

Intracerebral Hemorrhage

Intracerebral bleeding (hemorrhage) means a burst blood vessel dumps blood into the brain tissue. Lower blood pressure fast. Stop blood thinners. Watch pressure inside the skull. Surgery if the clot is big and the brain is shifting.

THE ONE-LINE TRUTH

A blood vessel inside the brain bursts and bleeds into the brain tissue itself.

The chain — how it unfolds

1. A small artery deep in the brain or on the surface ruptures. — why: Years of high blood pressure, amyloid buildup, an AVM, a tumor, or blood thinners weaken the vessel wall until it tears, and blood pours out under arterial pressure.
2. Blood forms a pooled collection of blood (hematoma) (clot) that grows and destroys brain tissue. — why: The leaked blood does not stay liquid—it clots and expands like a bruise, crushing and killing neurons directly. The clot can grow for hours, especially if blood pressure stays high or clotting is impaired.
3. Sudden, severe headache (often called 'the worst headache of my life'). — why: Blood irritates the meninges (the brain's protective layers) and stretches pain-sensitive structures, triggering intense head pain.
4. Nausea and vomiting. — why: Rising pressure inside the skull pushes on the area postrema and vomiting center in the medulla (lower brainstem), triggering the throw-up reflex.
5. Weakness, numbness, or paralysis on one side of the body. — why: If the bleed hits the internal capsule, basal ganglia, or motor cortex (areas that control movement and sensation), signals to the opposite side of the body are cut off, causing weakness on one side (hemiparesis) (one-sided weakness) or paralysis on one side (hemiplegia) (one-sided paralysis).
6. Trouble speaking or understanding (aphasia). — why: If the bleed is in the left hemisphere language areas (Broca's or Wernicke's area), the patient cannot produce or understand words.

7. Worsening drowsiness, confusion, or loss of consciousness. — why: The growing clot raises intracranial pressure (ICP), squeezing the reticular activating system in the brainstem (the brain's on-switch), and reducing blood flow to the cortex, so the patient gets sleepier and less responsive.
8. Brain herniation: the brain shifts and squeezes through openings in the skull. — why: When ICP is too high, the brain is pushed downward or sideways. The uncus (part of the temporal lobe) pushes through the tentorium and compresses the third cranial nerve (causing a blown pupil—one pupil huge and unresponsive to light) and the brainstem, or the cerebellar tonsils push down through the foramen magnum and crush the medulla, stopping breathing and heart function. Herniation is the final, irreversible step that causes death.

Spot it — what you see, and why

- Sudden weakness or numbness on one side of the body: Blood leaking into the brain tissue crushes and injures the nerve pathways that control movement and feeling. When the motor strip (the brain's movement command center) or its wiring is damaged, signals to muscles and skin on the opposite side of the body stop getting through.
- Severe headache that comes on suddenly: Blood pooling inside the skull stretches pain-sensitive membranes (the meninges that wrap the brain) and pushes on brain tissue. Blood itself is irritating to these tissues, triggering sharp, intense pain — like inflating a balloon inside a sealed box.
- Trouble speaking or understanding words (aphasia): Bleeding in the left side of the brain (in most people) damages language centers such as Broca's area (which helps form speech) or Wernicke's area (which helps understand words). Without these working, the brain cannot put thoughts into words or decode what others say.
- Sudden vision problems (blurred vision, double vision, or loss of part of the visual field): Blood pressing on the visual pathways (the optic tracts or occipital cortex, the brain's seeing center at the back) blocks the signals from the eyes. The brain cannot build a clear picture, so vision blurs, splits, or goes dark in patches.
- Loss of balance or trouble walking: Bleeding in the cerebellum (the brain's balance control center at the back-bottom) or in the pathways that coordinate movement disrupts the signals that keep you steady. The brain loses its 'gyroscope', making every step wobbly or impossible.
- Nausea and vomiting: Rising pressure inside the skull (from pooling blood and swelling) squeezes the brainstem, which houses the vomiting center. The brain interprets this pressure as a poisoning signal and triggers nausea and vomiting to try to protect itself.

Red flags — act now

- Sudden, severe headache described as 'the worst headache of my life'
- Rapid worsening of confusion, weakness, or loss of consciousness
- Seizure in someone with no prior seizure history
- Signs of brainstem injury: trouble breathing, very slow or irregular heartbeat, or pupils that do not respond to light
- Symptoms appearing suddenly in someone taking blood thinners (anticoagulants or antiplatelet drugs)

Treat it — in this order

1. Lower systolic blood pressure to under 140 mmHg using IV nicardipine or clevidipine → High pressure keeps forcing blood out through the crack in the vessel wall. Lowering the pressure slows bleeding and stops the pool of blood from growing bigger.
2. Reverse blood thinners: give vitamin K and prothrombin complex concentrate (PCC) for warfarin, idarucizumab for dabigatran, or andexanet alfa for rivaroxaban or apixaban → Blood thinners block clotting proteins or platelets. Reversal agents turn clotting back on so the body can plug the hole in the vessel and stop active bleeding.
3. Manage intracranial pressure: elevate head of bed to 30 degrees, give mannitol (0.25–1 g/kg IV) or 3% hypertonic saline, sedate if agitated, and consider an ICP monitor if GCS ≤ 8 → Blood takes up space in the skull and squeezes healthy brain tissue, cutting off its oxygen. Osmotic agents pull water out of swollen brain cells, lowering pressure and protecting tissue around the bleed.
4. Surgical evacuation if cerebellar bleed is larger than 3 cm, or lobar bleed larger than 30 mL that is getting worse; insert external ventricular drain (EVD) if hydrocephalus develops → Surgery physically removes the blood clot, relieving skull pressure instantly and restoring blood flow to squashed brain tissue. For cerebellar bleeds, it prevents the brainstem from being crushed, which would stop breathing.
5. Give levetiracetam 500–1000 mg IV twice daily for lobar hemorrhages to prevent seizures → Injured brain tissue near the surface fires wild, uncontrolled electrical bursts. Levetiracetam (a seizure medicine) calms these signals, preventing a seizure that would burn oxygen and spike intracranial pressure.

Your top priorities at the bedside

1. Check airway, breathing, and oxygen saturation every 15 minutes; keep oxygen saturation above 94% and position patient on their side if vomiting or unconscious. — why: Intracerebral bleeding (hemorrhage) can cause decreased level of consciousness and loss of protective airway reflexes (ability to cough and protect the airway), so aspiration (breathing in vomit or saliva) can cause pneumonia and low oxygen worsens brain swelling by causing vasodilation (widening of blood vessels that increases intracranial pressure).
2. Measure blood pressure every 15 minutes and notify the provider immediately if systolic pressure is above 140 mmHg; prepare IV nicardipine or clevidipine infusion as ordered. — why: High blood pressure makes the bleeding worse by forcing more blood out of the ruptured vessel, so acute blood pressure lowering to systolic under 140 mmHg within the first hour reduces a pooled collection of blood (hematoma) expansion (growth of the blood clot) and improves survival without increasing brain starved blood flow (ischemia) (lack of blood flow).
3. Perform full neurologic assessment using Glasgow Coma Scale (eye opening, verbal response, and motor response scores) and NIH Stroke Scale every hour and immediately report any worsening weakness, confusion, pupil changes, or decreased consciousness. — why: Rapid neurologic decline indicates a pooled collection of blood (hematoma) expansion or rising intracranial pressure from brain swelling, and early detection allows time for repeat CT scan, blood pressure adjustment, osmotic therapy (mannitol or hypertonic saline to pull fluid from brain tissue), or emergency neurosurgery before irreversible brain herniation occurs.