CONDITION

Cholesteatoma

Learn how cholesteatoma affects the middle ear, including symptoms, causes, diagnosis, surgery, possible complications, and long-term follow-up.

WHAT IT IS
Abnormal skin cell and keratin growth behind the eardrum

BODY SYSTEM
Ear and hearing

MAIN SYMPTOMS
Ear drainage, gradual hearing loss, ear pressure, dizziness

WHAT CAUSES IT
Trapped skin cells, acquired or congenital

HOW IT IS DIAGNOSED
Ear examination, hearing tests, imaging, surgical findings

MAIN TREATMENT
Surgery

CAN IT BE CURED?
Sometimes - residual or recurrent disease occurs

IS IT AN EMERGENCY?
Sometimes - sudden facial drooping or neurologic symptoms

LONG-TERM OUTLOOK
Usually controllable but requires long-term follow-up

Overview

A cholesteatoma is an abnormal collection of skin cells and keratin, the protein found in skin, that grows behind the eardrum. It usually develops in the middle ear or in the mastoid, the air-filled bone behind the ear.

Despite its name, a cholesteatoma is not made of cholesterol. It is also not usually cancer. However, it can slowly enlarge and damage nearby structures. Inflammation and pressure from the trapped material may erode the small hearing bones, the surrounding bone, or structures involved in balance and facial movement.

Most cholesteatomas are acquired, meaning they develop during life. A smaller number are congenital, meaning skin cells became trapped in the middle ear during development before birth.

Cholesteatoma matters because it does not normally go away on its own. Treatment can control infection, protect hearing, and reduce the chance of serious complications. Surgery is usually needed to remove the abnormal tissue, although the exact approach depends on its location, size, previous ear treatment, hearing, and a person's overall health.

Symptoms

Symptoms often develop gradually and may affect only one ear. The pattern can differ between adults and children.

Possible symptoms include:

A congenital cholesteatoma may cause no symptoms at first. It may be found during an ear examination as a white, pearl-like area behind an intact eardrum. In children, hearing loss may first appear as difficulty following conversation, delayed speech, reduced school performance, or turning up the volume on devices.

Ear drainage or hearing loss can have many causes, so these symptoms do not confirm a cholesteatoma. They should be assessed by a healthcare professional, especially if they persist or repeatedly return.

Facial weakness, severe vertigo, intense headache, confusion, neck stiffness, high fever, or redness and swelling behind the ear require urgent medical assessment. Sudden facial drooping, loss of consciousness, or severe neurologic symptoms should be treated as an emergency.

- Persistent or repeated drainage from the ear, which may have an unpleasant smell
- Gradual hearing loss or muffled hearing
- A feeling of pressure or fullness in the ear
- Ear discomfort or pain
- Ringing, buzzing, or other sounds in the ear, called tinnitus
- Dizziness, vertigo, or balance problems
- Repeated ear infections that do not fully settle

Causes and risk factors

The middle ear is normally lined by a thin membrane rather than ordinary skin. A cholesteatoma forms when skin-producing tissue enters or becomes trapped in this space.

The most common acquired type begins with a retraction pocket. This happens when part of the eardrum is pulled inward, often because the eustachian tube is not regulating middle-ear pressure properly. The eustachian tube connects the middle ear to the back of the nose. If it does not open well, negative pressure can develop behind the eardrum.

Skin cells normally move outward from the eardrum and leave the ear canal. Inside a deep retraction pocket, they may become trapped and build up over time. Repeated inflammation can then contribute to tissue and bone damage.

An acquired cholesteatoma may also develop when skin grows through a hole in the eardrum. Such a hole may follow chronic infection, injury, placement of an ear tube, or previous ear surgery.

Factors associated with acquired cholesteatoma include:

A congenital cholesteatoma develops from skin cells left behind in the middle ear during fetal development. It is often found behind an eardrum that has no hole and may otherwise look normal.

Cholesteatoma is not caused by poor personal hygiene or an ordinary buildup of earwax. Cleaning the outer ear cannot remove tissue growing behind the eardrum.

- Long-term or repeated middle-ear infections
- Ongoing eustachian tube problems
- A retracted or perforated eardrum
- Previous middle-ear or mastoid surgery
- Craniofacial conditions, including cleft palate, that can affect eustachian tube function

Diagnosis

Diagnosis usually begins with a medical history and a careful ear examination. A primary care clinician may identify concerning changes and refer the person to an ear, nose, and throat specialist, also called an ENT doctor. An otologist or neurotologist is an ENT specialist with additional expertise in complex ear conditions.

The clinician may use an otoscope, microscope, or small endoscope to examine the ear canal and eardrum. Findings can include a deep retraction pocket, trapped white debris, persistent drainage, a hole in the eardrum, or changes from earlier surgery. Gentle suction may be used to clear drainage or debris so the area can be seen more clearly.

Hearing tests are an important part of the assessment. Audiometry measures the quietest

sounds a person can hear and helps show whether hearing loss is conductive, sensorineural, or mixed. Conductive hearing loss occurs when sound cannot travel normally through the eardrum and middle-ear bones. Sensorineural hearing loss involves the inner ear or hearing nerve.

Tympanometry may also be performed. This test measures how the eardrum responds to changes in air pressure and can provide information about middle-ear function.

