Ozone therapy and laser puncture in the treatment of sudden deafness

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Abstract

Sudden deafness is a severe hearing loss, usually in only one ear, that develops over a period of a few hours or less. It produces a sensorineural hearing loss that requires an appropriate care. Considering the ozone biological effects (improvement of the antioxidant defense system, modulation of the immunological system, enhancement of blood rheological properties, increase of tissue oxygenation) and the therapeutic effects of low power laser (2mw), we decided to use ozone therapy in combination with laser puncture in patients suffering of sudden deafness. Twenty six patients (19 having sudden deafness in one ear and 7 in both ears), between 35 and 58 years old, were included in the study. In all cases it was their first episode of the disease. The lapse between the beginning of the symptoms and the application of the treatment varied since 4 hours to one month. To all patients, an initial and final audiometry (one month after the end of the treatment) was performed. In the initial stage, all patients presented a sensorineural hearing loss, either in all the frequencies registered (125 to 8000 Hz) or in one or more frequencies. The range of the hearing loss intensity fluctuated between 30 and 80 decibels. Hemogram, glycemia, cholesterol, triglycerides and creatinine had normal figures. CAT scan was performed in 10 patients and it was normal. Ozone therapy was applied, daily, by autohemotherapy (mixing 200 ml of ozone in 200 ml of blood with an ozone concentration of 40 mg/L) for a total of 15 sessions. Laser puncture was applied also daily, 15 sessions, and was stimulated the macrosystem points in relation with the ear and the microsystem points in relation with the external part of the ear. Radiation was made towards the ear canal, perpendicular to the eardrum. The results demonstrated that the patients treated had a total, partial and no recovery in 23 (88 %), 2 (8 %) and 1 patients (4 %), respectively. The results demonstrated that the patients treated had a total, partial and no recovery in 23 (88 %), 2 (8 %) and 1 patients (4 %), respectively. The ozone positive effect in the oxygen transport to tissue, in the blood rheological properties and its immune modulatory capacity, as well as the stimulation of the microcirculation and the improvement of cell biology produced by the laser and the stimulation of points of acupuncture, had a decisive role in the therapeutic results achieved in this study. It has to point out that patients with sudden deafness must be treated as soon as possible.

Introduction

Sudden deafness is a severe hearing loss, usually in only one ear, that develops over a period of a few hours or less. It produces a sensorineural hearing loss that requires an appropriate care [1]. The theories on the aetiology are very diverse and they have been very discussed. The vascular, viral or immunologic causes, anyone is their origin, they will converge in a neurosensorial hearing loss that requires of an appropriate and systematized care [1-10].

The conventional treatment of this pathology is based on the following medications: Nimodipine, heparin, steroids and oxygen, among others [6-8].

Ozone, a gas constituted by an ozone/oxygen mixture, it is employed for medical purposes for a long time ago in a variety of pathological processes. Ozone therapy produces assorted biological actions with beneficial results without causing adverse reactions or genotoxic damage [11-24]. An scheme with the ozone biological actions is showed below (Fig. 1):

