Social Problems in Patients with Idiopathic Sudden Sensorineural Hearing Loss

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Abstract

A relatively high incidence of idiopathic sudden sensorineural hearing loss (ISSHL) has recently been reported. The causes and pathogenesis of this condition are still unclear, and an effective treatment has not been found. The hearing loss is permanent in about 60% of patients. Consequently, the number of cases with permanent hearing loss increases each year. This review is focused on the social problems of patients with ISSHL. The results of a multicenter nationwide clinical study in Japan showed that patients with ISSHL suffer from several symptoms, such as hearing difficulty, hearing-related discomfort, tinnitus, and anxiety. They also experience a hearing handicap and suffer from deterioration of their quality of life. More attention should be paid to addressing these problems in patients with ISSHL.

Key words: sudden deafness, quality of life, handicap, hearing difficulty, hearing-related discomfort, tinnitus

1. Introduction/Background

Idiopathic sudden sensorineural hearing loss (ISSHL) is characterized by sudden onset of sensorineural hearing loss. The hearing loss is unilateral in most cases with bilateral involvement reported in less than 5% of cases. (Schreiber et al., 2010)

The lesion is most often cochlear in origin, and less frequently retrocochlear. Although the cause of ISSHL has not been identified, several possibilities for pathogenesis have been proposed, such as vascular disorders, viral infections and membrane breaks. Many treatment regimens have been investigated, including corticosteroids, vasoactive drugs, antiviral drugs, and hyperbaric oxygenation therapy, but none has been proven effective.

A recent study from Japan found an incidence of ISSHL of 60.9 cases per 100,000 per year. The patient population had a wide age distribution, with a peak among people in their sixties. (Nakashima et al., 2011) ISSHL occurs in approximately 77,000 people in Japan each year. Although ISSHL can be cured or improved in some patients, hearing problems persist in approximately 60% of patients. (Asakuma & Murai, 2010, Byl, 1984, Mattox & Simmons 1977, Okamoto et al., 2010) Thus, an estimated 46,000 patients develop permanent hearing loss each year in Japan.

ISSHL is unilateral in most patients. Patients with unilateral deafness have difficulty hearing sounds coming from the deaf side, localizing a sound source, and understanding speech against a noisy background. (Douglas et al., 2007, Harford et al., 1965, Bishop et al., 2010) However, severe auditory communication problems are usually not observed.

Some reports have investigated quality of life (QOL) in patients with ISSHL. Mosges et al. investigated changes in QOL of patients with ISSHL in terms of treatment effects. (Moges et al., 2008) Chiossonie-Kerdel et al. used the Hearing Handicap Inventory for Adults (HHIA) to investigate the degree of handicap in patients with ISSHL. Most patients had a handicap associated with hearing loss and tinnitus.

(Chiossonie-Kerdel et al., 2000) In 2011, Carlson et al. investigated QOL in patients with ISSHL using the EuroQoL-5D, Problems Impact Rating Scale, and the Hospital Anxiety and Depression Scale. (Carlson et al., 2011) They reported that all three indicators were significantly influenced by the presence of tinnitus and vertigo. However, patients with Meniere's disease may have been included in that report, because the incidence of vertigo at the time of investigation was quite high (34%).

Two main symptoms were reported to affect QOL in ISSHL patients with persistent hearing problems: difficulty in hearing and tinnitus (Carlsson et al., 2011, Chiossoene-Kerdel et al. 2000). Unilateral hearing loss is a sudden change for patients who have never experienced hearing problems before the onset of ISSHL. Other problems such as hearing-related discomfort, anxiety about recurrence, and psychosocial problems, may also affect QOL. These problems may differ from those in patients with congenital unilateral sensorineural hearing loss (USHL).

To investigate the social problems of patients with ISSHL in their persistent phase, the Acute Profound Deafness Research Committee of the Ministry of Health, Labor and Welfare in Japan conducted a multicenter clinical study to investigate symptoms, handicaps, and QOL in patients with ISSHL between 2009 and 2011. This review is focused on the results of this study.

