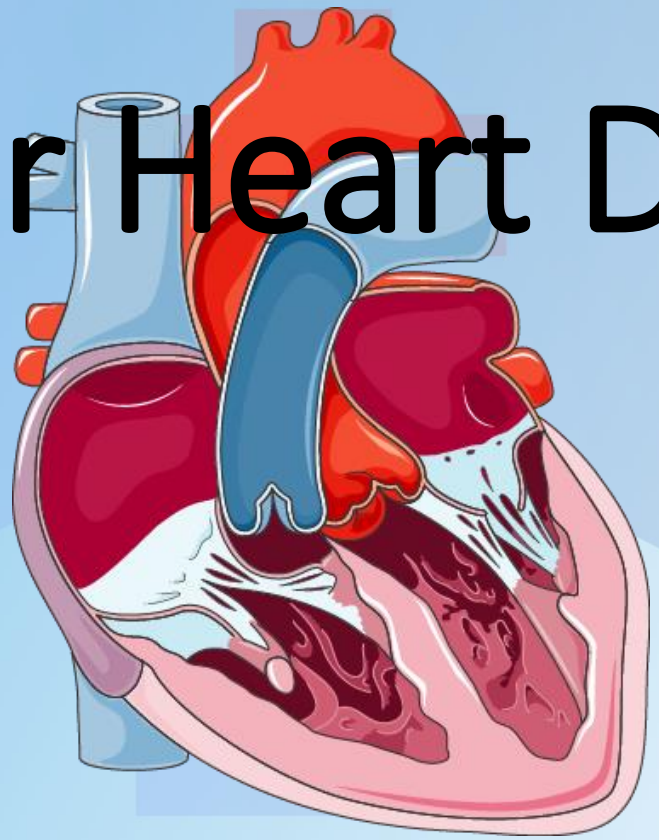
Valvular Heart Disease



Real life auscultation

Table of contents

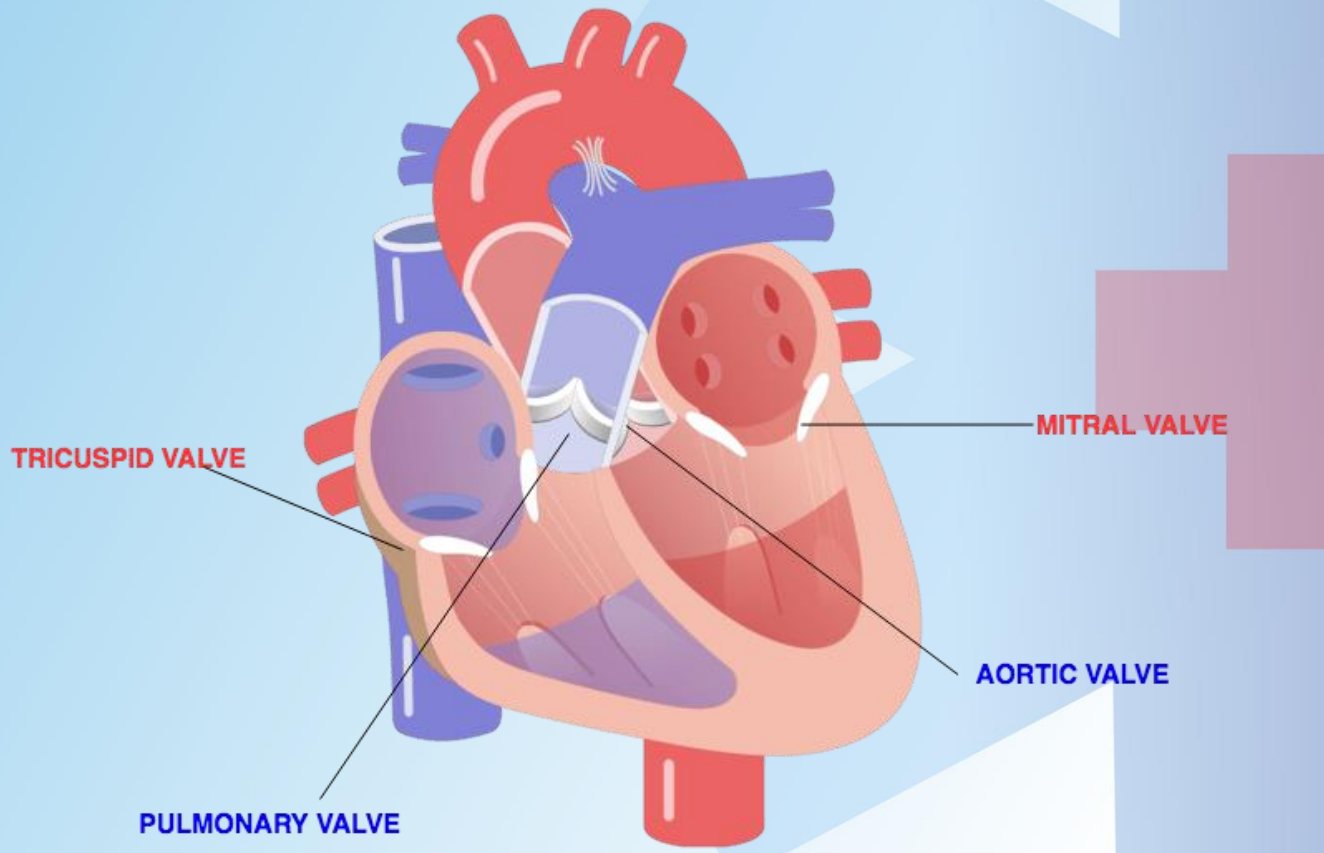
Review of the Heart Valves – Location

Atrio-Ventricular (AV valves):

- Mitral Valve
- Tricuspid Valve

Semilunar Valves:

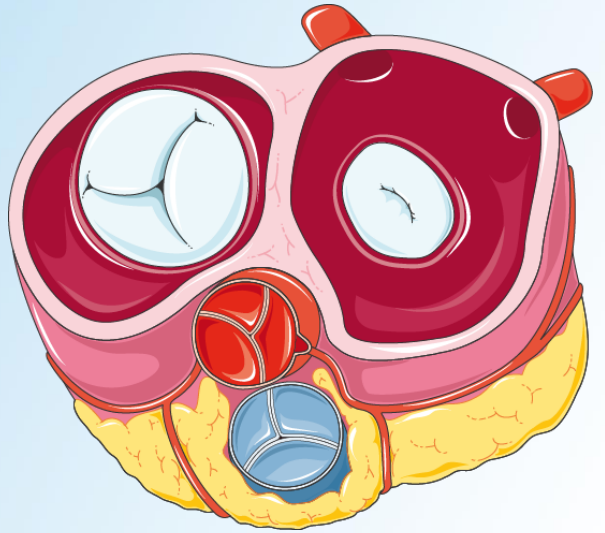
- Aortic Valve
- Pulmonary Valve



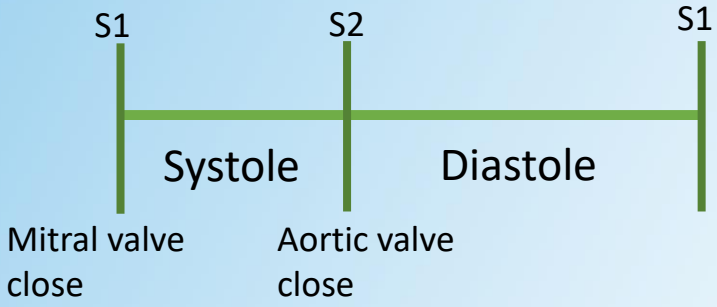
Review of the Heart Valves – Structure

Which of the following valves <u>does not</u> have three cusps/leaflets?

