Comparison of static and dynamic tests of otolith function

Bradley J, Young AS, Pogson J, Taylor RL, Rosengren S, Calic Z, Reid N, Rivas C, Nguyen V, Halmagyi GM, Welgampola MS

Institute of Clinical Neurosciences, RPA Hospital Camperdown NSW

Introduction

The Ocular Vestibular Evoked Myogenic Potentials (oVEMP) and Subjective Visual Horizontal (SVH) testing represent two non-invasive techniques of assessing human otolith function. We sought to compare the results of these two tests of predominantly utricular function when performed on the same day for a group of patients who presented to a neuro-otology outpatient facility.

Methods

A retrospective analysis was performed on 282 patients on whom both SVH, Cervical VEMP (cVEMP), and oVEMPs had been performed. SVH was tested with both eyes viewing an illuminated bar in a dark room; an average of 10 trials was used. Ocular VEMPs were recorded in response to 105 dB nHL (140 dB peak SPL) 0.1ms air-conducted clicks and 20V p-p (146 dB Force Level) 1-ms bone conducted taps delivered via a minishaker. Mean SVH was correlated with the asymmetry ratios for BC oVEMP and AC cVEMP peak to peak amplitudes.

Results

A total of 282 patients had measurement of SVH, oVEMPs, and cVEMPs on the same day; 53 patients had a diagnosis of acute vestibular neuritis (VN). The Pearson’s correlation coefficient between the SVH and the BC oVEMP across all 282 patients was 0.51 (p<0.001). When subjects with acute vestibular neuritis (n=53) were separately correlated, the coefficient rose to 0.61 (p<0.001).The correlation coefficient between the SVH and the AC cVEMP in patients with acute VN (n=53 ) was 0.43 (p<0.001). We also performed separate correlations for the subgroups of patients with other diagnoses, including vestibular schwannoma, Meniere’s disease, vestibular migraine, brainstem stroke, and superior semicircular canal dehiscence, and these will also be presented.

Conclusion

Static and dynamic tests of utricular function are affected to differing degrees depending on pathology, site, stage, and central compensation, with the strongest correlation in acute, uncompensated peripheral lesions. There are strong, highly significant correlations between SVH and oVEMP asymmetry when tested on the same day. As expected, subjects with acute vestibular neuritis, which predominantly affects the superior vestibular nerve, demonstrate more powerful correlations. Weaker correlations exist between SVH and the cVEMPs which assess saccular function.