AUDITORY FUNCTION RECOVERY IN SUDDEN SENSORINEURAL HEARING LOSS: 3-YEAR STUDY

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ABSTRACT

Objectives: The goal of this study was to assess the post-therapeutic rehabilitation for a group of patients in order to evaluate the conventional treatment of sudden sensorineural hearing loss. **Materials and methods:** 45 patients diagnosed with sudden sensorineural hearing loss, where clinically examined. A careful examination is needed to exclude life threatening causes such as vascular events and malignant diseases. Conventional treatment that include corticosteroids, antiviral drugs, vasoactive and vitamins (B1, B6) was administered to patients. **Results:** Post-treatment rehabilitation degree varies. The greatest recovery of hearing has been shown when corticosteroids are started within the first 1—2 weeks after symptom onset. About 45% of patients show good recovery, usually in about 2 weeks. Patients in whom there is no change within 2 weeks are unlikely to show much recovery. **Conclusions:** In most cases the cause is not identified, although various infective, vascular, and immune causes have been proposed. It is recommended that patients with sudden sensorineural hearing loss with no clear underlying cause after investigation are treated with a short course of oral prednisolone started within 2 weeks after onset. There is much to learn about pathogenesis of sudden sensorineural hearing loss and more clinical trials are needed to establish evidence-based management.

Key words: sudden hearing loss, corticosteroid, auditory recovery

INTRODUCTION

Sudden sensorineural hearing loss (SSNHL) is an emergency in otolaryngology. It has been defined for research purposes and has been accepted by most authorities as 30 dB or more sensorineural hearing loss over at least three contiguous audiometric frequencies occurring within 3 days or less.

The specific cause is identified in about 15% of the cases. Various infective (especially viral), vascular, and immune causes (Cogan's syndrome and Lupus) have been proposed [1]. There are ototoxic drugs that can damage hearing-antibiotics (aminoglycosides), diuretics and certain anti-cancer drugs. Acoustic trauma or trauma such as head injuries and temporal bone fractures can cause SSNHL. About 10% of the people getting Meniere's disease experience SSNHL. Also tumours such a vestibular schwannoma or cerebellopontine angle tumours can cause SSNHL. There are many potential causes of SSNHL, but despite extensive evaluation, the majority of cases remain idiopathic [1].

The goal of this study was to assess the post-therapeutic rehabilitation for a group of patients in order to evaluate the conventional treatment of sudden sensorineural hearing loss.

MATERIALS AND METHODS

Retrospective study over a period of three years (2008-2010) that included 44 patients diagnosed with sudden sensineural hearing loss with age ranging between 19 and 67 years. A careful history and detailed medical examination was made with special attention directed toward the onset time, possible

causes and associated simptoms. Clinical examination should include otoscopy, the Rinne and Weber test to exclude a conductive hearing loss (cerumen impaction, perforated tympanic membrane, middle-ear effusion, infection). Any patient with sudden hearing loss should have an urgent assessment with a minimum of pure tone audiometry (with air and bone conduction thresholds) and impedance to avoid misdiagnosis. In some cases additional audiovestibular tests were necessary to identify the site of pathological change and to elucidate the nature of any vestibular symptoms, which could indicate specific diagnoses (for example, stapedial reflex threshold and auditory brainstem evoked response, videonistagmography)

Blood tests appropriate to most cases include full blood count, erythrocyte sedimentation rate, C-reactive protein, phibrinogen, cholesterol and glucose values.

The detailed neurological and cardiovascular examination was made to exclude cerebellopontine angle lesions, posterior circulation abnormalities, or demyelination, respectively atrial fibrillation, aortic and mitral murmurs, and carotid bruits.

Imaging Studies

Approximately 1-2% of patients with ISNSHL have internal auditory canal (IAC) or CPA tumours. Conversely, 3-12% of patients with vestibular schwannomas present with sudden hearing loss. Magnetic resonance imaging (MRI) with gadolinium diethylenetriamine-pentaacetic acid (DPTA) enhancement is the criterion standard test for diagnosing CPA masses. The cost issue for MRI has been addressed by performing limited studies using fast spin echo techniques. In young patients, for whom only a small possibility of detecting a vestibular schwannoma exists, a noncontrast temporal bone computed tomography (CT) scan could be obtained. Anatomic defects such as a Mondini dysplasia or enlarged vestibular aqueduct might account for a sudden hearing loss [2].

