



VALVULAR HEART DISEASE
AORTIC VALVE DISEASE

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Aortic Valve

Aortic Stenosis

Aortic Regurgitation

Aortic Stenosis: Narrowing of aortic valve

Types of Aortic Stenosis

- **Valvular** (Most common)
- **Sub-valvular**: Fibrous ridge or diaphragm is situated immediately below aortic valve
- **Supravalvular**: congenital fibrous diaphragm above the aortic valve often associated with mental retardation and hypercalcemia (Williams syndrome)

Aortic Stenosis

Physiologic Principles-Natural History

Normal aortic valve area is 3.0 - 4.0 cm²

Circulation affected when valve area is reduced by ~ 75% (i.e. 0.75 - 1.0 cm²)

	<u>Valve area (cm sq)</u>	<u>Gradient (mm Hg)*</u>
Mild	> 1.5	< 50
Moderate	1.0 - 1.5	50 - 75
Severe	< 1	> 75

Onset of symptoms

0.9 cm² with CAD

0.7 cm² without CAD

* assumes normal cardiac output

Aortic Stenosis

PATHOPHYSIOLOGY:

Pressure over load---- LV hypertrophy -----
decrease LV compliance--- diastolic
dysfunction--- increase left atrial pressure—
AF + LV dilatation---Decrease cardiac
output

Aortic Stenosis – Etiology

Young patient :congenital

- Bicuspid
 - 2% population
 - 3:1 male:female distribution
 - Co-existing coarctation 6% of patients

Rarely

- Unicuspid valve
- Sub-aortic stenosis
 - Discrete
 - Diffuse (Tunnel)

Middle aged patient(4&5th decades) :

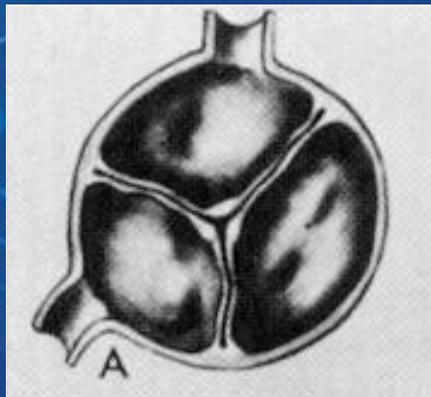
Bicuspid or
Rheumatic disease

Old patient: (6,7,8th decades)

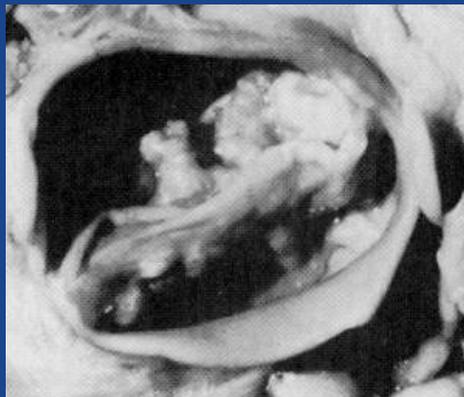
Degenerative

Aortic Stenosis: Etiology

Congenital bicuspid valve is the most common abnormality
Rheumatic heart disease and degeneration with calcification are found as well



