Case Report / Olgu Sunumu

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Via auricular ozone insufflation therapy for sudden sensorineural hearing loss: A case report

Ani sensörinöral işitme kaybi için kulak yoluyla ozon insüflasyon tedavisi: Bir olgu sunumu

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ABSTRACT

Sudden sensorineural hearing loss (SSNHL) is an otologic emergency that often presents without an identifiable cause. Its treatment aims to preserve auditory function through rapid diagnosis and targeted intervention. In this case report, we present a fifty-two years old male patient, unable to receive hyperbaric oxygen therapy due to pulmonary risk related to emphysema and who had profound improvement at hearing functions with via auricular ozone insufflation therapy. Ozone therapy must be kept in mind, through its antioxidant and microcirculatory effects, it may serve as an alternative therapeutic option when conventional treatments are not applicable or ineffective.

ÖZ

Ani sensörinöral işitme kaybı (SSNHL), genellikle tanımlanabilir bir neden olmaksızın ortaya çıkan bir kulak acil durumudur. Tedavisi, hızlı tanı ve hedefli müdahale yoluyla işitsel fonksiyonu korumayı amaçlar. Bu vaka raporunda, amfizemle ilişkili pulmoner risk nedeniyle hiperbarik oksijen tedavisi alamayan ve kulak içi ozon insüflasyon tedavisi ile işitme fonksiyonlarında belirgin iyileşme gösteren elli iki (52) yaşında bir erkek hastayı sunuyoruz. Ozon tedavisi, antioksidan ve mikrosirkülasyon etkileri sayesinde, geleneksel tedavilerin uygulanamadığı veya etkisiz olduğu durumlarda alternatif bir tedavi seçeneği olarak akılda tutulmalıdır.

Key Words:

Audiogram, Ozone Therapy, Sensorineural Hearing Loss

Anahtar Kelimeler:

Odyogram, Ozon Tedavisi, Sensörinöral Işitme Kaybı

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INTRODUCTION

Sensorineural hearing loss (SNHL) arises from damage to cochlear sensory cells or the auditory nerve pathways in the inner ear (Chau et al., 2010; Rauch, 2008). It is among the most common causes of permanent hearing impairment, particularly in the elderly population (Chau et al., 2010). Globally, the prevalence of SNHL increases significantly with age, affecting approximately 30% of individuals older than 65 (Chau et al., 2010). While presbycusis is the leading cause, additional etiologic factors include noise exposure, ototoxic drugs, infections, autoimmune processes, and trauma (Chau et al., 2010; Rauch, 2008). The primary goal in SNHL management is early intervention to prevent irreversible cochlear damage (Rauch, 2008). Conventional therapies such as systemic or intratympanic corticosteroids, vasodilators, antioxidants, and hyperbaric oxygen therapy yield variable success (Rauch, 2008; Lamm & Arnold, 1996). Recently, ozone therapy has gained attention for its ability to enhance oxygen delivery, reduce oxidative stress, and improve cochlear microcirculation (Borrelli et al., 2010; Gürlek et al., 2017; Onal et al., 2020; Martínez-Sánchez et al., 2019).

The Case Presentation

A 52-year-old male patient presented to the Emergency Service with sudden-onset unilateral sensorineural hearing loss (SSNHL). History revealed that the hearing loss began on the same day. His medical history included hypertension, type 2 diabetes, coronary artery disease, heart failure, prior stent placement, and coronary artery bypass grafting (CABG) with patch repair of a cardiac pseudoaneurysm. His medications included acetylsalicylic acid (Ecopirin Pro 81 mg, Abdi İbrahim İlaç, Türkiye), amlodipine (Norvasc 5 mg, Pfizer, USA), and carvedilol (Vasoxen 5 mg, Menarini İlaç, Türkiye). Then, he was referred to the ear, nose, and throat clinic. Audiometric evaluation revealed profound left-sided SNHL (PTA: right 10 dB, left 91 dB, Figure 1). Intratympanic dexamethasone (8 mg) was administered every other day over five sessions, but no improvement occurred.

Hyperbaric oxygen therapy was also taken into the consideration. But, it was excluded because of its high risk due to emphysema detected in thorax CT. The patient was referred to our Traditional and Complementary Treatment Clinics. After confirming an intact eardrum we started auricular ozone insufflation using specialized headphones. Ozone concentration was 10 gamma and duration of session was 20 min. A total of 10 sessions of ear ozone insufflation treatment were applied, the first five sessions were administered consecutively starting on Monday to friday, followed by five additional sessions over the next week. Audiometric measurements made before and after treatment are shown in the photographs below (Figures 1 and 2). The final audiometric assessment revealed a significant improvement in hearing thresholds after treatment. Hearing level was improved from 70-91 dB to 43-46 dB.

