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STATUS OF EUSTACHIAN TUBE PHARYNGEAL OSTIUM IN CHOLESTAETOMA AND RETRACTION

ENT

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ABSTRACT

Eustachian tube dysfunction (ETD) is one of the important aetiological factor in cholesteatoma and retraction and ETD has been linked to pathology in cartilaginous portion more often than bony portion. Study was undertaken to evaluate pharyngeal opening of eustachean tube (ET) in these cases and pharyngeal opening was divided in five types.

One hundred sixteen patients (58 each pathology) were selected and nasal endoscopy was done.

Normal pharyngeal opening was found in 62.06% and 39.65% subjects in cholesteatoma and retractionrespectively.Pathological ET opening was seen in 37.93%subjects of cholesteatoma and 60.34% cases of retraction which was statistically significant ($p<0.001$).Hence all cases of chronic otitis media must undergo nasal endoscopy to observe and treat the pathology in nose, nasopharynx and ET.

KEYWORDS

cholesteatoma, retraction, pharyngeal opening of eustachian tube.

INTRODUCTION

The middle ear is an air filled chamber within the skull that is periodically vented when the eustachian tube opens. Middle ear disease may be due to, atleast in part, to failure or inadequacy of eustachian tube function. There is no well accepted definition of eustachian tube dysfunction (ETD), but it is commonly understood to mean that the ET has failed to provide adequate ventilation to the middle ear. However, this imprecise definition excludes the common condition of a patulous (chronically patent) ET. ETD is more accurately defined as failure of the functional valve of the ET to open and/or close properly[1]. Eustachian tube dysfunction plays an important role in the pathogenesis of chronic ear disease. Lack of middle ear(ME) aeration from ET is an underlying cause of cholesteatoma, chronic tympanic membrane perforations, and atelectasis[2]. Browning GG classified chronic otitis media(COM) in to four categories.The retracted drum is categorised as inactive squamous chronic otitis media and cholesteatoma as active squamous COM[3]. Atelectasis or retraction of drum is an unpredictable entity, few retractions stabilise more or less , few progress silently towards cholesteatoma and remaining creep less silently in to the posterior tympanum around the ossicles leading to progressive hearing loss. Retraction is one point along the continuum at the end of which lies active ear disease and its complications[4]. Retraction pockets either localizing in pars tensa or pars flaccida are considered to be a mechanism for development of cholesteatoma in middle ear or attic. Papillary ingrowth through the retracted TM seems to be one of the main causes of initiating cholesteatoma growth[5]. The ET tympanometric tests provide indirect rather than direct measures of ET status, and the test – retest reliability of these test remains to be established for pathological ear[2]. The bony portion of ET is normally patent and does not open and closed dynamically as does the cartilaginous portion. Bony portion is lined with thin layer of cuboidal respiratory epithelium and is a fixed conduit. ETD has been linked to pathology within the cartilaginous portion more often than those of bony portion [6].

Causes of eustachian tube dysfunction (pharyngeal orifice)[7]

1. Oedema of the mucosa and submucosa- oedema is most often responsible for decreased lumina diameter and decreased ability to dilate the tube. Mucosal swelling can be accompanied by erythema & mucoid/ purulent secretion. Mucosal oedema can be caused by inflammatory disease, allergy, reflux from nasopharynx including laryngopharyngeal reflux.

2. Adenoid hypertrophy- it causes obstruction of pharyngeal end of ET. It may not obstruct the tubal opening at rest, but during swallowing adenoid is pressed into tubal orifice that forces the posterior cushion(postero medial wall) to completely cover and paradoxically obstruct the nasopharyngeal orifice at the time when it should be dilating.

3. anatomical obstruction- A) due to nasopharyngeal pathologies like polyp, neoplasm etc

B) blockage of tubal opening due to peritubal tonsil hypertrophy .

4. injury to tubal ostium- tubal ostium can be injured during nasopharyngeal surgery like adenoidectomy leading to cicatrization, adhesion formation resulting in Eustachian tube dysfunction.

6. dynamic dysfunction- actual muscular dysfunction can be present in few cases. There is functional inherent weakness of tubal muscle.

On the basis of the physiology of the Eustachian tube and pathogenesis of otitis media Jose et al 8 presented classification of type of ostium. They followed the model adopted by Manrique and Cervera-Paz. The pharyngeal ostium of the Eustachian tube divided in to five types .

Type 1 - Normal ostium :
The tubal orifice is normal .

Type 2 - Inflammatory ostium :
In acute episode , the mucosa becomes edematous and congested. In chronic conditions, such as allergy , this orifice can also be inflamed. In these conditon, the mucosa is pale and oedematous.

