

Otitis Media (Middle Ear Infection)

A germ invades the space behind the eardrum, trapping pus inside, swelling the drum, and sometimes making it burst.

THE ONE-LINE TRUTH

An infection behind the eardrum in the middle ear that fills the space with infected fluid, blocks sound waves, and causes sharp ear pain.

The chain — how it unfolds

1. A cold, flu, or allergy inflames the nose and throat, swelling the eustachian tube and pinching it shut. — why: When the tube can't open, air pressure in the middle ear drops and mucus can't drain, creating a stagnant pool where germs thrive.
2. Bacteria or viruses from the nasopharynx (back of the nose and throat) travel up the blocked eustachian tube into the middle ear and multiply in the trapped fluid. — why: The warm, moist, stagnant environment is perfect for germs; common culprits are *Streptococcus pneumoniae*, nontypeable *Haemophilus influenzae*, and *Moraxella catarrhalis*.
3. The infection triggers inflammation: the middle-ear lining swells, leaks fluid, and white blood cells pour in, turning the fluid cloudy and thick (purulent a fluid collection (effusion)). — why: Your immune system is fighting the germs, but the battle creates pus and more swelling, which raises pressure inside the sealed middle-ear space.
4. Pressure builds and pushes the eardrum outward, stretching it; the drum turns red and bulges, causing sharp, throbbing ear pain. — why: The eardrum has pain nerves, so stretching it hurts; the pain is often worse at night when lying flat, because more blood pools in the head and raises middle-ear pressure even more.
5. Fluid filling the middle ear damps the vibrations of the ossicle bones, so sound waves can't pass through well, and hearing becomes muffled (conductive hearing loss of roughly 20-30 decibels). — why: Sound travels poorly through liquid compared to air; the child may seem inattentive, turn up the TV, or not respond to soft sounds.
6. If untreated or if pressure is very high, the eardrum perforates—a small tear opens and thick yellow or cloudy fluid drains into the ear canal. — why: The tear relieves pressure instantly, so pain often drops; the hole usually heals on its own in days to weeks, but it can leave a permanent perforation if infections happen over and over.

7. In some children, fluid stays in the middle ear for weeks or months after the infection clears (otitis media with a fluid collection (effusion), or 'glue ear'), keeping hearing muffled. — why: The eustachian tube is still slow to open, so the thick fluid can't drain; prolonged hearing loss during ages one to three can delay speech and language development.
8. Rarely, infection spreads beyond the middle ear into the mastoid bone behind the ear (mastoiditis), into the inner ear (labyrinthitis, causing dizziness and severe hearing loss), or even into the brain (meningitis or brain abscess). — why: These serious complications happen when bacteria break through thin bone walls or travel along veins; they require urgent intravenous antibiotics and sometimes surgery.

Spot it — what you see, and why

- Ear pain (otalgia) that gets worse when lying down: Fluid and pus trapped behind the eardrum press outward on it, stretching it tight like a balloon being blown up. When you lie flat, more blood flows to the head and increases that pressure even more, making the pain sharper.
- Fever (usually 100–104°F): White blood cells (the body's soldiers) flood into the middle ear to fight the bacteria or virus causing the infection. These immune cells release chemicals called pyrogens (fever-makers) that turn up the body's thermostat in the brain, raising temperature to help kill the germs.
- Trouble hearing or feeling like sounds are muffled: The middle ear normally has air in it, which lets the tiny bones (ossicles) inside vibrate freely and carry sound from the eardrum to the inner ear. When thick fluid or pus fills that space instead, it weighs down and dampens those bones so they can't vibrate well—like trying to ring a bell underwater.
- Fluid draining from the ear (otorrhea): Pressure from pus and fluid inside the middle ear can tear a small hole in the eardrum (called a perforation). Once the drum ruptures, the trapped fluid leaks out through the ear canal. Oddly, this often makes the pain suddenly drop because the pressure is released.
- Pulling or tugging at the ear (especially in babies and toddlers): Young children who cannot yet say 'my ear hurts' will pull, rub, or bat at the painful ear because the discomfort is so bothersome. It is their way of showing you where it hurts.
- Fussiness, irritability, or trouble sleeping: Pain from the swollen, infected middle ear keeps the child uncomfortable and unable to settle. Lying down makes the pain worse, so babies wake frequently and cry because they cannot get comfortable.

