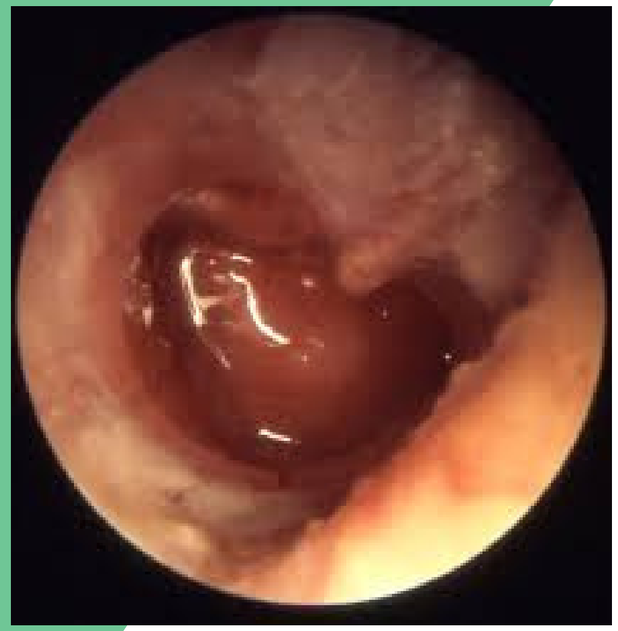
Chronic Otitis Media



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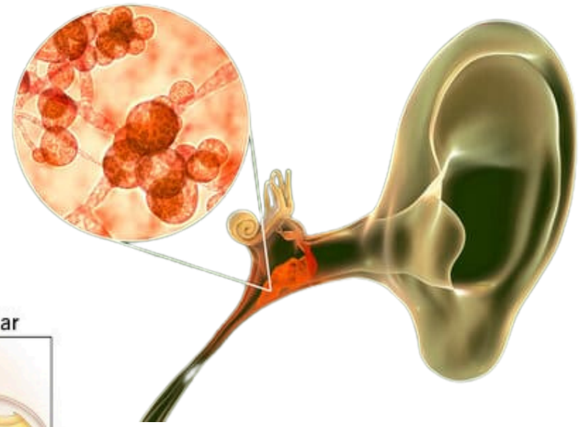
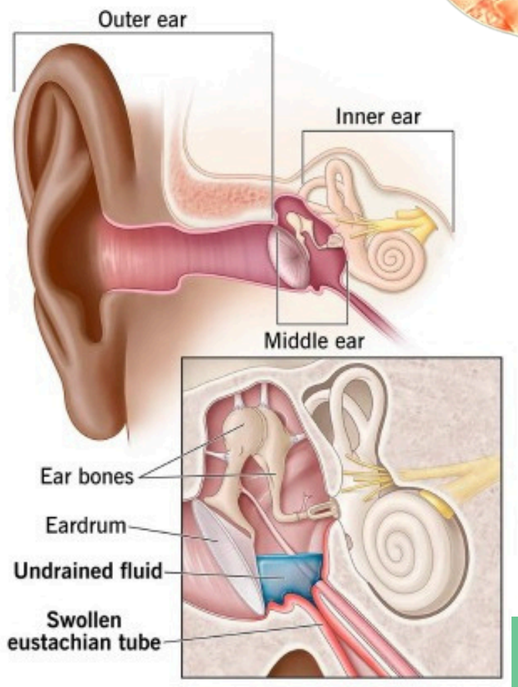




Introduction

Chronic Otitis Media (COM) :- it is an intractable pathology of middle ear cleft with permanent tympanic membrane defect of duration greater than 3 months.

Tympanic membrane defects Includes :

1. Retraction pockets (Invagination of tympanic membrane into middle ear).
1. Atelectasis (Retraction of tympanic membrane medially).
1. Perforation.

Risk factors

1. Late treatment of acute otitis media.
2. Inappropriate antibiotic.
3. Lowered resistance : malnutrition – anemia.
4. Ascending infections via eustachian tube from tonsils, adenoids, sinuses.
5. Poor socio-economic status : no infection control programs .
6. Virulent infection ex . measles : infects Eustachian tube (makes it easy for bacteria to infect the ear) , its epithelium type :ciliated pseudostratified columnar epithelium .

Chronic suppurative OM

Chronic otitis media with otorrhea for 6-12 weeks.

Pathophysiology :CSOM is initiated by an episode of acute infection. Irritation and subsequent inflammation of the middle ear mucosa. The inflammatory response creates mucosal edema à Ongoing inflammation eventually leads to mucosal ulceration and consequent breakdown of the epithelial lining . ► The host's attempt at resolving the infection or inflammatory insult manifests as granulation tissue, which can develop into polyps within the middle ear space . ► The cycle of inflammation, ulceration, infection, and granulation tissue formation may continue, destroying surrounding bone margins.

