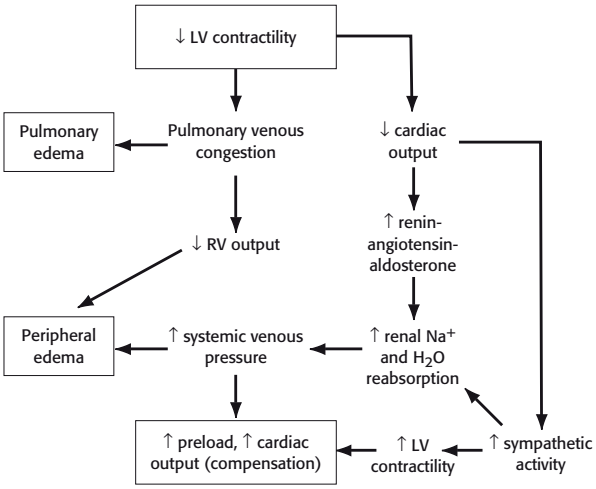
CHF

Abnormality	Cause
Dyspnea on exertion	Failure of LV output to ↑ during exercise.
Cardiac dilation	Greater ventricular end-diastolic volume.
Pulmonary edema, paroxysmal nocturnal dyspnea	LV failure → ↑ pulmonary venous pressure → pulmonary venous distention and transudation of fluid. Presence of hemosiderin-laden macrophages ("heart failure" cells) in the lungs.
Orthopnea (shortness of breath when supine)	↑ venous return in supine position exacerbates pulmonary vascular congestion.
Hepatomegaly (nutmeg liver)	↑ central venous pressure → ↑ resistance to portal flow. Rarely, leads to "cardiac cirrhosis."
Ankle, sacral edema	RV failure → ↑ venous pressure → fluid transudation.
Jugular venous distention	Right heart failure → ↑ venous pressure.



Right heart failure most often results from left heart failure. Isolated right heart failure is usually due to cor pulmonale.

Embolus types	**F**at, **A**ir, **T**hrombus, **B**acteria, **A**mniotic fluid, **T**umor. Fat emboli are associated with long bone fractures and liposuction. Amniotic fluid emboli can lead to DIC, especially postpartum. Pulmonary embolus—chest pain, tachypnea, dyspnea.	An embolus moves like a **FAT BAT.** Approximately 95% of pulmonary emboli arise from deep leg veins.
Deep venous thrombosis	Predisposed by Virchow's triad: 1. Stasis 2. Hypercoagulability 3. Endothelial damage	Can lead to pulmonary embolism.

Bacterial endocarditis

Fever, Roth's spots (round white spots on retina surrounded by hemorrhage), Osler's nodes (tender raised lesions on finger or toe pads), new **murmur, Janeway lesions** (small erythematous lesions on palm or sole), anemia, **splinter hemorrhages** on nail bed. Valvular damage may cause new murmur. Multiple blood cultures necessary for diagnosis (see Color Image 82).

1. Acute—*S. aureus* (high virulence). Large vegetations on previously normal valves. Rapid onset.
2. Subacute—viridans streptococcus (low virulence). Smaller vegetations on congenitally abnormal or diseased valves. Sequela of dental procedures. More insidious onset.

Endocarditis may also be nonbacterial 2° to malignancy or hypercoagulable state (marantic/thrombotic endocarditis).

Mitral valve is most frequently involved. **Tri**cuspid valve endocarditis is associated with IV **drug** abuse (don't **tri drugs**).

Complications: chordae rupture, glomerulonephritis, suppurative pericarditis, emboli.

Bacteria **FROM JANE:**
Fever
Roth's spots
Osler's nodes
Murmur
Janeway lesions
Anemia
Nail-bed hemorrhage
Emboli

Libman-Sacks endocarditis

Verrucous vegetations occur on both sides of the valve (can be associated with mitral regurgitation and, less commonly, mitral stenosis). Seen in lupus.