Normal



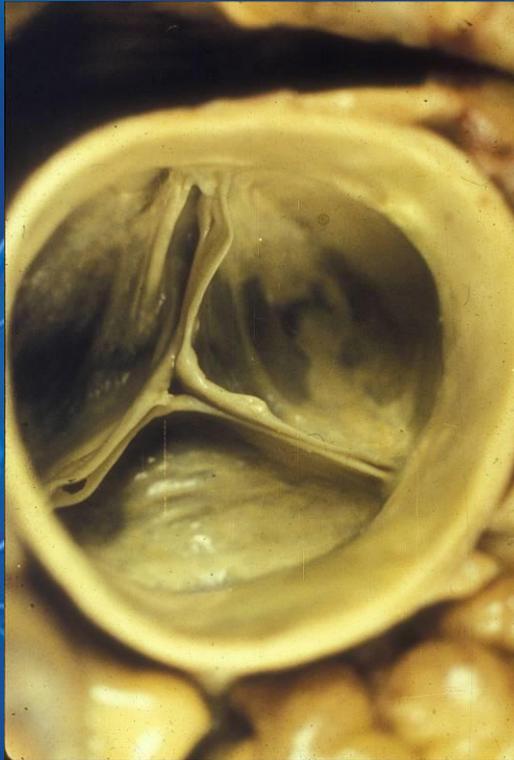
Bicuspid Ao V



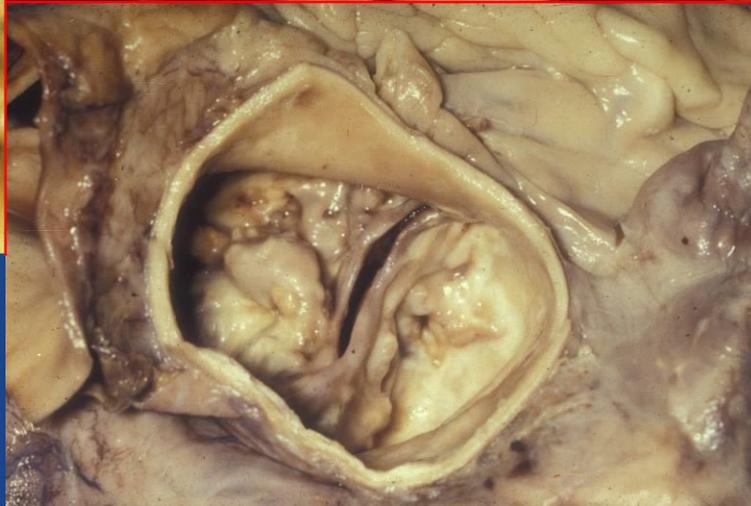
“Normal” geriatric
calcific valve

Aortic Stenosis: Pathology

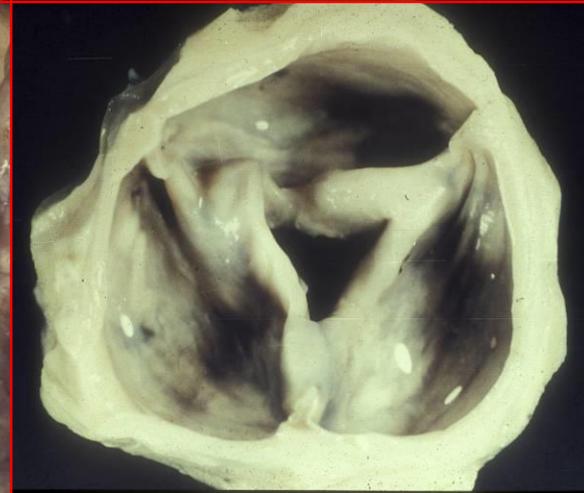
Normal



Congenital

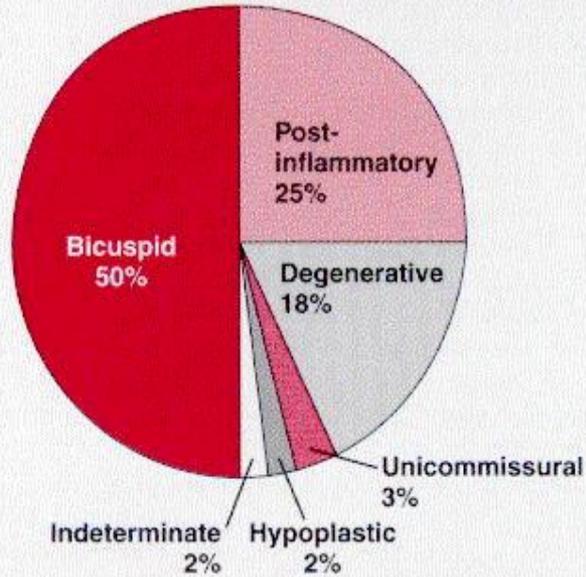


Acquired



AGE < 70

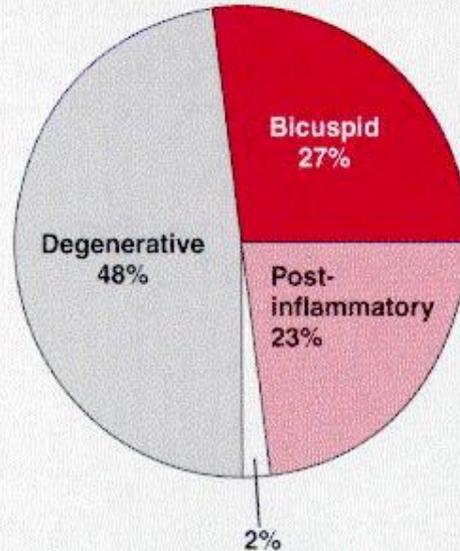
<70 YR OLD (n=324)



Aortic

Etiology of Stenosis
AGE > 70

≥70 YR OLD (n=322)



