

## Tragal Cartilage With Perichondrium Tympanoplasty

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### I. Materials and Methods

A prospective case control study of Tragal Cartilage with Perichondrium Autograft (TCPA) by Transcanal Endoscopic approach in cases of CSOM with dry CP , Recc CSOM cases and cases with grossly retracted ear drum was conducted in the department of otorhinolaryngology, RIMS Medical College, Ongole over a period of 3 yrs from May 2014 – May 2017.

### II. Aims Of The Study

- ▶ To study the outcome of Tragal Cartilage with Perichondrium Autograft (TCPA) in Endoscopic Tympanoplasty by transcanal approach .
- ▶ To study the 'Graft take up' rates in cases of
  - CSOM with dry CP,
  - Recurrent CSOM,
  - Retracted TM -Adhesive otitis media.

To assess the hearing improvement following Endoscopic Tragal Cartilage with Perichondrium tympanoplasty

### Source of Data

Patients **attending ENT out patient (OPD) department of RIMS Medical College, Ongole** diagnosed as CSOM with dry CP , Recc CSOM cases and cases with grossly retracted ear drum.

### Sample Size

- ▶ The study included 108 cases, in which
  - 88 cases are of CSOM with Central Perforation
  - 16 cases are of recurrent CSOM with central perforation and
  - 4 cases of adhesive otitis media, and all of them underwent Tragal Cartilage with Perichondrium Autograft (TCPA) tympanoplasty by Transcanal Endoscopic approach .

### Inclusion Criteria

- ▶ Patients who are interested to go for scarless technique of tympanoplasty by endoscopic approach , for cases with dry central perforation.
- ▶ Cases of recurrent CSOM with central perforation (with H/o tympanoplasty with presumably normal E. tube function).
- ▶ Cases with grossly retracted TM, adhesive otitis media.
- ▶ Patients willing to undergo surgery to obtain dry ear (but not assured of hearing improvement to that of normal).
- ▶ Cases with Normal ABC (Adequate cochlear reserve) with out sensory neural element of deafness.

### Exclusion criteria

- ▶ Cases of CSOM with acute exacerbations, cases with symptomatic DNS, Sinusitis and Tonsillitis are not included in the study.
- ▶ Cases which need mastoid exploration and those cases with atticofacial disease are not included in the study.
- ▶ Cases with SND / Mixed hearing loss requiring ossiculoplasty are not included in the study.

### III. Methodology

- ▶ A through history, clinical examination and investigations were carried out.
- ▶ All patients were admitted 3 days before surgery .

- ▶ The patients who presented with active ear discharge, URTI were treated for a minimum period of 2 weeks and cases have been admitted after atleast 1 month of dry ear.
- ▶ We used STORZ camera and Striker Camera and HOPKIN'S 0 degree ENDOSCOPES (STORZ) for documentation.
- ▶ Microear surgical instruments and few instruments specially designed for endoscopic ear surgery like circular knife and flag knife with suction attachment were used during surgeries.
- ▶ All surgical procedures were carried out under local anaesthesia.

#### **IV. Method Of Operative Management**

##### **Pre-Operative Instructions**

- ▶ Consent is taken for the surgery(If endoscopic is not feasible, we will convert into microscopic surgery which may need mastoidectomy also and will be excluded from the study).
- ▶ Xylocaine sensitivity test is done.
- ▶ Prophylactic antibiotics prior to surgery (Inj. Ceftriaxone 1gm iv ).
- ▶ Hair is removed 2.5 cm above and behind the auricle and rest of the hair is kept away from the operating field by means of adhesive plaster or hairpins or clips.(Not for all cases-for selected cases and in cases which may need mastoid surgery and those which may probably need a bigger graft)
- ▶ NBM after 6 AM on the day of operation.
- ▶ Head bath on the previous day of operation.

##### **Pre-medication**

- ▶ Inj. Fortwin 1CC (Pentazocine 30 mg) with Inj. Phenergan 1CC (Promethazine 25 mg) is given IM 30 min. before surgery.
- ▶ 4% xylocaine with Adrenaline will be instilled into EAC 20 min. before surgery.

