INTRODUCTION
Hearing is a sense that enables man to establish contact with his fellows via speech to experience life more fully. Deafness in varying degrees of severity is a big impediment to the integration of a person into the social structure. The otologist in the past had not much to offer to hearing handicapped people with chronic middle ear disease. With recent times the advent of the antibiotic era, the operating microscope and modern anesthetics techniques aimed at producing a dry, magnified operating field, have radically altered the outlook.

The necessary permission and approval from ethics committee were taken up to compare the results of the two connective tissue graft materials, viz temporalis fascia and the tragal perichondrium. The study includes the advantages and disadvantages of these graft materials vis-à-vis to each other.

AIMS AND OBJECTIVES
This is a comparative study of tympanoplasty operation using the temporalis fascia and tragal cartilage as a graft material.

This study is carried out to compare the:
1. Selection of grafting materials depending on type of defects in tympanic membrane.
2. Graft uptake rate of temporalis fascia and tragal cartilage in tympanoplasty.
3. Hearing improvement post operatively by using these materials.

MATERIALS AND METHODS
Present study is a prospective trial which was carried out from Sept 2015 to April 2017 on the patients attending the ENT Outpatient Department of ENT Muzaffarnagar Medical College and Hospital Uttar Pradesh where tympanoplasty is performed using temporalis fascia in 35 patients and tragal perichondrium in 35 patients in the age group of 15-50 years (males and females both).

Taking the above mentioned facts in consideration, this study was taken up to compare the results of the two connective tissue graft materials, viz temporalis fascia and the tragal perichondrium. The study includes the advantages and disadvantages of these graft materials vis-à-vis to each other.

Patients with the complaint of discharging ear and decreased hearing were screened.

Patients, in whom tubotympanic type of chronic suppurative Otitis Media was found, were taken for this study.

The necessary permission and approval from ethics committee was taken.

Informed written consents were obtained from the patients involved in the study according to the protocol approved by the Ethics Committee.

This study comprises of patients who were subjected to tympanoplasty.

Tympanoplasty, Tragal Perichondrium, Temporalis Fascia, hearing

KEYWORDS
Tympanoplasty, Tragal Perichondrium, Temporalis Fascia, hearing
tympanoplasty for the treatment of chronic suppurative otitis media. Each patient was subjected to a detailed examination of nose, paranasal sinuses and throat to rule out any focus of infection, which could influence the result of tympanoplasty.

Method of Collection of Data
All the patients in the study were clinically evaluated by taking detailed history and clinical examination including tuning fork test as per the proforma. Swab of ear discharge was sent for culture of organisms and antibiotic sensitivity. Antibiotics according to the sensitivity were given to dry up the ear discharge. Pure tone audiology was done as per American speech and hearing association (ASHA). For all patients X-ray mastoid were taken (Schuller view) Cases then were diagnosed and surgical plan of management was formulated. The patients routine blood tests and urine tests were done for purpose of anaesthesia and to know the general condition of the patient postoperative pure tone audiometry and ear microscopy was done in every case at the end of 6th month to record the hearing and graft uptake respectively.

RESULTS:
Table-1: Shows Age wise Distribution

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>15</td>
</tr>
<tr>
<td>21-40</td>
<td>18</td>
</tr>
<tr>
<td>&gt;40</td>
<td>02</td>
</tr>
</tbody>
</table>

The above table indicates that maximum number of patients belonged between the age group of 21-40 years.

Table-2: Preoperative Hearing Levels

<table>
<thead>
<tr>
<th>Preoperative Air-Bone Gap</th>
<th>Temporalis Fascia No of Patients</th>
<th>Tragal Perichondrium No of Patients</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>15</td>
<td>17</td>
<td>32</td>
<td>45.7%</td>
</tr>
<tr>
<td>21-40</td>
<td>18</td>
<td>16</td>
<td>34</td>
<td>48.5%</td>
</tr>
<tr>
<td>&gt;40</td>
<td>02</td>
<td>02</td>
<td>04</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

Majority of the patients shows mild to moderate hearing loss. 45.7% of being in 0-20 db air-bone gap range. 48.5% of being in 20-40 db air-bone gap range. Only 5.7% of them had air-bone gap range above 40 db.

Table-3: Postoperative Hearing Levels

<table>
<thead>
<tr>
<th>Postoperative Air-Bone Gap</th>
<th>Temporalis Fascia No of Patients</th>
<th>Tragal Perichondrium No of Patients</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>27</td>
<td>26</td>
<td>53</td>
<td>75.7%</td>
</tr>
<tr>
<td>21-40</td>
<td>07</td>
<td>08</td>
<td>15</td>
<td>21.4%</td>
</tr>
<tr>
<td>&gt;40</td>
<td>01</td>
<td>01</td>
<td>02</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

In the postoperative hearing analysis, 75.7% of the patients showed air-bone gap upto 20dB. 21.4% of the patients showed air-bone gap in the range of 21-40 dB. 77.1% of the patients operated with temporalis fascia showed air bone gap upto 20dB.

74.2% of the patients operated with tragal perichondrium showed air-bone gap upto 20dB.

