

Valvular heart disease

	Systolic murmurs (ASMR)		Diastolic murmurs (MSAR)	
	Aortic stenosis (AS)	Mitral regurg. (MR)	Mitral stenosis (MS)	Aortic regurg. (AR)
Causes	<p>1- Calcification and degeneration of a normal valve (elderly)</p> <p>2- Calcification and fibrosis of a congenitally bicuspid aortic valve</p> <p>3- Rheumatic valvular disease</p>	<p>1- Rheumatic heart disease</p> <p>2- MVP (prolapse)</p> <p>3- Endocarditis</p> <p>4- Ischemic heart disease</p> <p>5- Myocarditis</p> <p>6- Cardiomyopathies</p> <p>7- Myxomatus degeneration</p>	<p>1- Rheumatic Fever;</p> <p>2- Other less common causes:</p> <p>Congenital Mitral Stenosis, SLE, Rheumatoid Arthritis, Atrial Myxoma (tumor), Malignant Carcinoid, Bacterial Endocarditis</p>	<p>1- Rheumatic heart disease</p> <p>2- Aortic aneurysm \ Dissection.</p> <p>3- Inflammation</p> <p>4- Degeneration</p> <p>5- Severe Hypertension</p> <p>6- Bicuspid aortic valve</p> <p>7- Endocarditis</p> <p>8- Marfan's syndrome</p>
Pathophysiology	<p>1. Obstructed LV emptying (pressure overload)</p> <p>2. Left ventricular hypertrophy</p> <p>3. ↑LV diastolic pressure:</p> <ul style="list-style-type: none"> - ↑ LA pressure → pulmonary venous congestion - ↓ perfusion pressure. 	<p>1. increased LA pressure and decreased forward CO and Afterload.</p> <p>2. Volume overload occurs, increasing preload.</p>	<p>1. LA hypertension:</p> <ul style="list-style-type: none"> - Pulmonary interstitial edema. - Pulmonary hypertension - Leads to right heart failure / CHF - LA stretch & atrial fibrillation <p>2. Limited LV filling & cardiac output.</p>	<ul style="list-style-type: none"> - Stroke volume increased (high Systolic BP) - Regurgitant volume increased (Low Diastolic BP) → Pulmonary venous congestion
symptoms	<ul style="list-style-type: none"> - Angina (imbalance between supply & demand) - Syncope with exertion - Dyspnea - Congestive heart failure (CHF) 	<ul style="list-style-type: none"> - Fatigue & weakness - Dyspnea - Orthopnea, PND - Right sided HF (in the late stages of the disease) & eventually may lead to CHF. 	<ul style="list-style-type: none"> - Malar flush - Dyspnea on exertion - Fatigue - Orthopnea, PND, - Palpitation, Chest pain, Peripheral edema. - Hoarseness - Systemic embolism - Hemoptysis (10%) 	<ul style="list-style-type: none"> - Dyspnea on exertion (most common complaint) - Fatigue. - Diminished exercise tolerance. - Angina (Imbalance between myocardial supply & demand)
Signs	<ul style="list-style-type: none"> - Pulsus Parvus et Tardus - Systolic thrill - Narrow pulse pressure 	<ul style="list-style-type: none"> - Systolic thrill. 	<ul style="list-style-type: none"> - Sternal lift/ heave (due to RV enlargement) - Diastolic thrill 	<ul style="list-style-type: none"> - Bounding Pulses ¹ (widened pulse pressure) - Water hammer pulse (collapsing pulse)

¹**Eponymous signs:** Austin Flint murmur, Corrigan's sign (jerky carotid pulse), de Musset's sign (a rhythmic nodding or bobbing of the head in synchrony with the beating of the heart), Durosier's sign (an audible diastolic murmur which can be heard over the femoral artery), Quincke's sign (Alternating flashing and blanching of nail bed), Traube's phenomenon (A double sound – "pistol shot" – heard over the femoral artery in aortic insufficiency or mitral stenosis), Muller sign (uvula pulsating), Hill's sign (popliteal systolic blood pressure exceeding brachial systolic blood pressure by 60 mmHg or greater).

Apex beat (Apical impulse)	Sustained (not displaced) Bifid LV impulse (from LVH).	Laterally displaced , forceful, diffuse apex beat	Tapping apex beat (S1)	Hyperdynamic LV apical impulse (displaced , forceful, diffuse)
Heart sounds	Prominent S4 gallop (from LVH) Paradoxical splitting of S2 Single S2 : Soft or absent A2 (if severe)	Soft S1 S3 Gallop Split S2 (but is obscured by the murmur)	Loud S1 (won't occur if the valve is calcified). Loud S2 – due to pulmonary HTN (if present)	S4, S3 Gallop (advanced AI).
Murmur	Harsh Systolic Ejection Murmur – late peaking (diamond-shaped, Crescendo-decrescendo), radiates to carotids .	Holosystolic (pansystolic) apical murmur radiating to the axilla	Opening snap Low-pitched mid-diastolic rumble and presystolic accentuation.	Diastolic decrescendo murmur
CXR	<ul style="list-style-type: none"> - Normal heart size (until cardiac muscle decompensates) - Enlarged ascending aorta - Normal pulmonary vasculature 	<ul style="list-style-type: none"> - acute MR: Pulmonary edema, Heart is not enlarged - chronic MR: LA and LV are markedly enlarged, Pulmonary vasculature is usually normal 	<ul style="list-style-type: none"> - Straightening of the left heart border - Double density - Kerley B lines - Calcification in MV 	<ul style="list-style-type: none"> - Left ventricular enlargement - Enlargement of entire aorta
ECG	LA enlargement LVH	LA enlargement LVH	Atrial fibrillation (AFib) RA enlargement & RVH LA Enlargement (bifid P wave) RV dominance	LA enlargement LVH
Echo	(Echo 2D/color doppler) is the test of choice			
Maneuvers	<ul style="list-style-type: none"> - Right sided heart murmurs increase with inspiration. Left sided increase with expiration - Increasing the preload (squatting & leg raising) increases the intensity of these murmurs. - Decreasing the preload (Valsalva and standing) decreases the intensity of these murmurs. 			
Treatment	<ol style="list-style-type: none"> Medical therapy: treat the symptoms not the cause. Surgical therapy: Aortic valve replacement is the only truly effective therapy for AS (Bioprosthetic vs Mechanical AVR). 	<ol style="list-style-type: none"> Medical therapy: Diuretics, Vasodilators (ACE inhibitors) & SBE prophylaxis. Surgical therapy: MV repair. MV replacement. 	<ol style="list-style-type: none"> Medical therapy: Diuretics (for congestion) Digoxin, Beta-blockers & CCB, Anticoagulation (for AFib) SBE prophylaxis Surgical therapy: Percutaneous Ballon Valvuloplasty (for Non-calcified, pliable valve). Open Commisurotomy (repair) Mitral Valve Replacement 	<ol style="list-style-type: none"> Medical Therapy Serial Checkups with Echos (evaluating EF and Severity of AR) SBE Prophylaxis Vasodialators (Nifedipine, ACE-I) Diuretics Surgical therapy: Aortic Valve Replacement (Bioprosthetic vs Mechanical AVR)

Sources: **435 Medicine team** ([RHD](#), [VHD](#)), [Radiology](#), [Maneuvers](#) , Here is a nice graph [*please take a look*](#)