

Postoperative Hemorrhage

Bleeding after surgery — the heart races to push what little blood is left, pressure falls, urine stops, the belly swells or the drain fills with blood, and you must find the leak and close it before the body runs out of time.

THE ONE-LINE TRUTH

A blood vessel starts leaking after surgery, red blood cells spill out faster than the body can replace them, and blood pressure drops because there is not enough fluid left in the pipes.

The chain — how it unfolds

1. A blood vessel seal fails — a suture slips, a clot does not harden, or a hidden vessel opens. — why: Blood leaks out of the closed loop of vessels and pools in the belly (hemoperitoneum), chest (hemothorax), or tissues around the surgery site. The volume of blood that is circulating — the amount available to carry oxygen — starts to fall.
2. The heart races (tachycardia) and beats harder. — why: Baroreceptors in the aorta and carotid arteries sense the pressure drop and signal the brainstem, which releases norepinephrine through the sympathetic nervous system. Norepinephrine revs the heart to pump faster and harder, trying to push what little blood is left to the brain and kidneys.
3. Blood vessels squeeze tight (vasoconstriction), and the skin turns pale and cool. — why: Norepinephrine also makes smooth muscle in the walls of small arteries contract, shrinking the diameter of the pipes. Blood is shunted away from the skin, gut, and muscles and sent to the heart and brain — the most vital organs. The patient looks pale and feels cold to the touch.
4. The kidneys make almost no urine (oliguria below 0.5 mL/kg/hr), and urine becomes dark and concentrated. — why: When blood pressure falls, the kidneys do not get enough squeeze to filter blood, so urine output drops. The kidneys also release renin, triggering the body to hold onto sodium and water through the renin-angiotensin-aldosterone system, trying to keep whatever fluid is left inside the vessels.
5. The red blood cell count (hemoglobin and hematocrit) falls, and the blood becomes diluted. — why: Red blood cells are leaking out of the circulation faster than the bone marrow can replace them. As the body pulls fluid from the tissues into the blood vessels to maintain volume, the remaining blood becomes more diluted — so each drop carries less oxygen.

6. The drain tube fills with blood, the belly becomes swollen and tight, or imaging shows a blood collection (hematoma). — why: Blood that leaks into the abdomen, pelvis, or chest shows up as bright red fluid in the drain, a firm mass on exam, or a fluid pocket on ultrasound or CT scan. The abdomen may become distended (swollen) and tender as blood fills the space.
7. Blood pressure suddenly crashes (hypotension below 90 mmHg systolic), and the patient becomes confused, drowsy, or unresponsive. — why: Once 30–40% of blood volume is lost, the heart can no longer fill between beats — there is simply not enough fluid in the tank. Cardiac output plummets, blood pressure collapses (decompensated shock), and oxygen delivery to the brain falls. This is the tipping point into bleeding-driven (hemorrhagic) shock.
8. Organs begin to fail: the kidneys stop making urine (acute kidney injury), the brain becomes oxygen-starved (hypoxic) (leading to confusion or coma), the gut lining breaks down (risking infection), and the heart may stop (cardiac arrest). — why: Without enough oxygen, cells switch to anaerobic metabolism (burning fuel without oxygen), which makes lactic acid and poisons the cells. If the leak is not stopped and blood volume is not replaced with transfusion, multi-organ failure and death follow. The only way to reverse this domino is to find the bleeding vessel and close it — usually by taking the patient back to the operating room — and to give packed red blood cells, fresh frozen plasma, and platelets to replace what was lost and restore the clotting system.

Spot it — what you see, and why

- Bleeding from the surgical cut or drain: After surgery, the blood vessels at the cut edges need time to seal shut with clots. If a clot breaks loose, or if the surgeon's stitches or cautery burns (the tool that seals vessels with heat) don't hold, blood leaks out through the wound or the drain tube the surgeon left in place to carry away extra fluid.
- Swelling or a growing bruise near the surgery site: Blood is pooling under the skin or inside the tissue instead of staying in the vessels. The pooled blood pushes the tissue outward, creating a swelling called a pooled collection of blood (hematoma) (a pocket of clotted blood), and iron in the blood makes the skin look purple or black like a bruise.
- Blood-soaked bandages that need changing often: Active bleeding is soaking through the gauze faster than the body can clot the wound. This means either a vessel is still open or the clotting system isn't strong enough to plug the leak.
- Fast heart rate (tachycardia): When you lose blood, the amount of fluid carrying oxygen around the body drops. The heart tries to fix this by beating faster to push what's left through the body quickly, like a pump speeding up when the tank is low.

