

Cardiac Tamponade

Fluid fills the sac around the heart and squeezes it so hard the heart cannot fill with blood.

THE STORY IN ONE SENTENCE

Fluid fills the sac around the heart and squeezes it so hard the heart cannot fill with blood.

“Fluid builds up in the sac around the heart. The sac cannot stretch. It squeezes the heart so the chambers cannot fill. A needle drains the fluid and saves the pump.”

Normal anatomy — the body's job

The heart sits inside a thin, tough sac called the pericardium that holds about two tablespoons of clear fluid. That fluid keeps the heart sliding smoothly as it beats. The sac does not stretch much — it is like a snug jacket, not a stretchy balloon.

BODY'S JOB

Every second, the heart chambers relax and pull open to let blood flow in from the veins. The right side fills with blood coming back from the body. The left side fills with oxygen-rich blood from the lungs. Then both sides squeeze and push that blood out. The sac around the heart stays loose enough that nothing gets in the way of this filling and squeezing.

1. Blood returns from the body through the big veins called the vena cavae into the right side of the heart.
2. The right chambers relax and open wide, sucking blood in like a bellows.
3. At the same moment, the left side fills with bright red blood from the lungs.
4. Both sides squeeze together, shooting blood out to the lungs and the rest of the body.
5. The thin pericardial sac around the heart just sits there, holding a thin layer of slippery fluid and staying out of the way.

What breaks

Fluid — blood, pus, or watery fluid — pours into the sac around the heart faster than the sac can stretch. Pressure inside the sac climbs. That outside pressure squeezes all four heart chambers at once. The chambers cannot open wide, so they cannot fill with blood. Each heartbeat pumps less and less until the pump fails.

CLINICAL TERM

Pericardial a fluid collection (effusion) under tension causes equalization of diastolic pressures across all cardiac chambers and impairs ventricular filling, leading to reduced stroke volume, compensatory a fast heart rate (tachycardia), and eventually obstructive shock.

How the body compensates

The body tries to keep blood pressure and oxygen delivery steady by speeding up the heart, squeezing blood vessels tight, and holding onto salt and water. For a while, blood pressure may look almost normal — but that hides how close the person is to crashing. The key is to spot the pattern before the collapse.

1. {'what': 'Heart rate climbs (tachycardia).', 'why': 'The body senses that each heartbeat is weak, so it speeds up the heart to move more blood per minute — even though each beat is smaller.'}
2. {'what': 'Blood vessels squeeze tight (increased systemic vascular resistance).', 'why': 'Baroreceptors (pressure sensors) in the carotid artery and aortic arch sense low pressure, so the sympathetic nervous system (the body's alarm system) clamps down arteries to keep blood pressure from crashing and to push blood toward the brain and heart.'}
3. {'what': 'The body holds onto salt and water.', 'why': 'The kidneys sense less blood flow and release hormones — renin (a kidney hormone), aldosterone (a salt-keeping hormone from the adrenal glands), and antidiuretic hormone or ADH (a water-keeping hormone from the pituitary gland) — that tell the body to keep every drop of fluid, trying to fill the pipes and raise pressure.'}
4. {'what': 'Breathing gets fast and shallow.', 'why': 'Low oxygen delivery makes the brainstem (the part of the brain that controls breathing) push the lungs to work harder, and the person feels air hunger even though the lungs themselves are fine.'}
5. {'what': 'Neck veins stay full and bulging (jugular venous distention).', 'why': 'Blood is trying to return to the heart through the superior vena cava (the big vein draining the upper body), but the squeezed right atrium cannot accept it, so blood backs up into the internal jugular veins in the neck and upper body.'}

6. {'what': 'The dangerous middle: vital signs may look stable while compensation is maxed out.', 'why': 'The body can keep blood pressure almost normal for minutes to hours by working at 100 percent, but once that reserve runs out, the crash is sudden and hard to reverse.'}

