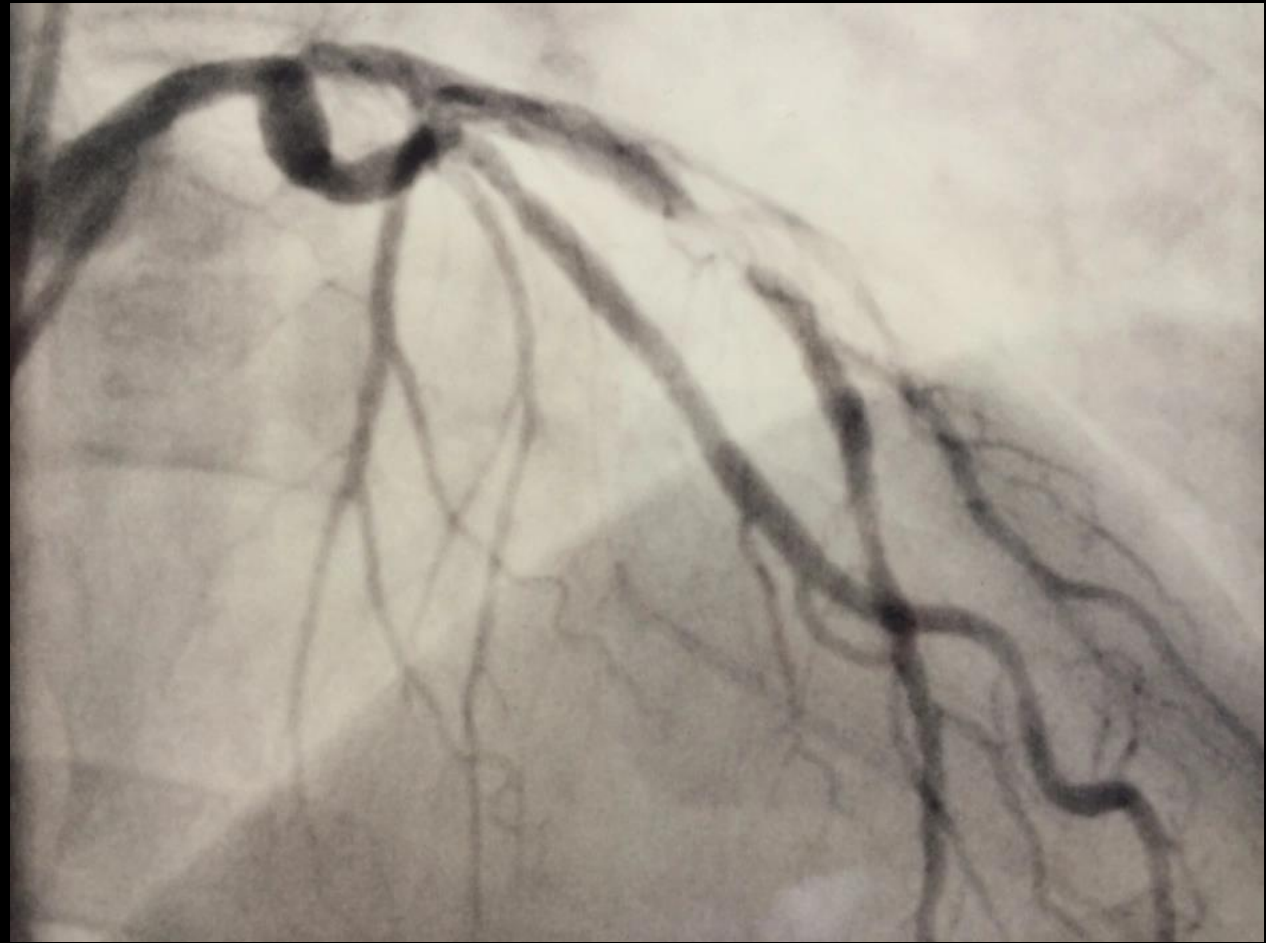
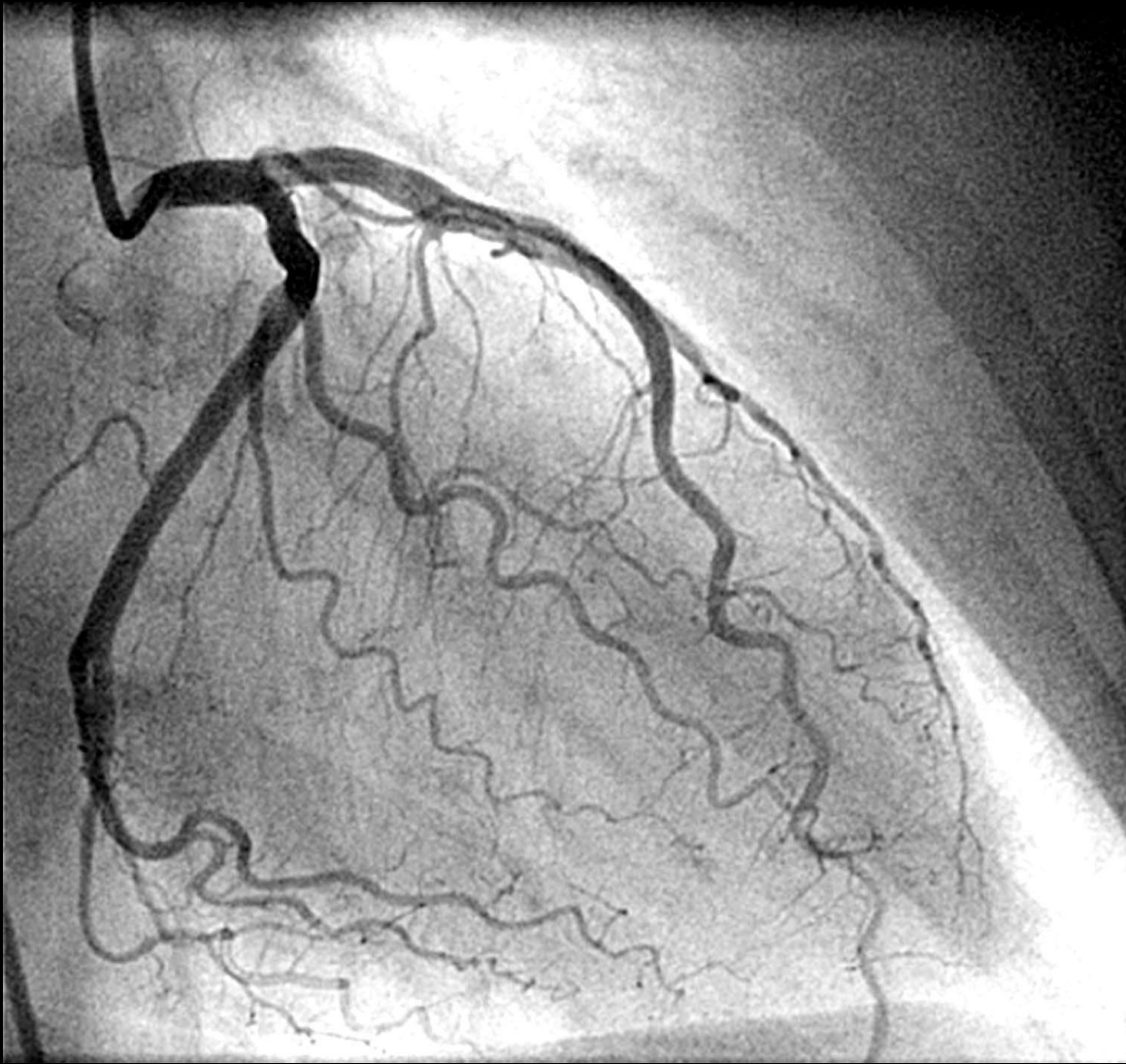
Chest X-Ray