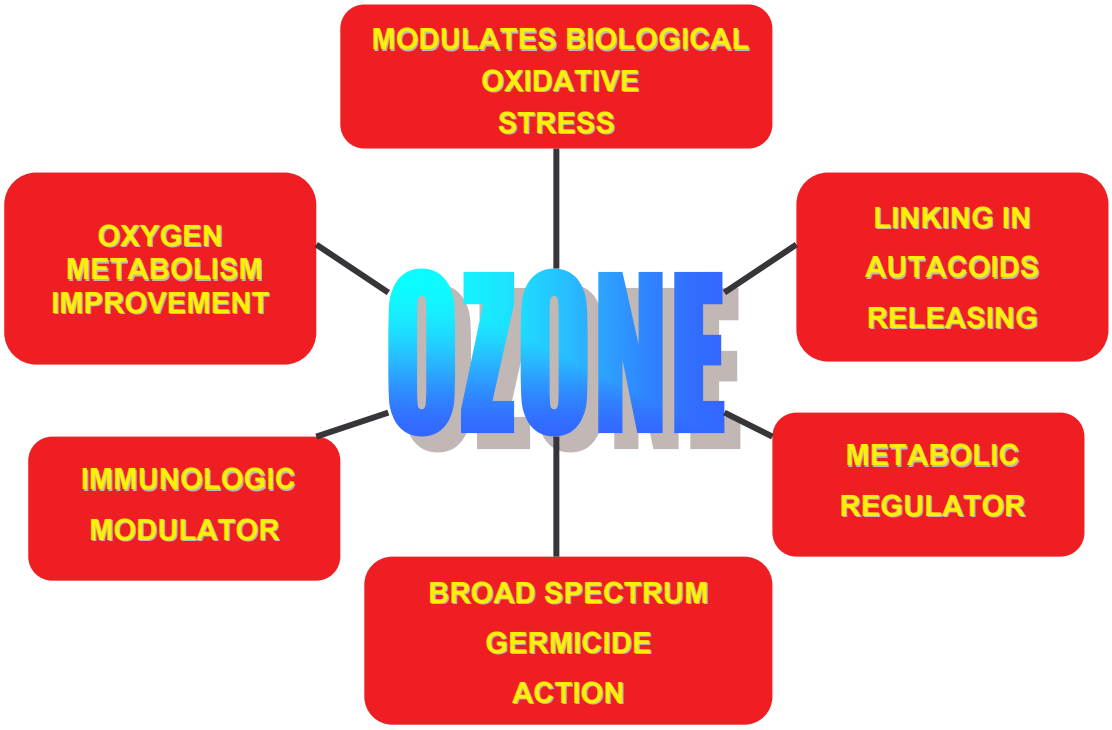


Fig. 1. Ozone biological actions

Taking into account some of the ozone biological effects: improvement of the antioxidant defense system, modulation of the immunological system, enhancement of blood rheological properties and the increase of tissue oxygenation and considering the therapeutic effects of low power laser (2mw) stimulating the micro circulation and improving the cellular biology supplemented by the punctural stimulation of the macro and acupuncture microsystems [24-26] , we decided to use ozone therapy in combination with laser puncture in patients suffering of sudden deafness in order to compare our results with previous reports.

Patients and methods

Twenty six patients (19 having sudden deafness in one ear and 7 in both ears), between 35 and 58 years old, were included in the study. In all cases it was their first episode of the disease. The lapse between the beginning of the symptoms and the application of the treatment varied since 4 hours to one month. To all patients, an initial and final audiometry (one month after the end of the treatment) was performed. In the initial stage, all patients presented a sensorineural hearing loss, either in all the frequencies registered (125 to 8000 Hz) or in one or more frequencies. The range of the hearing loss intensity fluctuated between 30 and 80 decibels. Hemogram, glycemia, cholesterol, triglycerides and creatinine had normal figures. CAT scan was performed in 10 patients and it was normal. Ozone therapy was applied, daily, by autohemotherapy (mixing 200 ml of ozone in 200 ml of blood with an ozone concentration of 40 mg/L) for a total of 15 sessions.

Laser puncture was applied also daily, 15 sessions, and was stimulated the macrosystem points in relation with the ear and the microsystem points in relation with the external part of the ear. Radiation was made towards the ear canal, perpendicular to the eardrum.

Results and Discussion

The treatments for the Sudden Deafness have been very varied and many of the numerous established protocols are based from empiric considerations. Moreover it is very discussed the aetiology of the illness and even some studies do not refer the rate of spontaneous recovery, which really exists [6-9].

The prescription of drugs to improve the circulation, as well as the use of the heparin and oxygen have been justified in order to increase the blood flow and the oxygenation in the internal ear. Arellano [6] combined oxygen therapy, Metilprednisolone and Nimodipine and reported complete recovery in 66 % in the experimental group and 46 % in the control group. In another study, a significant improvement in 83 % of patients was achieved using Metilprednisolone, Pentoxifiline and Carbogene (O_2 95% and CO_2 5%) [9].

Our results demonstrated that the patients treated with ozone therapy in combination with laser puncture had a total, partial and no recovery in 23 (88 %), 2 (8 %) and 1 patients (4 %) (Fig.2).

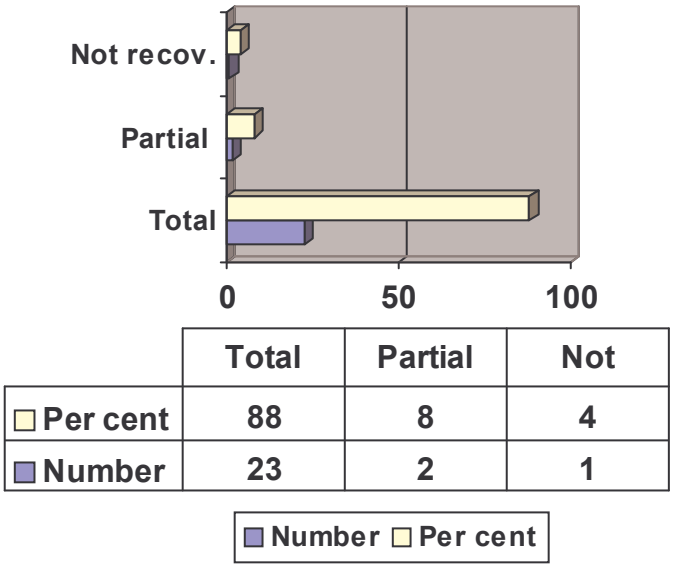


Fig. 2. Results obtained in patients treated with ozone therapy in conjunction with laser puncture.

