

Original Article

Hearing Status After Ossiculoplasty in Open Cavity Mastoidectomy

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Abstract

To evaluate the hearing outcome in canal wall down mastoidectomy with middle ear reconstruction, prospective longitudinal study was done at National Institute of ENT, Dhaka from March 2015 to September 2016. Total 22 patients were included in the study undergoing canal wall down mastoidectomy with 6 months postoperative followup. Hearing outcomes were observed and compared with the preoperative hearing tests. Among the 22 patients 9 (39.1% of subjects) patients had hearing gain, 12 (52.2%) had hearing loss and 1 (4.3%) had no change in hearing postoperatively. Although disease clearance is the main objective in canal wall down mastoidectomy, hearing gain can be achieved if combined with ossiculoplasty and tympanoplasty. The hearing gain or loss depends upon the extension of disease and status of the ossicular chain. Most patients usually experience hearing loss more than the preoperative period due to removal of ossicle or ossicles for the sake of disease clearance.

Introduction

Patients with canal wall down mastoidectomy had little to no hope of hearing reconstruction previously. With modern techniques of tympanoplasty and ossiculoplasty new hope for hearing reconstruction has developed¹. In clinical practice up to 50% of ears with active

chronic otitis media is associated with cholesteatoma among 5% CSOM prevalence rate in our country².

Surgery is the mainstay of treatment. Primary aim in surgical treatment is to remove the disease and render the ear safe, and second in priority is to preserve or reconstruct hearing but never at the cost of the primary aim. Two types of surgical procedures are done to deal with cholesteatoma. Canal wall down procedures leave the mastoid cavity open into the external auditory canal so that the diseased area is fully exteriorized. The commonly performed operations for atticofacial disease are atticotomy, modified radical mastoidectomy and rarely, the radical mastoidectomy. Canal wall up procedures. Here disease is removed by combined approach through the meatus and mastoid but retaining the posterior bony meatal wall intact, thereby avoiding an open mastoid

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cavity. It gives dry ear and permits easy reconstruction of hearing mechanism. However, there is danger of leaving some cholesteatoma behind. Incidence of residual or recurrent cholesteatoma in these cases is very high and therefore long-term follow-up is essential. Re-exploration in cases after 6 months or so may be required. Therefore Canal wall up procedures are advised only in selected cases³.

The ultimate goal of a canal wall down mastoidectomy is to create an ear in which the meatus is large enough for easy examination and provides appropriate ventilation of the external canal and mastoid cavity. Furthermore, the resultant mastoid cavity should be small and lined with healthy keratinizing epithelium. A canal wall down mastoidectomy is often accompanied by reconstruction of the middle ear and a tympanoplasty⁴.

The most common ossiculoplasty performed is an incus interposition with the patient's incus (autograft) or, occasionally, a cadaver incus (homograft). Augmentation ossiculoplasty entails increasing the height of the stapes above the fallopian canal when a canal wall down mastoidectomy is performed and the malleus is absent. This technique frequently uses the body of the incus, the head of the malleus, a cortical bone graft or a cartilage i.e, conchal or septal cartilage. The term partial ossicular replacement prosthesis (PORP) is used when a synthetic biocompatible prosthesis is positioned from the head of stapes superstructure to the tympanic membrane, graft, or malleus. In cases with an absent stapes superstructure along with other ossicles, a TORP is a good option⁵. A cartilage shield with a fenestra in its center and a cartilage piston is a better option for stability of the prosthesis and better hearing gain.

However the outcome still depends on clearance of disease, proper placement of the prosthesis (if used), wide meatotomy and meatoplasty and regular postoperative follow up.

Aim of study

To evaluate the hearing outcome in canal wall down mastoidectomy with middle ear reconstruction

Materials and Methods

Study Design:

Prospective Longitudinal study

Duration:

18 months from March 2015 to September 2016

Place of Study

National Institute of ENT, Dhaka

Study Subject:

Patients with squamosal chronic otitis media, undergoing canal wall down mastoidectomy with tympanoplasty, who came for regular follow-up were included in this study. Out of 22 patients with squamous COM 9 were female.

Patient Selection

Sampling technique: Purposive sampling technique

Data Collection

Pre and postoperative hearing assessments were done by PTA. Every patient was routinely followed up for at least 6 months of the postoperative period.