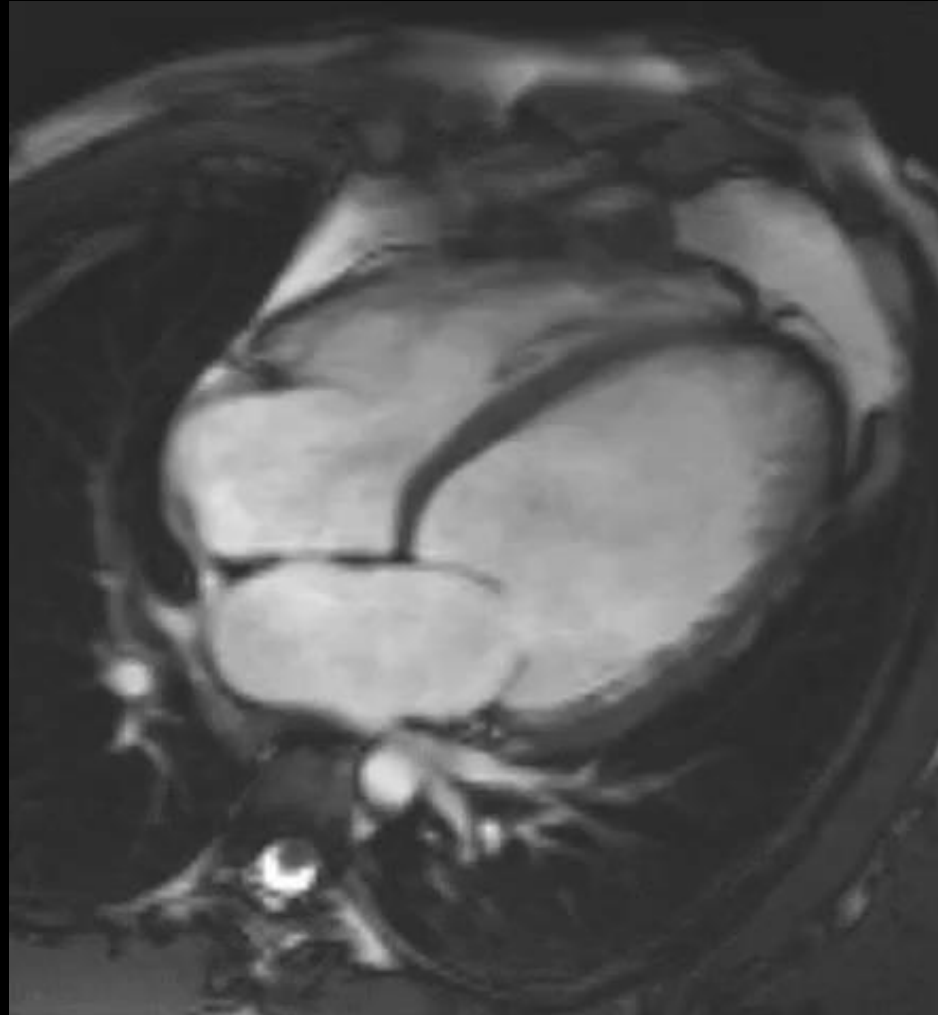
Cardiac Ultrasound: Echocardiogram



Angiography



Cardiac MRI



QUESTIONS?