Complications of otitis media

- **Intratemporal:**
  1. Mastoiditis (acute and subacute).
  2. Tympanosclerosis.
  3. Atelectasis of tympanic membrane.
  4. Petrositis.
  5. Facial nerve paralysis.
  6. Suppurative labyrinthitis

- **Intracranial:**
  1. Meningitis.
  2. Intracranial abscess (brain, subdural and extradural).
  3. Lateral sinus thrombosis.
  4. Otic hydrocephalus.

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Acute mastoiditis (con…)

- Extension of AOM into mastoid air cells with suppuration and bone necrosis.

- Symptoms:
  - Fever.
  - **Pain** over mastoid process (persistent and throbbing).
  - Ear discharge (creamy and profuse).
  - Increasing deafness.
Acute mastoiditis (con...)

- Signs:
  - Tenderness over mastoid antrum.
  - Tympanic membrane is either perforated and the ear discharging or it is red and bulging (If the tympanic membrane is normal, the patient doesn't have acute mastoiditis).
Acute mastoiditis (con...)

- Swelling in postauricular region leads to anteroinferior displacement of pinna.
Acute mastoiditis (con…)

- Occasional features:
  - **Subperiosteal abscess** over mastoid process.
  - **Bezold’s abscess** (pus breaks through mastoid tip and forms abscess in neck).
  - **Zygomatic mastoiditis**.

- Investigations:
  - **CBC** (increase WBC counts).
  - **CT scan** (opacity and air cell coalescence).

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Acute mastoiditis (con...)

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Acute mastoiditis (con...)

- Treatment:
  - **IV antibiotics** (depends on sensitivity of organisms).
  - **Cortical mastoidectomy:**
    - If there is a subperiosteal abscess or if the response to antibiotics is not rapid and complete.
2. Subacute mastoiditis

- Occur when inadequate treatment of AOM results in low-grade infection of mastoid air cells.

- Symptoms and signs are equivalent to those of acute mastoiditis but less severe.

- Most cases resolve with ventilation of middle ear combined with antibiotic.

- If this treatment fails, cortical mastoidectomy is indicated.
Tympanosclerosis

- Hyalinization and deposition of calcium in tympanic membrane and middle ear.

- Seen after recurrent episodes of AOM and OME and after ventilation tube insertion.

- If the process is limited to tympanic membrane (myringosclerosis) then hearing is usually unaffected.

- If the middle ear is involved, then ossicular chain can become immobilized, resulting in conductive hearing loss.

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Tympanosclerosis (con...)

- Clinical appearance is white plaques in tympanic membrane.

- Surgical correction by tympanoplasty may initially be successful, but refixation of ossicles not uncommon.

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Atelectasis

- Retracted or collapsed tympanic membrane.

- Result of prolonged negative middle ear pressure secondary to chronic eustachian tube dysfunction.

- Atelectatic tympanic membrane may not produce any symptom, but more commonly results in mild conductive hearing loss.
Atelectasis (con...)

- Prolonged contact between tympanic membrane and ossicles can result in ossicular erosion, more significant hearing loss.

- Persistent atelectasis cause abnormal migration of squamous epithelium from tympanic membrane, leading to accumulation of squamous debris and **cholesteatoma formation**.
Atelectasis (con…)

Treatment:

- If eustachian tube dysfunction is still considered to be present, the insertion of ventilation tubes could potentially reverse the changes in tympanic membrane by normalizing the pressure in middle ear space.

- If subsequent cholesteatoma formation, then excision and grafting of the affected portion of the tympanic membrane are recommended.
Petrositis (Gradenigo syndrome)

- Rare complication of suppurative OM occurs in both chronic and acute forms.

- In acute form, there is extension of acute mastoiditis into pneumatized petrous apex.

- The chronic form usually occurs as result of mucosal or cholesteatomatous.
Petrositis (con...)

- Clinical features:
  - Ear discharge.
  - Retroorbital pain and reduce corneal sensitivity.
  - Lateral rectus palsy.

- Because of close relationship between ophthalmic division of trigeminal nerve and abducens nerve to petrous apex.

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Petrositis (con...)  

- High incidence of intracranial extension.  

- Antibiotics and surgical drainage of petrous are the treatment of choice.
Facial nerve paralysis

- Result of either acute or chronic OM.

- Two mechanisms by which OM can result in facial nerve paralysis:
  1. Locally produced bacterial toxin.
  2. Pressure applied to nerve by cholesteatoma or granulation tissue.

- Managed by myrigotomy with aspiration of pus along with antibiotic therapy.
Suppurative labyrinthitis

- Direct bacterial invasion of inner ear, usually via round window.