2 types :

1. Tubotympanic.
1. Atticoantral.

Micro-organisms

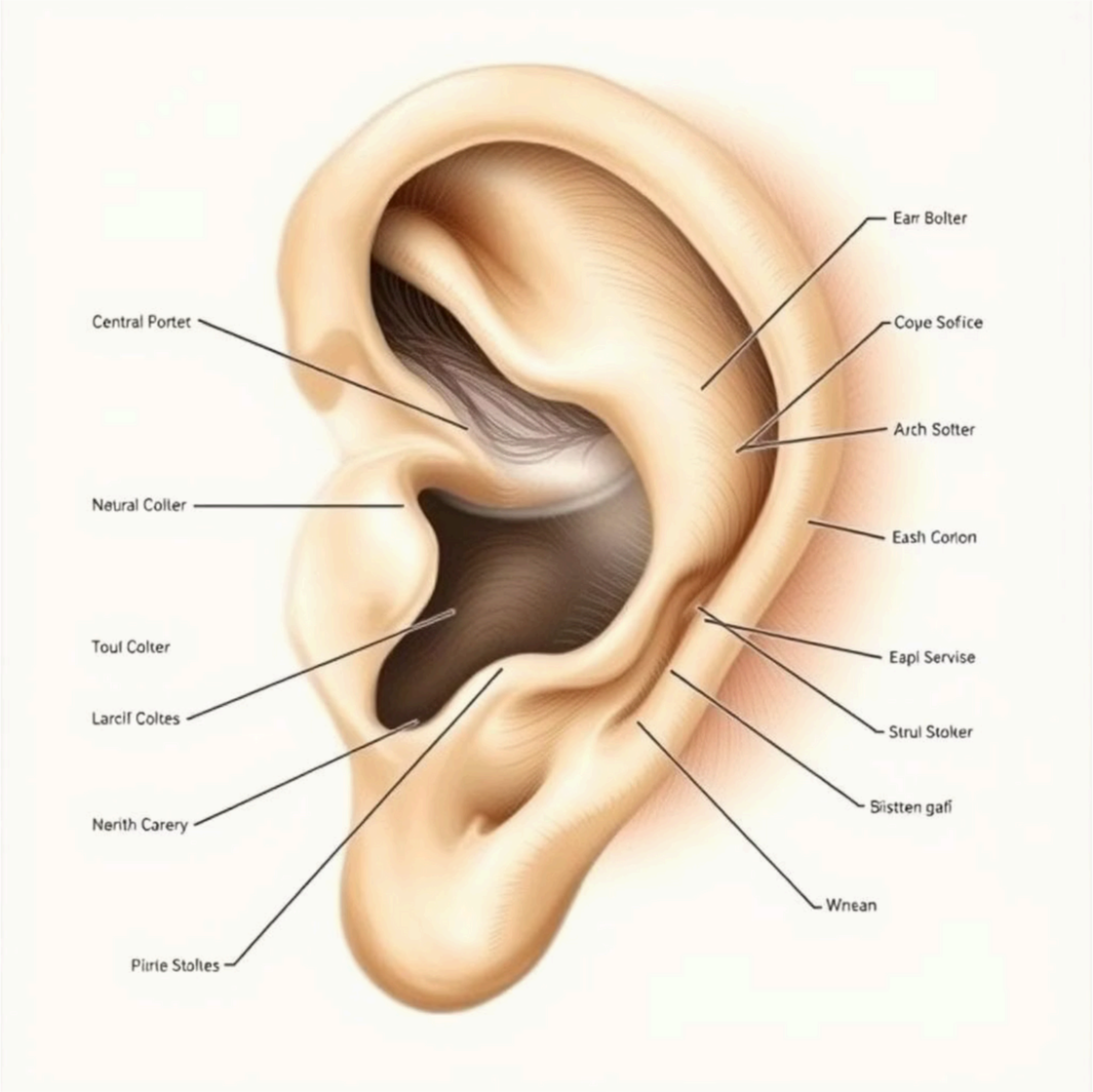
- Pseudomonas aeruginosa 48%-98% of cases.
- S. aureus is the second most common.
- Anaerobes make up 20-50%; tend to be associated with cholesteatoma.
- To 10% of infections are polymicrobial in etiology, often demonstrating a combination of gram-negative organisms and S. aureus.