Domino effect

1. Fluid pours into the pericardial sac faster than it can stretch. — Blood from a torn coronary artery or aorta, pus from bacterial or viral pericarditis (infection of the sac), serous fluid from severe waste buildup in the blood (uremia) (kidney failure toxins), malignant a fluid collection (effusion) from cancer spread, or fluid from autoimmune disease builds up in the pericardial space. The fibrous pericardium (the tough outer layer of the sac) cannot expand quickly, so pressure inside climbs.
2. Rising pressure in the sac squeezes all four heart chambers from the outside. — The pericardium wraps around the whole heart. When pressure inside the sac goes up, it presses on the right atrium, right ventricle, left atrium, and left ventricle at once, like a hand squeezing a soft bag.
3. The heart chambers cannot open wide during the relaxation phase (diastole). — Normally the ventricles spring open and suck blood in. Now outside pressure fights that, so less blood flows in. The amount of blood the heart can pump with each beat — called stroke volume — drops.
4. Pressures inside all four chambers become equal (equalization of diastolic pressures). — The outside squeeze overpowers the normal pressure differences between chambers, so right atrial pressure, right ventricular diastolic pressure, pulmonary artery diastolic pressure, and left ventricular diastolic pressure all rise to match the pericardial pressure — usually 15 to 30 millimeters of mercury (mmHg) or higher.
5. Blood backs up into the veins; neck veins swell and stay full (jugular venous distention). — The right atrium cannot accept the blood returning from the superior and inferior vena cavae (the body's main draining veins), so pressure rises in those veins and spills backward into the internal jugular veins. You can see the veins in the neck bulge, even when the person sits up.
6. When the person breathes in, blood pressure drops more than 10 mmHg (pulsus paradoxus). — Breathing in drops pressure in the chest (intrathoracic pressure falls), so more blood flows into the right heart. The stiff pericardium cannot let the right ventricle expand, so the interventricular septum (the wall between right and left ventricles) bows toward the left. That makes the left ventricle even smaller, so it pumps less blood and systolic pressure falls.
7. Heart sounds become quiet and distant. — The layer of fluid in the pericardial sac muffles the sound of the heart valves closing, like listening to a drum wrapped in a thick blanket.

8. Blood pressure drops (hypotension) and the pulse becomes fast and weak. — With less blood filling the left ventricle, less blood leaves with each beat. The sinoatrial node (the heart's natural pacemaker) speeds up the heart rate in response to signals from the sympathetic nervous system, but each beat stays weak, so blood pressure falls and organs do not get enough oxygen.
9. The person feels short of breath, anxious, and dizzy; skin turns cool and sweaty. — The brain and body sense the oxygen shortage. The medulla (the breathing center in the brainstem) makes the lungs work harder. The sympathetic nervous system dumps epinephrine and norepinephrine (adrenaline hormones). The person feels like something is terribly wrong — because it is.
10. If the fluid is not drained, the heart stops (pulseless electrical activity or asystole). — The chambers are squeezed so tight they cannot fill at all. The sinoatrial node and conduction system may still fire electrical signals, but no blood moves. The brain and organs shut down in minutes. Only immediate drainage with a needle (pericardiocentesis) or surgery (pericardial window) can reverse this.

Symptoms · what the patient feels, and why

- Blood pressure drops, especially when breathing in (pulsus paradoxus): Fluid squeezes the heart from the outside so the chambers can't fill properly. When you breathe in, pressure inside your chest changes and even less blood gets back to the heart. The squeeze becomes tighter, so blood pressure drops more than 10 points—doctors call that pulsus paradoxus, a hallmark sign that the heart is trapped.
- Neck veins bulge and stay swollen (jugular venous distention): Blood is trying to return to the right side of the heart, but the squeezed heart can't accept it. The blood backs up into the jugular veins (the big veins running up your neck), making them bulge out like garden hoses under pressure. The bulge gets bigger when you lie flat because gravity stops helping.
- Heart sounds turn quiet and muffled: Normally a stethoscope picks up crisp heart sounds through the chest wall. But when fluid fills the pericardial sac (the thin bag wrapped around the heart), it acts like a pillow, blocking and softening the sound waves before they reach the stethoscope.
- Trouble breathing or feeling short of breath (dyspnea): The squeezed heart can't pump enough blood forward to the lungs and body, so oxygen delivery drops. Your brain senses low oxygen and makes you breathe faster and harder to try to catch up, leaving you gasping for air even at rest.

