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# Surgical Outcome of Composite Cartilage Perichondrial Autogaft (CCPA) in Tympano Mastoid Surgeries

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**Abstract**
**Background:** *The Composite Cartilage Perichondrial Autograft (CCPA) tymponoplasty has been used in an effort to reduce recurrence or progression of middle ear disease. To this purpose we evaluated the surgical outcome of Composite Cartilage Perichondrial Autogaft (CCPA) is tympano mastoid surgeries.*
**Methods:** *This prospective case control study was conducted in the department of otorhinolaryngology, Sri Venkateswara Medical College, Tirupathi, Andhra Pradesh over a period of 2 years from August 2011 – August 2013 in patients whom were diagnosed as having recurrent CSOM with or without discharge with H/o tympanoplasty. CSOM with acute exacerbations, cases with known Eustachian tube dysfunction, cases with symptomatic DNS, Sinusitis and Cases with SND / Mixed hearing loss requiring improvements were excluded from the study. Composite Cartilage Perichondrial Autograft (CCPA) tymponoplasty done for all the cases and followed up at 1, 3, 6 and 12 months intervals. Data entered into excel spread sheet 2007.Statistical analysis was done using excel. Data was presented as Mean and SD, actual numbers and percentages.*
**Results:** *In this study, the majority of the patients who underwent surgery were in the 3rd and 4th decades of life (85%). In almost all the cases, H/o discharge from ear was since childhood and the duration ranged from minimum period of 6 months to maximum period of 20 years. 70% of cases presented with ear discharge associated with hearing loss. 2 cases of adhesive otitis media presented with only hearing loss. 90% of the cases are of recurrent CSOM and 10% of the cases are of adhesive otitis media. Among 20 cases, 18 of them had central perforation. 3 cases among the 18 had associated retraction pockets postero-superiorly. The 2 cases of adhesive otitis media had grossly retracted TM. In 95% of cases in our study, the graft has taken up. In only 1 case, the graft had not taken up.*
**Conclusion:** *CCPA tymponoplasty is an effective method to close recurrent central perforations of TM and has a high degree of graft take with satisfactory hearing results, particularly in the atelectatic ear, cartilage allowed us to reconstruct the tympanic membrane with good anatomic results compared to traditional reconstructions.*
**Keywords:** *Composite Cartilage Perichondrial Autograft (CCPA), Tymponoplasty, Chronic Suppurative Otitis Media (CSOM), Ear discharge.*

## INTRODUCTION

A dry and intact hearing apparatus is an essential prerequisite for normal hearing. In clinical practice, ENT surgeons encounter a great deal of patients suffering from chronic suppurative otitis media (CSOM) leading to tympanic membrane perforations, retractions, atelectasis and cholesteatoma.[1] Membranous grafts like temporalis fascia and perichondrium meet these criteria and result in closure of tympanic membrane perforation in 95% of ears with normal ventilation.[2-3] However situations such as recurrent perforation or total perforation, and chronic mucosal dysfunction tympanic membrane, fascia and perichondrium may undergo atrophy and result in graft re-perforation.[4-5] The Composite Cartilage Perichondrial Autograft (CCPA) tymponoplasty has been used in an effort to reduce recurrence or progression of middle ear disease. CCPA procedure is a versatile adjunct to tympanoplasty has an excellent 'take' rate and provides firm support to the canal and tympanic membrane preventing retraction at the grafted site. The Cartilage perichondrium would theoretically work well is being tougher and easily neo-vascularised. The incorporated cartilage would give it the necessary stiffness and mechanical stability to avoid retraction. Also, it has a low metabolic rate and good acceptance in the middle ear.[6-7] To this purpose we evaluated the clinical and surgical outcome of Composite Cartilage Perichondrial Autogaft (CCPA) is tympano mastoid surgeries.

## METHODS

This prospective case control study was conducted in the department of otorhinolaryngology, Sri Venkateswara Medical College, Tirupathi, Andhra Pradesh over a period of 2 years from August 2011 – August 2013. Institutional Ethical committee approved the study protocol and consent was obtained from the patient before starting the study protocol. Patients attending ENT outpatient department of S.V.R.R. Hospital diagnosed as having recurrent CSOM with or without discharge with H/o tympanoplasty. All the cases of recurrent CSOM with central perforation (with H/o tympanoplasty with presumably normal E. tube function), cases with glossly retracted tympanic membrane, adhesive otitis media and patients willing to undergo surgery to obtain dry ear were included in the study. CSOM with acute exacerbations, cases with known Eustachian tube dysfunction, cases with symptomatic DNS, Sinusitis and Cases with SND / Mixed hearing loss requiring improvements were excluded from the study. A through history, clinical examination and investigations were carried out. All surgical procedures were carried out under local anaesthesia. We used SEILER'S surgical microscope with STORZ camera attachment and HOPKIN'S ENDOSCOPES (STORZ) for documentation. Electric microdrill (MARATHON) and microsurgical instruments were used during surgeries.

