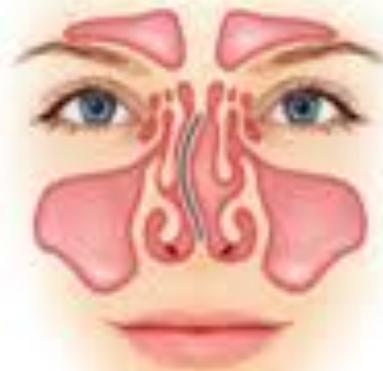


# Diseases of the Ear, Nose and Throat



1<sup>st</sup> Lecture:

## COMPLICATIONS OF SUPPURATIVE OTITIS MEDIA

Done by: Ahlam Al-Sulaiman

The slides were provided

(the Dr Alaisa slides / dr notes during the lec + Dr Alsnosi notes during the lec / diseases of nose, ear and throat, Lecture note books)

Important Notes in **red** / the doctor notes during the lecture in **dark blue** and Dr Alsnosi notes **the purple colour**

Copied slides in **black**

**ROUTES OF SPREAD:**

- Direct extension e.g. facial nerve paralysis
- Thrombophlebitis by blood
- Normal anatomical pathways (Eustachian tube (ET) → nasopharynx, Perforated TM → External Auditory Canal)
- Non anatomical bony defects (tegmen tympani → intracranial structures, mastoid tip → Neck)

**COMPLICATIONS OF SUPPURATIVE OTITIS MEDIA:**

- A. Extracranial complications
- B. Cranial (intra-temporal) complications ((within the middle ear cleft+ Temporal bone))
- C. Intracranial complications

**\*Note : Don't confuse between Cranial and Intracranial they are different**

**A. EXTRACRANIAL COMPLICATIONS:**

- **Otitis externa:** by the perforated TM the pus extend to the external canal, Sx: painful ear by touch Tx: by Abx.
- **Retropharyngeal abscess:** ET → nasopharynx → (sub mucosal) of posterior wall of the pharynx.  
**Diagnosis:** x- ray , **Treatment:** **Drainage** according to the type : Acute ( the drainage from **inside** or outside) Chronic mostly related to TB infection ( drainage from **out side** to prevent the spread to the lungs)
- **Septicemia:** Emergency case but less incidence due the Antibiotics.

**Bactermia:** the presence of bacteria in the boold / **Septicemia:** the infection resulted from the bacteria toxins

**B. CRANIAL (INTRATEMPORAL) COMPLICATIONS:**

- Acute mastoiditis
- Petrositis
- Facial nerve paralysis
- Labyrinthine fistula and labyrinthitis

**\*ACUTE MASTOIDITIS:**

Involvement of the bone of the mastoid air cells by **acute suppurative inflammation**

**Pathway:** Middle ear → attic → Mastoid

**Acute Mastoiditis Pathology:**

**1. Production of pus under tension:**

Swollen mucosa of the antrum and attic also impede the drainage system resulting in accumulation of pus under tension

**2. Hyperaemic decalcification:**

Hyperaemia and engorgement of mucosa causes dissolution of calcium from the bony walls of the mastoid air cells (hyperaemic decalcification).

**\*Both these processes combine to cause destruction and coalescence of mastoid air cells, converting them into a single irregular cavity filled with pus (Empyema of mastoid).**

**Symptoms:**

They are similar to that of acute suppurative otitis media.

It is the **change in the character of these symptoms** which is significant and a pointer to the development of acute mastoiditis.

➤ *Pain behind the ear:*

Pain is seen in acute otitis media but it subsides with establishment of perforation or treatment with antibiotics. It is the persistence of pain, increase in its **intensity** or **recurrence of pain**, once it had subsided. These are significant pointers of pain.

➤ *Fever:*

It is the persistence or recurrence of fever in a case of acute otitis media, in spite of adequate antibiotic treatment that points to the development of mastoiditis.

➤ *Ear discharge:*

In mastoiditis, discharge becomes **profuse** and increases in **purulence**.

