

RATIONALIZATION OF MYRINGOPLASTY IN CHILDREN: A COMPARISON WITH AN ADULT POPULATION

Meghal Chaudhary^{1*}, Tarun Ojha², Natwar Singh Rathore³, Amit singhal⁴, Abhishek Sharma⁵, Kanak Yadav⁶, Vaishali Kataria⁷

1, 3,6,7. Resident, Dept. of ENT and HNS, Mahatma Gandhi Medical college and Hospital, Jaipur

4,5. Assistant professor, Dept. of ENT and HNS, Mahatma Gandhi Medical college and Hospital, Jaipur

2. Professor and Head, Dept. of ENT and HNS, Mahatma Gandhi Medical college and Hospital, Jaipur

*Email id of corresponding author: meghalchaudhary007@gmail.com

Received: 12/10/2015

Revised: 02/02/2016

Accepted: 26/03/2016

ABSTRACT:

Objective: Myringoplasty is the surgical repair of the perforation of the tympanic membrane. It is a simple and effective procedure that results in the successful closure of the perforation in most cases. This study is planned to find out reliability of myringoplasty in children by comparing its anatomical and functional results with adult myringoplasty. **Study Design:** A descriptive cross sectional study

Place and Duration of Study: Department of Otolaryngology at a tertiary care teaching hospital in Jaipur from January 2015 to June 2015. **Materials and Methods:** A total of 67 patients having dry central tympanic membrane perforation of various sizes secondary to chronic tubotympanic suppurative otitis media were included in the study. The patients were divided in two groups. First group comprised of children upto the age of 14 years whereas those above the age of 14 years were included in second group. Myringoplasty was performed in all patients with temporalis fascia utilizing underlay technique. The two groups were compared regarding graft success rate and hearing improvement at the end of 6 months of follow up. **Results:** Out of 67 patients included in the study, 31 (46.2%) belonged to child group whereas 36 (53.73%) were included in adult group. Among 31 patients in child group, 28 (90.32 %) had successful graft take at the end of 6 months of follow up whereas 32 (89.3 %) patients out of 52 in adult group had successful graft. Average air bone gap closure of 19 dB was noted in child group whereas in adult group it was 15.1 dB. The difference between graft success rate and average air bone gap closure was found to be statistically insignificant ($P > 0.05$). **Conclusion:** Results of myringoplasty in paediatric and adult age group are comparable in terms of graft success rate and hearing improvement.

Key words: Myringoplasty, tympanic membrane, paediatric, middle ear

INTRODUCTION:

Otologic surgery in paediatric population is observed less successful than in adult patients. Surgeons have different opinions regarding the

correct indications for myringoplasty in children. The chronically draining ear that is resistant to medical therapy also requires surgery. (1)The

children are more susceptible to upper respiratory tract infections and eustachian tube dysfunction, which leading to recurrent middle ear infection. (2) This may make vulnerable to poor results of tympanic membrane grafting.

Children are in learning phase and try to interact socially.(3) Impaired hearing in children is likely to impede language and cognitive development which further affects child education and socialization.(4)

The rationale behind performing myringoplasty in children are convincing because of the good cochlear reserve in children, the possibility for restoring and preserving hearing is high. Also tympanoplastic repairs may check sequelae of chronic otitis media like development of cholesteatoma and hearing disability due to ossicular damage. (5,6)

Myringoplasty in adults is now considered to be well established and rewarding procedure with high success rate but controversy still surrounds the advisability of tympanic membrane repair in children. In this study, we tried to solve the controversy regarding advisability of paediatric myringoplasty by comparing the results of tympanic membrane grafting in children to that of adults.

MATERIAL AND METHODS

This study was conducted at the Department of Otolaryngology at a tertiary care teaching hospital in Jaipur during the period of January 2015 to June 2015. A non probability purposive sampling technique was adopted by including all patients coming to outpatient clinic of our department with dry central tympanic membrane perforation secondary to chronic tubotympanic suppurative otitis media,irrespective of age and gender. We took detailed clinical history .Ear nose throat examination was done thoroughly.

Otomicroscopic examination was done on all patients and findings were filled in a pre-designed performa.

The exclusion criterion for this study was atticofurrow type of disease,prior ear surgery, patients with chronic rhinosinuitis.

