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Clinico-Audiological Comparison Between Type I Tympanoplasty with and Without Canalplasty in Patients of Chronic Otitis Media with Inactive Mucosal Disease

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ABSTRACT

Chronic otitis media is a long-term disorder of the pars tensa or flaccida (COM). Having long-term middle ear mucosal inflammation. The main set of symptoms for the mucosal variety of COM is intermittent discharge from the ear along with tympanic membrane (TM) rupture and conductive hearing loss. To find out the success rate of type I tympanoplasty with or without canalplasty regarding graft uptake in both groups. The present study Prospective, longitudinal study, at the Department of Otorhinolaryngology and Head Neck Surgery, of Calcutta National Medical College and Hospital. It's conducted from 18 months (MARCH 2015 - AUGUST 2016), 40 patients were included in this study. Patients were divided in two groups. In 20 patients, canalplasty along with type Itympanoplasty were undertaken and in rest 20 patients, only type I tympanoplasty were performed without canalplasty. The Patients aged between 18 to 50 years attending out-patient department of Otorhinolaryngology, Calcutta National Medical College and Hospital with unilateral inactive mucosal variety of chronic otitis media with central perforation.Result: It is observed that mean improvement in the Group A undergoing canalplasty is 14.21 dB and in the group with only tympanoplasty it is 9.65 dB only. So additional hearing gain is 4.56 dB (12.31%). Our research concludes that both type I tympanoplasty and canalplasty are useful in enhancing middle ear function and hearing outcomes in individuals with chronic otitis media with inactive mucosal disease. But compared to patients who had tympanoplasty alone, we found that individuals who had canalplasty in addition to tympanoplasty had marginally improved postoperative air-bone gap closure and hearing improvement.

INTRODUCTION

Chronic otitis media is a long-term disorder of the pars tensa or flaccida (COM). experiencing long-term middle ear mucosal inflammation[1]. The main set of symptoms for the mucosal variety of COM is intermittent discharge from the ear along with tympanic membrane (TM) rupture and conductive hearing loss. The duration of otorrhoea is a topic of disagreement among otolaryngologists, who define it differently depending on differing studies, ranging from three months to six weeks. The present study classified the ailment as chronic otitis media using a 6-week duration as a diagnostic technique. Chronic otitis media is acknowledged as one of the most common conditions. Community-wide infections and a major factor in the usage of antibiotics[2]. The WHO estimates that a large fraction of the world's population has otitis media and unfortunately, most of these people are nationals of developing and underdeveloped nations. According to Mc Kanjie and Broth Well (1967), the illness has existed since prehistoric times. It was discovered in an Anglo-Saxon cranium, according to Shenoi PM (1987). Radiological evidence of infections in 47 temporal bones from Dakota Indian graves was found by Gregg, Skele and Holzhenter (1965). Rathbum and Mallin claimed that 15 temporal bones from Iran shared the same traits in 1977. The mortality and incidence of the illness are adequately supported by these figures. Numerous aetiologies for chronic otitis media have been proposed by various writers on occasion. But in poorer nations, racial and socioeconomic factors—like poor housing, dampness and crowded living conditions—have a big impact[3]. It has been discovered that otitis media is rather common among indigenous people of Alaska (Tschopp, 1977), Native Americans (Fairbanks, 1981), Australia's aborigines and New Zealand Maoris. The illness typically manifests itself before the age of two or eight. Nonetheless, research has shown that socioeconomic and cultural factors have a significant role in the high prevalence of the illness in emerging nations like India. The main contributing factors include inadequate access to medical facilities, overpopulation and poor hygiene. Furthermore, the majority of patients who present with chronic otitis media have misconceptions and a low level of information regarding the nature of the condition and how deadly it is. This leads to a naïve faith in established therapies and methods and a reluctance to have surgery. The significance of the disease and the problem in society have both grown as a result of all of this[4]. 31429 patients (53%) out of the 58942 patients who attended the ENT OPD in 2015-2016 reported hearing problems, according to our OPD register. The vast majority of these people suffer from mucosal chronic otitis media, which accounts for the high prevalence of otological problems in society. Regarding the management of chronic otitis media, patients have received a range of treatments throughout history, from deliberate, vigorous therapy to masterful inactivity. But as modern medicine has advanced, many patients are now receiving intensive care that sometimes combines vacuum clearing with medicated topical ear drops and systemic antibiotics[5]. Shenoi PM (1987) referenced Browning's (1984) allegation that 85% of his patients were no longer being released because of auditory toileting.

