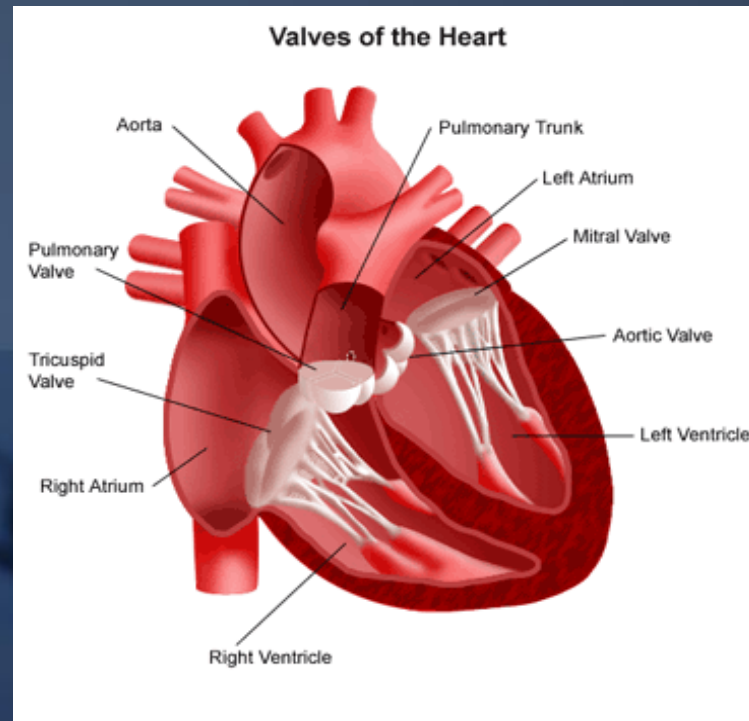


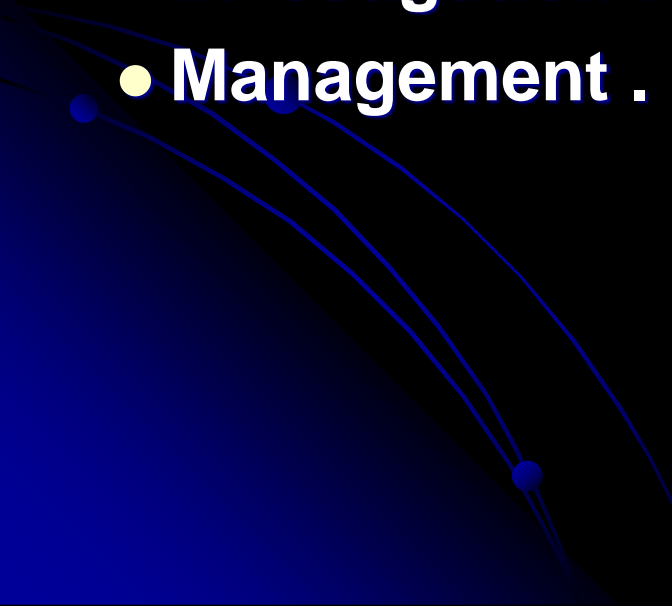
Valvular Heart Diseases



Prof. Mohammed Arafah
MB,BS FACP FRCPC FACC



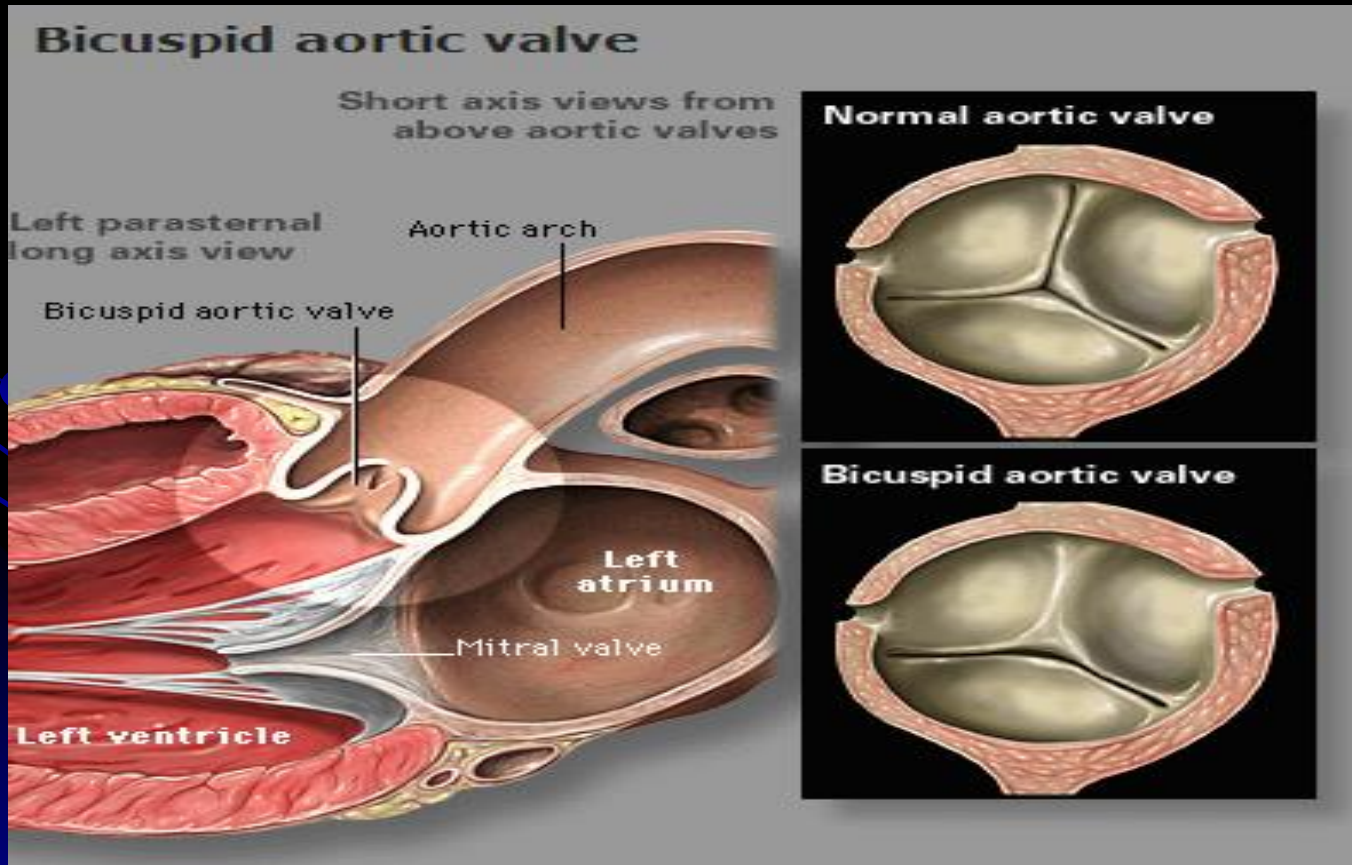
Objectives

- Etiology of valve diseases
 - Pathogenesis .
 - Clinical presentation .
 - Clinical findings .
 - Investigation .
 - Management .
- 

Etiology

- **Congenital :**

- Bicuspid or unicuspid .
- Subvalvular or supra-valvular .



Etiology - continue

- **Acquired :**

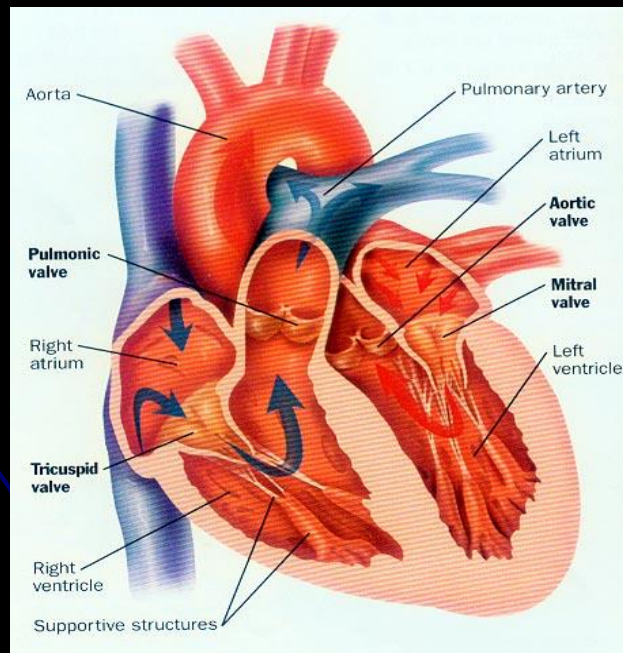
- Rheumatic .
- Degeneration .
 - myxomatous
 - calcification
- Ischaemic .
- Infective Endocarditis .
- Valve ring dilatation .

TYPES of Presentations

- Acute Presentation :

- Acute mitral regurgitation due to
eg acute myocardial infarction

- acute chordae tendineae rupture



TYPES of Presentations

- Chronic Presentation :

- Chronic mitral regurgitation due to
eg RHRUMATIC fever .

- Mitral valve Prolapse .

- Chronic aortic regurgitation due to
eg Bicuspid Aortic valve .

HEAMODYNAMICS Consequences

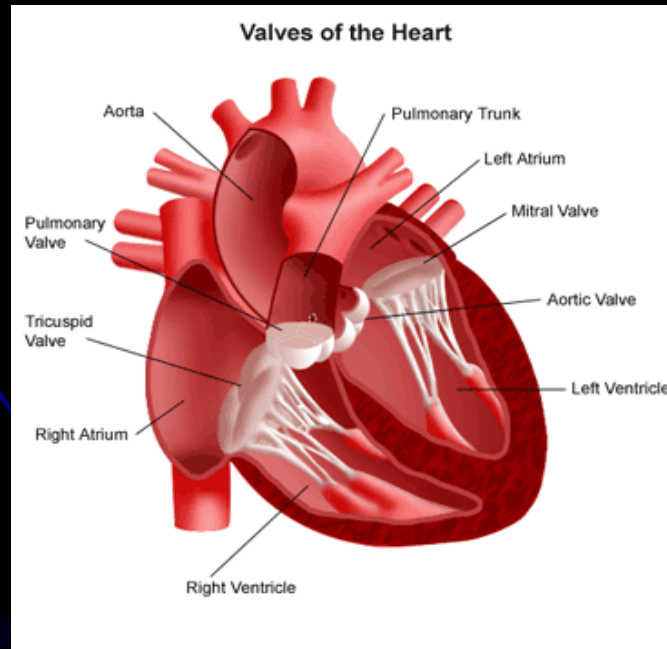
- Pressure Overload :

- Aortic stenosis

- Left Ventricular hypertrophy

- Mitral stenosis

- Left Atrial hypertrophy & dilatation



HEAMODYNAMICS Consequences

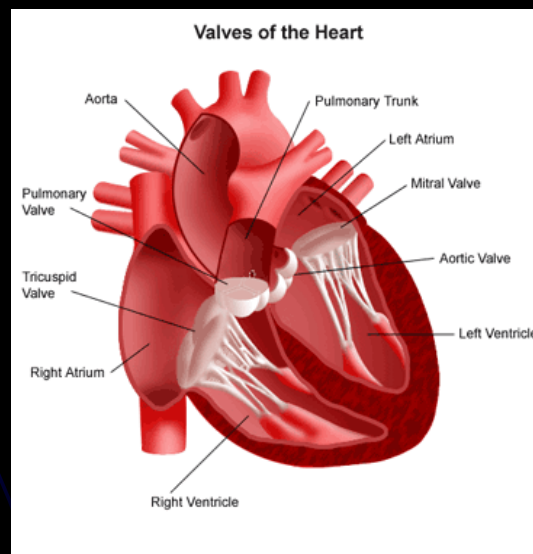
- Volume Overload :

