

# Mitral Regurgitation

A plain-English guide for you and your family

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## WHAT IS HAPPENING

Your heart has four chambers. The left atrium sits on top, and the left ventricle sits on the bottom. Between them is a door called the mitral valve. Normally, this valve opens to let blood pour down into the ventricle, then snaps shut when the ventricle squeezes so all the blood is pushed out to your body. Mitral regurgitation means this door does not close all the way. When the ventricle squeezes, blood leaks backward through the gap into the atrium instead of going forward to feed your body. Sometimes the valve itself is damaged — the flaps get floppy, infected, scarred, or torn. Sometimes the ventricle gets so big that it pulls the valve flaps apart. Either way, blood flows the wrong direction. If the leak happens suddenly — like when a heart attack tears one of the valve's support cables — the atrium is small and stiff and cannot stretch fast, so pressure shoots up into the lungs, you cannot breathe, and your blood pressure drops. If the leak builds slowly over months or years, the atrium and ventricle stretch to hold the extra blood, and you may feel fine for a long time. But eventually the ventricle gets tired and weak from pumping the same blood over and over, and heart failure starts. Every strange finding — the bigger heart, the wet lungs, the odd murmur — traces back to that one leaky valve.

## What you might feel

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- A blowing sound (murmur) during the heart squeeze, loudest at the top of the heart and spreading toward the left armpit
- Feeling short of breath, especially when lying flat or during activity
- Feeling very tired and weak, even with light tasks
- Swelling in the ankles, feet, or belly
- A fast or fluttering heartbeat (palpitations)
- The point where you feel the heart's strongest tap (PMI, or point of maximal impulse) is shifted down and to the left
- An extra low-pitched heart sound (S3 gallop) right after the usual 'lub-dub'
- Coughing, especially at night or when lying down, sometimes with pink frothy spit
- Crackles (wet popping sounds) heard through the stethoscope at the bottom of the lungs

- Needing to prop up on pillows to sleep (orthopnea) or waking up gasping for air (paroxysmal nocturnal trouble breathing (dyspnea))

## **Call the doctor right away if...**

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- Sudden, severe shortness of breath at rest or waking you from sleep (sign of acute heart failure or flash pulmonary edema (fluid flooding the lungs)—fluid flooding the lungs fast)
- Coughing up pink, frothy spit (sign that fluid and blood are filling the lungs under high pressure)
- New chest pain, dizziness, or fainting (may mean the heart can't keep up with the body's needs or dangerous heart rhythms like ventricular a fast heart rate (tachycardia) are starting)
- Rapid weight gain or swelling that gets worse quickly over days (sign that fluid is building up fast and the heart is decompensating)
- Lips or skin turning blue, especially around the mouth or fingertips (sign the body isn't getting enough oxygen)

## **What the care team will do**

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- Monitor oxygen saturation continuously and apply supplemental oxygen to keep SpO<sub>2</sub> above 92 percent
- Position the patient upright at 45 to 90 degrees with legs dangling if tolerated
- Establish IV access and prepare to give loop diuretics like furosemide as ordered
- Monitor blood pressure every 15 to 30 minutes and watch for low blood pressure (hypotension) below 90 systolic
- Assess heart rate and rhythm on telemetry and report new atrial fibrillation (an irregular, quivering heartbeat) or sustained a fast heart rate (tachycardia) above 120
- Auscultate lung sounds every 2 to 4 hours and report new crackles or decreased breath sounds
- Weigh the patient daily at the same time with the same clothing and report gains over 2 pounds in one day
- Restrict sodium to 2 grams per day and monitor strict intake and output every shift

## **Medicines you may be given — and why**

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### **Furosemide (Lasix)**

Furosemide pulls extra water and salt out of the body through urine, which shrinks the blood volume circulating back to the lungs and heart. When the mitral valve leaks backward, blood

backs up into the lungs like water pooling behind a dam. By draining off the extra fluid, furosemide lowers the lung pressure and makes breathing easier. It does NOT fix the leaky valve itself.

### **Sodium nitroprusside (Nipride)**

Nitroprusside relaxes the smooth muscle wrapped around arteries and veins, which widens the blood vessels and drops blood pressure fast. In acute severe mitral regurgitation (for example, when a heart-attack tears a papillary muscle and the valve suddenly flaps open), the heart is pumping against high resistance and a lot of blood is shooting backward through the leaky valve. By opening up the arteries — especially the big ones leaving the heart — nitroprusside makes it easier for blood to flow forward into the body instead of backward into the lungs. This takes pressure off the lungs within minutes and buys time for emergency surgery.

### **Enalapril (Vasotec) or other ACE inhibitor**

Enalapril blocks an enzyme that normally makes angiotensin II (a hormone that squeezes blood vessels tight and tells the kidneys to hold onto salt and water). By stopping that enzyme, enalapril keeps vessels relaxed and blood pressure lower. In chronic secondary mitral regurgitation — where the valve leaks because the heart chamber is stretched and weak, not because the valve itself is torn — ACE inhibitors are part of standard heart-failure treatment. They lower the resistance the damaged heart pumps against and slow the heart's remodeling (the dangerous enlargement and stiffening over time). They do NOT fix the valve or reverse existing scarring.

### **Carvedilol (Coreg) or metoprolol succinate (Toprol-XL)**

Beta blockers slow the heart rate and lower the force of each heartbeat by blocking adrenaline's landing spots (beta receptors) on heart muscle. In chronic secondary mitral regurgitation with heart failure, the heart is overworked and the nervous system is dumping adrenaline constantly to try to keep up. That adrenaline makes the heart race and squeeze hard, which burns energy and stretches the chamber even more. Beta blockers put the brakes on that vicious cycle, giving the heart time to rest and recover. Over months, the heart may shrink a little and pump more efficiently. They do NOT fix the leaky valve itself.

### **Spironolactone (Aldactone)**

Spironolactone blocks aldosterone (a hormone that makes the kidneys grab sodium and water and dump potassium). In heart failure with secondary mitral regurgitation, aldosterone is cranked up high, which traps fluid and scars the heart muscle over time. By blocking aldosterone's receptor in the kidney, spironolactone makes the kidneys let go of some salt and water (which shrinks swelling and lung congestion) while holding onto potassium. It also stops aldosterone from scarring the heart, which slows the heart's dangerous remodeling. It does NOT fix the leaky valve.

## Digoxin (Lanoxin)

Digoxin makes the heart squeeze a little harder and slows certain fast heart rhythms. It blocks a pump on heart cells called the sodium-potassium ATPase, which raises calcium inside the cell, and calcium triggers a stronger contraction. In chronic mitral regurgitation with heart failure and atrial fibrillation (an irregular, quivering heartbeat) (a chaotic, fast rhythm in the top chambers), digoxin can slow the heart rate and improve symptoms. It does NOT fix the leaky valve, and it is NOT a first-choice drug anymore — beta blockers are usually better — but digoxin is still used in some patients who stay symptomatic despite other medicines.

## Where this information comes from

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- AHA/ACC 2020 Guideline for the Management of Patients with Valvular Heart Disease
- American College of Cardiology
- American Heart Association
- European Society of Cardiology 2021 Valvular Heart Disease Guidelines

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