Red flags — act now

- Severe headache, stiff neck, or the child cannot touch chin to chest (possible meningitis— infection of the brain's covering)

- Swelling, redness, or tenderness of the bone behind the ear (mastoiditis—infection has spread into the skull bone)
- Facial weakness or drooping on one side (the facial nerve runs through the middle ear; swelling can pinch it)
- Persistent high fever above 102.2°F for more than 48 hours despite antibiotics, or the child looks very ill and listless
- New confusion, extreme drowsiness, seizure, or inability to wake the child fully (signs infection may have reached the brain)

Treat it — in this order

1. High-dose amoxicillin by mouth (80–90 mg per kilogram of body weight per day, split into two doses) for 5–10 days → Amoxicillin kills the most common bacteria that cause ear infections—*Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. The high dose is needed because some pneumococcus strains have built resistance to lower doses. Pain and fever usually drop within 48–72 hours if the drug is working.
2. Amoxicillin-clavulanate (Augmentin) if the child was on amoxicillin in the past 30 days, has both eyes infected (conjunctivitis), or isn't better after 48–72 hours → Clavulanate blocks the beta-lactamase enzyme that resistant bacteria use to destroy amoxicillin, so this combination works against strains that regular amoxicillin can't touch. It's the next step when first-line treatment fails.
3. Ibuprofen (10 mg/kg every 6–8 hours) or acetaminophen (15 mg/kg every 4–6 hours) for pain and fever → These medicines lower fever by resetting the brain's temperature control and reduce pain by blocking chemicals (prostaglandins) that make nerves more sensitive. Pain relief usually starts within 30–60 minutes and is often the most important treatment for the child's comfort in the first 1–2 days.
4. Watchful waiting (no antibiotics right away) for children 6 months to 2 years with ONE ear involved and only mild symptoms, or kids over 2 years with mild symptoms in one or both ears → Many ear infections clear up on their own in 2–3 days as the immune system fights off the germs. Skipping antibiotics when it's safe cuts down on side effects (diarrhea, rash, yeast infections) and slows the spread of resistant bacteria in the community.
5. Tympanostomy tubes (tiny plastic or metal tubes surgically placed through the eardrum) for children with recurrent infections (≥ 3 episodes in 6 months or ≥ 4 in 12 months) or fluid that won't clear for 3+ months with hearing loss → The tube creates a permanent air channel through the drum, so the middle ear stays dry and ventilated—like opening a window in a damp basement. This prevents fluid buildup and cuts the number of infections dramatically. Tubes usually fall out on their own after 6–12 months as the eardrum pushes them out while healing.

Your top priorities at the bedside

1. Assess and manage pain using age-appropriate pain scales, and give pain medicine (like acetaminophen or ibuprofen) as ordered. — why: Ear pain from middle ear infection can be very sharp and throbbing because the eardrum is stretched tight by fluid pressing against it. Controlling pain helps the person rest, eat, and feel safe. We measure pain with number scales or picture faces so we know if our treatment is working. Pain medicine also brings down fever, which makes the whole body feel better.
2. Check the ear with an otoscope (a lighted tool to look inside the ear canal) and watch for drainage, redness of the eardrum, or bulging. — why: Looking inside the ear shows us if the eardrum is red, swollen, or pushing outward from fluid behind it. A bulging eardrum confirms fluid is trapped in the middle ear. If we see drainage, we note the color and amount because thick yellow or green pus tells us about bacterial infection. This assessment guides whether antibiotics are needed and tracks if the infection is getting better or worse.
3. Teach the patient or family how to give antibiotics correctly (full course, right dose, right times) if they are prescribed. — why: Not all ear infections need antibiotics—many are caused by viruses that antibiotics can't kill. But when bacteria are the cause or the infection is severe, finishing the full course (usually 5-10 days) kills all the germs so they don't come back stronger or resistant (able to survive the medicine). Stopping early lets some bacteria survive and multiply again. We explain this clearly so families understand why every dose matters, even when the child feels better after a couple days.