- Heart beats fast (tachycardia, often over 100 beats per minute): Because each squeeze of the heart moves only a tiny amount of blood, the heart tries to make up for it by beating faster—like pedaling harder when your bike chain slips. The sinoatrial node (the heart's natural pacemaker) speeds up to keep oxygen delivery going.
- Chest pain or pressure: The pericardium (the sac around the heart) is stretched tight by the building fluid, which pulls on pain-sensing nerves in the sac's lining. The pain can feel sharp or pressing, and it often gets worse when you lie down or take a deep breath.
- Feeling dizzy, lightheaded, or confused: The brain needs steady blood flow to work. When the tamponade cuts the heart's output, less blood—and less oxygen—reaches the brain. Brain cells start misfiring, causing dizziness, confusion, or a feeling that you might faint.
- Weak, thready, or hard-to-feel pulse: Each heartbeat pushes out only a small volume of blood because the chambers can't fill. That weak surge of blood creates a faint, thread-like pulse at the wrist that's hard to feel or count. In severe tamponade, the pulse may disappear completely during inspiration.
- Cool, clammy, pale skin (signs of poor blood flow (perfusion)): When cardiac output drops, the body tries to protect the brain and heart by shutting down blood flow to the skin and limbs. The sympathetic nervous system releases norepinephrine (a stress messenger that tightens blood vessels), making the skin cold, sweaty, and pale.

Focused exam

- Narrow pulse pressure (systolic minus diastolic blood pressure is less than 25 mmHg): When fluid squeezes the heart from the outside, the heart cannot fill properly and cannot push out a strong wave of blood. The top number (systolic pressure — the peak pressure when the heart squeezes) stays low because the heart is not ejecting much blood, and the bottom number (diastolic pressure — the baseline pressure when the heart relaxes) creeps up because the constant squeeze keeps pressure high inside the chest. A gap smaller than 25 mmHg is a red flag that the heart is trapped and struggling to pump.
- Pulsus paradoxus (systolic blood pressure drops more than 10 mmHg when the patient breathes in): Breathing in normally lowers blood pressure by a tiny amount — about 5 mmHg — because blood pools briefly in the lungs. When fluid squeezes the heart, breathing in pulls even more blood into the lungs, and the already-squeezed left side of the heart cannot fill enough to keep blood pressure steady. A drop bigger than 10 mmHg with each breath in tells you the heart is being crushed and cannot adjust. You measure this by inflating a blood pressure cuff slowly and listening for when you first hear beats only on breaths out, then when you hear beats on every heartbeat; the difference is the paradox.

- Jugular venous distention (neck veins stand out and stay full even when the patient sits upright at 45 degrees or more): Blood returns to the heart through the big veins in the neck — the internal jugular veins. When the heart cannot open to accept blood because fluid is squeezing it shut, blood backs up into those veins and they bulge. Normally when you sit up, gravity pulls blood down and the neck veins flatten. If they stay full sitting up, it means the right side of the heart is blocked and blood is stuck outside the heart.
- Muffled or distant heart sounds (you cannot hear the heartbeat clearly through the stethoscope): Normally sound waves from the heart travel easily through the thin chest wall to your stethoscope. When fluid fills the pericardial sac (the tough bag around the heart), it acts like a pillow or a layer of water between the heart and your ear, muffling the sound. This tells you there is extra fluid between the heart and the outside of the chest.
- Low blood pressure (Hypotension) (systolic blood pressure under 90 mmHg) that does not improve after giving intravenous fluids: When the heart cannot fill because it is being squeezed, it cannot pump enough blood to keep blood pressure up. Normally if someone is in shock from losing blood or being dehydrated, giving extra fluid through an IV brings the blood pressure back up. If the pressure stays low or rises only a little, it means the problem is not a lack of blood volume — it is the squeeze itself stopping the heart from filling. This tells you the shock is obstructive (something blocking blood flow) rather than from blood loss or pump failure.

