MIDDLE EAR DISORDERS

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NEGATIVE MIDDLE-EAR PRESSURE

- POOR FUNCTION OF THE EUSTACHIAN TUBE (ET) IS RESPONSIBLE FOR MANY MIDDLE-EAR DISORDERS.
- TWO MOST COMMON CAUSES OF EUSTACHAIN-TUBE DYSFUNCTION (ETD) ARE:

1. EDEMA OF THE ET SECONDARY TO INFECTION OR ALLERGY.
2. BLOCKAGE OF THE ET BY HYPERTROPHIED (OVERGROWN) ADENOIDS.

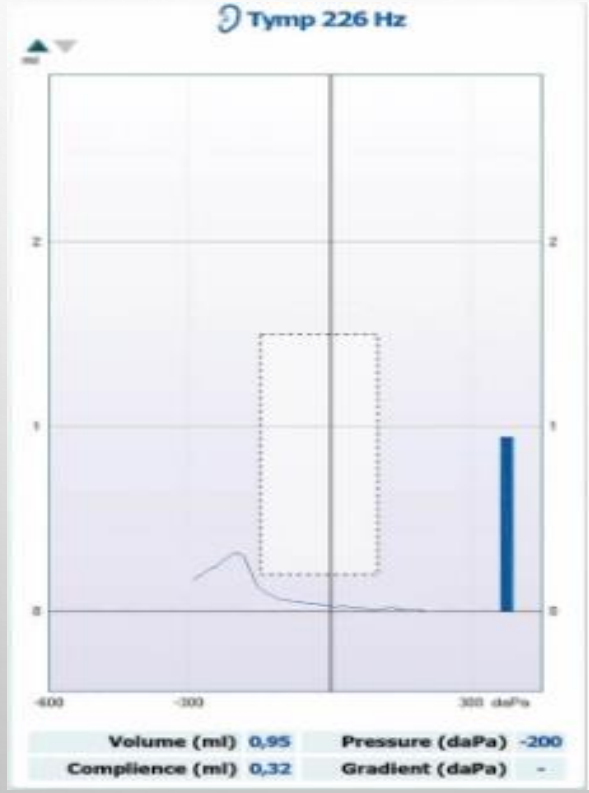
- ETD WILL RESULT IN A DROP IN PRESSURE WITHIN THE MIDDLE EAR, THIS CAUSES THE TYMPANIC MEMBRANE TO BE RETRACTED AS THE PRESSURE IN THE EXTERNAL CANAL IS HIGHER THAN THE PRESSURE IN THE MIDDLE EAR. THE RETRACTION FROM THE ETD INTERFERES WITH THE NORMAL VIBRATION OF THE TM AND MAY PRODUCE A SLIGHT CONDUCTIVE HEARING LOSS.

AUDIOLOGICAL TEST RESULTS IN NEGATIVE MIDDLE EAR PRESSURE

- IN THE HISTORY, PATIENTS MAY DESCRIBE SOME EAR DISCOMFORT, A FULLNESS OR PRESSURE FEELING AND MAY RESULT IN A MILD HEARING IMPAIRMENT AND RINGING IN THE EAR (TINNITUS).
- OTOSCOPIC EXAMINATION WILL REVEAL A RETRACTED TYMPANIC MEMBRANE

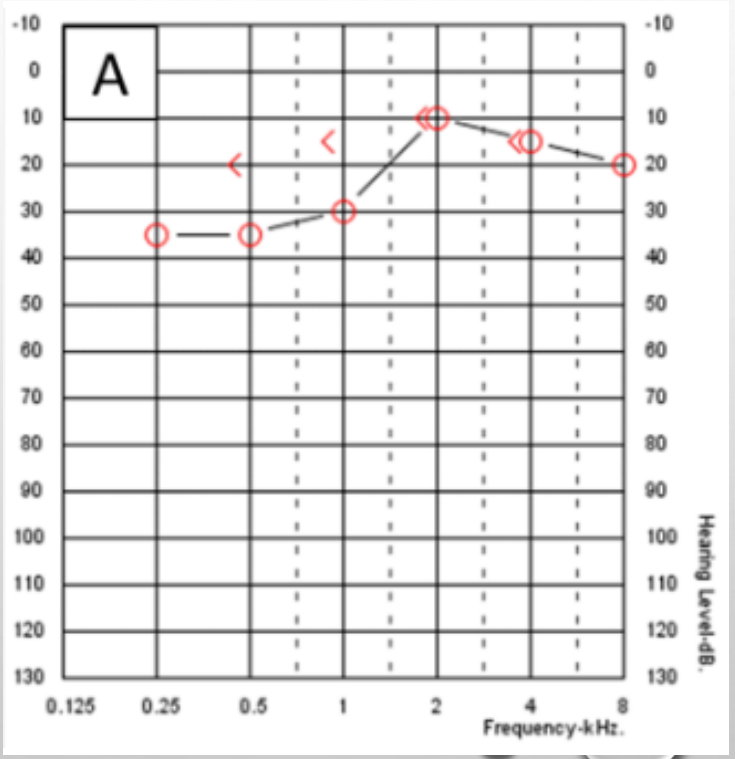
AUDIOLOGICAL TEST RESULTS IN NEGATIVE MIDDLE EAR PRESSURE

- TYMPANOMETRY WILL SHOW “TYPE C” TYMPANOGRAMS



AUDIOLOGICAL TEST RESULTS IN NEGATIVE MIDDLE EAR PRESSURE

- PURE TONE AUDIOMETRY WILL SHOW NORMAL HEARING SENSITIVITY OR SLIGHT CONDUCTIVE HEARING LOSS.