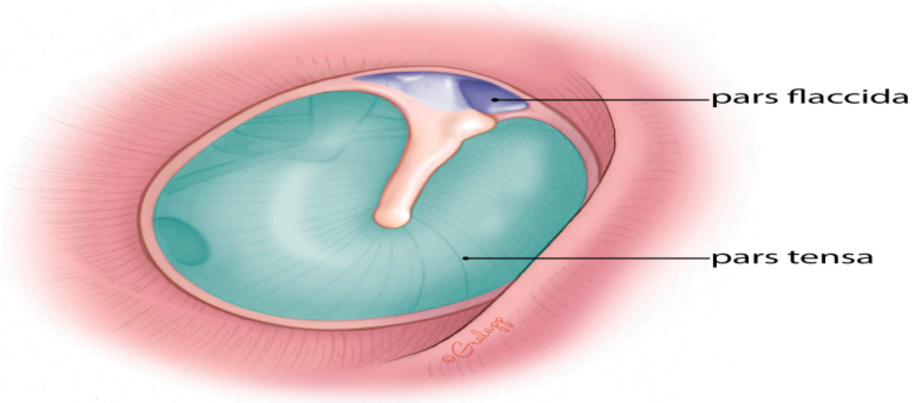
1- Tubotympanic type

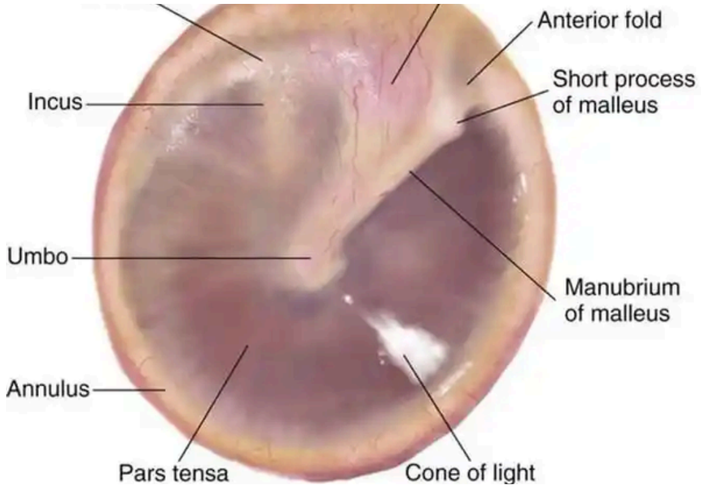
Also called the safe or benign (mucosal) type ; it involves anteroinferior part of middle ear cleft (Eustachian tube) and is associated with a central perforation . It is less liable to produce complications.

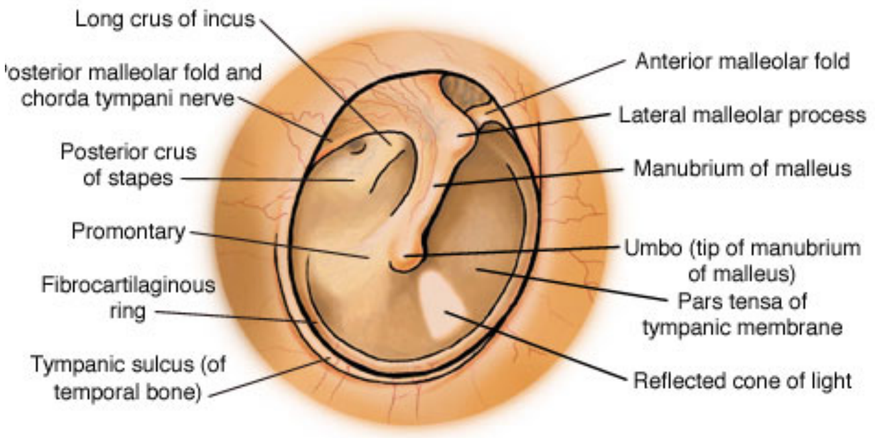
Signs :

1. Profuse (Secretions from ciliated columnar epithelium from Eustachian tube), mucopurulent odorless (aerobic bacteria)
1. Middle ear mucosa : Pale & dry (inactive) or Congested (active).
1. Granulations polyps.
1. Central perforation.
1. Hearing loss : Conductive type of loss.

