

# Dry versus Wet Myringoplasty: Our Experience

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## ABSTRACT

**Introduction:** Conducting a myringoplasty in wet ear or dry ear, had been a matter of controversy during past many years because of its different success rates in different studies. **Materials and methods:** This study was conducted over a period of one year to find out graft take up rate in dry and wet myringoplasty and to look for complications both in dry and wet cases during the follow up period. The study comprised of 52 patients with dry and wet myringoplasty. Out of these 52 patients, 4 cases (2 from dry and 2 from wet) had to be excluded from the study because of the lack of follow up. So ultimate analysis in this study was done for 48 cases. The selected patients were subjected to clinical, audiological, radiological and laboratorial investigations. Myringoplasty was done in all patients via postaural approach using temporalis fascia graft. Intactness of drum, hearing assessment and presence of any complication was noted during the follow up period. **Results:** Initial examination in dry ears postoperatively at 3 wks showed normal healed tympanic membrane in 22 cases (78.56%), whereas 6 cases (21.43%) were having residual perforation. Out of 6 perforations, 1 perforation healed spontaneously and 1 by chemical cauterization. So, overall graft uptake rate in dry ears was 85.71% at 3 months whereas in wet ears at 3 wks showed intact tympanic membrane in 12 cases (60%) whereas 8 cases (40%) were having residual perforation. Out of 8 perforations, 2 healed with chemical cauterization and 1 closed spontaneously. So, overall graft uptake rate in wet ears was 75% at 3 months follow up. **Conclusion:** Air-bone gap deterioration was seen more commonly in wet than in dry ears and graft take-up rate is higher in dry ears (85.72%) as compared to wet ears (75%).

**KEYWORDS:** Central perforation, Chronic suppurative otitis media, Dry ear, Myringoplasty, Wet ear

## INTRODUCTION

Myringoplasty is an operation limited to the repair of tympanic membrane defects without exploration of the middle ear cleft. The success rate of graft depends on many factors, and nobody can claim 100% success in every operation.<sup>1</sup> Various factors influencing the success of myringoplasty reported in the literature are patients age, site of perforation, condition of the ear (dry or discharging), status of the contralateral ear, grafting material, surgical techniques and associated pathologies like adenoiditis, tonsillitis and sinusitis. Myringoplasty can be performed on dry or wet perforations. Dry central perforations mean ear should be dry for at least six weeks, tympanic membrane remnant should be of normal colour, middle ear mucosa and tympanic plexus should be normal and wet perforations mean congestion of drum remnant, congestion of middle ear mucosa, presence of discharge in middle ear, polypoidal or mucosal hypertrophy of middle ear mucosa obscuring the view of tympanic plexus.<sup>2</sup> The present data was collected to compare the success rates of myringoplasty in dry and wet ears.

## MATERIALS AND MEHODS

This study was conducted in the Department of ENT & Head and Neck Surgery, SMGS Hospital, Government Medical College, Jammu, during the year 2013 to 2014, to find out graft take up rate in dry and wet myringoplasty and to look for complications both in dry and wet cases during the follow-up period. The study comprised of 52 patients with dry and wet myringoplasty. Out of these 52 patients, 4 cases (2 from dry and 2 from wet) were excluded from the study because of the lack of follow-up. The ultimate analysis in this study was done in 48 cases. The patients were selected on the basis of following criteria.

- **Inclusion criteria for wet ears:** Congestion of drum remnant, congestion of middle ear mucosa, presence of a discharge in the middle ear and polypoidal or mucosal hypertrophy of middle ear mucosa obscuring the view of tympanic plexus.
- **Inclusion criteria for dry ears:** The ear should be dry for at least six weeks, tympanic membrane remnants should be of normal colour and middle ear mucosa and tympanic plexus should be normal.

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- Patients with small/medium/large/subtotal central perforation with the exclusion of total and attic perforation.
- Patients with pure conductive hearing loss with no sensorineural component.
- Patients with good general physical conditions.
- Patients without any evidence of active infection in the nose, throat and paranasal sinuses.
- Patient without any evidence of cholesteatoma, squamous epithelium in the middle ear, polyps, and ossicular erosion.
- Hearing loss of less than 45 dB.

After proper consent, these selected patients were subjected to clinical (detailed history, systemic, ear, nose and throat examination), audiological (pure tone audiometry), radiological (x-ray mastoids and x-ray paranasal sinuses as and when required) and laboratorial investigations (relevant routine investigations). Myringoplasty was done in all patients via postaural approach, and temporalis fascia was used as a graft material in all the patients. Patients were kept under observation weekly for first one month and monthly for next three months and further when needed. Intactness of drum, hearing assessment and presence of any complication was noted.

## RESULTS

In our study of 48 patients, 28 cases had dry ear and 20 cases had a wet ear. Out of 48 patients, 27 were males and 21 were females, and most of the patients were in the age group of 21-40 years.