OTITIS MEDIA

- OTITIS MEDIA (OM): IS ANY INFECTION OF THE MUCOUS MEMBRANE LINING OF THE MIDDLE-EAR CLEFT.
- ONE OF THE MOST COMMON DISORDERS OF THE MIDDLE EAR CAUSING CONDUCTIVE HEARING LOSS.
- NEARLY 70% OF THE UNITED STATES CHILDREN WHO ARE UNDER 2 YEARS ARE EXPERIENCING OM, WITH MORE THAN HALF OF THESE CHILDREN HAVING RECURRENT EPISODES.

RISK FACTORS OF OTITIS MEDIA

1. ETD

2. BAROTRAUMA (SUDDEN CHANGES IN AIR PRESSURE, AS WHEN FLYING OR DIVING)

3. ABNORMALITIES IN THE MUCOUS MEMBRANE

4. CRANIOFACIAL ABNORMALITIES AFFECTING THE EUSTACHIAN TUBE (DOWN'S, TURNER'S) IN CHILDREN

5. AGE (OM IS MORE COMMON IN CHILDREN)

6. RACE (COMMONER IN CHINESE, ESKIMOS AND NATIVE AMERICANS AND LESS COMMON IN WHITES, WHILE IN BLACKS IT IS LEAST COMMON)

7. GENDER (MORE COMMON IN MALES THAN IN FEMALES)

8. SOCIOECONOMIC FACTORS

9. INDIVIDUAL'S IMMUNE SYSTEM

10. EXPOSURE TO CIGARETTE SMOKE OR OTHER FUME (EXTERNAL FACTOR)

11. SEASONAL EFFECTS (OM IS MOST COMMON IN THE WINTER MONTHS).

SUPPURATIVE OTITIS MEDIA

- IN SUPPURATIVE OTITIS MEDIA, THE MUCOSA BECOMES FILLED WITH BLOOD, THE SUPERFICIAL CELLS BREAK DOWN, AND PUS ACCUMULATES.
- SYMPTOMS: 1. PAIN IN THE EAR 2. PULSE RATES AND BODY TEMPERATURES BECOME ELEVATED 3. VISIBLY ILL
- IF PRESSURE FROM THE PUS GOES UP, NECROSIS WILL OCCURRED (DEATH OF THE MUCOSA, SUBMUCOSA, AND TM)
- FURTHER INCREASE IN PRESSURE WILL CAUSE RUPTURE IN THE TM
- PUS MAY REACH THE MASTOID CAUSING MASTOIDITIS, WHEN NOT TREATED.
- USUALLY BILATERAL.

SUPPURATIVE OTITIS MEDIA

- **TWO TYPES: CHRONIC AND ACUTE SUPPURATIVE OTITIS MEDIA.**
- **CHRONIC OTITIS MEDIA REFERS TO A LONG STANDING CONDITION.**
- **ACUTE OTITIS MEDIA GENERALLY DEVELOP RAPIDLY AND INCLUDE SWELLING, REDNESS, AND BLEEDING**

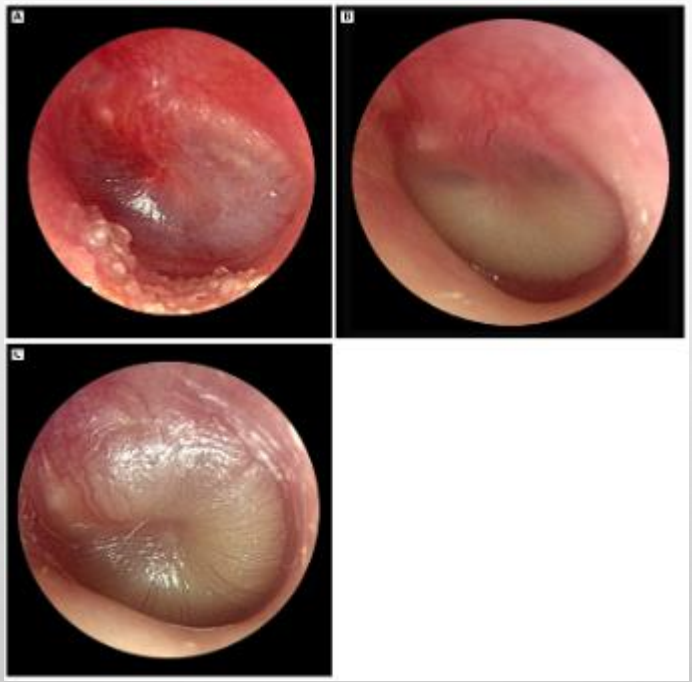
• PURE TONE AUDIOMETRY – CONDUCTIVE HEARING LOSS (DEGREE OF HEARING LOSS RELATED TO THE ACCUMULATION OF FLUID IN THE MIDDLE EAR AND THE CONFIGURATION IS RATHER FLAT ACROSS ALL FREQUENCIES)