**\*Note:** Any persistence of discharge beyond three weeks, in a case of acute otitis media, points to mastoiditis

((It happens more as a complication **after acute OM** than the chronic ))

**Signs:**• **General constitutional manifestations:**

Patient appears ill and toxic with low-grade fever. In children, fever is high with a rise in pulse rate.

• **Tympanic membrane changes:**

- Usually, a small perforation is seen *in pars tensa with congestion of the rest of tympanic membrane*.
- Perforation may sometimes appear as a *nipple-like protrusion*.
- Sometimes, tympanic membrane is *intact but dull and opaque* especially in those who have received inadequate antibiotics.

• **Sagging of posterosuperior meatal wall (seen by the otoscope)**• **Otorrhea and reservoir sign.**• **Retroauricular tender red swelling.**• **Abscess: (These Abscess considered extracranial complication)**

1. **Subperiosteal abscess (postauricular abscess):** is the **commonest abscess that forms over the mastoid**. Pinna is displaced forwards, outwards and downwards.

Positive reservoir sign i.e. rapid re-accumulation of discharge after cleaning of the ear.

**The extracranial complications are rare.**

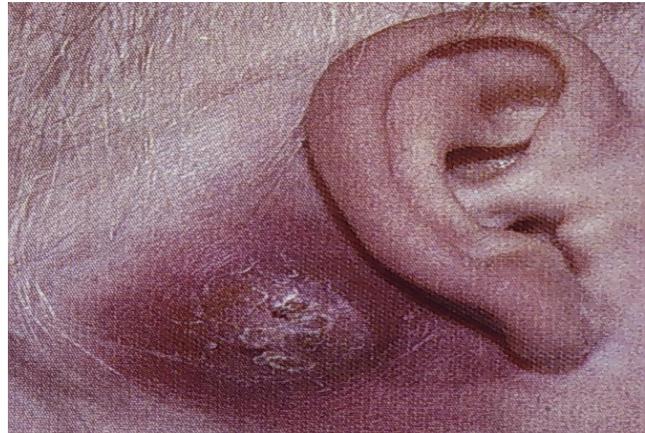
If the patient present with acute mastoiditis with postauricular abscess ,it is an **Emergency** case and you have to admit the pt and do CT to know the extent of the bone destruction ,and if you suspect intracranial involvement do MRI .

**4** Complication of suppurative otitis media

**2. Bezold's abscess:** pus breaks through the mastoid tip and forms an abscess in the *neck*. Just lateral to the sternocleidomastoid



**3. Zygomatic mastoiditis:** result on swelling over the zygoma .



**Postauricular Abscess**  
**Subperiosteal abscess ((IMP SAQ))**  
And they asked about the management  
((Look at it below))

**Lymphadenitis**

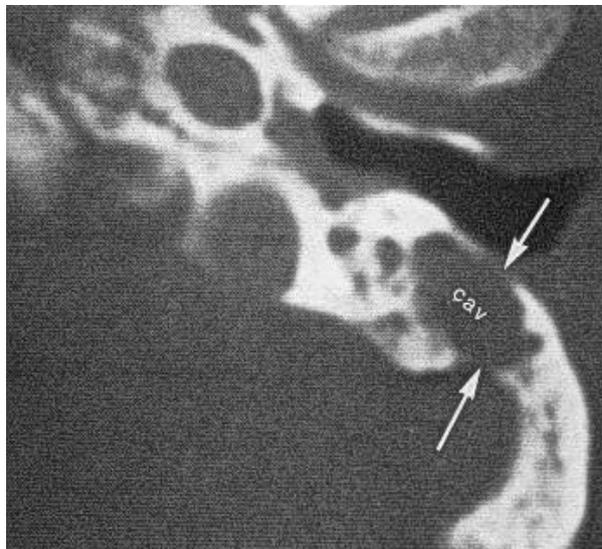
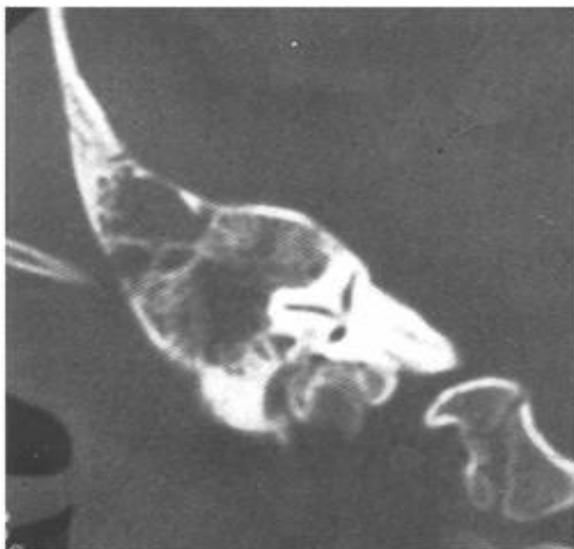
**\*Note:** To differentiate between them in Lymphadenitis there is no symptoms from ear.