Table-6: Post Operative Hearing Improvement Level

<table>
<thead>
<tr>
<th>Mean change in hearing levels in dB</th>
<th>Temporalis Fascia</th>
<th>Tragal Perichondrium</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change or worsen</td>
<td>03</td>
<td>03</td>
<td>06</td>
<td>8.5%</td>
</tr>
<tr>
<td>1-15</td>
<td>28</td>
<td>27</td>
<td>55</td>
<td>78.5%</td>
</tr>
<tr>
<td>16-30</td>
<td>04</td>
<td>05</td>
<td>09</td>
<td>12.8%</td>
</tr>
<tr>
<td>&gt;30</td>
<td>00</td>
<td>01</td>
<td>00</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Hearing at 3 months
- 55 of 70 patients showed improvement in hearing between 0 to 15 db (78.5%).
- Out of these patients, 28 were operated using temporalis fascia i.e. 28 out of 35 patients (80%).
- 27 out of 35 using tragal perichondrium showed improvement in hearing i.e. (77.1%).
- There is no statistical significant difference in hearing improvement, using temporalis fascia or perichondrium for tympanoplasty.

Table 6: Post Operative Hearing Improvement Level

<table>
<thead>
<tr>
<th>Hearing at 3 months</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change or worsen</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>1-15</td>
<td>28</td>
<td>27</td>
</tr>
<tr>
<td>16-30</td>
<td>04</td>
<td>05</td>
</tr>
<tr>
<td>&gt;30</td>
<td>00</td>
<td>01</td>
</tr>
</tbody>
</table>

FACTORS AFFECTING GRAFT TAKE RATE

TABLE NO 8: Graft Uptake Rate

<table>
<thead>
<tr>
<th>Type of graft</th>
<th>Graft uptake</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporalis fascia</td>
<td>28/35</td>
<td>80%</td>
</tr>
<tr>
<td>Tragal perichondrium</td>
<td>27/35</td>
<td>77.1%</td>
</tr>
<tr>
<td>Overall</td>
<td>55/70</td>
<td>78.5%</td>
</tr>
</tbody>
</table>

The above table indicates that 28 (80%) out of 35 ears operated using temporalis fascia graft healed completely at the end of 3 months with well taken graft. 77.1% out of 35 ears operated using tragal perichondrium were dry with graft in place at the end of 6 months. No statistical significant association was found in graft uptake with respect to type of graft (P>0.05).

Most of the smaller perforations here were taken for tympanoplasty when they failed to respond to medical treatment of weekly trichloro-acetic acid cautery or when patient cannot come for repeated sittings.

TABLE 10: GRAFT UPTAKE RATE WITH RESPECT TO AGE OF THE PATIENTS (n = 70).

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20</td>
<td>11/14</td>
<td>78.5</td>
</tr>
<tr>
<td>21 – 30</td>
<td>19/22</td>
<td>86.3</td>
</tr>
<tr>
<td>31 – 40</td>
<td>15/21</td>
<td>71.4</td>
</tr>
<tr>
<td>&gt;40</td>
<td>10/13</td>
<td>76.9</td>
</tr>
</tbody>
</table>

From the above table it is seen that maximum graft uptake rate observed in the age group 21-30 years (86.3%).

TABLE 11: GRAFT UPTAKE RATE WITH RESPECT TO SEX (n = 70).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Graft uptake</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>24/32</td>
<td>75</td>
</tr>
<tr>
<td>Female</td>
<td>31/38</td>
<td>81.5</td>
</tr>
</tbody>
</table>
The above table shows that graft uptake rate was 75% (24 out of 32 ears) in males and 81.5% (31 out of 38 ears) in female.

P>0.005 so there is no statistical significant difference seen in graft uptake rate in sex.

DISCUSSION

This is the prospective study of 70 Tympanoplasties on patients between the age of 16 to 50 years, who were admitted in the from January 2015 to August 2016 on the patients attending the ENT Outpatient Department of ENT at Muzaffarnagar Medical College and Hospital Uttar Pradesh between Sept 2015 to April 2017. This entire study group of patients suffered from Chronic Suppurative Otitis Media. Patients in this study were from all socioeconomic groups, including patients referred from other practitioners also. Conservative measures were first tried in all cases, particularly for small to moderately sized perforations. These included systemic antibiotics, trichloro-acetic acid cautery, repeated aural toilet in ears with active infections. Cases with bilateral ear diseases with suspected central septic focus were operated with tonsillectomy, adenoidectomy, septoplasty, etc. as needed. 35 patients were subjected to tympanoplasty with temporalis fascia remaining 35 with tragal perichondrum. Follow up of postoperative cases was for 6months.

Technical Aspects

Tympanoplasty is technically more difficult in patients having a narrow canal, undergoing revision surgery, by transcanal approach and in anterior perforations. Post-auricular approach is commonly used in our institution. The contour of tragus was found to be satisfactory in postoperative period without any cosmetic deformity.

GRAFT TAKE RATE

The graft take rate after 6 months was 78.5%. Similar reports was given by Palva T et al (1995) with graft take rate was 97%.