TREATMENT:

- **WATCHFUL WAITING AND DECONGESTANT-ANTIHISTAMINE COMBINATIONS**
- **ANTIBIOTICS FOR BACTERIAL INFECTIONS ONLY**
- **PUS REMOVAL**
- **IF RECURRENCE - GROMMETS**
- **IF COMPLICATED, SURGERY**

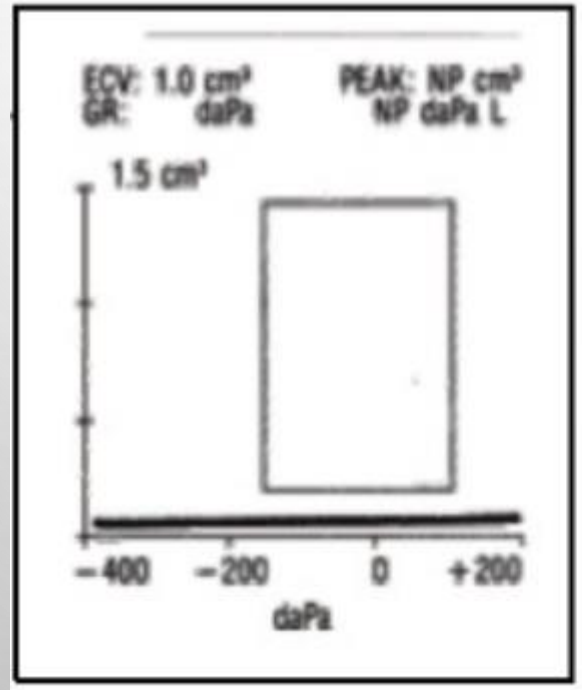
AUDIOLOGICAL TEST RESULTS

- OTOSCOPIC EXAMINATION WILL REVEAL REDNESS AND BULGING TYMPANIC MEMBRANE



AUDIOLOGICAL TEST RESULTS

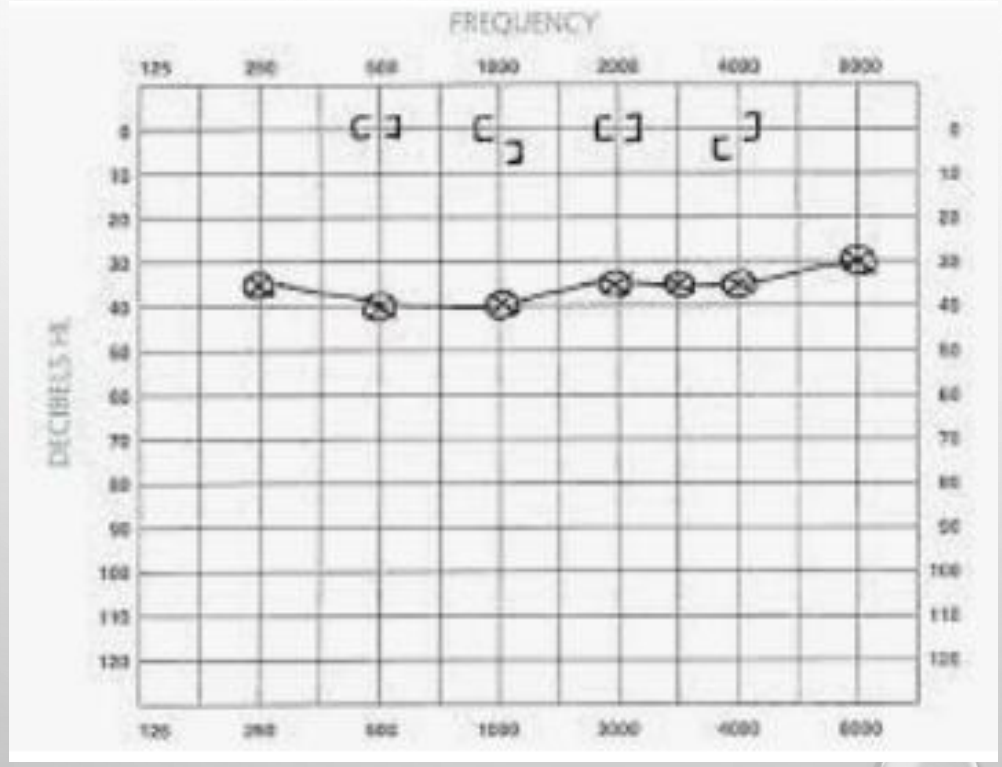
- TYMPANOMETRY IS CONTRAINDICATED IN THIS CONDITION AND IF TO BE DONE WILL SHOW TYPE B TYMPANOGRAMS WITH NORMAL EAR CANAL VOLUME.