Preparation of graft (cartilage island with surrounding perichondrium)-In case of tragal cartilage, perichondrium is elevated on one side completely and a few mm of cartilage is excised all around so that a central island of tragal cartilage with its perichondrium all around. In case of conchal cartilage, as perichondrium could not be elevated completely on one side keeping attachment with cartilage, perichondrium is elevated partially all around on both sides and peripheral rim of cartilage removed so that central island of conchal cartilage with its surrounding perichondrium all around is prepared.

Positioning of graft (underlay technique) - The harvested composite cartilage perichondrium autograft is placed in the tympanic cavity such that the bare cartilage is facing middle ear and perichondrium outside (in case of tragal cartilage) and cartilage is adjusted in the posterosuperior aspect of tympanic membrane. Free perichondrium in the anterior part tucked below the anterior remnant TM, posterioinferiorly the perichondrium is spread on the bare bone over which tympanomeatal flap is replaced.

Supporting the graft -Graft is supported medially by placing gel foam impregnated with Tamingen – S ear drops in middle ear and laterally by keeping gel foam with Neosporin-H ointment and gel foam

with Tamigen-S ear drops. Posterior meatal flap replaced over graft and meatus packed with gel foam and cotton swab with Neosporin-H ointment kept as auralpack. All the cases were followed up at 1, 3, 6 and 12 months intervals.

**STATISTICAL ANALYSIS**

Data entered into excel spread sheet 2007.Statistical analysis was done using excel. Data was presented as mean and SD, actual numbers and percentages

**RESULTS**

In this study, the majority of the patients who underwent surgery were in the 3rd and 4th decades of life (85%). In almost all the cases, H/o discharge from ear was since childhood and the duration ranged from minimum period of 6 months to maximum period of 20 years. 70% of cases presented with ear discharge associated with hearing loss. 2 cases of adhesive otitis media presented with only hearing loss. 90% of the cases are of recurrent CSOM and 10% of the cases are of adhesive otitis media. Among 20 cases, 18 of them had central perforation. 3 cases among the 18 had associated retraction pockets postero-superiorly. The 2 cases of adhesive otitis media had grossly retracted TM. In 95% of cases in our study, the graft has taken up. In only 1 case, the graft had not taken up. (Table-1)

**DISCUSSION**

In the present study, 18 cases of recurrent CSOM and 2 cases of adhesive otitis media are treated by Composite Cartilage Perichondrial Autograft (CCPA) tympanoplasty, successful graft uptake was achieved in the overall success rate of achieving dry ears and improvement of hearing was 95% in our study. These results are comparable to the study by Sapci T et al [8] in which 92% and Chouhan et al [1] 90% successful closure of tympanic membrane was achieved using tragal cartilage graft. Cartilage is a reliable graft for tympanic membrane reconstruction as it is nourished by diffusion and becomes well incorporated in the tympanic membrane. [2]

Our results of tympanic membrane closure achieved by cartilage graft are comparable to those achieved by different workers for temporalis fascia graft-Dabholkar JP et al (9) (84% graft uptake), Ozbek C et al. [10] (70.2%), Sirena E et al. [11] (80%), Yetiser S et al.[12] (95%).

**CONCLUSION**

CCPA tymponoplasty is an effective method to close recurrent central perforations of TM and has a high degree of graft take with satisfactory hearing results, particularly in the atelectatic ear, cartilage allowed us to reconstruct the tympanic membrane with good anatomic results compared to traditional reconstructions.

**CONFLICT OF INTEREST**: NONE

| **Table-1.** Clinical features and surgical outcome of composite cartilage perichondrial autograft (ccpa) is tympano mastoid surgeries | | |
|---|---|---|
| Clinical characteristics | No. of Cases | Percentage (%) |
| Age (in yrs.) | | |
| 11-20 | 2 | 10 |
| 21-30 | 9 | 45 |
| 31-40 | 8 | 40 |
| 41-50 | 1 | 5 |
| Gender | | |
| Males | 12 | 60 |
| Female | 8 | 40 |
| Complaints | | |
| Ear discharge | 4 | 20 |
| Hard of hearing | 2 | 10 |
| Both | 14 | 70 |
| Diagnosis | | |
| Recurrent CSOM | 18 | 90 |
| Adhesive otitis media | 2 | 10 |
| Otoscopic findings | | |
| Central Perforation | 18 | 90 |
| Retracted TM (with intact TM) | 2 | 10 |
| Previous History of surgery | | |
| Tympanoplasty | 17 | 85 |
| Tympanoplasty + Cortical Mastoidectomy | 1 | 5 |
| Grommet insertion | 2 | 10 |
| Graft | | |
| Conchal cartilage with perichondrium | 18 | 90 |
| Tragal cartilage with perichondrium | 2 | 10 |
| Type of tympanoplasty | | |
| I | 18 | 90 |
| II | 1 | 5 |
| III | 1 | 5 |
| Surgical outcomes | | |
| Graft taken up | 19 | 95 |
| Graft not taken up | 1 | 5 |

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