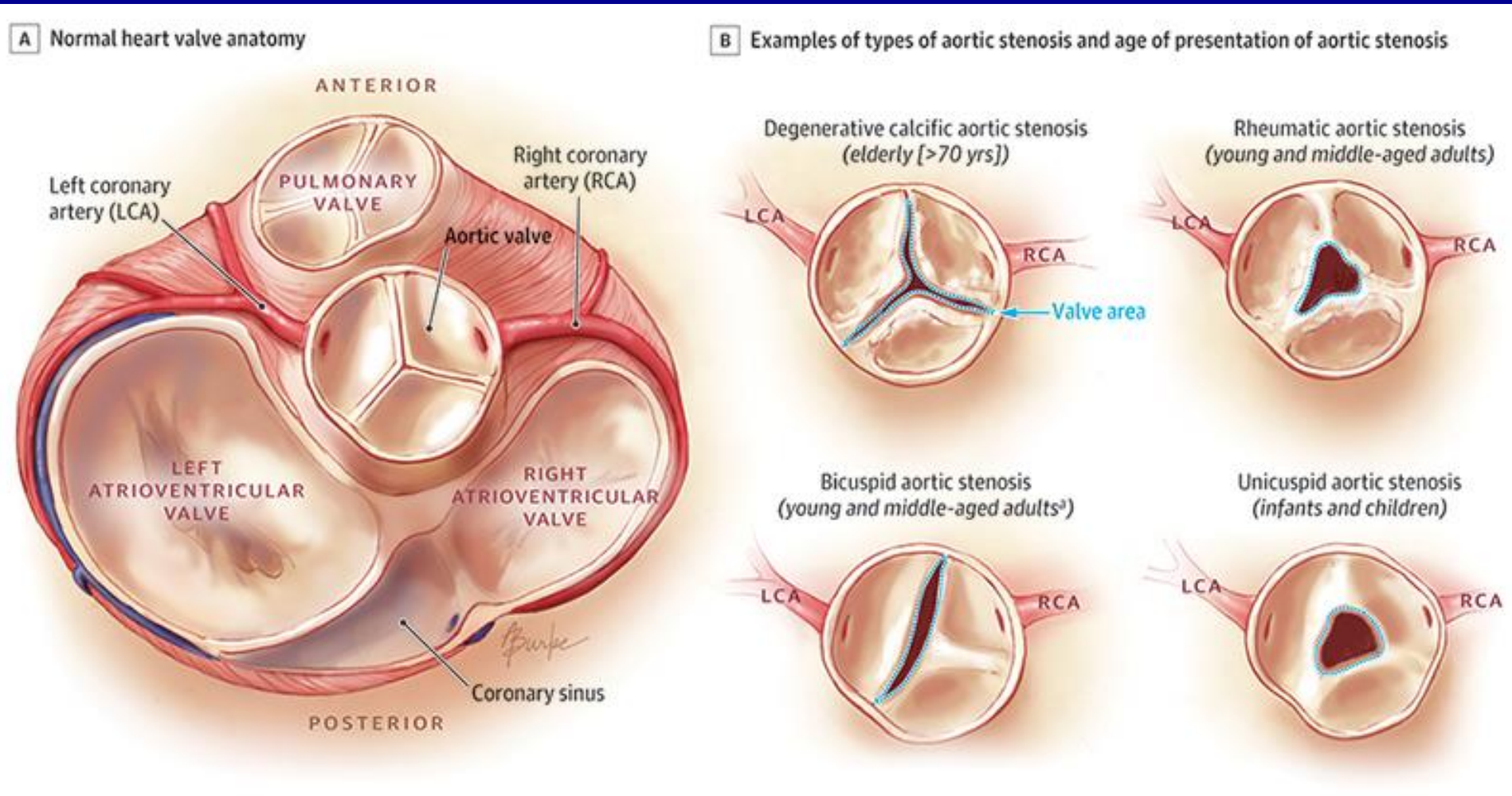
Aortic stenosis

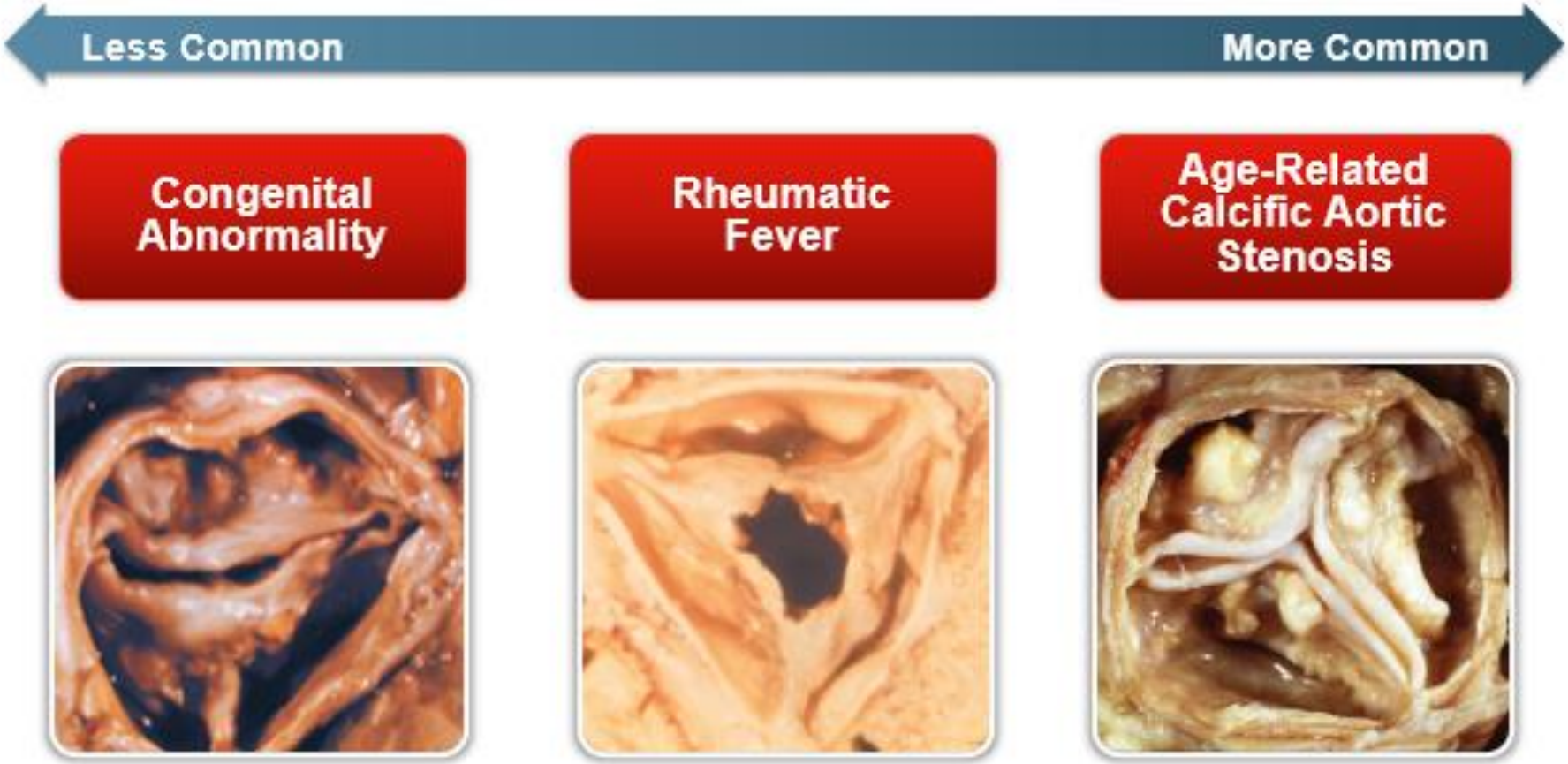
December 8 2017

Dr. Khalil Masri

Anatomy


A Normal heart valve anatomy
ANTERIOR
Left coronary artery (LCA)
PULMONARY VALVE
Right coronary artery (RCA)
Aortic valve
LEFT ATRIOVENTRICULAR VALVE
RIGHT ATRIOVENTRICULAR VALVE
Coronary sinus
POSTERIOR
B Examples of types of aortic stenosis and age of presentation of aortic stenosis
Degenerative calcific aortic stenosis
(elderly [>70 yrs])
LCA
RCA
Valve area
Rheumatic aortic stenosis
(young and middle-aged adults)
LCA
RCA
Bicuspid aortic stenosis
(young and middle-aged adults[a])
LCA
RCA
Unicuspid aortic stenosis
(infants and children)
LCA
RCA

Aortic Stenosis



Worldwide
Rheumatic most common

Calcific Aortic Stenosis

- Thickening and calcification of the valve

- Pathophysiology
  - Lipid accumulation
  - Inflammation
  - calcification

Mayo Clinic Study

- 932 adults were examined the relative prevalence of trileaflet vs congenitally abnormal valves

  - Patients < 50
    - 2/3 Bicuspid
    - 1/3 Unicuspid
  - Patients 50-70
    - 2/3 Bicuspid
    - 1/3 Trileaflet
  - Patients > 70
    - 60% Trileaflet
    - 40% Bicuspid