a) Aortic Valve
b) Tricuspid Valve
c) Mitral Valve
d) Pulmonary Valve

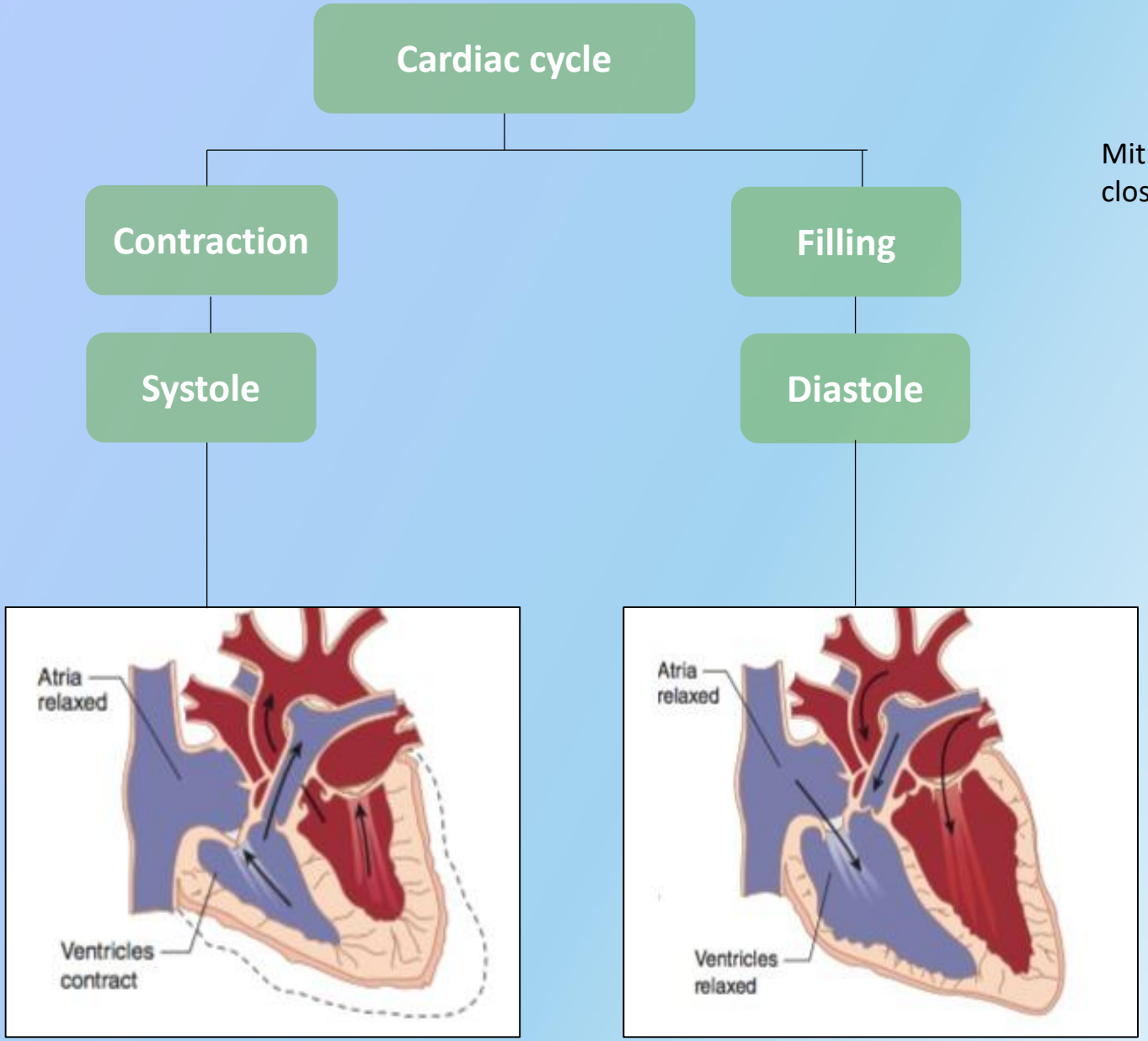


HEART SOUNDS



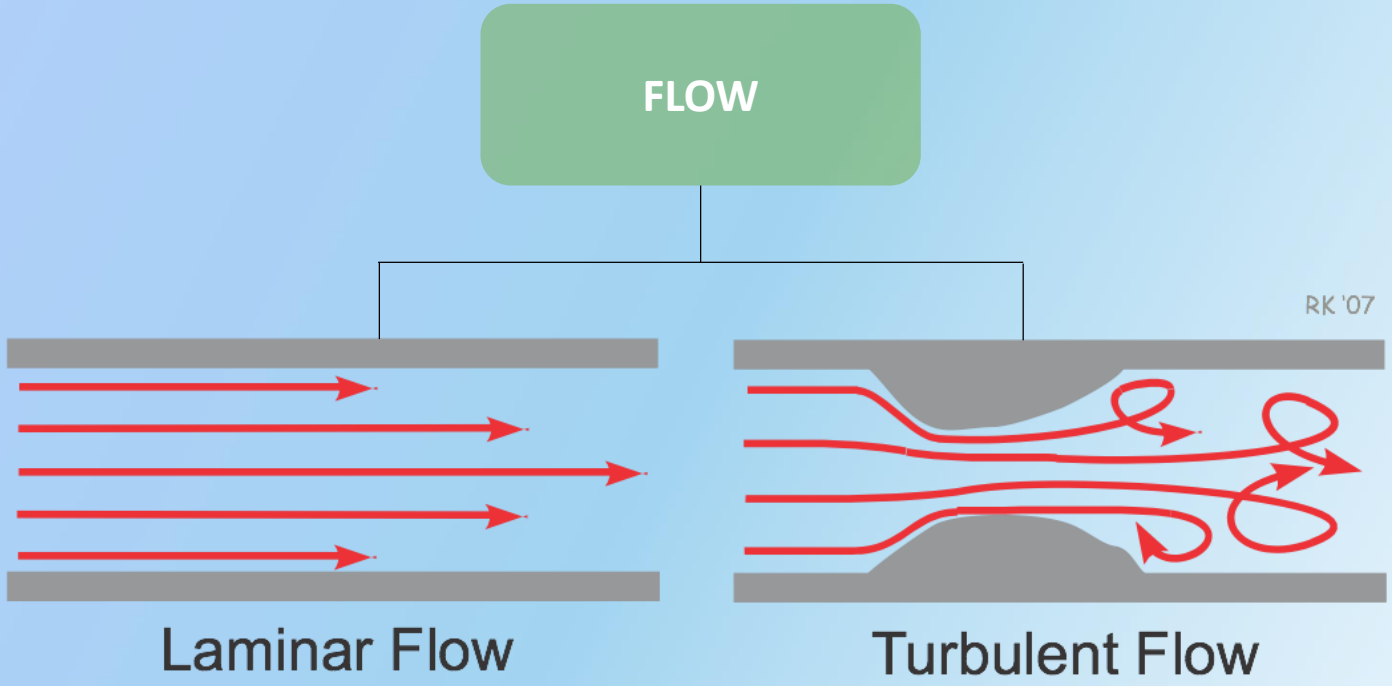
STATE OF VALVES

	Systole	Diastole
Aortic valve	Open	Closed
Mitral Valve	Closed	Open



Murmurs

- Murmurs are **audible vibrations** caused by turbulent flow

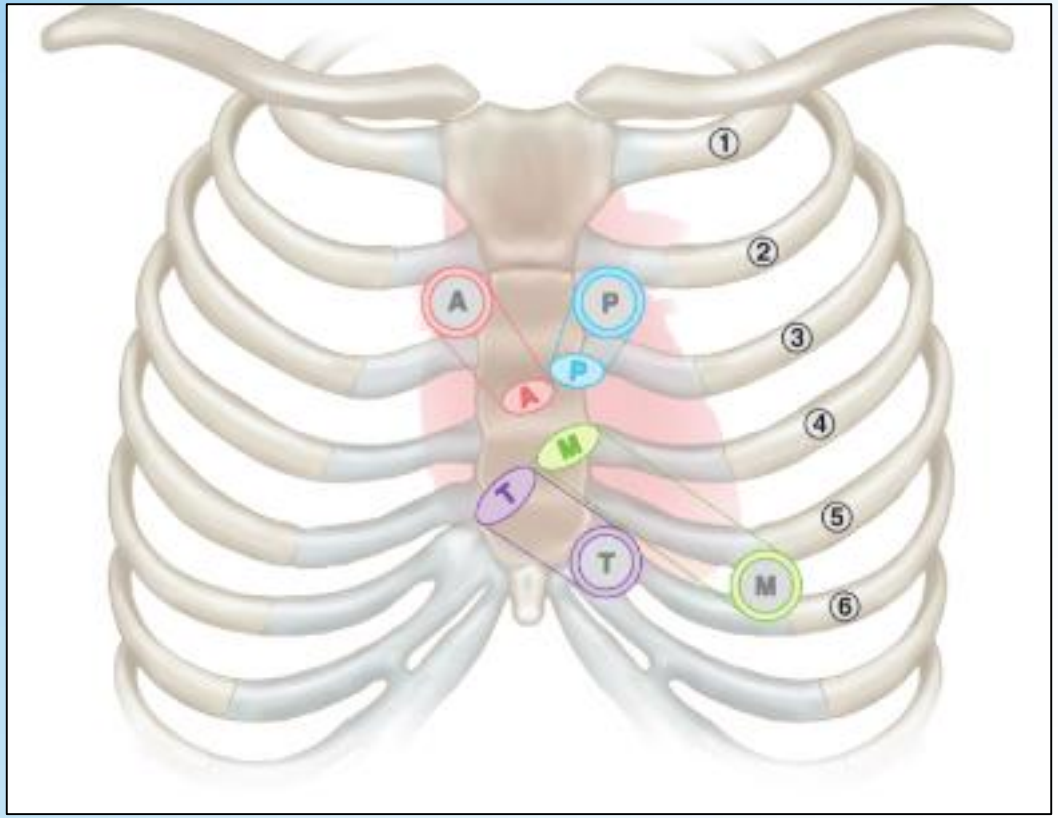


- Flow in layers
- Non-audible

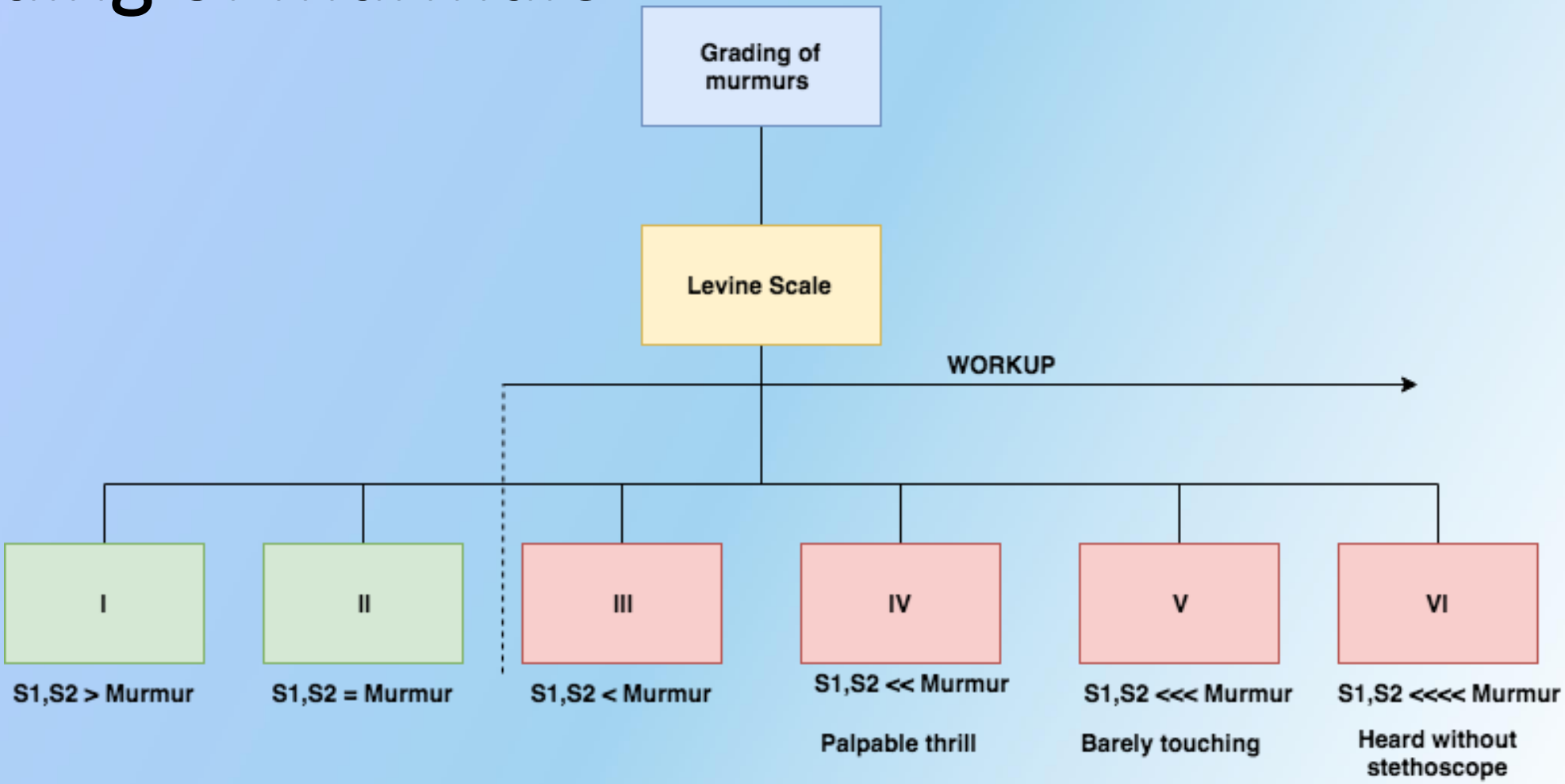
- Chaotic flow
- Created by narrowing of vessels or damaged valves
- Audible vibrations
- Radiates