- Type B
- No Mobility
- Normal ECV (1.0 cm_3)
- No Compliance (No Peak)
- No Middle-ear Pressure
- No Gradient

AUDIOLOGICAL TEST RESULTS

- PTA WILL SHOW BILATERAL MILD TO MODERATE CHL



DORMANT OTITIS MEDIA

- REFERS TO EXACERBATION OF THE SAME CONDITION OF OTITIS MEDIA EXPERIENCED EARLIER. MANY PATIENTS DISCONTINUE THEIR OWN ANTIBIOTICS TREATMENTS WHEN THEIR SYMPTOMS OF OM ABATE, LEAVING SOME OF THE BACTERIA ALIVE WHICH WILL CAUSE THE CONDITION TO FLARE UP AGAIN. STRONGER STRAIN OF BACTERIA WILL RESULT (SIDE EFFECT OF ANTIBIOTICS) THAT IS LESS SUSCEPTIBLE TO MEDICATION.

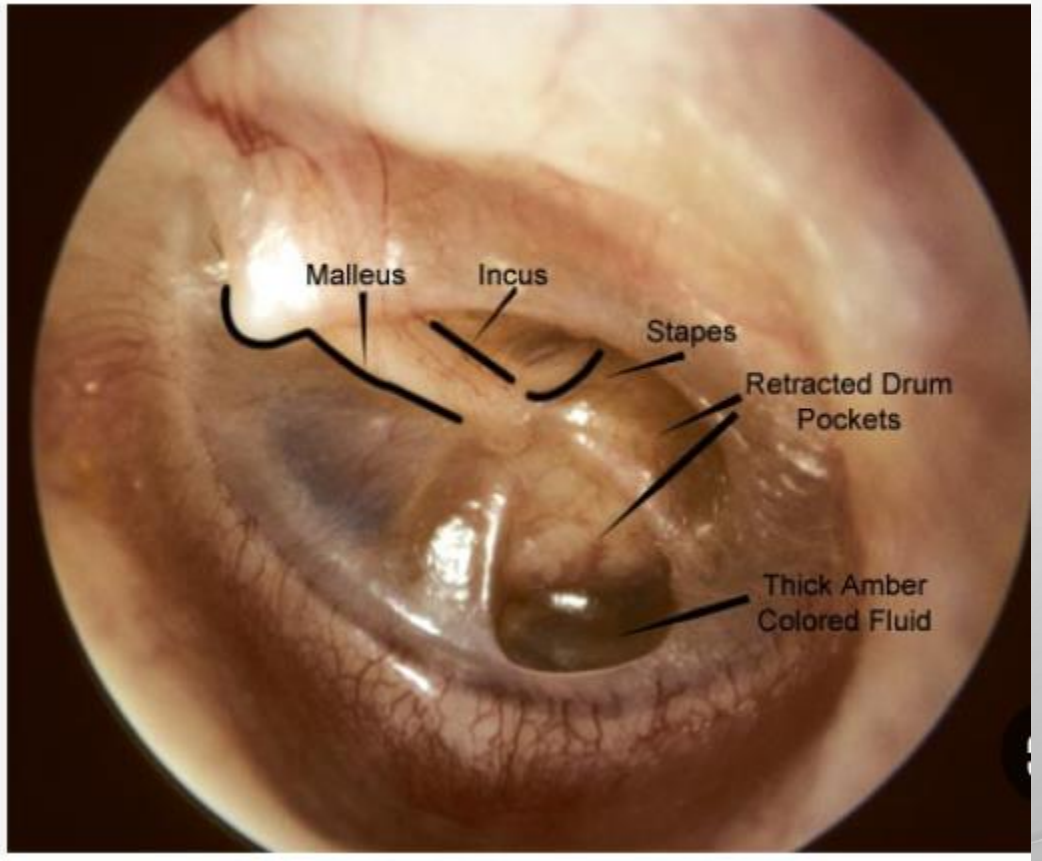
SEROUS EFFUSION OF THE MIDDLE EAR (OTITIS MEDIA WITH EFFUSION)

- DEFINITION INFLAMMATION OF THE MIDDLE EAR CLEFT CHARACTERIZED BY THE PRESENCE OF NON PURULENT FLUID AND WITHOUT ANY FEATURES OF INFECTION.
- MENISCUS: THE FLUID LINE THAT REVEALS THE PRESENCE OF FLUIDS AND CAN BE SEEN IN THE OTOSCOPIC EXAMINATION.
- WHEN THE MENISCUS RISES ABOVE THE SUPERIOR MARGIN OF THE TM, THE CONDITION AT THIS STAGE IS DIFFICULT TO DIAGNOSE VISUALLY.