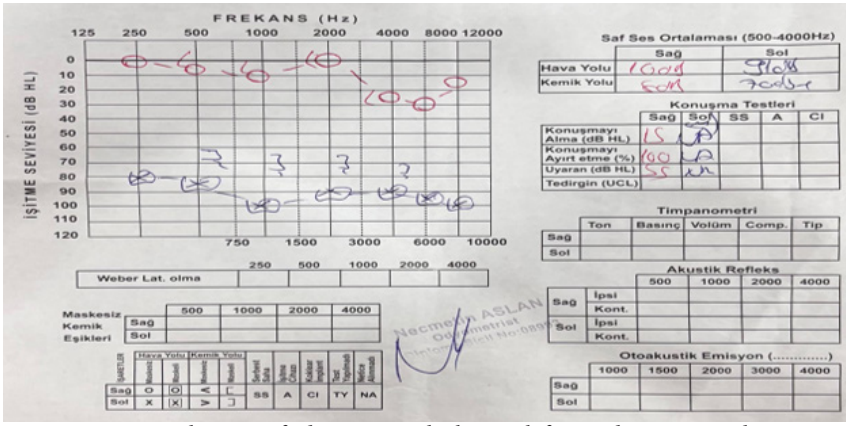

Figure 1. At the time of admission to the hospital, first audiometric analysis.

Pure Tone Average (PTA, dB HL): Right: 10/8 | Left: 91/70; Clinical Interpretation: Severe SNHL (left); According to the audiometric analysis, hearing thresholds in the right ear were within the normal range, whereas in the left ear, there was a profound sensorineural hearing loss

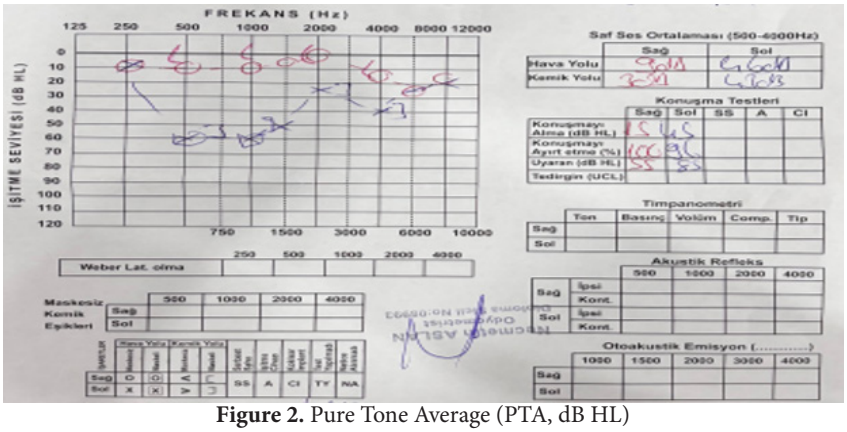

Figure 2. Pure Tone Average (PTA, dB HL)

Air: Right 9 | Left 46 Bone: Right 3 | Left 43; Speech Reception Threshold (SRT, dB HL): Right: 100 | Left: 96, Stimulus Level (dB HL): Right: 55 Left: 85.; Clinical Interpretation: Marked improvement at SNHL (left); According to the audiometric analysis, hearing thresholds in the right ear were within the normal range, whereas in the left ear, there was a mild sensorineural hearing loss.

Figure 3. A: Destructor outlet B: Inlet

In the device used for intratympanic ozone insufflation, the inlet segment (B) delivers ozone into the patient's external auditory canal, excessive ozone gas in the canal is expelled via destructor (A) after decomposing ozone into the oxygen.

DISCUSSION

Ozone therapy enhances oxygen delivery at the cellular level, promotes antioxidant defense mechanisms, and improves microcirculatory function (Borrelli et al., 2010; Gurlek et al., 2017; Martínez-Sánchez et al., 2019). These effects positively influence the pathophysiology of SNHL, in which oxidative stress and impaired cochlear perfusion contribute significantly (Onal et al., 2020).

The primary therapeutic objective in SSNHL is rapid restoration of hearing and minimization of cochlear damage (Rauch, 2008). While corticosteroids remain first-line therapy, their efficacy can be limited in patients with contraindications - such as the emphysema present in this case (Lamm and Arnold, 1996).

In our case, ozone therapy was selected as an alternative due to the high risk associated with hyperbaric oxygen therapy. After treatment, the patient's PTA improved from 73 dB to 46 dB, and speech discrimination increased from 24% to 96%. The patient demonstrated clinically meaningful improvements in pure-tone thresholds following ozone therapy, consistent with previously reported outcomes (Onal et al., 2020). Improved cochlear blood flow, reduced oxidative stress, and enhanced cellular metabolism are considered key mechanisms underlying the therapeutic benefits of ozone therapy (Borrelli et al., 2010; Gurlek et al., 2017).

CONCLUSION

Early recognition and timely treatment are critical to preventing permanent auditory deficits in SSNHL (Rauch, 2008). Ozone therapy may serve as a safe, effective, and non-invasive alternative, particularly for patients with contraindications to conventional approaches such as hyperbaric oxygen therapy (Onal et al., 2020; Clavo et al., 2018). Further randomized controlled studies are required to standardize treatment protocols and clarify long-term outcomes.

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