

Chronic Hypertension

Chronic high blood pressure (hypertension) means blood pressure is high all the time. Over years it thickens artery walls, strains the heart, scars the kidneys, and cracks tiny vessels in the eyes and brain.

THE ONE-LINE TRUTH

Blood pressure stays high for months or years, quietly damaging the heart, brain, kidneys, and eyes.

The chain — how it unfolds

1. Pressure inside arteries stays high month after month — why: In primary high blood pressure (hypertension), vessel tone is too tight, kidneys hold too much salt and water, or both — driven by genes, salt, weight, age, and stress. In secondary high blood pressure, a fixable cause (kidney artery narrowing, aldosterone tumor, sleep pauses in breathing (apnea)) keeps pressure high.
2. Artery walls thicken and stiffen (vascular remodeling) — why: High pressure stretches vessel walls. Smooth muscle cells grow thicker to resist the force, and the artery loses its stretch. Stiff arteries cannot absorb the pulse wave from each heartbeat, so pressure spikes higher.
3. Left heart muscle thickens (left ventricular hypertrophy, LVH) — why: The left ventricle pumps against stiff high-pressure arteries. The muscle cells thicken to generate more force. A thick heart wall is stiff and needs more oxygen; it cannot relax well, so the chamber does not fill completely (diastolic dysfunction).
4. Kidney filters scar and leak (hypertensive nephrosclerosis) — why: High pressure pounds the tiny glomeruli (kidney filters). Their walls thicken, scar, and leak protein into urine (proteinuria). Over years the kidneys shrink and lose filtering power, leading to chronic kidney disease.
5. Retina blood vessels narrow, nick, and bleed (hypertensive retinopathy) — why: Tiny arteries in the retina squeeze down under high pressure (narrowing). Where arteries cross veins, the stiff artery compresses the vein (arteriovenous nicking). Vessel walls crack and bleed; fluid leaks out (exudates, hemorrhages). In severe cases the optic nerve swells (papilledema).

6. Atherosclerosis accelerates in coronary, brain, and leg arteries — why: High pressure injures the inner lining of arteries (endothelium). Cholesterol and inflammatory cells invade faster, building plaques that narrow or block vessels. This causes heart attack, stroke, or leg pain with walking (claudication).
7. Heart fails (heart failure with preserved or reduced ejection fraction) — why: A thick stiff heart cannot relax and fill (HFpEF — heart failure with preserved ejection fraction). Eventually the muscle weakens from chronic overwork and oxygen debt, and it cannot pump enough blood out (HFrEF — heart failure with reduced ejection fraction). Fluid backs up into the lungs (pulmonary swelling (edema)) and legs (peripheral swelling).
8. Brain vessels weaken and rupture or clog (stroke, vascular dementia) — why: High pressure over years weakens small brain arteries. They can burst (hemorrhagic stroke) or form tiny clots (ischemic stroke). Repeated small strokes damage memory and thinking (vascular dementia).

Spot it — what you see, and why

- Blood pressure reading stays at 130/80 mmHg or higher: The heart is pushing blood through vessels that are too tight or stiff (like trying to push water through a narrow hose), so the pressure inside the vessels stays high. Over time, the vessel walls can get thicker and stiffer, which keeps the pressure up even when the heart is resting.
- No symptoms at all (most common): Blood pressure rises slowly over months or years, so the body gets used to it. The organs keep working without sending pain or alarm signals until damage builds up—like a slow leak that doesn't make noise until the pipe finally cracks.
- Headache (dull, on both sides of the head, often in the morning): When blood pressure gets very high, the extra pressure stretches the blood vessels in the brain and the covering around the brain (the meninges), which have pain sensors. The brain itself does not feel pain, but the stretched vessels do.
- Blurred vision or seeing spots: High pressure damages the tiny blood vessels in the back of the eye (the retina). When those vessels leak fluid or bleed, the light-sensing cells can't work right, so vision gets blurry or you see dark spots floating.
- Chest pain or pressure
- Shortness of breath with activity or when lying flat: Years of high pressure make the heart muscle thick and stiff (like a balloon that's been blown up too many times). The stiff heart can't relax and fill with blood easily, so fluid backs up into the lungs (pulmonary swelling (edema)), making it hard to breathe.