In our study, graft uptake rate for temporalis fascia was 80% as compared to tragal perichondrium (77.1%). Graft take-rate was slightly better for temporalis fascia than for tragal perichondrum (not significant p>>0.005).

These result compare well with Jyoti P Dabholkar (2007) whose postoperative graft uptake rate with temporalis fascia 84% and tragal perichondrium showed 80%.

Tragal perichondrium was used in revision tympanoplasty where temporalis fascia was initially used. There was good graft-take in these cases. These reports compare well with Jain CM (1968) who reports 83.33% success rate with temporalis fascia, Ahad SA (1986), with 83.30% success with homologous temporalis fascia. Blanshard JD (1990) 78% take-rate with temporalis fascia in pediatric tympanoplasty.

Most of graft failures seen in the follow-up period were due to infection probably transmitted either along Eustachian tube or along external auditory canal.

HEARING RESULT

78.5% of cases showed improvement in hearing, while 8.5% of them showed either deterioration or no improvement, at 6 month follow-up period. About 80% cases operated with temporalis fascia showed hearing improvement, while 77.1% of cases who were operated using tragal perichondrium showed improvement in hearing (statistically not significant p>0.05) as shown in the Table-6.

Mean improvement in hearing using temporalis fascia was 12.8 db and that with tragal perichondrium it is 11.4 db (statistically not significant p>0.05). These result compare well with Strauss et al (1975) who found that improvement in air bone gap was 15 db. These result also compare well with Ophir D (1987) and Terry RM (1988), result with fat myringoplasty.

Hartwein (1992) claims reduction of air bone gap of around 15 db with tragal perichondrium graft.

This study compare well with Sunita Chhapola,Inita Matta (2011) whose postoperative hearing achieved after 6 months of surgery, with temporalis fascia graft showed air bone gap of less than 10dB in 82% of patients and more than 10dB in 18% patients. Air bone gap closure with tragal perichondrium was less than 10 dB in 78% patients more than 10dB in 22% of patients.

The patient population attending our hospital was also from low socioeconomic status, many had poor personal hygiene and poor nutritional status. These were probably some of the factors which contribute to higher rate of graft rejection.

FACTORS AFFECTING GRAFT TAKE-RATE

In our study take-rate was not influenced by age, sex, size or site of perforation.

Similar opinion is expressed by Blanshard JD (1990) who opines that age at operation, size of perforation and prior adenoïdectomy had no significant influence on the success rate or audiological outcomes.

Factor such as duration of illness, age and sex of patients used, did not significantly affect graft take rate in our study. Vartiainen E (1993) also states that the preoperative factor like dryness or discharging ear, site of perforation of technique (onlay/underlay) do not affect the take rate.

Berger G, et al (1997), stated that results of myringoplasty were independent of patient’s age, location and size of perforation and the seniority were not decisive factors in the result of myringoplasty.

SUMMARY

- 70 tympanoplasties were performed on indoor basis.
- Age range from 16-50 years.
- 32 (46%) males and 38 (54%) females.
- Mean duration of illness was 15.78 months.
- Majority of the patients preoperatively showed mild to moderate hearing loss. 45.7% patients showed to 20 dB air bone gap range, 48.5% patients showed 21-40dB air-bone gap and 5.7%.
- Surgeries were performed by post-aural or end-aural approach.
- In all surgeries grafts were placed as underlay technique.
- 35(50%) patients were operated using temporalis fascia and 35(50%) patients using tragal perichordium.
- Graft take rate was overall 78.5%.
- Take-rate was 80% with temporalis fascia and 77.1% with tragal perichondrium.
- In postoperative hearing analysis, 78.5% patients showed air-bone gap around 20db.
- Overall mean improvement in hearing was 12.1db.
- Mean improvement in hearing for temporalis fascia was 12.8 db and for tragal perichordium was 11.4 db.
- Take rate of graft was not influenced by the age ,sex, size or site of perforation.
- Improvement in hearing was also not significantly influenced by the type of graft used.

CONCLUSIONS

- Tympanoplasty is the most effective method for control of the tubotympanic type of CSOM disease and hearing improvement.
- Both temporalis fascia and tragal perichondrium are excellent graft materials for closure of perforation of tympanic membrane and hearing improvement.
- Graft uptake rate is good for both with slightly better take rates for temporalis fascia, than tragal perichondrium.
- Hearing improvement does not depend on type of graft (No statistically significant difference – p>0.5).
- In our study, uptake rate of graft was neither influenced by the site or size of the perforation.
- Improvement in hearing is not significantly influenced by duration of disease, age or sex of patients.

REFERENCES

[6] Wright WK. Repair of chronic central perforation membrane: by repeated aural cautery and repeated aural toilet in ears with active infections. Cases with bilateral ear diseases with suspected central septic focus were operated with tonsillectomy, adenoidectomy, septoplasty, etc. as needed. 35 patients were subjected to tympanoplasty with temporalis fascia remaining 35 with tragal perichondrum. Follow up of postoperative cases was for 6months.


