INTRODUCTION

Idiopathic sudden sensorineural hearing loss (ISSNH), is defined as a sensorineural hearing loss greater than 30 dB, occurring in at least 3 contiguous frequencies and developing in 72 hours or less. It is a disease with unknown etiology, which can lead to permanent morbidity. Available treatments include steroids, vasodilators, antivirals and immunosuppressants.

To date, the most accepted treatment are corticosteroids, however, there is no accepted worldwide treatment. Approximately, 61% of patients experience spontaneous recovery, for those patients without clinical improvement, intratympanic corticosteroids have been widely used. Unfortunately, the latter constitutes an invasive procedure. Associated risks like tympanic perforation, meningitis and otitis media have been reported.

HBOT has been shown to provide significant additional effect when used in combination with steroids, however, the therapeutic role of HBOT individually is not well established. The objective of this protocol, is to determine effect of HBOT for the treatment of ISSNH refractory to treatment with systemic and intratympanic steroids.

We performed a cases series, in patients refractory to systemic and intratympanic corticosteroids with ISSNH.

METHODS AND MATERIALS

We included 4 patients with diagnosis of idiopathic sudden sensorineural hearing loss (ISSNH) treated at the Otolaryngology department of the Hospital Civil de Culiacan from March 2013 to July 2013.

This study was approved by the Ethics Committee. HBOT was performed by slowly increasing the air pressure to 2 Atm. Breathing 100% oxygen for 60 minutes. A Full course was defined as the HBO once a day for 10 days over a 2 week period. The results were evaluated before and after treatment (audiometry and speech audiometry).

Inclusion criteria: Patients previously treated with intratympanic and Systemic corticosteroids without clinical improvement in the audiometry test. Patient must be older than 18 years old.

Exclusion criteria: Patients who have not been treated with systemic or intratympanic corticosteroids, patients with associated diseases: serous otitis media, eustachian tube dysfunction, brain trauma, Meniere’s disease, ear surgery, vestibular neuronitis, labyrinthitis, migraine, central nervous system involvement. Patient’s inability to perform HBOT.

Elimination criteria: tympanic perforation or complication of serous otitis media, increase in dizziness or appearance of neurologic symptoms, revocation of informed consent or loss of follow up. Incomplete HBOT. Patients who didn’t perform audiometry test before and after the treatment protocol.

RESULTS

We included four female patients, mean age 51 years. The mean time from onset of illness to HBOT was 108.75 days. Initial mean PTA was 55.31 dB, final PTA was 54.6875 dB (p=0.098).

Mean hearing gain was 0.625 dB. One patient had complete hearing recovery, 2 patients slight improvement (recovery of 3.75 dB), 1 patient worsened; In addition, 2 patients reported subjective improvement of dizziness. See Table 1. Although hearing gain was observed at low frequencies in two patients (25dB and 20 dB), no statistical significance was achieved (p=0.817). No complications were reported.

Table 1. Patient results. PTA4, defined as the mean of the 500 Hz, 1000 Hz, 2000 Hz y 4000 Hz. Evolution in days: from onset of disease to the beginning of the HBO. Only patient 2 had full recovery.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (Years)</th>
<th>Evolution in Days</th>
<th>Side</th>
<th>Pre HBOT</th>
<th>Post HBOT</th>
<th>Gain dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>43</td>
<td>155</td>
<td>Left</td>
<td>78.75</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>21</td>
<td>56</td>
<td>Left</td>
<td>32.5</td>
<td>8.75</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>83</td>
<td>50</td>
<td>Left</td>
<td>42.25</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>57</td>
<td>174</td>
<td>Left</td>
<td>68.5</td>
<td>97.5</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>51</td>
<td>108.75</td>
<td></td>
<td>55.3</td>
<td>54.6</td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Currently, the pathophysiology of SNHL remains unknown. There are many drug therapies based on observational, empirical and experimental studies. Nonetheless, the standard of care is the use of corticosteroids. Hypothetically, most of the treatment options target the inner ear in order to improve blood circulation and restore the oxygen pressure. However, there are many refractory cases, with no -evidence based- alternative treatment. The hyperbaric chamber, used as an adjuvant therapy has proven utility in diverse studies. Furthermore, ISSHL guidelines by the American academy of otologygry have approved its use in ISSNH patients. The mechanism of action is mainly described as the arterial oxygen diffuses through the capillaries into the inner ear and its membranes, providing oxygen to the sensorineural structures of the cochlea and therefore, increasing inner ear’s oxygen saturation. A review of published articles which used hyperbaric chamber as a ISSNH treatment in the past 10 years was performed. All studies had PTA pre/post measurements (Table 2).

Table 2. Atm: atmospheres, dB:decibels, HBOT: Hyperbaric oxygen therapy, IT: intratympanic therapy, PTA: pure tone average.

REFERENCES