Type 3 - Ostium with adjacent lymphoid hyperplasia :
The tubal ostium has a lymphoid accumulation of tissue that forms tubal tonsil. The hypertrophy of this tonsil is observed. The mucosa is oedematous , granular and dark red.

Type 4 - Hypoplastic ostium :
The bilateral hypoplasia of the tubal ostium can be observed. The etiology of these pathological changes is unknown, being able to be a final level of the chronic inflammatory process of the mucosa.

Type 5 - Cicatrical ostium :
This type of ostium is generally found in patients who have been submitted to the surgical or radiotherpy treatment for nasopharyngeal pathologies or of skull base.

Evaluation of ET:-
Eustachian tube ostium can be observed by endoscopy. Nasal endoscopy and flexible nasopharyngoscopy has added advantage of being able to identify sinonasal and nasopharyngeal pathologies including anatomic variations.

The present study was undertaken to evaluate the pharyngeal end of ET in patients having cholesteatoma and retraction.

Nasal endoscopy was done in all the patients to know
1) the status of pharyngeal orifice of eustachian tube in cholesteatoma and retraction.
2) whether it differs in these two conditions.
3) presence of any pathology in nasopharynx.

Patients and methods

The present study was hospital based, prospective study. The protocol for this study was approved by the college ethics committee. Informed consent was obtained from all the patients. 116(Hundred sixteen) patients having cholesteatoma and retraction were selected for the study. Subjects with cholesteatoma and retraction were 58(fifty eight) each. 57 patients were male and 59 were female aged between eighteen to fifty year. A detail history about ear, nose and throat symptom was taken. Particular attention was given to history of ear discharge, duration of ear discharge, muffled hearing or hearing loss, history of nasal obstruction, nasal discharge, sneezing and headache. H/o LPR, allergy, smoking (including passive smoking) was asked. H/o adenoidectomy and frequent respiratory tract infection was enquired. Thorough ear, nose, throat examination was done.

Inclusion criteria:
1 Cholesteatoma
2 Retraction

Exclusion criteria
1. Aural polyp obscuring tympanic membrane visualisation.
2. Acute rhinosinusititis.
3. Sinonasal Polyposis.

In all the patients selected for the study otomicroscopy and nasal endoscopy was performed.

Otomicroscopy was done in all the patients to confirm the findings of clinical examination.

Nasal endoscopy.

Nasal endoscopy was done with zero degree & 30 degree 4 mm endoscope (henke sass wolf make) under local anaesthesia.

Detail examination of nasal cavity, ostiomeatal complex and nasopharynx was done. Any sinonasal pathology and anatomical variation was noted.

Nasopharyngeal examination was done to find out pathology like adenoid , mass and polyp.

Pharyngeal ostium of Eustachian tube was studied in details. The findings were grouped according to the type of ostium. Presence of persistent adenoid blocking ET was noted separately.

70 degree scopy to look at larynx for evidence of laryngopharyngeal reflux was done in patients having history of LPR.

RESULTS:

116(hundred sixteen) patients of cholesteatoma and retraction were studied.

CHOLESTEATOMA-

Cholesteatoma was present in 58 subjects. In 58 patients of cholesteatoma 31.03% (18/58) subjects had bilateral disease and 68.96% (40/58) had unilateral cholesteatoma. Total number of ears having cholesteatoma were seventy six . In unilateral disease other ear had normal tympanic membrane (TM) in 70% (28/40) cases and retracted TM in 22.5% (9/40) and safe CSOM in 7.5% (3/40) patients.

Associated factors -

H/o allergy, smoking and Laryngopharyngeal reflux was present in 24.13% (14/58), 10.34%(6/58) and 8.62% (5/58) respectively.

Association of DNS -

In cholesteatoma subjects 63.79%(37/58) subjects had deviated nasal septum. Out of these 67.56% (25/37) had symptoms of nasal obstruction.

Association of adenoids :-

Enlarged adenoids were present in 20.68% (12/58)cases .

RETRACTION:-

Retracted drum was present in 58 subjects. Unilateral disease was present in 60.34%(35/58) and bilateral disease in 39.65%(23/58).Total number of ears having retraction were 81(eighty one).

In unilateral retraction 68.57% (24/35) had normal TM and 31.42%(11/35) had safe CSOM on other side.

Associated factors:-

Allergy, smoking and laryngopharyngeal reflux was present in 32.75 %(19/58), 17.24%(10/58) and 13.79%(8/58) patients respectively.

Association of DNS:-

Deviated nasal septum was present in 72.41%(42/58) subjects. Out of these 66.66%(28/42)were symptomatic.

Association of adenoids:-

Adenoids were present in 15.51%(9/58) subjects.