2. Outline of the Study

Nine university hospitals participated in the study. Patients with ISSHL, bilateral sensorineural hearing loss (BSHL), and USHL were recruited. ISSHL was defined as the sudden onset of hearing loss or hearing loss first noticed on awakening, hearing loss severe enough to be recognized by the patients themselves, and sensorineural hearing loss of unknown cause.

Inclusion criteria for ISSHL patients were as follows: age 20 years or older, time interval from the onset 30 days or longer, unilateral involvement, and average hearing levels (500, 1000, and 2000 Hz) in the unaffected ear 30 dBHL or lower. Inclusion criteria for BSHL

patients were as follows: age 20 years or older, average hearing levels in the better ear 30 dBHL or higher, and hearing loss for more than 6 months. Inclusion criteria for patients with USHL were as follows: age 20 years or older, hearing loss diagnosed before 7 years of age, an average hearing level of 90 dBHL or higher in the affected ear, and 30 dBHL or lower in the unaffected ear.

The Short-Form Health Survey Version 2 was used to assess health-related QOL. The survey provides scores for eight health-related QOL domains and 2 more comprehensive scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The scores for the eight domains and the two component summaries were standardized (norm-based scoring, Japanese average = 50 standard deviations = 10) for comparison with the scores of people in the general population or those reported in other studies.

The Japanese version of the Hearing Handicap Inventory for Adults (HHIA) was used to evaluate handicaps. The HHIA is a self-assessment questionnaire of hearing handicap consisting of 25 items, 13 dealing with emotional aspects and 12 dealing with social and situational aspects.

The Symptoms Questionnaire was newly created to assess the patients' symptoms. It consisted of 17 questions, that covered six categories: hearing difficulty (4 questions), hearing related discomfort (4 questions), attitude to communications (2 questions), tinnitus (2 questions), vertigo (1 question), and anxiety (4 questions) .

3. Quality of Life

One hundred sixty-seven patients with ISSHL (77 males and 90 females; mean age, 58.2 years; range, 21-85 years) and 134 patients with BSHL (63 males and 68 females; mean age, 59.8 years; range 20-97 years) were investigated. The hearing levels varied from normal to profound hearing loss in patients with ISSHL, whereas moderate hearing loss dominated in patients with BSHL. (Sano et. al., 2012)

The average scores for the eight domains and the two summary components in the Short-Form Health

Survey Version 2 were similar for patients with ISSHL and those with BSHL. All scores except those for Bodily Pain in patients with ISSHL and those for Bodily Pain and Vitality in patients with BSHL were significantly lower than the Japanese average of 50 ($p < 0.05$ by the t-test). (Fukuhara et al., 1998) Patients with ISSHL had low scores for Social Functioning, General Health, Role Physical, Role Emotional and Mental Health in descending order. With regard to the summary components, MCS scores in the ISSHL group were especially low.

When the average scores for the two summary components in patients with ISSHL and those with BSHL were compared with average Japanese scores matched by decade of age, the PCS scores for both ISSHL and BSHL patients in all age groups were not significantly different from the Japanese average scores. However, the MCS scores for patients with ISSHL aged 40-49, 50-59, 60-69 and 70 or more years and for patients with BSHL 70 or more years of age were significantly lower than the age-matched average Japanese scores.

Multiple linear regression analysis was used to investigate confounders influencing MCS scores in patients with ISSHL. The effects on MCS scores of sex, age, hearing level at the time of investigation, and time from the onset were evaluated. The results showed that two factors, age (older age was associated with better scores) and time from the onset (longer time intervals were associated with better scores), were significant confounders.

4. Handicap

Seventy-one patients with ISSHL (33 males and 38 females, mean age, 52 years; range, 21-81 years), 121 patients with BSHL (58 males and 63 females; mean age, 60 years; range 20-97 years) and 17 patients with USHL (10 males, 7 females; mean age, 31 years; range 20-77 years) were investigated to determine the effects of handicap. (Iwasaki et al., 2013)

Significant differences in the mean values of HHIA scores were found among all groups. Similar trends were indicated in the scores for Emotional Aspects, Social Aspects, and in the total score. Patients with BSHL had the highest

handicap scores; patients with ISSHL had slightly, but statistically significantly, lower handicap scores than patients with BSHL; and patients with USHL had much lower handicap scores than the other two groups. Relative percentages of the total HHIA scores in ISSHL group and USHL group compared with BSHL group were 73% and 25%, respectively.