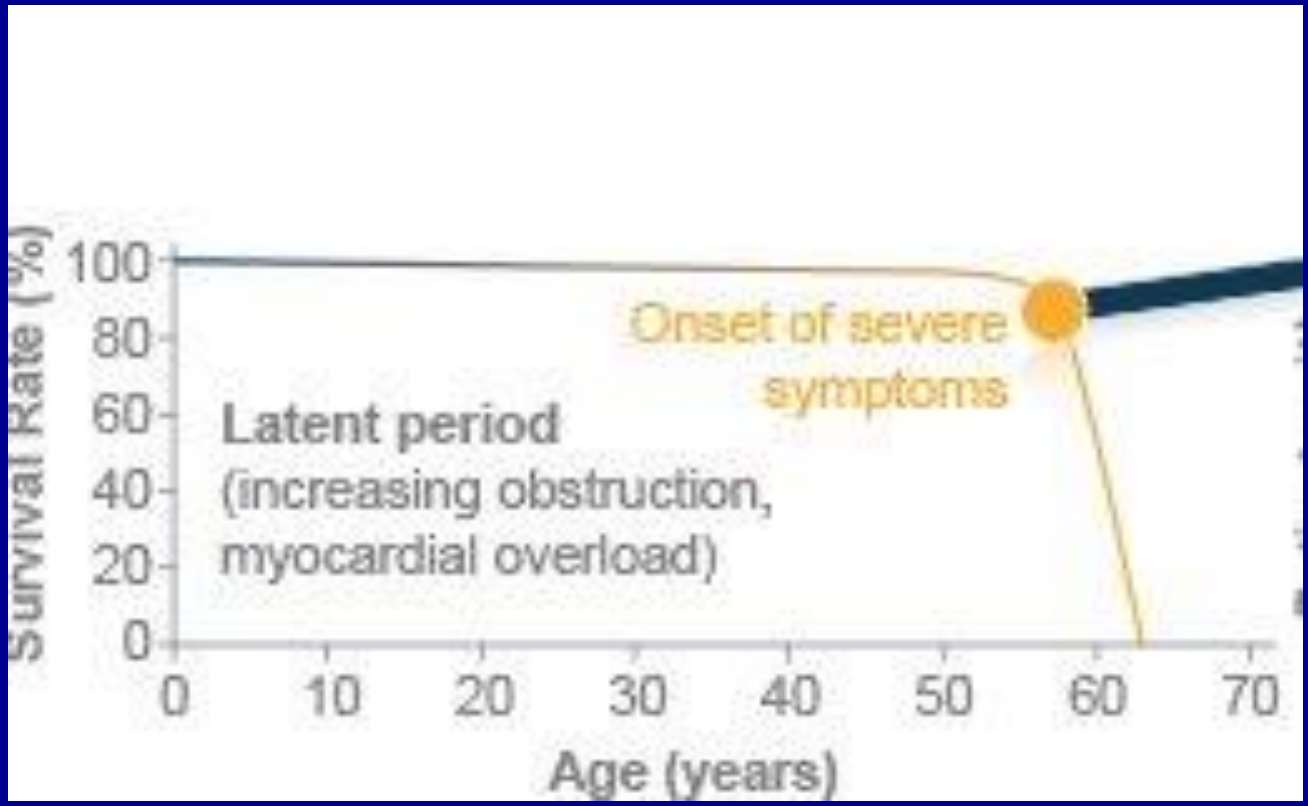
Aortic Stenosis Associations

- Heyde's syndrome:
- massive GI bleeding due to angiodysplasia

- Lev's disease:
- Calcific aortic stenosis and heart block

- Rare causes:
- Fabry's, SLE, Paget's disease, CKD

Aortic Stenosis Progression



Symptoms

- Exertional angina
- Exertional shortness of breath
- Exertional dizziness or syncope
- Fatigue
- Congestive heart failure

