

Subarachnoid Hemorrhage

A plain-English guide for you and your family

WHAT IS HAPPENING

Normally, blood vessels in your brain are strong and sealed tight. A thin cushion of clear fluid wraps around your brain in a space called the subarachnoid space — it protects your brain like bubble wrap. No blood belongs in that space. But when a weak balloon on a brain vessel (called an aneurysm) bursts, or an injury tears a vessel, blood floods that cushion space. The blood irritates the brain's protective covering (the meninges) and pushes up the pressure inside your skull. That sudden flood causes the worst headache you've ever felt — people say it's like being struck by lightning or hit with a bat. Your neck gets stiff because your body locks the muscles to guard the brain. Bright lights hurt because the irritated nerves are extra sensitive. You might feel sleepy or confused because the pressure is squeezing your brain. If you've had a sudden bad headache before that went away, that was a warning leak. The real danger is the bleed itself, then rebleeding before doctors seal the leak, then the blood vessels squeezing down days later (vasospasm) and choking off oxygen. The body tries to help by raising blood pressure to push oxygen through, but that can make the weak spot bleed again. Doctors find it with a CT scan, confirm with a spinal tap if needed, seal the aneurysm with a coil or clip, give nimodipine to relax the vessels, and watch closely to catch problems early. Every step aims to stop the bleed, protect the brain, and buy time for healing.

What you might feel

- Sudden, severe headache — often called the worst headache of your life
- Stiff neck (can't easily bend your chin down toward your chest)
- Sudden nausea and vomiting
- Sensitivity to light (photophobia — bright light hurts your eyes or makes your headache worse)
- Confusion or trouble staying awake (altered level of consciousness)
- Sudden loss of consciousness or fainting (syncope)
- Seizure (sudden jerking movements or blanking out)

- Weakness or numbness on one side of the body, trouble speaking, or vision loss (focal neurologic deficits)
- Blurred or double vision

Call the doctor right away if...

- Sudden, worst headache of your life — especially if it peaks within seconds to minutes (thunderclap headache)
- Loss of consciousness, seizure, or trouble staying awake after the headache starts
- Sudden weakness, numbness, trouble speaking, or vision loss on one side
- Stiff neck with severe headache and sensitivity to light — may signal bleeding around the brain
- Headache after head injury, especially if you passed out or vomited

What the care team will do

- Check airway patency and oxygen saturation every 15 minutes and prepare for intubation if Glasgow Coma Scale drops below 8
- Keep systolic blood pressure between 140 and 160 mmHg using IV labetalol or nicardipine until the aneurysm is secured
- Perform hourly neurological checks including Glasgow Coma Scale score and pupil size and reaction to light
- Give nimodipine 60 mg by mouth or feeding tube every 4 hours for 21 days starting as soon as the diagnosis is confirmed
- Monitor EVD (external ventricular drain) output hourly and keep the drain at the ordered height above the tragus of the ear
- Keep the head of bed elevated to 30 degrees and maintain head in midline neutral position
- Maintain a quiet dark room and limit visitors to prevent stimulation and straining
- Hold all aspirin and anticoagulants and check PT INR and platelet count immediately

Medicines you may be given — and why

Nimodipine

Nimodipine relaxes the smooth muscle in the walls of brain arteries. After a bleed in the space around the brain, these arteries can squeeze down tight (vasospasm) days later, starving brain tissue of oxygen. Nimodipine keeps calcium—the signal that tells muscle to squeeze—from flooding into the muscle cells in the artery wall, so the vessels stay open and blood flows.

Labetalol or nicardipine (for blood pressure control before the aneurysm is secured)

High blood pressure after a subarachnoid bleeding (hemorrhage) can push on the weakened aneurysm wall and cause it to bleed again before it is clipped or coiled. Labetalol blocks receptors (docking sites) on blood vessels and the heart that respond to adrenaline, slowing the heart and relaxing vessels. Nicardipine blocks calcium channels in artery walls, causing them to relax. Both lower the pressure inside the aneurysm, buying time until it can be repaired.

Levetiracetam or phenytoin (short-term seizure prevention)

Blood in the subarachnoid space and the injury from the bleed can irritate the brain's surface, making neurons (brain cells) fire in wild bursts—a seizure. Levetiracetam binds to a protein called SV2A on the storage bubbles that hold neurotransmitters (chemical messengers), making it harder for the cells to dump their signals all at once. Phenytoin blocks sodium channels on neuron membranes, stopping the rapid-fire electrical waves that spread a seizure.

Hypertonic saline (3%) or fludrocortisone (for cerebral salt wasting or symptomatic low sodium (hyponatremia))

After subarachnoid bleeding (hemorrhage), the brain can send signals that make the kidneys dump too much sodium into the urine (cerebral salt wasting), or release too much ADH—antidiuretic hormone—which makes the body hold water and dilute the blood (SIADH). Both drop the sodium level in the blood (hyponatremia). Low sodium causes brain cells to swell and can lead to confusion, seizures, or coma. Hypertonic saline delivers concentrated sodium to raise blood sodium quickly. Fludrocortisone tells the kidneys to hold onto sodium and water, fixing the loss in cerebral salt wasting.

Where this information comes from

- AHA/ASA Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage (2012, updated 2023)
- Neurocritical Care Society
- Cochrane Database of Systematic Reviews
- UpToDate Clinical Decision Support

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