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Original Research Article

EVALUATION OF DIFFERENT TYPES OF OSSICULAR PATHOLOGIES AND THEIR TREATMENT WITH CARTILAGE TYMPANOPLASTY IN CSOM PATIENTS

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Abstract

Background: Chronic otitis media, active mucosal type, is a long-term infection of the middle ear cleft's mucoperiosteal lining, characterized by long-lasting perforation and ear discharge. Tympanoplasty is a surgical procedure that removes disease from the middle ear, with or without ossicular reconstruction. The study aimed to examine the various types of ossicular pathology in CSOM cases and their treatment with various cartilage tympanoplasty techniques. **Materials and Methods:** Fifty CSOM patients of both sexes were studied, either atticoantral (risky) or tubotympanic (safe). Routine examinations were performed on all patients before surgery. Various surgical techniques are available depending on the shape of the cartilage graft, and we used the cartilage shield technique. Furthermore, we have performed post-op follow-ups for up to 3 months. **Result:** Patients with CSOM ranged from 10 to 60 years old (mean: 28.83), and most patients were between 10 and 25 (52%). There were 24 males and 26 females who participated. Most CSOMs (56%) had problems with their left ear, while 16% had problems with both ears, and 28% had problems with their right ear. The postoperative air-born gap was 11-15db in 56% of patients, < 5db in 12%, 6-10db in 30%, and >16 in 18% of patients. 48 of the 50 cases had successful graft uptake, statistically significant, while 2% had an unsuccessful result. **Conclusion:** A larger study, possibly with healthy controls and long-term follow-up of CSOM cases, will be useful in determining the prognostic significance of our findings and those discussed in the literature.

INTRODUCTION

Chronic suppurative otitis (CSO) is a chronic inflammatory response in the middle ear cleft, accompanied by discharge and tympanic membrane perforation. This is a common pathological condition treated by otologists in their regular practice.[1] This CSO is one of the leading causes of disabling hearing impairment (DHI) in developing countries populations. It has been observed that CSOM has the greatest impact on children, particularly during their early childhood.[2] Acquired hearing loss is the most common cause of CSOM in children. Because of overpopulation and low economic status, developing countries have a higher prevalence of CSOM, according to the WHO report. The incidence rates of CSOM differ significantly between developing and developed countries.[3] Traditional CSOM is divided into atticoantral (risky) and tubotympanic (safe). The atticoantral type is distinguished by its foul-smelling discharge, marginal perforation, and involvement of cholesteatoma, tissue granulation, and other issues. In the tubotympanic type, significant discharge from the ear and tympanic membrane perforation occur.[4] A common surgical procedure is tympanomastoid surgery, a one-stage mastoidectomy with tympanoplasty. Since the early 1980s, it has been in a constant state of evolution. The original technique was gradually shaped and improved as newer methods of ear surgery emerged.[5] In a recent study, it has been shown that in various tympanoplasty reconstructions, the tragal perichondrium and

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cartilage graft composite can be a good option.[6] Improvement in the hearing of approximately 15 dB of bone conduction is now considered a standard criterion for assessing surgical success.

According to research, pathology and the state of the ossicular chain are used to produce good anatomical and audiologic results in cartilage tympanoplasty. This study was thus carried out to investigate the various pathological changes in CSOM Indian patients and their management by applying cartilage tympanoplasty. This allows us to understand better the vascular changes associated with CSOM disease.

MATERIALS AND METHODS

A prospective randomized descriptive study of 50 patients with COSM was conducted at those who attended the Outpatient Department of ENT and Head and Neck Surgery, Tirunelveli Medical College Tirunelveli, from Nov 2017 to July 2019. This study was approved by the institutional ethical committee and carried out following the Helsinki Treaty, and informed written consent was taken from the patients.

Inclusion Criteria

The inclusion criteria encompassed patients with atticoantral or tubotympanic type chronic suppurative otitis media (CSOM), without sensorineural hearing loss or complications.

Exclusion Criteria

Cases with sensorineural hearing loss and complications of chronic suppurative media, such as facial palsy, labyrinthitis, and intracranial or extracranial complications, were excluded.

All patients underwent routine clinical examination of the ear using Bull's eye lamp, oto-endoscopy, Tuning fork tests, and PTA. Average air conduction hearing loss was obtained. Initially, routine tests such as blood tests, X-rays and ECG were examined for all participants. We have used the cartilage shield surgery technique to eradicate the disease.

Surgical Technique

The surgery was performed under either local or general anaesthesia. The post-aural approach is the most commonly used. We mixed 2% Lignocaine with 1: 100,000 epinephrine for local infiltration. After incisions at 6 and 12 o'clock, the Korners flap was lifted. Following that, a William Wilde incision was made postauricular. Conchal cartilage was obtained from both sides of an intact perichondrium. Cartilage with attached perichondrium was dissected with scissors to obtain the superficial perichondrium on both sides. Furthermore, cartilage was sliced to a 15mm length and a 10mm width. Two techniques depend on the pathological condition, either limited to the posterior segment or spread towards the entire middle ear. Graft placement was done by underlay technique and medial to the manubrium in both groups. The entire graft is underlaying, with the cartilage toward the promontory and the perichondrium adjacent to the tympanic.7

Postoperative follow-up: The patients were given IV antibiotics for 5-6 days before sutural removal on the seventh day. Following that, weekly visits were made for one month, followed by three months of PTA.

