

## A study of the results of myringoplasty with and without cortical mastoidectomy in chronic suppurative otitis media safe type dry ears

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### Abstract

This prospective study of the results of myringoplasty with and without cortical mastoidectomy in chronic suppurative otitis media safe type dry ears revealed that success rate was higher in terms of graft uptake, hearing improvement and subjective sense of well-being in patients in whom myringoplasty was accompanied with mastoidectomy as compared to those with myringoplasty alone.

**Keywords:** Myringoplasty, cortical mastoidectomy, chronic suppurative otitis media.

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### Introduction

The Mastoid acts as a physiological buffer for the middle ear. Although the human middle ear contains about 0.5 ml of proper gas volume, the volume of the entire middle ear cleft differs greatly among individuals as it includes mastoid cavities of variable volume[1, 2]. The mastoid pneumatic system varies from about 1 ml to 30 ml. Therefore, a given gas deficit (or excess) will manifest itself differently in well pneumatised as well as in poorly pneumatised mastoids[3, 4]. A 20 ml volume change would be resulting in a 100 mm H<sub>2</sub>O pressure change in a 2 ml middle ear cleft. The pressure difference may be pathological in the small volume middle ear but non-significant in the other[4].

Most ear affected with the chronic ear syndrome have a hypopneumatized acellular or sclerotic mastoid. Ears with well pneumatised mastoids rarely exhibit any of the chronic otitis media conditions and probably rarely develop a negative middle ear pressure[5]. The explanation for the protective effect of an adequately pneumatised mastoid is quite simple. Its volume serves as a pressure buffer. This study underlines the importance of this air reservoir in improving the results of myringoplasty.

### Materials & Methods

This study was conducted in 30 patients between the age group of 20 to 40 years both age and sex matched in SVS Marwari Hospital, Naihati Corporation Hospital and ICARE Institute of Medical Sciences and Research, Haldia within a timeframe of 2 years. Each case was subjected to detailed history, general examination, complete ENT examination including otoscopy as well as tuning fork tests. Special investigations such as Pure Tone Audiometry, X-ray mastoid in lateral oblique view were also performed. Size of the mastoid was assessed using graph paper placed on the radiograph and area of

mastoid air cell system was directly measured. Mastoids were classified as small (< 5 cm<sup>2</sup>), medium (5-10 cm<sup>2</sup>) or large (> 10 cm<sup>2</sup>) depending on the size. Most of the cases had small or medium sized mastoids. Cases with sensorineural deafness and air bone gap > 50 db were excluded from the study.

Under operating microscope, through William Wilde postaural incision, myringoplasty was performed by under lay technique, using temporalis fascia as graft materials, under local anaesthesia in all cases. The test group includes 15 cases where cortical mastoidectomy was done, exenterating all mastoid air cells to create a large mastoid cavity which communicated with the attic through the aditus (If absent then atticotomy was performed). Drainage tube was left in place. Fluid was aspirated till the drainage reduced significantly. Mastoid bandage was applied which was removed on the 7<sup>th</sup> post-operative day. Consecutively all the patients were followed up after 2 months, 6 months and 1 year. Informed written consent was obtained from all the participants included in the study in accordance with the Helsinki Declaration. The study was approved by the Institutional Ethics committee.

### Results

Patients selected were in the age group of 20 to 40 years, of both sexes, with moderate to large central tympanic membrane perforation, with the ear being dry for at least past 3 months. The results showed that gender and age was immaterial. In both groups most of the ears had poorly pneumatised mastoids (small or medium). Only few patients had pneumatised large mastoids. In the test group, all patients had 100% graft uptake. The hearing gain was better (about 20 dbs). There was a sense of general well being in these patients. The results were better in those with medium than those with small mastoids. Likewise, in the control group only 1 patient had failure to take graft. Hearing gain was slightly less than that of test group. Sense of well being was slightly less than that of the test group [Table 1]. During follow up after 2 months 100% graft uptake was observed in test group whereas 1 graft failure was observed in control group. After 6 months and 1 year follow-up consecutively same results were observed in test as well as controls as seen during 2 months follow-up.