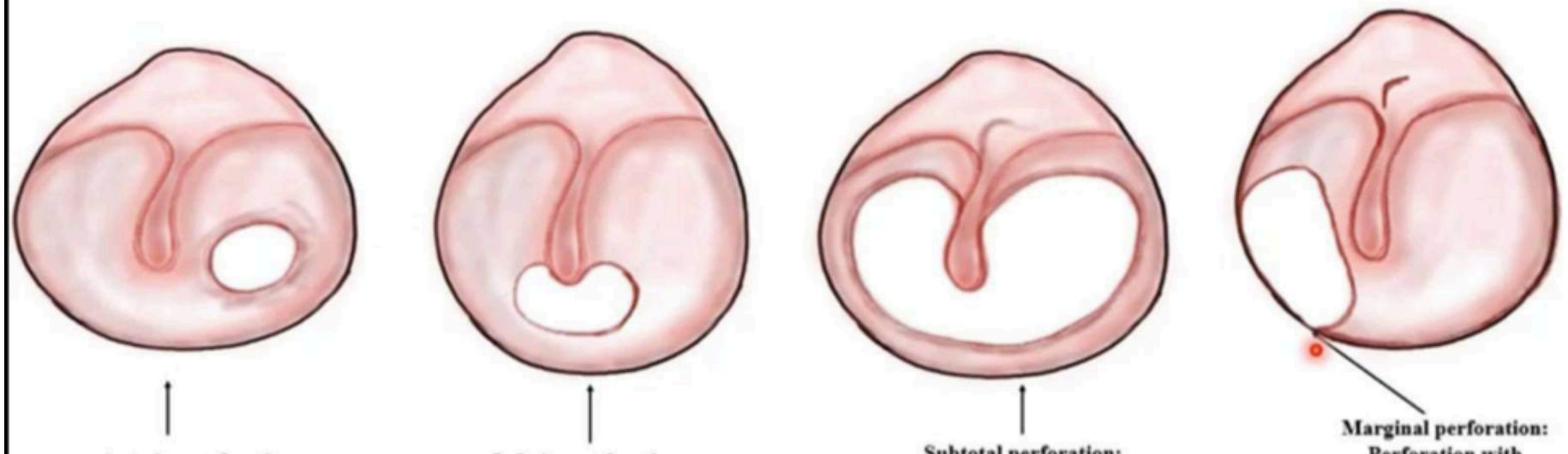








cholesteatoma



Diagnosis

1. Otoscopic examination :

- Type of perforation (Anterior , Inferior , Subtotal , Marginal).
- Middle ear mucosa (Pale & Dry or Congested).

2. Microscopic examination :

- Status of ossicular chain.
- Granulation tissue.

3. Microbiology : culture and sensitivity of ear discharge.

4. Audiological tests :

- Tuning fork tests (Conductive hearing loss).
- Pure tone audiometry (Conductive hearing loss).
- Tympanometry (Type B).

5. Radiological :

- Mastoid x-rays.
- CT scan for temporal bone.

Management

Medical treatment :

Indicated in infected tympanic membrane perforation, basis is to eradicate infection and produce dry ear.

1. Aural toilet : by dry mopping or suction cleaning under microscopic visualization
1. Topical antibiotics (Neomycin).
1. Systemic antibiotics : needed in acute exacerbation of disease.
1. General advice : avoid swimming and entry of water into the ear.

Surgical treatment :

When there is a dry perforation, surgery may be considered but is not mandatory.

Myringoplasty is the repair of a tympanic membrane perforation.

Success rates for this procedure are very , high repair of the tympanic membrane may be combined with ossicular reconstruction, if necessary , in order to restore hearing— the operation is then referred to as a tympanoplasty.

2-Atticoantral (Bony) type

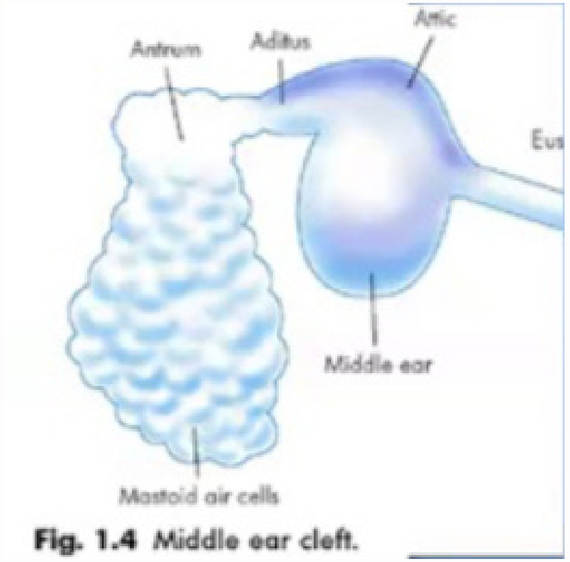


Fig. 1.4 Middle ear cleft.

It involves a posterosuperior part of middle ear cleft (attic, antrum, posterior tympanum and mastoid) and is associated with cholesteatoma, which, because of its bone eroding properties, causes the risk of serious complications. For this reason, the disease is also called unsafe or dangerous type.