Status of pharyngeal ostium of eustachian tube in cholesteatoma and retraction is depicted in Table 1 :

In subjects of cholesteatoma 62.06 % (36/58) had normal eustachian tube . Abnormal pharyngeal end (type 2 and type 3) was seen in 37.93 % (22/58) cases .

In subjects of retraction 39.65 % (23/58) had normal eustachian tube and type 2 and 3 pharyngeal ostium was seen in 60.34%(35/58) subjects .

In unilateral disease the contralateral healthy ear side also had abnormal ostium in subjects having type 2 and type 3 ostium.

DISCUSSION

In the present study in cholesteatoma subjects normal ET was seen in 62.06% (36/58) and abnormal ET orifice(type 2 and 3) in 37.93% (22/58) subjects. This suggests that ET blockage is one of the important factor in cholesteatoma formation. In retraction cases normal ET orifice was observed in 39.65% (23/58) and abnormal ET (type 2 and 3) in 60.34% (35/58) cases.This is statistically significant ($p<0.001$).Oedema of pharyngeal orifice and enlarged tubal tonsil is most common cause leading to retraction of tympanic membrane .pathological ET in cholesteatoma & Retraction was 37.93% and 60.34 % respectively. In addition to ET blockage there are other theories of cholesteatoma formation while ET blockage in main cause in retraction.

Jose Evandro et al in his study also examined pharyngeal orifice in cases of COM and classified it into 5 types.He observed pathological ET orifice in 38.2%cases of chronic squamosal disease (cholesteatoma) and 44.8% cases of retraction .

Shraddha Jain et al[9] has observed nasopharyngeal end of ET by dynamic slow motion video endoscopy and found abnormal ET in 76.30 % cases and normal ET in 23.70 % cases of cholesteatoma. In cases of Retraction they had abnormal ET in 75% and normal in 25% cases. They had more number of abnormal ET than the preset study as they have studied both mechanical and functional dysfunction while in present study only mechanical factors were considered due to nonavailability of facility for dynamic video endoscopy.

Aetiological factors responsible for pathology of ET are said to be allergy , smoking, LPR and respiratory tract infection. In present study history of allergy ,smoking ,LPR and repeated URI was asked and clinical examination including indirect laryngoscopy to look for changes due to LPR was done. We did not find any study mentioning incidence of the aetiological factors like allergy , smoking, LPR and morpholoigcal changes in pharyngeal orifice of ET.

Cholesteatomas are potentionlly dangerous because of their potential to incite resorption of bone leading to various complications. Surgical treatment is the only effective treatment for cholesteatoma. Recurrent cholesteatoma arises as a result of post operative drum retraction and has been reported in 5-13% cases [10]. Chao et all[11] in their retrospective study found retraction of drum in 66% cases postoperatively after a follow up of 9 months to five years. Yeolekar &

Dasgupta[12] in their study found improvement in ear disease after septal correction.In the present study septal correction was done in subjects having symptomatic deviation.In cholesteatoma septal correction was done after dealing with cholesteatoma surgically to prevent postoperative retraction. Preoperative eustachian tube examination should be done and obstruction if any should be treated by medical management in cases of cholesteatoma. Patients should be kept under follow up post operatively for any ET abnormality leading to retraction and cholesteatoma.

Simultaneous treatment of eustachian tube, nasal and nasopharyngeal pathology is also necessary in cases of retracted drum. If retraction is allowed to progress it causes erosion of ossicles and cholesteatoma .

CONCLUSION:

Endoscopic examination showed oedema and tubal tonsil enlargement at pharyngeal orifice of ET in 37.93% patients having cholesteatoma. Simultaneous medical line of treatment should be given in addition to surgical treatment in cases of cholesteatoma . Continuous ET blockage can lead to recurrence of cholesteatoma as a result of postoperative drum retraction .

In retraction 60.34% subjects had type 2 and type 3 pharyngeal ostium which is statistically significant. Nasal endoscopy to inspect nose ,sinuses, nasopharynx and pharyngeal ostium should be done in all the patients of retracted drum for the effective treatment of the disease .

FURTHER SCOPE.

Dynamic video endoscopy when avaible will be useful to see muscular dysfunction. Eustachian tube endoscope when avaiable can show entire lumen of ET

Table 1 *ET STATUS IN CHOLESTEATOMA AND RETRACTION*

ET STATUS	CHOLESTEATOMA		RETRACTION	
	Unilateral (n=40)	Bilateral (n=18)	Unilateral (n=35)	Bilateral (n=23)
Type 1	62.50% (25)	61.11% (11)	51.42% (18)	21.73% (05)
Type 2	22.50% (09)	22.22% (04)	37.14% (13)	52.17% (12)
Type 3	15% (06)	16.66% (03)	11.42% (04)	26.08% (06)

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