Auscultation Areas

- **Aortic area**
  - 2nd right intercostal space
- **Pulmonary area**
  - 2nd left intercostal space
- **Tricuspid area**
  - 4th left intercostal space
- **Mitral area**
  - 5th left intercostal space – midclavicular line

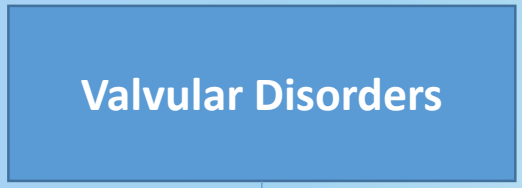


Grading of murmurs



Valvular Disorders - Overview

	Systole	Diastole
Aortic valve	Open	Closed
Mitral Valve	Closed	Open



Stenosis

- Stiff valve
- Problems w/ opening

Murmur will be heart when the valve is supposed to open

Regurgitation

- Floppy valve
- Problems w/ closing – remains open

Murmur will be heard when the valve is supposed to be closed

Question

- The murmur of mitral stenosis will be heard during _____:

a) Diastole

b) Systole

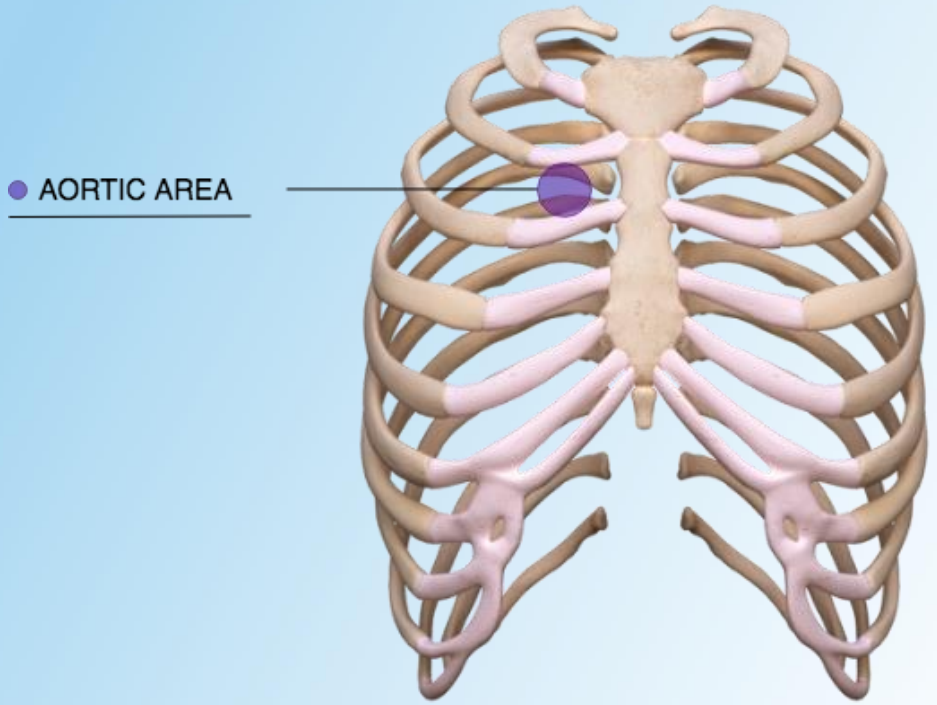
c) Both

Aortic area

- 2nd right intercostal space

Murmurs

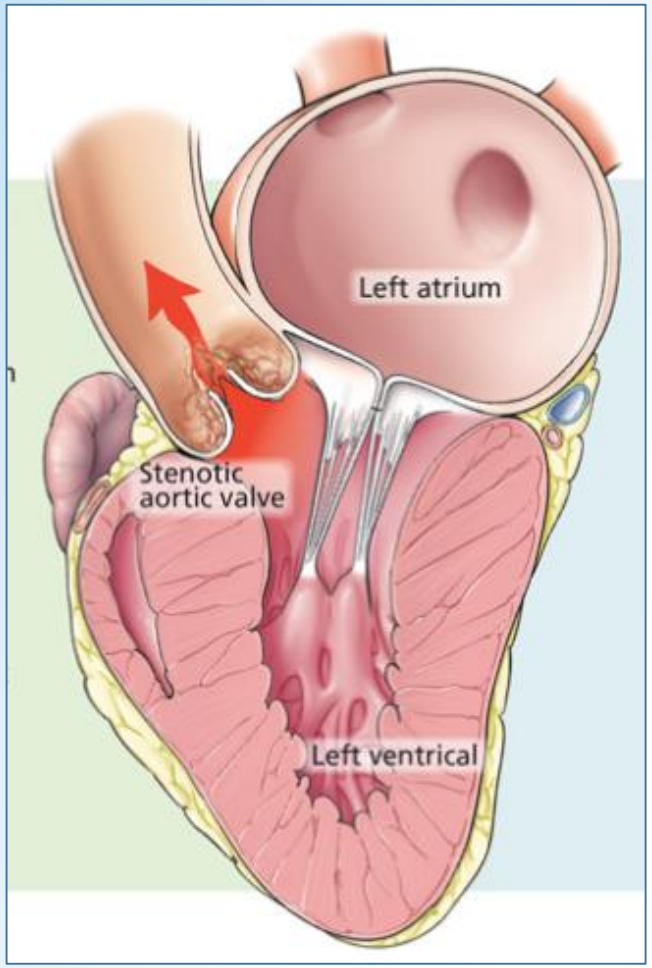
- Aortic Stenosis



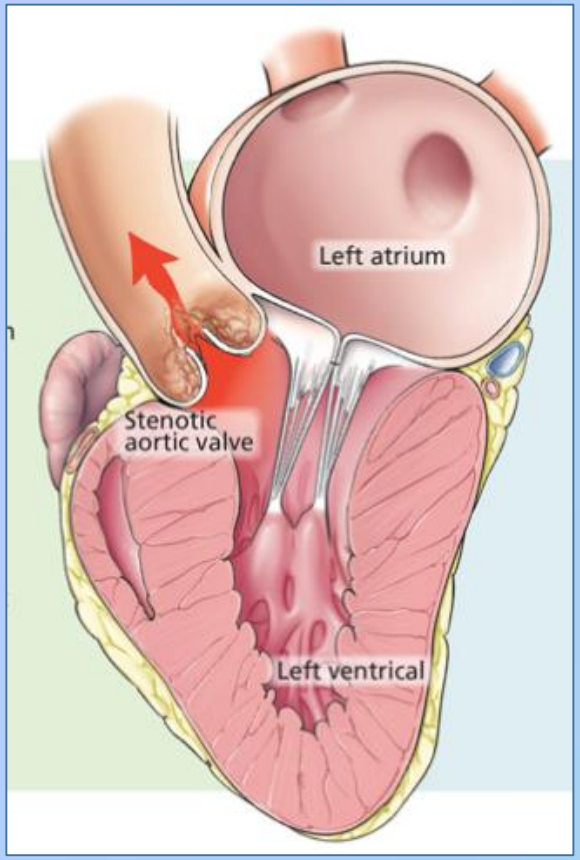
Aortic Stenosis
Overview and Etiology

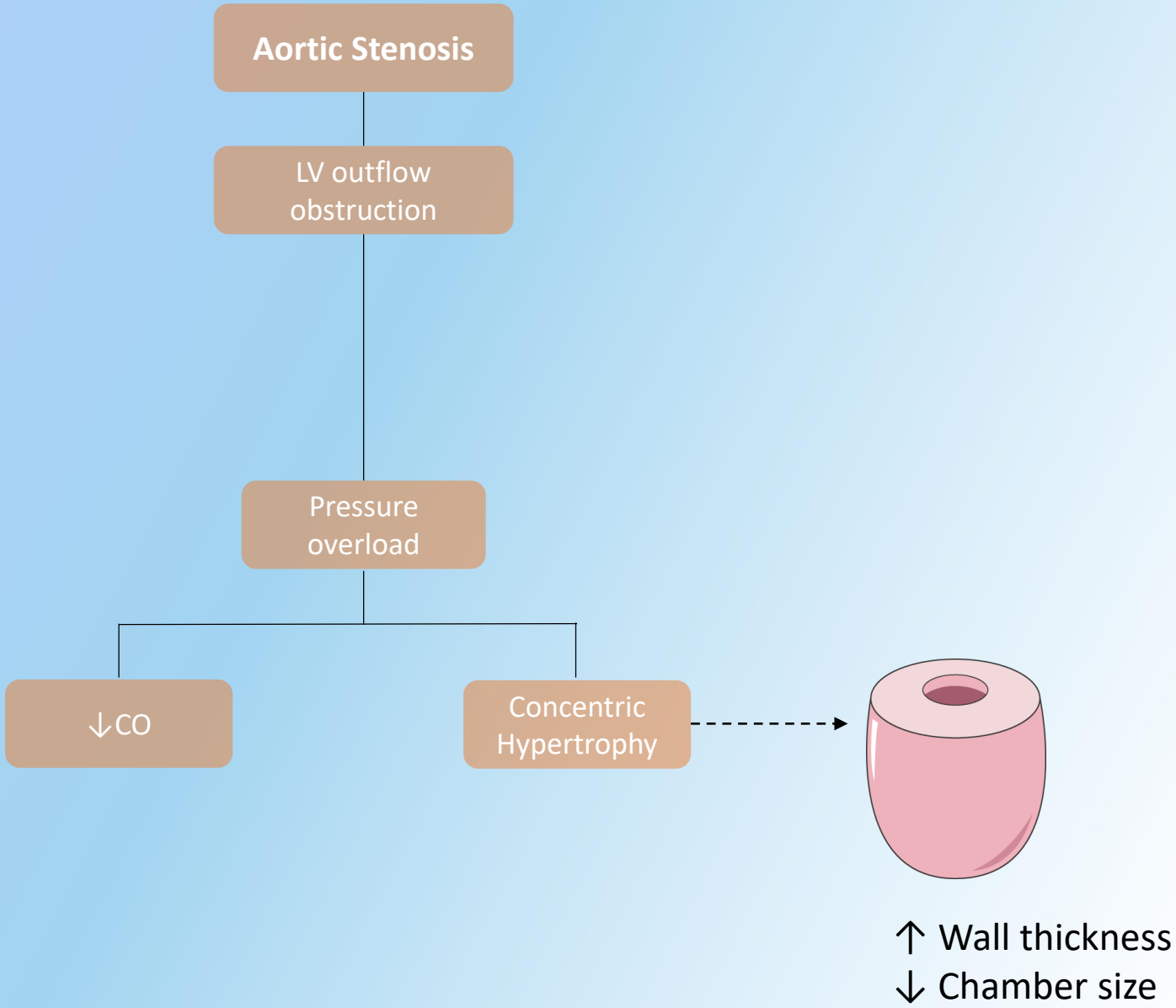
- **Overview**
  - Stenotic valve → Problems w/ opening
  - LV has to generate more pressure to open the aortic valve