Signs :

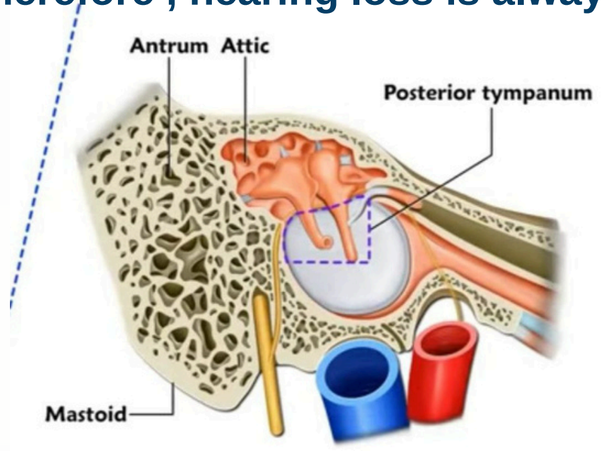
1.The discharge is often scanty (squamous epithelium secretes less than ciliated columnar) but usually persistent, and is often foul smelling (Boney part involvement).

2. Osteitis and granulation tissue : A fleshy red polypus may be seen filling the meatus.

3. Cholesterol granuloma : It is a mass of granulation tissue with foreign body giant cells surrounding the cholesterol crystals.

4. Cholesteatoma.

5. Ossicular necrosis : It is common in Atticoantral disease. Destruction may be limited to the long process of incus or may also involve stapes superstructure, handle of the malleus or the entire ossicular chain. Therefore , hearing loss is always greater than in disease of tubotympanic type.



Complications :

- Intracranial : Extradural abscess , Brain abscess , Meningitis.
- Infratemporal : Mastoiditis , Facial paralysis.

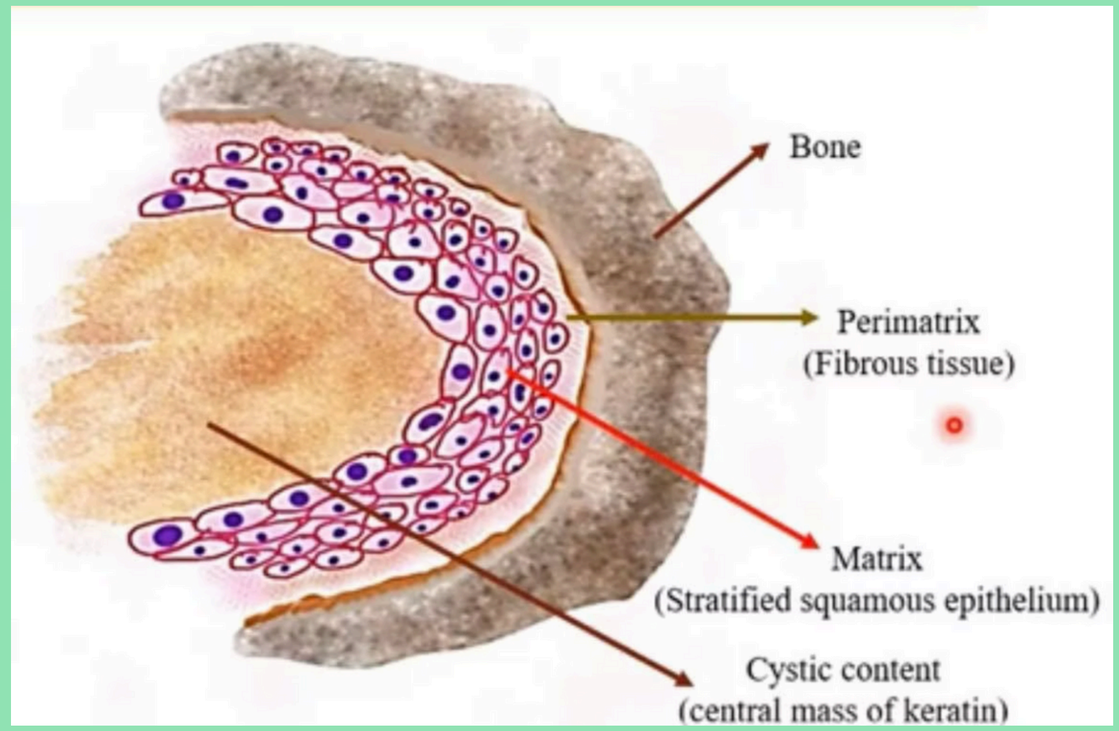
Cholesteatoma

Is a destructive and expanding growth consisting of keratinizing squamous epithelium in the middle ear and/or mastoid process.

