

Shock

Shock is blood flow failure. Find which of the three things broke—tank, pump, or pipes—and fix it fast.

THE ONE-LINE TRUTH

Shock means the body cannot deliver enough oxygen-rich blood to cells, so cells start to die.

The chain — how it unfolds

1. One of the three upstream things breaks: tank (volume loss), pump (heart failure), or pipes (vessels dilate or get blocked). — why: This is the single root cause—everything else that follows is the body's reaction to this one break, so finding and fixing this upstream problem is the only way to stop the cascade.
2. Oxygen delivery to cells drops because blood flow or oxygen content falls. — why: Cells need a steady stream of oxygen to make energy (ATP); when delivery falls below what cells need, they can't do their jobs and start to fail.
3. Cells switch to anaerobic metabolism (backup fuel pathway that doesn't need oxygen), and lactate piles up as waste. — why: Anaerobic metabolism is like running a car on fumes—it keeps the engine sputtering for a little while but makes toxic exhaust (lactate); rising serum lactate (normal <2 mmol/L, shock often >4) is the lab's red flag that cells are suffocating.
4. Baroreceptors sense low pressure and trigger sympathetic surge: heart rate climbs, vessels squeeze tight, and blood flow is pulled away from skin, gut, and kidneys to protect brain and heart. — why: The body rations blood like a city in drought rations water—non-essential services (skin color, gut motility, kidney filtering) are cut to keep the critical infrastructure (brain, heart) running as long as possible.
5. Skin becomes cold, pale, and clammy in cardiogenic and hypovolemic shock (vasoconstriction); or warm and flushed early in distributive shock (vasodilation) before it later turns cold. — why: Skin blood flow (perfusion) and temperature are the physical exam's roadmap to the type of shock: if vessels are squeezed tight (hypovolemic, cardiogenic, late septic), skin is cold and pale because blood is being kept away; if vessels are wide open (early septic, anaphylactic, neurogenic), blood pools in the skin so it looks warm and red even though pressure is low.

6. Kidneys reduce urine output (oliguria, <0.5 mL/kg/h) as they hold onto salt and water, and RAAS activation begins. — why: Low flow to the kidneys makes them think the body is dehydrated, so they clamp down on urine production to try to keep every drop of fluid in the tank and boost blood volume and pressure back up—but if the real problem is a broken pump or wide-open pipes, adding fluid won't fix it and may even make things worse (fluid overload in cardiogenic shock).
7. Brain blood flow (perfusion) starts to fall, causing confusion, agitation, or lethargy. — why: The brain is usually the last organ to lose blood flow, so altered mental status is a late and ominous sign that even the body's highest-priority organ is now starving—this often signals impending decompensation.
8. Multi-organ dysfunction begins: acute kidney injury (AKI), liver enzyme rise (hepatic starved blood flow (ischemia)), gut starved blood flow (lactic too much acid in the blood (acidosis) worsens, risk of gut barrier breakdown and bacterial translocation), and myocardial dysfunction (even non-cardiogenic shock can cause secondary heart injury from poor coronary blood flow (perfusion)). — why: Once cells go without oxygen for more than a few minutes to hours (depending on the organ), they start to die; kidneys can't filter waste (creatinine rises), liver can't process toxins (ammonia, bilirubin rise), gut wall breaks down (bacteria leak into blood, worsening sepsis), and even the heart muscle gets stunned from low coronary flow, creating a vicious cycle.

Spot it — what you see, and why

- Fast heart rate (tachycardia): The heart beats faster to pump more blood and oxygen to the body when blood pressure drops or there is not enough blood. It is like a pump working overtime to keep up.
- Low blood pressure (hypotension): Not enough blood moves through the tubes (vessels) in your body. This happens because there is too little blood, the tubes are too wide and loose, or the heart cannot pump hard enough.
- Cold, clammy, pale skin: Blood vessels in the skin squeeze tight to save blood for the brain and heart. Less blood reaches the skin. It is like closing side roads so more cars can stay on the main highway.
- Weak or absent pulses: Low blood pressure means each heartbeat pushes out less blood. The pulse feels very weak or you cannot feel it at all in your wrist or feet.
- Confusion or agitation: The brain is not getting enough oxygen because blood is not flowing well. It is like a phone battery running too low and starting to act weird.
- Very little or no urine (oliguria or no urine output (anuria)): The kidneys need strong blood flow to clean the blood and make urine. When blood pressure drops, the kidneys hold onto water to try to keep blood volume high.