- **Etiology**
  - Senile Aortic Stenosis
    - Age-related degeneration
    - Fibrosis → Calcification
  - Bicuspid aortic valve
    - Most common congenital valvular abnormality of the heart
    - Prone to damage → Fibrosis → Calcification



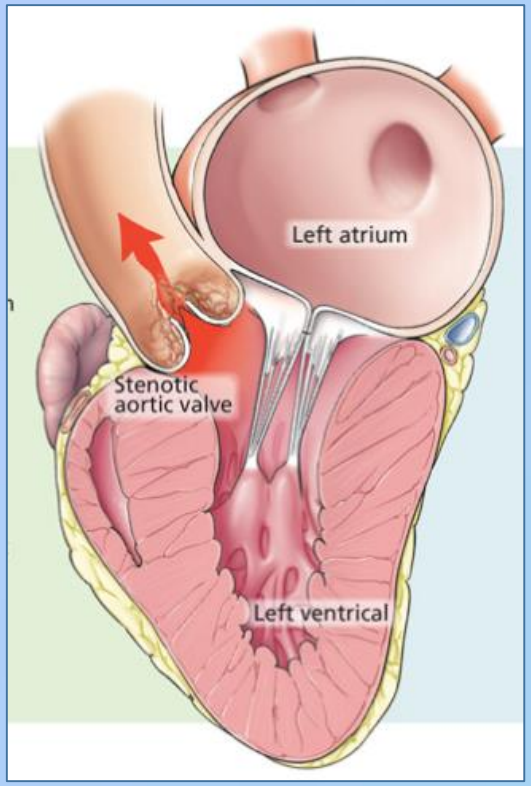
Aortic Stenosis
Pathophysiology

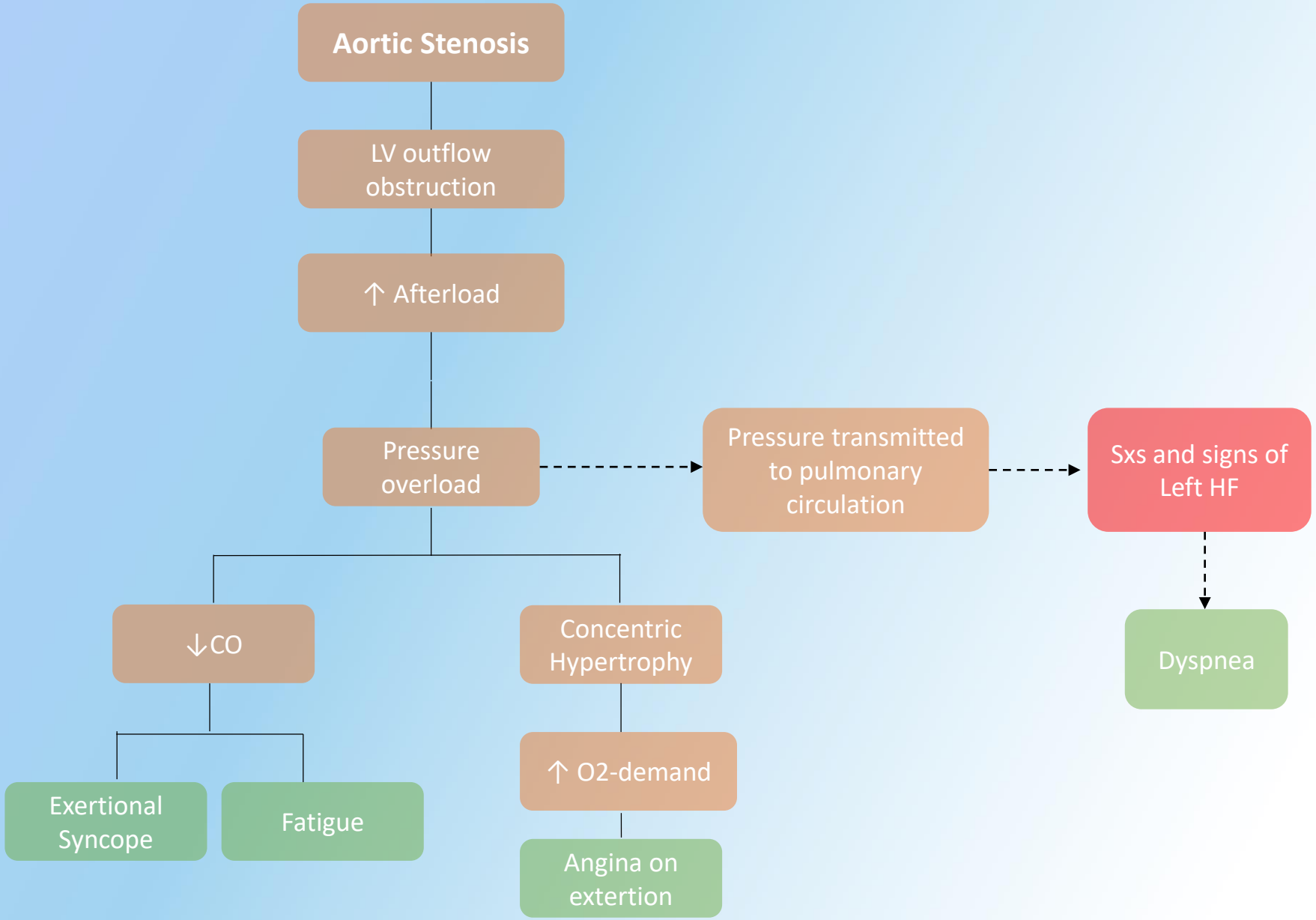


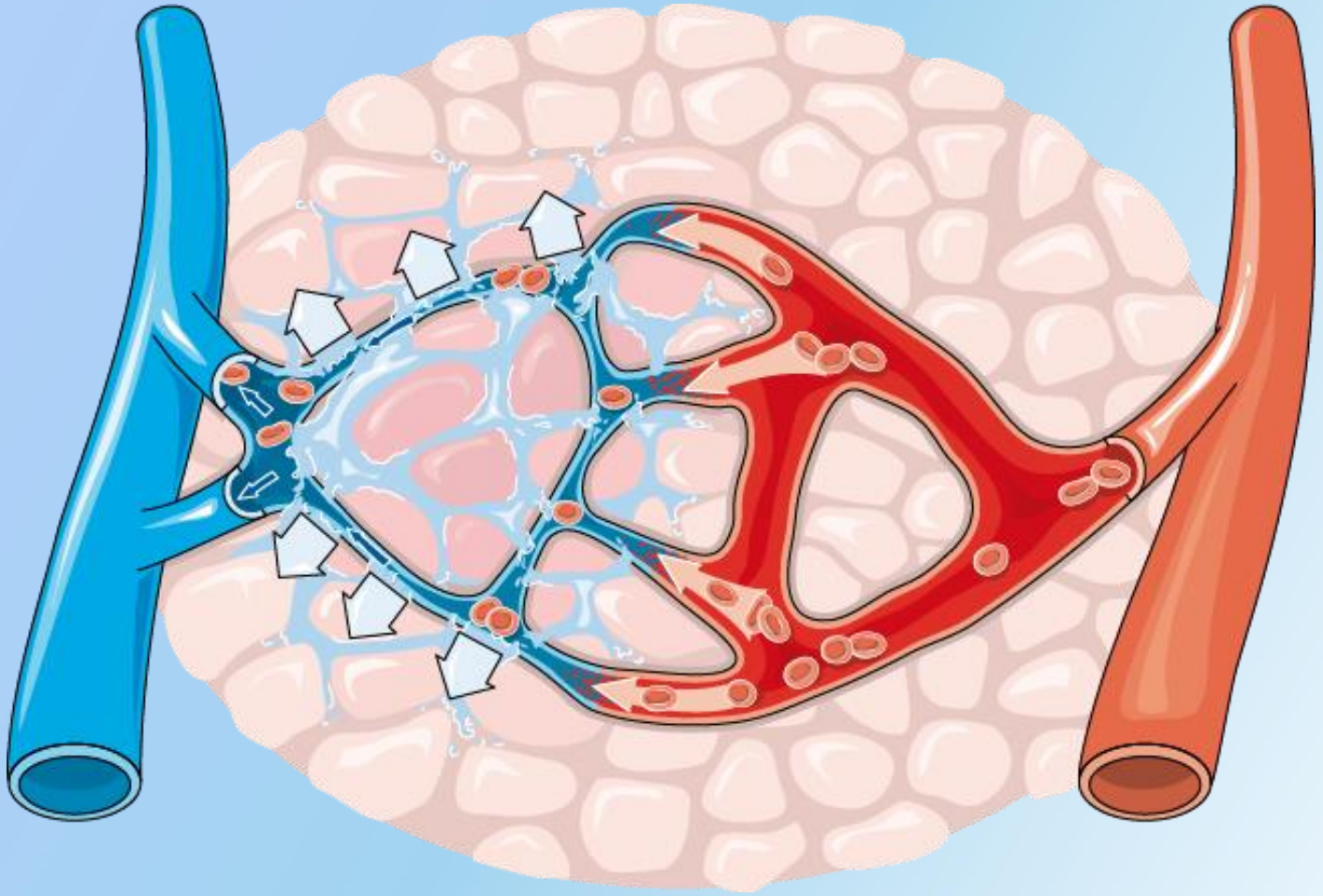


Aortic Stenosis
Symptoms

Classic triad – SAD:
- **S**yncope
- **A**ngina
- **D**yspnea







Aortic Stenosis
Signs

1. Auscultation

- Midsystolic murmur (2nd left intercostal space)
  - Prolonged opening time
- Crescendo – Descresendo (Rising – falling)
  - Blood flow through the aorta rapidly escaltes and then decline
- Ejection click
  - Stiff valve