Diagnostics · every test answers a question

- Point-of-care (bedside) echocardiogram (ultrasound of the heart) → Is there fluid in the pericardial sac, and is it squeezing the heart chambers so they cannot fill?
- Chest X-ray (posteroanterior and lateral views) → Is the heart shadow enlarged, suggesting fluid has built up around it?
- Electrocardiogram (ECG or EKG) → Are there electrical signs of fluid around the heart or stress on the heart muscle?
- Arterial blood gas (ABG) → Is the body getting enough oxygen, and is waste building up because blood flow is failing?
- Complete blood count (CBC) → Is there infection or bleeding that might explain why fluid is building in the pericardial sac?
- Blood urea nitrogen (BUN) and creatinine → Is kidney failure causing waste buildup that irritates the sac and makes fluid leak around the heart?
- Troponin I or troponin T → Is the heart muscle itself being damaged, or is the problem only the squeeze from outside?
- Blood cultures (two sets from different sites before starting antibiotics) → Is bacteria growing in the blood and seeding infection into the pericardial sac?

Treatment logic

- Pericardiocentesis (inserting a needle or thin catheter into the pericardial sac under ultrasound or fluoroscopy guidance to drain fluid) → Removes fluid from the sac so pressure around the heart drops immediately. The heart chambers can expand and fill with blood again. Cardiac output — the amount of blood the heart pumps out per minute — jumps back up, and blood pressure rises within seconds to minutes. Even removing 50–100 mL can make a huge difference if the fluid built up fast. This is the only treatment that fixes the squeeze itself and saves the patient's life in an emergency.
- Intravenous fluid bolus (0.9% normal saline, 500–1,000 milliliters given quickly over 15–30 minutes) → Increases the volume of blood in the veins so more blood tries to push into the heart. Even though the heart is being squeezed from outside and cannot fill well, a higher pressure pushing blood in from the veins can help a small amount more get through and keep blood pressure from crashing completely. This buys time — usually minutes to an hour — while you prepare to drain the fluid. It can temporarily stabilize the patient and prevent cardiac arrest.
- Avoid positive-pressure ventilation (intubation and putting the patient on a mechanical breathing machine) unless absolutely necessary; if the patient needs breathing support, use high-flow nasal oxygen or non-invasive ventilation (like BiPAP) very carefully and prepare to drain the fluid immediately → Positive pressure — forcing air into the lungs with a machine — raises pressure inside the chest, which squeezes the outside of the heart even more and can make the already-low blood pressure drop further or cause the heart to stop. Keeping the patient breathing on their own, or using gentle support that does not raise chest pressure too much, protects the heart from extra crushing force.
- Vasopressors — norepinephrine preferred, starting at 0.05–0.1 micrograms per kilogram per minute, or dopamine 5–10 micrograms per kilogram per minute — if blood pressure stays dangerously low (systolic under 90 mmHg or mean arterial pressure under 65 mmHg) despite intravenous fluids → Tightens blood vessels all over the body so blood pressure stays high enough to push blood to the brain, kidneys, heart, and other vital organs even though the heart is pumping weakly. Protects organs from dying while you prepare to drain the pericardial fluid. Norepinephrine is preferred because it raises blood pressure without making the heart beat too fast or work too hard. This is only used when the patient is in shock and time is running out.

- Treat the underlying cause: antibiotics (e.g., vancomycin 15 milligrams per kilogram IV every 12 hours plus ceftriaxone 2 grams IV daily, or anti-TB drugs if tuberculosis is suspected) for bacterial pericarditis; antifungals or antivirals for fungal or viral infections; urgent dialysis for uremic pericarditis from kidney failure; chemotherapy, radiation, or both for cancer causing malignant a fluid collection (effusion); NSAIDs like ibuprofen 600–800 milligrams three times daily or indomethacin 25–50 milligrams three times daily, plus colchicine 0.6 milligrams once or twice daily, and sometimes corticosteroids for autoimmune or with no known cause (idiopathic) (unknown cause) inflammatory pericarditis → Stops the process that is making fluid leak into the pericardial sac. Prevents fluid from coming back after you drain it. If the cause is inflammation or infection, treating it helps the body reabsorb leftover fluid and heal the lining of the sac. For cancer, shrinking the tumor stops malignant fluid from refilling the sac. For kidney failure, dialysis removes the waste that is irritating the pericardium. This is the only way to prevent tamponade from happening again.
- Surgical pericardial window or pericardiectomy (cutting a small hole in the pericardial sac or removing part or all of it) if fluid keeps coming back despite repeated drainage, if the sac is too thick, scarred, or filled with clots to drain safely with a needle, or if trauma caused active bleeding into the sac that needs repair → Creates a permanent opening so fluid can drain continuously into the chest cavity or belly, where the body can absorb it, and it cannot squeeze the heart again. Fixes recurrent tamponade when needle drainage is not enough. In trauma with ongoing bleeding, surgery finds and stops the bleeding blood vessel, removes blood clots that a needle cannot reach, and repairs torn heart tissue. This is a definitive solution for mechanical trapping of the heart.

