IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 15, Issue 12 Ver. III (December. 2016), PP 43-45
www.iosrjournals.org

Tympanosclerosis and Recurrent Sinusitis: An Association Found in Our Retrospective Study

[1]Dr. Rajiv Gupta, [2]Dr. Deepika Tiwari
[1](Senior resident, deptt of ent, Government Doon Medical College, Dehradun)
[2](Senior residents, deptt of anaesthesia, Government Doon Medical College, Dehradun)

Abstract:
Background: *We conducted a retrospective study to evaluate the incidence of tympanosclerosis (TS), degree of resulting deafness, the required surgical stratergies and their outcome in patients with tympanic membrane perforation.*
Material and methods: *A retrospective study was done in 500 patients (14 – 45 yrs) with ear discharge attending the out patient department (OPD) in the last 3 years. Data regarding incidence of TS, location of perforation, degree of deafness, association with repeated cold, headaches and sinusitis; history of grommet insertion or trauma to the tympanic membrane (TM) and the surgical stratergy required was compiled.*
Results: *9.6% (48 patients) perforations were associated with a patch of TS. It involved the upper anterior and posterior quadrants in 81% (39 patients), lower anterior quadrant in 13% (6 patients), large inferior quadrant in 4% (2 patients) and nearly the whole TM in 2% (1 patient). The degree of deafness was mild to moderate in 76%, moderate to severe in 19% and profound in 5% patients. 84% patients had long term symptoms of repeated colds, headaches and nose blocks with associated sinusitis. No patients had history of grommet insertion or trauma to TM. Need of silastic sheet insertion and staged surgery was noted in 3 cases.*
Conclusion: *There is a strong association between sinusitis / Eustachian tube block and TS.*
Keywords: *Tympanosclerosis (TS), Sinusitis, Tympanic membrane (TM)*

I. Introduction

Tympanosclerosis (also known as myringoclerosis or intratympanic tympanosclerosis) is a condition caused by clacification of tissues in the middle ear, sometimes resulting in a detrimental effect to hearing. Increased fibroblast activity results in deposition of collagen and deposition of calcium phosphate plaques in lamina propria of the TM.[1,2] Myringosclerosis refers to a calcification only within the TM and is usually less extensive than intratympanic tympanosclerosis, which refers to any other location within the middle ear such as the ossicular chain, middle ear mucosa or less frequently the mastoid cavity.[3] However its aetiology is not commonly understood, common causes include long term otitis media, grommet insertion and atherosclerosis.[2,4,5] We aimed to study the incidence of TS, degree of resulting deafness, the required surgical stratergies and their outcome in patients with tympanic membrane perforation.

II. Material And Methods

A retrospective study over a period of 3 years was done in 500 patients (14 – 45 yrs) with central perforation and ear discharge attending the OPD in Doon hospital, Dehradun. Data regarding incidence of TS, location of perforation, degree of deafness, association with repeated cold, headaches and sinusitis; history of grommet insertion or trauma to the tympanic membrane (TM) and the surgical stratergy required was compiled. The surgical steps included the removal of whole tympanosclerotic patch in addition to freshening of the TM perforation. We noticed that the upper posterior localized patch was associated with ossicular chain involvement in majority of cases, was more difficult to clear and also required the reconstruction of ossicular chain. Commonly, the head of malleus required attention which can be missed if the mobility is not rechecked. In few cases a raw area was left requiring a silastic sheet insertion to prevent adhesions and the surgery was staged.

III. Results

9.6% (48 patients) perforations were associated with a patch of TS.

Table1: Incidence of location of TS patch in TM

Location of TS patch	No. of patients	%age
Upper anterior & posterior quadrant	39	81%
Lower anterior quadrant	6	13%
Large inferior quadrant	2	4%
Nearly whole TM	1	2%

Table2: Degree of deafness associated with TS

Degree of deafness	No. of patients	%age
Mild to moderate	37	76%
Moderate to severe	9	19%
Profound	2	5%

In addition we noted that long term symptoms of repeated colds, headaches and nose blocks with associated sinusitis (seen on X-ray paranasal sinus and occipito-mental view) were present in 84% (40 patients). No patients had history of grommet insertion or trauma to TM. Need of silastic sheet insertion and staged surgery was noted in 3 cases.

