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A STUDY OF HEARING IMPROVEMENT AFTER TYMPANOPLASTY BY MEANS OF PURE TONE AUDIOMETRY DURING PERIOD OF ONE YEAR IN TERITIARY CARE HOSPITAL .

ENT

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ABSTRACT

Objectives

1. Selection of patients of CSOM with conductive deafness to undergo various types of Tympanoplasty surgeries.
2. To document hearing improvement after various types of Tympanoplasty surgeries in cases of CSOM by means of PTA.

Methods

A total of 50 cases of CSOM presented with hearing loss were compiled after applying the inclusion and exclusion criterias. All the cases underwent detailed otoscopic and audiometric examination. All the patients were treated surgically and were followed up after 3 months. Descriptive and inferential statistical analysis has been carried out in this study.

Results

Comparing the preop and 3 months postop PTA, significant AB gap closure was seen in 30(60%) patients, remained same in 18(36%) patients and worsened in 2(4%) patients.

Maximum improvement (75%) was seen in pre op 21-30 dB group. The mean preop AB gap calculated was 37.2±6.875 dB and mean postop AB gap calculated was 27.08±9.9 dB.

KEYWORDS

CSOM ,TYMPANOPLASTY ,PURE TONE AUDIOMETRY.

INTRODUCTION

CSOM is the result of an initial episode of acute otitis media and is characterized by a persistent discharge from the middle ear through a tympanic perforation. It is an important cause of preventable hearing loss, particularly in the developing world. The global burden of illness from CSOM involves 65–330 million individuals with draining ears, 60% of whom (39–200 million) suffer from significant hearing impairment.1CSOM typically pro-duces a mild to moderate conductive hearing loss. Becausethe eardrum is perforated and the middle ear ossicular chain may be disrupted by osteomyelitic erosion, sound vibrations enter the middle ear through the perforation and strike the oval and round windows. Theoretically and provided the cochlea is in-tact, the hearing loss produced is about 30 dB but may reach a maximum of 60 dB.2. is continuous, dB should not be super-scribed and 2 is superscribed. In the preantibiotic era, otitis media frequently lead to intratemporal and intracranial compli-cations. The mortality rate of patients with such complications was high. With the introduction of modern antibiotic therapy, the incidence of such complications has declined dramatically.3 The term tympanoplasty was first used in 1953 by Wullstein to describe surgical techniques for reconstruction of the middle ear hearing mechanism that had been impaired or destroyed by chronic ear disease. Tympanoplasty is the final step in the surgi-cal conquest of conductive hearing losses and is the culmination of over 100 years of development of surgical procedures on the middle ear to improve hearing. 3 In the present study, hearing im-provement in cases of CSOM presented with conductive hearing loss was evaluated by means of PTA taking into account the AB gap closure after various methods of tympanoplasty, which is an accepted standard criteria for determining restoration of hear-ing as per the available literature. The study was conducted at the Department of Otorhinolaryngology, This study attempts to documen and analyze different methods of Tympanoplasty in CSOM and their effectiveness postoperatively.

METHODOLOGY

This study of hearing improvement gained after Tympanoplasty by means of PTA was done in the Department of Otorhinolaryngology, from APRIL 2017 to APRIL 2018.

INCLUSION CRITERIA:

CSOM patients of the ages from 15 to 50 years with documented conductive hearing loss.

EXCLUSION CRITERIA:

- CSOM with mixed/sensorineural hearing loss.
- CSOM with complications.
- Patient's general condition not permitting surgery.

METHOD OF COLLECTION OF DATA

1. In the patients who initially presented with active ear discharge, appropriate Antibiotic therapy was given to make the disease inactive.
2. Dry aural toilet was done to remove debris from the ear canal.
3. Status of TM perforation was evaluated under video endoscopy.
4. Septic foci in the nose or in the throat were treated at the out patients if present.
5. PTA was done as per Hughson Westlake method.
6. For cases with suspicion of Unsafe CSOM, HRCT was done to know the extent of disease and status of hearing apparatus.
7. Cases then were diagnosed and surgical plan of management was formulated.
8. The patients routine Hb, BT, CT, urine analysis, GRBS, B. Urea, HIV, HBsAg were done.
9. The patients were subjected to various tympanoplasty surgeries under General anesthesia. Patients were followed upto three months. The hearing evaluation was made 3 months after surgery. All patients had postoperative PTA.