Natural History

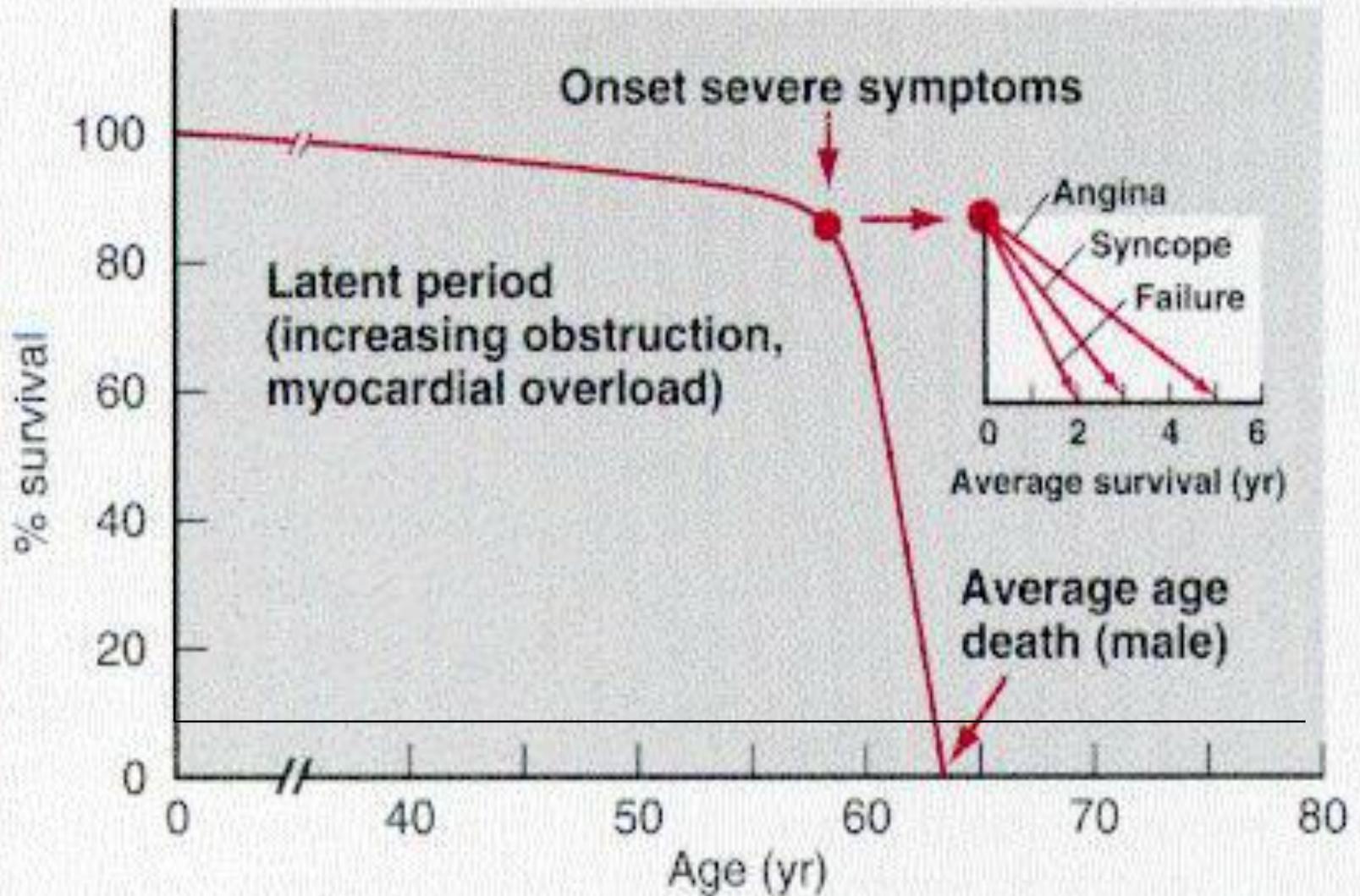
Asymptomatic

- For many years

SYMPTOMATIC:

Duration of symptoms until death

	presentation	survival
■ Angina -	35%,	3-5 years
■ Syncope -	15%	2 -3 years
■ CHF –	50%	1-2 years
■ Sudden death		



Ross J Jr, Braunwald E: Aortic stenosis. *Circulation* 38[Suppl V]:61, 1968

Aortic Stenosis

Vital Signs

- **Narrow pulse pressure**
- **Carotid pulse: slow rising, small volume, delay**

Carotid area: Systolic thrill

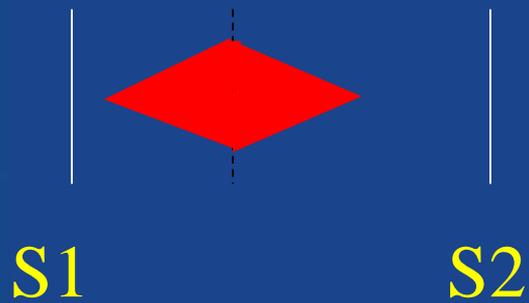
Apex beat

- **Normal or Displaced, Sustained**
- **Double impulse: sometimes**

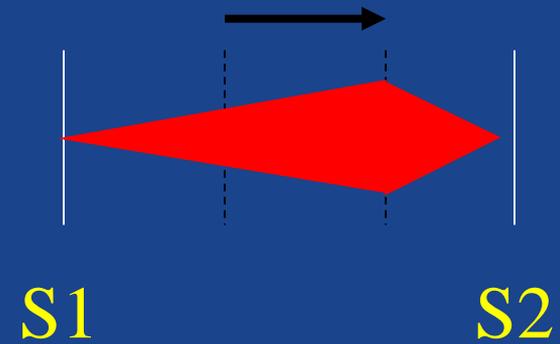
Ascultation

- **Soft A2, S4, reverse splitting of S2**
- **Murmur- Ejection Systolic, low pitch, radiated to carotid**

Aortic Stenosis: Physical Findings



Mild-Moderate



Severe



Aortic Stenosis

Management Guidelines

Initial Diagnostic Testing

- CXR, ECG,
- Echocardiography
- Lipids, renal function, Ca, P---
- Cardiac catheterization with angiography
 - If clinical and echo data are discordant
 - To assess coronary circulation prior to surgery

Aortic Stenosis-Investigation

EKG

- Hypertrophy, Left atrial enlargement.

CXR

- Cardiomegaly $<50\%$, post-stenotic dilatation, calcification of aortic valve

ECHO

- Confirm, Severity
- LVH, LV function

LHC

- Severity, Coronary Artery Disease

Doppler info



Aortic Stenosis

Management Guidelines

Avoid strenuous exercise

Avoid vasodilators (ACEI

Medical treatment for HF

Scheduled Follow-up

	<u>office interval</u>	<u>echo interval</u>
Mild AS	12 months	5 yrs
Moderate AS	6 months	2 yrs
Severe AS	6 months	1 yr

Aortic Stenosis

Management Guidelines

Recommendations for Aortic Valve Replacement (AVR)