- chronic mitral regurgitation

- dilated left ventricle & left atria

- chronic tricuspid regurgitation

- dilated right ventricle & right atria

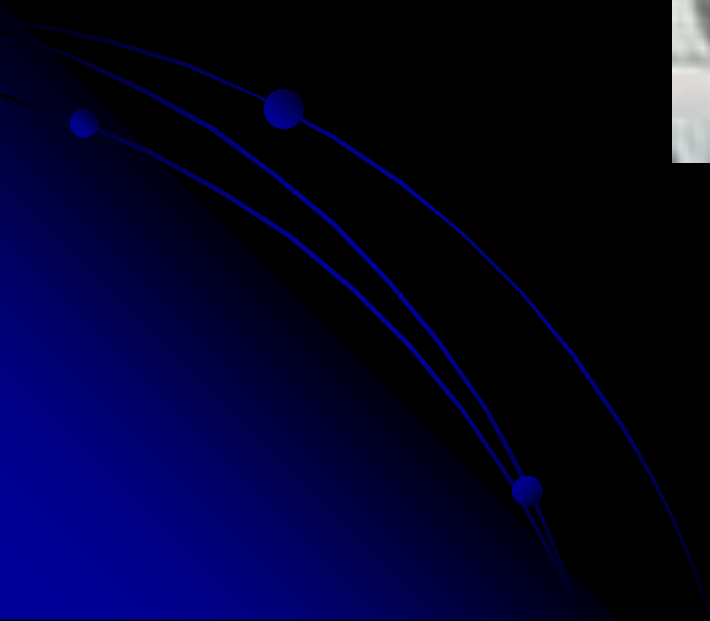


SYMPTOMS

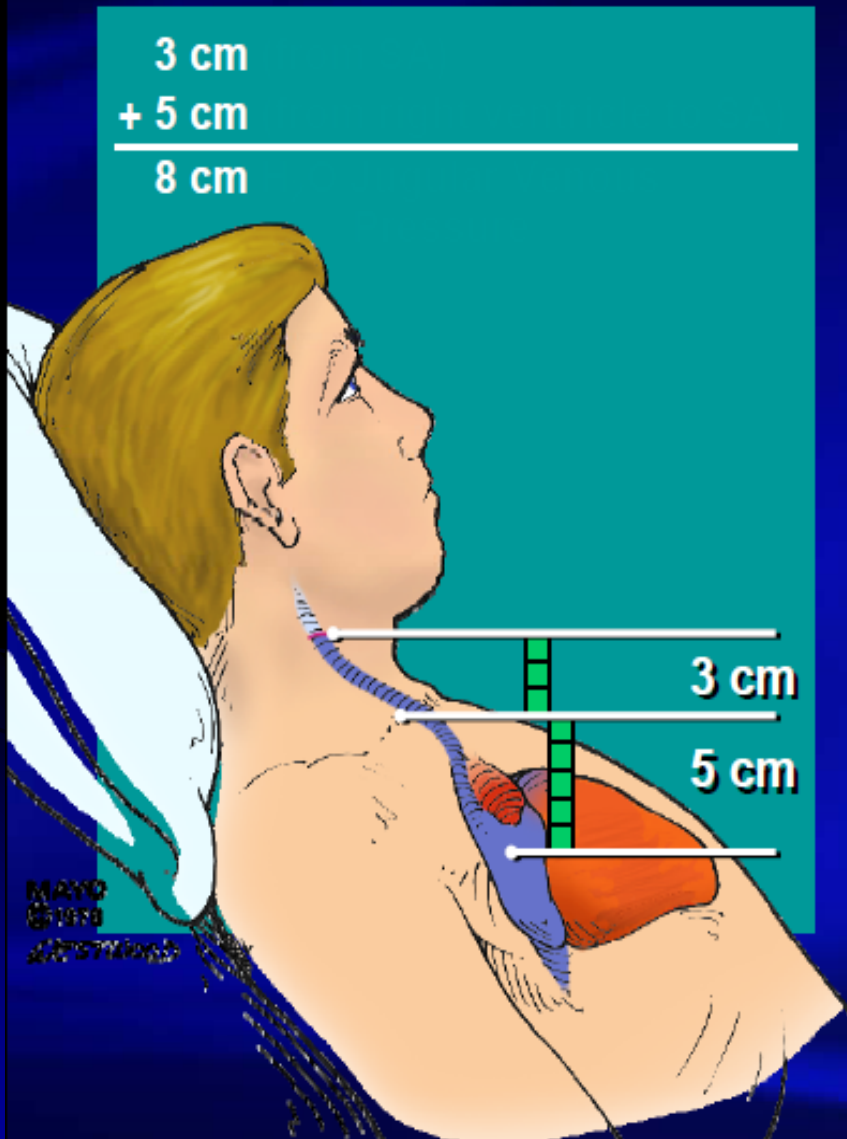
- Dyspnea , paroxysmal nocturnal dyspnea orthopnea .
- Palpitation .
- Chest pain .
- Dizziness , prefainting ,syncope .
- Oedema , Ascites
- Cough .
- Fatigue
- Hemoptysis
- Symptoms of thromboembolic complication .

Signs of Valvular Diseases

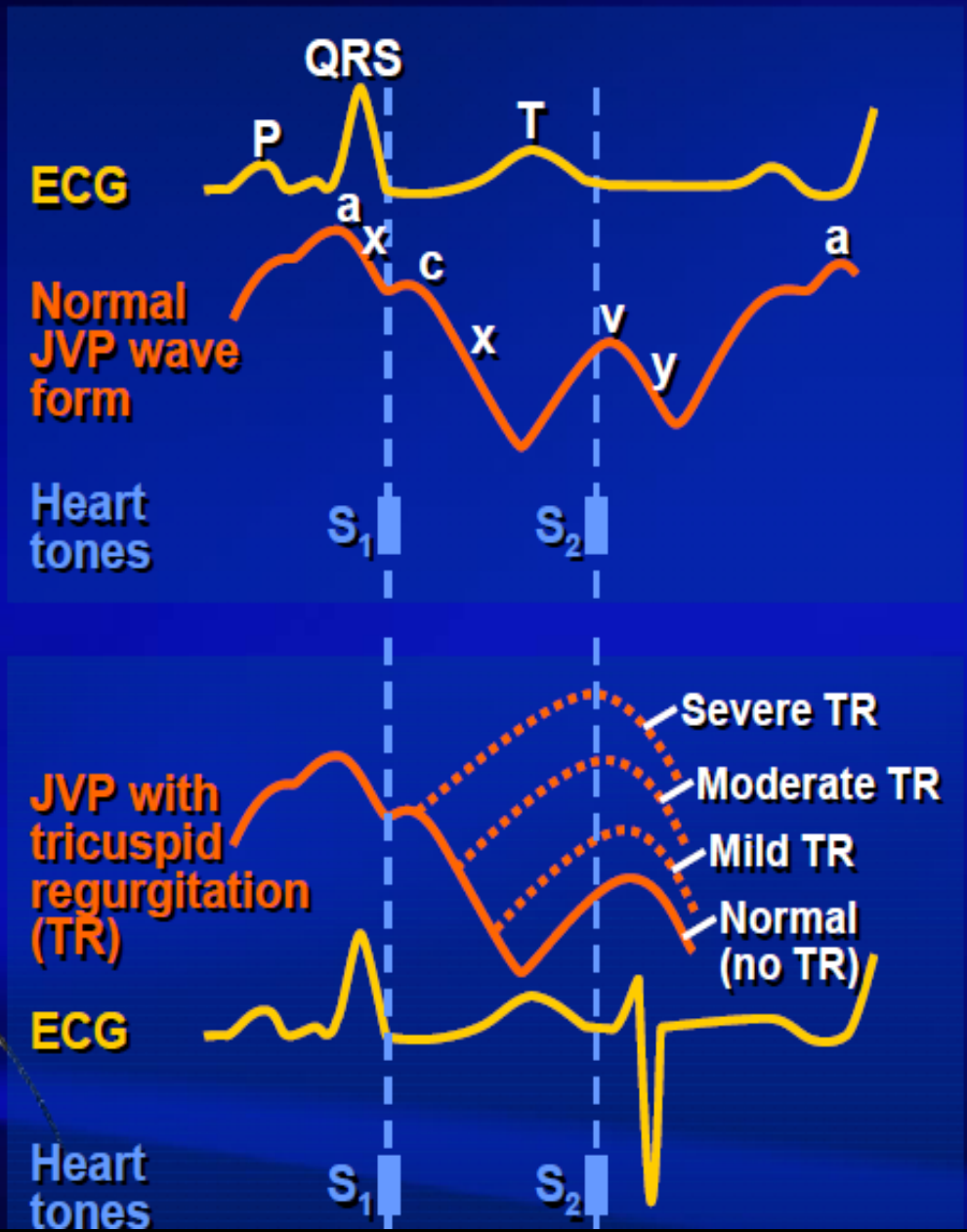
- Abnormal look (mitral facies) .
- Abnormal pulse (Atrial fibrillation) .
- Abnormal JVP
- Apex beat abnormality .
- Sternal or parasternal heave .
- Thrill .
- Abnormal heart sound .
- MURMURS .
Systolic or Diastolic .



Jugular Venous Pulsation Evaluation



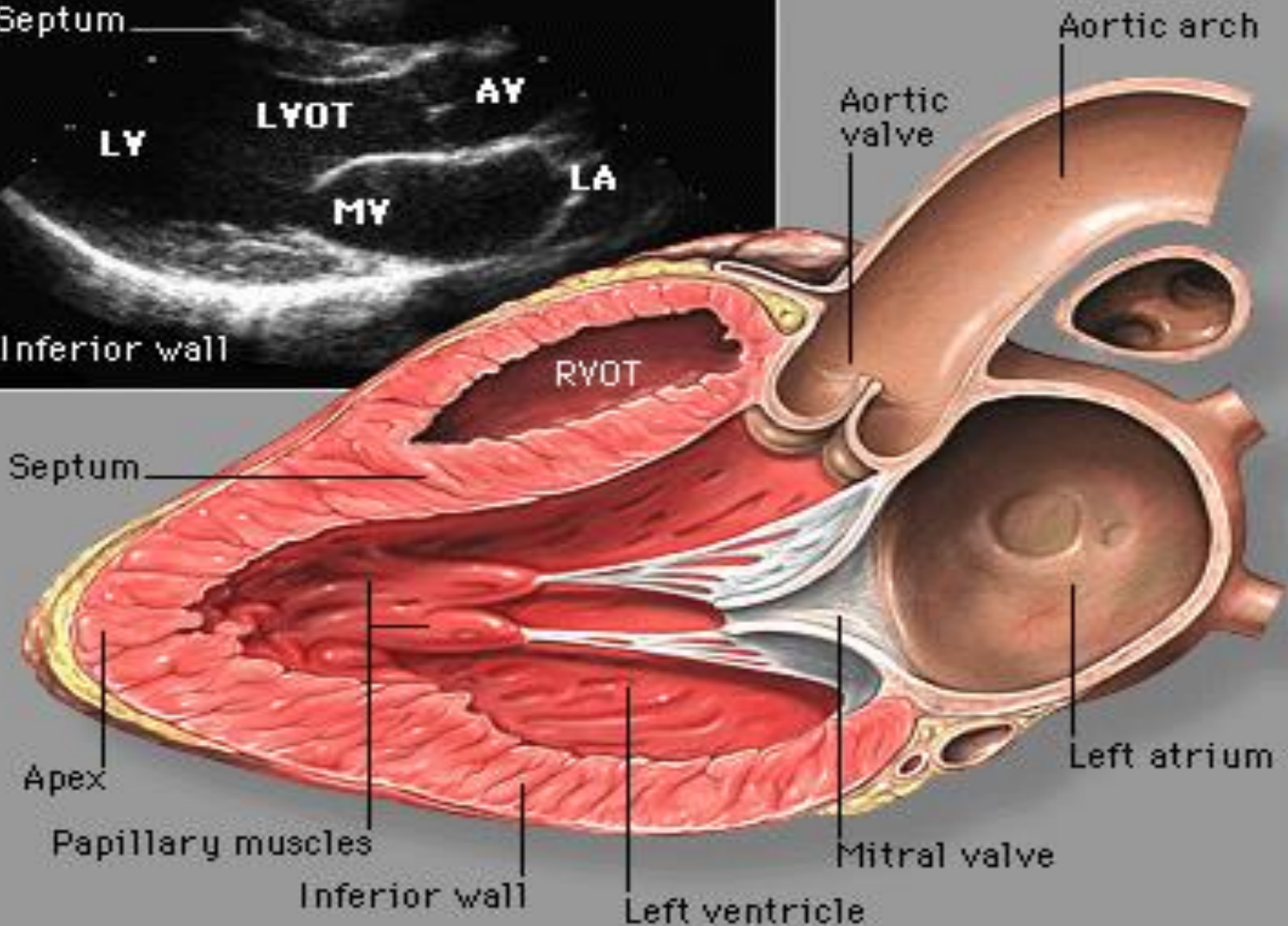
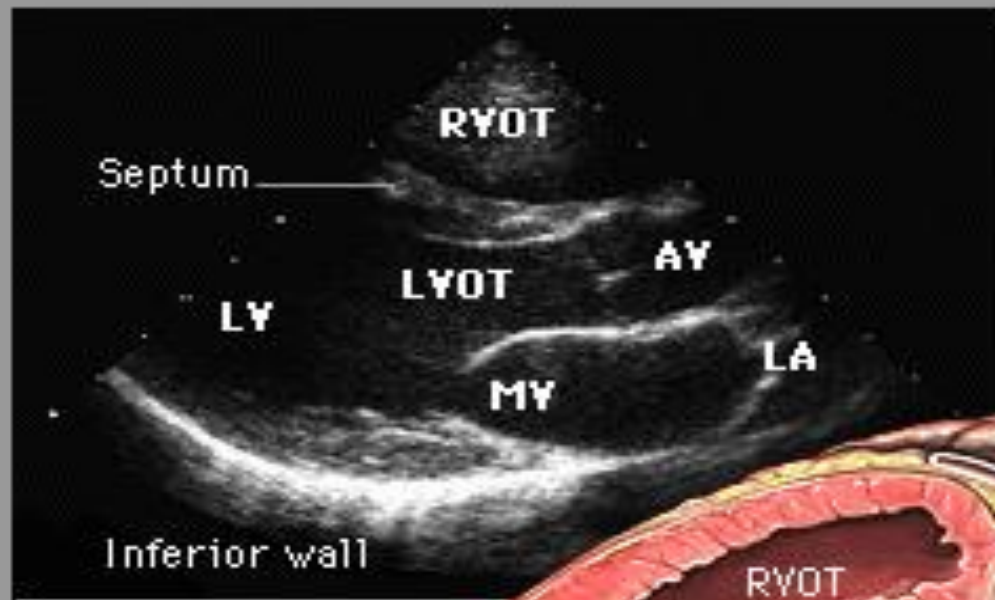
Adapted from
Constant: Bedside Cardiology 4th ed. 1994



INVESTIGATION

- ECG .
- CXR .
- Echo cardiology .
M mode , 2D ,3D . 4 D . TEE .
Doppler .
- 24 hours monitor for heart rhythm .
- MRI .
- Cardiac catheterization .