IV. Discussion

Myringosclerosis is the deposition of hyaline and calcium in the collagen layer of the TM. It often occurs in patients who have undergone tympanostomy / grommet tube insertion.[6,7] Mattsson et al proposed that the pathogenesis of myringosclerosis might be due to increased production of the oxygen derived free radicals as an outcome of hyperoxic conditions leading to the accumulation and aggregation of sclerotic deposits.[8]

Trauma is a major factor in the development of myringosclerosis and is most commonly associated with myringotomy and tympanostomy tube insertion. Intratympanic haemorrhage is also implicated in the pathogenesis of TS.[6,9] The rate of occurence of myringosclerosis after myringotomy with tympanostomy tube insertion was reported to be 48% by Bonding et al, 42% by Brown et al, 52% by Pichichero et al and 32% by Kay et al.[10-13] Barati et al in their study observed that myringosclerosis was the most common complication of tympanostomy tube insertion and also found a 17.1% incidence rate of myringosclerosis in ears that had been operated on.[14]

None of the previous studies stated the relationship of sinusitis and otitis media with myringosclerosis / TS. In our retrospective study **we** found a very close relationship of the presence of sinus infection in the paranasal sinuses, mainly the maxillary / ethmoid complex. The unique geographical location of Dehradun valley with: a) large temperature variations (ranging from 15 to 18 degrees), with temperatures falling down steeply after late evenings till early morning and again rising till midday, leading to exposures; b) daily altitude changes as most people residing at one altitude travel to and fro for work located at another altitude leading to an excessive load on Eustachian tube functions. Both these factors favour and lead to Eustachian tube dysfunction. If this remains for a prolonged period of time, it gives rise to middle ear pathology, leading to inflammations and infections.

We analysed these factors in our retrospective study and found that ears with TS require a different approach in the preoperative period where sinusitis should be assessed and treated first by medical treatment, surgical intervention or both to re-establish the mucociliary transport mechanism in the sinuses. The surgery becomes more time consuming and at times is staged. The results for hearing remain lower in selected cases where there is gross TS with ossicular chain involvement.

Further studies are however needed to assess whether myringosclerosis is the initial stage further progressing and leading to TS. Studies are also required to assess the association between the duration of sinusitis / Eustachian tube block ending up as TS.

V. Conclusion

We conclude that there is a strong association between recurrent sinusitis / Eustachian tube block and TS. Therefore there is a strong need for the treatment and repeated observation in patients having repeated cold and sinusitis to prevent the development of middle ear infections, leading to TS which then makes a simple surgery more extensive and results in a poorer prognosis.

References

[1]. Forseni M, Bagger-Sjoback D, Hultcrantz M. A study of inflammatory mediators in the human tympanosclerotic middle ear. Arch Otolaryngol Head Neck Surg 2001;127(5):559-64.
[2]. Asiri S, Hasham A, al Anazy F, Zakzouk S, Banjar A. Tympanosclerosis: review of literature and incidence among patients with middle-ear infection. J Laryngol Otol 1999;113(12):1076-80.
[3]. Isaacon JE, Vora NM. Differential diagnosis and treatment of hearing loss. Am Fam Physician 2003;68(6):1125-32.
[4]. Hampal S, Flood LM, Kumar BU. The mini-grommet and tympanosclerosis. J Laryngol Otol 1991;105(3):161-4.
[5]. Ferri M, Faggioli GL, Ferri GG, Pirodda A. Is carotid stenosis correlated with tympanosclerosis. Int Angiol 2004;23(2):144-6.
[6]. Friedman EM, Sprecher RC, Simon S, Dunn JK. Quantitation and prevalence of tympanosclerosis in a pediatric otolaryngology clinic. Int J Pediatr Otorhinolaryngol 2001;60(3):205–11.
[7]. Unceri C, Baglam T, Yazici M. The effect of vitamin E treatment on the development of myringosclerosis after ventilation tube insertion. Int J Pediatr Otorhinolaryngol 2006;70(6):1045–8.

[8]. Mattsson C, Marklund SL, Hellstrom S. Application of oxygen free radical scavengers to diminish the occurrence of myringosclerosis. Ann Otol Rhinol Laryngol 1997;106(6):513–8.
[9]. Maw AR. Development of tympanosclerosis in children with otitis media with effusion and ventilation tubes. J Laryngol Otol 1991;105(8):614–7.
[10]. Bonding P, Tos M. Grommets versus paracentesis in secretory otitis media: a prospective controlled study. Am J Otol 1985;6(6):455–60.
[11]. Brown MJ, Richards SH, Ambegaokar AG. Grommets and glue ear. J R Soc Med 1978;71(5):353–6.
[12]. Pichichero ME, Berghash LR, Hengerer AS. Anatomic and audiologic sequelae after tympanostomy tube insertion or prolonged antibiotic therapy for otitis media. Pediatr Infect Dis J 1989;8(11):780–87.
[13]. Kay DJ, Nelson M, Rosenfeld RM. Meta-analysis of tympanostomy tube sequelae. Otolaryngol Head Neck Surg 2001;124(4):374–80.
[14]. Barati B, Hashemi SM, Tabrizi AG. Otological findings ten years after myringotomy with tympanostomy tube insertion. Iran J Otorhinolaryngol 2012;24(69):181-6.

Source of support: Nil
Conflict of interest: None declared