

Prospective Study of Myringoplasty in Children

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Abstract

Objectives: To observe the surgical outcome of myringoplasty in children in terms of graft uptake and improvement in hearing. **Materials and Methods:** The prospective study was conducted on 30 children of either sex upto the age of 15 years both from urban and rural population irrespective of socioeconomic status and was conducted in Department of ENT, Government Medical College and Rajindra Hospital, Patiala. All the patients had central perforation and dry ear having duration of atleast 6 weeks. The myringoplasty was performed under either general anesthesia or local anesthesia, using either per meatal or post auricular approach Patients were followed up in post operative period at 4th, 8th and 12th weeks for any complication, assessment of graft status and audiological evaluation. **Results:** Out of 30 patients taken for myringoplasty, 17 (56.7%) were males and 13 (43.3%) were females. 70% of the patients were from rural background and 30% were from urban area. The mean age was 13.6 ± 1.49 years with majority (76.66%) of the patients in 13-15 years age group, while 7 patients (23.33%) were in the 9-12 years age group. In this study, successful graft uptake was seen in 24 (80%) cases while 6 (20%) cases had graft rejection and all successful patients had improvement in hearing ranging from 20dB to 30dB. **Conclusion:** Myringoplasty is safe and effective and can be performed in pediatric population regardless of age, location and type of perforation.

Keywords: Chronic otitis media; Myringoplasty; Central perforation.

Introduction

Myringoplasty is an effective and simple procedure for the closure of tympanic membrane perforations. Tympanic membrane perforations can occur due to chronic suppurative otitis media in young children, trauma from direct physical injury or head injury, iatrogenic damage by inserting ventilating tube.¹ Rupa et al. (1999) in a study on 914 children of age group 2-10 years found the overall prevalence of CSOM to be 6%.² This infection is associated with

chronic hearing loss, and may have an impact on development of speech, language, cognition and school performance of pediatric population and carry the potential risk of life-threatening suppurative complications.³

Chances of developing acute suppurative otitis media are more in children because they have not yet achieved adult immunity to the respiratory tract infections, leading to perforation of tympanic membrane. With recent trends, otorhinolaryngologists dedicated to pediatric

pathology have started considering it necessary to manage chronic ear infections at an early age. Ear drops containing antimicrobial agents either with or without an anti-inflammatory component have been promoted as an effective therapy for COM since the 1950s.⁴⁻⁶

Following medical management, children whose discharge resolves but the perforation becomes chronic should be informed about the hazards of water contamination and the disease sequelae. Closing of tympanic membrane perforation prevents contamination of middle ear. It also maintains or improves hearing and decreases tinnitus thus reducing economic and social disability.

The heterogeneous approach to the management of these children indicates a lack of standardised management guidelines and probably misunderstanding amongst parents. Myringoplasty in children continues to be a contentious issue. Many surgeons favour myringoplasty in children and find principles of surgery to be same as in adults while others find it to be more difficult and results to be uncertain.

Although there is no consensus among otologists regarding benefits of myringoplasty in children, but the benefits of operating early in a child are as: 1) To prevent the chronic ear disease and its related complications, 2) To improve hearing and thus optimizing one of the conditions for speech and language development, 3) To let the child enjoy water activities etc (Kessler et al., 1994).⁷

However, much debate exists over the management of COM in children, majority of it being centred around the surgical management. High rates of closure can be achieved no matter at what age surgery is undertaken but there is an increased risk, compared to adults, of subsequent perforation with the next episode of otitis media in younger children. In children, poor Eustachian tube function and recurrent upper respiratory tract infection can lead to increased rate of failure of myringoplasty (Dhingra, 2007).⁸

Though numerous studies are mentioned on the subject in literature, but in the absence of prospective studies it is always difficult to draw definitive conclusions. Keeping all this in view, the present study was designed to know the usefulness of myringoplasty in children and is undertaken to 1) evaluate graft uptake in children 2) evaluate the hearing improvement after myringoplasty in children 3) determine the causes of failure of myringoplasty in children.