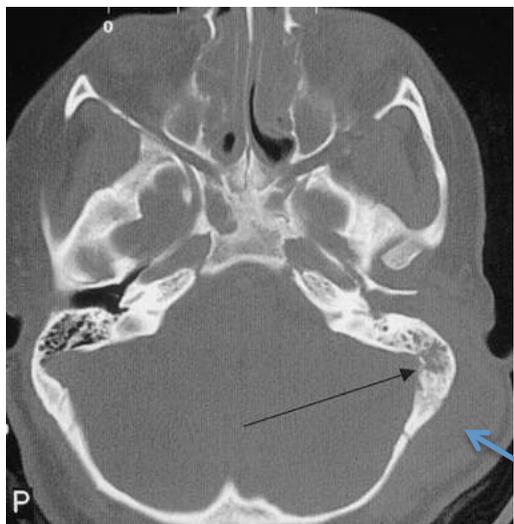
**Bezold's abscess**

**Investigations:**

CT scan



CT, there is no air in the mastoid, the opacity mean that there is a fluid in the mastoid antrum .



Opaque defect in the bone that may lead to intracranial Complication.

Subperiosteal Abscess

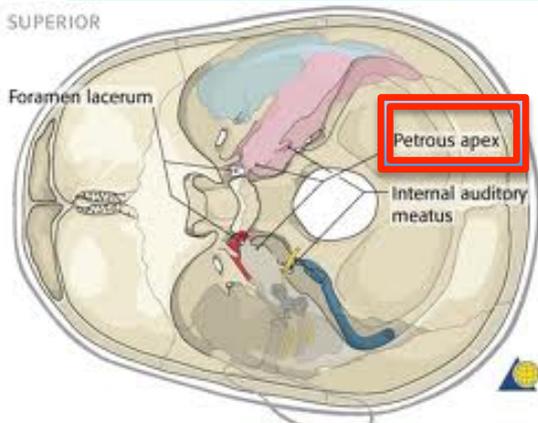
**TREATMENT OF ACUTE MASTOIDITIS: ((SAQ ))**

1. Admit the patient.
  2. **IV antibiotics** (Cephalosporin 2G ± Metronidazole or clindamycin) to cover the aerobes & anaerobes
  3. Cortical **mastoidectomy** if:
    - Medical treatment fails.
    - Signs of abscess formation.
- An operation in which the mastoid antrum and air cells are converted into one cavity without disturbing the middle or external ears (*it wont affect the hearing as a complication*).
  - It may be combined with myringotomy (TM opening). Which is indicated in:
    - Middle effusion
    - Mastoiditis if TM is intact
    - Recurrent attack of OM
  - Observe for other complication (new symptoms)



**Drain** it until completely dry, this operation wont affects the hearing.

**PETROSITIS (PETROUS APICITIS):**



**Dr. Alsноси didn't talk about it ☺**  
 An extension of infection from the middle ear into a pneumatized petrous apex.

- Gradenigo's syndrome
  - Otitis media (otorrhea)
  - Retro-orbital pain
  - Squint (VI cranial nerve palsy) abducent.

