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The Factors Affecting Surgical Outcome of Myringoplasty in Rural Patients Bangladesh

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Abstract **Original Research Article**

Background: Endaural, post-auricular, and permeatal/transcanal access to the tympanic membrane are the three acknowledged surgical techniques for myringoplasty. In general, the preferred method is determined by the location of the hole and the surgeon's experience. ***Objective:*** In this study our main goal is to evaluate the factors affecting surgical outcome of myringoplasty in rural patients Bangladesh. ***Method:*** This cross sectional study was done at tertiary medical hospital from Feb 2021 to Feb 2022. Where 100 patients were divided into several groups based on factors like size of perforation (small, medium and large), site of perforation (anterior central, posterior central and central malleolar), surgical approach (post auricular and transcanal). ***Results:*** During the study, where 60% cases were Central malleolar and 35% were Posterior central. 45% cases had medium size of perforation. According to improvement of hearing thresholds after myringoplasty in relation to the size of the perforation where The closure of air-bone gap in small, medium and large perforation was 11.15 dB, 20.61 dB and 18.55 dB respectively. The difference of air bone gap closure between small and larger perforation was statistically significant by unpaired t-test ($p<0.001$). In addition, according to improvement of hearing thresholds after myringoplasty in relation to the site of perforation and surgical approach where closer of air bone gap was maximum (20.90 dB) in central malleolar perforation and minimum (12.11 dB) in posterior central perforation. Which was statistically significant from unpaired t-test ($p<0.001$). In addition, closure of air bone gap was more in dry ear. The difference between two groups was statistically significant from unpaired t-test ($p< 0.02$). ***Conclusion:*** We concluded from this study that the location and extent of tympanic membrane perforation, as well as the state of the middle ear, influence surgical result following myringoplasty.

Keywords: Myringoplasty, middle air, site of perforation.

INTRODUCTION

The surgical repair of a ruptured tympanic membrane is referred to as myringoplasty. Middle ear infection, trauma, or iatrogenic reasons are the most common causes of tympanic membrane perforation. According to the literature, up to 80% of this incision closes spontaneously.

Recurrent otorrhea, the desire to swim without wearing water protection in the ear, and the improvement of conductive hearing loss caused by a non-healing hole of the tympanic membrane are the three main reasons for myringoplasty [1-4].

The primary purpose of myringoplasty is to restore the tympanic membrane's integrity. This result might be reached using surgical approaches that include inserting connective tissue at the location of the ear drum perforation in order to stimulate skin and mucosal regeneration, resulting in permanent closure of the defect [3-5].

In this study our main goal is to evaluate the factors affecting surgical outcome of myringoplasty in rural patients Bangladesh.

OBJECTIVE

To evaluate the factors affecting surgical outcome of myringoplasty in rural patients Bangladesh.

METHODOLOGY

This cross-sectional study was done at tertiary medical hospital from Feb 2021 to Feb 2022. Where 100 patients were divided into several groups based on factors like size of perforation (small, medium and large), site of perforation (anterior central, posterior central and central malleolar), surgical approach (post auricular and transcanal). Surgical outcome of myringoplasty was measured on the basis of graft take rate and post operative hearing improvement.

RESULTS

In table-1 shows age distribution of the study group where majority were belonging to >60 years age group, 65%. Followed by 25% belong to 41-50 years group and 10% belong to 31-40 years age group. The following table is given below in detail:

Table-1: Age distribution of the patients

Age group	%
16-26 years	**30%**
27-37 years	45%
38-48 years	25%
>48 years	65%

In Figure-1 shows gender distribution of the study group where majority were male, 60%. The following figure is given below in detail:

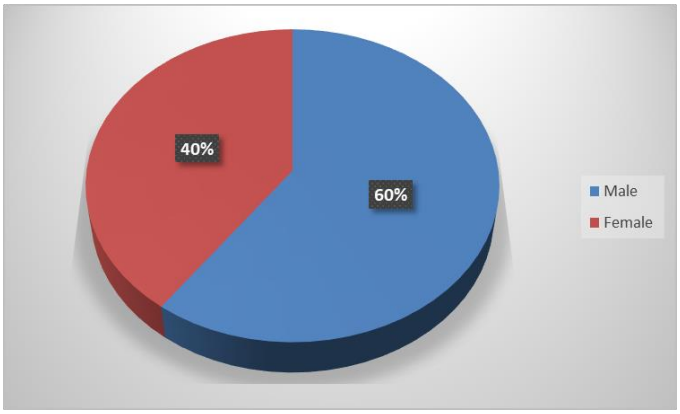

Figure-1: Gender distribution.

