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Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

Tympanosclerosis

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BRS HOSPITAL

Definition:

Price Rs. 5/- Only

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Editors

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28,Cathedral garden Rd, Nungambakkam, Chennai - 600 034. Phone: 044 - 61434250 044 - 61434230 Email: brsmadhu@yahoo.co.in Web: www.brshospital.com It is a degenerative sequelae characterised as submucosal hyalinization and calcification in Tympanic Membrane , middle ear cleft or mastoid that occurs following chronic ear inflammation (chalky white lesions within TM)

Possible factors:

Long lasting inflammation Recurrent infection and

inflammation

Mucosal trauma and damage



Tympanosclerosis is a condition in which there is calcification of tissue in the eardrum and middle ear, including the tympanic membrane. If extensive, it may affect hearing.

Tympanosclerosis may be classified as:

• **Myringosclerosis** - involving only the tympanic membrane.

• **Intratympanic tympanosclerosis** - involving other middle ear sites: the ossicular chain or, rarely, the mastoid cavity.

Eardrum and ossicles evidencing the tympanosclerotic plaque (in grey)



(a) Only in the eardrum (b) in the eardrum and malleus



History

• 1734- limestone plaques in the eardrum were defined by Cassebohm

• In 1955–56, Zollner and Beck made detailed examinations using ear microscopes and revealed pathologies caused by tympanosclerosis in the middle ear and bones

Etiology

- Eustachian tube dysfunction
- Grommet insertion, Ear drum perforation
- Intra epithelial bleeding (bleeding within layers of TM)
- Ear infection (myringitis, otitis media)
- Aging

Studies have shown that there are identical risk factors for atherosclerosis and tympanosclerosis- high levels of homocysteine, low-density lipoprotein, total cholesterol and triglyceride

Pathophysiology



Types of tympanosclerosis

Histological:

- ✤ Type 1- fibrous type 90%
- ✤ Type 2- calcified type 9.7%

Classification as per eardrum status:

- Open TS with perforation
- Closed TS without perforation

Classification as per location:

• Myringosclerosis - only in ear drum

• Intra tympanic Tympanosclerosis - involving middle ear structures, sometimes extending to attic, mastoid

Histopathology:

Tympanosclerosis is characterized by

- Decreased vascularization in lamina propria,
- Increased hyalinization,
- Calcium accumulation.

Wielinga A.G. Kerr classification of TS

- Type I. Involvement of the tympanic membrane, either intact or perforated. Sometimes this involves the malleus.
- Type II. Fixation of the malleus-incus complex in the attic with a mobile stapes.
- Type III. Fixation of the stapes. The malleus-incus complex, if present, is mobile. The stapedial arch may be absent.
- Type IV. Fixation of the stapes and malleus-incus complex.

Signs and symptoms

- The opaque or patchy white appearance of the eardrum
- The amount of eardrum involvement can vary considerably between cases.
- Intratympanic tympanosclerosis is more difficult to identify but may be suspected if there are typical chalky lesions on the eardrum, scarring of the eardrum, or a

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history of otitis media, with non-progressive conductive deafness and no family history of otosclerosis.

• May resemble like Congenital cholesteatoma- mass behind intact TM.

Stages of TS formation

Stage1 : Inflammation and fibrogenesis

Proinflammatory mediators: lipopolysaccharides,
bacterial components, ICAM-1 (intercellular adhesion molecule), iNOS, cytokines, chemokines in middle ear are released, which are noted in middle ear effusion.
Stage 2: Cell degeneration and precipitation.
Degenerating cell nests form on the TM epithelium

Stage 3 : Calcification- membrane covered vesicles containing Ca+, P+ are deposited, calcification starts when these spherules adhere to each other.

Stage4: Decalcification and recovery- calcium deposition in these calcospheres decrease, plaques become small in size and disappear.

Treatment -

Treatment is only required if there is hearing loss. Hearing aids can be beneficial, as with any form of conductive hearing loss

Surgery -

• Surgery for tympanosclerosis involves excision of the sclerotic areas and reconstruction of the ossicular chain.

There are various surgical procedures, and some involve two-stage surgery. Reported success rates are variable.

Manubrio-stapedioplasty has been shown to be an effective method for ossicular reconstruction in cases of malleus and incus fixation due to tympanosclerosis

Surgery for tympanosclerosis usually results in significant improvement of hearing.

Can use drill or laser adjunct to remove plaques After laser division, tendency of recurrence has reduced

• Potential raw areas in attic has to be filled with gelfoam - to avoid adhesion and ossicular refixation

• Local cortisone application to reduce fibrosis

Grafting:

Combined with plaque removal if TM perforation present , Temporalis fascia grafting is done as in tympanoplasty procedures. Graft uptake is good after removing plaques

Can be done as staged procedures too

High rate of recurrence. 36% recurrence rate noted Main problem encountered by surgeon when. Ossicular chain immobile

Disadvantages of surgery:

• Sensorineural HL:

This makes the surgery controversial in management of TS Excessive stapes manipulation

• Inadvertent creation of perilymph fistula by cracking or puncturing stapes footplate.

Conclusion

- The most common treatment method of tympanosclerosis is surgery. Stapedectomy is recommended in surgery instead of mobilization techniques.
- Wielinga kerr type 1, 2 has 90% improvement of hearing post surgery
- Tympanosclerosis of the oval window combined with other chronic inflammation usually requires two-stage surgery
- Hearing aids can be used in cases of extensive TS and post op residual hearing impairment.

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90th Birthday Celebration of Prof.Dr.R.Venkatakrishnan.M.S.(Gen Surg), M.S.(Ortho)

Sr.Consultant Orthopedic Surgeon BRS HOSPITAL



Prof. RVK with BRS Family



Prof. RVK with Grandchildren Ms. Tapasya, Dr. Pujita and Mrs. Deeksha



Prof.RVK with his old students from Madurai Medical College.

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