MATERIAL AND METHODS

The present study entitled “clinico-audiological comparison between type I tympanoplasty with and without canalplasty in patients of chronic otitis media with inactive mucosal disease” has been carried out as follows:

Study Area: The Department of Otorhinolaryngology and Head Neck Surgery, of Calcutta National Medical College and Hospital.

Study Population: The Patients aged between 18 to 50 years attending out-patient department of Otorhinolaryngology, Calcutta National Medical College and Hospital with unilateral inactive mucosal variety of chronic otitis media with central perforation.

Study Period: 18 months (MARCH 2015 - AUGUST 2016).

Sample Size: 40 patients (based on previous record, inclusion criteria, exclusion criteria).

Preliminary canal wall volumes in the both ears of 20 normal patients were studied in the ENT OPD to observe external ear canal volume in the both ears. Then external ear canal volume of both the operated and non-operated ears measured in 40 patients 3 month after operation of the study group and studied accordingly.

Study Design: Prospective, longitudinal study.

Sample Design: Patients were divided in two groups. In 20 patients, canalplasty along with type I tympanoplasty were undertaken and in rest 20 patients, only type I tympanoplasty were performed without canalplasty.

Inclusion Criteria: All patients attending the outpatient’s department of CNMCH in the age group of 18years to 50 years with unilateral inactive mucosal variety of chronic otitis media with central perforation with normal cochlear reserve.

Exclusion Criteria:

- Patients with bilateral COM with inactive mucosal disease.
- Poor general health or any debilitating disease.
- COM with squamosal pathology.
- COM with complications.
- Patients with sensorineural or mixed hearing loss.
- All revision cases.
- Patients with gross external auditory canal pathology like ear canal stenosis, osteoma etc.
- Patients below 18 years and above 50 year.

RESULT

In With Canalplasty, 9 patients were 18 years to 30 years of age, 5 patients were 31 years to 40 years of age and 6 patients were 41 years to 50 years of age (Table 1). In Without Canalplasty, 10 patients were 18 years to 30 years of age, 6 patients were 31 years to 40 years of age and 4 patients were 41 years to 50 years of age. Association of Age with Group was not statistically significant (p=0.7620). In With Canalplasty, 11 patients were Male and 9 patients were Female In Without Canalplasty, 12 patients were Male and 8 patients were Female Association of Sex with Group was not statistically significant (p=0.7491) (Table 2). In With Canalplasty, 13 (65%) patients had Right Ear of Disease and 7 (35%) patients had Left Ear of Disease. In Without Canalplasty, 9 (45%) patients had Right Ear of Disease and 11 (55%) patients had Left Ear of Disease. Association of According To Laterality of Disease with Group was not statistically significant (p=0.2036). In Success 9 (100%) patients were 18-30 years of age, 4 (80.0%) patients were 31-40 years of age and 6 (100%) patients were 41-50 years of age. In Failure 1 (20%) patient was 31-40 years of age Association of According Tympanoplasty Along With Canalplasty with Group was not statistically significant (p=0.2062) (Table 3). In the above table it is observed that mean improvement in the Group A undergoing canalplasty is 14.21 dB and in the group with only tympanoplasty it is 9.65 dB only. So additional hearing gain is 4.56 dB (12.31% (Table 4)). In With Canalplasty patients had 75 Mins Time Taken In Without Canalplasty patients had 70 Mins Time Taken Association of According Tympanoplasty Along With Canalplasty with Group was not statistically significant (p=0.6779). In Without Canalplasty 3 (15%) patients had Not Improved, 5 (25%) patients had Slightly Improved, 7 (35%) patients had Significantly Improved and 5 (25%) patients had Symptom Free (Table 5). In With Canalplasty 1 (5%) patient was Not Improved, 3 (15%) patients had Slightly Improved, 8 (40%) patients had Significantly Improved and 8 (40%) patients had Symptom Free. Association of According With Respect to Subjective Assessment Done by Five Point Scale with Group was not statistically significant (p=0.5204) (Table 6).

Table 1: Distribution of Demographic Parameters

	Group		
Demographic Parameters	With Canalplasty	Without Canalplasty	p-value
Age			
18 years to 30 years	9	10	0.7620
31 years to 40 years	5	6	
41 years to 50 years	6	4	
Sex			
Male	11	12	0.7491
Female	9	8	
M:F	11:9	12:8	

Table 2: Distribution According To Laterality of Disease

	Group			
	With Canalplasty (N = 20)	Without Canalplasty (N = 20)	Total (N = 40)	p-value
Right Ear	13 (65%)	9 (45%)	22 (55%)	0.2036
Left Ear	7 (35%)	11 (55%)	19 (45%)	