In Figure-2 shows site of tympanic membrane perforation where 60% cases were Central malleolar and 35% were Posterior central, the following figure is given below in detail:

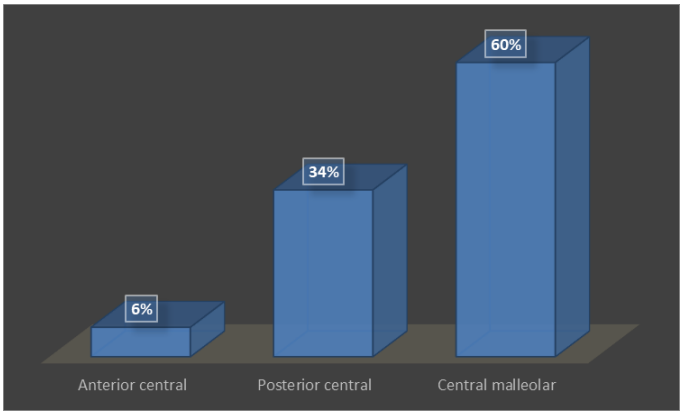

Figure-2: Site of tympanic membrane perforation

In table-3 shows perforation size where 45% cases had medium size of perforation. The following table is given below in detail:

Table-3: Perforation size

Perforation size	%
Small	20%
Medium	45%
Large	35%

In table-4 shows surgical approach of the patients where 80% cases were post aural. The following table is given below in detail:

Table-4: Surgical approach of the patients

Surgical approach	%
Post aural	80%
Transcanal	20%

In table-5 shows improvement of hearing thresholds after myringoplasty in relation to the size of the perforation where The closure of air-bone gap in small, medium and large perforation was 11.15 dB, 20.61 dB and 18.55 dB respectively. The difference of air bone gap closure between small and larger perforation was statistically significant by unpaired t-test ($p<0.001$). The following table is given below in detail:

Table-5: Improvement of hearing thresholds after myringoplasty in relation to the size of the perforation

Size of perforation	Bone thresholds thresholds gap Mean (dB)	Air conduction thresholds gap Mean (dB)	Air bone thresholds gap Mean (dB)
Small	1.05	11.15	10.351
Medium	2.02	20.61	19.22
Large	0.91	18.55	18.55

In table-6 shows improvement of hearing thresholds after myringoplasty in relation to the site of perforation and surgical approach where closer of air bone gap was maximum (20.90 dB) in central malleolar perforation and minimum (12.11 dB) in posterior central perforation. Which was statistically significant from unpaired t-test ($p<0.001$). In addition, closure of air bone gap was more in dry ear. The difference between two groups was statistically significant from unpaired t-test ($p< 0.02$). The following table is given below in detail:

Table-6: Improvement of hearing thresholds after myringoplasty in relation to the site of perforation and surgical approach

Site of perforation	Bone thresholds thresholds gap Mean (dB)	Air conduction thresholds gap Mean (dB)	Air bone thresholds gap Mean (dB)
Anterior central	1.88	15.98	15.21
Posterior central	1.23	13.45	12.112
Central malleolar	1.09	20.01	20.90
Condition of middle ear	**Bone thresholds thresholds gap Mean (dB)**	**Air conduction thresholds gap Mean (dB)**	**Air bone thresholds gap Mean (dB)**
Post aural	1.33	17.90	17.5
Transcanal	2.75	24.55	15.40

DISCUSSION

In this study average graft taking rate was 81.67%, which is similar with other study with success rate (60-99%) for closure of the tympanic membrane in adult.

Various studies showed that there are different criteria for assessment of hearing improvement after myringoplasty. In one study favored a hearing gain method, whereas Elbrond8 used the mean air-bone gap for each frequency [6].

Majority of perforation was medium sized followed by large and small. Mean preoperative air-bone gap of small perforation was 21.91 dB and that of medium perforation was 34.8 dB which was statistically significant from unpaired t- test ($p< 0.05$). Improvement of airbone gap closure after myringoplasty in small, medium and large size perforation was 11.15 dB, 20.61 dB and 18.55 dB respectively. The study is similar to other studies [7, 8].

Majority of the patients had 60% cases were Central malleolar and 35% were Posterior central, Graft take rate was more in central malleolar perforation than posterior central. Though in a series it was found that anterior perforation predisposed to an unfavorable take rate of the graft [9-12].

Improvement of hearing threshold after myringoplasty was more in central malleolar perforation than anterior central and posterior central.

A study obtained worse result with posterior perforation which is relevant to our study. Maximum perforations were dry. No operation was performed through endaural approach. Most of the operation was done by post-aural approach and remaining by transcanal approach.

CONCLUSION

We concluded from this study that the location and extent of tympanic membrane perforation, as well as the state of the middle ear, influence surgical result following myringoplasty.

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