It's considered lethal if not treated L L .

Histology (from Inner to Outer) :

1. **Central mass of keratin.**
2. **Matrix - stratified squamous epithelium.**
3. **Peri matrix - fibrous tissue.**
4. **Bony part**



Interaction of cholesteatoma with bone

Results in bone erosions of ossicular chain (Mostly Long process of incus and stapes superstructure) and bone wall of middle ear and mastoid.

Other structures involved :

1. **Bone covering lateral semi-circular canal (leading to Vertigo).**
2. **Facial Nerve (leading to facial paralysis).**
3. **Bone over dura of middle and posterior cranial fossa (leading to meningitis , brain abscess).**

Mechanism :

- **Physical pressure à erosion of bone .**
- **Activation of osteoclasts à osteolytic enzymes.**
- **Release of inflammatory mediators such as cytokine interleukin from macrophages and epidermal keratinocytes.**
- **Other factors associated : prostaglandins, cathepsin D**

Cholesteatoma Types

Congenital Cholesteatomas

- **Inclusion cyst in the anterosuperior surface quadrant of middle ear near the Eustachian Tube.**
- **Diagnosed by otoscope which reveals white mass behind an intact tympanic membrane with no history of otitis media.**

Acquired Cholesteatoma

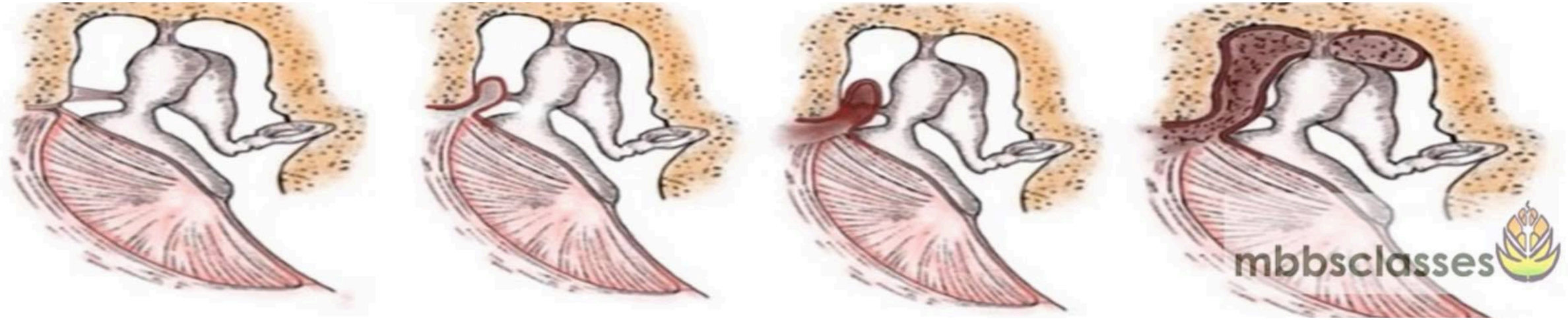
Primary acquired Cholesteatoma

Typical retraction pocket cholesteatoma adjacent to **posterosuperior** tympanic membrane or pars flaccida and in the center contains keratin (Invagination theory).

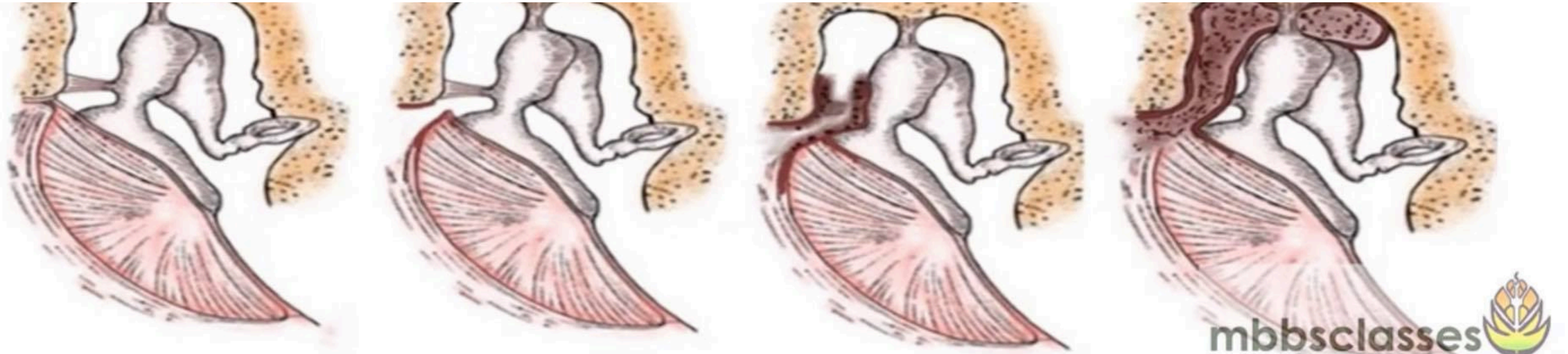
Secondary acquired Cholesteatoma

As the tympanic membrane tries to heal, keratinizing squamous epithelium migrate through the perforation into the middle ear and makes the cholesteatoma (Migration theory).