\* **Note:** Its not nessccary to have all of those 3 symptoms together.

Diagnosis:



CT



MRI T2

Show Abscess near to the cerebellum  
 Diagnosis of petrous apicitis requires both CT scan and MRI.

Treatment:

1. Admit the patient.
2. Antibiotics and myringotomy (If TM intact) and drain the abscesses by mastectomy
3. Surgical drainage if medical treatment fails

**FACIAL PARALYSIS:**

- The temporal & the mastoid part of the nerve are our concern in OM . **Dr alsnosi said the tympanic segment the commonest dehiscence area and dr Sami said the labrynth segment ☹ anyway u gonna to take it in sprerate lec in details (facial nerve )**
- 30% has dehiscence facial nerve ((not covered with bone)) so in middle ear infection affect the facial nerve . **IN chronic OM the chloestotoma eat the bone that cover the nerve.**
- Fallopian Canal: is the facial nerve canal

	AOM	CSOM
The pathology	Mostly due to pressure on a dehiscence nerve by inflammatory products	Usually is due to pressure by cholesteatoma or granulation tissue
The onset	Sudden in onset	Insidious in onset
The clinical course	Usually is partial facial palsy	May be partial or complete (start as partial and continue to become complete)
Treatment	Treatment is by systemic antibiotics IV and myringotomy (To relive the pressure on the nerve)  *Prognosis : is Good usually the symptoms disappear after three days of Tx.	Treatment is by <b>immediate surgical exploration by masodectomy and "proceed"</b> (look for any cause for the obstruction e.g. granulation tissue and remove it)

**Dr. Alsosi treatment : Acute OM → cortical mastectomy +ventilation tube**

**Chronic OM→ mastectomy + facial nerve paralysis Tx**

Both Drs shared the same Tx in chronic but not in the acute cortical mastectomy wasn't mentioned in dr.alisa lec.

**Labyrinthine fistula and labyrinthitis (medial extension):**

- **Labyrinthine fistula**
- **Labyrinthitis** has three types: **These types Dr.alsnosi did not talk about ☺**
- Circumscribed labyrinthitis
- Acute diffuse serous labyrinthitis
- Acute diffuse suppurative labyrinthitis
- Chronic labyrinthitis

**LABYRINTHINE FISTULA: (MCQ)** common occur as a complication after **chronic OM** not the acute.

Loss of the bony labyrinthine wall exposing the endosteum (part of periostum) .  
Fistula is an opening btw 2 epithelium, common with unsafe type due to the presence cholesteatoma which help spreading the infection .

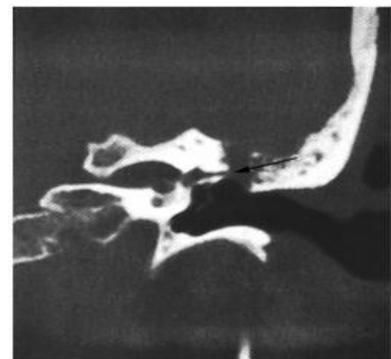
**\*Note:** the horizontal or the **lateral labyrinth** is **The Most** **Commonly** affected labyrinth

**Diagnosis:**

- No symptoms
- Vertigo if present indicate inner ear involvement  
SNHL (indicate cochlea involvement)
- **Fistula test (+) MCQ**

Applying Pressure to the ear by your finger will lead to vertigo or pump air inside the ear, which will induce **vertigo** and **Nystagmus** ( Look below For more Explanation)

- CT scan diagnostic !