The maximum number of cases 17 (35.42%) had a medium size perforation while a subtotal perforation was seen in 13 cases (27.08%). A small size perforation was seen in only 10 cases (20.83%). Out of 28 dry ear cases, 10 cases (35.71%) were having medium sized perforation, 9 cases (32.14%) were having subtotal perforation and rest 9 cases (32%) were with small and large size perforation. Out of 20 wet ear cases, 7 cases (35%) were having medium sized perforation, 5 patients (25%) with small perforation and 8 patients (40%) were with large and subtotal perforation.

In 20 wet ear cases, congestion of drum remnant was seen in 14 patients, congestion of middle ear mucosa in 10 patients, presence of discharge in middle ear in 4 cases and mucosal hypertrophy of middle ear mucosa obscuring the view of tympanic plexus in 5 cases.

Comparison of AB gap (preoperatively and postoperatively) with its improvement levels in case of dry ears are listed in Table 1 and Table 2.

Initial examination of dry ears postoperatively at 3 wks showed normal healed tympanic membrane (TM) in 22 cases (78.56%), whereas 6 cases (21.43%) were having a residual perforation. Out of 6 perforations, 1 perforation healed spontaneously and 1 by chemical cauterization. So overall graft uptake rate in dry ears was 85.71% at 3 months follow-up.

Observations regarding AB gap comparison (preoperatively and postoperatively) with its improvement levels in case of wet ears are listed in Table 3 and Table 4.

Initial examination of wet ears at 3 wks showed intact TM in 12 cases (60%) whereas 8 cases (40%) were having a residual perforation. Out of 8 perforations, 2 healed with chemical cauterization and 1 closed spontaneously. So, overall graft uptake rate in wet ears was 75% at 3 months follow-up.

Graft take up rate comparison of dry and wet ear myringoplasties is shown in Table 5.

No complication was seen in both dry and wet myringoplasty during the follow-up period.

AB GAP	PREOPERATIVE	POSTOPERATIVE
< 20 db	8	18
21-30 db	15	5
31-45 db	5	5

Table 1. Comparison of AB gap in dry ears

AB GAP Improvement	24(85.7%)
AB GAP Stable	1(3.5%)
AB GAP Deterioration	3(10.7%)

Table 2. Improvement levels in dry ears

AB GAP	PREOPERATIVE	POSTOPERATIVE
<20 db	6	4
21-30 db	10	9
31-45 db	4	7

Table 3. Comparison of AB gap in wet ears

AB GAP IMPROVEMENT	11(55%)
AB GAP STABLE	1(5%)
AB GAP DETERIORATION	8(40%)

Table 4. Improvement levels in wet ears

TYPE OF EAR	NO. OF CASES	FAILURE	SUCCESS
DRY	28	4(14.29%)	24(85.71%)
WET	20	5(25%)	15(75%)

Table 5. Graft take up rate

Author	Year	Success % in wet ear	Success % in dry ear
Sheehy and Glasscock	1980	98	96.6
Glasscock et al.	1982	92.7	93.1
Fadl	2003	83.3	84.6
Present study	2013	75	85.72

Table 6. Results of myringoplasty in dry and wet ears

## DISCUSSION

Myringoplasty is an established procedure, yet several aspects regarding its timing, choice of optimal material and factors influencing the short-term and long-term results, had been a subject of controversies. Various factors influencing the success of myringoplasty reported in the literature are patient's age, site of perforation, condition of the ears (dry or discharging), status of the contralateral ear, grafting material and surgical

techniques and associated pathologies like adenoiditis, tonsillitis and sinusitis.

Myringoplasty can be performed on dry perforation or moist (wet) perforation. As far as literature goes, controversies still surround the subject of performing myringoplasty in wet ears. While performing dry and wet myringoplasties, some authors are of the opinion that results of dry myringoplasty are better while other believe that the results of wet myringoplasty are better.

The present study has been undertaken to find out graft take-up rates in dry and wet myringoplasty, to compare hearing gain achieved in dry and wet myringoplasty and to look for complications both in dry and wet myringoplasty during the follow-up period.

In the present study, total numbers of 48 cases were subjected to myringoplasty, out of which 28 had dry ears, and 20 cases had wet ears.

**Sex:** Twenty-seven cases (56.25%) were males, and 21 cases (43.78%) were females. Thus, patients who opted for surgery in our studies had male predominance. Our results are compatible with a study where out of 183 myringoplasties in children, 105 (57.38%) were males and 78 (42.62%) were females.<sup>3</sup> However, some studies reported equal cases of both sexes in their series.<sup>4</sup>

**Age:** Most of the cases in our study, 26 (54.2%) were in the age group of 21-40 years, and 18 (37.5%) were under the age of 20 years. Our results are comparable with a study, where out of 40 cases, 13 (32.5%) were under the age of 20 years.<sup>5</sup>

**Size of perforation:** In our study (dry and wet), maximum cases had a medium size perforation followed by subtotal perforation. According to a previous study, the size of perforation of tympanic membrane was classified in the following manner: Grade 1- less than one-quarter of the eardrum; Grade 2- up to half the eardrum's size; Grade 3- up to three quarters of the drum; and Grade 4- total i.e., perforation in which only the annulus or part of it were left. In this study, most of the perforations were either grade 2 or grade 4 being 44% and 40% of the total number of cases respectively.<sup>6</sup> These results are compatible with our study.