Invagination theory



Migration theory



Classification of Cholesteatoma based on anatomical sites:

1 **Pars tensa cholesteatoma**

results from retraction pocket or perforation in posterosuperior quadrant of pars tensa.

2 **Pars flaccida cholesteatoma**

results from retraction pocket or perforation in pars flaccida.

3 **Occult Cholesteatoma**

often congenital.

Pathogenesis of Acquired Cholesteatoma :

- Invagination of tympanic membrane (retraction pocket Cholesteatoma).
- Basal cell hyperplasia.
- Epithelial ingrowth through perforation (Migration theory).
- Squamous metaplasia (unknown cause).

Clinical presentation

- Patient usually have either history of otitis media or ventilation tube or had surgery on the tympanic membrane.
- Signs and symptoms :

1. Progressive hearing loss (Conductive hearing loss).
2. In late stages (Sensorineural hearing loss).
3. Otorrhea :
   - Purulent or blood stained.
   - Foul smelling due to infection with anaerobic bacteria.
   - Blood stained due to osteitis and granulation tissue.
4. Otalgia.
5. Aural fullness.
6. Symptoms of complications : Vertigo, Facial paralysis or Intracranial infection.

Chronic discharge with inflammation of f the mucosa of tympanic membrane + severe itching
indicates: Fungal infection : (otomycosis) :
90% : Aspergillus (wet newspaper).
10% : Candida (whitish)

Treatment : Topical anti-fungal 3-4 weeks

Approach to patient

Otoscopic examination (for Diagnosis)

: suction cleaning and canal debridement for better visualization.

Microscope examination (For Diagnosis)

: better visualization of perforation, retraction pocket, Cholesteatoma and granulation tissue.

Radiological tests (For Management)

: High resolution CT scan , MRI.

Audiological tests

: To document preoperative hearing loss.

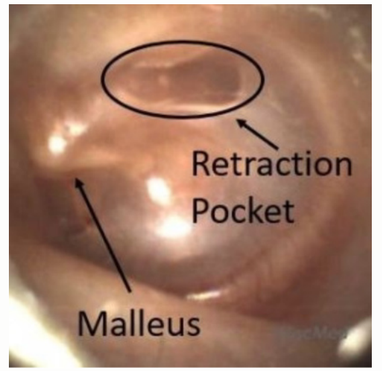
Pneumatic otoscopy

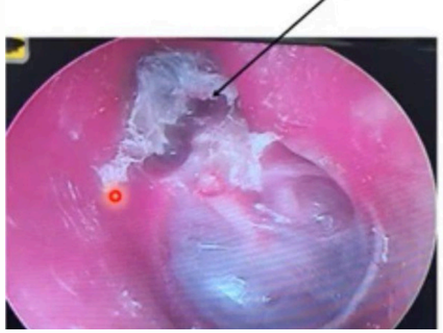
: In patients of COM with vestibular symptoms.

Positive fistula tests

characterized by vertigo and nystagmus suggests erosion of lateral semi circular canal by cholesteatoma.

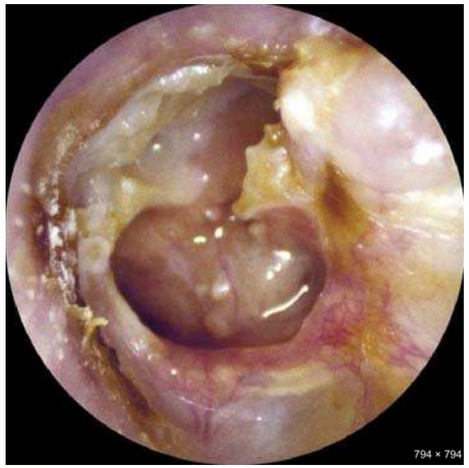
Otoscopic findings of Cholesteatoma

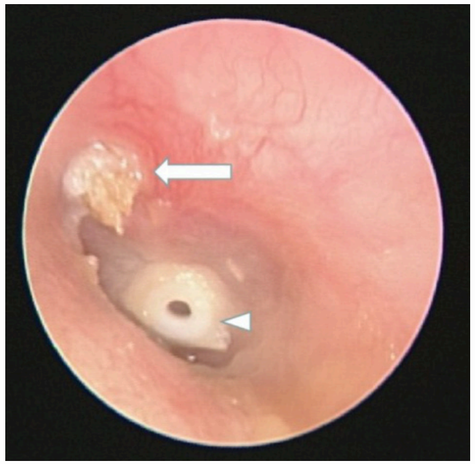




Primary acquired cholesteatoma :

- Typical attic retraction cholesteatoma appears as pearl white defect of variable size adjacent to posterosuperior portion of tympanic membrane.
- Contains keratin debris.