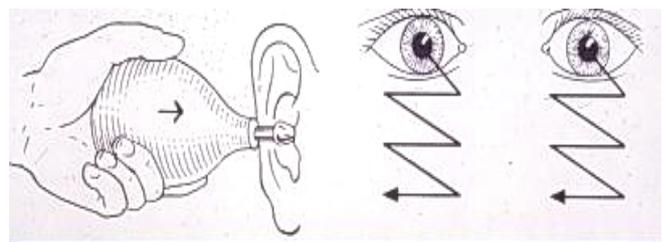


CT Fistula sometime missed because it is very small

**Treatment:**

Mastoid exploration is often required to eliminate the cause e.g. cholesteatoma. Systematic antibiotics should be instituted before and after the surgery.

**((Mastoidectomy look for the defect and close it))**



**INTRACRANIAL COMPLICATIONS:**

- A. Extradural abscess
- B. Lateral sinus thrombophlebitis
- C. Subdural empyema
- D. Meningitis
- E. Brain abscess
- F. Otitic hydrocephalus

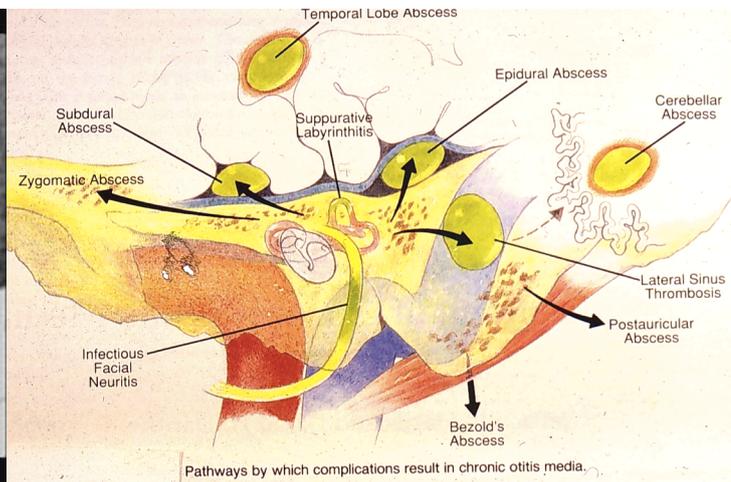
**\*Note:** Any pt with chronic disease think about intracranial extension

## A. Extradural abscess MCQ the commonest abscess

- Accumulation of pus between dura and bone (Defect in the bone that has been eaten up due to the infection, the bones involved are the tegmen tympani & tegmen antri)
- In the middle or posterior fossa (perisinus)

Outside the dura of lateral venous sinus its called (perisinus abscess)

- Causes headache (if there is increase in ICP, persistence headache on the side of OM) but may be **silent**.  
Most of the time, extradural or perisinus abscesses are **asymptomatic and silent**, and are **discovered accidentally** during cortical or modified radical mastoidectomy. The Dr said that they discovered accidentally **by CT** when looking for what is going on in middle & posterior fossa.
- Diagnosis is confirmed by CT or MRI
- Treatment is by **drainage** and **mesectomy + IV Abx to prevent Recurrence**.



## SUBDURAL ABSCESS (EMPYEMA): Rare

- Suppuration of the subdural space.
- May be localized, multiple or diffuse.
- Severe headache due to high ICP, fever, irritative and paralytic focal neurological symptoms
- CT and MRI
- Treatment is by neurosurgical drainage (combination btw neurosurgery and ENT by mastoidectomy for drainage)

Lumbar puncture should not be done as it can cause herniation of the cerebellar tonsils. It is a neurological emergency. A series of burr holes or a craniotomy is done to drain subdural empyema. Intravenous antibiotics are administered to control infection. Once infection is under control, attention is paid to causative ear disease which may require mastoidectomy.

## LATERAL SINUS THROMBOPHLEBITIS:

Its either directly from mastoid or by venous channels

The pathological process can be divided into the following stages:

**a. Perisinusitis:**

Abscess forms in relation to outer dural wall of the sinus

**b. Mural thrombus:**

Inflammation spreads to inner wall of the venous sinus with deposition of fibrin, platelets, and blood cells leading to thrombus formation within the lumen of sinus.

**c. Occluding thrombus:**

Mural thrombus enlarges to occlude the sinus lumen completely.