RESULTS

A total of 50 cases of CSOM presented with hearing loss were compiled after applying the inclusion and exclusion criterias. All the cases underwent detailed otoscopic and audiometric ex-amination. Patients with active disease at the time of presenta-tion were adequately treated pre operatively by medical line of treatment. In the present study, the minimum age was 17 years and maximum age was 49 years. Mean age was 31.68±9.19 years. Male to female ratio was 1.17. All the patients presented with hearing loss, 40 (80%) with active discharge and 10(20%) with no discharge.36(72%) patients had central perforation, 8(16%) had attic perforation and 6(12%) had marginal perforation. Of the 50 cases, 9(18%) patients underwent type I tympanoplasty,8(16%) patients underwent type II tympanoplasty, 6(12%) patients un-derwent type IIIatympanoplasty, 2(4%) patients underwent type IIIb tympanoplasty, 7(14%) patients underwent CM with type I tympanoplasty, 4(8%) patients underwent CM with type II tym-panoplasty, 3(6%) patients underwent CM with type IIIa tympa-noplasty, 2(4%) patients underwent cortical mastoidectomy with type IIIb tympanoplasty, 5(10%) patients underwent MRM with type IIIa tympanoplasty, 2(4%) patients underwent MRM with type IIIb tympanoplasty, 2(4%) patients underwent MRM with type IIIc tympanoplasty. Only TM as graft was used in 30(60%) cases, TM with autologous sculpted incus was used in 13(26%) cases and TM with autologous conchal cartilage was used in 7(14%) cases. Comparing the preop and 3 months postop PTA, significant AB gap closure was seen in 30(60%) patients, re-mained same in 18(36%) patients and worsened in 2(4%) pa-tients. Maximum improvement (75%) was seen

in the pre op 21-30 dB group, in which of the 12 cases,2 had a post op AB gap of less than 10 dB and 7 has a post op AB gap in the range 11-20 dB. The mean preop AB gap calculated was 37.2±6.875 dB and the mean postop AB gap calculated was 27.08±9.9 dB.

DISCUSSION

In the present study, in the group below 30 years of total 20 patients, 11(55%) patients showed improvement, 9(45%) patients remained same and none worsened. In the group above 30 years of total 30 patients, 19(63.3%) patients improved, 9(30%) patients remained same and 2(6.7%) patients worsened after surgery. In the present study, number of male patients operated were 27(54%) and number of female patients operated were 23(46%). In the Male group with 27 patients, hearing improvement was seen in 16 (59.2%) patients, no improvement in 9(33.3%) patients and worsening in 2(7.4%) patients. In the Female group with 23 patients, hearing improvement was seen in 14(61%) patients, no improvement in 9(39%) and worsening in none after surgery.As per the available literature there is no difference in outcome of surgery solely on the basis of gender. In the present study, left ear was operated in 26(52%) patients and right ear was operated in 24(48%) patients. In the present study, number of patients with no discharge at the time of initial presentation was 10(20%). Amongst the 25 patients presented with mucopurulent discharge initially, hearing improvement was seen in 15(60%) patients, no improvement in 10(40%) patients and worsening in none. Amongst the 15 patients presented as purulent discharge initially, hearing improvement was seen in 8(53.3%) patients, no improvement in 5(33.3%) patients and worsening in 2(13.3%) patients Amongst the 10 patients presented with no discharge initially, hearing improvement was seen in 7(70%) patients, no improve-ment in 3(30%) patients and worsening in none after surgery. Amongst the 36 patients presented with central perforation, hearing improvement was seen in 24(66.6%) patients, no im-provement in 12(33.3%) patients and worsening in none. Amongst the 8 patients presented with attic perforation, hearing improvement was seen in 3(37.5%) patients, no improvement in 4(50%) patients and worsening in 1(12.5%). Amongst the 6 patients presented with marginal perforation, hearing improvement was seen in 3(50%) patients, no improvement in 2(33.3%) patients and worsening in 1(16.6%) patients after surgery. In the present study, amongst the 9 patients who underwent Type I tympanoplasty, 6(66.6%) showed hearing improve-ment and 3(33.3%) remained the same. Amongst the 8 patients who underwent Type II tympanoplasty, 6(75%) showed hear-ing improvement and 2(25%) remained the same.Amongst the 6 patients who underwent Type IIIa tympanoplasty, 4(66.6%) showed hearing improvement and 2(33.3%) remained the same. Amongst the 2 patients who underwent Type IIIb tympanoplas-ty, 2(100%) showed hearing improvement. Amongst the 7 patients who underwent CM with Type I tym-panoplasty, 4(57%) showed hearing improvement and 3(43%) remained the same.Amongst the 4 patients who underwent CM with Type II tympanoplasty, 3(75%) showed hearing improve-ment and 1(25%) remained the same. Amongst the 3 patients who underwent CM with Type IIIa tympanoplasty, 2(66.6%) showed hearing improvement and 1(33.3%) remained the same. Amongst the 2 patients who underwent CM with Type IIIb tympanoplasty, 1(50%) remained the same and 1(50%) wors-ened after the surgery.Amongst the 5 patients who underwent MRM with Type IIIa tympanoplasty, 3(60%) showed hearing improvement and 2(40%) remained the same.Amongst the 2 patients who underwent MRM with Type IIIb tympanoplasty, 1(50%) remained the same and 1(50%) worsened after the sur-gery Amongst the 2 patients who underwent MRM with Type IIIc tympanoplasty, 2(100%) remained the same. In the present study amongst the 30 patients in whom only tym-panic membrane was used as graft 19(63.3%) showed hearing improvement, 11(36.6%) remained same and none worsened. Amongst 13 patients in whom ossiculoplasty was done using autologous sculpted incus in addition to tympanic membrane graft, 8(61.5%) showed hearing improvement, 4(30.7%) remained same and 1(7.7%) worsened after surgery. Amongst 7 patients in whom ossiculoplasty was done using autologous conchal cartilage in addition to tympanic membrane graft, 3(42.8%) showed improvement, 3(42.8%) remained same and 1(14.2%) worsened after surgery. In the present study, conchal cartilage graft was only used in in-stances where extensive erosion of incus was seen and sufficient incus could not be obtained for grafting purpose. Spur cartilage is considered to be better option over conchal cartilage but in-volves additional incision over nasal septum, where conchal cartilage can be harvested through already made post-auricular incision. In the present study of 50 patients who underwent surgery for CSOM, out of 1 case in the pre op range 11-20 dB, there was no improvement seen.Out of 12 cases in the pre op range 21-30 dB, 2 had a post op AB gap of less than 10 dB, 7 cases were in the range of 11-20 dB, and 3 cases did not change. Out of 17 cases in the pre OP range 31-40 dB, 4 cases were in the range of 11-20 dB, 6 cases were in the range of 21-30dB, 7 cases did not change.Out of 20 cases in the pre op range 41-50 dB, 2 cases were in the range of 21-30 dB, 9 cases in the range 31-40 dB, 7 cases did not change another 2 had AB gap of >50 dB.In the present study, the mean preop AB gap calculated was 37.2±6.875 dB and the mean postop AB gap calculated was 27.08±9.9 dB. Patients were followed upto three months. The hearing evalua-tion was made 3 months after surgery. Comparing the preop and 3 months postop PTA, significant AB gap closure was seen in 30(60%) patients, remained same in 18(36%) patients and wors-ened in 2(4%) patients

