# COMPARATIVE STUDY OF COMPLICATIONS OF TYPE-I TYMPANOPLASTY IN CHILDREN VERSUS ADULTS

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**ABSTRACT**

**BACKGROUND**

The objectives of the study were

1. To compare different complications of Type 1 Tympanoplasty of children with complications in adults.
2. To determine as to whether performing Type 1 Tympanoplasty is justifiable in children or should we wait until the age of 13 yrs.

**MATERIALS AND METHODS**

The study was conducted in Andhra Medical College, Govt. ENT Hospital, Visakhapatnam during October 2016 to March 2018 for a period of 18 months

The complications in Type 1 Tympanoplasty for Chronic Suppurative Otitis Media (CSOM) with central perforation in 50 patients aged between 6 to 12, were compared with 50 adult patients aged between 20 to 50.

**RESULTS**

In children for type I tympanoplasty, there was a female preponderance with M:F ratio of 1:1.27 (44:56) and in the adult group M:F ratio was 1:1.08 (48:52).

The granulation in external auditory canal with 6% in both groups was the most common complication. The residual perforation (6% in children and 4% in adults), medialisation or atelectasis and blunting (4% each in both the groups), injury to chorda tympani and epithelial pearl formation (2% in children and 4% in adult), Lateralisation (2% in both groups) were followed. The least common complication was vertigo (2% in adults). The sensorineural hearing loss, injury to facial nerve, injury to jugular bulb, ossicular dislocation and cholesteatoma were not reported.

**CONCLUSION**

Complications of type 1 Tympanoplasty, like residual perforation, external ear granulations, epithelial pearl formation, injury to chorda tympani and atelectasis were found to be almost equal in children and adults. Hence, it is advised to proceed in children aged between 6-12 years for type 1 Tympanoplasty without any hesitation, to give good hearing to acquire knowledge and better academic performance.

**KEYWORDS**

Tympanoplasty in Children, Tympanoplasty in Adults, Complications of Tympanoplasty.

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## BACKGROUND

Tympanoplasty type I is the surgery performed to eradicate infection, to stop discharge and to improve the hearing in the patients with chronic suppurative otitis media with central perforation. Indeed, there is a high demand of clearing or controlling the predisposing factors and diseases before performing tympanoplasty. In most of the adult patients, DNS with or without allergic rhinitis is the predisposing factor. Later are nasal polyposis, chronic sinusitis and rarely benign and malignant tumours of nose and nasopharynx.

In children, the most common predisposing factor is adenoiditis with chronic tonsillitis.[1,2] Later nasal allergy, cleft palate, foreign body nose and rhinolith also can cause CSOM.

Nowadays, as every child is admitted to primary school at the age 6 yrs. and continues in High school, at this learning age, that is from 6 yrs. onwards hearing is very important to develop their knowledge and personality.

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Tympanoplasty type I is performed in CSOM with central perforation possibly after making the ear dry by treating predisposing factors commonly adenotonsillectomy in children or septoplasty with allergic management in adults.[3] This defect in tympanic membrane is closed by using graft with mostly temporalis fascia, Other graft materials like perichondrium with or without cartilage, periosteum, vein graft and fat are also used. Postauricular approach is widely used in India than endaural or endomeatal approach. After advent of endoscopic tympanoplasty people are using more the endomeatal or transcanal approach. In all these approaches the underlay graft method is used for myringoplasty.

The complications that occur in Type I tympanoplasty commonly are residual perforation, blunting, medialisation or atelectasis, lateralization, ossicular chain dislocation, sensorineural hearing loss, injury to chorda tympani and rarely epithelial pearl formation, injury to the facial nerve, jugular bulb and round window membrane

**Aims and Objectives**

1. To compare different complications of type 1 tympanoplasty of children with complications in adults
2. Whether Type 1 Tympanoplasty performing is justifiable in children or shall we wait until the age of 13 yrs. age

**MATERIALS AND METHODS**

The study was conducted in Andhra Medical College, Government ENT Hospital Visakhapatnam during October 2016 to March 2018 for a period of 18 months.

Total number of 50 patients between age of 6 and 12 with chronic suppurative otitis media with central perforation for which Type 1 Tympanoplasty performed were compared with 50 adult patients between age of 20 and 50 with central perforation in CSOM for which same type 1 tympanoplasty done.

**Study Design**

Prospective study.

**Inclusion Criteria**

1. Children aged between 6 to 12 yrs.
2. Adult aged between 20 to 50 yrs.
3. CSOM with dry central perforation.

**Exclusion Criteria**

1. CSOM with granulations and polyp.
2. CSOM with mastoiditis.
3. CSOM with otitis externa.
4. CSOM due to tuberculous otitis media.
5. CSOM with extra or intra cranial complications.

All the cases both adults and children underwent type 1 tympanoplasty with post auricular approach only. The temporalis fascia was used as a graft material to close the perforation, with Gelfoam support both in middle ear and external auditory canal. Post operatively sutures were removed after 7 days and the follow up was done every month up to 3 months.