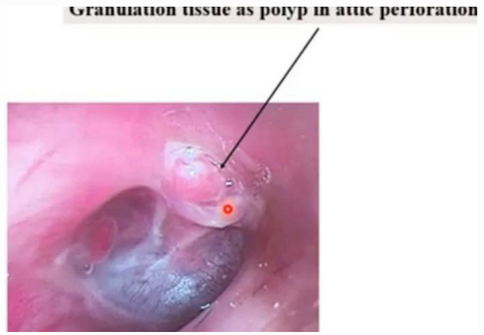


Secondary acquired cholesteatoma :

- It is found next to TM perforation.
- Center of the defect contains keratin debris.
- Keratinized epithelium migrates through a perforation into middle ear.

Aural polyp :

- Infected cholesteatoma may manifest as an aural polyp.
- Polyps in chronically infected ear should be considered as cholesteatoma until proved otherwise.
- Polyps are granulation tissue at the junction of eroding cholesteatoma and bone.



Complications

Extra cranial :

1. Acute mastoiditis.
1. Sub periosteal abscess.
1. Post auricular, Zygomatic, Bezolds (abscess deep to the sternocleidomastoid muscle), citelli's abscess (pus along the posterior belly of the digastric muscle).
1. Labrynthitis.
1. Facial nerve paralysis.
1. Petrositis (petrous portion of the temporal bone) and Gradenigo syndrome (triad of otitis media, facial pain and abducens pals).
1. Septicemia.

Intra Cranial :

1. Sub Dural abscess.
1. Meningitis.
1. Peri sinus abscess.
1. Sigmoid sinus thrombosis.
1. Otitis encephalitis.
1. Brain abscess : -temporal lobe abscess , cerebellar abscess.

Management of COM with cholesteatoma

- Principle aim of the treatment :
- To remove the disease and eliminate the major risk of complications to make the ear safe and if possible dry.
- Once ear becomes safe , additional objective is to restore the hearing if it is compromised by cholesteatoma.

The effective treatment of cholesteatoma requires a surgical intervention.

Treatment :

- Regular aural toilet.
- Suction toilet : under microscope, we evacuate pocket of cholesteatoma.
- Mastoidectomy : it is always necessary.
- Antibiotics if there is infection.

Mastoidectomy

- **Simple Mastoidectomy**
- **Radical Mastoidectomy**
- **Modified Radical Mastoidectomy**
- **Mastoidectomy with tympanoplasty**

In case of Eustachian Tube dysfunction , it leads to high failure rate L L , so we use antihistamine and mucolytics to hopefully to restore eustachian tube function but it is controversial.

Atticoantral (Bony) type	Tubotympanic (mucosal) type
It involves a posterosuperior part of middle ear cleft and is (attic, antrum, posterior tympanum and mastoid) associated with cholesteatoma, which, because of its bone eroding properties, causes the risk of serious complications. For this reason, the disease is also called unsafe or dangerous type	Also called the safe or benign (mucosal) type ; it involves anteroinferior part of middle ear cleft and is associated with a central (Eustachian tube) .perforation . It is less liable to produce complications
The discharge is often scanty (squamous epithelium secretes less than ciliated columnar) but usually persistent, and is often .foul smelling (Boney part involvement) Osteitis and granulation tissue : A fleshy red polypus may be seen .filling the meatus Cholesterol granuloma : It is a mass of granulation tissue with .foreign body giant cells surrounding the cholesterol crystals .Cholesteatoma .Ossicular necrosis : It is common in Atticoantral disease Destruction may be limited to the long process of incus or may also involve stapes superstructure, handle of the malleus or the entire ossicular chain. Therefore , hearing loss is always greater .than in disease of tubotympanic type	Profuse (Secretions from ciliated columnar epithelium from Eustachian tube), mucopurulent odorless (aerobic bacteria) .Middle ear mucosa : Pale & dry (inactive) or Congested (active) .Granulations polyps .Central perforation Hearing loss : Conductive type of loss
Mastoidectomy	Management : medical and surgical