AUDIOLOGICAL TEST RESULTS

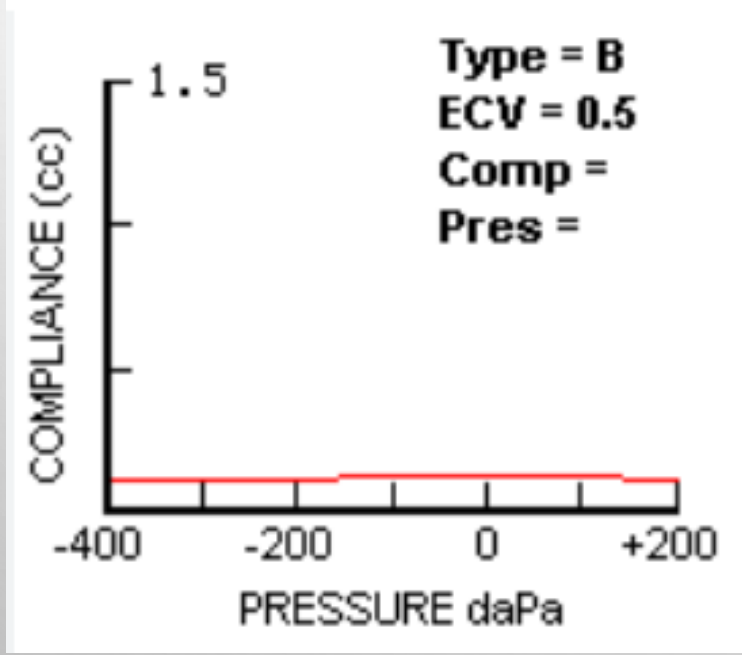
- TYPICAL CASE HISTORY IS SCHOOL-AGE PATIENTS, BOTH PARENTS AND TEACHERS COMPLAINS THAT THE CHILD CAN'T HEAR WILL, NO PAIN.
- OTOSCOPIC EXAMINATION WILL REVEAL

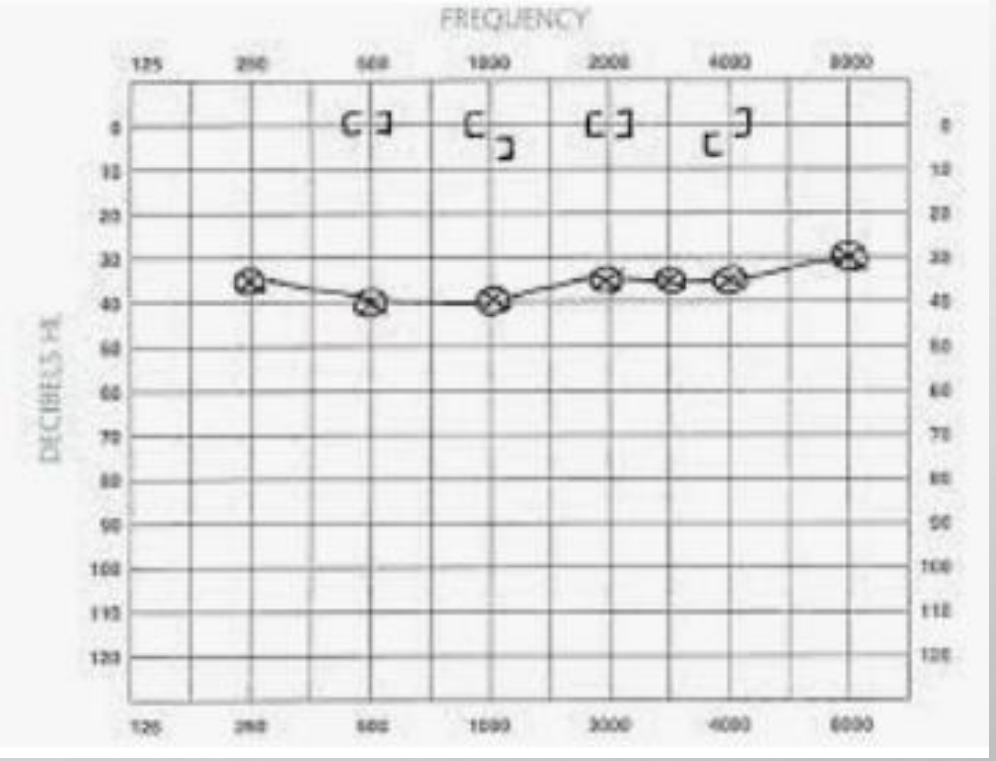
MENISCUS OR BUBBLES ON THE TM.



AUDIOLOGICAL TEST RESULTS

- TYMPANOMETRY TYPE B WITH NORMAL ECV
- PTA BILATERAL FLAT MILD TO MODERATE CHL





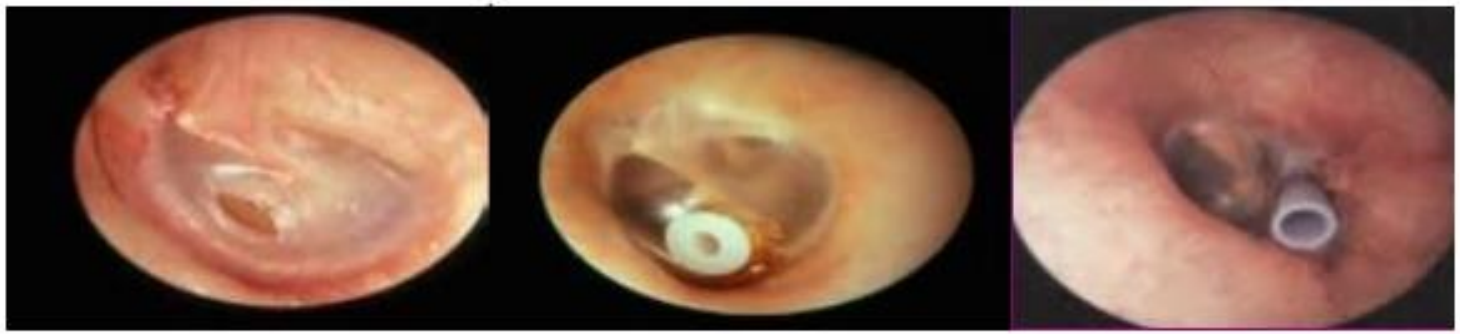
SEROUS EFFUSION OF THE MIDDLE EAR (OTITIS MEDIA WITH EFFUSION)