Class I

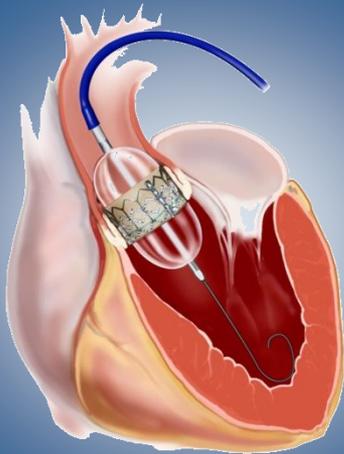
- Severe AS and symptoms
- Severe AS (with or without sx) and need for CABG, other valve replacement or aortic surgery

Class IIa

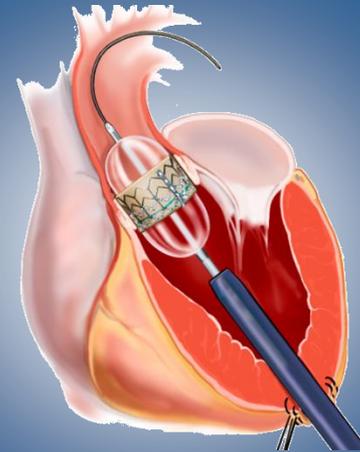
- Moderate AS and need for other cardiac surgery
- Asymptomatic severe AS and diminished LVEF or hypotensive response to exercise

TAVR

Transfemoral and Transapical



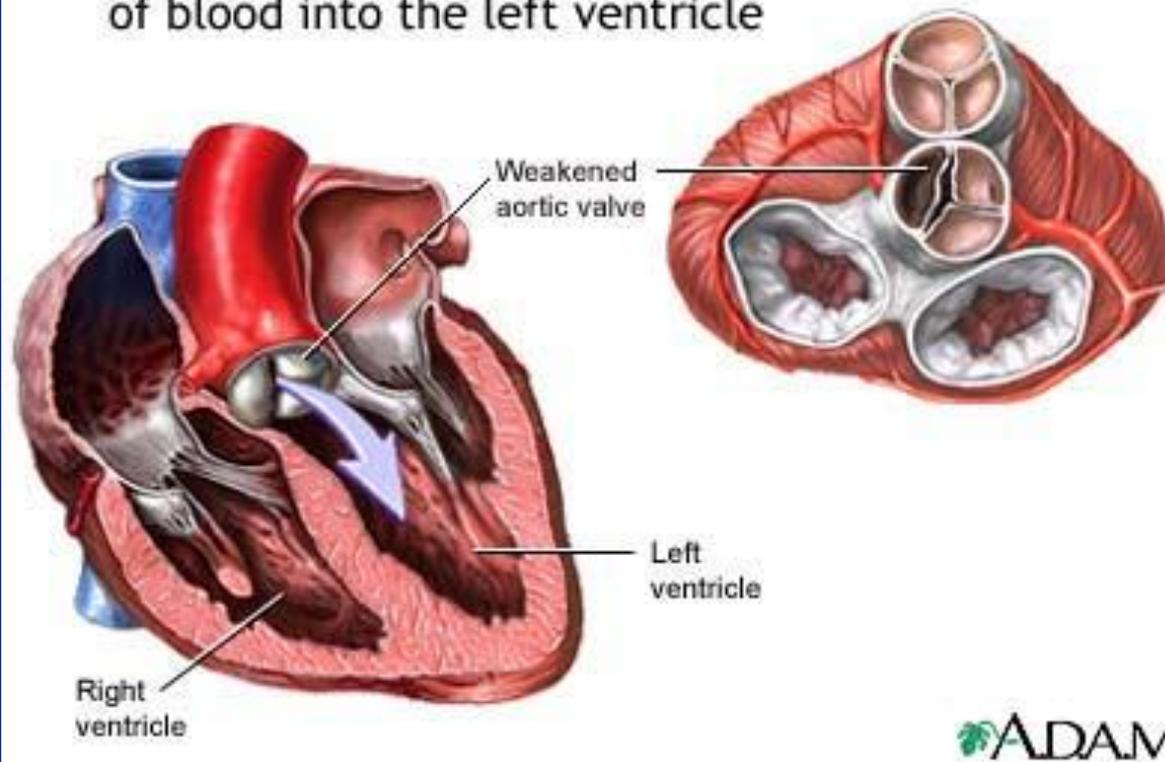
Transfemoral



Transapical

Aortic Insufficiency

Failure of the aortic valve to close tightly causes back flow of blood into the left ventricle