2. Other

- Displaced apical impulse
  - Enlarged heart
- Decreased and delayed carotid pulse
  - Carotid pulse is felt after the first heart sound (not simultaneously)
- HF signs

Case Presentation

35 year old Mr. Tired, a sportsman, presents to your office complaining of fatigue and shortness of breath that has been increasing the last couple of months. You take the medical history and establish that Mr. Tired experienced two episodes of syncope over the last two months during his traning sessions. Unremarkable past medical history. Cardiovascular examination reveals a displaced apical impulse and a mid-systolic murmur – loudest in 2nd right intercostal space (grade 4 / 6) with radiation to the neck. The peripheral pulses are weak. Lung asculation reveals crackles at the base of the right and left lung.

Vitals:
Blood pressure: 140/85
Heart Rate: 65 bpm
SatO2: 98%
Respiratory Rate: 14

What is the most likely diagnosis?

a) Aortic Stenosis due to bicuspid aortic valve **with** signs of heart failure

b) Aortic stenosis due to bucuspid aortic valve **without** signs of heart failure

c) Aortic Stenosis due to calcification **with** signs of heart failure

d) Aortic Stenosis due to calcification **without** signs of heart failure

Case Presentation

35 year old Mr. Tired, a sportsman, presents to your office complaining of **fatigue** and **shortness of breath** that has been increasing the last couple of months. You take the medical history and establish that Mr. Tired experienced two episodes of **syncope** over the last two months during his traning sessions. The past medical history is unremarkable. Cardiovascular examination reveals a **displaced apical impulse** and a **mid-systolic murmur** – loudest in 2nd right intercostal space (grade 4 / 6) with **radiation to the neck**. The **peripheral pulses** are **weak.** Lung auscultaion reveals **crackles** at the base of the right and left lung.

Vitals:
Blood pressure: 140/80
Heart Rate: 65 bpm
SatO2: 98%
Respiratory Rate: 14

What is the most likely diagnosis?

a) Aortic Stenosis due to bicuspid aortic valve **with** signs of heart failure

b) Aortic stenosis due to bucuspid aortic valve **without** signs of heart failure

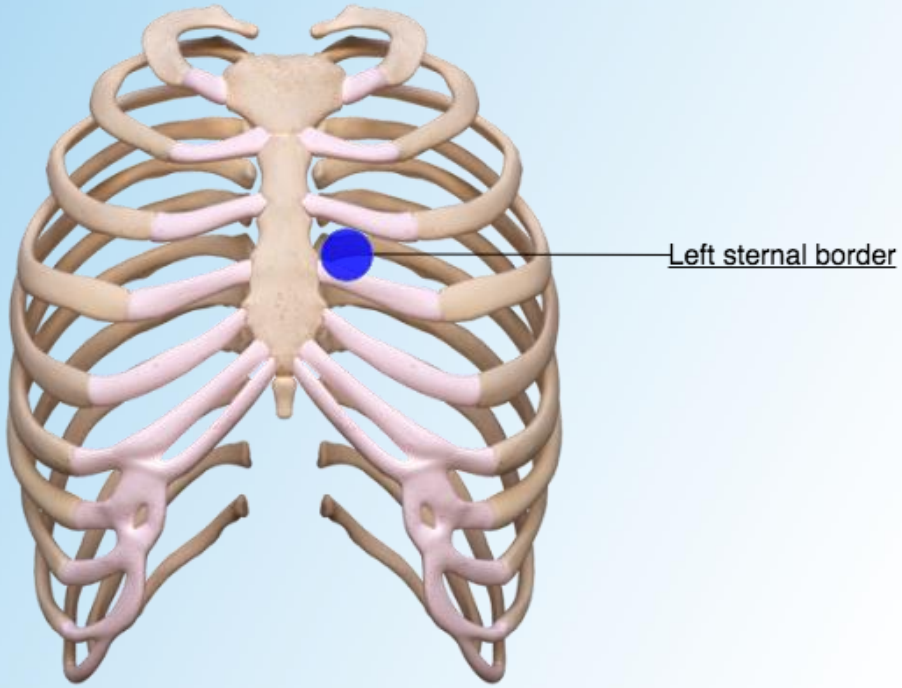
c) Aortic Stenosis due to calcification **with** signs of heart failure

d) Aortic Stenosis due to calcification **without** signs of heart failure

Left sternal border

Murmurs

- Aortic regurgitation



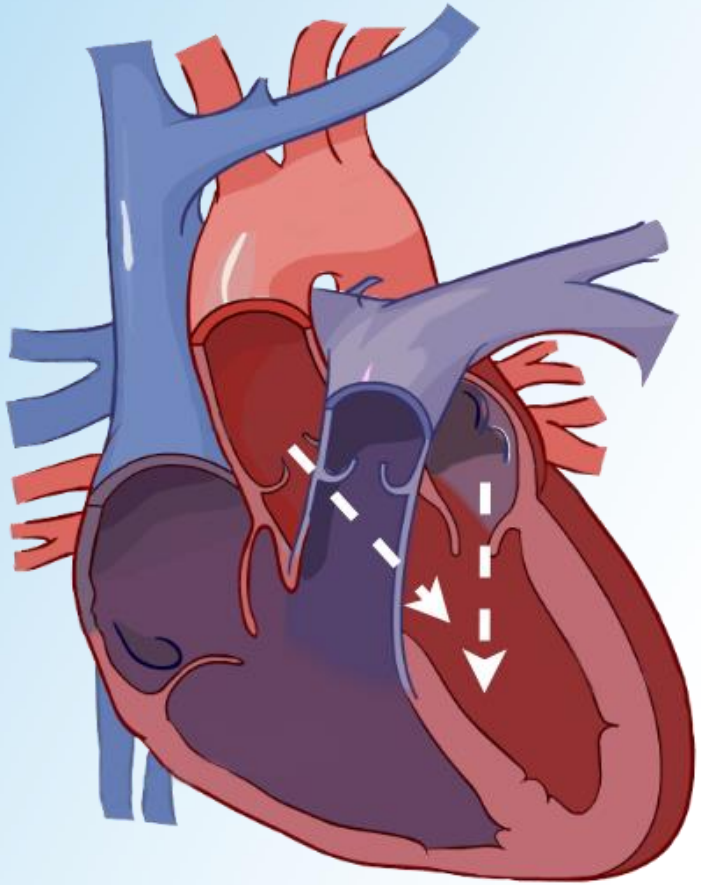
Aortic Regurgitation
Overview and Etiology

- **Overview**
  - Floppy valve
  - Remains open during **diastole**
  - Blood regurgitates into left ventricle

- **Etiology**

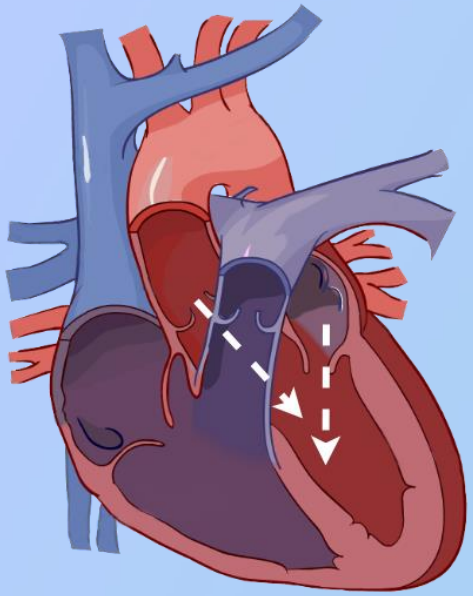
1. **Acute**
   - Infective Endocarditis

2. **Chronic**
   - Rheumatic heart disease
   - Congenital anomalies
   - Connective tissue disease



Chronic Aortic Regurgitation

Pathophysiology



Aortic Regurgitaion

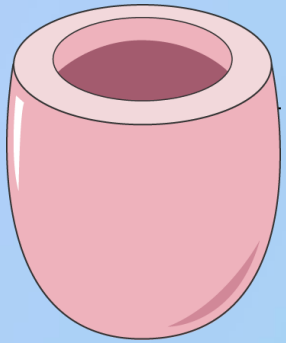
Backflow of blood into LV

↓DBP

- Less blood in vessels during diastole

↑ Diastolic LV volume

Volume overload



Accomodates for ↑Volume
↑Chamber size
N wall thickness

Eccentric Hypertrophy

↑O2-demand

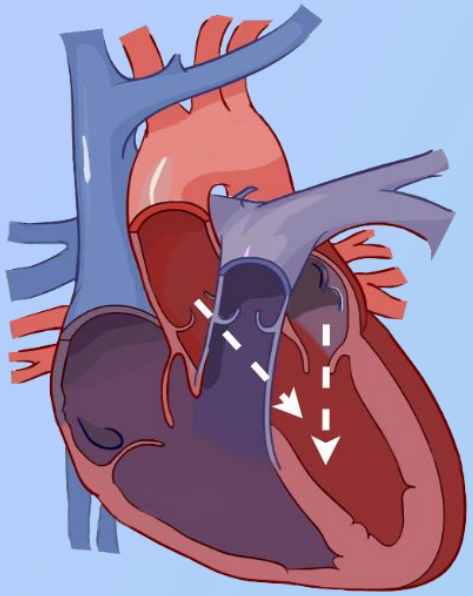
↑Stroke Volume

↑SBP

- Increased amount of blood in vessels during systole

Chronic Aortic Regurgitation

Symptoms



Aortic Regurgitaion

Backflow of blood into LV

↓DBP

- Less blood in vessels during diastole

↑ Diastolic LV volume

Volume overload

Pressure transmitted to pulmonary circ.