Materials and Methods

The Study was conducted on 30 children of either sex upto the age of 15 years both from urban and rural population irrespective of socioeconomic status and was conducted in Department of ENT, Government Medical College and Rajindra Hospital, Patiala after approval from the Institutional Ethical Committee. All the patients had central perforation and dry ear having duration of at least 6 weeks, mild to moderate conductive hearing loss, normal cochlear functions, normal or good Eustachian tube function, no evidence of infection in nose, paranasal sinuses, nasopharynx and throat.

All the patients selected were evaluated based on history, general physical examination as well as complete ear, nose and throat examination. Written consent from each of the patients was obtained. Detailed history of patient included history of adenoidectomy or tonsillectomy, history of ventilation tube placement and otoscopic findings were recorded. Examination under microscope was done in all the cases. Tuning fork tests and pure tone audiogram were done for preoperative assessment and to confirm degree and type of hearing loss.

Surgical Procedure

The operation was performed under either general anesthesia or local anesthesia, using either permeal or post auricular approach depending upon the size, shape of EAC and site and size of perforation. After harvesting the temporalis fascia graft, the middle ear was examined for any pathology. Graft was placed by underlay technique. Patients were observed for graft uptake and for any complications at 4th, 8th and 12th week of operation. PTA was done three months after surgery to assess the hearing and was compared with that of preoperative audiogram. Any factors contributing to the failure of the graft uptake were also noted.

The criteria for Surgical success was 1) integrity of the graft or membrane; 2) postoperative improvement of hearing. Residual perforations were regarded as treatment failure.

Results

Out of 30 patients taken, 17 (56.7%) were males and 13 (43.3%) were females. 70% of the patients were from rural background and 30% were from urban area. The mean age was 13.6 ± 1.49 years with majority (76.66%) of the patients in 13-15 years age group, while 7 patients (23.33%) were in the

9–12 years age group. Contralateral ear was involved in 18 (60%) cases. 12 (40%) cases had unilateral ear disease out of which 5 patients had right ear disease while 7 patients had left ear disease. The duration of discharge was more than 8 years in 14 patients while 6 patients had duration of 5–8 years. All the patients had dry ear prior to surgery ranging from 1–24 months. In our study, majority 16 (53.3%) of the patients had subtotal perforation while anterior quadrant and posterior quadrant involvement was seen in 6 (20%) and 8 (26.7%) cases respectively. Mean pre operative AB gap was 29.90 with SD of 9.10.

Left ear was operated upon in 14 (46.7%) cases while right ear was operated in 16 (53.3%) cases. Majority (83.4%) of the patients were operated through post-aural approach. Successful graft uptake was seen in 24 (80%) cases while 6 (20%) cases had graft rejection.

Success of graft uptake was 71.42% in 9–12 years age group and 13–15 years age group showed 82.60% success rate of graft uptake.

The 14 patients who had duration of discharge of more than 8 years showed graft uptake in 10 (71.4%) cases while 6 patients who had duration of 5–8 years showed 83.3% successful graft uptake. Children with dry ear for more than 1 year showed 100% graft uptake and those who had dry ear for less than 1 year showed success rate ranging from 70%–81.8%.

Graft uptake was found in 75% of the cases with posterior quadrant perforation and in 66.6% of the cases with anterior quadrant perforation while cases with subtotal perforation had success rate of 87.5%. Out of successful 24 cases, 16 cases (66.6%) had post operative hearing improvement of less than 20 dB while 4 cases (16.6%) had hearing

improvement of 20–30 dB and more than 30 dB hearing improvement was also seen in 4 cases (16.6%). In none of the patients, sensory neural hearing loss was observed post operatively.

Post operatively vascularization, texture and motility of tympanic membrane was observed. Only two children (8.33%) presented with intact but non mobile and thickened graft. Medialization of anterior part of graft was seen in two children (8.3%).

