

MALDEK

PATIENT TEACHING · MALDEK CONDITION CATALOG

CHF · Heart Failure Decompensation

A plain-English guide for you and your family

WHAT IS HAPPENING

Your heart is a pump with four rooms. The two small top rooms (atria) collect blood, and the two strong bottom rooms (ventricles) do the heavy work of pushing it out. The left ventricle sends oxygen-rich blood to your whole body. The right ventricle sends blood that needs oxygen to your lungs. A healthy heart fills when it relaxes, then squeezes hard to push blood forward. Your kidneys watch the flow and balance salt and water so you do not get waterlogged. In heart failure, the pump loses power in one of two ways. Either the muscle gets weak and cannot squeeze hard enough—this is called HFrEF (heart failure with reduced ejection fraction), and the squeeze drops below 40 percent when normal is 55 to 70 percent. Or the muscle gets stiff and thick so it cannot relax and fill—this is called HFpEF (heart failure with preserved ejection fraction), and the squeeze stays above 50 percent but the heart cannot hold enough blood. Common causes of a weak pump are a heart attack that killed muscle, years of high blood pressure, leaky or tight valves, a virus that inflamed the heart (myocarditis), heavy alcohol use, or certain chemotherapy drugs. A stiff pump usually comes from long-standing high blood pressure, diabetes, or aging. When the heart cannot keep up, blood backs up like water behind a dam. If the left side fails, blood backs up into your lungs, making you short of breath—especially when you lie flat or move around. If the right side fails, blood backs up into your body veins, making your legs, liver, and belly swell. Often a trigger tips you over the edge: eating salty food (which holds water), skipping your water pill, catching pneumonia or another infection, your blood pressure spiking, your heart beating too fast or irregularly (like atrial fibrillation (an irregular, quivering heartbeat)), becoming anemic, your kidneys getting worse, or taking medicines that hurt the heart like ibuprofen or naproxen. Your body fights back by releasing stress hormones—adrenaline from your nerves and a chain of hormones from your kidneys (renin, angiotensin, aldosterone). These squeeze your blood vessels tight, speed up your heart, and tell your kidneys to hold every bit of salt and water. This keeps your blood pressure from crashing and saves your life in the short term, but it also makes the backup worse—more fluid floods your lungs and legs, so you feel even more breathless and swollen. Every symptom—gasping for air, puffy ankles, sudden weight gain—is your body's emergency plan trying to keep you alive, even though it makes you miserable. Treatment works by turning off those alarms, flushing out the extra fluid with diuretics (water pills), and giving medicines (ACE inhibitors, beta-blockers, SGLT2 inhibitors) that let your heart rest and pump more easily. These medicines cut the risk of dying or going to the hospital in half.

What you might feel

- Short of breath when lying flat (orthopnea)
- Waking up at night gasping for air (paroxysmal nocturnal trouble breathing (dyspnea))

- Crackling or wet sounds when listening to the lungs (rales or crackles)
- Extra heart sound heard early in the heartbeat (S3 gallop)
- Bulging neck veins (jugular venous distension)
- Swollen legs, ankles, or feet (peripheral swelling (edema))
- Sudden weight gain over a few days (often 2 to 3 pounds or more)
- Feeling very tired and weak, even with light activity
- Belly swelling and feeling full quickly when eating (ascites)
- Confusion or trouble thinking clearly

Call the doctor right away if...

- Severe shortness of breath at rest or gasping for air
- Chest pain or pressure (may signal a heart attack triggering the heart failure)
- Coughing up pink, frothy spit (sign of severe fluid in the lungs, called pulmonary edema (fluid flooding the lungs))
- Sudden confusion, loss of alertness, or acting strange
- Fast or very irregular heartbeat (may be dangerous arrhythmia like atrial fibrillation (an irregular, quivering heartbeat) or ventricular a fast heart rate (tachycardia))

What the care team will do

- Sit the patient upright at 45 to 90 degrees (high Fowler position) immediately.
- Apply oxygen by nasal cannula or face mask to keep oxygen saturation above 90 percent, and monitor oxygen levels with continuous pulse oximetry.
- Start an IV line with at least an 20-gauge or larger catheter and give the ordered loop diuretic (usually furosemide) by IV push over 1 to 2 minutes.
- Measure strict intake and output every hour, weigh the patient daily at the same time on the same scale, and watch for at least 0.5 to 1 mL per kg per hour of urine output after diuretic.
- Place the patient on continuous heart monitor (telemetry) and check blood pressure every 15 to 30 minutes when giving IV diuretics or vasodilators.
- Draw blood for baseline labs including basic metabolic panel (sodium, potassium, creatinine, BUN) and brain natriuretic peptide (BNP, a hormone the heart releases when stretched by extra fluid).
- Listen to lung sounds in all fields every 2 to 4 hours and count respiratory rate, watching for decreased crackles and slower, easier breathing.

