

ABSTRACT

Hearing loss is the most common sensory impairment. More than 5 % of the world's population suffers from disabling hearing loss, which affects approximately one third of people over the age of 65. In those cases where hearing aids are not a sufficient solution to these difficulties, cochlear implantation is the standard treatment. It replaces, at least in part, the function of the hair cells that are no longer able to stimulate the primary auditory neurons. However, there are concerns about the potential risk of impaired vestibular function and the development or worsening of non-vestibular problems such as tinnitus, vertigo and orofacial disorders.

Aims: To provide a theoretical summary of fundamental information on the vestibular system and cochlear implantation and to assess vestibular and non-vestibular function after cochlear implantation and the impact of any abnormalities on patients' quality of life.

Methods: All of the participants underwent subjective visual vertical examination, platform posturography and completed five questionnaires – *Dizziness Handicap Inventory*, *Tinnitus Handicap Inventory*, *Facial Disability Index*, *Beck's Anxiety Inventory* and *Beck's Depression Inventory*. Overall and partial results from platform posturography examinations were compared with a control group of healthy individuals, and subjective visual vertical examination was assessed against a normative of $\pm 2^\circ$. The questionnaires were scored according to the cut-off scores indicated and were then subject to a correlation analysis.

Results: The normative values of deviation from the subjective visual vertical for healthy subjects were not met by 10 % of patients. Mild to moderate tinnitus, mild depression, mild to moderate anxiety, and moderate vertigo were found in 20 %, 14 %, and 7 % of cochlear implant users, respectively. Statistically significant correlations were found between *Dizziness Handicap Inventory* and *Beck's Anxiety Inventory* (0.837; $p=0.01$) and *Beck's Depression Inventory* (0.666; $p=0.01$), between *Tinnitus Handicap Inventory* and *Beck's Depression Inventory* (0.548; $p=0.05$), and between *Tinnitus Handicap Inventory* and the functional component of the *Facial Disability Index* (-0.756; $p=0.01$).

Conclusion: Platform posturography did not reveal any statistically significant deviations in inner ear function in patients, compared to the general population. In 10 % of patients, an abnormality of inner ear function was found in the subjective visual vertical examination. Some patients had non-vestibular disorders such as tinnitus, dizziness or facial disability affecting their quality of life. There was a significant correlation between *Tinnitus Handicap Inventory* and the functional component of the *Facial Disability Index*, suggesting a possible correlation between the occurrence of tinnitus and facial disability.

key words: vestibular function, cochlear implantation, postural stability, platform posturography, subjective visual vertical, tinnitus, vertigo, orofacial function, anxiety, depression, quality of life