Left parasternal long axis view



19 Sep 06

7:36:38 am

4V1c-S 65Hz

H4.25MHz 120mm

Cardiac

NTHI General /V

65dB T1/ 0/1/4

Gain= -2dB Δ=4

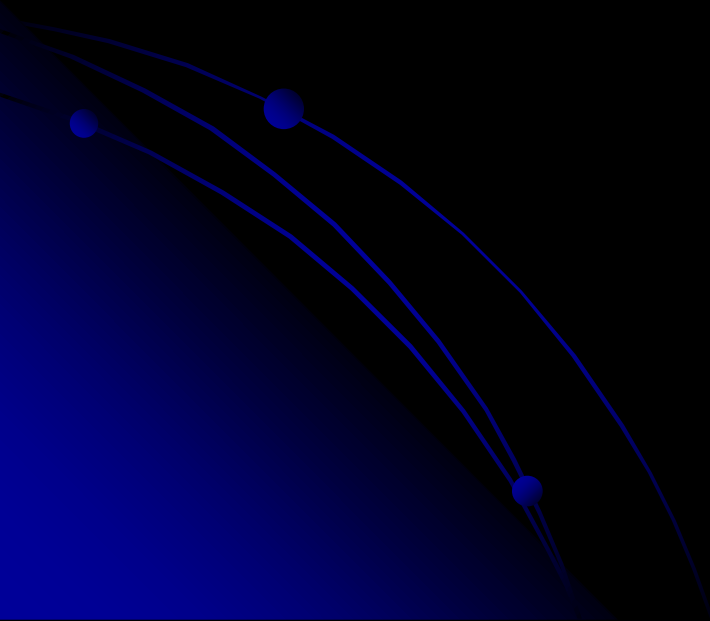
Store in progress

1:38:16

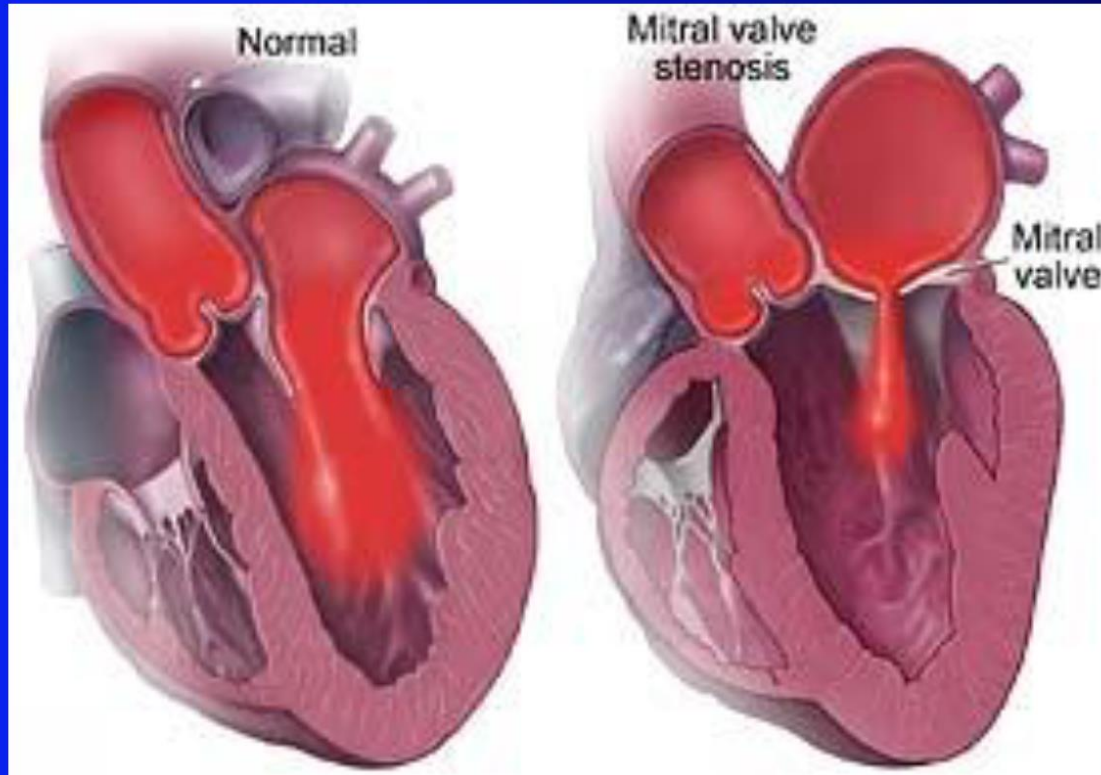
HR= 60bpm



MITRAL STENOSIS



Mitral Stenosis



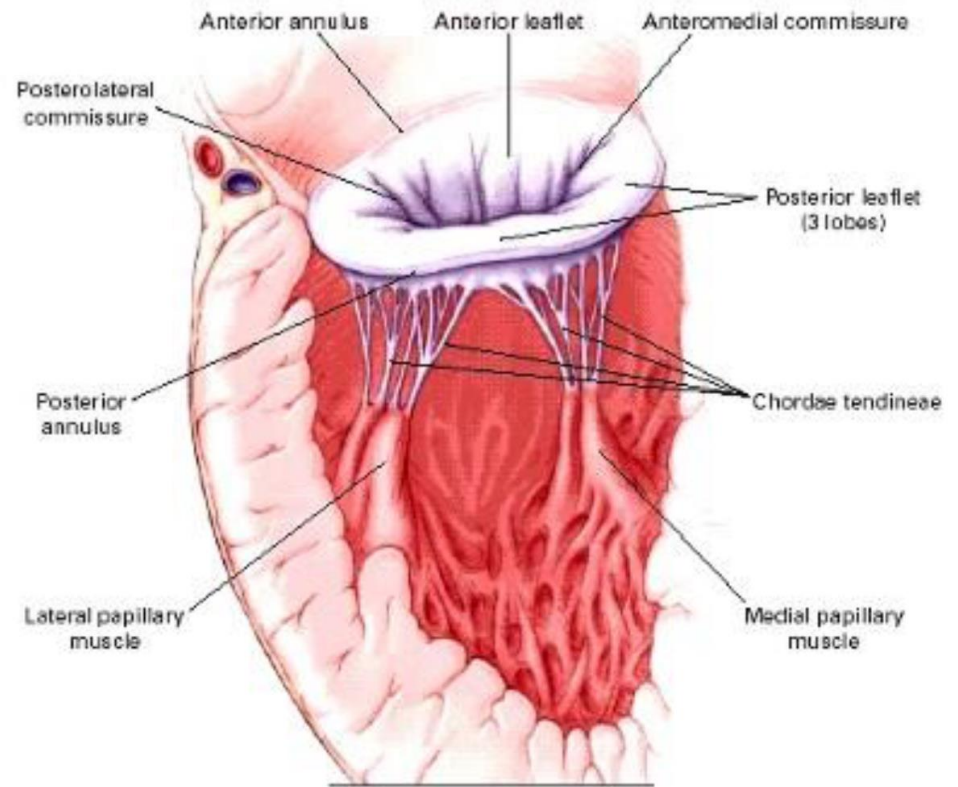
- Restriction and narrowing of mitral valve
- Impairment of left ventricular filling

Mitral Stenosis: Etiology

- Rheumatic Fever (>90% cases)
 - (~ 99% of MV's @ surgery show rheumatic damage)
 - 50% patients will have known history of RF
 - Average 20 years prior to clinical symptoms
- Congenital stenosis of MV (Shone Syndrom)
- Extensive calcification
- Endocarditis – scarring & fusion of valve
- SLE

Mitral Valve Apparatus

- Mitral valve leaflets (AML and PML)
- Mitral valve annulus
- Chordae tendinaea
- Papillary muscles
- Left ventricular myocardium



MITRAL STENOSIS results in several changes to the integrity of the valves:

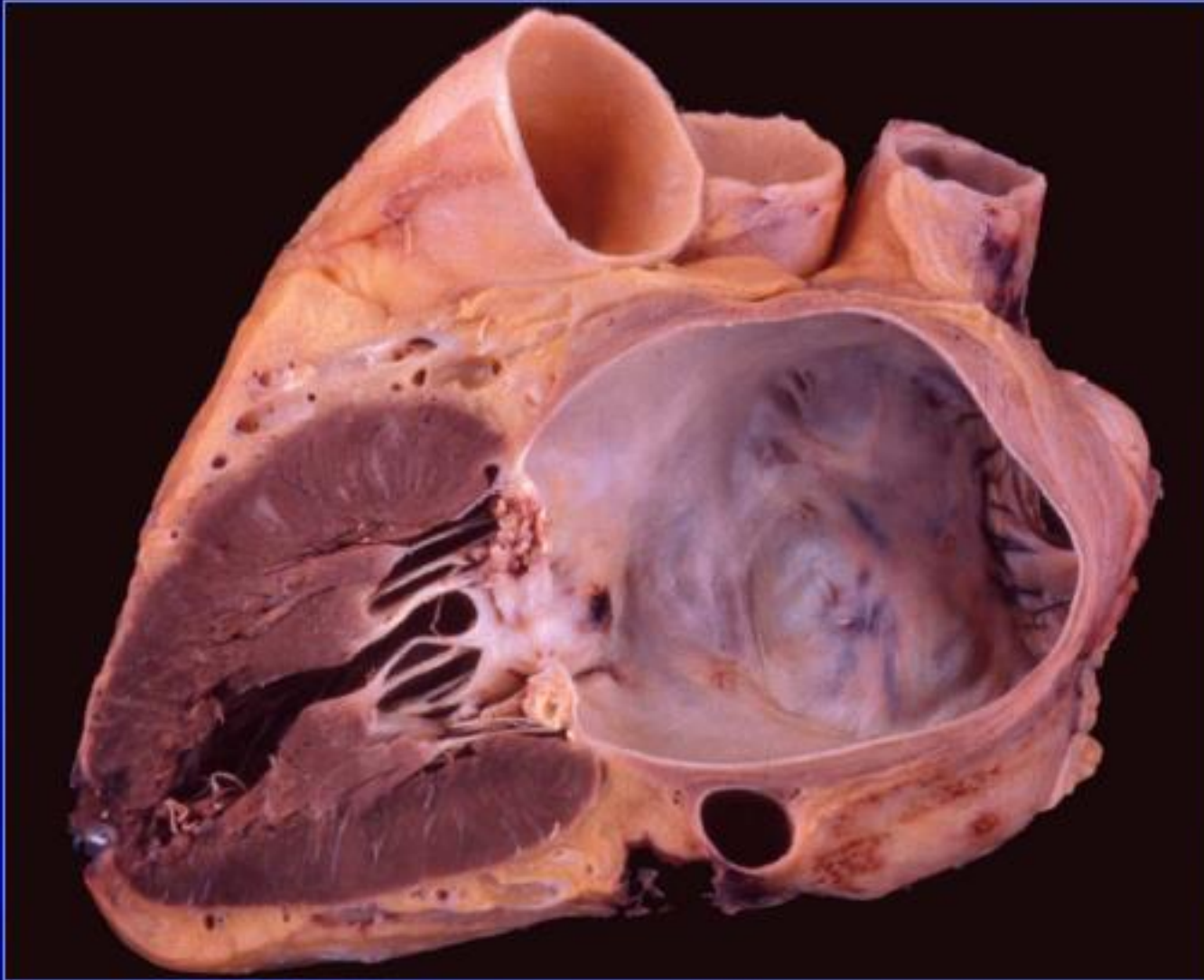
CUSPS THICKEN

COMMISSURES FUSED TOGETHER

**CHORDAE TENDINAE BECOMES
THICKENED & SHORTENED**

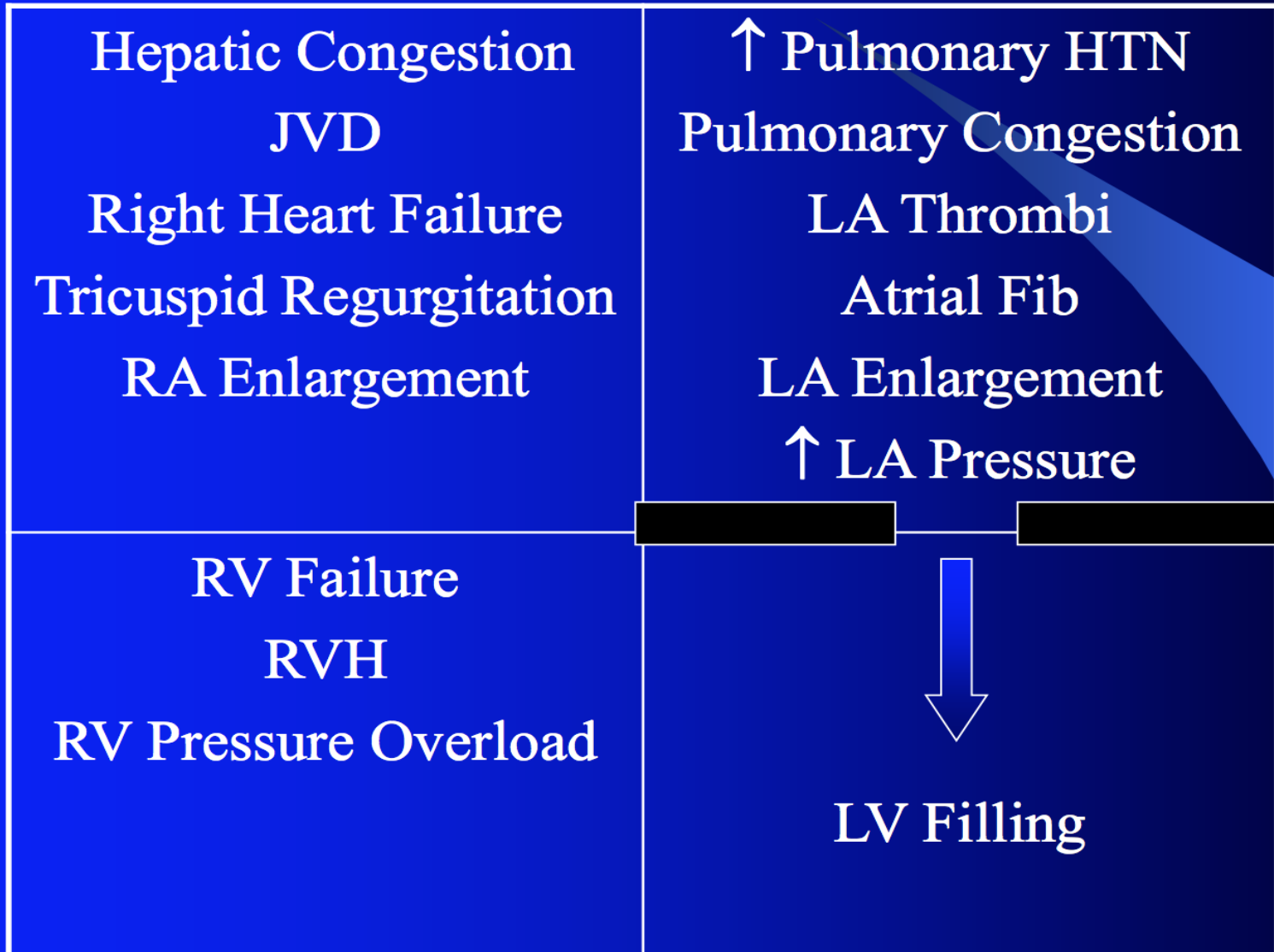
CALCIUM DEPOSITS FORM

Mitral Stenosis



**Pressure overload: LA, RV, RA & pulmonary tree
LV protected**

Mitral Stenosis: Pathophysiology



Mitral Stenosis

Symptoms

- **Increased LA pressure**

Hallmark of MS

Atrial Fibrillation

Pulmonary Hypertension

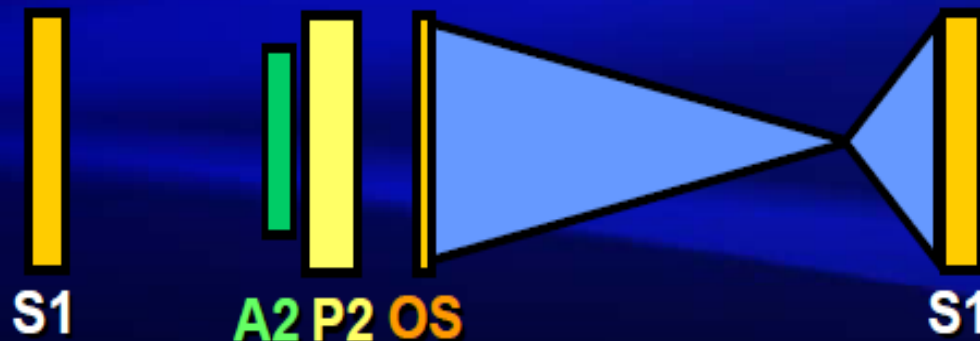
- **Dyspnea on exertion**
- **Fatigue**

Mitral Stenosis Examination

- Palpation RV lift
 - Loud P2
 - Loud S1
 - Opening snap
 - Diastolic rumble
- } Pliable MV

What heart sound can't you get with significant MS?

S₃

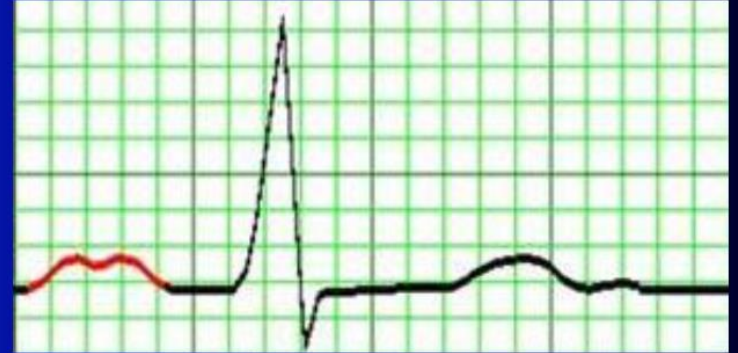


Evaluation of MS

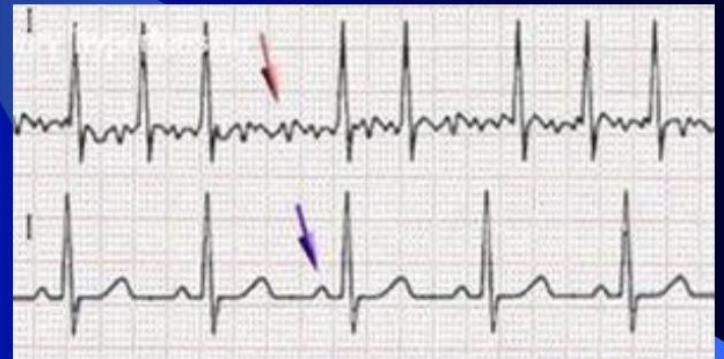
- **ECG:** may show atrial fibrillation and LA enlargement, RVH
- **CXR:** LA enlargement and pulmonary congestion. Prominent pulmonary arteries, Occasionally calcified MV
- **ECHO:** The ***GOLD STANDARD*** for diagnosis. Asses mitral valve mobility, gradient and mitral valve area, Thickened MV & LAE

MS - EKG

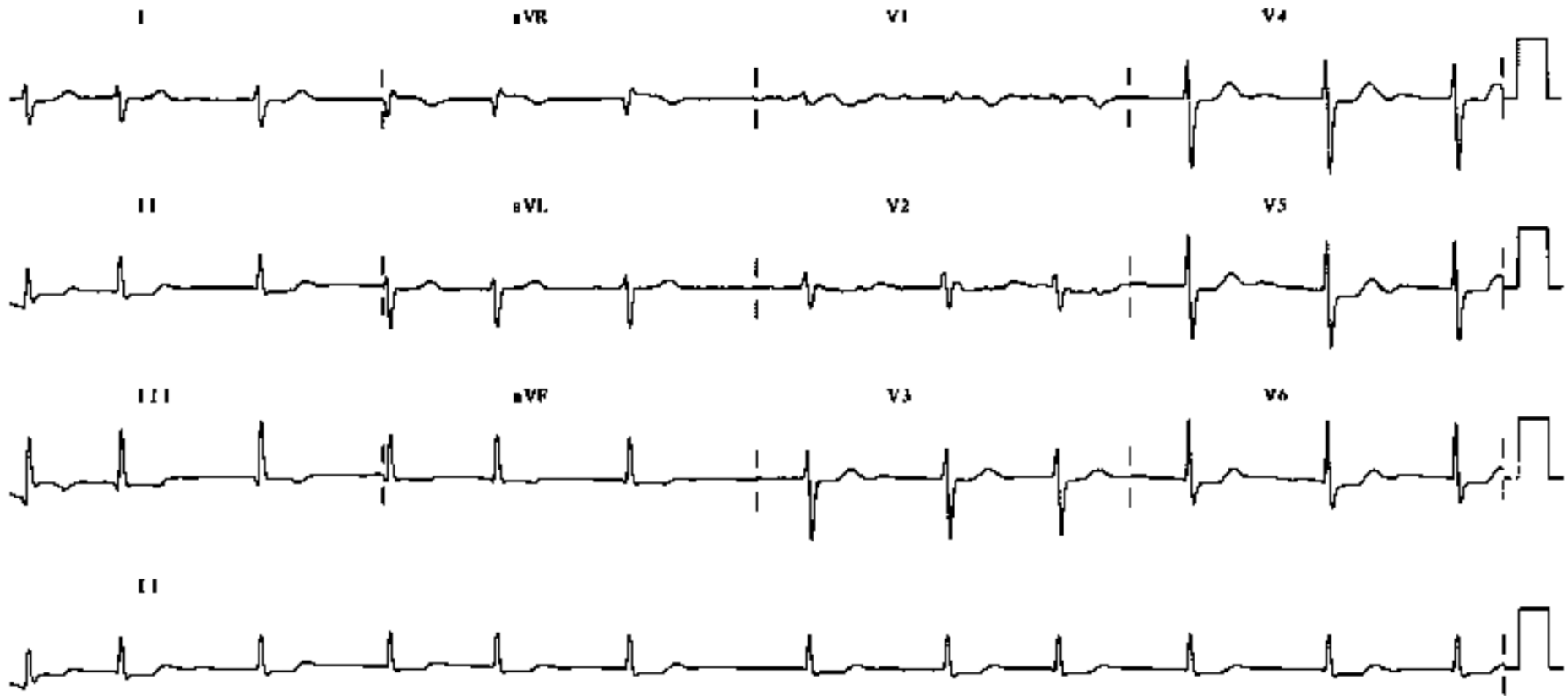
Broad notched P wave (LAE)



Atrial fibrillation

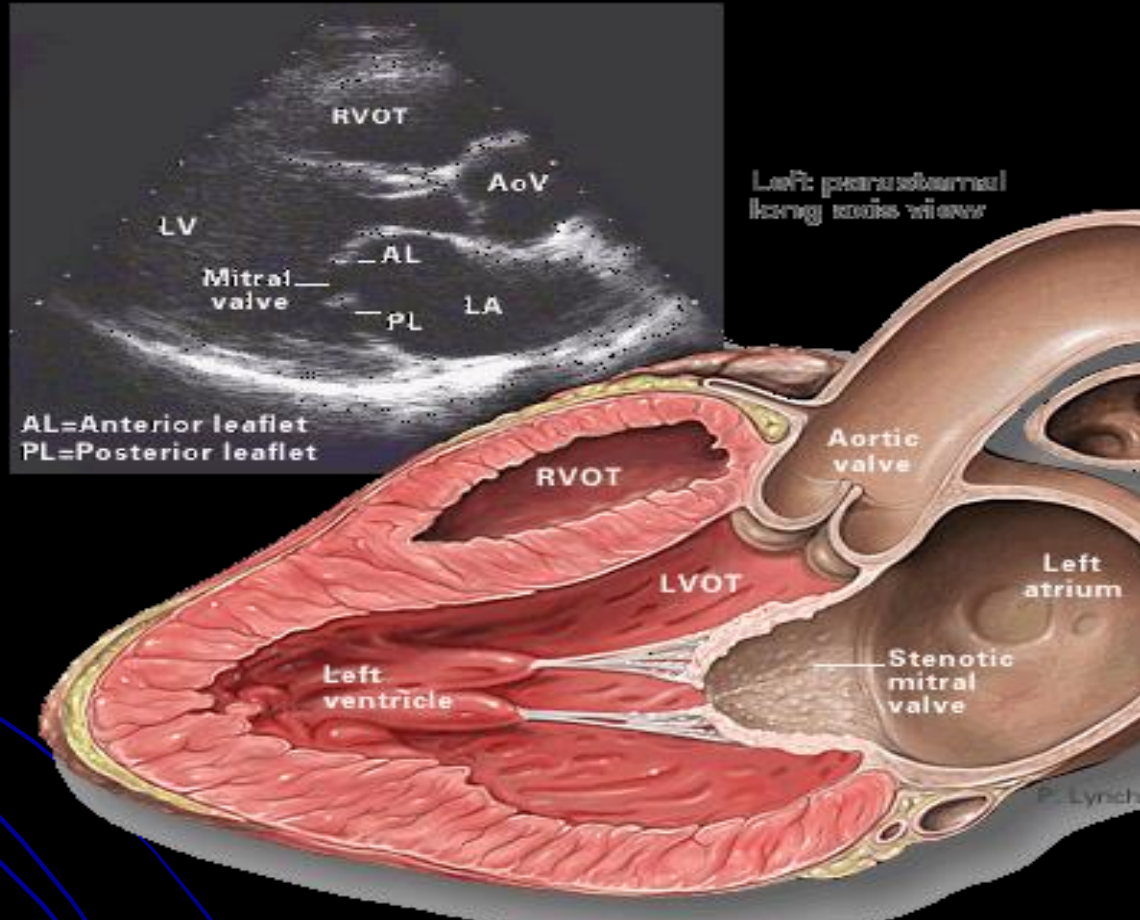


A 35 year old pregnant woman with loud first heart sound and mid-diastolic murmur