TREATMENT:

- WATCHFUL WAITING
- DECONGESTANT-ANTIHISTAMINE COMBINATIONS WILL HELP TO RESTORE NORMAL MIDDLE-EAR PRESSURE THAT RESULTS FROM ETD. HOWEVER, THESE TREATMENTS ARE FOUND TO BE USELESS IN INFANTS AND SMALL CHILDREN AS ET IS LESS EFFICIENT IN THOSE GROUPS.
- ANTIBIOTICS ARE NOT INDICATED AS WITH SEROUS EFFUSION, THE MIDDLE EAR IS NOT INFECTED.
- SURGICAL TREATMENT (PRESSURE EQUALIZATION TUBES “PE TUBES”).

SURGICAL TREATMENT FOR MIDDLE-EAR FLUID

- Myringotomy or myringostomy which include performing incision into the TM to relieve the fluid pressure and suction out the remaining fluid. A plastic pressure-equalizing (P.E.) tube is inserted through the incision in the TM to keep the middle



CHOLESTEATOMA

- THE CONDITION REFERS TO THE PRESENCE OF A PSEUDOTUMOR WHICH IS OCCURRED WHENEVER SKIN IS INTRODUCED TO THE MIDDLE-EAR SPACE.
- CHOLESTEATOMA FORM AS A SAC, WITH ONIONLIKE RINGS.
- A PRIMARY ACQUIRED CHOLESTEATOMA OCCURRED WITHOUT A HISTORY OF OM IF THE EPITHELIUM OF THE ATTIC OF THE MIDDLE EAR BECOMES MODIFIED. THIS ALTERATION MAY OCCUR IF THE PARS FLACCIDA OF THE TM BECOMES SUCKED INTO THE MIDDLE EAR THROUGH NEGATIVE PRESSURE AND THEN OPENS, REVEALING THE SKIN FROM THE OUTER PORTION OF THE TM TO THE MIDDLE EAR.
- IN PATIENTS WITH PERFORATED TM, THE SKIN MAY ENTER THE MIDDLE EAR THROUGH THE PERFORATIONS. THIS INVASION PRODUCE A SECONDARY CHOLESTEATOMA.
- THE BEST TREATMENT FOR CHOLESTEATOME IS SURGERY.
- THE CONDITION SPREADS RAPIDLY, SO DURING THE SURGERY ALL THE CHOLESTEATOMATOUS MATERIAL MUST BE REMOVED.
- MOST EARS WITH THE CONDITION ARE SECONDARILY INFECTED AND PRODUCE FOUL-SMELLING DISCHARGE THAT DRAIN FROM THE EARS (OTORRHEA).

SYMPTOMS

A CHOLESTEATOMA USUALLY ONLY AFFECTS ONE EAR.

THE TWO MOST COMMON SYMPTOMS ARE:

- A PERSISTENT OR RECURRING WATERY, OFTEN SMELLY, DISCHARGE FROM THE EAR, WHICH CAN COME AND GO OR MAY BE CONTINUOUS
- A GRADUAL LOSS OF HEARING IN THE AFFECTED EAR

ALSO SOME PEOPLE MAY EXPERIENCE SLIGHT DISCOMFORT IN THEIR EAR.

- TINNITUS AND VERTIGO, WITH MORE SEVERE CASES.

AUDIOLOGICAL TEST RESULTS

- OTOSCOPIC EXAMINATION

AUDIOLOGICAL TEST RESULTS

- TYMPANOMETRY RESULTS WILL DEPEND ON THE STAGE OF THE DISEASE

- EARLY STAGES WILL BE TYPE C WITH RETRACTED TM

- ADVANCED STAGES AND AFTER TM BEING PERFORATED WILL SEE TYPE B WITH ECV>2.5 ML

- PURE TONE AUDIOMETRY WILL SHOW CONDUCTIVE HEARING LOSS, THE SEVERITY OF THE CHL WILL ALSO DEPEND ON THE STAGE OF THE DISEASE