**Preoperative and postoperative air-bone gap in dry and wet ears:** Preoperative and postoperative Audiological evaluation in terms of the air-bone gap was done at 500, 1000, 2000 Hz. In our study, an air-bone gap of 20-30 dB was seen in 15(53.57%) of the cases in dry ears and 10(50%) of the cases in wet ears. An air-bone gap of less than 20 dB was seen in 8(28.57%) of dry ears and 6(30%) in wet ears. None of the patients with the dry ear and wet ear had an air-bone gap of 46-60dB.

In a study conducted earlier, three groups of hearing levels were reported. Group 1 with hearing level between 0-41 dB, Group 2 hearing level between 41-70 dB and group 3 with a hearing level greater than 70 dB. Out of these groups, most of the ears had an air-bone gap of

group 2 seen in 40 cases (25%) and only 6 cases (4%) had an air-bone gap of greater than 70 Db.<sup>7</sup>

In our study postoperatively, 18 cases (64.28%) of dry ears had a air-bone gap of less than 20 dB, while 5 cases (17.86%) each had an air-bone gap of 20-30 dB and 31-45 dB. Similarly, 9 (45%) cases of wet ears showed mild hearing loss of 20-30db, 7 (35%) cases had a moderate hearing loss of 31-45 dB and only 4 (20%) cases in the series had hearing loss of < 20 dB and none of the patients had severe hearing loss (46-60 dB), whereas air-bone gap closure within 10 dB was achieved in 54-56% in some previous studies.<sup>8,9</sup> No sensorineural deafness was observed postoperatively.

**Hearing improvement level:** In the present study, amongst the dry ear, 24 cases (85.71%) had air-bone gap improvement. Whereas, 1 case (3.57%) had a stable hearing loss, and 3 cases (10.72%) underwent deterioration. In wet ears, 11 cases (55%) had air-bone improvement, whereas 1 case (5%) had a stable hearing loss, and 8 cases (40%) underwent deterioration. Hence, air-bone gap deterioration was seen more commonly in wet than in dry ears.

Our results are comparable with a study, where 100 patients, aged between 4 to 14 years underwent myringoplasty, a closure of perforation was seen in 90% of the patients but dropped to 88% as 2 patients developed glue ear. Hearing improvement in 64 patients (72%), deterioration in 7 (8%) and unchanged in 18 (20%) of the cases. There was no case of profound hearing loss.<sup>10</sup>

**Success rate of dry and wet myringoplasty:** The success rate of graft take up in our study was 85.71% in dry ears and 75% in wet ears with follow-up of three months. Hence, graft take up rate in dry ears was higher as compared to wet ears.

**Success rate of dry myringoplasty:** The success rate of dry myringoplasty in our study was 85.71% as compared with other studies in which the success rate ranged from 35% to 97%.<sup>11,12</sup>

Our results are comparable with a study which presented long-term results of three years after primary myringoplasties with fascia temporalis autograft. The overall success rate was 87.7%<sup>13</sup>, whereas, in a study of performed myringoplasty in 100 patients, aged between 4 to 14 years, a closure of perforation was achieved in 80 (90%) of the patients, but dropped to 88% as two patients developed glue ear.<sup>10</sup> In a study, out of 150 patients reported successful closure of the perforation was achieved in 89% in the dried fascia group (42/47 patients), 84% in the fresh fascia group (37/44 patients), and 85% in the dried and rehydrated group (39/46 patients). The overall success rate of graft take-up was 86%.<sup>14</sup>

**Success rate of wet myringoplasty:** The success rate of wet myringoplasty in our study was 75% as comparable to other studies in which the success rate had varied from

82 to 98%.<sup>4,15</sup>

A study of 51 patients aged between 5-16 years with a follow-up of 1.5 years underwent myringoplasty, a closure of perforation was achieved in 82% of the patients and reported that discharging ears in children favour good outcome and should be operated regardless of age and site of perforation<sup>4</sup> whereas some previous studies report that the state of the middle ear at the time of surgery does not affect graft take up rate.<sup>16,17,18</sup>

Table 6 shows results of some previous studies regarding success rates of myringoplasties in dry and wet ears.<sup>4,8,9</sup>

## CONCLUSION

Performing myringoplasty in dry ear is better (success rate of 85.72%) as compared to myringoplasty performed in wet ears (success rate of 75%) because of its high success rate and more hearing improvement postoperatively.

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