Discussion

Chronic suppurative otitis media is a persistent disease capable of causing destruction of middle ear structure with irreversible sequelae which manifests as deafness and discharge (PM Sheno, 1987).⁹

Myringoplasty is an effective and simple procedure for the closure of tympanic membrane perforations. In children early type-I tympanoplasty had a good chances of restoring function with the potential for reducing further complications and deterioration (PM Sheno, 1987).⁹

There are controversies regarding age for myringoplasty in children. Robert et al., (1994) recommended postponing myringoplasty in children until age of 7 years as rates of re-perforation are higher due to recurrent otitis media and eustachian tube dysfunction.¹⁰ Glasscock (1976) gave young age as relative contraindication to tympanoplasty because children younger under the age of 3 to 4 years were prone to respiratory tract infections and recurrent attacks of otitis media.¹¹ Raine and Singh (1983) recommended waiting upto 12 years of age as success of myringoplasty in children improved with age.¹² Lau & Tos (1986)

Table 1: Factors Influencing Success Rate

Contributing Factors		Success Rate (%)
Age Group (Years)	9–12	71.42
	13–15	81.60
Duration of discharge (Years)	<1	100
	1–4	87.5
	5–8	83.3
	>8	71.4
Duration of dry ear (months)	1–4	70
	5–8	81.8
	9–12	75
	>12	100
Site of perforation	Subtotal	87.5
	Anterior	66.6
	Posterior	75
Status of non-operated ear	Dry	75
	Wet	83.5

found no significant difference in outcome between the age of 2 to 7 age group and those children aged between 8 to 14 years. They suggested that early operation may prevent progression of ossicular chain resorption.¹³ Ophir et al., (1987) reported 79% overall success rate, and their success in younger children (5–8) was comparable to the success rate for older children. So, they concluded that myringoplasty had a good chance of success at any age.¹⁴

Koch et al., (1990) reported an 81% success rate for children age 8 and older, but only 9.30% success rate in younger patients. They concluded that tympanoplasty before the age 8 results in a high rate of failure because of Eustachian tube dysfunction and frequent upper respiratory tract infections.¹⁵

Yung et al., (2007) analysed the myringoplasty in 51 children aged 4 to 13 years to examine this success rate in young and older. The graft uptake rate was 83.8%. They found no difference in outcome in young and older children.¹⁶

In the present study, graft uptake was seen in 24 cases (80%) out of total 30 patients. In 9 to 12 years age group, 71.42% and in 13 to 15 years age group 82.60% success was achieved. Thus, as the age advances, the chances of success of myringoplasty also improve.

Table 2:

Sr. No.	Source, Author, Year	No. of ears operated	Age group years (no. of patients)	Success %
1.	Blanshard et al., 1990 ¹⁷	59	7-14	78
2.	Koch et al., 1990 ¹⁵	64	< 8 8-17	30 81
3.	Ghosh and Dubey 1991 ¹⁸	32	5-12 5-8 9-12	60 72.7
4.	Kessler et al., 1994 ⁷	100	0-18 0-6 (18) 6-12 (63) 13-18 (19)	81 88 90
5.	Chandrasekhar et al., 1995 ¹⁹	226	0-19	84.9
6.	Umpathy and Dekker 2003 ²⁰	51	9-14	92
7.	Yung et al., 2007 ¹⁶	51	4-13	83.8

The outcome of myringoplasty depends on the criteria for selection and length of follow up. This is the main reason for widely differing rates.

Koch et al. (1990) reported improvement in the hearing upto 30 dB in 64% cases.¹⁵ Kessler et al. (1994) achieved post operative AB gap of less than

20 dB in 93% cases.⁷ Skotnicka B (2008) in a study of 71 children, obtained AB gap between 0 to 20 dB in 95.6% of the patients.²¹ Raine and Singh (1983) in their study achieved post operative AB gap of less than 30 dB in 82% patients¹² while Ophir et al. (1987) achieved hearing improvement between 84% to 90%. Thus, the hearing improvement in the present study is in accordance with the above mentioned studies.¹⁴

In the present study, postoperatively 60% patients had AB gap less than 20 dB and 33.3% had AB gap between 20-30 dB. Less than 20 dB improvement was noted in 16 (66.66%) cases while 4 cases (16.66%) had shown improvement of 20-30 dB and 16.66% had shown more than 30 dB improvement in hearing.

Conclusion

In our study, the success rate of myringoplasty in children aged 9–15 years is 80% with good improvement in hearing. Thus, myringoplasty is a beneficial procedure in the children and can be performed safely, especially in children having both ears perforation. In such children where there is increased hearing loss and it prevents the mental development, a successful myringoplasty will reduce the enormous degree of economic and social disability.

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