Red flags — act now

- Blood pressure 180/120 mmHg or higher (hypertensive crisis—the vessels and organs are at risk of tearing or failing right now)
- Sudden, severe headache with confusion, trouble speaking, or weakness on one side (possible stroke from a burst or blocked brain vessel)
- Chest pain with sweating or nausea (possible heart attack—not enough blood reaching the heart muscle)
- Sudden trouble breathing or coughing up pink, frothy spit (fluid flooding the lungs because the heart can't pump well)
- Sudden vision loss or double vision (bleeding or swelling in the eye or brain)

Treat it — in this order

1. DASH diet (lots of fruits, vegetables, whole grains, low-fat dairy) with sodium under 2.3 grams daily, lose 5–10% body weight if overweight, exercise 150 minutes weekly, limit alcohol to 1–2 drinks daily, quit smoking → Lowers blood pressure by 5–10 mmHg by reducing salt (which holds water in blood vessels), shrinking body weight (which reduces the workload on the heart), and relaxing blood vessels. Fixes the root causes before adding medicine.
2. ACE inhibitor (lisinopril, enalapril) or ARB (losartan, valsartan) — use first if chronic kidney disease, diabetes, heart failure, or albuminuria is present → Blocks angiotensin II, a hormone that squeezes blood vessels tight and thickens artery walls. This makes vessels relax and protects the kidneys from high-pressure damage. Slows progression to kidney failure and heart failure.
3. Calcium channel blocker (amlodipine, nifedipine) — first choice for Black patients without chronic kidney disease, or add to any regimen if blood pressure is not controlled → Blocks calcium from entering smooth muscle cells in artery walls, so the vessels relax and blood pressure drops. Works well in all patients, especially Black patients and older adults.
4. Thiazide or thiazide-like diuretic (chlorthalidone, hydrochlorothiazide, indapamide) — often added to any regimen → Makes the kidneys get rid of extra salt and water, shrinking the total blood volume the heart has to pump. Lowers blood pressure and reduces risk of stroke and heart failure. Chlorthalidone is stronger and lasts longer than hydrochlorothiazide.
5. Start two medicines at once if blood pressure is 20/10 mmHg or more above goal (for example, 150/90 or higher when goal is 130/80) → Drops blood pressure faster so organs (brain, heart, kidneys) stop being hurt right now by the high force. Prevents strokes, heart attacks, and kidney failure sooner.

Your top priorities at the bedside

1. Measure blood pressure in both arms with the correct cuff size after the patient sits quietly for 5 minutes with feet flat and back supported. — why: A cuff too small gives falsely high readings, and anxiety or talking raises pressure temporarily; comparing both arms finds coarctation of the aorta (narrowing of the main artery) or subclavian narrowing (stenosis) (blockage in the arm artery), which changes the diagnosis.
2. Ask about and document chest pain, sudden severe headache, confusion, one-sided weakness, or trouble breathing, and notify the provider immediately if any are present. — why: These symptoms signal with high blood pressure (hypertensive) emergency (pressure above 180/120 mmHg with active organ damage like heart attack, stroke, or heart failure), which requires IV medication in the ICU to lower pressure slowly over hours and prevent further vessel tearing or organ death.
3. Teach the patient to check blood pressure at home twice daily (morning and evening) and bring the log to every visit. — why: Home readings diagnose masked high blood pressure (hypertension) (normal in office, high at home) in 10 to 15 percent of people and show whether medications are working all day; this prevents strokes that happen from untreated high pressure at night or early morning.