TREATMENT

- ALTHOUGH SURGERY IS RARELY URGENT, ONCE A CHOLESTEATOMA IS FOUND, SURGICAL TREATMENT IS THE ONLY CHOICE. SURGERY USUALLY INVOLVES A MASTOIDECTOMY TO REMOVE THE DISEASE FROM THE BONE, AND TYMPANOPLASTY TO REPAIR THE EARDRUM. THE EXACT TYPE OF OPERATION IS DETERMINED BY THE STAGE OF THE DISEASE AT THE TIME OF SURGERY.
- CHOLESTEATOMA SURGERY, WHICH IS DELICATE SURGERY PERFORMED UNDER A MICROSCOPE, USUALLY TAKES 2 TO 3 HOURS, AND PATIENTS MAY GO HOME THE SAME DAY. IT IS VERY IMPORTANT TO REMOVE THE DISEASE COMPLETELY, OR IT MAY GROW BACK. THE RATE OF RE-GROWTH IS HIGHER IN CHILDREN THAN ADULTS. BECAUSE OF THE AGGRESSIVE NATURE OF CHOLESTEATOMA, THAT'S WHY PATIENTS ARE ASKED TO COME IN REGULARLY FOR CAREFUL FOLLOW-UP. SOMETIMES A SECOND OPERATION WILL BE NECESSARY.

HEARING STATUS AFTER CHOLESTEATOMA SURGERY

- PATIENTS WITH CHOLESTEATOMA USUALLY HAVE HEARING LOSS PRIOR TO SURGERY. DURING THE SURGERY, AN ATTEMPT TO RECONSTRUCT THE HEARING IS DONE, THIS USUALLY RESULTS IN HEARING IMPROVEMENT, BUT NOT ALWAYS. INFLAMMATION AND SCAR TISSUE CAN SOMETIMES PREVENT A GOOD HEARING RESULT. A SECOND-STAGE OPERATION CAN BE ATTEMPTED IN THE FUTURE WHEN THE EAR IS STABLE AND THERE IS NO MORE DISEASE.
- ALSO HEARING AIDS ARE A GOOD CHOICE IF HEARING LOSS PERSISTS.

Case Presentation:

A 44-year-old healthy lady presented with a history of right ear fullness for the past few years, with an associated tympanic membrane retraction pocket filled with debris. The retraction pocket was treated previously with frequent ear cleaning. Later, she was lost to follow up until she presented again with a 6 month history of progressive right ear hearing loss and increased aural fullness. The patient had no previous history of draining ear, surgery or trauma. She has no other associated symptoms.

On physical examination, the right ear showed a superior retraction pocket filled with whitish debris, and a pearly white structure behind the posterior part of the tympanic membrane *(fig. 1)*. No perforation or drainage was seen. Left ear exam was normal. The rest of physical exam was non relevant.

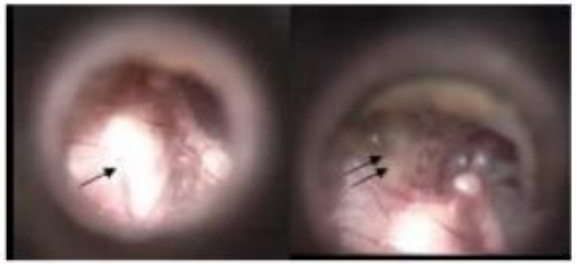


Fig. 1: Examination under microscope: posterior cholesteatoma (one arrow) and superior posterior retraction pocket (two arrows)

Pure tone audiometry showed mild-to-severe conductive hearing loss on the right and a mild sensorineural hearing loss on the left at high frequencies. Tympanograms showed a B curve on the right and a C curve on the left *(fig. 2)*

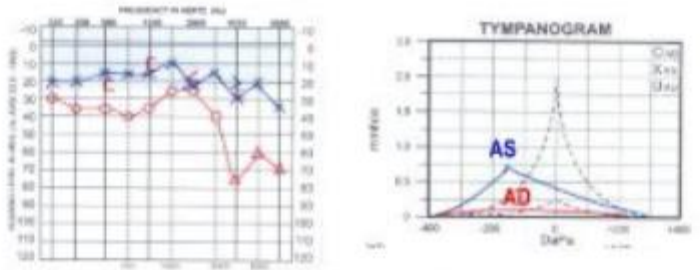
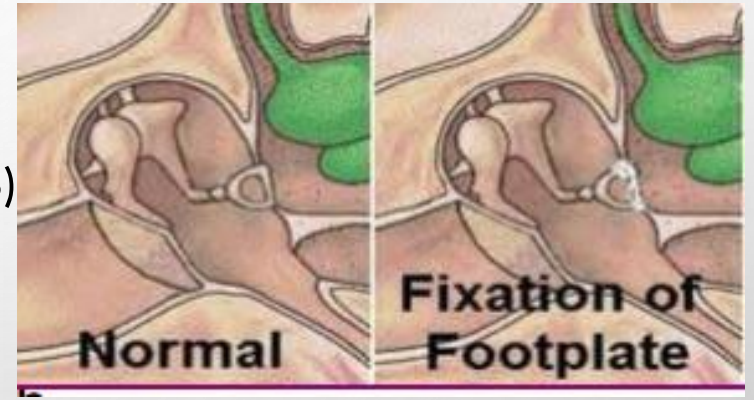


Fig. 2: Audiogram and tympanogram showing right conductive hearing loss and flat curve.