Table 3: Results in Patients with Tympanoplasty Along With Canalplasty

	Group					
Age Group	Total	Success	Percentage	Failure	Percentage	pP-value
18-30 years	9	9	100%	0	0.00%	0.2062
31-40 years	5	4	80%	1	20%	
41-50 years	6	6	100%	0	0.00%	
Total	20	19	95%	3	5%	

Table 4: Mean and Mean Percentage of Hearing Gain (Improvement of AB Gap)

	With Canalplasty		Without Canalplasty		
	Mean	Percentage	Mean	Percentage	p-value
Mean Hearing Gain	14.21 DB	42.87%	9.65 DB	30.56%	0.3505

Table 5: Comparison between Average Time Taken In Surgery in Both Groups

	Group		
	With Canalplasty	Without Canalplasty	p-value
Time Taken	75 Mins	70 Mins	0.6779

Table 6: Distributon With Respect to Subjective Assessment Done by Five Point Scale

	Group				
	Without Canalplasty		With Canalplasty		
	No.	Percentage	No	Percentage	p-value
Not Improved	3	15%	1	5%	0.5204
Slightly Improved	5	25%	3	15%	
Significantly Improved	7	35%	8	40%	
Symptom Free	5	25%	8	40%	

DISCUSSION

The present study Prospective, longitudinal study, at the Department of Otorhinolaryngology and Head Neck Surgery, of Calcutta National Medical College and Hospital. It's conducted from 18 months (March 2015 - August 2016), 40 patients were included in this study.

At the third post-operative month, the graft uptake rate in tympanoplasty plus canalplasty is 95%, compared to 85% in tympanoplasty alone. According to the study, group A had a higher success rate than group B when it came to drum closure. Ajay Mallik, Vijay Valla and Ravi Roy's study also demonstrates a 92% graft uptake rate when canalplasty is combined with tympanoplasty, as opposed to an 84% graft uptake rate when tympanoplasty is the sole procedure performed[6].

In our study, 10 patients were 18 to 30 years old in Without Canalplasty group but this was not statistically significant (p = 0.7620).

Canalplasty provides a 9dB increased gain in hearing compared to not having canalplasty, according to a prospective interventional research by H. Vijayendra et al. that included 100 instances of Tympanoplasty type 1 performed before 1995 and 100 cases completed after 1995 with combined canalplasty and malleus exteriorization[7].

We found that, male population was higher than the female population. Male: Female ratio was 12:8 but this was not statistically significant (p=0.7491).

The side of the disease has no significance in assessing the hearing outcome of the procedures used for surgery as shown by other authors[8,9].

Our study showed that, most of patients had Right Ear Laterality of Disease in With Canalplasty Group [13 (65%)] compared to Without Canalplasty Group [9 (45%)] but this was not statistically significant (p=0.2036).

A study done by Olusesi et al recommends that subjective hearing assessment should form part of indicators for success following tympanoplasty .

In our study, out of 20 patients 10 patients were 18 to 30 years old [9(100%)] in Without Canalplasty group but this was not statistically significant (p=0.2062).

We observed that, higher number of patients had Mean Hearing Gain With Canalplasty Group-[14.21(42.87%)] compared to Without Canalplasty Group [9.65(30.56%)] but this was not statistically not significant (p=0.3505).

We observed that, patients had 75 Mins Time Taken in Surgery in With Canalplasty Group-[14.21(42.87%)] compared to 70 Mins Time Taken in Surgery in Without Canalplasty Group [9.65(30.56%)] but this was not statistically not significant (p=0.6779).

We examined that, more number of patients had Significantly Improved Subjective Assessment in With Canalplasty Group [8 (40%)] compared to Without Canalplasty Group [7(35%)] which was not statistically significant (p=0.5204).

The surgical approach, with special emphasis to bone removal from the anterior canal wall, was detailed in detail in a paper by Lavy *et al*. that reported on 100 consecutive ears operated on by a single surgeon. According to the study, the majority of cases were caused by soft tissue stenosis rather than bone stenosis and canalplasty is a secure and efficient method of enlarging canals[11].

CONCLUSION

Our research concludes that both type I tympanoplasty and canalplasty are useful in enhancing middle ear function and hearing outcomes in individuals with chronic otitis media with inactive mucosal disease. But compared to patients who had tympanoplasty alone, we found that individuals who had canalplasty in addition to tympanoplasty had marginally improved postoperative air-bone gap closure and hearing improvement. Additionally, the canalplasty group had a decreased frequency of postoperative problems such residual perforation and graft displacement. According to these results, canalplasty may provide further advantages in some patients by improving surgical access, making it easier to insert grafts and lowering the chance of recurrence. Nonetheless, more extensive randomized controlled studies with extended follow-up durations are necessary to confirm these findings and identify the best surgical strategy for this patient group.

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