Sxs and signs of Left HF

Eccentric Hypertrophy

↑O2-demand

Angina

↑Stroke Volume

↑SBP

- Increased amount of blood in vessels during systole

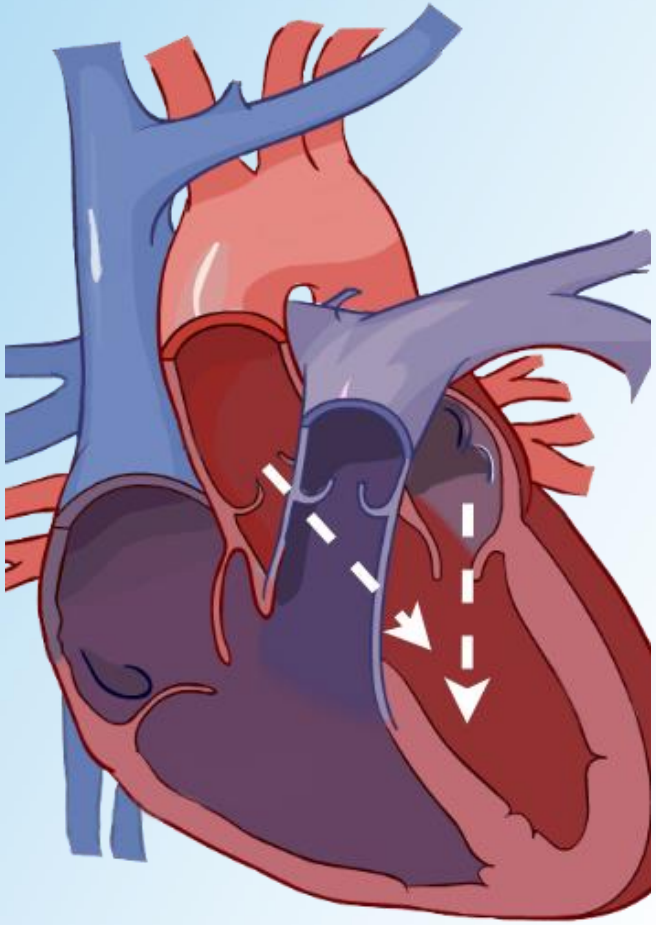
Chronic Aortic Regurgitation

Signs

1. **Heart auscultation**
   - Early diastolic murmur

2. **Hyperdynamic Pulses**
   - Corrigans pulse
   - Quincke sign
   - Muller sign

3. **Other**
   - HF signs



Chronic Aortic Regurgitation
Pulses

↑SBP

- Increased amount of blood in vessels during systole

↓DBP

- Less blood in vessels during diastole

Hyperdynamic pulses

Carotid arteries

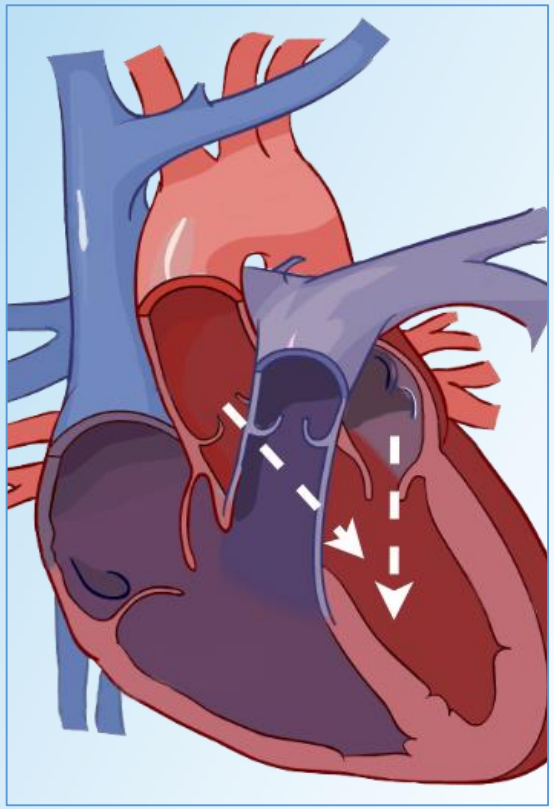
- Corrigans pulse

Nailbed capillaries

- Quincke sign

Uvula

- Muller sign



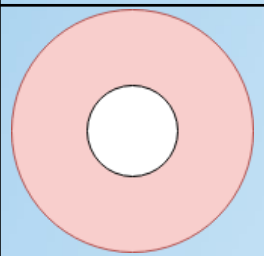
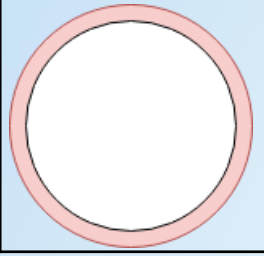
https://www.youtube.com/watch?v=5YQsd6di6B4

studyaid

Concentric hypertrophy is characterized by?

a) Increased wall thickness
b) Hypertrophy due to pressure overload
c) Hypertrophy due to volume overload
d) Decreased wall-thickness
e) A and B

Concentric vs. Eccentric Hypertrophy

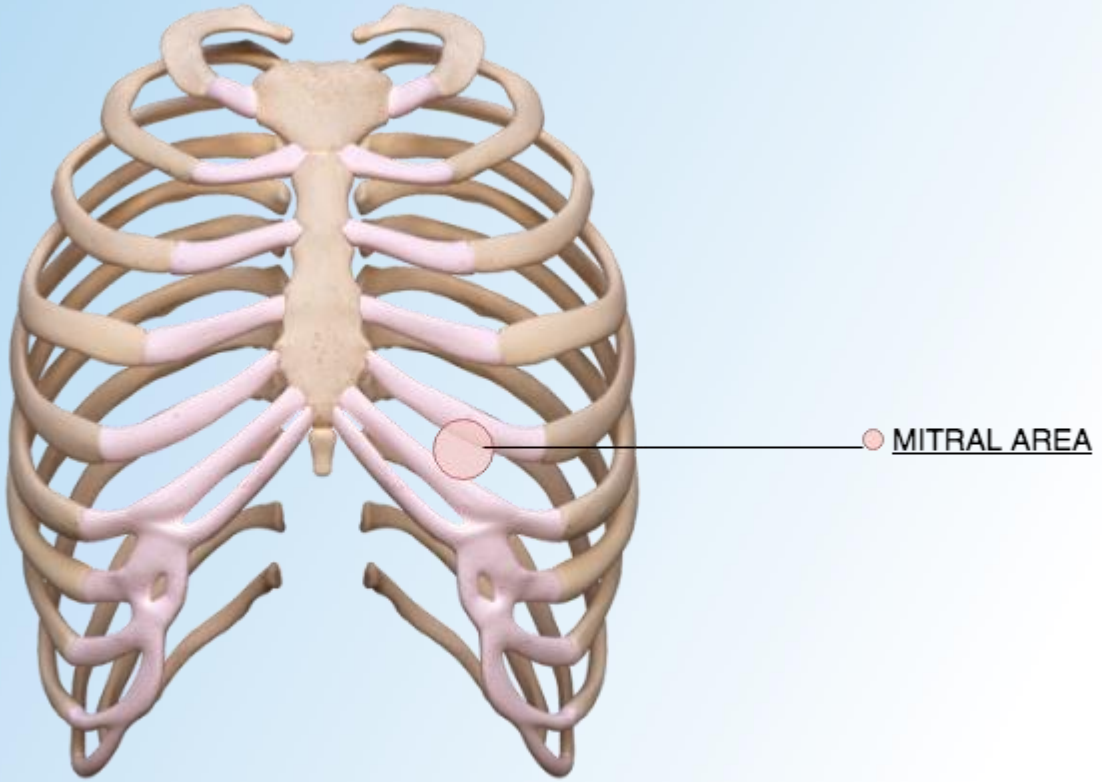
	Concentric	Eccentric
Chamber size	↓	↑
Wall thickness	↑	Normal
Pathophysiology	Pressure overload	Volume overload
Consequence	Imparied filling – Diastole	Impared contraction – Systole
Etiology - Example	Aortic Stenosis	Aortic regurgitation
Illustration		