In both the ISSHL and the BSHL groups, patients with tinnitus had significantly higher total HHIA scores than patients without tinnitus. A multiple logistic regression analysis performed to determine the influence of age, average hearing loss, tinnitus, and type of hearing loss (BSHL, ISSHL, or USHL) on total HHIA score showed that tinnitus, age, and average hearing loss had significant influences.

5. Symptoms

One hundred forty patients with ISSHL (64 males, 76 females; mean age, 59.1 years; range, 21-85 years) and 24 patients with USHL (13 males, 11 females; mean age, 30.5 years; range 20-77 years) were investigated to determine the effects of symptoms. The majority of patients with USHL (71%) were between 20 and 29 years of age. (Sano et al., 2013)

More patients with ISSHL than patients with USHL experienced symptoms. In response to questions regarding hearing difficulty, patients in both groups reported that they frequently had problems. With regard to two items, “conversation” and “conversation in noisy place”, significantly more patients with ISSHL than those with USHL reported difficulty in hearing. In response to all questions regarding hearing-related discomfort (four questions), significantly more patients with ISSHL than those with USHL experienced symptoms. Few patients with USHL, many patients with ISSHL reported having tinnitus (two questions). For questions regarding attitude toward communication (2 items), the results were similar for patients in both groups: problems related to communication were fairly uncommon. The same was true for vertigo. However, more patients with ISSHL than those with USHL reported having anxiety about the possibility of recurrence of vertigo. More patients with ISSHL than those with

USHL reported having anxiety about the possibility of recurrence of hearing loss in the affected ear. Patients in both groups expressed anxiety about the possibility that the unaffected ear might be affected in the future; no significant difference was observed in response to this question between the groups.

The next stage of the study investigated the relationship between QOL and symptoms. As mentioned above, MCS scores in patients with ISSHL were significantly lower than the Japanese average. However, the scores in patients with USHL group did not differ significantly from the Japanese average. Confounders influencing MCS scores in patients with ISSHL were investigated by multiple linear regression analysis evaluating associations between MCS scores and age, hearing level at the time of the investigation, time from the onset, and responses to the questionnaire on symptoms. Unexpectedly, the results showed that the symptom regarding hearing-related discomfort was the sole significant confounder.

The relationship between responses to questions on symptoms of hearing-related discomfort and hearing levels in the affected ear was also investigated. The results showed that responses to questions on hearing-related discomfort were not associated with hearing levels, and high incidence of symptoms was reported even in patients with profound hearing loss. The findings that many patients with profound hearing loss, who were unable to hear with the affected ear, also experienced hearing-related discomfort, suggested that a mechanism other than hyperacusis or frequency distortion must produce the symptoms. The authors speculated that the symptoms could result from loss of the ability to locate the direction due to unilateral hearing loss. The authors termed this loss “collapse of spatial hearing perception.”

6. Conclusion

Figure 1 summarizes the results. Mental component scores of QOL in patients with ISSHL were lower than the Japanese average and were similar to or slightly worse than those of patients with BSHL. Handicap scores in patients with

ISSHL were worse than those in patients with USHL, and slightly better than those in patients with BSHL. Patients with ISSHL experienced several symptoms: hearing difficulty, hearing-related discomfort, tinnitus, and anxiety. The latter three symptoms were characteristic of patients with ISSHL. Hearing-related discomfort was significantly associated with deterioration of QOL, and tinnitus was significantly associated with hearing handicaps.

In recent years, bone-anchored hearing aids and cochlear implants have been successfully used to improve hearing difficulty and tinnitus in patients with ISSHL. (Hol et al., 2010, Ramos et al., 2012). We should pay more attention to problems in patients with ISSHL and establish appropriate means for treatment.

Conflicts of Interest: None.

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Figure Legends:

Figure 1. Summary of results. - Relationship between symptoms and QOL/Handicap -

ISSHL: idiopathic sudden sensorineural hearing loss
BSHL: bilateral sensorineural hearing loss
USHL: congenital unilateral sensorineural hearing loss