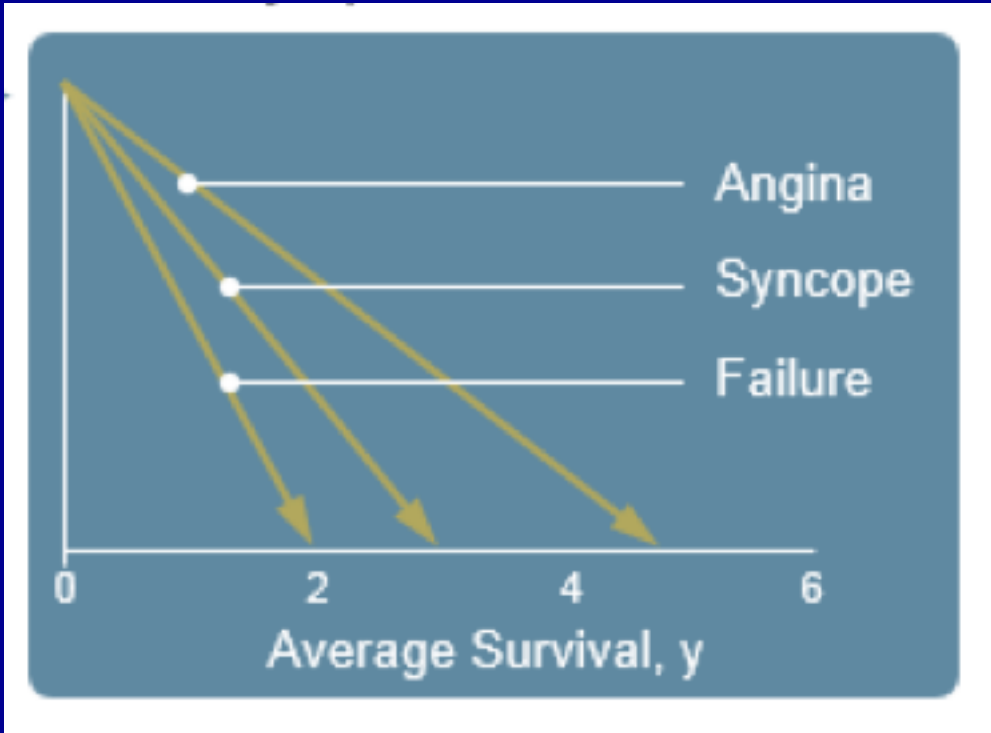
Syncope

- Several proposed explanations
  - Decreased cardiac output due to fixed obstruction
  - Exercise induced vasodilation
  - Arrhythmias
  - Abnormalities in baroreceptor response

Dyspnea

- Two factors
  - Diastolic dysfunction, with an increase in left ventricle filling pressure with exertion
  - Inability of LV to increase C.O
- Systolic LV dysfunction is rare
- Overt heart failure is a late, often end stage finding

Why treat Aortic Stenosis?



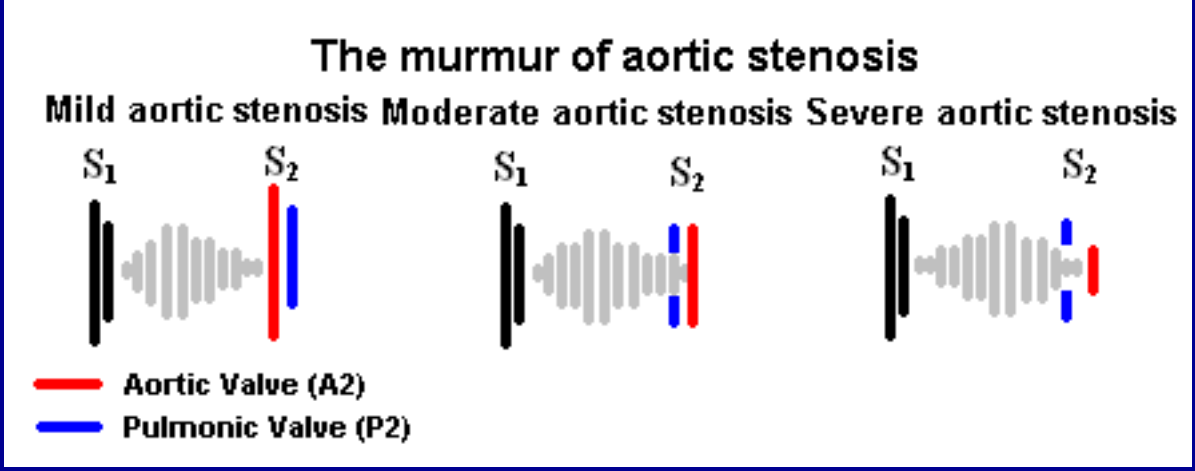
- Angina → < 5 years
- Syncope → ~ 3 years
- Heart Failure → ~ 2 years

