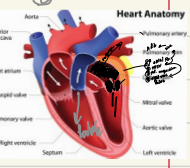
(↓ end-diastolic LV volume) → decreased stroke volume → decreased cardiac output (forward heart failure)

Mitral valve stenosis → increase in left atrial pressure → backup of blood into lungs → increased pulmonary capillary pressure → cardiogenic pulmonary edema

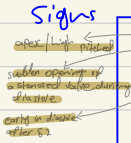


Mitral Stenosis: - late diastolic murmur (2)

- rheumatic heart di (1)
- Pathogenesis: immune mediated damage to mitral valve (due to ① ric f ② by cross-reactivity b. the streptococcal antigen and the valve tissue leading to scarring of narrowing of mitral valve ie.
- Mitral stenosis results in elevated left atrial and pulmonary venous pressure leading to pulmonary congestion.
- Anything that increases flow across the mitral valve(exercise,tachycardia,and so on) exacerbates the pulmonary venous HTN and associated symptoms.
- Long-standing mitral stenosis can result in pulmonary HTN and ultimately can result in right ventricular failure (RVF).
- Long-standing mitral stenosis can als olead to AFib due to increased left atrial pressure and size. (5)
- Patients are usually asymptomatic until the mitral valve area is reduced to approximately 1.5 cm2 (normal valve area is 4 to 5 cm2).

Sympt. → 1 Exertion of dyspnea, orthopnea, PND
2 palpitation 4 hemoptysis → ruptures anastomosis small bronchial v.
3 chest pain 5 thromboembolism → A. fib
6 If RV failure occure, ascites and edema may develop

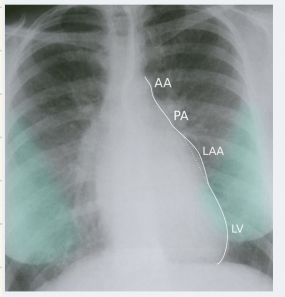
Signs → mitral stenosis murmur (3)



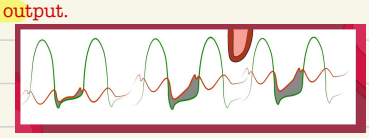
The **opening snap** is followed by a low-pitched diastolic rumble and presystolic accentuation. This murmur increases in length as the disease worsens.
Heard best with bell of stethoscope in left lateral decubitus position.

- S2 is followed by an opening snap. The distance between S2 and the opening snap can give an indication as to the severity of the stenosis. The closer the opening snap follows S2, the worse is the stenosis.
- Murmur is followed by a loud S1. A loud S1 may be the most prominent physical finding.
- With long-standing disease, will find signs of RVF (e.g.,right ventricular heave, JVD, hepatomegaly, ascites) and/or pulmonary HTN (loud P2). (4)
- All signs and symptoms will increase with exercise and during pregnancy

Dx: CXR → left atrial enlargement (early) (6)
echo → ; ; ;
- thick, calcified mitral valve
- narrow shaped orifice
- signs of RVF if advanced disease



a. Diuretics—for pulmonary congestion and edema.
b. β-Blockers—to decrease heartrate(increase diastolic time to improve LV filling and LA emptying) and cardiac output.



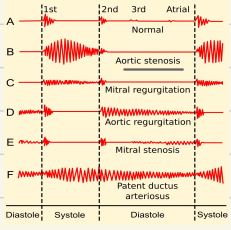
Mitral Regurgitation: - Parasystolic murmur (1)

- abrupt elevation of left atrial Pr. in the setting of nL LA size and compliance causing backflow into pulmonary circulation with resultant pul. edemea.
- ↓ CO → hypotension and shock may occur

Causes (2)

Acute:
- endocarditis → staph aureus (m/c)
- rupture → chordae tendinae; papillary ms → dysfunction, infarction

Chronic:
- Gradual elevation of left atrial pressure in the setting of dilated LA and LV (with increased left atrial compliance)
- LV dysfunction occurs due to dilation
- Pulmonary HTN can result from chronic backflow into pulmonary vasculature
- marfan syn
- mitral valve prolapse
- Rheumatic Fever
- cardiomyopathy causing dilation of mitral annulus



Prognosis
a. Acute form is associated with much higher mortality
b. Survival is related to extent of LV cavity dilation

Sympt (3)
1 dyspnea on exertion 2 Palpitation 3 Pul. edema 8 Afib

Sign (4)
1 Holosystolic murmur at apex
2 S1 → Diminished
3 S2 → widening
4 lat. displaced PMI
5 S3 gallop
6 Palpable P2
7 radiation to back or laterally depen on which leaflet is involved

5

Diagnosis
1. CXR findings:Cardiomegaly, dilated LV, pulmonary edema.
2. Echocardiogram: MR; dilated LA and LV; decreased LV function. Should be performed serially in patients with known MR.