In Figure 3 are shown the audiometries of different patients (before and after the treatments).

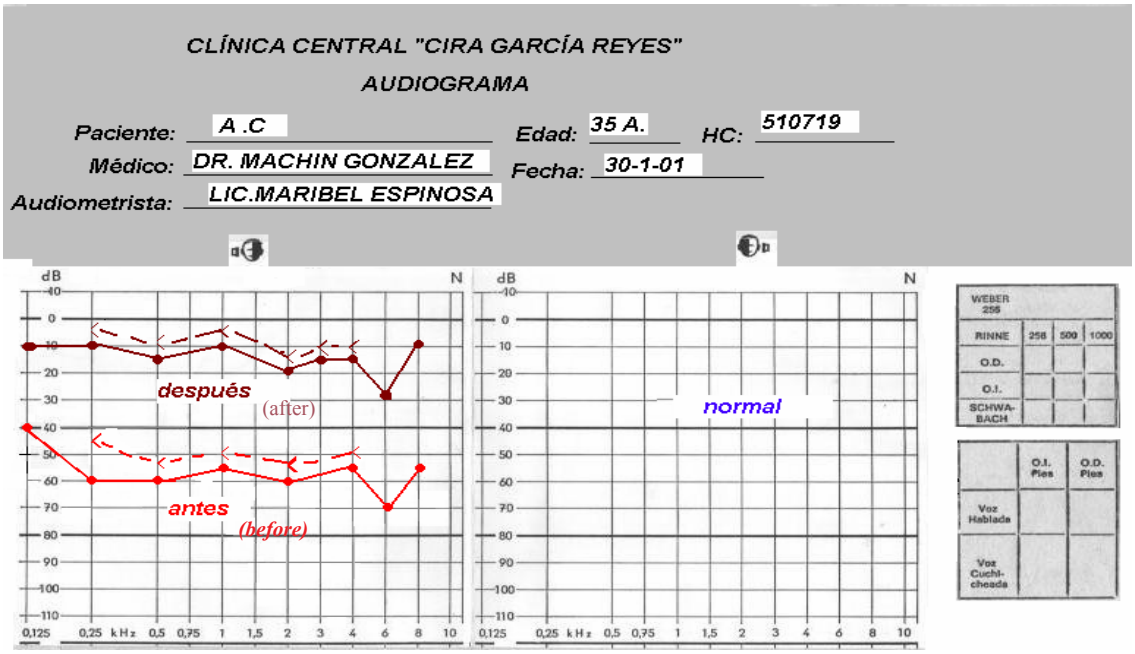
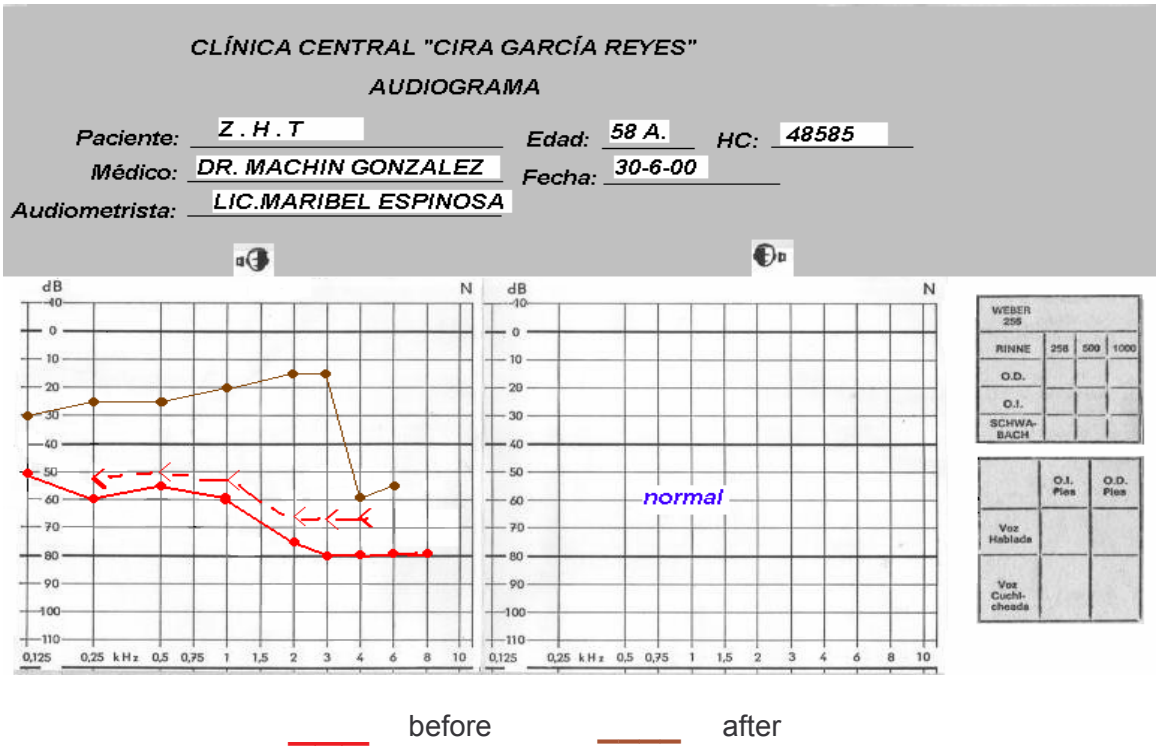
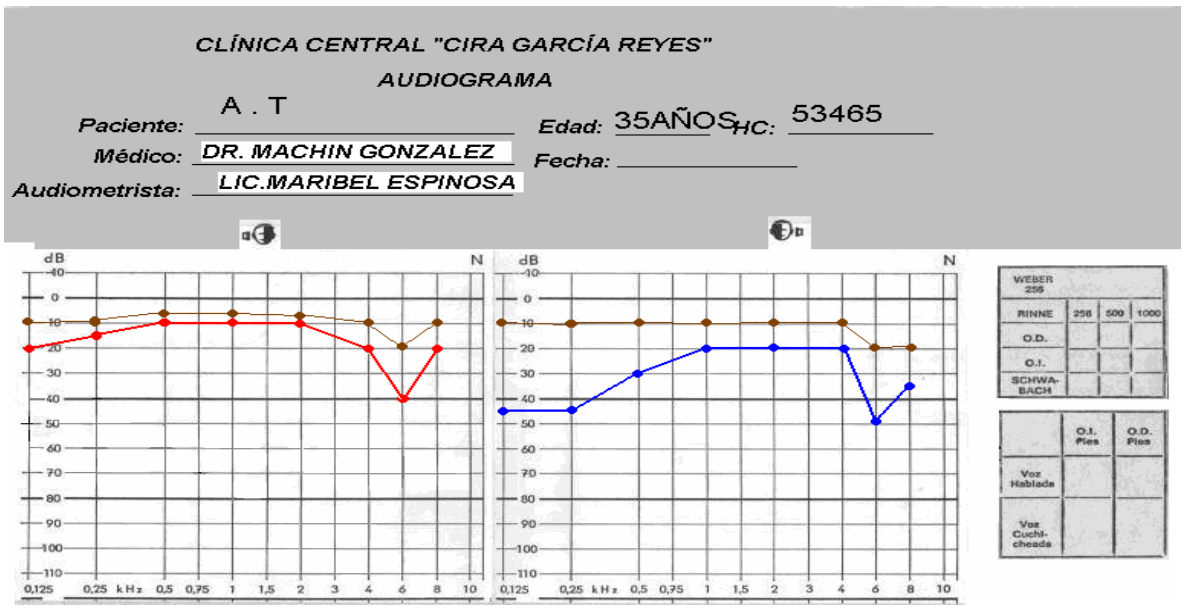


Fig. 3A



before after

Fig. 3 B



before

before after

Fig. 3C

Fig 3. Audiometry of different patients. A and B represent patients having sudden deafness in one ear and C in both ears. Red and blue lines are before the treatment and brown lines after the treatment.

In our opinion two different biological actions of ozone therapy should be considered in the treatment of sudden deafness: the enhancement of blood rheological properties increasing tissue oxygenation and its capacity to modulate the immune system.

On the other hand, the treatment with Laser of low power (2mw), stimulating the micro circulation and improving the cellular biology, supplemented by the punctural stimulation of the macro and acupuncture microsystems was considered another decisive strategy in the therapy applied to our patients.

Conclusions

The ozone positive effect in the oxygen transport to tissue, in the blood rheological properties and its immune modulatory capacity, as well as the stimulation of the microcirculation and the improvement of cell biology produced by the laser and the stimulation of points of acupuncture had a decisive role in the therapeutic results achieved in this study. It has to point out that patients with sudden deafness must be treated as soon as possible.

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