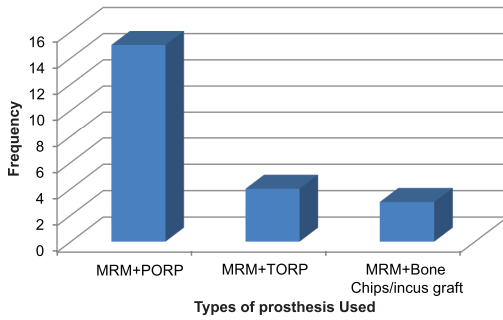
Inclusion Criteria

-Patients with squamosal chronic otitis media
-who gave written and informed consent for the study were included.

Exclusion Criteria

- CSOM without cholesteatoma
- Previous mastoid surgery
- Lost to Follow up and poor cochlear reserve were excluded.

Observation & Results

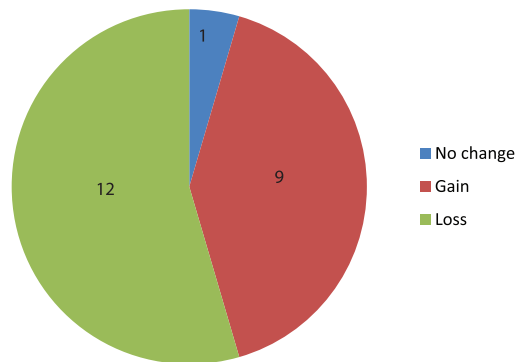


Preoperative

Hearing Loss in (dB)	Frequency
20.00	1
25.00	2
30.00	2
31.67	1
33.33	2
40.00	2
41.67	1
45.00	1
46.67	1
50.00	3
51.67	1
55.00	1
56.67	1
55.00	1
63.30	1
60.00	1
Total	22

Postoperative

Hearing Loss in (dB)	Frequency
30.00	1
36.50	1
38.33	1
40.00	2
40.30	1
45.00	3
46.67	1
47.00	1
48.00	2
48.33	1
50.00	1
51.67	1
53.50	1
58.33	2
55.33	1
53.00	1
55.67	1
Total	22



Post operative gain or loss according to PTA

Minimum age 10 yrs and maximum age of patient 45 yrs. Out of 22 patients with squamous COM 9 were female. 16 patients had extensive Cholesteatoma and 2 had COM with complications. All patients undergone Canal wall down mastoidectomy with ossicular reconstruction. Among the 22 patients 9 (39.1% of subjects) patients had hearing gain, 12 (52.2%) had hearing loss and 1 (4.3%) had no change in hearing postoperatively. Maximum

hearing gain was 11.7dB and minimum gain was 1.67 dB. Maximum hearing loss was 20.30 dB and minimum loss was 5 dB.

Discussion

In our study most of the cases had extensive long standing disease. The presence or absence of the stapes suprastructure influences the hearing result⁶. The air bone gap was shown to have decreased to 20dB in 69% of the patients with intact stapes undergoing CWDM, 30% in cases of absent stapes (Cook et al, 1996)⁷. In classical type III tympanoplasty 73.7% cases and 76% cases in cartilage augmented type III tympanoplasty fell within 30dB ABG closure. (Shrestha et al, 2009)⁸. Postoperative airbone gap decreased to <25dB in 48% of cases in CWDM with type III tympanoplasty (Ramazan et al, 2013)⁹. During MRM diseased ossicles were removed. In 4 out of 22 cases we had used TORP (18.18%) over the stapes footplate. In 68.18% of the cases (15 out of 22) PORP were used over stapes head. In rest 3 cases (13.63%) cortical bone chips and/ or incus graft were used. We have done ossicular reconstruction in all cases and there were noticeable hearing gain in 39.1% cases. In the cases where bridging cholesteatoma were present, there was small amount of preoperative hearing loss but, postoperatively more hearing loss (in 52.2% of cases). The postoperative follow up was upto 6 months. Further evaluation of hearing status would have given us more idea about the cases. We had done more than 40 cases in the study period. But a lot of patients did not comply for regular postoperative follow up owing to poor socio economic condition, long distance travel and no postoperative complications.

Conclusion

Although disease clearance is the main objective in canal wall down mastoidectomy, hearing gain can be achieved if combined with ossiculoplasty and tympanoplasty. The hearing gain or loss depends upon the extension of disease and status of the

ossicular chain. Most patients usually experience hearing loss more than the preoperative period due to removal of ossicle or ossicles for the sake of disease clearance.

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