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ORIGINAL ARTICLE

The place of hyperbaric oxygen therapy and ozone therapy in sudden hearing loss[☆]

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KEYWORDS

Hyperbaric oxygen therapy;
Idiopathic sudden sensorineural hearing loss;
Oral steroid;
Ozone therapy

Abstract

Introduction: It is difficult to evaluate the effect of drugs clinically used for idiopathic sudden sensorineural hearing loss, mainly because the underlying mechanism of it has remained unknown.

Objective: This study assessed the efficacy of hyperbaric oxygen therapy or ozone therapy in the treatment of idiopathic sudden sensorineural hearing loss, when either therapy was included with steroid treatment.

Methods: A retrospective analysis examined 106 patients with idiopathic sudden sensorineural hearing loss seen between January 2010 and June 2012. Those with an identified etiology were excluded. The patients were divided into three treatment groups: oral steroid only ($n=65$), oral steroid + hyperbaric oxygen ($n=26$), and oral steroid + ozone ($n=17$). Treatment success was assessed using Siegel criteria and mean gains using pre- and post-treatment audiograms.

Results: The highest response rate to treatment was observed in the oral steroid + ozone therapy group (82.4%), followed by the oral steroid + hyperbaric oxygen (61.5%), and oral steroid groups (50.8%). There were no significant differences in the response to treatment between the oral steroid and oral steroid + hyperbaric oxygen groups ($p < 0.355$). The oral steroid + ozone group showed a significantly higher response rate to treatment than the oral steroid group ($p = 0.019$). There were no significant differences between the oral steroid + hyperbaric oxygen and oral steroid + ozone groups ($p = 0.146$).

Conclusion: The efficiency of steroid treatment in patients with severe hearing loss was low. It was statistically ascertained that adding hyperbaric oxygen or ozone therapy to the treatment contributed significantly to treatment success.

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PALAVRAS CHAVE

Oxigenoterapia hiperbárica;
Surdez súbita;
Esteróide oral;
Ozonioterapia

O papel da oxigenoterapia hiperbárica e da ozonioterapia na surdez súbita**Resumo**

Introdução: É difícil avaliar o efeito dos fármacos clinicamente utilizados na surdez Súbita Idiopática SS, principalmente porque o mecanismo subjacente de PANSSI manteve-se desconhecido.

Objetivo: Este estudo avaliou a eficácia da Oxigenoterapia Hiperbárica (OHB) ou ozonioterapia no tratamento de surdez súbita, quando uma ou outra terapia foi incluída no tratamento com esteróides.

Método: Uma análise retrospectiva examinou 106 pacientes com surdez súbita atendidos entre janeiro de 2010 e junho de 2012. Aqueles com uma etiologia identificada foram excluídos. Os pacientes foram divididos em três grupos de tratamento: apenas esteróide oral (n=65), esteróide por via oral + OHB (n=26) e esteróides por via oral + ozônio (n=17). O sucesso do tratamento foi avaliado usando critérios de Siegel e os ganhos médios usando audiogramas pré e pós-tratamento.

Resultados: a taxa de resposta mais elevada para o tratamento foi observada no grupo de esteróide + ozonioterapia (82,4%), seguida por grupos de esteróide oral + OHB (61,5%) e esteróide oral (50,8%). Não houve diferenças significativas na resposta ao tratamento entre os grupos de esteróide oral e esteróides + OHB ($p < 0,355$). O grupo de esteróide oral + ozônio apresentou uma taxa de resposta significativamente mais elevada ao tratamento do que o grupo de esteróide oral ($p = 0,019$). Não houve diferenças significativas entre os grupos de esteróide oral + OHB e esteróide oral + ozônio ($p = 0,146$).

Conclusão: A eficiência do tratamento com esteróides em pacientes com perda auditiva grave foi baixa. Verificou-se estatisticamente que a adição de OHB ou ozonioterapia ao tratamento contribuiu significativamente para o sucesso do tratamento.

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Introduction

Idiopathic sudden sensorineural hearing loss (ISSNHL) is an otologic disease requiring urgent diagnosis and treatment. ISSNHL is commonly defined as hearing loss of more than 30 dB, affecting three or more frequencies, arising over less than 3 days, without an identifiable etiology.¹ The hearing loss develops within a few seconds, minutes, or hours. In several epidemiological studies conducted on the incidence of ISSNHL, the spontaneous recovery rate of ISSNHL is high; the actual incidence is estimated to be far above this value.

Although several factors account for its etiology, most cases are idiopathic. Although there are more than 100 considered etiologic causes, the widely accepted etiological theories are viral infections, vascular causes, cochlear membrane disorders, and autoimmunity. In many cases, however, no apparent cause can be indicated.²⁻⁴ The etiology can be clarified in 10–15% of cases, with ISSNHL diagnosed in the remainder.^{2,4,5}

Although ISSNHL recurs spontaneously in 32–65% of cases,⁶ the reported rate ranged between 49% and 89% when steroids were used during treatment.⁷ Steroids remain the most commonly used medication for the treatment of ISSNHL.

The idea that ISSNHL could occur due to hypoxia in the cochlear apparatus makes hyperbaric oxygen therapy (HBOT) a reasonable choice. Generally, HBOT is recommended for the treatment of ISSNHL as a supplementary therapy to the first-line medical treatment.

Recently, ozone therapy has been used as a supplementary treatment for diseases where inflammatory processes are preponderant and an ischemic etiology is found. Ozone therapy is considered a treatment for ISSNHL because its effects, such as enhancing oxygen, glucose, and adenosine triphosphate (ATP) delivery to ischemic tissues, in turn producing reactive oxygen derivatives, result in vasodilation by increasing the amount of nitric oxide, stimulating angiogenesis and providing immunomodulation.

Our study included 106 patients with ISSNHL who were treated at our clinic between 2010 and 2012. We retrospectively investigated the efficacy of the treatment protocols applied to patients with ISSNHL, and studied the role of HBOT or ozone therapy for the treatment of ISSNHL with either therapy administered as a supplement to systemic steroid treatment.

Methods**Patients**

A retrospective chart review was performed 106 patients with a diagnosis of ISSNHL who presented at the Department of Otorhinolaryngology – Head and Neck Surgery at Akdeniz University, between January 2010 and June 2012. The inclusion criteria were the same for each group of treatment. The inclusion criteria were unilateral sensorineural hearing loss with an average hearing loss of 30 dB in consecutive

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