LEFT PARASTERNAL, LONG AXIS VIEW



STENOTIC MITRAL VALVE



3V2c

43.5MHz

Echo

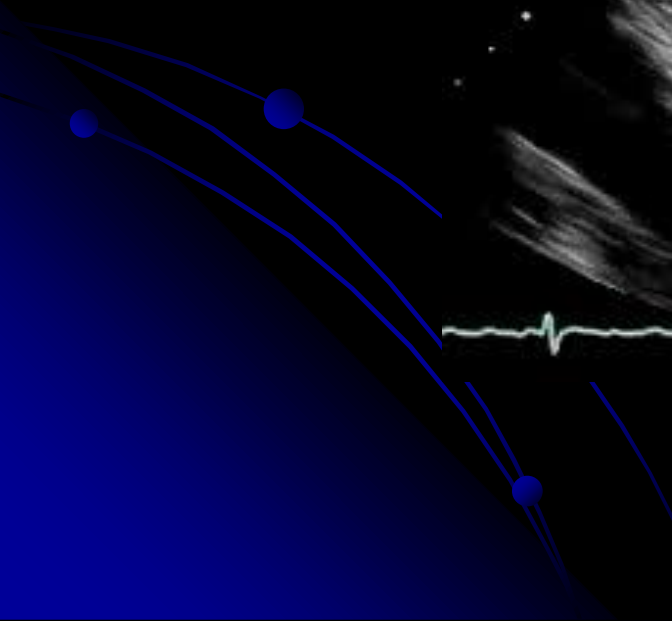
55dB T1/

Gain= 0dB

Store in prog

☐

HR= 76bpm



MEDICAL MANAGEMENT

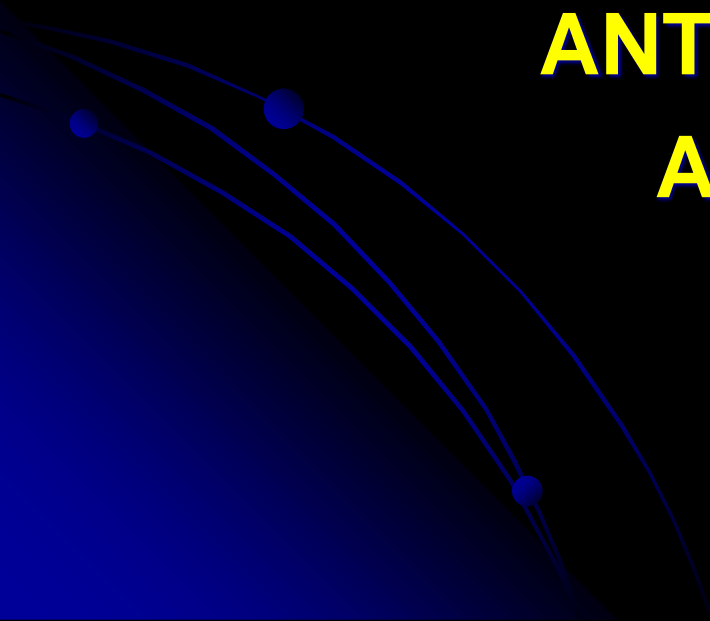
DIURETICS

DIGITALIS

ANTI-ARRHYTHMICS

ANTICOAGULANTS

ANTIBIOTICS

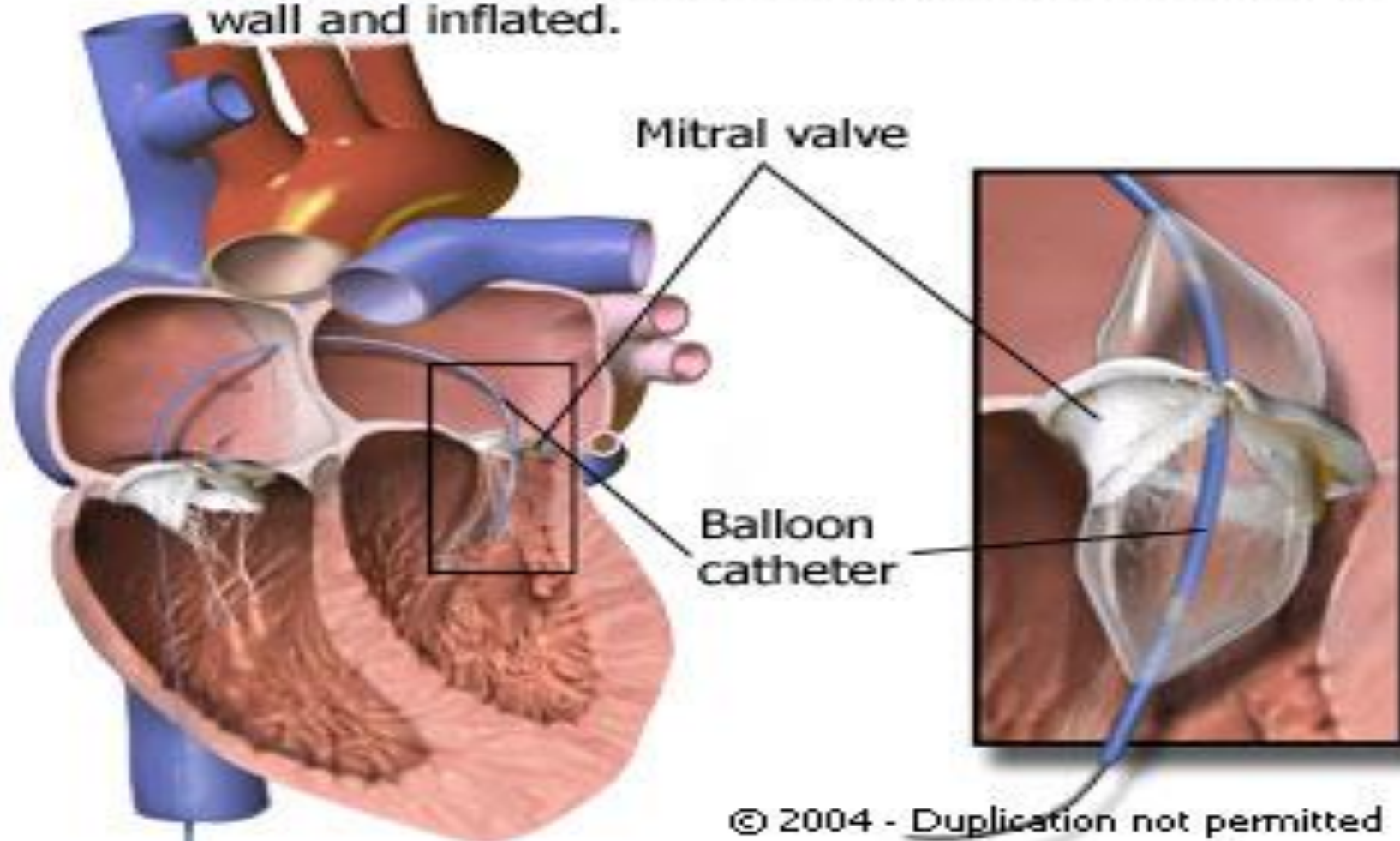


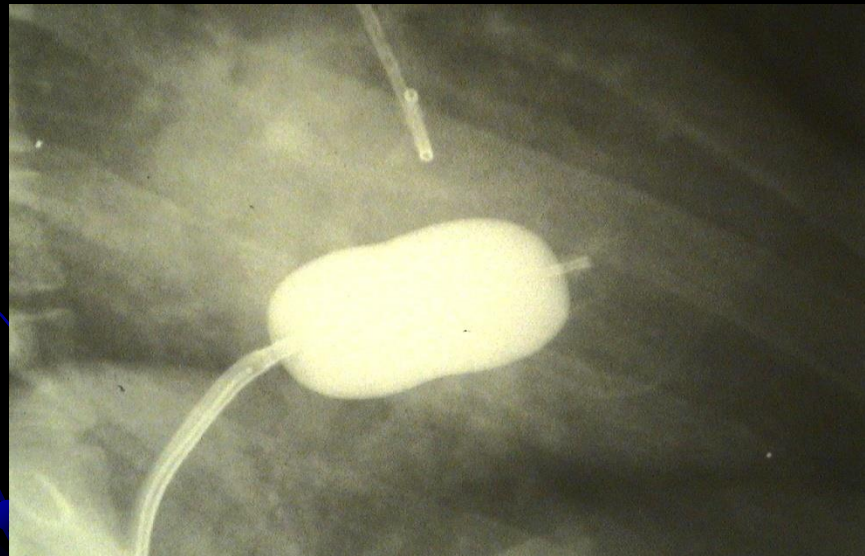
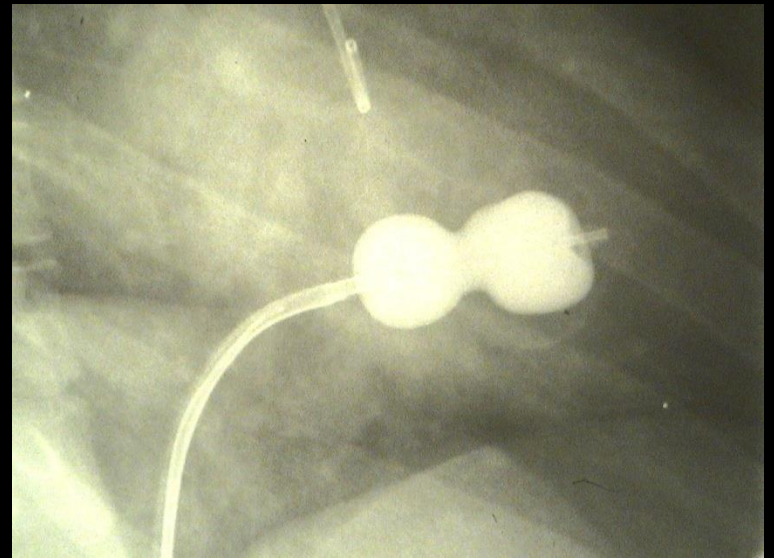
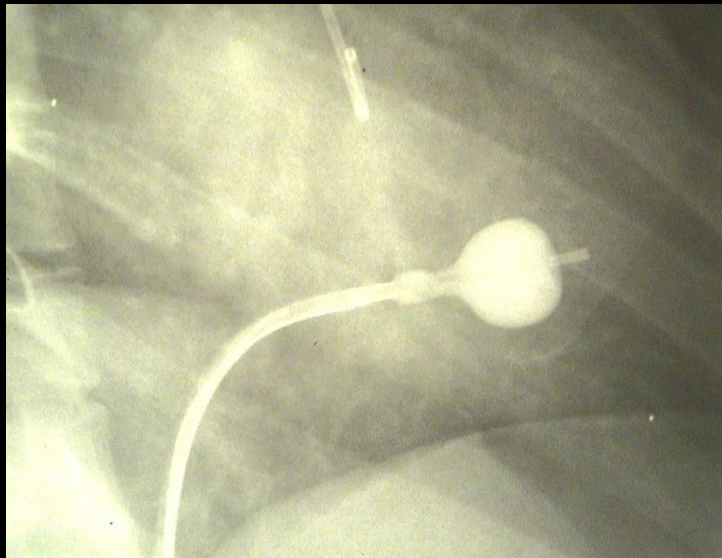
Intervention

- **PERCUTANEOUS TRANSVENOUS MITRAL COMMISSUROTOMY (PTMC)**
 - **SURGICAL COMMISSUROTOMY**
 - **MITRAL VALVE Replacement .**
- 

Valvuloplasty

A procedure to improve blood flow through a narrow valve. A catheter is threaded to the valve through a hole temporarily created in the septal wall and inflated.







**MVA = .982 cm²
PRE-PROCEDURE**



**MVA = 1.84 cm²
POST-PROCEDURE**



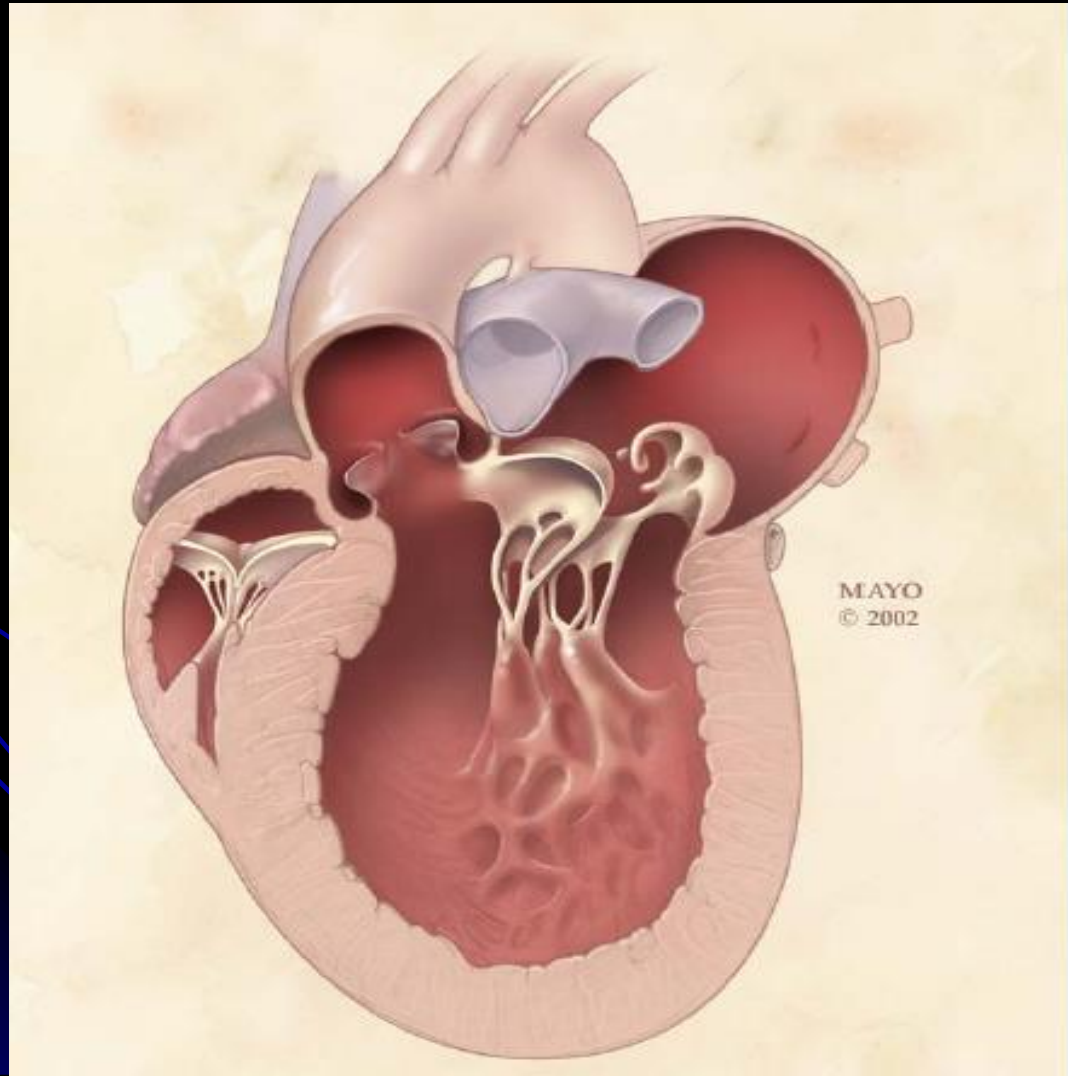
(b)

⏪ ⏩ ⏴ ⏵



(c)