RESULTS AND DISCUSSIONS

This study of sudden sensorineural hearing loss show a wide age distribution, with an average of 40—50 (Fig. 1) years and no sex preference (F/M=51%: 49%). The hearing loss is unilateral in most cases, with bilateral involvement reported in 11% (Fig. 2).

The severity of hearing loss was divided into mild, moderate, severe, profound and cofosis (Fig. 3). The configuration of the hearing loss varies and can affect high, low, or all frequencies. Tinnitus occurs in about 48% of patients, and vertigo, indicating an associated peripheral vestibular dysfunction, in about 7.5%. Up to 80% of patients report a feeling of ear fullness. Other common complaints are of the ear feeling numb or blocked.

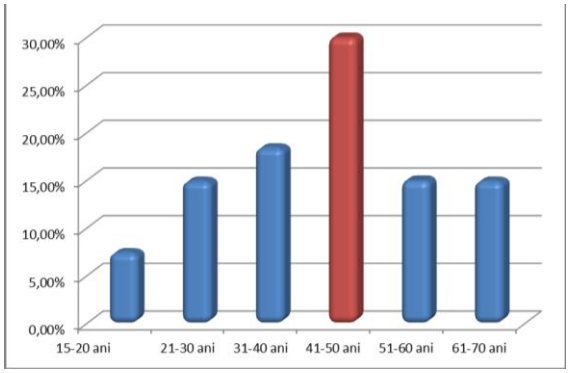

Fig. 1. Age distribution

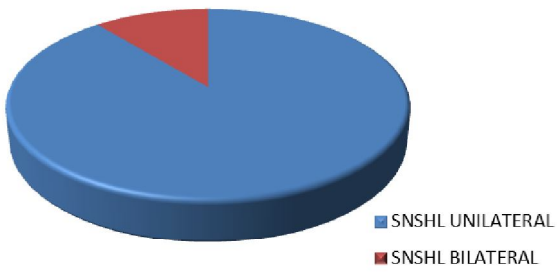

Fig. 2. SNSHL location

Fig. 4 shows the distribution of the number of cases after the time of onset.

Sudden sensorineural hearing loss can present as an isolated problem or in the course of an established diagnosis. In most cases the cause is not identified, although various infective, vascular, and immune causes have been proposed. In our study in only 22% cases could be established the cause [1] (Fig. 5).

Because hearing tends to recover spontaneously at a high rate, treatment is not always felt necessary, especially when impairment is minor. Nevertheless the prospect of being permanently deaf in one ear is daunting and has prompted many trials of therapy. The lack of a standard protocol among trials made comparison difficult and a conclusion unreachable.

It is recommended that patients with moderate to profound sudden sensorineural hearing loss with no clear underlying cause after investigation to be treated with a short course of oral prednisolone started within 2 weeks after onset [3].

Conventional treatment that includes corticosteroids (metilprednisolon, prednison), vasoactive (pentoxyfilline) and vitamins (B1, B6) was administered in most all of our patients. Only two patients diagnosed with diabetes have not received corticosteroids treatment.

The post-therapeutic auditory recovery (revealed by performing pure tone audiogram) varied and was divided into several degrees (Fig. 6). The greatest recovery of hearing has been shown when corticosteroids are started within the first 1—2 weeks after symptom onset. Patients with profound hearing loss and cofosis shows much lower recovery rates compared with other groups.

There is much to learn about pathogenesis of sudden sensorineural hearing loss and more clinical trials are needed to establish evidence-based management [4].