Pure tone audiometry with air and bone conduction threshold was performed in all patients. The above mentioned criteria were used to select the patients then they were divided in two groups according to age. First group includes of children up to the age of 14 years and the second group consists of patients above 14 years of age. All the patients underwent myringoplasty under general anesthesia using post aural approach and underlay technique of tympanic membrane grafting. Post operative antibiotic cover was given for 5 days. Patients were discharged on second postoperative day and were followed up after three weeks when bismuth iodoform paraffin paste pack was removed from the external auditory canal. Status of graft (full take or failure) was noticed on that visit.

They were then followed up at monthly interval for up to at least 6 months. During that period, they were observed for graft success. At the end of 6 months of follow up, pure tone audiogram with air and bone conduction thresholds was repeated. Both groups of patients were compared in terms of graft success rate (anatomical gain) and hearing improvement (functional gain). Graft take was defined as full, intact healing of tympanic membrane graft at 6 months postoperatively. Hearing improvement was reviewed as the change in air-bone gap at the end of six months follow up period. Gap change was defined as the difference between the pre and postoperative air-bone gap. Air-bone gap was calculated as the average difference between air conduction and bone conduction at 0.5, 1 and 2 kHz. Results were statistically analyzed

using SPSS version 10.0. Chi square test was performed to find out the difference between graft success rates of both the groups. Pre and postoperative air-bone gap change in dB between the two groups was analyzed by using t test. Statistical significance was accepted as $p < 0.05$.

RESULTS

A total of 67 patients, who fulfilled the inclusion criteria were included from January 2015 to December 2015. Thirty one of them, up to the age of 14 years, were included in child

group whereas 36 having more than 14 years of age were included in adult group. Demographics of both the groups are shown in Table I. Average follow up duration was 3.04 months (range 0.6 to 10 months). Graft success rates and hearing improvement (air-bone gap closure in successful graft) in both the groups are shown in Table II. The difference between graft success rate and air-bone gap closure in two groups were found to be statistically insignificant ($P > 0.05$). Overall hearing improvement was noted in all patients of both groups except those who met with graft failure.

Table-I: Demographics of Child and Adult Group

	Child Group	Adult Group
Total No. of Patients in each group	31(46.2%)	36 (53.73 %)
Male	17	11
Female	14	25
Mean Age (Years)	8.42	30.9
Age Range (Years)	5-14	15-48
Average Duration of Disease (Years)	3.04 (0.6-10)	6.61 (0.5 to 21)
Size of Tympanic membrane perforation	Small = 5 Medium = 16 Large = 10	Small = 8 Medium = 25 Large = 17
Status of Contra-lateral ear	20 (64.5)	24 (66.6%)
Normal	11(30.5)	12 (33.3%)
Perforated		

Table-II: Graft Success Rates and Air Bone Gap Closure in Both Groups

	Child Group n=31	Adult Group N=36
Graft Success rate	28 (90.32 %)	32 (89%)
Average Air-Bone gap closure (dB)	19 (Range 6 to 34.3)	15.1 (Range 4 to 26.5)

DISCUSSION

Myringoplasty in children is still a topic interesting debate among surgeons. Some previous studies appeared in literature on this subject in the recent past but opinions still differ on this subject. In the present study, we tried to solve this controversy by comparing the results of paediatric myringoplasty with that of same procedure in the adults. We obtained graft success rate of 90.32 % in children between the ages of 6 to 14 years.

Comparable graft success rate (89 %) were achieved in adult patients (> 14 yrs) utilizing the same underlay technique and graft i.e., temporalis fascia. The difference between graft success rates was statistically not significant. These results are similar to certain other studies in which adult and pediatric myringoplasty results were compared .(7)

In literature, we find wide variations between the graft success rates of paediatric myringoplasty ranging from 35 to 100%.(8,9,10,11) One study from México City stated graft success rate of 93.8 % at one year of follow up. This study included forty-eight cases of paediatric myringoplasty in more than 5 years

of age children.(12) Another study reported graft success rate of 88% at one year of follow up, in 100 cases of myringoplasty performed in children less than 14 years of age. (13) In another study of 231 cases of paediatric myringoplasty, 93.5% graft success rate was achieved at one year of follow up. (14)

In one study, overall graft success rate of 87% was reported with 3 years of follow up whereas in another with longer follow up period, 80.5% graft success rate was reported in 41 cases of paediatric Myringoplasty. The mean follow up period in that study was 39 months.(9) In a study published

in 2010, which reported (retrospective) the results of 132 tympanoplasties performed on children, ranging from 6–15 years and divided into two groups (<8 and >8 years),the success rate was 80.0% of cases at the first postoperative visit. However, at 12 months, the success rate, cases decreased to 67.3%. (16).We reported 91.8% graft success rate in children at 6 months of follow up. We recommend studies with long term follow up of at least three years to evaluate the issue of delayed graft failures in paediatric myringoplasty.

