Clinical Application of Vestibular Evoked Myogenic Potential in Acute Low-Tone Sensorineural Hearing Loss

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Introduction

Vestibular evoked myogenic potential (VEMP) with saccular stimulation has been proposed to differentiate acute sensorineural hearing loss (ALHL) from Meniere’s disease. Furthermore, VEMP with galvanic stimulation (g-VEMP) was suggested to provide useful information in detecting endolymphatic hydrops (EH), and to support the diagnosis of Meniere’s disease. This study investigated the interaural difference (IAD) of saccular responses in patients of acute low-tone sensorineural hearing loss (ALHL). We intended to explore the association between IAD ratio and the final hearing recovery.

Materials and Methods

This study enrolled 21 patients with unilateral ALHL. Each received daily oral isosorbide (70%, 90ml) for 3 weeks prior to monitoring. Consent was obtained at least one week after onset. The percent of hearing recovery was measured three months after onset. Outcome analysis was performed using the non-parametric Kruskal-Wallis test. The correlation between IAD ratio and percent of hearing recovery was further analyzed using the Spearman’s coefficient.

Results

Significant difference was shown in hearing recovery for each of the three parameters was demonstrated in Table 1. When raw amplitude of c-VEMP was used to indicate IAD, patients of normal responses demonstrated the best recovery (0.87 [0.56 - 1]), while patients with augmented response demonstrated the worst recovery (0.56 [0.46 - 0.72]). Similar pattern was also observed in corrected amplitude of c-VEMP (p = 0.02, Kruskal-Wallis test). In contrast, corrected C/G ratio was not significantly correlated to the percent of hearing recovery in ALHL patients (p > 0.05). Although corrected c-VEMP amplitude could overcome the influence of background muscular activity, other confounding factors might also diminish the capability of c-VEMP to assess labyrinthine dysfunction, such as inherent interaural asymmetry, muscular activity and structural differences of the neck, other confounding factors might also unaccounted for variables might result in the non-significant correlation of IAD ratio and hearing outcome.

Discussion

Since acoustic and galvanic stimulation act on the saccular hair cells and their afferents, the ratio of c-VEMP amplitude to g-VEMP was suggested to provide useful information in detecting endolymphatic hydrops (EH), and to support the diagnosis of Meniere’s disease. Our results demonstrated that IAD of saccular responses assessed by raw amplitude of c-VEMP or g-VEMP was useful in predicting final hearing recovery in ALHL. However, further longitudinal studies should be carried out to verify if ALHL patients with abnormal C/G ratios eventually develop Meneire’s disease.

Conclusions

Saccular dysfunction in ALHL might be investigated using the ratio of corrected c-VEMP amplitude to g-VEMP. This study indicated that interaural difference of c-VEMP amplitudes and/or the amplitude ratio of corrected c-VEMP to g-VEMP might be a promising prognostic factor for hearing recovery in ALHL. However, further longitudinal studies should be carried out to verify if ALHL patients with abnormal C/G ratios eventually develop Meneire’s disease.