#### **V. Observation And Results**

- ▶ The present study involved 108 cases among which
  - 88 cases are of CSOM with dry central perforation
  - 16 cases are of recurrent chronic suppurative otitis media with central perforation and
  - 4 cases of adhesive otitis media with retracted tympanic membrane.

#### **VI. Disease Presentation**

##### **Duration**

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.

#### **VII. Operative Procedure**

a) Graft utilized for tympanic membrane reconstruction

In all of our cases, we have employed Tragal cartilage with perichondrium as the graft material.

b) All the procedures were done under local anesthesia by Transcanal Endoscopic approach and graft was placed by underlay technique.

c) Type of tympanoplasty

All the cases underwent type I tympanoplasty, in which case, all the ossicles were intact and ossicular movements were normal.

- In all the cases Trans canal Endoscopic approach and graft of Tragal cartilage with perichondrium is employed and placed by underlay technique.
- 88 cases of CSOM with CP and 16 cases of recurrent CSOM with central perforation with H/o tympanoplasty were treated by this technique with a success rate of 97.1%.
- 4 cases of adhesive otitis media with grossly retracted TM with H/o Grommet insertion were treated by this technique with a success rate of 100%.
- Over all success rate of this technique in our study was 97.2%.
- Pre operatively, mean air conduction was 45.15 dB and mean A-B gap was 29.63 dB.
- Post operatively, mean air conduction was 29.9 dB and mean A-B gap was 18.45 dB.
- There was a mean improvement of Air conduction from pre-op to post op by 15.5 dB.
- There was an improvement of mean AB gap by 11.45 dB from pre op to post op.
- The over all success rate of achieving dry ears and improvement of hearing was 97.2% in our study

### **VIII. Conclusion**

- ▶ Transcanal Endoscopic Tragal Cartilage tympanoplasty is
  - minimally invasive procedure
  - for the repair of perforated or retracted ear drum
  - a day care procedure
  - minimal dressing
  - least post op complications
  - very good graft take up rates and hearing results.
- ▶ Graft can be obtained from tragus region with little or no cosmetic defect
- ▶ Tailoring of graft to exact size is a bit time taking and the inherent stiffness of cartilage allows precise manipulation & positioning.
- ▶ Blunting or lateralization of graft has not occurred in our series.
- ▶ Cartilage tympanoplasty achieves good anatomical and audiologic results when pathology and status of the ossicular chain dictate the technique utilized.

### **IX. Follow Up Period**

- ▶ All the cases were followed up at 1 month, 3 months, 6 months and 1 year intervals. The graft 'take up' and A-B gap in the post operative period is documented and analysed after 3 months of surgery for uniformity and comparison.

### **X. Discussion**

#### **Tragal Cartilage-Endoscopic Tympanoplasty introduction**

Use of Cartilage in Middle ear surgeries

- ▶ Not a new concept
- ▶ Used to manage retraction pockets from many years
- ▶ Recently been used in reconstruction of TM Recc. perforations, atelectesis and cholesteatoma pockets

#### **Cartilage graft benefits**

##### **Advantages:**

- ▶ Naturally thicker and stiffer than fascia ,easy to introduce in place and has less shrinkage and displacement.
- ▶ Nourished largely by diffusion and become well incorporated in TM.
- ▶ Retains rigid quality and resists resorption and retraction even in chr.ET tube dysfunction.

##### **Thick and Rigid cartilage -??Conductive Hearing Loss**

- ▶ Can be reduced using cartilage slicer,taking 0.5mm,1mm or 2mm thickness graft material.
- ▶ Several studies proved that the hearing results with Cartilage to be no different than those for fascia.