SLE causes **LSE.**

Rheumatic heart disease

Rheumatic fever is a consequence of pharyngeal infection with group A β-hemolytic streptococci. Early deaths due to myocarditis. Late sequelae include rheumatic heart disease, which affects heart valves—mitral > aortic >> tricuspid (high-pressure valves affected most). Associated with Aschoff bodies (granuloma with giant cells), Anitschkow's cells (activated histiocytes), migratory polyarthritis, erythema marginatum, elevated ASO titers.

Immune mediated (type II hypersensitivity); not direct effect of bacteria (see Color Image 85).

FEVERSS:
Fever
Erythema marginatum
Valvular damage (vegetation and fibrosis)
ESR ↑
Red-hot joints (polyarthritis)
Subcutaneous nodules (Aschoff bodies)
St. Vitus' dance (chorea)

Cardiac tamponade

Compression of heart by fluid (e.g., blood, effusions) in pericardium, leading to ↓ CO.

Equilibration of diastolic pressures in all 4 chambers.

Findings: hypotension, ↑ venous pressure (JVD), distant heart sounds, ↑ HR, pulsus paradoxus; ECG shows electrical alternans (beat-to-beat alternations of QRS complex height).

Pulsus paradoxus (Kussmaul's pulse)—↓ in amplitude of pulse during inspiration. Seen in severe cardiac tamponade, asthma, obstructive sleep apnea, pericarditis, and croup.

Pericarditis		
Serous	Caused by SLE, rheumatoid arthritis, viral infection, uremia.	
Fibrinous	Uremia, MI (Dressler's syndrome), rheumatic fever.	
Hemorrhagic	TB, malignancy (e.g., melanoma).	
	Findings: pericardial pain, friction rub, pulsus paradoxus, distant heart sounds. Findings include ECG changes with diffuse ST-segment elevation.	
	Can resolve without scarring or lead to chronic adhesive or chronic constrictive pericarditis.	
Syphilitic heart disease	3° syphilis disrupts the vasa vasorum of the aorta with consequent dilation of the aorta and valve ring.	Can result in aneurysm of the ascending aorta or aortic arch and aortic valve incompetence.
	May see calcification of the aortic root and ascending aortic arch. Leads to "tree bark" appearance of the aorta.	
Cardiac tumors	Myxomas are the most common 1° cardiac tumor in adults (see Color Image 88). 90% occur in the atria (mostly LA). Myxomas are usually described as a "ball-valve" obstruction in the LA (associated with multiple syncopal episodes). Rhabdomyomas are the most frequent 1° cardiac tumor in children (associated with tuberous sclerosis).	
	Metastases most common heart tumor (melanoma, lymphoma).	
	Kussmaul's sign: ↑ in jugular venous pressure on inspiration.	
Telangiectasia	Arteriovenous malformation in small vessels. Looks like dilated capillary.	Affects small vessels.
	Hereditary hemorrhagic telangiectasia (Osler-Weber-Rendu syndrome)—autosomal-dominant inheritance. Presents with nosebleeds and skin discolorations.	
Raynaud's disease	↓ blood flow to the skin due to arteriolar vasospasm in response to cold temperature or emotional stress. Most often in the fingers and toes (see Color Image 106). Called Raynaud's phenomenon when 2° to a mixed connective tissue disease, SLE, or CREST syndrome.	Affects small vessels.
Wegener's granulomatosis	Characterized by triad of focal necrotizing vasculitis, necrotizing granulomas in the **lung and upper airway,** and necrotizing glomerulonephritis.	Affects small vessels.
Symptoms	Perforation of nasal septum, chronic sinusitis, otitis media, mastoiditis, cough, dyspnea, hemoptysis, hematuria.	
Findings	**c-ANCA** is a strong marker of disease; chest x-ray may reveal large nodular densities; hematuria and red cell casts.	
Treatment	Cyclophosphamide and corticosteroids.	