Statistical Analysis

All the data were entered into MS Excel, and demographic data were expressed as frequency and percentage.

RESULTS

Patients with CSOM ranged from 10 to 60 years old (mean: 28.83), and most patients were between 10 and 25 (52%). 26% of patients are between the ages of 26 and 40, and 22% are between the ages of 41 and 60, with 24 men and 26 women participating. Most CSOMs (56%) had problems with their left ear, while 16% had problems with both ears, and 28% had problems with their right ear [Table 1].

The postoperative air-born gap was 11-15 dB in 56% of patients, < 5 dB in 12%, 6-10 dB in 30%, and > 16 in 18% of patients. Six months after the operation, an intact mobile tympanic membrane with an AB gap less than or equal to 15 dB is a successful outcome. As per our results, we had more than 50% successful outcomes.

Among 50 patients, 11 of who had recurrent CSOM, and 39 of whom had first-time CSOM. It was discovered that the patients with recurrent CSOM had a 100% graft uptake status [Table 2].

48 of the 50 cases had successful graft uptake, statistically significant, while 2% had an unsuccessful result. The middle ear ossicles, particularly the incus, are frequently involved in the disease process. We looked at ossicular pathology and discovered that incus (76%) was the most common type, followed by other ossicular pathologies such as 36% malleus, 16% malleus and incus, 14% tapes, and 8% of all ossicles [Table 3].

Table 1: Distribution of CSMO according to age, gender and sides of the ear

		Number of cases (n)	Percentage (%)
Age	10-25 years	26	52
	26-40 years	13	26
	41-60 years	11	22
Gender	Male	24	48
	Female	26	52
Sides of Ear	Right	14	28
	Left	28	56
	Bilateral	8	16

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Table 2: Postoperative pain in AB gap and graft status

dB	Number of cases (n)	Percentage (%)
<5	6	12
6-10	15	30
11-15	20	40
>16	9	18
Graft Status		
Intact	48	96
Non-Intact	2	4

Table 3: Distribution of different types of ossicular pathology in CSOM patients

Types of Ossicular Pathology	Percentage
Incus	76
Malleus	36
Malleus and Incus	16
Stapes	14
All ossicle	8

DISCUSSION

Chronic suppurative otitis media is frequently associated with low socioeconomic status or poverty-related conditions such as inadequate healthcare, an unsanitary environment, malnutrition, and upper respiratory tract infection.8 According to our findings, the lower age group (10-25 years) is the most affected by CSOM, accounting for 56% of all cases, consistent with previous research. There were 24 (48%) males and 26 (52%) females. Adopting medical needs in many developing countries is difficult due to limited available resources. In a study by KC Poonam et al., 91.1% of hearing cartilage graft uptake was 91.1%.8 Similarly, our study showed that 48% of the 50 cases had successful graft uptake, which was 94%.[9] Furthermore, a study by Vadiya et al. discovered that the modified cartilage tympanoplasty method for graft uptake was far better than temporalis fascia.[10] John Dornhoffer examined the anatomical and audiologic outcomes of over 1,000 cartilage tympanoplasties. Each pathological group involved in the study improved their hearing significantly. In 103 cases to improve hearing (auditory), the average pre-and postoperative PTA-ABGs were 33.6 +/- 9.6 dB and 14.6 +/- 10.1 dB, respectively (P.05).

Our study was consistent with the findings of Dornhoffer and showed that the postoperative air-born gap was 11–15 dB in 56% of patients.[11] According to C. Jefforey's Cochrane review of 199 articles, cartilage palisade tympanoplasty provides a high rate of successful graft and excellent postoperative improved hearing for perforations of various shapes and sizes in all types of cases.[12] We also experienced the same thing in our study. The middle ear aims to transport external ear sounds to the inner ear, attained by the tympanic membrane and the ossicular chain, which comprises the malleus, incus, and stapes. Ossicular pathology is defined as the necrosis of ossicular bones and tympanosclerosis of the joints of the ossicular bone.

We have observed significant ossicular pathology with the involvement of incus-type pathology in our study, which is consistent with the 2015 finding of Haidar et al., who observed incus erosion in 22% of their study cases.[13] No simple protocol for treating ossicular pathology in chronic otitis media exists. It necessitates careful pre-operative evaluation and advanced planning of the type of tympanoplasty to be performed, which will determine the outcome of surgery.

The small number of patients in each psoriasis group limited our study. A larger study, possibly with healthy controls and long-term follow-up of CSOM cases, will reveal the prognostic significance of our research results and those discussed in the literature.

CONCLUSION

There is no simple protocol for treating ossicular pathology in chronic otitis media. It necessitates careful pre-operative evaluation and planning of the type of tympanoplasty to be performed, which will determine the outcome of surgery.

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