Mitral Valve area

- 5th left intercostal space – Midclavicular line

Murmurs

- Mitral Stenosis
- Mitral Regurgitation



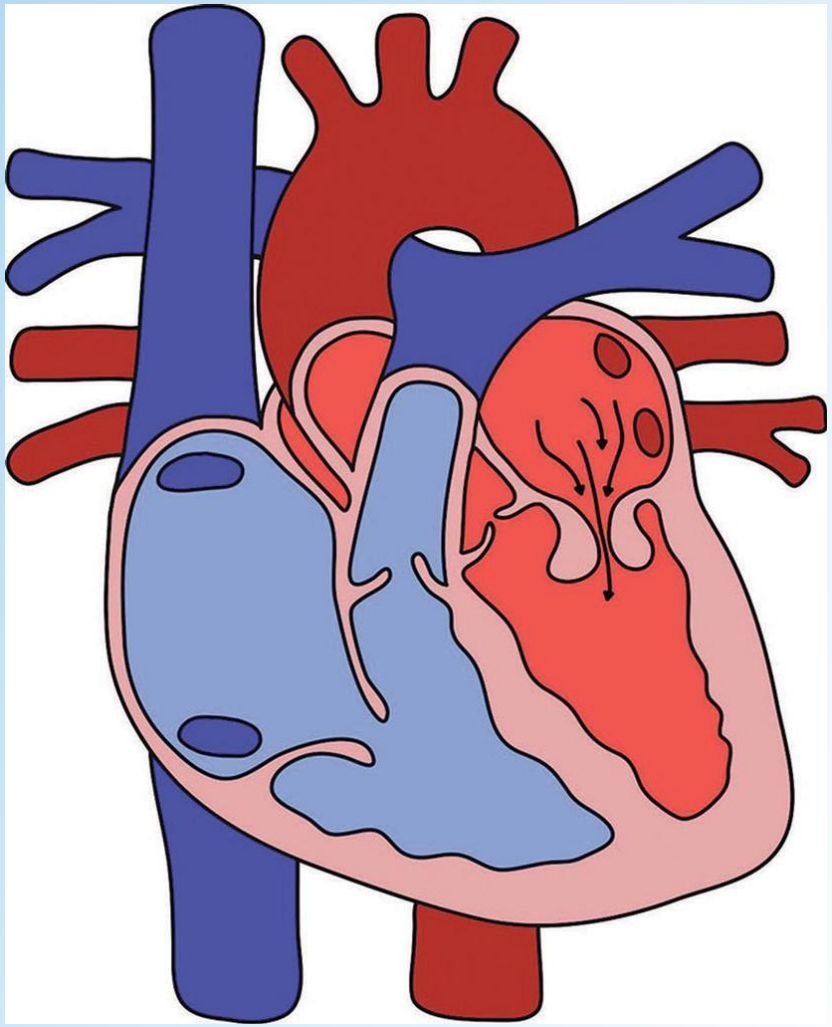
Mitral Stenosis

Overview

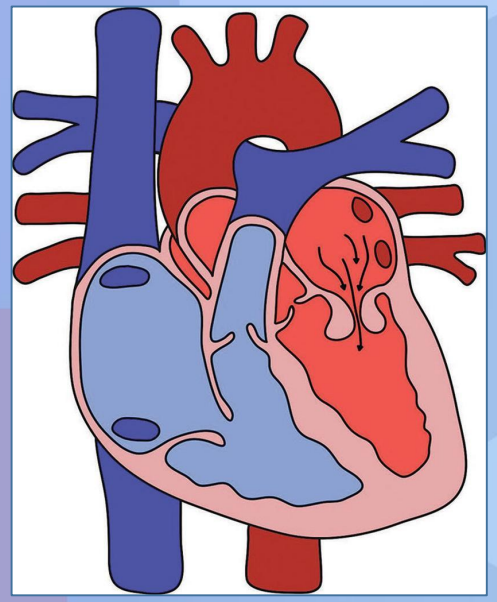
- Narrowing of the mitral valve
- Flow from LA to LV during **diastole** is obstructed

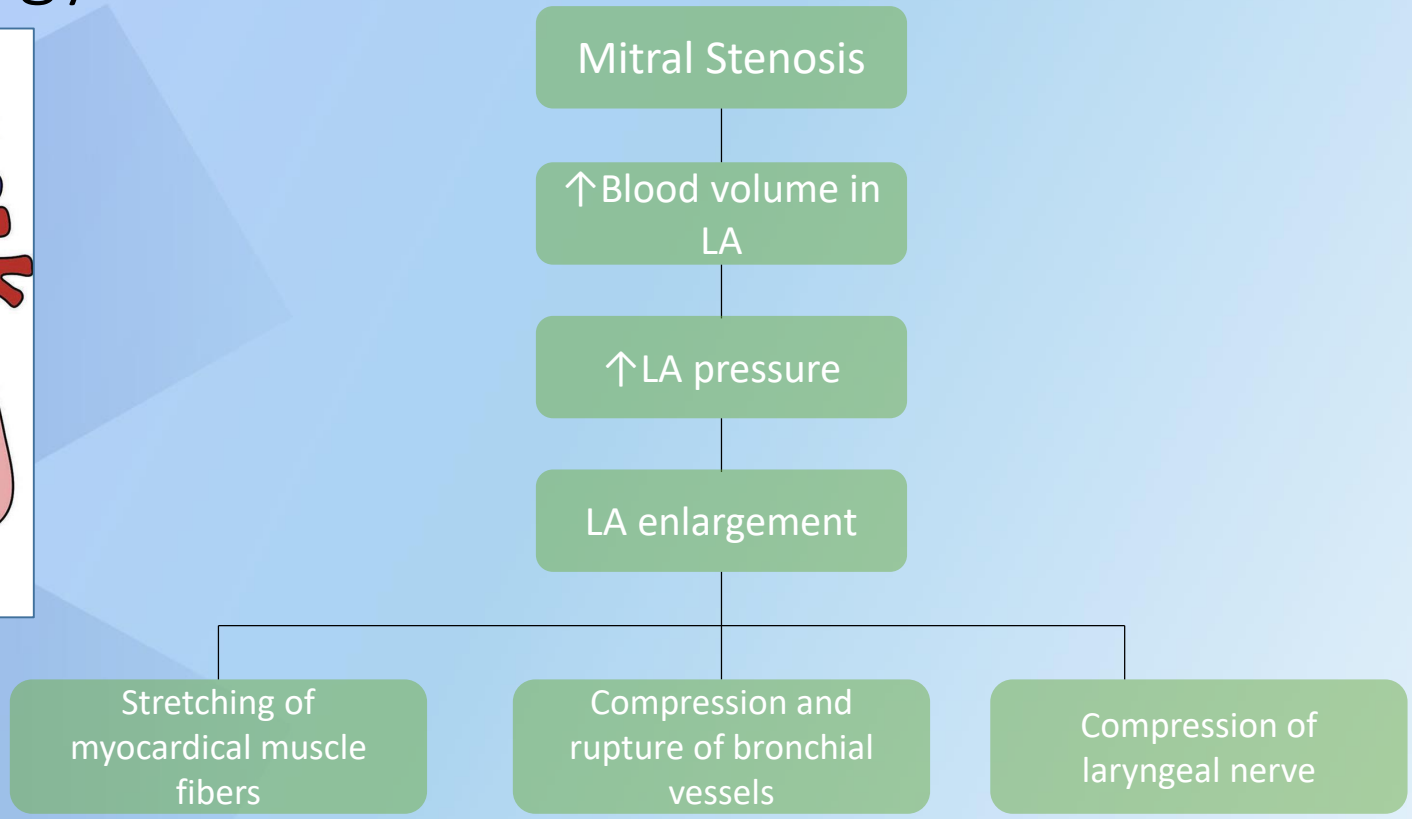
Etiology

1. Rheumatic Heart Disease (most common)
2. Senile calcification

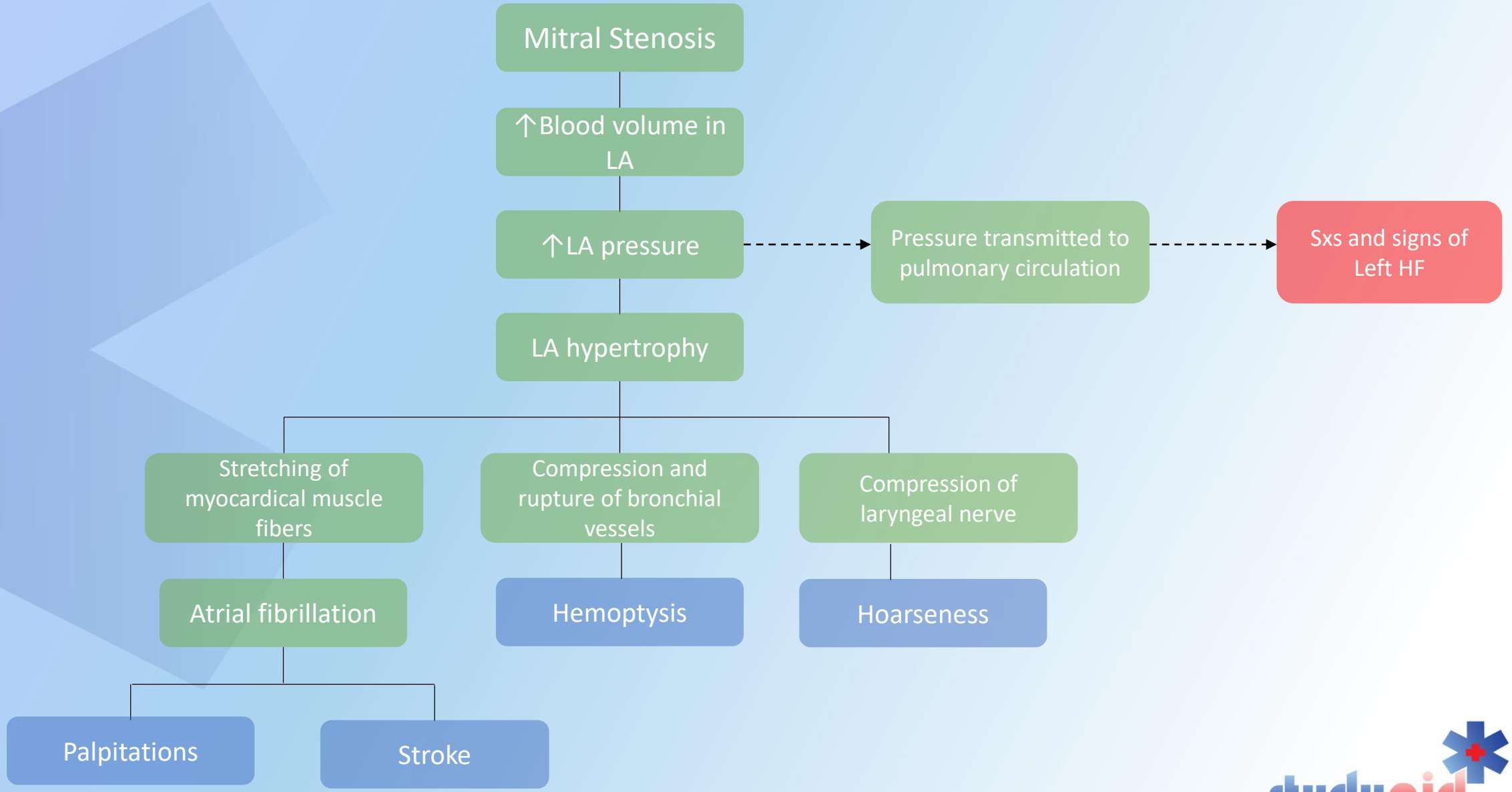


Mitral Stenosis
Pathophysiology





Mitral Stenosis
Symptoms



Mitral Stenosis
Signs

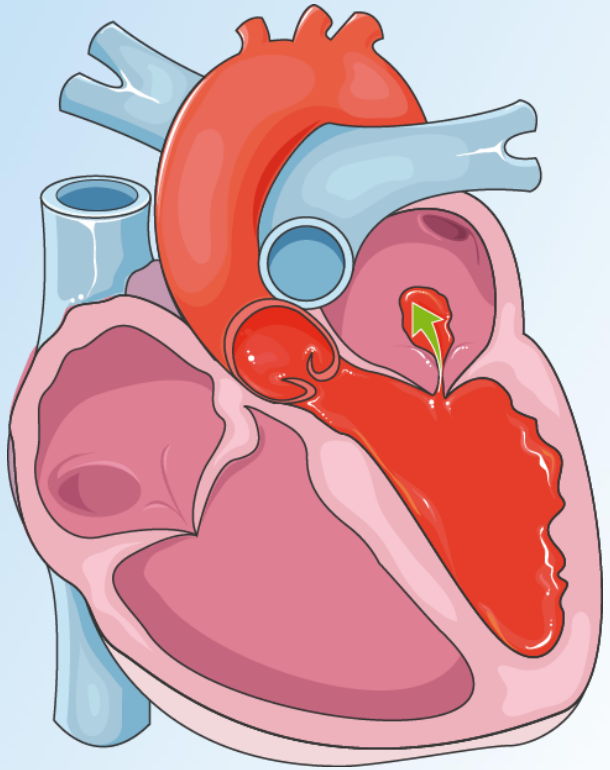
1. **Heart Ascultation**
    - **Rhumbling mid-diastolic murmur**
        - turbulent flow across the mitral valve during diastole
    - **Opening snap**