The functional results of paediatric

myringoplasty are not only promising but are also comparable to same procedure in adults. All of our patients in both child and adult group had hearing improvement after the surgery except those with graft failures. We noted an average air-bone gap closure of 19 dB and 15.1 dB in child and adult group respectively. The difference was statistically insignificant in air bone gap closure in both groups. These results showed that the functional results of paediatric and adult myringoplasty are comparable. This view is shared by number of other studies reported in literature.(13,15)

We suggest that the results of our study may be of play a significant role in resolving the controversy of paediatric myringoplasty in favor of early surgical intervention.

This will confer considerable benefits to children with tympanic membrane perforation in terms of improved hearing and decrease in number of recurrent ear discharge, which in turn leads to better academic and intellectual performance and socialization.

In spite of our study results, we suggest that further studies should be carried out with larger number of patients and longer follow -ups to resolve the controversy regarding paediatric myringoplasty.

CONCLUSION

The success rate of myringoplasty in children is similar to that of same in adults both in terms of anatomical and functional gains. The results of this study mitigates against delaying myringoplasty in paediatric population.

REFERENCES

1. Joao Carlos Ribeiro, Cerejeira Rui, Silvestre Natercia , Romao Jose, Paiva Antonio. Tympanoplasty in children: A review of 91 cases. *Auris Nasus Larynx* 2011;38: 21-25.
2. Kessler A, Potsic WP, Marsh RR. Type 1 tympanoplasty in children. *Arch Otolaryngol Head Neck Surg.* 1994;120: 487-90.
3. Mak D, MacKendrick A, Bulsana M et al. Outcomes of myringoplasty in Australian Aboriginal children and factors associated with success: a prospective case series. *Clin Otolaryngol Allied Sci.* 2004; 29:606-11.
4. Cappelli, M., Daniels, T., Durieux-Smith, A., McGrath, P., & Neuss, D. (1995) Social development of children with hearing impairments who are integrated into general education classrooms. *The Volta Review*, 97, 197-208.
5. Isaacson G. Tympanoplasty in children. *Otolaryngol Clin North Am* 1994; 27: 593-605.
6. Koch WM, Friedman EM, McGill TJ, Healy GB. Tympanoplasty in children. *Arch Otolaryngol Head Neck Surg* 1989; 116:35-40.
7. Gersdorff M, Garin P, Decat M, Juantequi M. Myringoplasty : long- term results in adults and children. *Am J Otol* 1995;16: 532-5.
8. Bluestone CD, Cantekin EI, Douglas GS. Eustachian tube function related to the results of tympanoplasty in children. *Laryngoscope* 1979;89: 450-8.
9. Pignataro L, Berta L, Capaccio P, Zaghis A. Myringoplasty in children: anatomical and functional results. *J Laryngol Otol* 2001; 115: 369-73.
10. Chandrasekhar SS, House JW, Devgan U. Pediatric tympanoplasty. A 10 years experience. *Arch Otolaryngol Head Neck Surg* 1995; 121: 873-8.

11. Potsic WP, Winawer MR, Marsh RR. Tympanoplasty for the anterior- superior perforation in children. *AmJ Otol* 1996; 17:115-8.
12. Boronat-Echeverría et al.: Prognostic factors of successful tympanoplasty in pediatric patients: a cohort study. *BMC Pediatrics* 2012 12:67.
13. Umapathy N, Dekker PJ. Myringoplasty: is it worth performing in children? *Arch Otolaryngol Head Neck Surg.*2003;129:1053-5.
14. Denoyelle F, Roger G, Chauvin P, Garabedian EN. Myringoplasty in children: predictive factor of outcome. *Laryngoscope.* 1999;109:47-51.
15. Alberna R, Riontino E, Giordano L, Gervasio CF et al. Myringoplasty in children: a comparison with an adult population. *Acta Otorhinolaryngol Ital* 1998; 18: 295-9.
16. Kumar S, Acharya A, Hadjihannas E, Panagamuwa C, McDermott AL: Pediatric myringoplasty: Definition of “success” and factors affecting outcome. *Otol Neurotol* 2010, 31:1417–1420.