**d. Suppuration:**

Organisms may invade the thrombus causing intrasinus abscess

**e. Embolization:**

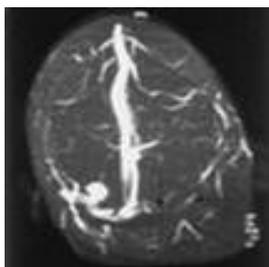
Though central part of thrombus breaks down due to intrasinus abscess, thrombotic process continues both proximally and distally. Proximally, it may spread to confluence of sinuses and to superior sagittal sinus or cavernous sinus, and distally, into mastoid emissary vein, to jugular bulb or jugular vein.

**Diagnosis:**

- Fever, **rigor**, and sweating
- Headache and neck pain
- Positive **Greissinger's sign, which is edema and tenderness** over the area of the mastoid emissary vein.
- **Tenderness** and edema **in the neck (at the intrnal jugular vien area )** **When the clot extends to the jugular vein, the vein will be felt in the neck as a tender cord** and there will be a **manifestation of increased IC pressure** (headache, vomiting, and papilledema).
- Propagation and embolic manifestations
- **Blood culture is positive during the febrile phase**, CSF manometry
- **CT with contrast, MRI** to show the complication

The problem with the lateral sinus thrombosis that it may send a distal emboli not to the brain only but to the lungs, abdomen and anywhere else. Its go to the heart as a complication.

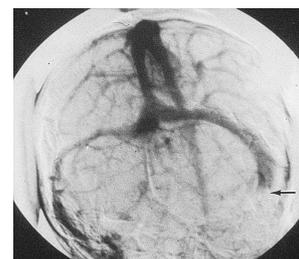
MRI Angiogram



CT Abscess



Subtraction Angiogram



**Imaging Study: Reading**

Contrast-enhanced CT scan can show sinus thrombosis by typical delta sign.

It is a triangular area with rim enhancement, and central low density area is seen in posterior cranial fossa on axial cuts. MR imaging better delineates thrombus.

"Delta sign" may also be seen on contrast-enhanced MRI. MR venography is useful to assess progression or resolution of thrombus.

**TREATMENT:**

- Admit
- IV antibiotics
- Surgery should follow within 48 hours unless there is dramatic clinical and radiological improvement (expose the sinus and clean it)

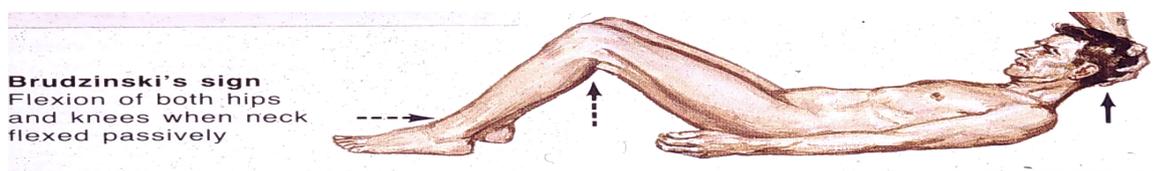
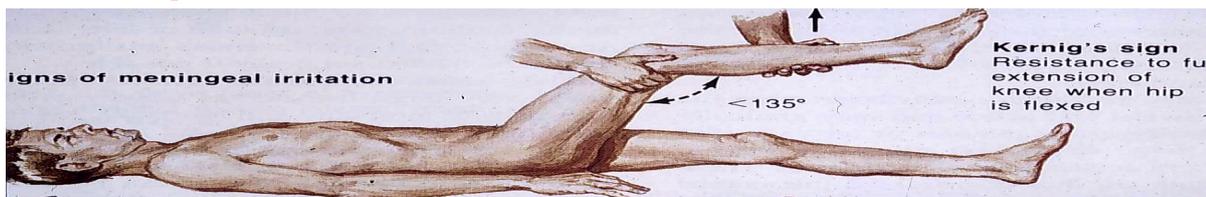
\*IN Cavernous sinus syndrome: the abducent nerve the commonest affected .