Imaging is not needed in exactly the same way for every person. When it is useful, tests may include:

The diagnosis is usually based on the examination, hearing tests, imaging when needed, and findings during surgery. Other conditions, including chronic infection, earwax, tumors, or inflammatory tissue, can sometimes look similar.

- Computed tomography, or CT: Provides detailed images of the ear bones and may show bone erosion, mastoid involvement, or anatomy needed for surgical planning.
- Magnetic resonance imaging, or MRI: A specialized technique called diffusion-weighted imaging can help identify cholesteatoma tissue. It is especially useful when looking for disease that remains or returns after treatment.

Treatment and management

An ENT specialist plans treatment based on the cholesteatoma's extent, active infection, hearing, previous procedures, and the condition of the opposite ear. The main goals are to create a safe, dry ear, prevent further damage, and preserve or improve hearing when possible.

If the ear is infected or draining, the clinician may first clean it with gentle suction. Prescription antibiotic ear drops or, in some situations, oral antibiotics may be used to control infection. These measures can reduce drainage and inflammation, but they do not remove the underlying cholesteatoma.

Surgery is the usual definitive treatment. The procedure may involve removing disease from the middle ear, the mastoid, or both. Common parts of treatment include:

Surgeons use different mastoidectomy techniques. In a "canal wall up" procedure, the back wall of the ear canal is preserved. This may maintain more normal anatomy, but hidden residual disease can be harder to detect. In a "canal wall down" procedure, part of that wall is removed to create a larger cavity that can be examined and cleaned. This may be chosen for extensive disease or when reliable control is difficult with other approaches.

Hearing reconstruction may occur during the first operation or at a later procedure. Hearing does not always return to normal, particularly if the hearing bones or inner ear have been

damaged. The first priority is usually complete disease control and a stable ear.

Some people need a planned second operation or follow-up MRI to check for cholesteatoma that was too small to see or that remained after surgery. In selected situations, regular specialist cleaning and monitoring may be considered when surgery carries greater risk than benefit. This approach requires dependable, long-term follow-up because office cleaning does not cure hidden disease.

While awaiting care or recovering from surgery, patients should follow their clinician's instructions about keeping the ear dry. Cotton swabs, ear-cleaning tools, and nonprescription ear drops should not be placed in an affected or operated ear unless the treating clinician says they are safe.

- Tympanoplasty: Repairing or rebuilding the eardrum
- Mastoidectomy: Removing cholesteatoma and unhealthy tissue from the mastoid bone
- Ossicular reconstruction: Repairing or replacing damaged hearing bones

Complications

Without effective treatment, a cholesteatoma can continue to expand. The most common complications involve infection and hearing damage.

The small middle-ear bones may erode, leading to conductive hearing loss. Less commonly, inflammation can affect the inner ear and cause permanent sensorineural hearing loss, vertigo, or both. Damage near the facial nerve may produce weakness on one side of the face.

Other possible complications include:

Rarely, infection can spread beyond the ear and cause meningitis, an abscess around the brain, or a blood clot in a major vein near the brain. These complications are uncommon but need immediate treatment.

The possibility of complications does not mean they will occur. Early specialist assessment and continued follow-up help limit the risk.

- Repeated or long-lasting ear infections
- A fistula, or abnormal opening, into the balance portion of the inner ear
- Infection of the mastoid bone
- Persistent tinnitus or balance problems
- Disease that remains or returns after surgery

Follow up

Cholesteatoma requires long-term follow-up, including after apparently successful surgery. Small areas of tissue may remain in places that are difficult to see, and a new retraction pocket or cholesteatoma can develop later.

Routine follow-up may include ear examinations, microscope cleaning, hearing tests, and diffusion-weighted MRI. The timing depends on the operation, the extent of disease, age, symptoms, and what the surgeon finds during follow-up.

People with a canal wall down cavity may need periodic professional cleaning because the enlarged ear space may not clear wax and skin normally. The clinician can also advise whether water precautions or other ongoing ear care are needed.

After surgery, the care team should explain which symptoms are expected and when to make contact. Mild discomfort, temporary fullness, and some drainage may occur during healing. Contact the surgical team promptly if pain or drainage is increasing, hearing suddenly worsens, the wound becomes red or swollen, or fever develops.

Seek urgent medical care for new facial weakness, severe or continuous vertigo, swelling behind the ear, intense headache, confusion, neck stiffness, or repeated vomiting. Emergency care is appropriate for sudden neurologic symptoms, collapse, or severe facial drooping.

Keeping follow-up appointments is important even when the ear feels normal. Recurrent or residual cholesteatoma may not cause noticeable symptoms at first.

Sources

- Castle JT. Cholesteatoma Pearls: Practical Points and Update. Head and Neck Pathology . 2018;12(3):419-429. doi:10.1007/s12105-018-0915-5.
- Kuo CL, Shiao AS, Yung M, et al. Updates and Knowledge Gaps in Cholesteatoma Research. BioMed Research International . 2015;2015:854024. doi:10.1155/2015/854024.
- National Health Service. Cholesteatoma . NHS health information.
- American Academy of Otolaryngology-Head and Neck Surgery. Clinical Indicators: Mastoidectomy .
- Yung M, Tono T, Olszewska E, et al. EAONO/JOS Joint Consensus Statements on the Definitions, Classification and Staging of Middle Ear Cholesteatoma. Journal of International Advanced Otology . 2017;13(1):1-8. doi:10.5152/iao.2017.3363.