Medications

IV normal saline (0.9% sodium chloride solution) · Intravenous fluid (isotonic crystalloid)

This salt-water solution fills your blood vessels quickly. When the sac around your heart squeezes it, the heart chambers shrink and hold less blood. By pouring more fluid into your veins, we boost the pressure pushing blood back into the heart. This extra pressure helps the heart fill a little better—even though the outside squeeze is still there—so each beat pumps out a bit more blood to your body. Think of it like turning up water pressure in a garden hose that someone is pinching: you cannot remove the pinch yet, but higher pressure forces more water through. This buys time until the fluid around the heart is drained.

1. Salt water flows rapidly through an IV line into a vein.
2. The fluid spreads through your bloodstream, expanding the total volume of blood.
3. Blood pressure inside the veins climbs.

4. Higher vein pressure pushes more blood into the right atrium and right ventricle, even against the squeeze from the fluid-filled pericardial sac.
5. The right ventricle fills slightly better and pumps a little more blood forward with each beat.
6. Cardiac output (the amount of blood leaving the heart each minute) rises enough to keep your brain, kidneys, and other organs fed until the tamponade is fixed.

SAFETY WATCH

Too much fluid too fast can flood the lungs if the heart cannot pump it forward, causing fluid to back up and making breathing harder. · Watch closely for worsening shortness of breath or dropping oxygen levels. · Avoid IV fluids in patients who already have severe heart failure from other causes, because they may not tolerate the extra volume. · In very severe tamponade with near-collapse, fluids must be given carefully and quickly paired with definitive drainage.

Norepinephrine (Levophed) · Vasopressor (a drug that tightens blood vessels to raise blood pressure)

Norepinephrine squeezes the muscle layer in the walls of your arteries and veins, making the vessels narrower. When vessels narrow, blood pressure climbs—like crimping a hose raises the pressure inside. In tamponade, even though the heart is being squeezed and cannot fill well, higher blood pressure helps push blood through vital organs like your brain, kidneys, and the heart muscle itself. It also raises the pressure that drives blood back to the heart.

Norepinephrine is used when IV fluids alone are not enough to keep blood pressure safe while you wait for the pericardial drain.

1. Norepinephrine is infused continuously through an IV, usually into a large central vein near the heart.
2. It travels through the bloodstream and lands on alpha-1 receptors on the muscle cells lining blood vessel walls.
3. When it docks, it signals the muscle cells to tighten.
4. Blood vessels narrow, and resistance to blood flow goes up.
5. Blood pressure rises, making sure the brain, kidneys, and heart muscle receive enough blood even though the heart's output is low.
6. The drug is stopped or slowly lowered as soon as the pericardial fluid is drained and the heart can fill normally again.

SAFETY WATCH

Can cause dangerously high blood pressure if the dose is too high; blood pressure must be checked every few minutes. · May cut blood flow to the skin, fingers, toes, and intestines—watch for pale, cold, or blotchy skin. · Must be given through a central IV line (a large tube in a big vein near the heart) because it can damage smaller veins and skin if it leaks out. · Can trigger irregular heart rhythms in some people. · Lower or stop the dose as soon as blood pressure steadies and the tamponade is treated. · Doses above 0.5 to 1 micrograms per kilogram per minute signal severe shock and the urgent need for drainage.

Dobutamine · Inotrope (a drug that makes the heart muscle squeeze harder)

Dobutamine lands on beta-1 adrenergic receptors on heart muscle cells and tells them to contract more forcefully. Even when the heart chambers are being squeezed from outside and cannot fill well, dobutamine helps each heartbeat push out as much blood as possible from the small amount that does get in. Think of it like pressing harder on a sponge that is already squeezed—you wring out every drop you can. It is used in tamponade mainly when the heart is very weak or when blood pressure stays low despite fluids and vessel-squeezing drugs.

