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Original Article

The outcomes of myringoplasty

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Abstract

***Objective**: To assess the rate of graft take and hearing improvement after myringoplasty.*

***Methods**: This cross sectional study was carried out among sixty (60) patients those who were admitted into the Department of Otolaryngology & Head-Neck Surgery, Dhaka Medical College Hospital and BSMMU with their descriptive history, clinical finding's, pre and post-operative hearing assessment by PTA during the period of June' 2006 to December'2006.*

***Results**: Sixty cases were diagnosed as CSOM (tubo-tympanic) disease and underwent myringoplasty. The lowest and highest age of the patient's at presentation was 15 and 45 years respectively with a mean age of 27 years. The overall success rate was 80% (48 out of 60). The surgical failure was 20% (12 out of 60) and those were graft failure, re-perforation & anterior blunting at the last visit. Graft failure occurred during the first 8 weeks in 3 cases out of the 12 cases.*

***Conclusion**: Myringoplasty is a valid treatment modality for tubo-tympanic type of CSOM.*

***Key words**: Tympanic membrane perforation, Myringoplasty.*

Introduction

The incidence of chronic suppurative otitis media is very high in Bangladesh. Poor living conditions, overcrowding, poor hygiene, malnutrition, lack of health education all have been suggested as a basis for the widespread prevalence of chronic suppurative otitis media in our country. It affects both sex and age group. It is the single most important cause of hearing impairment in rural population.

A hole in the tympanic membrane reduces the effective area of the membrane in contact with the sound wave. Holes also reduces the pressure difference across the tympanic membrane and depending on their position, reduces the mechanical coupling between the remaining intact portions of the tympanic membrane and the malleus.[1]

In general, the larger the perforation, the greater the hearing impairment, but this relationship is not constant and consistent in clinical practice, seemingly identical perforations in size and location produce different degree of hearing loss.[2] Averaging positions in which holes are made, small lesion (10% of the membrane) produces loss of 10-15 dB below 3 KHz with smaller losses at higher frequencies. Large lesion produces

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severe loss over the whole range. With these lesion, the sound waves act directly on the round & oval windows. Small and moderate lesions (10-40% of the area) have far more severe effect when place on the posterior and superior part of the membrane than when placed on the anterior and inferior margin.[1] However, non-marginal perforation with intact ossicular chain shows hearing loss approx 10-30 dB.

The predominant hearing loss in tubo-tympanic type is conductive in nature. But a few cases of sensorineural hearing loss is also found.[3]

Myringoplasty has been suggested to protect against long-term middle ear damage by preventing the progression of ossicular pathology and preventing migration of squamous epithelium around the margin of the perforation with possible consequent cholesteatorna formation.[2] The prerequisites of myringoplasty are: 1. Central dry perforation of tympanic membrane, 2. External ear, middle ear & mastoid- free from any disease, 3. Functioning Eustachian tube, 4. No respiratory tract infections, 5. No systemic illness e.g. diabetes mellitus, hypertension, liver disease etc.

Many factors influence the outcome of myringoplasty. The reported success rate of myringoplasty is variable, because of differences in inclusion and exclusion criteria. In a study the overall success rate of myringoplasty was 86%. Posterior and inferior perforations were 90%. On the contrary, anterior perforation was only (67%).[4]. This was due to poor access to anterior perforation. The success rate of subtotal perforation was 92.5%. Where as the closure rate of small perforation was (94.1%).[5] But incase of younger age the results were poorer as because of i) higher incidence of upper respiratory tract infection shorter and straight or more horizontal eustachian tube that predispose to middle ear infection and ii) immaturity of the immune system. Incase of advancing age group found better results. Vrabec et al.[6] found better success with advancing age. This was due to i) lower incidence of upper respiratory tract infection ii) better Eustachian tube function & iii) well developed immune system. Caylan et al.[7] found no statistical difference in the success rate between two sex groups. A little difference was found when comparing the two surgical techniques of overlay and underlay. Incase of former the success rate was 79.1% and the later was 82.3%.[8] When hearing improvement was the main indication for surgery it was improved in 67%.[9]

At present, myringoplasty is common in ENT units due to microsurgical facilities. The present study aims to evaluate the outcome of myringoplasty in selected patients with tympanic membrane perforation and assess the factors potentially influencing their outcomes.

Methods

A total of sixty (60) patients were collected from the Department of Otolaryngology Head & Neck Surgery, Dhaka Medical College Hospital and BSMMU with their descriptive history, clinical finding, pre and post operative hearing assessment by PTA during the period of June'2006 to December'2006.

The patients were observed after operation by clinical examination weekly intervals for the first month and monthly for 3 months. The mean duration of follow up was 12 weeks. Audiological assessment was done in every successful cases at the last visit.

At the follow-up examination, outcome of surgery was evaluated. It was considered successful if the ear was dry and the graft was well taken. Audiological assessments were performed according to ISO standards after 3 months of surgery. The results of both pre and post operative PTA were observed and some successful cases showed improvement of hearing and some showed no improvement of hearing. Analyzed data present by various tables, graphs and figures.