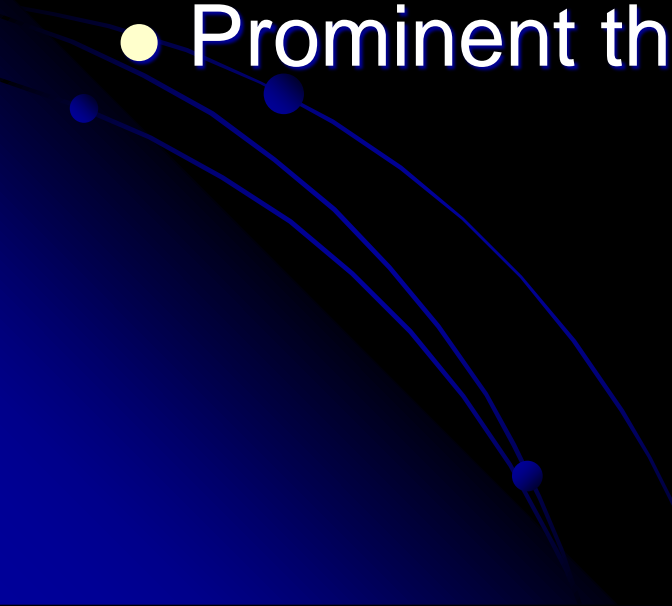
MITRAL REGURGITATION



ETIOLOGY

- RHEUMATIC HEART disease .
- MITRAL Valve Prolapse .
- Others
 - IHD
 - Cardiomyopathy (dilated , hypertrophic)
 - Hypertensive heart disease
 - infective endocarditis
 - Myocarditis
 - connective tissue disorders - (SLE)
 - collagen abnormalities - Marfan's syndrome

SIGNS

- Laterally displaced (forceful) diffuse apex beat and a systolic thrill .
 - Soft first heart sound .
 - Pansystolic murmur .
 - Prominent third heart sound .
- 

Mitral Regurgitation

Examination

Acute

- **Sitting upright**
- **Rales**
- **Murmur**

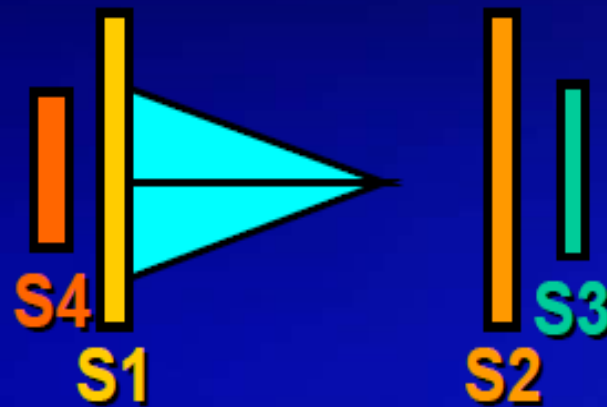
May be subtle

Chronic

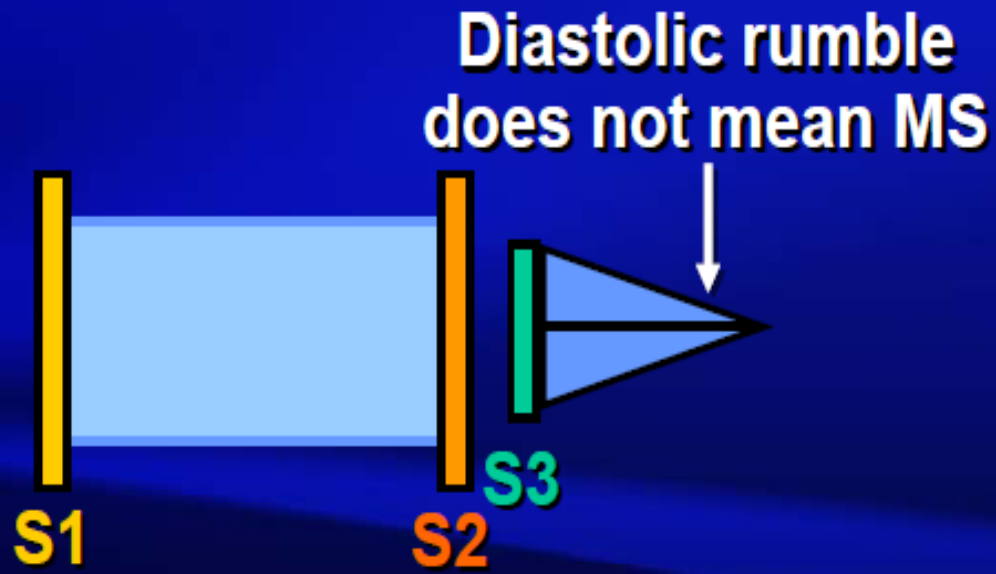
- **Apical impulse**
Diffuse, tapping
- **May have**
pulmonary findings
- **S3 ± Palpable**

Mitral Regurgitation Examination

Acute MR



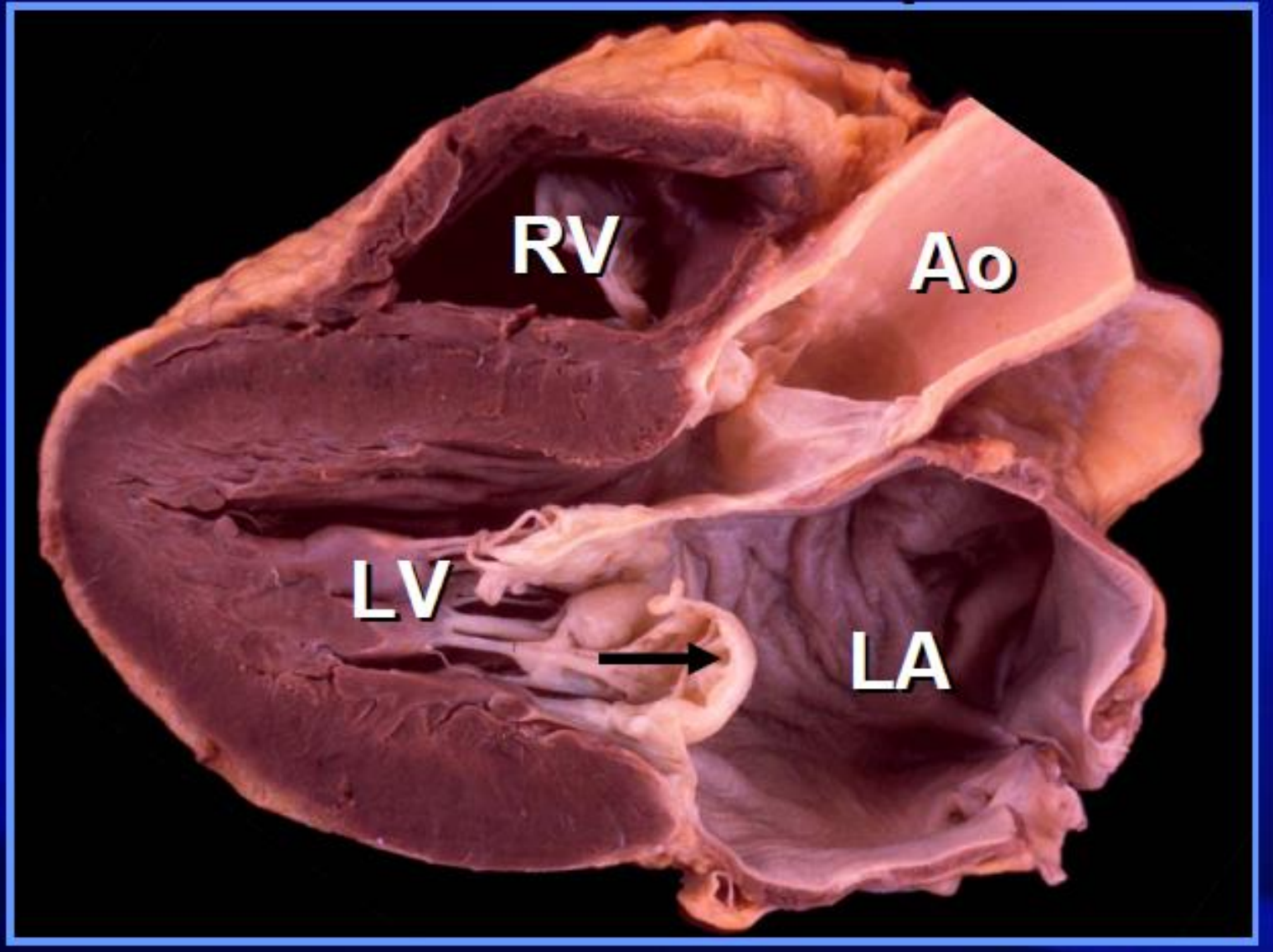
Chronic Severe MR



Management of mitral regurgitation

- Evidence of progressive cardiac enlargement generally warrants early surgical intervention by either mitral valve repair or replacement .
- Treatment with ACE inhibitors, diuretics and possibly anticoagulants .

Mitral Valve Prolapse



Pathology

- Large mitral valve leaflets, an enlarged mitral annulus, abnormally long chordae or disordered papillary muscle contraction .
- Demonstrate myxomatous degeneration of the mitral valve leaflets .
- Associated with Marfan's syndrome, thyrotoxicosis, rheumatic or ischaemic heart disease .

Symptoms

- *Atypical chest pain* is the most common symptom .
- *Palpitations* may be experienced because of the abnormal ventricular contraction or because of the atrial and ventricular arrhythmias .
- Sudden cardiac death due to fatal *ventricular arrhythmias* is a very rare but recognized complication.

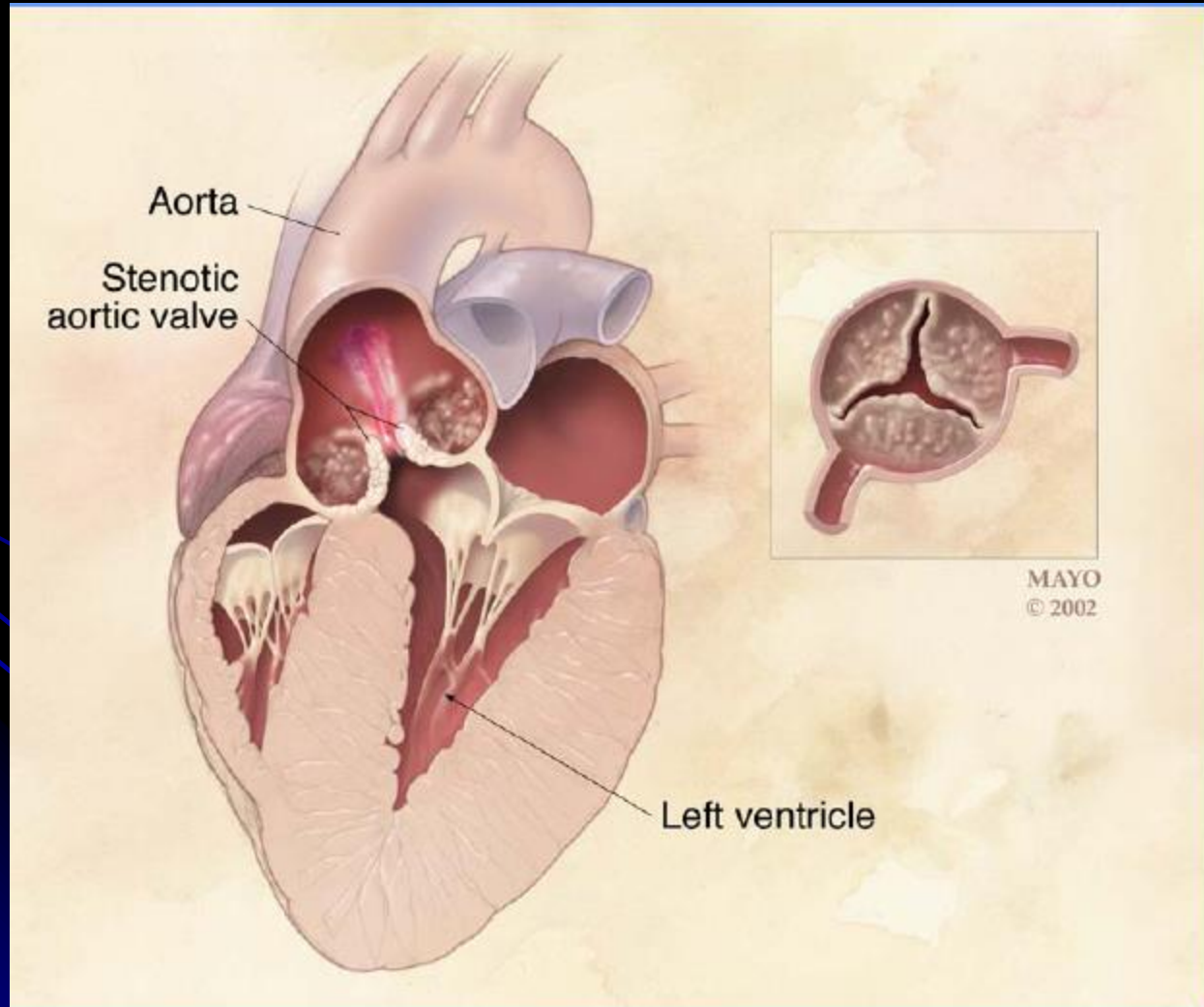
SIGNS

- The most common sign is a mid-systolic click .
- Produced by the sudden prolapse of the valve and the tensing of the chordae tendineae that occurs during systole .
- A late systolic murmur owing to some regurgitation

Treatment

- Beta-blockade is effective for the treatment of the atypical chest pain and palpitations .
- Mitral valve prolapse associated with significant mitral regurgitation and atrial fibrillation, anticoagulation is advised to prevent thromboembolism .
- Mitral valve prolapse associated with severe mitral regurgitation has a risk of sudden cardiac death.