- Keep the patient on a strict fluid restriction (usually 1.5 to 2 liters total per day) and no-added-salt diet (less than 2 grams sodium per day).

Medicines you may be given — and why

Furosemide (IV)

Furosemide pulls extra fluid out of your body through your kidneys so you pee more. When your heart can't pump well, fluid backs up into your lungs and legs like water pooling behind a weak dam. This drug opens the floodgates in your kidneys to drain that extra water away, making it easier to breathe and reducing the swelling.

Nitroglycerin (IV)

Nitroglycerin relaxes and widens your blood vessels—both the veins (which carry blood back to the heart) and the arteries (which carry blood away). When the veins relax, less blood floods back to your already struggling heart, so the heart has less work to do. When the arteries relax, your blood pressure drops and the heart does not have to push as hard. Together, this eases the load on the heart and helps fluid drain out of your lungs.

BiPAP (Bilevel Positive Airway Pressure)

BiPAP is a mask that fits over your nose and mouth and gently pushes air into your lungs under pressure. That pressure props open the tiny air sacs (alveoli) that have filled with fluid, like blowing up a wet balloon. It also pushes back against the fluid trying to leak from your blood vessels into your lungs. At the same time, the pressure in your chest helps your heart by reducing how much blood tries to flow back into it. The result: you can breathe easier right away, your oxygen goes up, and your heart gets a break.

Sacubitril/valsartan (Entresto)

This is a two-in-one pill. Valsartan blocks angiotensin II (a hormone that squeezes your blood vessels tight and makes your heart work harder). Sacubitril stops an enzyme (neprilysin) that breaks down helpful hormones (like natriuretic peptides) that relax blood vessels, help you pee out salt and water, and protect the heart. Together, the drug reduces the squeeze on your vessels AND boosts the body's natural helpers—so your heart has less work to do, your blood pressure drops, and over time your heart may pump a bit better.

Carvedilol (or metoprolol succinate or bisoprolol)

Beta-blockers slow your heart rate and lower the force of each heartbeat by blocking adrenaline (epinephrine) from landing on beta receptors in the heart. When your heart is failing, your body releases a lot of adrenaline to try to make the heart beat faster and harder—but over time this adrenaline actually harms the heart muscle, causing it to remodel (get

stiffer, weaker, and more scarred). Beta-blockers protect the heart from that constant adrenaline stress, giving it time to heal and pump more efficiently.

Spirolactone (or eplerenone)

Spirolactone blocks aldosterone, a hormone that tells your kidneys to hold onto salt and water and makes your heart and blood vessels stiffen and scar. In heart failure, your body makes too much aldosterone, which worsens fluid buildup and damages the heart muscle over time. Blocking aldosterone helps you pee out extra salt (and a little water), protects the heart from scarring (fibrosis), and reduces dangerous heart rhythms.

Dapagliflozin (or empagliflozin)

SGLT2 inhibitors block a pump in your kidneys that normally pulls sugar (glucose) back into your blood. When you block that pump, sugar spills into your urine and you pee it out. But sugar pulls water with it (osmotic diuresis), so you also pee out a little extra salt and water—helping to lower blood pressure and fluid overload. Beyond that, these drugs seem to protect the heart and kidneys through other mechanisms scientists are still studying: they may shift the heart's fuel use, reduce inflammation, and lower stiffness in the heart muscle. The result is fewer heart failure hospitalizations and better kidney health, even in people without diabetes.

Where this information comes from

- AHA/ACC/HFSA 2022 Heart Failure Guideline
- NEJM Heart Failure Review
- Cochrane Systematic Reviews
- ESC 2021 Heart Failure Guidelines

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