Severe Aortic Stenosis

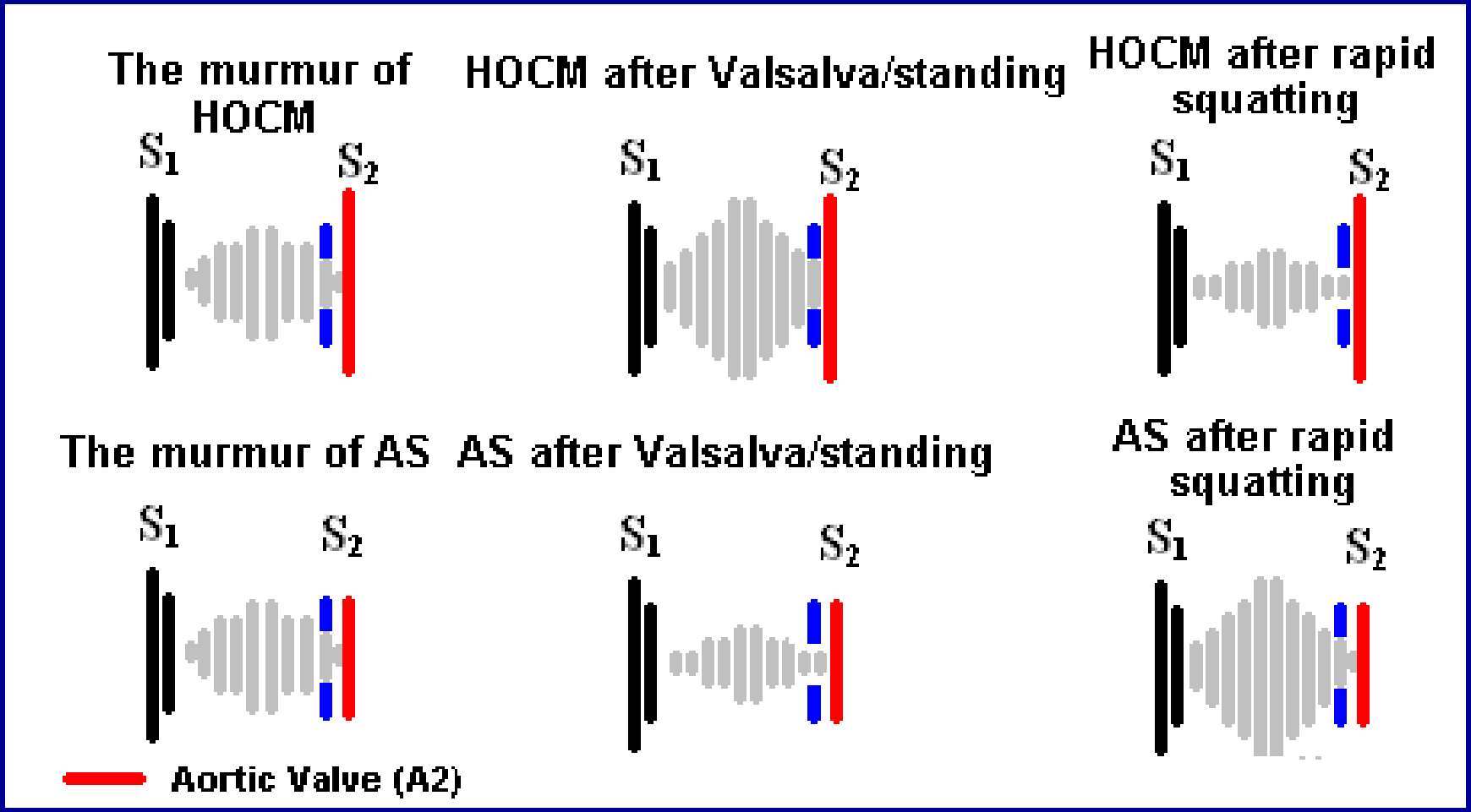
Murat Tuczu, MD, Cleveland Clinic

Physical Exam Findings

- Crescendo decrescendo ejection systolic murmur
  - Late peaking murmur (severe AS)
  - Radiates to the carotids
  - Is S2 preserved