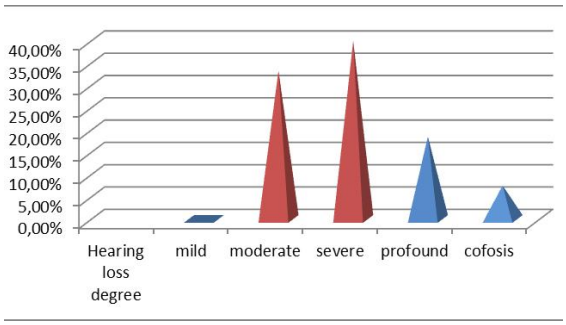

Fig. 3. Hearing loss degree

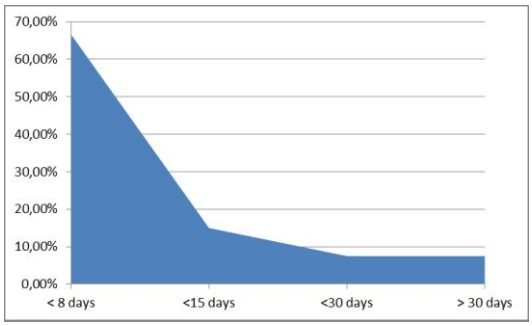

Fig. 4. SNSHL onset

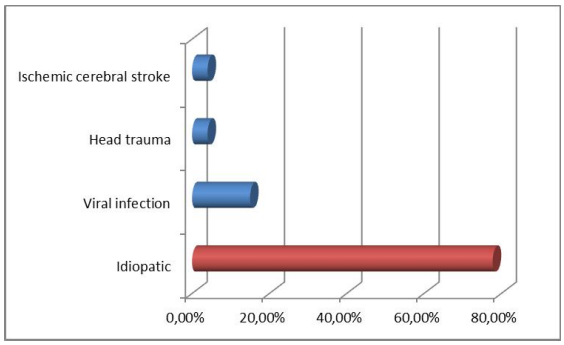

Fig. 5. Aetiology of Sudden sensoneural hearing loss

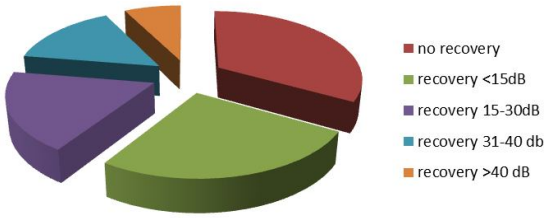

Fig. 6. Auditory thresholds rehabilitation

Many studies have been conducted in recent years to investigate hypothesis of stress as a predisposing risk factor in the development of sudden hearing loss. Medication with antioxidant and anti-inflammatory effects may help reduce the oxidative stress of the cochlea in SSNHL, implying a new direction in the treatment of this disease [2].

Patients with persistent symptoms should be referred to the appropriate specialists for continuing management of their auditory symptoms. This management can include counselling, information about lifestyle changes, and techniques (such as amplification, cochlear implantation) for overcoming the communication handicap that hearing loss imposes [4, 5].

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REFERENCES

1. Benjamin E Schreiber, Charlotte Agrup, Dorian O Haskard, Linda M Luxon, Sudden sensorineural hearing loss, The Lancet, Volume 375, Issue 9721, Pages 1203 - 1211, 3 April 2010
2. Yang CH, Ko MT, Peng JP, Hwang CF, Zinc in the treatment of idiopathic sudden sensorineural hearing loss., Laryngoscope 2011 Mar;121(3):617-21. doi: 10.1002/lary.21291. Epub 2010 Oct 6
3. Neeraj N Mathur, MBBS, MS, Professor, University of Delhi, India, Michele M CARR Associate Professor, Department of Otolaryngology, Hershey Medical Center, Inner Ear, Sudden Hearing Loss: Follow-up
4. Wu CS, Lin HC, Chao PZ. Sudden sensorineural hearing loss: evidence from Taiwan. Audiol Neurootol 2006; 11: 151-156. PubMed
5. Penido NO, Cruz OL, Zanoni A, Inoue DP. Classification and hearing evolution of patients with sudden sensorineural hearing loss. Braz J Med Biol Res 2009; 42: 712-716. PubMed