OTOSCLEROSIS

- DEFINITION:

LOCALIZED LESION OF THE STAPEDIAL FOOTPLATE OR THE COCHLEA OF ONE OR BOTH EARS WHERE NORMAL BONE IS REPLACED BY SPONGY BONE



- COMMON CAUSE OF HEARING LOSS IN ADULTS
- ETIOLOGY: PROBABLY GENETIC (IN AT LEAST 70%OF ALL CASES)
- FIXATION OF STAPES FOOTPLATE IS THE CAUSE OF SYMPTOMS
- 50% OF ADULT CHL
- THE INCIDENCE IN WOMEN APPROXIMATELY TWICE THAN IN MEN AND USUALLY BETWEEN 20 AND 30
- MORE COMMON IN WHITE RACE
- RARE AMONG CHILDREN

SYMPTOMS

- CHL – GRADUAL AND USUALLY BILATERAL; MAY BE SEVERE
- MIXED IF COCHLEA AFFECTED
- PATIENTS OFTEN EXHIBIT A BLUISH CAST TO THE WHITES OF THEIR EYES
- THEY COMPLAIN OF DIFFICULTY HEARING WHILE CHEWING
- PARACUSISWILLISII
- TINNITUS AND VERTIGO

AUDIOLOGICAL TEST RESULTS

- OTOSCOPIC EXAMINATION

TM NORMAL BUT MAY SHOW SCHWARTZE'S SIGN (FLAMINGO PINK TINGE)

- TYMPANOMETRY

IS NOT SENSITIVE IN DIAGNOSING OTOSCLEROSIS, SO IT WILL BE TYPE A INSTEAD OF AS

- PTA

- CONDUCTIVE HEARING LOSS WITH CARHART'S NOTCH

- MIXED HEARING LOSS IF REACHED THE COCHLEA

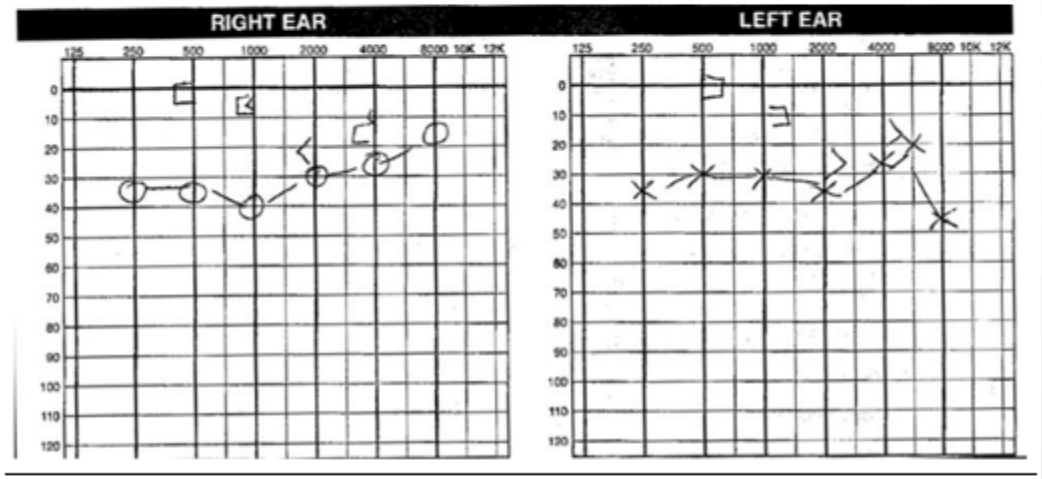
MANAGEMENT

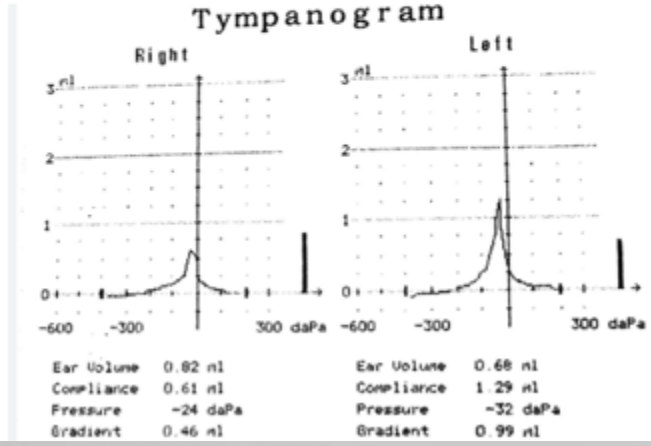
- CONSERVATIVE WITH MONITORING AND AMPLIFICATION
- SURGERY WHEN INDICATED – STAPEDOTOMY WITH PROSTHESIS USUALLY MADE OF TEFLON – NOT WITHOUT COMPLICATIONS – USUALLY CLOSES THE AIR BONE GAP AND ABOLISHES THE CARHART'S NOTCH

Case presentation

A 36-years old female came to your clinic complaining from bilateral hearing loss and tinnitus. Her symptoms started three years ago after giving birth to her second child, and her hearing is deteriorating since then. Furthermore, there is a family history of hearing loss, both her aunt and grandmother have hearing issues.

Tests results:





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