Physical Exam Findings



Physical Exam Findings

- Pulsus parvus et tardus

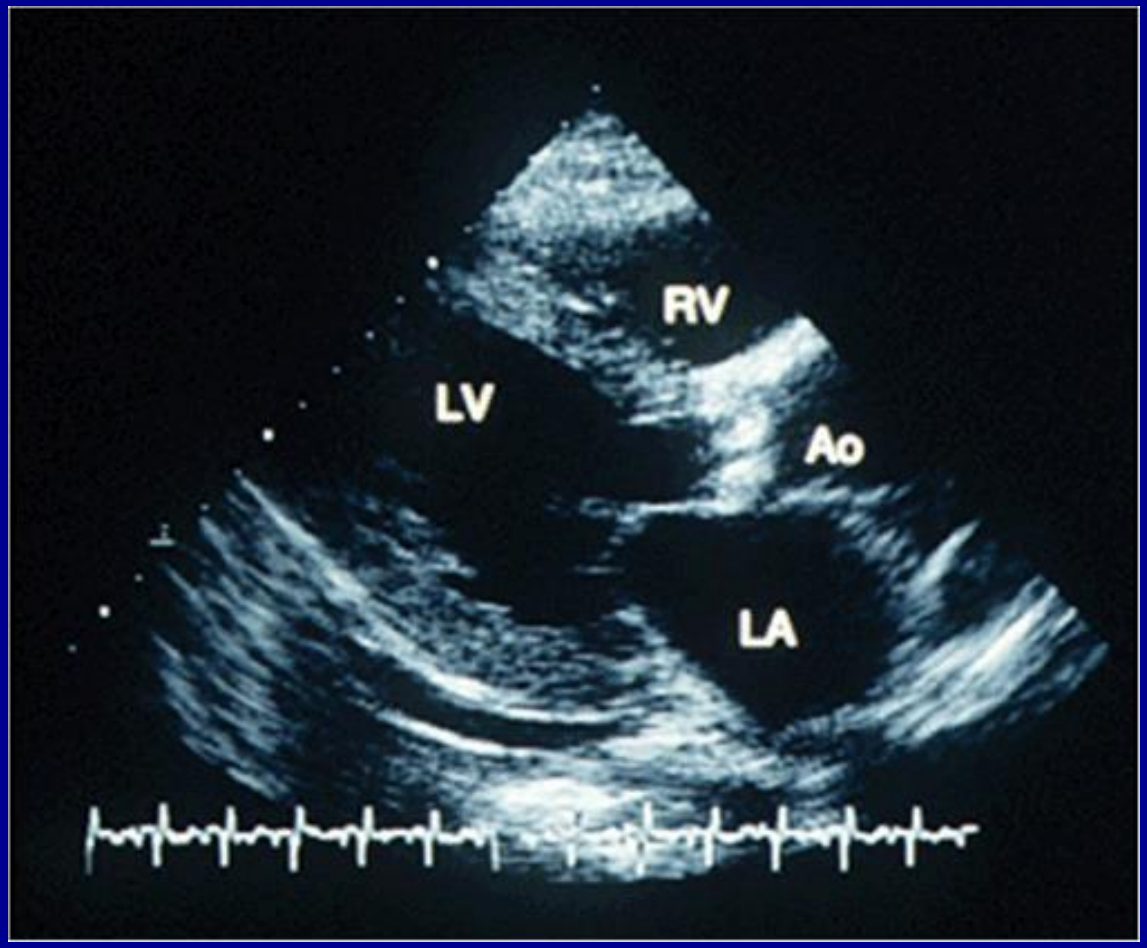
- Parvus = weak
  - (compare carotid pulse to your own)

- Tardus = late
  - (compare S2 to carotid pulse)