Results

Table- I
Age distribution (n= 60)

Age group (years)	No. (%)	Successful case No. (%)
15-25	18 (30%)	14 (77.77%)
25-35	36 (60%)	30 (83.33%)
35-45	6 (10%)	4 (66.66%)

Table- II
Distribution of size of perforation (n= 60)

Size	No. (%)	Successful case No. (%)
Small	6 (10%)	6 (100%)
Medium	36 (60%)	32 (88.88%)
Subtotal	18 (30%)	10 (55.55%)

Table- III
Distribution of site of perforation (n= 60)

Site	No. (%)	Successful case No. (%)
Anterior	27 (45%)	24 (88.88%)
Posterior	15 (25%)	14 (93.30%)
Subtotal	18 (30%)	10 (55.55%)

Table- IV
Overall outcome of 60 myringoplasty (n= 60)

Tympanic membrane	No. of patients (%)
Intact and mobile	48 (80.00%)
Graft failure	8 (13.33%)
Reperforation	3 (5.00%)
Anterior blunting	1 (1.66%)

Table- V
Hearing status in successful cases (n= 48)

Pre-operative air conduction threshold	No. of patients (%)
0-20 dB	14 (29.16%)
20-40 dB	30 (62.50%)
40-60 dB	4 (8.30%)
Mean air conduction threshold= 44.5 dB	
Post-operative air conduction threshold	**No. of patients (%)**
0-20 dB	32 (66.66%)
20-40 dB	13 (27.08%)
40-60 dB	3 (6.25%)
Mean air conduction threshold= 35.1 dB	
Hearing status (n= 48)	**No. of patients (%)**
Hearing gain	32 (66.66%)
No improvement	16 (33.33%)
Hearing Outcome	Mean (dB)
Pre-operative air conduction threshold	44.5
Post-operative air conduction threshold	35.1
Pre-operative air-bone gap	30.2
Post-operative air-bone gap	20.1
Change in air-bone gap	10.1

Discussion

Some authors have stated that function may even improve following a successful myringoplasty.[10,11] It suggests that closure of a perforation prevent irritation of the middle ear mucosa, which encourages a return of normal tubal function.[11]

Patient's age has generally been considered as influencing surgical outcome. In this study majority of the patients were in the age group 25-35 years (83.33%) followed by 77.77% and 66.66% in the age group of 15-25 years and 35-45 years respectively. Vrabec et al.[6] also found better success rate in myringoplasty at the age group of 25-35. This was probably due to lower incidence of upper airway infections and better Eustachian tube function.

Male outnumbered the female in ratio of 1.5:1. There was no significant difference in surgical outcome (77.77% vs. 83.33% in male and female respectively). Out of sixty patients, fifteen had unilateral and forty five had bilateral diseases. The surgical success (operation done only on one ear) rate was 86.66% in the former and 77.77% in the latter, a difference that was not statistically significant. The discrepancy between our results and those of Kessler et al.[12] and Denoyelle et al.[13] who found that a pathological contralateral ear independently influences the risk of graft material, seems to be related to the fact that our cases did not show any inflammatory changes in the contralateral ear.

Lee P et al[14] studied 423 cases and success rate was 74.1% in small perforation but in this study success rate was 100% that did not correlate with the above series most probably to a very small number of cases. In case of large perforation success rate was 56% but in my study(18) success rate was 55.55% that is similar to the above study.

With regard to the role of size of perforation, small (100) and medium size (88.88%) perforation had more success rate than subtotal perforation (55.55%).

Numerous authors have reported that the failure rate in anterior perforation is higher than posterior perforation.[15] In our study success rates of posterior perforation (93.33%) and anterior perforation (88.88%) are more than that of subtotal perforation (93.33%) and anterior perforation (88.88%) are more than that of subtotal perforation (55.55%). Our finding of a higher rate of surgical failure in patients with anterior perforations in comparison to posterior perforations, may have been due to the more limited vascularization of the anterior part of the eardrum[16] and also due to limited access to this perforation.

No significant difference was found when comparing the three surgical approaches: the success rate was 80% in postauricular, 66.66% in endaural and 88.88% in transcanal approach.

Lee et al.[14] Palva and Ramsay[16] studied the following number of cases 261& 281 and mean hearing improvement were 8.1dB & 8.0dB respectively. But in my study 60 cases mean hearing improvement was 9.4dB that was not significantly difference with the above study.

In this study the overall success rate was 80% (48 out of 60) that correlated with the previous study. The surgical failure in eight cases (13.33%) was characterized by evidence of a graft failure at the last follow-up visit. Three patient's (5%) developed re-perforation and 1(1.66%) developed anterior blunting. So total failure was observed in 12 (20%) patients. Graft failure occurred during the first 8 weeks in 3 of the 5 cases. None of the patients developed epithelial pearl, medialization or lateralization of graft. Crusting and this externa were seen in two successful cases that were treated accordingly.

Conclusion

From this study it can be concluded that myringoplasty is a valid treatment modality for tubo-tympanic type of CSOM.The status of the middle ear (i.e the presence of a dry ear) significantly improves surgical outcome.So preoperative inflammatory changes in the middle ear mucosa should be carefully evaluated and its medical treatment considered.The evidence of a good audiological result in anatomically successful cases that is associated with a highly probable return to normal function and lifestyle at any age.

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