- Low blood pressure (hypotension): Blood loss shrinks the total volume in the blood vessels, so there's less pressure pushing against the vessel walls—like a garden hose with half the water turned off. If the pressure drops too low, organs don't get enough oxygen-rich blood.
- Pale, cool, or clammy skin: The body pulls blood away from the skin and sends it to the brain and heart first when blood volume is low. Less blood in the skin makes it look pale and feel cold. Stress hormones like epinephrine (the body's main 'fight or flight' chemical) also trigger sweating, making the skin clammy.

Red flags — act now

- Bleeding that soaks through bandages every hour or faster
- Heart rate above 120 beats per minute or blood pressure dropping below 90 systolic (the top number)
- Confusion, extreme sleepiness, or trouble staying awake
- Swelling at the surgery site that grows quickly or feels tight and painful
- Vomiting blood, blood in the urine, or black tarry stools

Treat it — in this order

1. Place two large-bore IV lines (18-gauge or bigger), send type and crossmatch, activate massive transfusion protocol if patient is in shock (1:1:1 ratio of packed red blood cells : fresh frozen plasma : platelets) → Replaces the blood volume and red blood cells you lost, so your heart does not have to race and your organs get oxygen again. The 1:1:1 ratio keeps your blood thick enough to clot — if you only give red cells and skip plasma and platelets, you water down the clotting factors and make bleeding worse.
2. Reverse any blood thinners the patient was taking: give prothrombin complex concentrate (PCC) or fresh frozen plasma plus vitamin K for warfarin; andexanet alfa or PCC for factor Xa inhibitors like apixaban or rivaroxaban; idarucizumab for dabigatran; protamine sulfate for heparin → Turns off the drug that was blocking your clotting system. Once the block is lifted, your body can make clots again and seal the bleeding vessel. For example, warfarin blocks vitamin K so your liver cannot make clotting factors — giving PCC or FFP plus vitamin K restores those factors immediately.
3. Give tranexamic acid (TXA) 1 gram IV over 10 minutes, ideally within 3 hours of bleeding onset; can repeat 1 gram over 8 hours → Locks clots in place by blocking plasmin, the enzyme that normally dissolves fibrin (the mesh that holds a clot together). This stops clots from falling apart and keeps the plugs you form from washing away.

4. Find the bleeding source: examine the wound, review drain output, order bedside ultrasound or CT scan, call interventional radiology for embolization or return the patient to the operating room for surgical exploration and repair → Locates exactly where the blood is leaking — a slipped tie, a missed vessel, a reopened suture line — so you can tie it off, cauterize it, pack it with gauze, or block it with a coil or glue from inside the vessel. Stopping the one broken pipe upstream fixes the whole problem.
5. Correct impaired blood clotting (coagulopathy): give fresh frozen plasma if PT/INR is prolonged or aPTT is high; give cryoprecipitate if fibrinogen is below 150 mg/dL; give platelets if platelet count is below 50,000 per microliter or if the patient is still bleeding → Restores the missing pieces your blood needs to clot — clotting factors in plasma, fibrinogen in cryoprecipitate, and platelets to plug small holes. Once these are back, your blood thickens and can seal wounds instead of staying thin and runny.

Your top priorities at the bedside

1. Get large-bore IV access (two 18-gauge or bigger needles) in place right now and start giving crystalloid fluids like normal saline or lactated Ringer solution wide open — why: Big IV needles let us push fluids and blood products fast. Crystalloid fluids (salt water solutions) fill up the blood vessels temporarily while we get blood ready. This keeps blood pressure up so organs get oxygen.
2. Apply direct pressure to any visible bleeding wound or surgical site with gauze pads — why: Direct pressure squeezes blood vessels shut so clots can form. This is the fastest way to slow down bleeding we can see and saves blood while we prepare other treatments.
3. Measure vital signs every 5 to 15 minutes: blood pressure, heart rate, respiratory rate, oxygen saturation, and temperature — why: Falling blood pressure with rising heart rate tells us shock (not enough blood flow to organs) is getting worse. Frequent checks catch changes early so we can act before organs fail.