Red flags — act now

- Blood pressure stays low even after you give fluids through the IV tube
- The person is confused, very sleepy, or cannot wake up all the way
- Skin is cold, sweaty, and blotchy or has a blue color
- Urine output drops to almost nothing (less than 0.5 mL per kg per hour)
- Blood lactate level is high and going up (above 4 mmol/L). This shows tissues are not getting enough oxygen

Treat it — in this order

1. Identify the type of shock by physical exam: Check neck veins (full veins = heart or obstructive problem), listen to lungs (crackles = heart failure backing up), look at skin (cold and pale = hypovolemic or cardiogenic; warm and flushed = distributive like sepsis). → Naming the upstream broken piece tells you which treatment will actually work. A septic patient needs antibiotics and norepinephrine to tighten blood vessels, not just fluids. A bleeding patient needs blood products and surgery to stop the bleed, not pressors. A heart-attack patient needs the blocked artery opened fast. Each type of shock has a different fix, so guessing wrong wastes time and can harm the patient.
2. Hypovolemic shock (bleeding or dehydration): Give IV crystalloid fluids rapidly (30 mL per kg in the first hour, about 2 liters in an average adult), give packed red blood cells if hemoglobin is under 7 g/dL or actively bleeding, and find and stop the bleeding source (surgery, endoscopy, or clotting products like tranexamic acid). → Replacing lost volume fills the tank back up so the heart has blood to pump. Blood pressure rises, organs get blood flow again, lactate drops, and kidneys start making urine. The body stops rationing blood away from skin and gut. If the patient lost blood, giving red cells also restores oxygen-carrying capacity.
3. Distributive shock — sepsis: Give IV crystalloid fluids (30 mL/kg in first hour), start broad-spectrum antibiotics within 1 hour of recognizing septic shock (guideline target per Surviving Sepsis Campaign), draw blood cultures before antibiotics, add norepinephrine (a vasopressor that tightens blood vessels) if MAP stays under 65 mmHg after fluids, and find and remove the source of infection (drain abscess, remove infected catheter). → Fluids fill the widened vascular space, norepinephrine squeezes blood vessels back to normal width and pushes blood back to the center where organs need it, and antibiotics kill the bacteria that triggered the immune chemicals causing the shock. Blood pressure rises, lactate drops, and organs start working again.

4. Distributive shock — anaphylaxis: Give intramuscular epinephrine 0.3–0.5 mg immediately (into the thigh), lay the patient flat and elevate legs, give IV fluids rapidly, give inhaled albuterol if wheezing, give IV antihistamines (diphenhydramine) and corticosteroids (methylprednisolone), and remove the allergen trigger if possible. → Epinephrine reverses the allergic reaction by tightening blood vessels, opening airways, and stopping the immune cells from releasing more histamine. Blood pressure rises, airway swelling goes down, and shock reverses within minutes. Fluids support blood volume while epinephrine works.
5. Cardiogenic shock: Open blocked arteries fast (emergency cardiac catheterization with stent placement for STEMI, guideline target door-to-balloon time under 90 minutes), give inotropes like dobutamine (2.5–20 mcg/kg/min) to strengthen the heartbeat, add norepinephrine if blood pressure is still low, use mechanical support (intra-aortic balloon pump or ventricular assist device) if medications are not enough. → Unblocking the artery restores blood flow to dying heart muscle and stops the heart attack. Inotropes make the heart squeeze harder so it can pump more blood forward, which raises blood pressure and delivers oxygen to organs. Mechanical pumps take over part of the heart's job while it heals.

Your top priorities at the bedside

1. Place the patient on a cardiac monitor and pulse oximeter, and get a full set of vital signs including blood pressure in both arms, heart rate, breathing rate, temperature, and oxygen saturation every 5 to 15 minutes — why: Shock changes fast. Frequent vital signs let you see if the person is getting better or worse. A difference in blood pressure between arms can mean aortic dissection (a tear in the main artery), which is a cause of obstructive shock. The monitor catches dangerous heart rhythms that happen when the heart does not get enough oxygen.
2. Start two large-bore IV lines (18-gauge or bigger) immediately and prepare to give rapid IV fluid boluses as ordered, usually 30 milliliters per kilogram of crystalloid solution like normal saline or lactated Ringer solution in the first hour — why: Large IV catheters (tubes) let you give fluids fast. Most shock types need quick fluid replacement to fill the blood vessels and raise blood pressure so organs get oxygen. Two IV lines give a backup if one stops working and let you give blood products and medicines at the same time. Crystalloid fluids (salt water solutions) are the first choice because they are safe and move into blood vessels quickly.

3. Give high-flow oxygen by non-rebreather mask at 10 to 15 liters per minute to keep oxygen saturation above 94 percent, or prepare to assist breathing with a bag-valve mask if the patient cannot protect their airway or breathe well — why: In shock, blood carries less oxygen to tissues because circulation is poor. Extra oxygen raises the amount dissolved in blood and helps prevent cell death. If the person is very confused or too weak to breathe deeply, their airway can close or they can breathe in vomit. Assisting breaths pushes oxygen into the lungs until a breathing tube (endotracheal intubation) can be placed.