Meningitis

A plain-English guide for you and your family

WHAT IS HAPPENING

Normally, the blood-brain barrier (a tight seal in blood vessels around the brain) keeps the cerebrospinal fluid (CSF) — the clear cushion that wraps the brain and spinal cord — sterile and clean. The CSF bathes the brain, absorbs shocks, and washes away waste. Small guard cells called microglia patrol and handle tiny threats. In bacterial meningitis, that seal fails. Bacteria sneak into the CSF in three ways: they ride the bloodstream from an infection elsewhere in the body (like pneumonia or a bloodstream infection), they crawl through from a nearby infection (like an ear infection or sinus infection that erodes through bone), or they enter directly from trauma or surgery that breaks the skull or spine. Once inside, bacteria multiply fast because CSF has almost no white blood cells or antibodies to fight them. The body floods the meningeal lining (the thin wrap around the brain) with white blood cells and inflammatory chemicals to kill the invaders, but that immune storm causes the symptoms: severe headache, stiff neck, high fever, confusion, and sometimes seizures. The brain swells from the inflammation, blood vessels get inflamed and leak, and pressure inside the skull rises. If bacteria spill heavily into the bloodstream, septic shock can crash blood pressure and starve organs. Every symptom is the body's emergency response trying to wall off the infection and protect the brain — not the infection itself. Treatment must kill the bacteria with antibiotics, dampen the immune overreaction with steroids, and manage brain swelling to prevent permanent damage. Speed matters: every hour's delay raises the risk of death or lasting harm like hearing loss, brain damage, or limb loss from clotting.

What you might feel

- Fever
- Severe headache
- Stiff neck (cannot bend the neck forward comfortably)
- Altered mental status (confusion, sleepiness, hard to wake up, or acting unlike themselves)
- Petechial or purpuric rash (tiny red or purple spots that do not fade when you press on them)
- Light sensitivity (Photophobia) (eyes hurt or water in bright light)

- Nausea and vomiting
- Positive Kernig sign (pain or resistance when the knee is straightened while the hip is bent)
- Positive Brudzinski sign (hips and knees bend automatically when the neck is flexed forward)
- Seizures

Call the doctor right away if...

- Altered mental status, confusion, or hard to wake up
- Seizure
- Petechial or purpuric rash that does not blanch (does not turn white when pressed)
- Signs of shock (very low blood pressure, fast heart rate, cold hands and feet, pale or mottled skin)
- Focal neurologic deficits (weakness, numbness, or vision loss on one side)

What the care team will do

- Obtain blood cultures and ensure antibiotics start within 30 minutes of arrival, before any imaging or lumbar puncture
- Administer dexamethasone 10 mg IV before or with the first antibiotic dose
- Monitor neurological status every 1 to 2 hours using Glasgow Coma Scale and pupil response
- Elevate the head of the bed to 30 degrees and keep the patient's head midline
- Place the patient in droplet precautions with a mask until bacterial meningitis is ruled out or 24 hours of antibiotics are complete
- Maintain normothermia with acetaminophen or cooling blankets, targeting temperature below 38°C (100.4°F)
- Give IV fluids to maintain euvolemia with normal saline, avoiding both dehydration and fluid overload
- Minimize stimulation by dimming lights, reducing noise, and clustering care activities

Medicines you may be given — and why

Ceftriaxone

Ceftriaxone punches holes in the walls that bacteria need to stay alive. Without a strong wall, the bacteria burst and die. It works especially well against the most common germs that cause meningitis—Streptococcus pneumoniae (the pneumonia bug) and Neisseria meningitidis (the

meningococcal bug)—because it crosses from the bloodstream into the fluid around the brain and spinal cord even when inflammation is present.

Vancomycin

Vancomycin attacks a different part of the bacterial wall than ceftriaxone does, blocking the bacteria from linking wall pieces together. It is added to ceftriaxone because some strains of Streptococcus pneumoniae have become resistant to other antibiotics, and vancomycin can still kill them. Together, ceftriaxone and vancomycin cover almost all the bacteria that cause bacterial meningitis in adults and children.

Ampicillin

Ampicillin is added to the antibiotic mix when the patient is over 50 years old, pregnant, or has a weakened immune system (from cancer, HIV, transplant drugs, or steroids) because these groups are at higher risk for Listeria monocytogenes meningitis. Listeria is resistant to ceftriaxone and vancomycin, but ampicillin kills it by breaking down its cell wall. Ampicillin also covers some other bacteria, making the initial treatment as broad as possible until lab tests identify the exact germ.

Acyclovir

Acyclovir is started immediately if the doctor cannot yet rule out herpes simplex virus (HSV) encephalitis, a viral brain infection that looks very similar to bacterial meningitis at first but needs antiviral treatment, not antibiotics. HSV encephalitis can cause fever, confusion, seizures, and brain swelling; without acyclovir, it can lead to permanent brain damage or death. Acyclovir works by sneaking into infected brain cells and stopping the virus from copying its DNA, which halts the infection.

Dexamethasone

Dexamethasone is a powerful anti-inflammatory steroid given before or with the first dose of antibiotics to reduce brain swelling and damage in bacterial meningitis, especially pneumococcal meningitis caused by Streptococcus pneumoniae. When bacteria die from antibiotics, they release toxins and debris that trigger a massive inflammatory response in the tight space around the brain. This inflammation can damage nerves, cause hearing loss, and lead to stroke or death. Dexamethasone dampens that inflammatory surge, protecting the brain and reducing the risk of long-term disability like deafness or cognitive problems.

Where this information comes from

- IDSA Clinical Practice Guidelines for Bacterial Meningitis 2004 (updated 2017)
- CDC Meningitis Guidelines

- Cochrane Acute Bacterial Meningitis Reviews
- WHO Guidelines on Meningitis

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