**SURGICAL TREATMENT OF SINUS THROMBOPHLEBITIS:** the doctor said it is **not imp** just if you want to read about it + Dr ALSNOSI did not mention ☺:

- Exposure of healthy dura proximal and distal
- Verify the sinus content
  - Blood clot: leave alone
  - Pus: incise to drain
- Ligate only if there is repeated embolisms or uncontrolled extension

**OTOGENIC MENINGITIS:**

- Infection of the subarachnoid space
- **The most common intracranial complication ( middle ear infection)**
- Fever, headache, neck stiffness, phonophobia, restlessness etc
- Kernig's & Brudzinski signs
- **Lumbar puncture to confirm the Dx and culture it**



Treatment: referral to neurosurgery the ENT role in this if there is mastoid pus accumulation they drain it

## **OTOGENIC BRAIN ABSCESS: the brain abscess the most lethal**

- 25% of children's and 50% of adult's brain abscesses are otogenic.
- Mostly in temporal lobe or cerebellum (2:1) More in the temporal and the manifestations are according to the site.

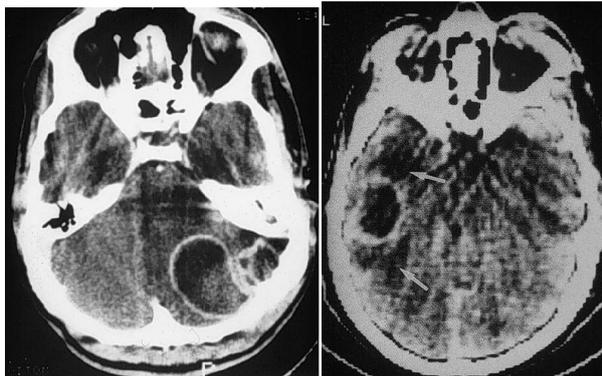
### **Clinical manifestations**

- General manifestations: fever, lethargy, headache **sever generalized worse in the morning**.
- Manifestation of raised IC pressure ( **headach , N&V**) **the latter usually projectile seen more often in cerebellar lesions.**
- Focal manifestations
  - **Temporal: Aphasia, hemianopia, paralysis**
  - **Cerebellar: ataxia, vertigo, nystagmus, muscle incoordination**

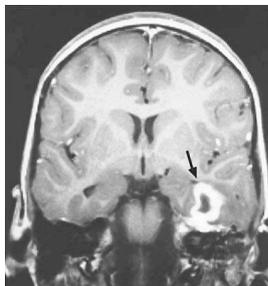
### **Diagnosis**

- CT
- **MRI ( tissue extension)**
- LP ( lumbar puncture )
- Burr hole needling

The manifestation gives us a hint about the site .



CT: Abscess with well formed wall, they should be referred to the neurosurgery ( temporal lobe , cerebellum )



MRI

### **Treatment:**

- Repeated aspiration
- Excision ( the neurosurgeon will drain it )

**OTITIC HYDROCEPHALUS** dr.alsnosi didn't mention 😊

- Very rare
  - An idiopathic benign intracranial hypertension associated with ear disease. **It most often follows lateral sinus ( sigmoid ) thrombophlebitis**
  - Clinically: Manifestations of increased IC pressure
  - Treatment:steroids, diuretics, hyperosmolar dehydrating agents, repeated LP
- They are referred to neurosurgery**

**GENERAL PRINCIPLES OF TREATMENT OF THE COMPLICATIONS:**

- Parental antibiotics IV
- Surgery for the complication if applicable
- Treatment of the ear lesion
  - Myringotomy in AOM
  - Mastoidectomy in CSOM

**AT The End**

This lec was given by Dr. Alaisa for F2 and by Dr. Alsanosi for F1  
Regarding the differences both of our doctors emphasized on the IMP points equally.  
Whoever, both drs notes have been covered

وإن أصببت فمن الله وإن أخطأت فمن نفسي والشيطان

**GOOD LUCK**