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**Table 1: Illustrating the results of myringoplasty alone versus myringoplasty with cortical mastoidectomy in CSOM safe type dry ears**

Group	No. of Patients	Graft take up after 2 months	Graft take up after 6 months	Graft take up after 1 year	Hearing Gain
Test	15	100%	100%	100%	20 db approx
Control	15	100%	93.33%	93.33%	16 db approx

**Discussion**

The role of Eustachian tube dysfunction is well accepted in chronic suppurative otitis media and the results of myringoplasty[6, 7]. However, the role of concomitant cortical mastoidectomy is debated. Some surgeons are of the opinion that concomitant cortical mastoidectomy gives improved results in terms of hearing gain, graft uptake and dry ear[8,9]. On the other hand, another section of surgeons feel that the results are same in both the groups[10, 11]. Thus concomitant cortical mastoidectomy does not yield superior results. Potential risks and cost to the patient should be considered when considering addition of mastoidectomy to a myringoplasty.

According to a study done by Wehrs in 1981, poor Eustachian tube function is the most commonly blamed in cases of failure to maintain an aerated middle ear following tympanoplasty[12]. Another study by Juckler and Schindler in 1984 concluded that simple mastoidectomy is safe and useful adjunct to myringoplasty in selected cases[13]. Moreover, Holmquist and Bergstrom found better results of myringoplasty when an air reservoir was surgically created[2]. This mastoid cavity remains air filled and not by fibrous tissue or granulation, in many of the second stage reconstructive procedures. They felt that the air reservoir compensated the adverse effects of a poorly functioning Eustachian tube. Likewise, a study conducted by Mc Eleveen et al observed that hearing was better when myringoplasty was combined with mastoidectomy[5]. Thus the mastoid air reservoir was acoustically desirable. An Indian study conducted by Agarwal et al revealed that the size of the mastoids directly influence the take up rate of the graft as well as the hearing gain following myringoplasty in dry tubo tympanic disease ears[14]. Thus they felt that it was desirable to do a cortical mastoidectomy even if the ear is dry to create a mastoid air reservoir which probably can buffer the detrimental effects of a poorly functioning Eustachian tube. Concomitant cortical mastoidectomy with myringoplasty has high success rates compared to myringoplasty alone with respect to graft take up and hearing gain. Contradicting this study another study was done by Balyan et al which observed no statistical significance in terms of graft success rates or hearing outcome was found when mastoidectomy was done along with myringoplasty[15]. It was further concluded that mastoidectomy adds extra effort and risk. They also found that success rates were similar for both dry and discharging ears. Moreover, another study by Mishiro et al also did not find any significant difference between cases who underwent myringoplasty with those who had myringoplasty with concomitant cortical mastoidectomy[9]. Similarly, no significant differences were observed between graft success rates in discharging and dry ears. Thus they concluded mastoidectomy is not helpful in tympanoplasty for non cholesteatomatous chronic suppurative otitis media even in discharging ears. However, another study by McGrew et al also did not find mastoidectomy necessary for success of myringoplasty but found it valuable in reducing the need for future surgery by decreasing the disease progression[16]. A study by Bhat et al also did not find concomitant mastoidectomy to be superior to myringoplasty alone on a short term followup[17]. Another study by Albu et al found that any significant factor for success of myringoplasty was a dry period longer than 3 months and cortical mastoidectomy gives no additional benefit[18]. Our study gives an insight into the role of concomitant cortical mastoidectomy in the success of myringoplasty especially when the mastoid air cell volume is less than 10 cm<sup>2</sup>. In most operations, myringoplasty along with cortical mastoidectomy always yields better results as compared to myringoplasty alone, not only in terms of graft uptake but also improvement in hearing and a subjective sense of well being in the patient. In experienced hands the results of graft uptake could be feasible but hearing gain and sense of well being is not always achieved. This was always better in ears with myringoplasty with cortical mastoidectomy. Thus, in all the cases, it is always best to do a cortical mastoidectomy along with myringoplasty.

**Conclusion**

This prospective study of the results of myringoplasty with and without cortical mastoidectomy in chronic suppurative otitis media safe type dry ears revealed that success rate was higher in terms of graft uptake, hearing improvement and subjective sense of well-being in patients in whom myringoplasty was accompanied with mastoidectomy as compared to those with myringoplasty alone.

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