AORTIC STENOSIS



Aortic Stenosis

Etiology

Degenerative-calcific

- Most common
- >70 years

Bicuspid

- 1.8% population
- Sx present \leq 60 years

Rheumatic

Differential diagnosis

Supravalvular – murmur R carotid, \uparrow A₂

Subvalvular – often leads to AR

HCM

**Survival
Percent**

**Onset
severe
symptoms**

100

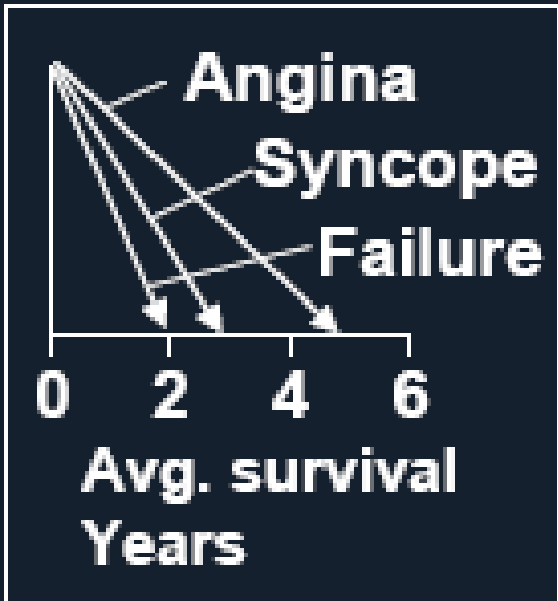
80

60

40

20

**Latent Period
(Increasing
Obstruction,
Myocardial
Overload)**



0 2 4 6

**Avg. survival
Years**

0

40

50

60

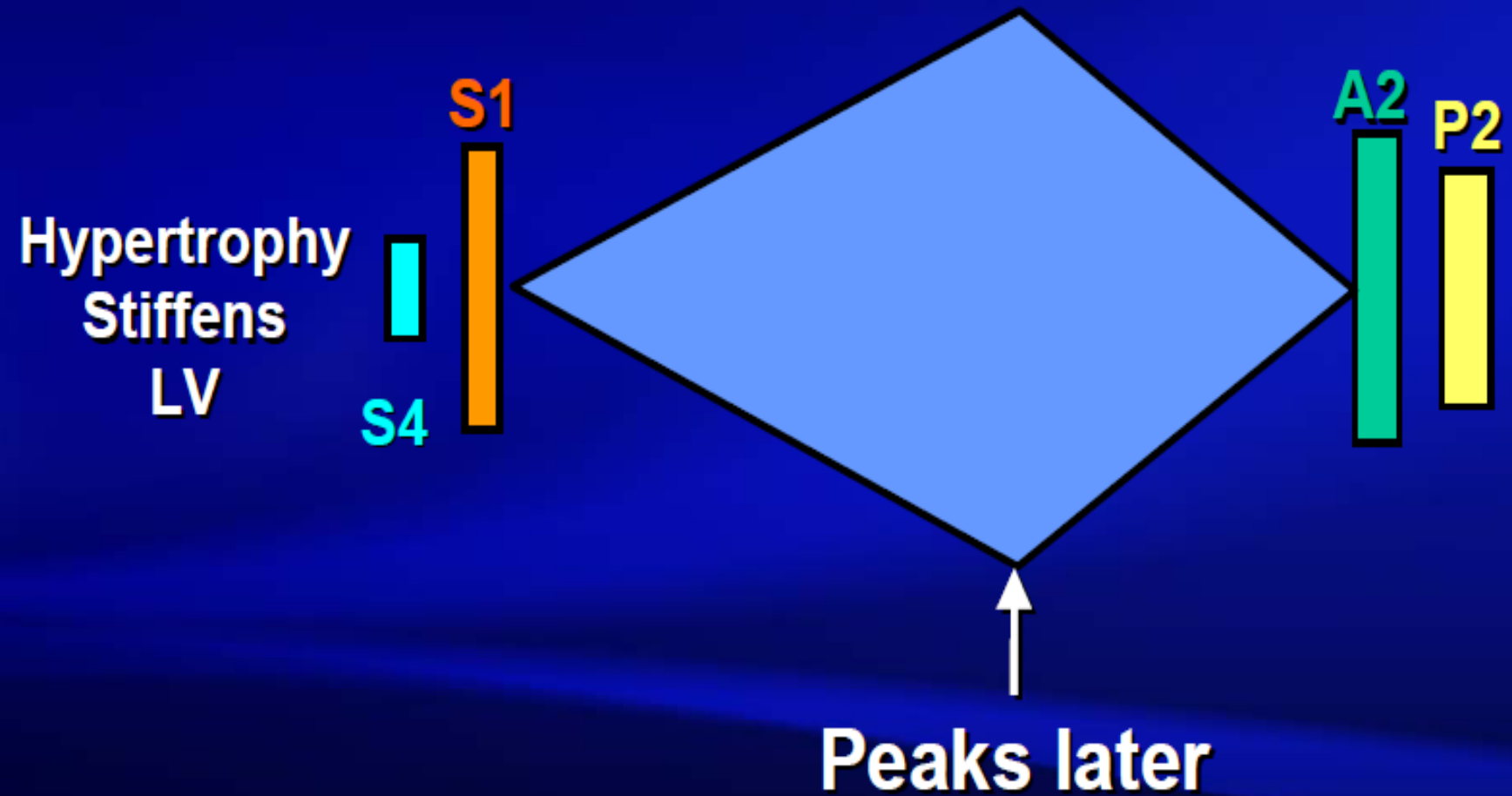
70

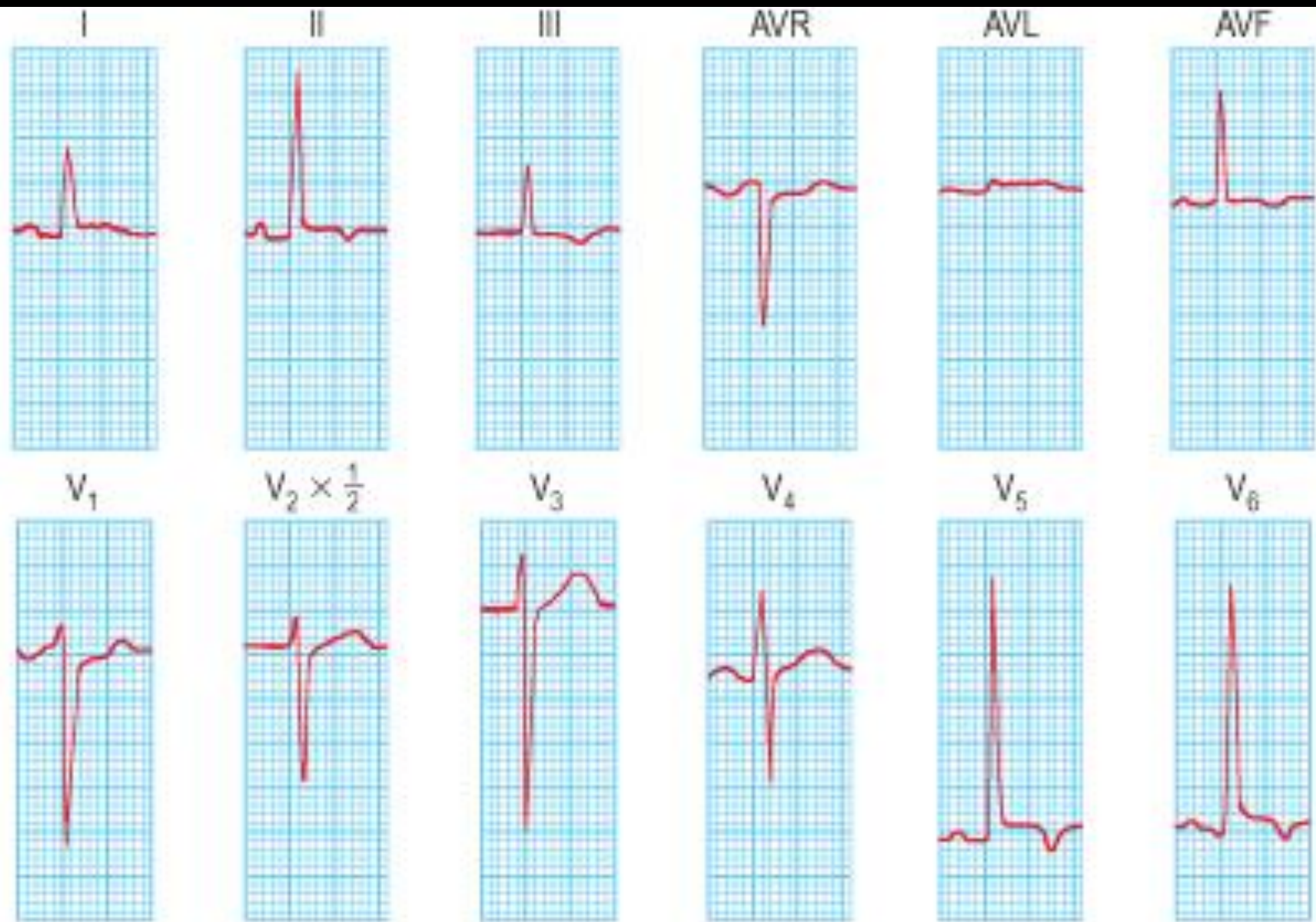
80

**Age
Years**

Moderate Aortic Valve Stenosis

Crescendo Decrescendo
Murmur



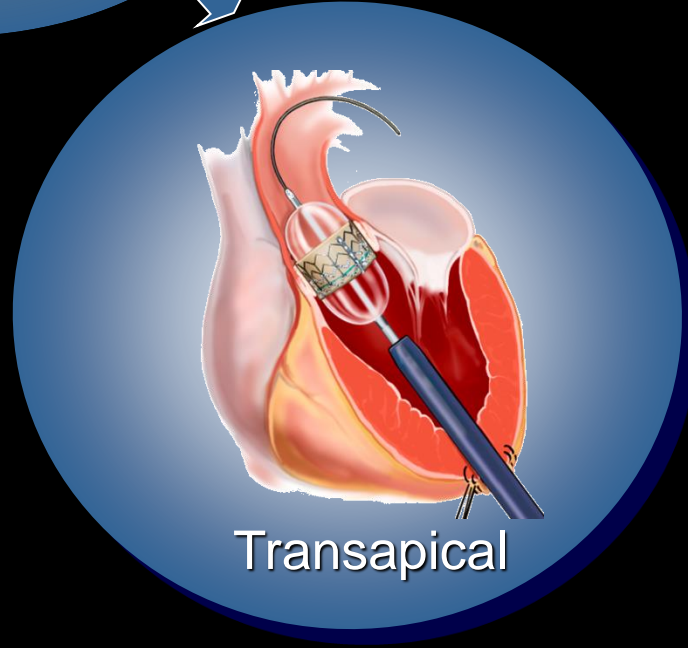
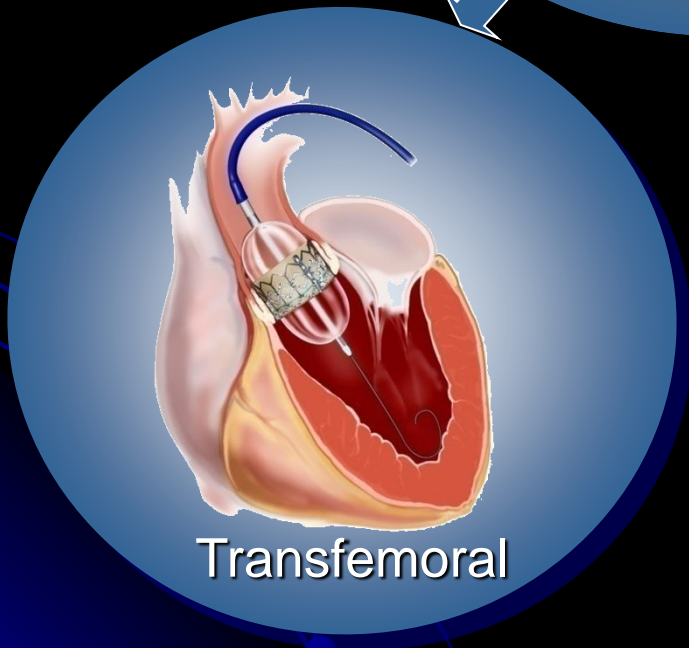
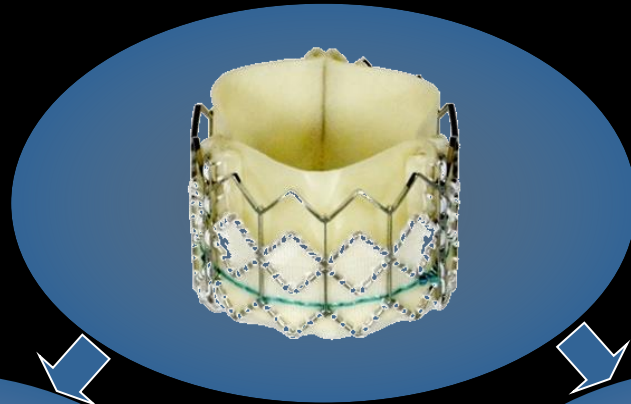