**RESULTS**

| Sl. No. | Sex | Children | Adult |
|---|---|---|---|
| 1. | Male | 22 | 24 |
| 2. | Female | 28 | 26 |
| | Total No. of Patients | 50 | 50 |

***Table 1. Gender Distribution***

In this study of children for type I tympanoplasty found the female preponderance with male female ratio of 1:1.27 (44:56). In the adult group for tympanoplasty it was found the same female domination with male and female (48:52) ratio 1:1.08

| Sl. No. | Type of Complication | Children | Adult |
|---|---|---|---|
| 1. | Residual Perforation | 3 | 2 |
| 2. | Medialisation/Atelectasis | 2 | 2 |
| 3. | Lateralisation | 1 | 1 |
| 4. | Granulations in Ear | 3 | 3 |
| 5. | Ossicular Dislocation | 0 | 0 |
| 6. | Injury to Facial Nerve | 0 | 0 |
| 7. | Epithelial Pearl Formation | 1 | 2 |
| 8. | Injury to Chorda Tympani | 1 | 2 |
| 9. | Injury to Jugular Bulb | 0 | 0 |
| 10. | Blunting | 2 | 2 |
| 11. | Sensorineural Hearing Loss | 0 | 0 |
| 12. | Vertigo | 0 | 1 |
| 13. | Cholesteatoma | 0 | 0 |

***Table 2. Complications***

The most common complication observed in this series of study was granulation in external auditory canal with 6% each in both the groups. Later the residual perforation with 6% in children and 4% in adults. The next complications were medialisation or atelectasis and blunting, 4% each in both the groups. The less occurring complications are injury to chorda tympani and epithelial pearl formation which accounts for 2% in children and 4% in adult groups. Lateralisation is found to be 2% in both groups. Vertigo was complained only in adult as 2%, as a least complication.

The sensorineural hearing loss, injury to facial nerve, injury to jugular bulb, ossicular dislocation and cholesteatoma were not reported in any of the patient.

**DISCUSSION**

In children group the females (56%) have dominated the males (44%) in number with M:F, 1:1. 27. This study is similar to Adva B Friedman et al[4] with M:F ratio is 1:1.28 and Dr. Khalid Mahmud et al[5] with M:F ratio is 1:2 and varies with Meghal Chaudhary et al,[6] M:F ratio it is 1.27:1. In this adult group study male female ratio is 1:1.08 with female preponderance. In Meghal Chaudhary,[6] in adults, M:F ratio is 1:2.27 with female preponderance

This show the female children are also taken care & given importance equally with male children by parents now a days. And those who are neglected previously are also added for this female preponderance. The same female preponderance was observed in adults with male female ratio of 1:1.08 which shows females are coming forward for Tympanoplasty for CSOM as they also seek for more education and employment.

The residual perforation in children is 6% and in adult it is 4% with a minimum difference of 2% only. Dr**.** Khaled Mahmud et al[5] study in children shows 6.6% residual perforation. William O Collins Et al,[7] showed recurrent perforation in 16% which varies from ours. Umapathy et al[8] shows 2.2% incidence of residual perforation. In Meghal Chaudhary et al,[6] in children group graft failure with residual perforation was 9% and in adults it was 11%.

The incidence of post-operative granulations in external auditory canal is 6% in children & 6% in adults which are equal. In Umapathy et al[8] shows in children the granulations in external auditory canal as 3.2%. William O Collins et al[7] in children group incidence of post-operative granulations was 4%.

Atelectasis after tympanoplasty is equally seen in both children & adults i.e. 4%. Study by Willian O Collins[7] and Jeffrey T Vrabec et al[9] showed the incidence of atelectasis in children group as 5% and 6.7% respectively.

The occurrence of lateralization after tympanoplasty type I is also same percentage i.e. 2% in both children and adult groups. The blunting which was resulted due to placement of graft anteriorly after lifting anterior fibrous annulus in cases of total perforation was found to be 4% equally seen in both adults and children.

Epithelial pearl due to residual Squamous epithelium trapped in between layers of tympanic membrane was seen in children as 2% and adult as 4%. This can be considered to be almost equal in both these groups. Study by Jaos Carlos et al[10] shows incidence of epithelial pearl as 2.9% which was similar to our study in children.

The taste changes over the tongue due to chorda tympani injury was reported to be 2% in children and 4% in adult. This also can be considered almost similar in both groups. In children this alteration in taste sensation is less appreciated and that should be noted here. In Dr Jaos Carlos et al,[10] in children group injury to chorda tympani was 5.7% and T Shankar et al[11] it was 3%.

Post-operative granulations due to otitis externa, inappropriate reposition of graft and due to foreign body reaction like cotton and gauze fibres and bone dust appeared in children as 6% and also equally in adults as 6%. A transient vertigo was complained in 2% of adults which may be due to irritation and sensitivity of Betadine and different fluids and noise and vibrations due to drilling. In children, postoperative vertigo was 0%, because neither they complained specifically, nor the attendants understood it.

The complications like sensorineural hearing loss, ossicular dislocation, injury to facial nerve and jugular bulb and iatrogenic cholesteatoma were not seen in both these groups.

The complications are almost equal in children and adults[12,13] in this study. Hence the children particularly in the age between 6 and 12 years studying in primary school and early secondary school, can be considered for type I tympanoplasty

## CONCLUSION

The children having age group of 6-12 years should have normal functioning ears with good hearing for better academic excellence and acquiring knowledge. Hence those who are having CSOM with discharge and deafness must be operated to close the perforation and make middle ear and mastoid healthy to improve hearing.

In olden days surgeons used to ask the children with CSOM to come after attaining the age of 12-15 years for tympanoplasty surgery, in view of complications more in children. The study shows here that the complications occurring in children & adults are almost nearer to equal. Hence, we can proceed for regular tympanoplasty in children without waiting till adolescence.

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