Etiology of Acute Aortic Insufficiency:

1- Infective Endocarditis

2-Aortic Dissection

3- Trauma

Etiology of Aortic Insufficiency:

1- Valvular disease

2- Aortic root disease

1-Valvular Disease

- **Rheumatic Heart Disease**
- **Infective Endocarditis**
- **Bicuspid valve**
- **Degenerative**
- **Trauma**
 - **Tear of the ascending aorta**

Etiology of Aortic Insufficiency

2-Aortic root disease Dilatation(1/3 of patients)

- Systemic Hypertension
- Marfan's syndrome
- Ankylosing spondylitis, Rheumatoid arthritis
- Aortic root dissection, aneurysm
- Behcets syndrome
- Reiter's syndrome
- Cystic medial necrosis
- Decelerating injury
- Syphilitic aortitis: very rare

Aortic Insufficiency

Symptoms

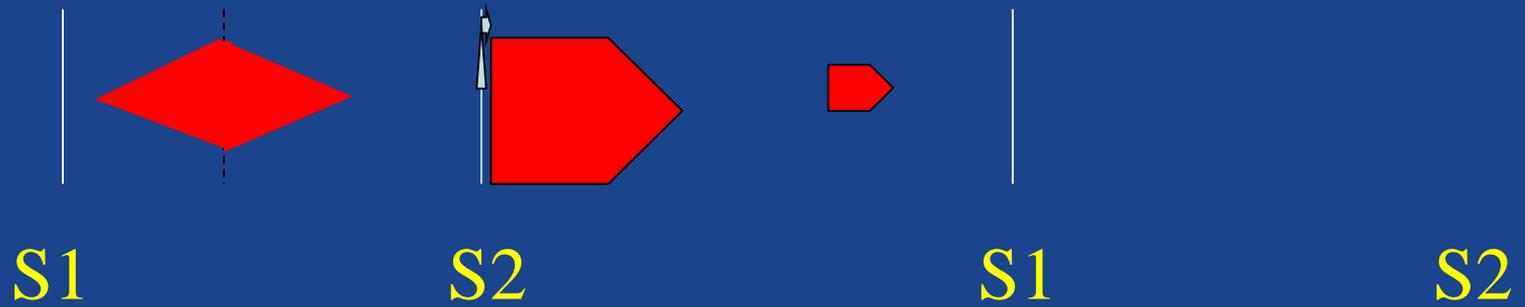
- Angina
- Palpitations
- CHF symptoms

Signs of Aortic Insufficiency

Pulses:

- Collapsing or water-hammer (Abrupt distension and quick collapse) : Corrigan's pulse
- Bisferiens pulse: **two systolic peaks**
- Traube's sign: **pistol shot over the femoral artery**
- Muller's sign: **pulsation of the uvula**
- Quincke's sign: **capillary pulsation in the nail beds**
- De Mussets Sign: **rhythmical nodding of the head synchronous with the heart beat**
- Duroziez sign: **a to-and fro murmurever femoral artery when pressure applied distaly**
- Pistol shot femoral: **a sharp bang heard over femoral artery**

Aortic Regurgitation: Auscultatory Findings



Chronic Aortic Regurgitation: Physical Findings

Widened Pulse Pressure > 70mmHg (170/60)

Low diastolic pressure <60mmHg

Hyperdynamic LV –

- DeMusset's signs
- Corrigan's pulse
- Quincke's pulsations,
- Durozier's murmur

Auscultation:

- Diminished A₂
- Descrescendo diastolic blowing murmur @ LSB
- Austin-Flint murmur – diastolic flow rumble @ apex
 - Due to interference with trans-mitral filling by impingement from aortic regurgitant jet.
 - DDx - mitral stenosis(increases intensity with amyl nitrite)