##### **Why Tragal Cartilage Is An Ideal Graft?**

- ▶ Availability at the operative site
- ▶ Stiffer consistency and easy to mould
- ▶ Min. shrinkage and lateralisation.
- ▶ Natural angle of perichondrium for annular reconstruction.
- ▶ Being mesenchymal , lacks secreting glands and hair follicles, thus good for inlay graft.
- ▶ Excellent elasticity and tension and has low metabolic rate.
- ▶ Maintains volumetric integrity.
- ▶ Minimum extrusion and absorbtion rate(1.19%)
- ▶ Excellent graft take up rates
- ▶ Very effective material for TM reconstrucion ,ossicular reconstruction and specially indicated in advanced middle ear pathologyatelectic,cholestatoma and retraction pockets.special role in reinforcement of TM in PORP and TORP procedures.

##### **Endoscopes in otology-advantages**

##### **Advantages:**

- ▶ Minimally invasive surgery as Myringoplasty,ossiculoplasty,atticotomy and Stapedectomy procedures.
- ▶ excellent image resolution
- ▶ Portable
- ▶ Documentation is easy
- ▶ Angled scopes useful in visualising Nook and Corners
- ▶ Clinical evaluation is very precise and accurate

##### **Disadvantage**

- ▶ Only one hand is available for doing the procedure as other hand is engaged in holding the endoscope.

##### **Conclusions**

- ▶ Cartilage tympanoplasty achieve good and reliable anatomical and audiological results.

- ▶ Transcanal Endoscopic approach-Minimally invasive procedure.
- ▶ Very useful in atelectatic ear , limited cholesteatoma, recurrent perforations.

**Indications**



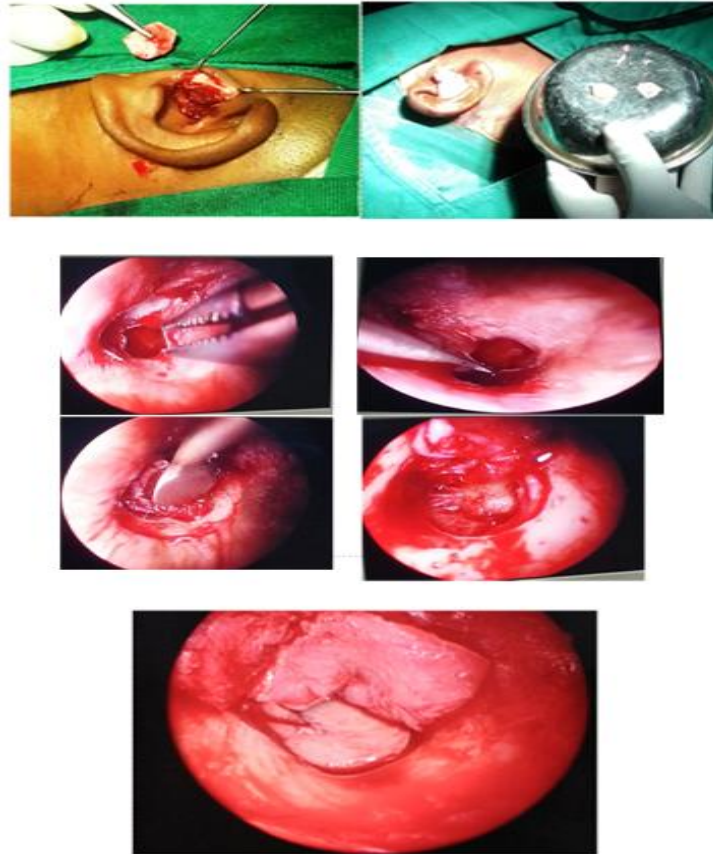
**Harvesting Tragal cartilage graft**

1.5 cm incision is made 2mm medially from tragal crest line , so scar will be hidden.

**Incision**

**Harvesting Tragal Cartilage**





## OBSERVATION AND RESULTS

- ▶ The present study involved **108 cases** among which **88 cases** are of CSOM with dry central perforation , **16 cases** are of recurrent chronic suppurative otitis media with central perforation and **4 cases** of adhesive otitis media with retracted tympanic membrane.