1. Dobutamine is infused continuously through an IV.
2. It binds to beta-1 receptors on heart muscle cells.
3. This binding starts a chain reaction inside the cell that boosts calcium release.
4. Calcium makes the muscle fibers slide together more forcefully.
5. Each heartbeat becomes stronger, squeezing more blood out of the ventricle.
6. Cardiac output rises slightly, helping keep blood flowing to your organs until the pericardial fluid is removed.

SAFETY WATCH

Can speed up the heart rate too much, which shortens the time the heart has to fill and may drop blood pressure further. · May trigger irregular heart rhythms, especially in people with underlying heart disease. · Raises the heart's need for oxygen, which can be risky if the coronary arteries (the vessels feeding the heart muscle) are already narrowed. · Monitor heart rate, rhythm, and blood pressure continuously. · Used carefully and only as a bridge until definitive treatment (pericardiocentesis or surgery). · Rarely used in tamponade; norepinephrine is preferred because dobutamine can worsen low blood pressure.

Antibiotics (examples: vancomycin plus ceftriaxone or cefepime, chosen based on suspected bacteria) · Antimicrobial agents

If the tamponade is caused by bacterial infection in the pericardial sac (called pus-filled (purulent) or bacterial pericarditis), antibiotics kill the bacteria making the infected fluid. Bacteria have cell walls or protein factories that human cells do not. Antibiotics target those parts—some punch holes in bacterial walls (like ceftriaxone and cefepime), others jam the bacteria's machinery for building walls or making proteins (like vancomycin). Once the bacteria die, the infection stops, new fluid production slows, and your body can start to clear the fluid. Antibiotics do NOT drain the fluid themselves; drainage is still needed. But they stop new fluid from forming and keep the infection from spreading to your blood or other organs.

1. Antibiotics are given through an IV (sometimes switched to pills later, once you are stable).
2. They travel through the bloodstream to the pericardial sac.
3. The drug enters or sticks to bacterial cells.
4. Depending on the type, it either breaks the bacteria's outer wall, stops it from building new wall material, or halts its ability to make proteins and multiply.
5. Bacteria die or stop reproducing.
6. Your immune system sweeps away dead bacteria and infected fluid, and new fluid stops forming.
7. The pericardial drain pulls out the fluid that has already collected.

SAFETY WATCH

Allergic reactions (rash, itching, or rarely life-threatening swelling and breathing trouble, especially with penicillins and cephalosporins like ceftriaxone and cefepime). · Kidney injury with vancomycin and some others; kidney function is checked with blood tests during treatment. · Diarrhea and stomach upset; rarely, severe gut infection (*Clostridioides difficile* colitis) if normal gut bacteria are wiped out. · Drug interactions: some antibiotics interfere with blood thinners, seizure medicines, or other drugs. · The antibiotic choice depends on culture results (lab tests that identify the bacteria and which drugs kill it); broad-spectrum combinations (like vancomycin plus ceftriaxone or cefepime) are started first before results come back. · Treatment usually lasts several weeks, and drainage with a tube or surgery is often needed because thick infected fluid does not drain easily with a single needle stick.

NSAIDs (nonsteroidal anti-inflammatory drugs, such as ibuprofen, indomethacin, or aspirin at high dose) · Anti-inflammatory agents

If the tamponade is caused by inflammation of the pericardium (pericarditis from a virus, autoimmune disease, or unknown trigger), these drugs calm the immune response that is

making the sac swell and leak fluid. NSAIDs block an enzyme called cyclooxygenase (COX) that makes prostaglandins—chemical messengers that trigger inflammation, pain, and fluid leakage. When prostaglandins drop, swelling decreases, pain eases, and the pericardium stops oozing fluid. NSAIDs are used after the fluid is drained to prevent it from building up again. They are taken for weeks to months, depending on the cause.