Complication of AR

Endocarditis

LV dilatation and irreversible contractile dysfunction

AI- Investigations

EKG

- LVH

CXR

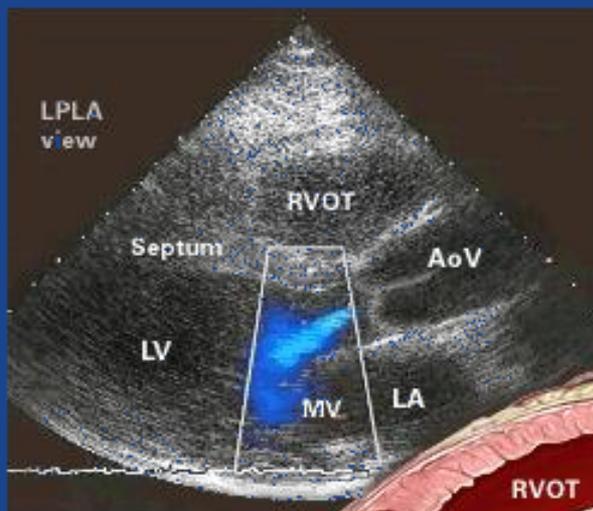
- Marked enlargement if AI is chronic

ECHO

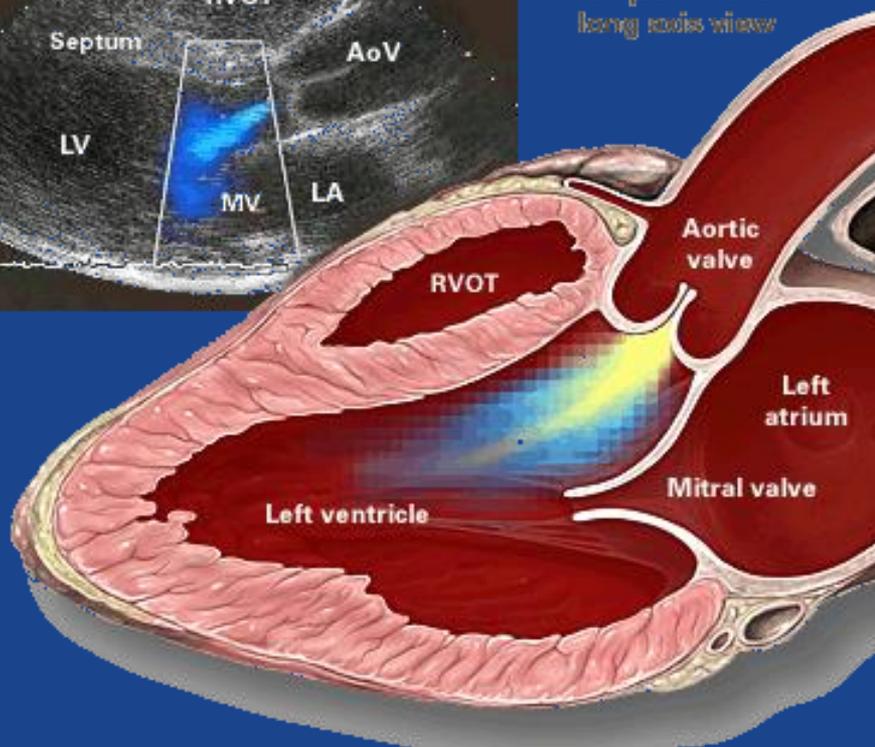
- **Confirms/severity**

LHC

- **Severity/CAD**



Left parasternal
long axis view



AI- Treatment

Follow clinically (q 6 mos)

- Asymptomatic with normal LV
- **SYMPTOMATIC**
- Digoxin: sever AR, LV dilatation
- Vasodilator, diuretics, digoxin : LV failure

Surgical Treatment:

AVR: for valvular causes of aortic incompetence

AVR + root replacement: for aortic root dilatation of AI

THANK YOU

