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ORIGINAL ARTICLE

Role of preoperative air-bone gap in tinnitus outcome after tympanoplasty for chronic otitis media with tinnitus[☆]

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KEYWORDS

Tinnitus;
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Abstract

Introduction: Previous reports indicated that middle ear surgery might partially improve tinnitus after surgery. However, until now, no influencing factor has been determined for tinnitus outcome after middle ear surgery.

Objective: The purpose of this study was to investigate the association between preoperative air-bone gap (ABG) and tinnitus outcome after tympanoplasty type I.

Methods: Seventy-five patients with tinnitus who had more than 6 months of symptoms of Chronic Otitis Media (COM) on the ipsilateral side that were refractory to medical treatment were included in this study. All patients were evaluated through otoendoscopy, pure tone/speech audiometer, questionnaire survey using Visual Analog Scale (VAS) and Tinnitus Handicap Inventory (THI) for tinnitus symptoms before and 6 months after tympanoplasty. The influence of preoperative Bone Conduction (BC), preoperative ABG, and postoperative ABG on tinnitus outcome after the operation was investigated.

Results and conclusion: The patients were divided into two groups based on preoperative BC of less than 25 dB ($n = 50$) or more than 25 dB ($n = 25$). The postoperative improvement of tinnitus in both groups showed statistical significance. Patients whose preoperative ABG was less than 15 dB showed no improvement in postoperative tinnitus using VAS ($p = 0.889$) and THI ($p = 0.802$). However, patients whose preoperative ABG was more than 15 dB showed statistically significant improvement in postoperative tinnitus using VAS ($p < 0.01$) and THI ($p = 0.016$). Postoperative change in tinnitus showed significance compared with preoperative tinnitus using VAS ($p = 0.006$). However, the correlation between reduction in VAS score and ABG ($p = 0.202$)

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PALAVRAS-CHAVE

Zumbido;
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pré-operatório

or between reduction in THI score and ABG ($p=0.290$) was not significant. We suggest that the preoperative ABG can be a predictor of tinnitus outcome after tympanoplasty in COM with tinnitus.

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Papel do gap aéreo-ósseo pré-operatório no desfecho do zumbido após timpanoplastia para otite média crônica com zumbido

Resumo

Introdução: Relatos anteriores indicaram que a cirurgia no ouvido médio pode melhorar parcialmente o zumbido após a cirurgia. No entanto, até agora, nenhum fator influenciador foi determinado para o resultado do zumbido após cirurgia de ouvido médio.

Objetivo: O objetivo desse estudo foi investigar a associação entre o gap aéreo-ósseo (GAO) pré-operatório e o desfecho do zumbido após timpanoplastia do tipo I.

Método: Setenta e cinco pacientes com zumbido, com mais de 6 meses de sintomas de Otite Média Crônica (OMC) no lado ipsilateral que eram refratários ao tratamento médico foram incluídos nesse estudo. Todos os pacientes foram avaliados através de otoendoscopia, audiometria tonal/vocal, questionário utilizando a Escala Visual Analógica (EVA) e o questionário *Tinnitus Handicap Inventory* (THI) para sintomas de zumbido antes e 6 meses após a timpanoplastia. A influência da condução óssea (CO) pré-operatória, GAO pré-operatório e GAO pós-operatório sobre o desfecho do zumbido após a operação foi analisada.

Resultados e conclusão: Os pacientes foram divididos em dois grupos com base na CO pré-operatória de menos de 25 dB ($n=50$) ou mais de 25 dB ($n=25$). A melhora do zumbido pós-operatória em ambos os grupos mostrou significância estatística. Pacientes com GAO pré-operatório inferior a 15 dB não apresentaram melhora no zumbido pós-operatório utilizando a EVA ($p=0,889$) e THI ($p=0,802$). Entretanto, pacientes com GAO pré-operatório maior que 15 dB apresentaram melhora estatisticamente significativa no zumbido pós-operatório utilizando a EVA ($p<0,01$) e o THI ($p=0,016$). A mudança pós-operatória no zumbido mostrou significância em comparação com o zumbido pré-operatório usando a EVA ($p=0,006$). No entanto, a correlação entre a redução no escore da EVA e GAO ($p=0,202$) ou entre a redução no escore do THI e GAO ($p=0,290$) não foi significativa. Sugerimos que o GAO pré-operatório pode ser um preditor de desfecho do zumbido após timpanoplastia em OMC com zumbido.

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Introduction

Tinnitus is the perception of noise in the ears which can take many forms such as ringing, roaring, buzzing, hissing, and others. Despite thorough and extensive research, the cause of tinnitus is yet to be determined. The prevalence of tinnitus is significantly higher among hearing-impaired persons than in the normal-hearing population.¹ Surveys have revealed that while 10%–15% of the adult population as a whole suffers from tinnitus, as many as 70%–85% of the hearing impaired population report tinnitus.^{1,2}

A temporary or permanent decrease in auditory stimuli (sensory deficit) increases the sensitivity of subcortical neurons, resulting in the plastic reorganization of the auditory cortex, with subsequent sustained awareness of tinnitus.³ Studies on plasticity have suggested that an increase in the auditory stimulus provided by external sound amplification through the masking effect can induce secondary plasticity, helping to decrease the discomfort associated with tinnitus.⁴ There is a significant correlation between tinnitus and

hearing loss in 85%–96%.⁵ Therefore, restoration of hearing by surgery or amplification by hearing aid can attenuate tinnitus. Tinnitus is a common problem in patients with Chronic Otitis Media (COM).^{6,7} Since the effect of tympanoplasty on tinnitus had been suggested by Helm for the first time,⁸ there have been few studies to date investigating tinnitus outcomes after middle ear surgery for chronic simple otitis media with tinnitus.^{6–9} Previous reports indicated that middle ear surgery might partially improve tinnitus after surgery. However, until now, no influencing factor has been determined for tinnitus outcome after middle ear surgery. The purpose of this study was to investigate the association between preoperative air-bone gap (ABG) and tinnitus outcome after tympanoplasty type I.

Methods

This retrospective study was conducted in patients with COM with subjective tinnitus on the ipsilateral side who

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