2. **Other**
    - HF signs

Mitral Regurgitation
Overview and Etiology

Overview

- Mitral Valve remains open during systole
- Backflow of blood into LA



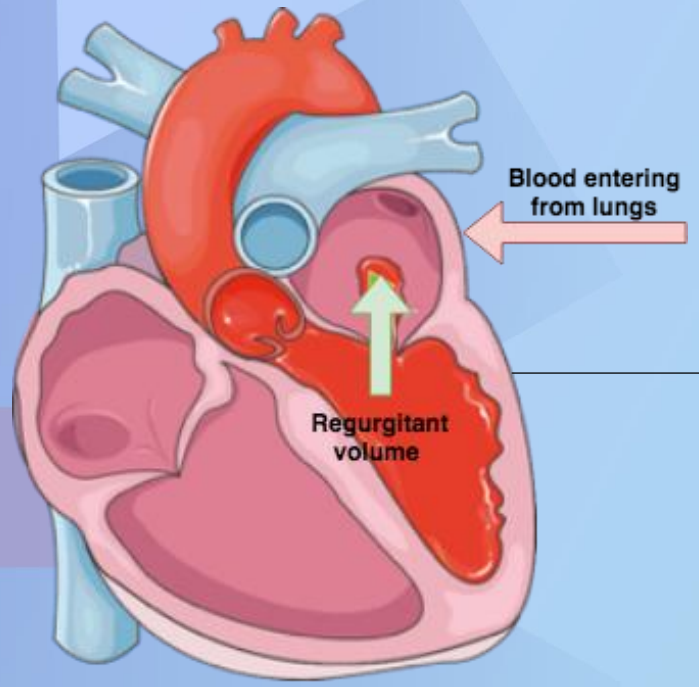
Etiology

1. <u>Acute</u>
   - Papillary muscle infarction
   - Ruptured chorda tendinae
   - Infective endocarditis

2. <u>Chronic</u>
   - Mitral valve prolapse
   - Rheumatic heart disease

Chronic Mitral Regurgitation

Pathophysiology



Mitral Regurgitation

↓

Backflow of blood into LA

↓

↑LA volume and pressure

↓

↑LV filling and pressure

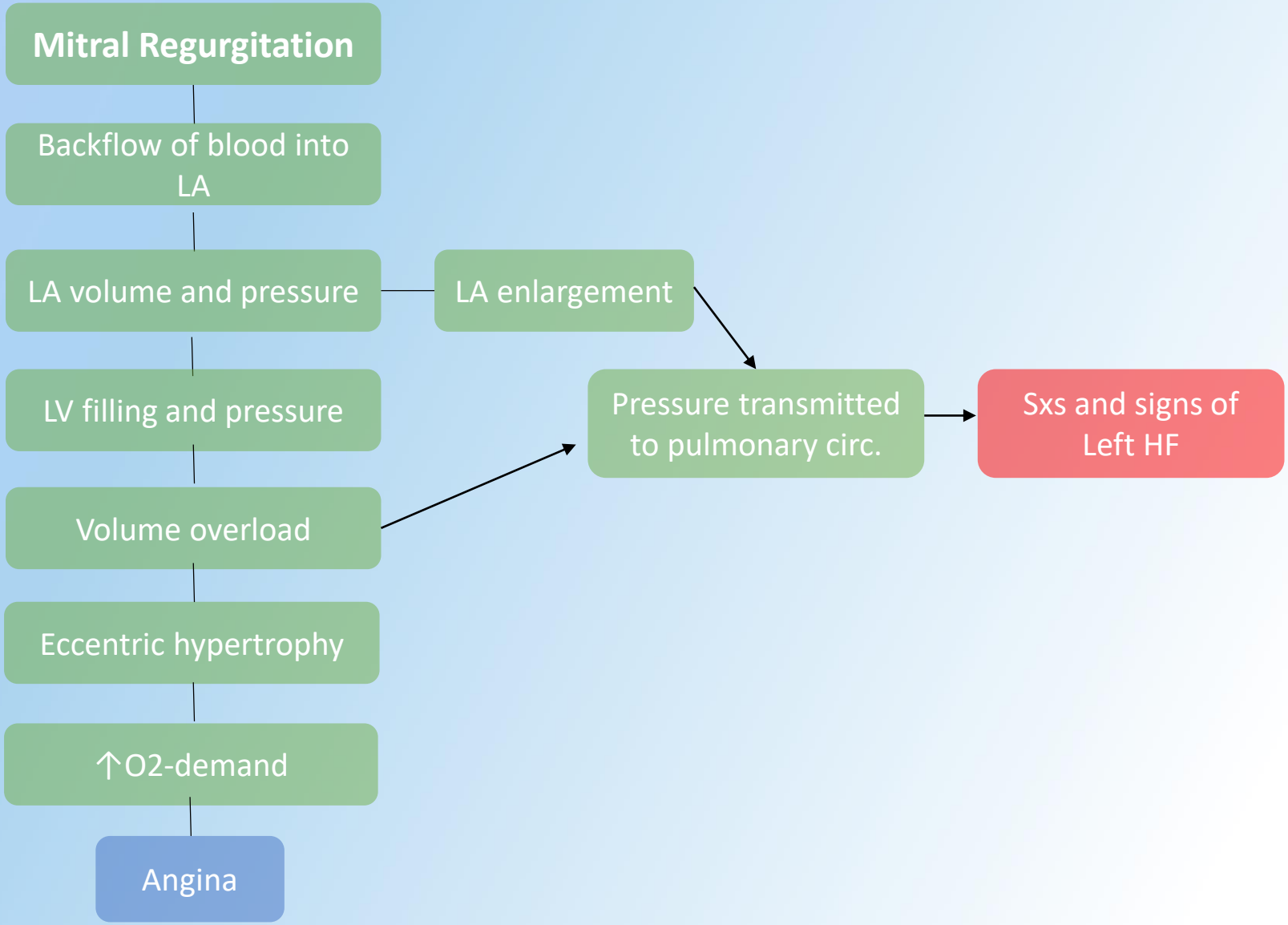
↓

Volume overload

↓

Eccentric hypertrophy

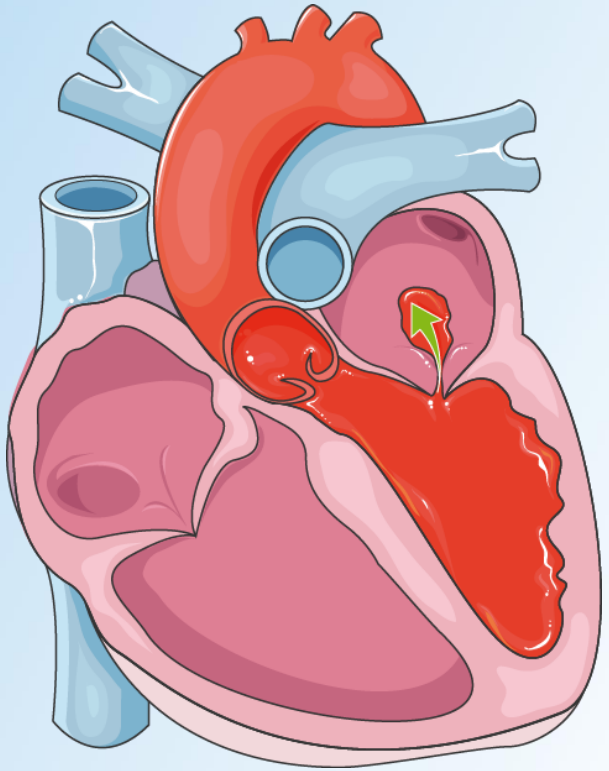
Mitral Regurgitation
Symptoms



Chronic Mitral Regurgitation
Signs

1. **Heart auscultation**
   - Early Systolic Murmur
   - Pansystolic/Holosystolic – lasts thorugh entire systole
   - Radiation to axilla

2. **Other**
   - Displaced apical impulse
     - Enlarged heart
   - HF signs



Case Presentation

Mr. Polish alcoholic, a **39 year old man**, presents to your office complaining of **shortness of breath** when he´s taking his daily walk to zabka to buy alcohol. Mr. Alcoholic has never been to a doctor before, as his family had little money when he was younger. When taking the medical history, Mr.alcoholic denies having any other symptoms than shortness of breath. He further denies smoking or alchohol abuse. Past medical history reveals that he had **strep. Throat** when he was 26 years old, which was left **untreated** because Mr. Alcohol wanted to spend his money on alcohol instead. On physical examination his blood pressure is 170/90 and heart rate is 80 bpm. His skin appears to be **cyanotic**. On auscultation you note a **early diastolic murmur** (grade 4/6) loudest on the left sternal border. Lung auscultation reveal **billateral crackles** at the bases of the lungs. Examination of peripheral pulses reveal **collapsing pulses** at the carotid artery and **systolic pulsations of the uvula and capillary nailbed.**

What is the most likely diagosis?

A) Aortic Regurgitation with symptoms of heart failure
B) Aortic Regurgitation without symptoms of heart failure
C) Mitral Regurgitation with symptoms of heart failure
d) Mitral Regurgitation without symptoms of heart failure