

Aortic Stenosis

A plain-English guide for you and your family

WHAT IS HAPPENING

The aortic valve sits between the heart's main pumping chamber (left ventricle) and the big artery that feeds your body (aorta). Normally, the valve opens wide during each heartbeat to let blood out, then snaps shut to keep blood from flowing backward. When aortic narrowing (stenosis) develops, the valve leaflets (flaps) thicken and stiffen—most often from calcium buildup in older adults (like rust that makes a hinge stiff), from a valve born with two leaflets instead of three (bicuspid aortic valve, which tends to fail younger), or from old rheumatic fever scarring. As the opening shrinks, the left ventricle has to squeeze harder and harder, so its muscle walls thicken (like a weightlifter's bicep). A thick, stiff ventricle cannot relax well, which means it fills poorly between beats, squeezes the tiny blood vessels that feed the heart muscle, and cannot pump more when you exercise. That explains why people with severe aortic narrowing feel chest pain (the heart muscle is starving for blood), faint during exercise (the heart cannot pump enough blood to the brain), or become short of breath (pressure backs up into the lungs). Once any of those three symptoms appear, the clock starts: without valve replacement, half of patients die within two to three years. The body compensates for a long time—your pulse and blood pressure can look fine even when the valve is critically tight—but once the muscle gives out, decline is rapid.

What you might feel

- Shortness of breath with activity (exertional trouble breathing (dyspnea))
- Chest pressure or pain during activity (angina)
- Fainting or feeling dizzy during exercise (exertional fainting (syncope))
- Tiring easily and stopping activity sooner than before
- Trouble breathing when lying flat or waking up gasping at night
- Harsh heart murmur that gets louder then softer, heard at the upper right chest
- Weak, slow pulse in the neck (pulsus parvus et tardus)
- Sudden death without warning

Call the doctor right away if...

- Fainting or near-fainting during exercise (the heart cannot supply enough blood; sudden death risk is very high)
- New or worse shortness of breath, leg swelling, or trouble lying flat in someone with known aortic narrowing (stenosis) (the heart is failing and the valve must be replaced urgently)
- Chest pain at rest or with only light activity (the heart muscle is starving for oxygen and can die)
- Fast, irregular heartbeat (atrial fibrillation) in a patient with aortic narrowing (stenosis) (losing the normal atrial squeeze can crash blood pressure and cause shock)
- Low blood pressure or shock after taking water pills or blood-pressure medicines (the heart depends on high filling pressure; sudden loss of fluid can stop the pump)

What the care team will do

- Monitor blood pressure and heart rate every 4 hours or more often if symptomatic, and call the provider immediately if systolic blood pressure drops below 90 mmHg or patient becomes dizzy or confused
- Keep the patient on continuous telemetry (heart monitor) and watch for atrial fibrillation (an irregular, quivering heartbeat), ventricular arrhythmias, or heart block, alerting the provider immediately if any appear
- Position the patient upright at 45 to 90 degrees if they have shortness of breath or crackles in the lungs, and give prescribed diuretics like furosemide on time to remove excess lung fluid
- Give intravenous fluids slowly and monitor lung sounds before and after each fluid bolus, stopping immediately and notifying the provider if crackles appear or worsen
- Hold or question any order for ACE inhibitors (lisinopril, enalapril), ARBs (losartan, valsartan), nitrates (nitroglycerin), or other vasodilators, and clarify with the provider before giving
- Teach the patient to stop activity immediately and sit or lie down if they feel chest pain, dizziness, or shortness of breath, and use the call light rather than walking to the bathroom alone
- Administer preventive (prophylactic) antibiotics exactly as ordered (amoxicillin 2 grams by mouth or ampicillin 2 grams IV) 30 to 60 minutes before any dental procedure or invasive procedure involving mucous membranes

- Assess and document the classic triad of symptoms daily—exertional trouble breathing (dyspnea) (shortness of breath with activity), angina (chest pain with activity), and fainting (syncope) (fainting with activity)—and report any new or worsening symptoms to the provider immediately

Medicines you may be given — and why

Valve replacement (SAVR or TAVR)

Aortic narrowing (stenosis) means the aortic valve—the door between the heart's main pumping chamber and the body—is too stiff and narrow. The heart has to squeeze extra hard to push blood through that tiny opening, like trying to blow up a balloon through a coffee stirrer. Over time the heart muscle gets thick and tired. No pill can widen a calcified (rock-hard) valve. The only fix is to replace the valve. SAVR (surgical aortic valve replacement) means open-heart surgery: the surgeon cuts through the breastbone, stops the heart, cuts out the old valve, and sews in a new one (either a mechanical metal valve or a tissue valve from a cow or pig). TAVR (transcatheter aortic valve replacement) is a newer way: the doctor threads a collapsed new valve up a blood vessel (usually through a small cut in the groin), parks it inside the old valve, and pops it open—no big incision, heart keeps beating. Both methods give the blood a wide-open door again, so the heart can relax and pump normally.

Diuretics (e.g. furosemide)

If the heart is so stiff and weak from aortic narrowing (stenosis) that fluid backs up into the lungs (causing shortness of breath, coughing up pink foam, swelling in the legs), a diuretic—a 'water pill'—can buy time by telling the kidneys to dump extra salt and water into the urine. Think of it as opening a drain valve: less fluid in the tank means less pressure in the lungs and less work for the struggling heart. BUT diuretics do NOT open the narrow valve; they only treat the symptom (fluid overload), not the cause. Use them gently and only as a bridge to valve replacement, because taking away too much fluid can drop the blood pressure so low that the brain and kidneys don't get enough blood.

Beta-blockers (e.g. metoprolol)

Beta-blockers are heart-slowng drugs. Adrenaline and stress hormones normally land on 'beta receptors' on heart cells and say 'beat faster, squeeze harder.' A beta-blocker sits on those receptors like a cork in a bottle, blocking the adrenaline signal. The heart rate drops. In aortic narrowing (stenosis), a very fast heart rate is bad because the heart has less time to fill with blood between beats, and filling time (diastole) is critical for the stiff, thick left ventricle. If a patient has chest pain (angina) because the thickened muscle needs extra oxygen and the heart is racing, slowing it down with a beta-blocker can ease the pain by giving the heart more rest time. BUT use beta-blockers very cautiously and at low doses—the diseased heart already

struggles to pump through the narrow valve, and beta-blockers also weaken the squeeze (negative inotropy), which can tip a borderline heart into failure.

Statins (e.g. atorvastatin)

Statins lower cholesterol by blocking the liver's cholesterol factory. For years doctors hoped statins might also slow the calcium buildup on aortic valves (since calcific AS looks a bit like atherosclerosis—plaque in arteries). Multiple large trials (SALTIRE, SEAS, ASTRONOMER) tested this idea and found statins do NOT stop or slow aortic narrowing (stenosis) progression. However, many AS patients are older and have coronary artery disease (clogged heart arteries) at the same time. Statins DO prevent heart attacks by shrinking cholesterol plaques in those arteries. So give a statin if the patient has high cholesterol or known coronary disease, but do NOT give it to treat the valve itself—only to protect the arteries around the heart.

Where this information comes from

- ACC/AHA 2020 Guideline for the Management of Patients With Valvular Heart Disease
- ESC/EACTS 2021 Guidelines for the Management of Valvular Heart Disease
- American Heart Association Scientific Statements on Valvular Disease
- Cochrane Database Systematic Reviews: Interventions for Aortic Stenosis

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