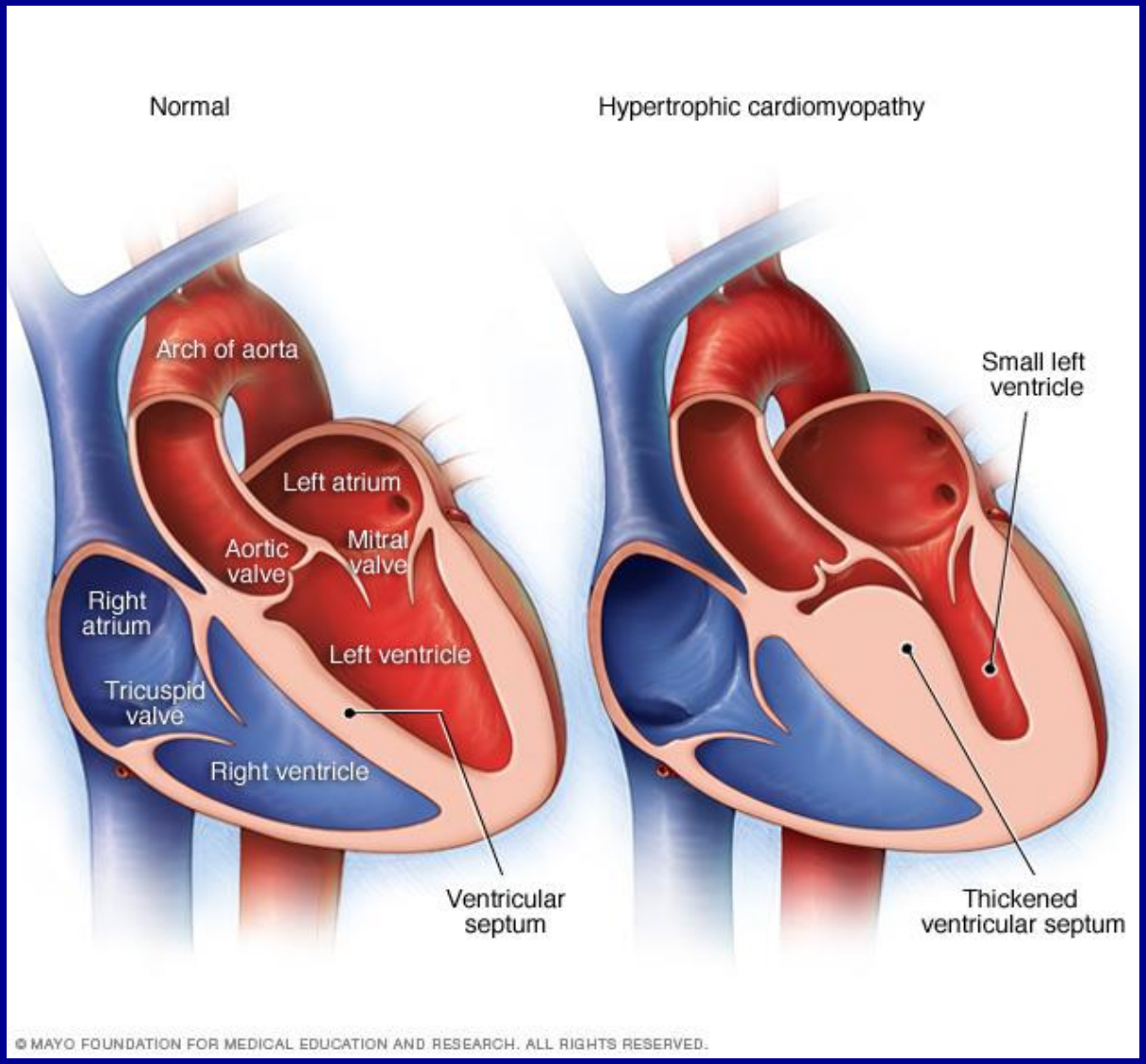
Diagnosis of Aortic Stenosis

	Mean gradient (mmHg)	Aortic Valve Area (cm2)
Mild	15-25	> 1.5
Moderate	25-40	1.0-1.5
Severe	> 40	0.7-1.0
Critical	N/A	< 0.7