CONCLUSION

The primary objective of surgery for CSOM is to eradicate in-fection and disease and make the ear safe and dry.A second objective of surgery for CSOM is to restore hearing to serviceable levels by means of tympanoplasty.The main objective of this study is to determine the level of gain of hearing postoperatively after tympanoplasty surgery in relation to various parameters.Postop hearing gain obtained was found to be better in patients operated upon with TT disease than those operated with AA disease. Amongst the various methods used for reconstruction of os-sicular mechanism, postop hearing gain was found to be bet-ter in patients in whom autologous sculpted incus was used as compared to autologous conchal cartilage. Amongst the various types of surgeries where mastoidecto-mies were performed in combination to tympanoplasty, better hearing gain was obtained in the CM group as compared to MRM group. However, it may be attributed to less extensive disease in the former. Success of tympanoplasty is better in restoring hearing in cases with lesser AB gap at the presentation than with larger AB gap provided regular postoperative care is done. However, it should be noted that the 'key to success in oto-logic surgery is not what technique one uses but how well one uses it'.

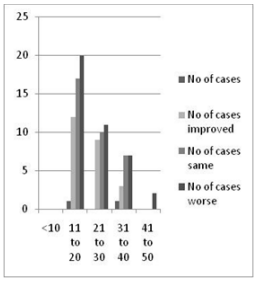

Figure1:Result in relation to preop AB gap

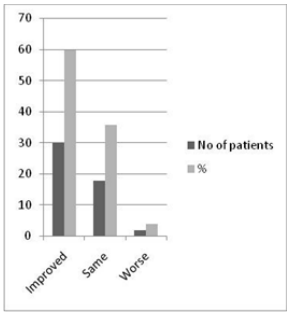

Figure2:Result of postop hearing after 3 months

		Final outcome	
Type of surgery	Improved (n=30)	Same (n=18)	Worse (n=2)
Tympanoplasty alone	18 (72%)	7 (28%)	0 (0%)
Tympanoplasty withcortical mastoidectomy	9 (56.25%)	6 (37.5%)	1 (6.25%)
Tympanoplasty with modified radical mastiodectomy	3 (33.33%)	5 (55.55%)	1 (11.11%)

Table1:Result in relation to Tympanoplasty only Vs combi-nation with various mastoidectomies

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