1. The drug is taken by mouth as a pill or liquid.
2. It is absorbed in your gut and travels through the bloodstream to inflamed tissue.
3. NSAIDs block the COX enzyme inside cells, stopping the production of prostaglandins.
4. Prostaglandin levels drop, so inflammation, pain, and fluid leakage all decrease.
5. The pericardium gradually stops making new fluid.
6. Your body slowly reabsorbs leftover fluid (drainage may still be needed if a large amount has already collected).
7. Treatment continues for several weeks to prevent the inflammation from flaring up again.

SAFETY WATCH

Can irritate the stomach and cause ulcers or bleeding; take with food and watch for black tarry stools, vomiting blood, or severe stomach pain. · Can harm the kidneys, especially in older adults, people who are dehydrated, or those already taking certain blood pressure medicines (ACE inhibitors, ARBs); kidney function is checked with blood tests. · May raise blood pressure slightly. · Raise the risk of heart attack or stroke if used at high doses for a long time, especially in people with existing heart disease (short-term use for pericarditis is usually safe). · Can make asthma worse in some people. · Avoid in the third trimester of pregnancy (can harm the baby's heart and kidneys). · Ibuprofen 600 to 800 mg three times daily, indomethacin 25 to 50 mg three times daily, or aspirin 750 to 1000 mg three times daily are typical doses; exact choice depends on guideline recommendations and patient factors.

Colchicine · Anti-inflammatory agent (microtubule inhibitor)

Colchicine disrupts the tiny tubes (microtubules) inside immune cells that act as their skeleton and railroad tracks. Without working microtubules, white blood cells cannot travel to the pericardium, cluster there, or dump out inflammatory chemicals. This cools down the immune attack on the pericardial sac, slows fluid production, and cuts the chance that fluid will build up again after drainage. It is used alongside NSAIDs for pericarditis and is especially good at preventing recurrences (fluid coming back weeks or months later). Treatment usually lasts three months.

1. Colchicine is taken by mouth as a pill.
2. It is absorbed in your gut and enters the bloodstream.

3. The drug slips into white blood cells and binds to tubulin, the building block of microtubules.
4. Microtubules fall apart or cannot form properly.
5. White blood cells lose their ability to move, cluster, and release inflammatory signals.
6. Fewer immune cells reach the pericardium, so inflammation drops.
7. Fluid production slows, and the risk of recurrence falls sharply.
8. The drug is continued for weeks to months to keep inflammation from flaring again.

SAFETY WATCH

Diarrhea is very common (happens in up to one in three people); lower the dose if this occurs. · Nausea, vomiting, and belly cramps are also common. · Muscle pain or weakness (myopathy) can happen, especially in people with kidney disease or those taking certain other drugs (statins, fibrates). · Rarely, bone marrow suppression (low blood counts) in people with severe kidney or liver disease. · Drug interactions: levels can spike dangerously if taken with certain antibiotics (clarithromycin, erythromycin), antifungals (ketoconazole, itraconazole), or some HIV medicines; tell your provider about all medications. · Dose must be lowered in people with kidney disease. · Typical dose is 0.5 to 0.6 mg once or twice daily (weight-based in smaller patients or those with kidney issues).

Corticosteroids (such as prednisone or methylprednisolone) · Systemic anti-inflammatory and immunosuppressant agents

Corticosteroids are powerful drugs that shut down many immune pathways at once. They slip into cells and turn off genes that make inflammatory chemicals (cytokines, prostaglandins, leukotrienes). This calms severe or autoimmune-driven pericardial inflammation that does not respond to NSAIDs and colchicine alone. Steroids are used when pericarditis is caused by lupus, rheumatoid arthritis, or other autoimmune diseases, or when other anti-inflammatory drugs have failed or cannot be used. They are NOT first-line because they raise the risk of the fluid coming back after you stop them.

1. The drug is taken by mouth (pill) or given through an IV if you are very sick.
2. It enters the bloodstream and travels to cells throughout the body.
3. The drug passes through the cell membrane and binds to glucocorticoid receptors inside the cell.
4. The receptor-drug pair moves into the nucleus and changes which genes are turned on or off.
5. Genes that make inflammatory chemicals are switched off; genes that make calming proteins are switched on.
6. Inflammation in the pericardium drops sharply.

7. Fluid production slows and may stop, allowing the body to reabsorb it (drainage is still done first for safety).
8. The dose is slowly lowered (tapered) over weeks to months to avoid a rebound flare.