- Present with sudden sensorineural hearing loss, severe vertigo, nystagmus, nausea and vomiting.

- Cochlear aqueduct provides direct communication between perilymph and cerebrospinal fluid, therefore there is a significant risk of developing meningitis.
Suppurative labyrinthitis (con...)

- Treatment:
  - Antibiotics.
  - Mastoidectomy for drainage.
Meningitis

- Acute otitis media is the most common cause of bacterial meningitis.

- Occur as result of hematogenous spread, direct extension from middle ear through bony dehiscence or through cochlear aqueduct via inner ear.

- Most common organisms responsible for otic meningitis are *S pneumoniae* and *H influenzae* type B.
Meningitis (con...)

- Symptoms and signs:
  - Fever.
  - Neck rigidity.
  - Positive Kernig’s sign.
  - Photophobia.
  - Headache.
  - Fluctuating levels of consciousness.
Meningitis (con...)

- Investigations:
  - CSF:
    - Essential unless there is increase intracranial pressure.
    - Pressure, white cells and protein are raised.
    - Chloride and glucose are lowered.
  - Brain MRI to rule out other intracranial complications.
Meningitis (con...)

- Treatment:
  - **Myringotomy** should be performed once antibiotic therapy initiated.
  - Mastoidectomy is necessary if meningitis results from mastoiditis.
Brain abscess (con...)

- Otogenic brain abscess occur in cerebellum or in temporal lobe of cerebrum.

- Infection reach the brain by direct spread via bone and meninges or via blood vessels.

- Progression of symptoms can be gradual, occurring over days or even weeks.

- Symptoms:
  - Fever and malaise.
  - Headache, drowsiness, confusion, impaired consciousness and papilloedema.
Brain abscess (con...

- Signs:
  - Temporal lobe abscess:
    - Dysphasia.
    - Paralysis of contralateral face and arm.
    - Hallucination of taste and smell.
  - Cerebellar abscess:
    - Neck stiffness.
    - Weakness and loss of tone on same side.
    - Ataxia.
    - Intention tremor.
    - Nystagmus.
    - Vertigo.
Brain abscess (con...)
Brain abscess (con...)

- **Treatment:**
  - Drained through a burr hole or excised via a craniotomy, if the patient’s condition permits, mastoidectomy should be performed under same anesthetic.

- **Prognosis:**
  - High mortality rate.
  - Better for cerebral abscess than for cerebellar abscess.
Subdural abscess

- Forms between dura mater and arachnoid mater.
- Occurs in frontal region from sinusitis, but may result from ear disease.
- Symptoms and signs tend to progress more than those seen with brain abscess.
- Drainage of abscess is the mainstay of treatment.
Subdural abscess (con...)
Extradural abscess

- Formed in middle fossa between dura matter and thin bony plate of tegmen.

- They also occur in posterior fossa, where they are commonly associated with lateral sinus thrombosis.

- Clinical features are nonspecific and may fluctuate if a dehiscence in tegmen is present, allowing abscess to partially drain into mastoid cavity.
Extradural abscess (con...)  

- Because of its location, extradural abscess can be drained through mastoidectomy approach while treating the underlying middle ear disease.
Lateral sinus thrombosis

- Because of its close proximity to mastoid air cells, the lateral sinus is prone to involvement in middle ear infections, which may lead to thrombosis.

- Once infected thrombus has formed, it may propagate distally and proximally and give rise to infected emboli.

- Clinical features:
  - Fever and rigor.
  
  - If thrombus propagates into neck, there will be neck tenderness along internal jugular vein, and neck stiffness.

  - Extension of thrombus to sagittal sinus can result in symptoms and signs of raised intracranial pressure.

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Lateral sinus thrombosis (con...)

- Positive Tobey-Ayer test:
  - Compression of contralateral internal jugular vein leads to raise in CSF pressure.

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Lateral sinus thrombosis (con...)  

- MRI most reliably makes the diagnosis of lateral sinus thrombosis.

- The management requires broad-spectrum antibiotics and complete mastoidectomy with exposure of lateral sinus.

- Once the diagnosis confirmed by needle aspiration, the sinus is opened and infected thrombus evacuated.
Otic hydrocephalus

- Rare.

- Increase intracranial pressure (pathophysiology is poorly understood).

- The usual features are headache, vomiting, disturbed mental state, visual disturbance and papilledema.

- Imaging of brain reveals ventricular size to be normal.
Otic hydrocephalus (con...)

- Lumbar puncture confirms raised cerebrospinal fluid pressure.

- Resolving the middle ear infection and normalizing intracranial pressure with use of steroids and diuretics (mannitol).