

Kayvan Kiakujori (MD)^{*1}
Mansour Esmaili (MD)²
Asieh Shabani Faramarzi
(BS)³

1- Department of
Otolaryngology, Babol
University of Medical
Sciences, Babol, Iran.
2- Babol University of
Medical Sciences, Babol,
Iran.
3- Babol University of
Medical Sciences, Babol,
Iran.

*** Correspondence:**
Kayvan Kiakujori, Assistant
Professor of Otolaryngology,
Department of Otolaryngology
Ayatollah Rouhani Hospital,
Babol University of Medical
Sciences, Babol, Iran.

Post Code: 47176-47754
E-mail: kia_ko13358@yahoo.com
Tel: 00981112238301-5
Fax: 00981112238309

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The result of hearing in patients treated by surgery due to chronic otitis media

Abstract

Background: Hearing loss due to chronic otitis media is common. The purpose of this study was to evaluate hearing before and after canal wall up, canal wall down mastoidectomy and tympanoplasty.

Methods: From 2004 to 2007, all patients with chronic otitis media who were admitted at the Department of Otolaryngology, Babol Medical University were studied. For 126 patients' canal wall up, canal wall down mastoidectomy and tympanoplasty were done. Hearing before and after procedures were compared.

Results: The mean age of the patients was 26.02 years (38.6% males and 61.4% females). One hundred-three patients suffered from conductive hearing loss, 8 from sensorineural hearing loss and 12 from mixed conductive and sensorineural hearing loss. Those who operated by tympanoplasty were age > 40 years (65%). Ninety-five percent of the patients who had conductive hearing loss cured (95%). There was no statistical significant differences between types of operation and improvement of hearing ($p=0.009$).

Conclusion: The results show that improvement of hearing loss was seen in tympanoplasty, canal wall up and canal wall down in patients with chronic otitis media.

Key words: Hearing loss, Chronic otitis media, Surgery.

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Otitis media is an inflammation of the middle ear. This is the most commonly caused by the build-up of fluid behind the ear drum, as a result of a blockage to the Eustachian tube (1). Otitis media can cause a mild to moderate hearing loss, due to fluid interfering with the transmission of sound through to the inner ear (2). There are 3 types of otitis media: Noncholesteatomatous chronic otitis media (NCCOM), otitis media with effusion and chronic otitis media with cholesteatoma (COM) (3) and Chronic otitis media (COM) which is a chronic inflammatory disease of the middle ear and mastoid that often result in partial or total loss of tympanic membrane (T.M) and ossicles, leading to conductive hearing loss that can range in severity up to 60-70 decible (db) (4). COM is a common condition, affecting 0.5-30% of any community (5). Chronic otitis media is generally associated with some degree of hearing loss, which is often the patient's chief complaint (6). Therefore, a conservative estimate of the number of people in the world suffering from COM is over 20 milion. The prevalence of squamous type of COM is 3.5% in Nepal (5). Consequently, surgical treatments usually result in hearing.

This study was designed to evaluate the efficacy of the treatment of forms of chronic otitis media for which a tympanoplasty with or without mastoidectomy is the treatment of choice. Based on literature review, patients with diagnosis of permanent perforation, tubotympanic and cholesteatoma that suffer from conductive-sensorineural hearing loss or mixed need canal-wall down mastoidectomy with tympanoplasty, canal-wall up mastoidectomy with tympanoplasty and tympanoplasty. The purpose of this study was to evaluate improvement of hearing after these procedures in Babol, north of Iran.

Methods

From 2004 to 2007, all patients with chronic otitis media admitted at the Department of Otolaryngology, Babol Medical University were studied. The purpose of this study was to compare the pre and post-hearing results in three different procedures used [canal wall up (CWU), canal wall down (CWD) and tympanoplasty] to improve hearing.

Patients with dry ear underwent tympanoplasty, those with permanent drainage used canal-wall up and the other group with cholesteatoma underwent canal-wall down. Patients with conductive or mixed hearing loss with and without discharge were included in this study. Audiologic examination was performed together with the evaluation of hearing loss 4 months before and until 1 year after ear surgery.

All the patients' medical and surgical records, including age, sex, history of pre-admission middle ear infections, clinical signs, surgical findings, and treatment results, period of follow-up and site of disorder were also examined. The inclusion criteria implied: total persons with chronic otitis media and exclusion criteria include: patients without consistent follow-up. Therefore, the number of patients that participated in this study was 126 patients. For all the subjects, Pure Tone Audiometry (P.T.A) before and after operation was done for the determination of types of hearing loss.

Descriptive statistical analyses were adopted. Chi-square test was used to analyze the result of hearing in patient treated by surgery due to chronic otitis media. The data were evaluated using statistical analyses is SPSS software for windows and then compared with the relevant and available literature. For the analysis of data $p > 0.05$ was considered to be significant.

Results

The mean age of the patients was 26.02 years (38.6% were males and 61.4% were females). Right ear was involved in 52% and left ear in 48% subject. Based on pure-tone audiometry (P.T.A), 103 (81.1%) suffer from conductive hearing loss, 8 (6.3%) with sensorineural hearing loss and finally 16 (12.6%) with mixed hearing loss. Sixty-six (52%) underwent tympanoplasty, 26 (20.5%) canal wall up and 34 (27.6%) surgery with canal wall down. In patients with conductive hearing loss, improvement of hearing was

seen in 95% of subjects against 1.7% in sensorineural subjects ($p > 0.001$). However, reducing hearing after operation in sensorineural was more than the others. Permanent perforation, tubotympanic and cholesteatoma were seen in 38%, 36.4% and 41% males and in 62%, 63.6% and 58.8% females, respectively. In patients < 20 years, cholesteatoma (41.2%) was more prevalent than the other type of the disease. Patients between 20-30 years cholesteatoma was seen in 32.4%.

In 30-40 years of age, tubotympany was seen in patients (23.8%) and > 40 years tubotympany (19%) was more prevalent. Comparisons of hearing results that were obtained in post-operative period is summarized in table (1). After the operations, hearing improvement and resolution of the disease was seen in 92.1% cases. Consequence of improving hearing in pre and post operative was (47.2%) Tympanoplasty had the best result with 64.5% improvement and left ear canal wall up with the result of 63.6%. Tympanoplasty had the best result after operation than the other types of operation (53%).

Table 1. Outcome of different procedures on improvement of hearing

Type of operation	Hearing improvement	Hearing reduced	Hearing unchanged
Tympanoplasty (n=66)	35 (53%)	26(40%)	5 (7.6)
Canal wall up (n=26)	5 (20.5%)	5 (20.5)	16 (59%)
Canal wall down (n=34)	9 (26.5)	14 (40%)	11 (32.4)

Discussion

The objective of this study was to compare the pre and post hearing results in patients suffering from chronic otitis media. The results demonstrated and confirmed that the most prevalent of operations related to age was tympanoplasty at age > 40 (65%) that in study of Yung-Song Lin the mean age of patients with chronic otitis media (C.O.M) increased at age (7). There was highly significant improvement in post-operative of conductive hearing (95%).

We had the best result of hearing after operation in patients with tympanoplasty, that this result is equal with the study of Cruz OL (3) and Olszewski J (8), however, there was no statistical significance between the type of operation

and result ($p=0.009$). Most studies on showed that most patients suffer from permanent perforation dysfunction, although also equally with this result (9).

Finally, the results are often influenced by wide variety in the surgical techniques employed, in the criteria used to evaluate hearing results and a number of other anatomical, physiological and pathological events that occur post-operatively in the middle ear.

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