Diagnosis of Aortic Stenosis

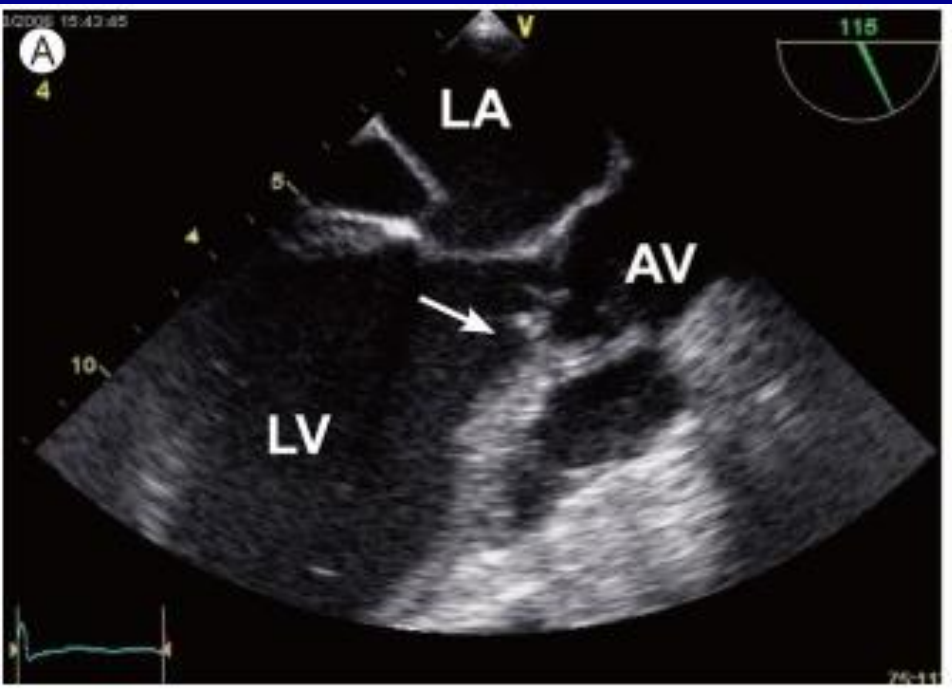


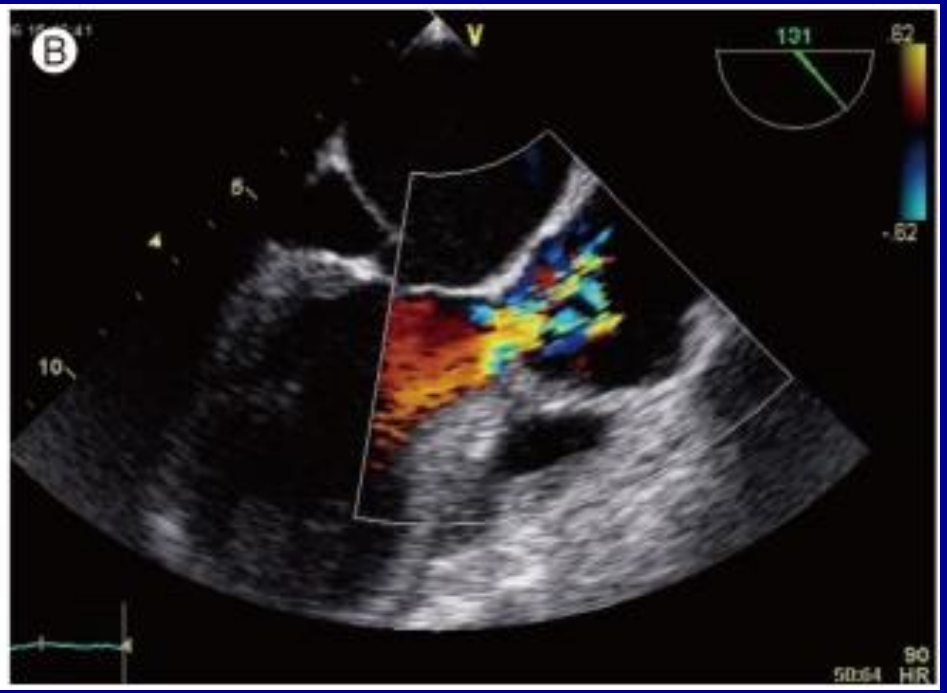
Hypertrophic Cardiomyopathy



© MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH. ALL RIGHTS RESERVED.

Sub-aortic Membrane

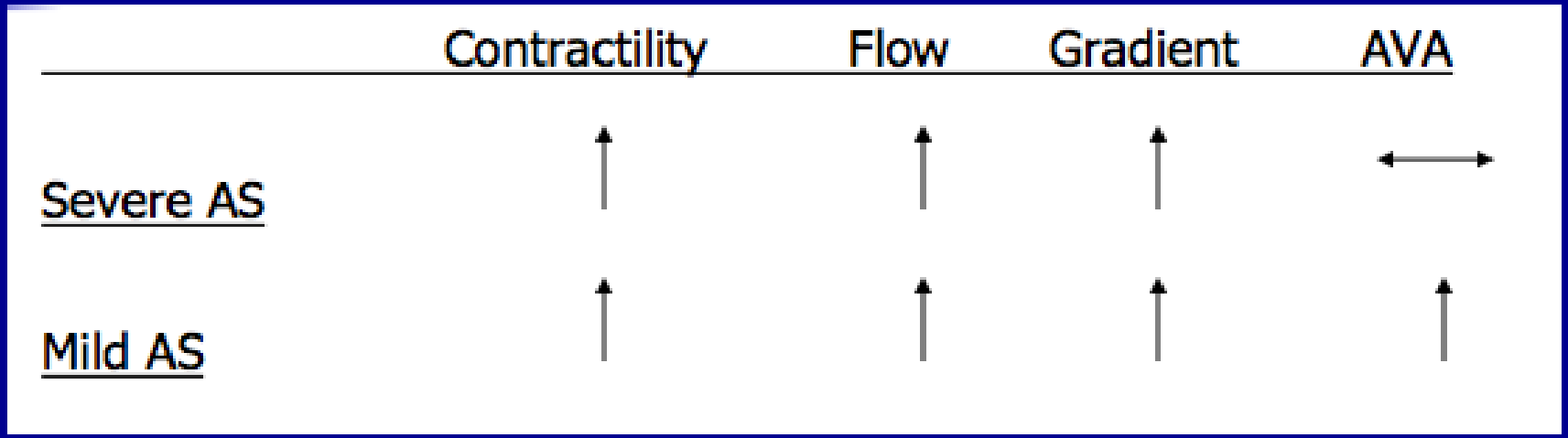




Diagnostic Dilemmas

- Moderate aortic stenosis and LV dysfunction
- A mean gradient may be 25mmHg and significant
  - Low gradient severe aortic stenosis
  - Calculate an aortic valve area
  - Consider Dobutamine Stress Echo
    - Is the aortic valve now opening?
    - Did the gradients go up?
    - How much did the velocity go up by?
    - What happened to AVA?

Response to Stress Echo



Transesophageal Echo

- Direct measurement of the aortic valve area
  - Not very accurate

Left Heart Cath

- Can be useful to directly measure gradients across the aortic valve

Treatment of Aortic Stenosis

- Medications
- Balloon aortic valvuloplasty
- Transcatheter aortic valve replacement
- Bioprosthetic aortic valve replacement
- Mechanical aortic valve replacement