Treatment
1. Medical
a. Afterload reduction with vasodilators is recommended for symptomatic patients only; they are not recommended in most asymptomatic patients as they may mask progression of the disease
b. Chronic anticoagulation if patient has AFib
c. IABP can be used as a bridge to surgery for acute MR(decreases afterloadand favors normal flow, not regurgitant flow)

Mitral valve prolapse :-

MVP is defined as the presence of excessive or redundant mitral leaflet tissue due to myxomatous degeneration (deposition of glycosaminoglycan such as dermatan sulfate) of mitral valve leaflets and/or chordae tendineae.
The redundant leaflet(s) prolapse toward the LA in systole, which results in the auscultated click and murmur.

MVP is common in patients with genetic connective tissue disorders,such as Marfan syndrome, osteogenesis imperfecta, and Ehlers–Danlos syndrome.
MVP is a common cause of MR in developed countries.
Arrhythmias and sudden death are very rare.

Symp.

Most patients are asymptomatic for their entire lives.
Palpitations and atypical chest pain may occur.
TIAs due to emboli from mitral valve have been reported, but are very rare.

Sign

Midsystolic or late systolic click(s).
b. Mid-to-late systolic murmur.
c. Some patients have mid systolic click without the murmur;others may have the murmur without the click.
d. Standing and the Valsalva maneuver increase murmur and click because these maneuvers reduce LV chamber size, allowing the click and murmur to occur earlier in systole.
e. Squatting decreases murmur and click because it increases LV chamber size, thus delaying the onset of the click and murmur.

Key Signs of MVP
Systolic clicks
Midsystolic rumbling murmur that increases with standing and the Valsalva maneuver and decreases with squatting

Diagnosis
1. Echocardiogram is the most useful.
2. Most patients are asymptomatic, so diagnosisis typically made on the basis of the murmur and echocardiogram alone.

Auscultation in valvular defects			
	Maximum point	Murmur	Characteristics
Aortic stenosis	• Aortic valve (parasternal 2nd right intercostal space) • Erb point	• Harsh crescendo-decrescendo systolic ejection murmur	• Radiation to the carotids • Soft S_2 • Possibly ejection click
Aortic regurgitation	• Aortic valve (parasternal 2nd right ICS) • Erb point	• Diastolic murmur with a decrescendo • Possible additional quiet systolic murmur	• Immediately following the 2nd heart sound ("immediate diastolic murmur") • Austin Flint Murmur
Mitral stenosis	• Heart apex (midclavicular 5th left ICS)	• Delayed diastolic murmur with a decrescendo	• "Tympanic" 1st heart sound • Mitral opening murmur/opening snap (OS)
Mitral valve prolapse	• Heart apex (midclavicular 5th left ICS)	• Late-systolic crescendo	• Midsystolic high-frequency click (due to the tensing of the chordae tendinae) • Loudest before S_2
Mitral regurgitation	• Heart apex (midclavicular 5th left ICS) • Left axilla	• Holosystolic murmur • 3rd heart sound audible • Quiet 1st heart sound	• Blowing • Radiation into the axilla
Pulmonary stenosis	• Pulmonary valve (parasternal 2nd left ICS)	• Crescendo-decrescendo ejection systolic murmur	• Possible radiation into the back • Possible early systolic pulmonary ejection click and/or widely split 2nd heart sound
Pulmonary regurgitation	• Pulmonary valve (parasternal 2nd left ICS)	• Diastolic murmur with a decrescendo	• Graham Steell murmur: high-frequency decrescendo diastolic murmur
Tricuspid stenosis (extremely rare)	• Tricuspid valve (parasternal 4th left ICS)	• Delayed diastolic murmur with a decrescendo • Possible pre-systolic crescendo	
Tricuspid regurgitation (extremely rare)	• Tricuspid valve (parasternal 4th left ICS)	• Holosystolic murmur	• Augmentation of the murmur's intensity with inspiration (Carvallo sign)

Etiology of valvular heart conditions [2][3]			
		Valve stenosis	Valve regurgitation
Left heart	Mitral valve	• Rheumatic fever • Rheumatic diseases (e.g., SLE, RA)	• Mitral valve prolapse • Dilated cardiomyopathy • Ischemic heart disease (e.g., following myocardial infarction) • Degenerative calcification • Rheumatic fever • Infective endocarditis

	Aortic valve	• Degenerative calcification (most common)
		• Rheumatic endocarditis
		• Congenital (e.g., unicuspid, bicuspid, or hypoplastic valve)
			• Acute: infective endocarditis, aortic dissection type A, chest trauma
			• Chronic
			  ◦ Bicuspid aortic valve
			  ◦ Connective tissue diseases (e.g., Marfan syndrome, Ehlers-Danlos syndrome)
			  ◦ Rheumatic fever
			  ◦ Rheumatic diseases (e.g., Behcet disease, RA, SLE)

Right heart	Tricuspid valve	• Rheumatic fever • Infective endocarditis (mostly IV drug abuse)	• Right ventricular dilation (e.g., in right-sided heart failure) • Infective endocarditis (IV drug use) • Rheumatic fever • Connective tissue diseases (e.g., Marfan syndrome) • Carcinoid syndrome • Pulmonary hypertension (cor pulmonale; secondary to mitral stenosis) • Left-sided heart failure
	Pulmonary valve	• Congenital • Carcinoid syndrome	• Pulmonary hypertension (e.g., tetralogy of Fallot, ventricular septal defects) • Dilated cardiomyopathy