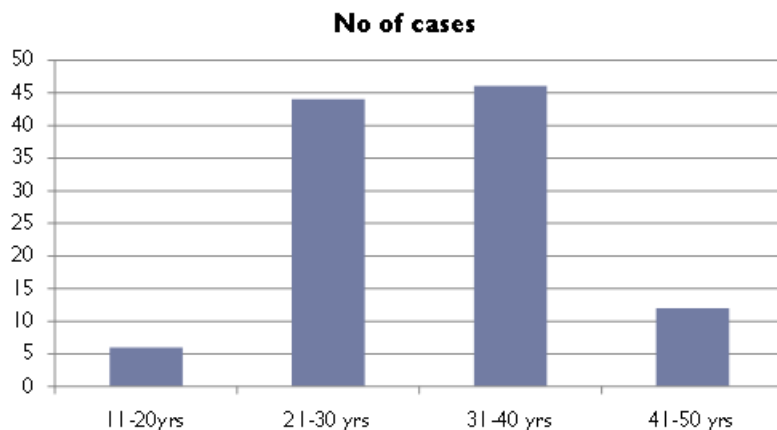
## INCIDENCE

### ▶ Age and Sex distribution of patients

Age (in yrs.)	Age distribution		Sex distribution	
	No. of Cases	Percentage (%)	Males	Females
11-20	6	5.55	2	4
21-30	44	40.74	19	25
31-40	46	42.59	17	29
41-50	12	11.11	5	7

- ▶ In this study, it was found that majority of the patients who underwent surgery were in the 3<sup>rd</sup> and 4<sup>th</sup> decades of life (**83.3%**).

## Age distribution of patients



## PRE-OPERATIVE PURE TONE AUDIOMETRY

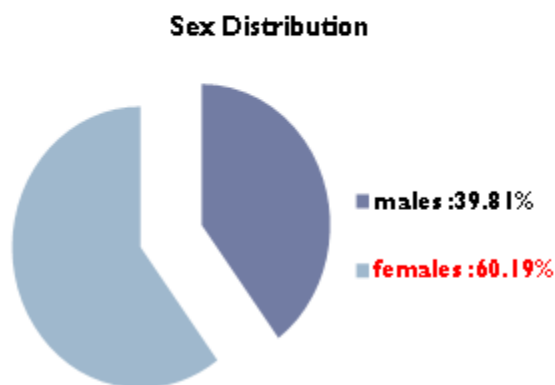
▶ **Average pre-op air conduction in the ear on which surgery was done**

Avg. Pre-op-Air conduction	No. of Cases	Percentage (%)
Upto 20 dB	Nil	-
21-30 dB	3	2.8
31-40 dB	42	38.9
41-50 dB	48	44.4
51-60 dB	11	10.2
61-70 dB	4	3.7

- ▶ Majority of cases (90/108)(83.3%) had average pre-op air conduction of 31-50 dB.
- ▶ Mean pre-operative air conduction was 45.15 dB.

## Sex distribution of patients

- ▶ In our study, 39.81% of cases (43 patients) are males and 60.19% of cases ( 65 patients) are females.



## POST OPERATIVE COMPLICATIONS

- ▶ Three cases (3/108) had recurrence of ear discharge due to graft failure which was noticed 1 month after surgery.

Criterion	No. of Cases	Percentage (%)
Otorrhoea	3	2.8
Wound infection	Nil	
Wound Gaping	Nil	
Keloid formation/Hypertrophy of scar	Nil	
Chorda Tympani Nerve injury resulting in altered taste sensation	1	0.9
Perichondritis	Nil	
Granulations	2	1.9
Ear Block	7	6.5

## RESULTS

### a) Graft 'take up' rates

- ▶ In 97.2% of cases in our study, the graft has taken up. In only 3 cases, the graft had not taken up.

Criterion	No. of Cases	Success Rate
Graft taken up	105	97.2
Graft not taken up	3	2.8

### Post operative hearing improvement

Criterion	Pre-op	Post-op
Mean Air Conduction	45.15 dB	29.63 dB
Mean A.B gap	29.9 dB	18.45 dB

- ▶ There was a **improvement of mean Air conduction** from pre-op to post op by **15.5 dB**.
- ▶ There was an **improvement of mean AB gap** by **11.45 dB** from pre op to post op.

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