SAFETY WATCH

Raise blood sugar, which can trigger or worsen diabetes; blood sugar is monitored. · Weaken bones over time (osteoporosis), raising fracture risk with long-term use. · Suppress the immune system, making infections more likely and harder to fight. · Can hide signs of infection (no fever, less pain), delaying diagnosis. · Cause weight gain, mood swings, trouble sleeping, and increased appetite. · Raise blood pressure and can cause fluid retention and swelling. · Long-term use can thin the skin, cause easy bruising, and slow wound healing. · Must be tapered slowly; stopping suddenly can cause adrenal crisis (life-threatening drop in blood pressure and cortisol). · Typical dose is prednisone 0.25 to 0.5 mg per kilogram per day (roughly 15 to 50 mg daily), tapered over weeks to months based on response.

Red flags

- Blood pressure dropping below 90 systolic or falling fast despite fluids
- Confusion, loss of consciousness, or not responding normally
- Pulsus paradoxus greater than 10 mmHg (big drop in systolic pressure when breathing in)
- Oxygen levels dropping below 90% or severe trouble breathing
- Signs of shock: cold clammy skin, fast weak pulse, pale or blue color, and altered mental state

Nursing priorities

1. Place the patient on continuous cardiac monitoring and pulse oximetry, and measure blood pressure every 5 to 15 minutes. — Tamponade causes the heart to fail quickly; close monitoring catches dangerous drops in blood pressure, rising heart rate above 100, and falling oxygen levels before the patient crashes into cardiac arrest.
2. Start two large-bore intravenous lines (18-gauge or larger) and give a rapid bolus of 500 to 1,000 mL of 0.9% normal saline over 10 to 20 minutes if blood pressure is dropping. — Increasing the blood volume inside the vessels raises pressure and helps the right side of the heart fill despite the squeeze from outside; this buys time until the fluid can be drained.

3. Keep the patient sitting upright at 45 degrees or higher, and avoid laying them flat. — An upright position uses gravity to reduce pressure on the heart and makes breathing easier; lying flat increases venous return (blood coming back to the heart) and can worsen the squeeze and cause sudden decompensation (rapid decline).
4. Prepare immediately for pericardiocentesis by gathering the drainage kit, ultrasound machine, sterile gloves and drapes, local anesthetic like lidocaine, and cardiac arrest supplies including a defibrillator. — Draining even 50 to 100 mL of fluid can reverse shock within seconds; having equipment ready prevents delays, and the procedure carries risk of heart perforation or arrhythmia (abnormal heart rhythm) that may need emergency response.
5. Give high-flow oxygen by nasal cannula or non-rebreather mask to keep oxygen saturation above 92%, but avoid bag-mask ventilation or intubation unless the patient stops breathing. — Positive-pressure ventilation (forcing air into the lungs with a machine or bag) raises pressure inside the chest and crushes the already squeezed heart, dropping blood pressure further and causing cardiac arrest.
6. Assess for pulsus paradoxus by measuring the difference between systolic blood pressure during inspiration (breathing in) and expiration (breathing out); report if the drop is greater than 10 mmHg. — A big pressure drop when breathing in happens because the squeezed heart cannot adjust to normal changes in blood return; a difference above 10 mmHg confirms tamponade and tells the team the situation is critical.
7. Check neck veins with the head of the bed raised to 30 to 45 degrees; look for jugular venous distention (JVD) that stays swollen even when sitting up. — Normally neck veins flatten when sitting up, but tamponade blocks blood from entering the right side of the heart, so pressure backs up into the veins and keeps them bulging; this sign separates tamponade from other causes of low blood pressure like bleeding.
8. Hold all blood-thinning medications including heparin, enoxaparin, warfarin, and antiplatelet drugs like aspirin or clopidogrel, and notify the provider immediately. — Anticoagulants can turn a small pericardial bleed into a massive bleeding (hemorrhage) (severe bleeding); stopping them reduces the risk of worsening tamponade while the team prepares for drainage.

Sources

- ESC Guidelines on Pericardial Diseases 2015
- AHA/ACC Pericardial Disease Guidelines
- American College of Cardiology
- UpToDate Clinical Reference

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