Treatment

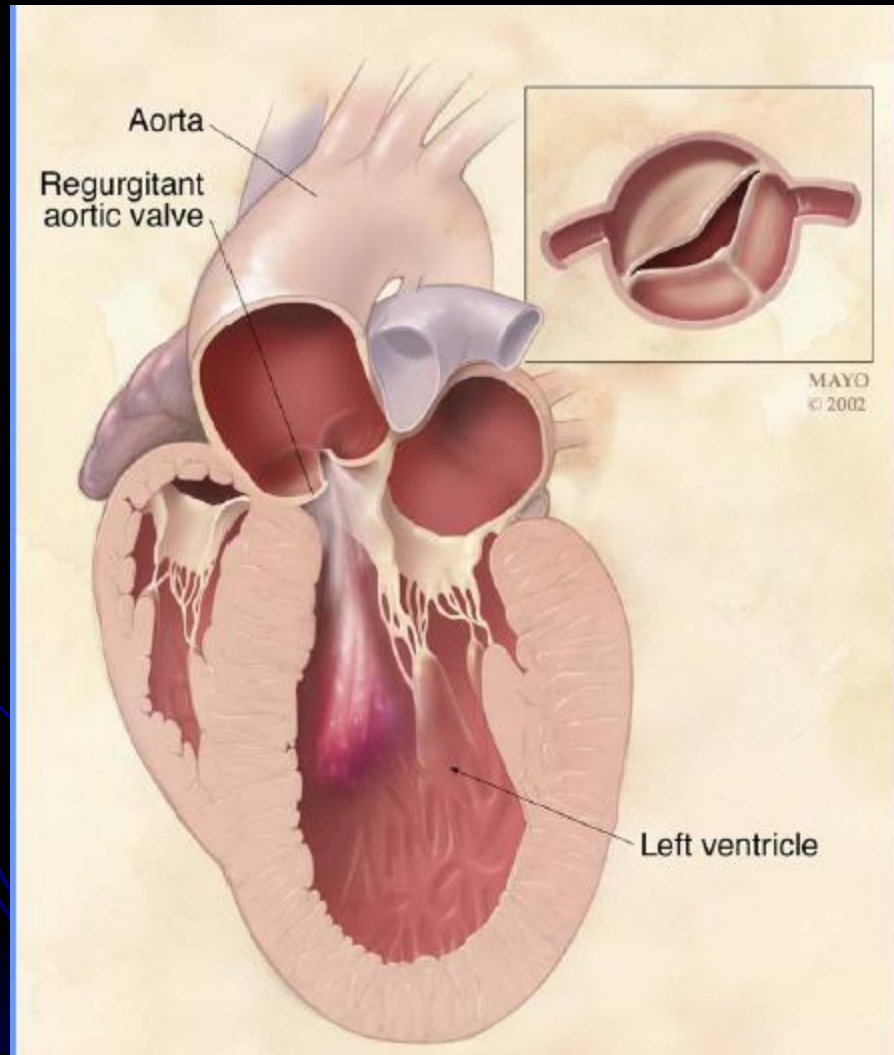
- In patients with aortic stenosis, symptoms are a good index of severity and all symptomatic patients should have aortic valve replacement.
- Asymptomatic patients should be under regular review for assessment of symptoms and echocardiography .

TAVR

Transfemoral (TF) and Transapical (TA)



AORTIC REGURGITATION



Aortic Regurgitation

Etiology

Valvular

- Chronic

Rheumatic

Bicuspid

- Acute

Endocarditis

Aortic root

- Chronic

HTN

Marfan

Aortitis

- Acute

Dissection

Aortic Regurgitation

Examination

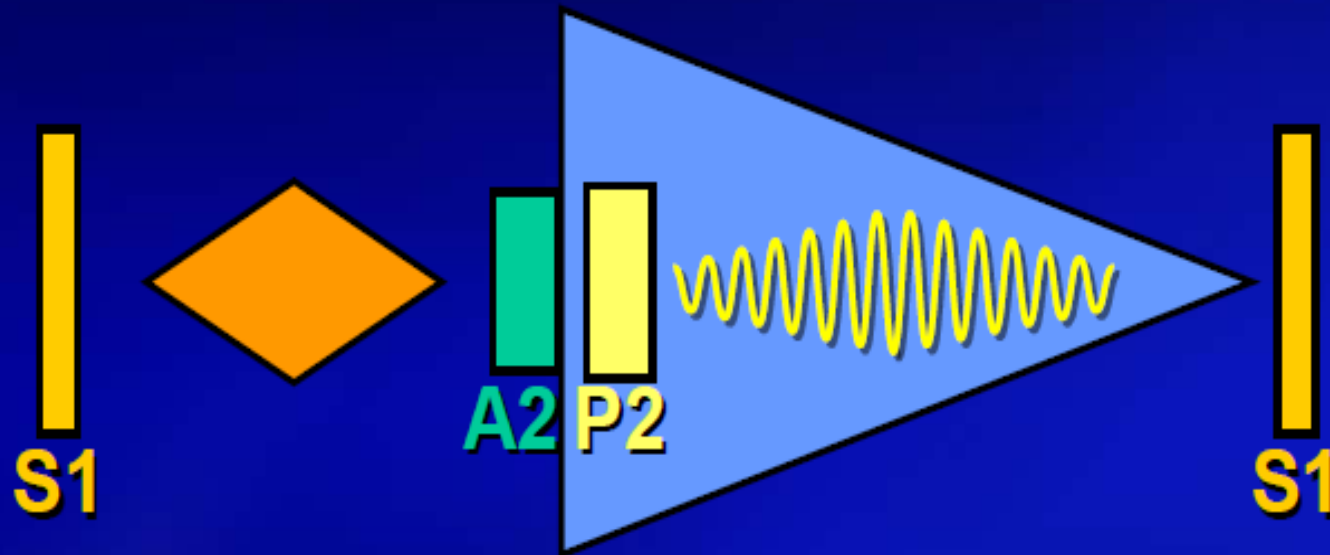
Acute

- May have few signs
- Murmur underwhelming
- Very faint, short, non-compliant LV

Chronic

- Bisferiens pulse
- Wide pulse pressure
Quinke, Duroziez', Pistol shot, Head bob
- Diffuse, hyperdynamic LV
- Diastolic murmur

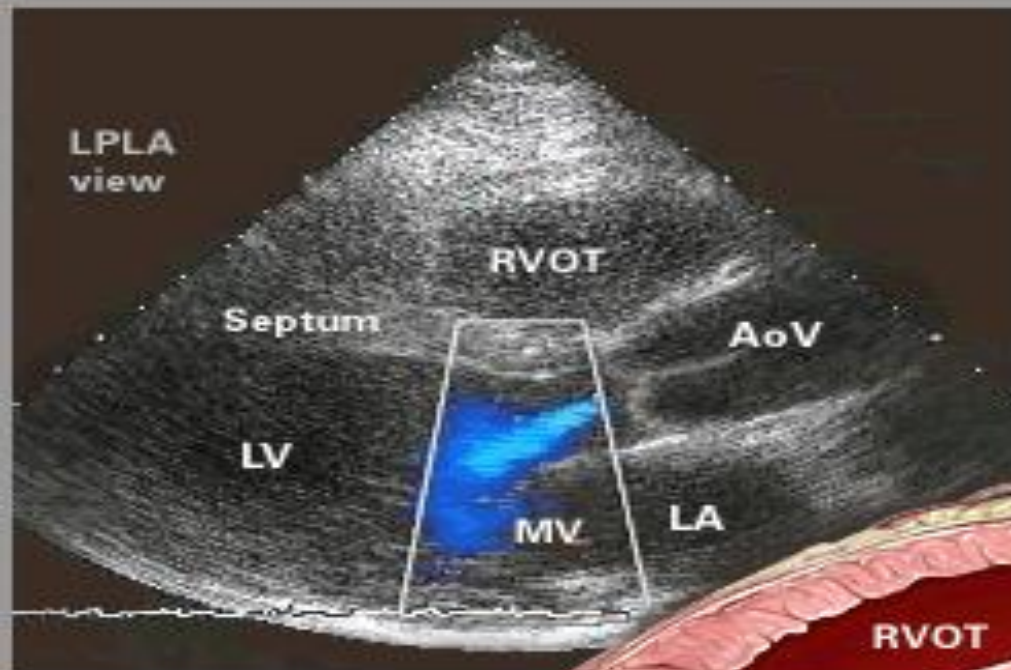
Aortic Regurgitation Murmur



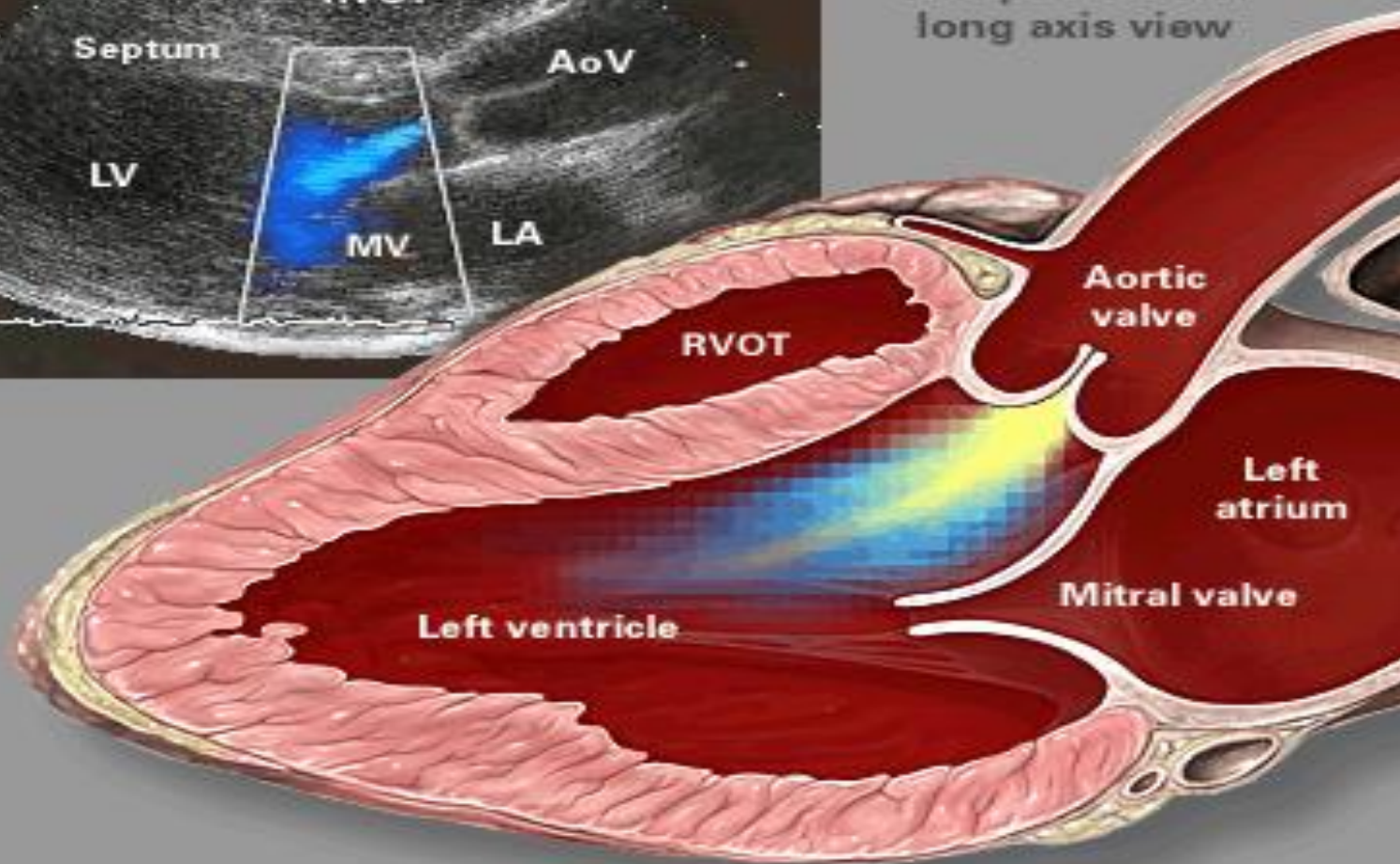
BP = ↑ PP

Austin flint murmur

Aortic regurgitation



Left parasternal long axis view






3V2c
3.5MHz
ECHO

T1/-1/ 0/V
1/2 80
CD Gain = 50

Store in prog
98
HR: 68bpm

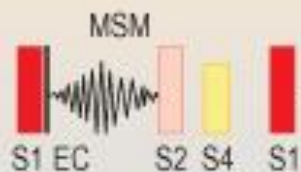
Acute aortic regurgitation

- Acute rheumatic fever
 - Infective endocarditis
 - Dissection of the aorta
 - Ruptured sinus of Valsalva aneurysm
 - Failure of prosthetic heart valve
- 

Chronic aortic regurgitation

- Rheumatic heart disease
- Syphilis Arthritides:
 - Reiter's syndrome
 - Ankylosing spondylitis
 - Rheumatoid arthritis
- Hypertension (severe)
- Bicuspid aortic valve
- Aortic endocarditis
- Marfan's syndrome
- Osteogenesis imperfecta

Aortic stenosis



Clinical memo

Aortic stenosis

Pulse:	Sinus rhythm, low volume, slow rising
Aortic area:	Systolic thrill
Apex:	Not displaced, sustained
Sounds:	Ejection click, soft A2, S4
Murmurs:	Systolic, low pitched, ejection, radiating to carotids

Aortic regurgitation



Clinical memo

Aortic regurgitation

Pulse:	Sinus rhythm, large volume, collapsing
Blood pressure:	Wide pulse pressure
Apex:	Displaced, diffuse, forceful
Murmurs:	(1) High pitched, early diastolic at LSE (2) Ejection systolic at base and into neck (high flow) (3) Mid-diastolic rumble at apex (Austin Flint) not shown

Murmurs heard best with patient leaning forwards and breath held in expiration

Treatment :

Aortic valve replacement

- Because symptoms do not develop until the myocardium fails and because the myocardium does not recover fully after surgery, operation is performed before significant symptoms occur.
- The timing of the operation is best determined according to haemodynamic, echocardiographic or angiographic criteria

PULMONIC Valve Diseases

- ***PULMONIC Valve stenosis***
 - ***PULMONIC Valve Rergurgitation***
- 

TRICUSPID Valve Diseases

- ***TRICUSPID Valve Regurgitation***
 - ***TRICUSPID Valve stenosis***
- 

Thank You 😊

Valvular Heart Diseases

Prof. Mohammed Arafah

