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Metabolic and visuospatial memory function changes in transient mal de debarquement syndrome

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Background: Mal de debarquement syndrome (MdDS) is a subjective perception of self-motion after a period of travel, classically by boat. It is not commonly encountered in clinical practice, but an enigmatic neurological disorder with high morbidity, psychosocial burden, and few treatment options. The pathogenesis of MdDS is not well-understood and therefore, treatment options are limited. Recent studies using functional neuroimaging have shown increased glucose metabolism in the entorhinal cortex and amygdala in the setting of decreased prefrontal and temporal cortex metabolism in subjects with persistent MdDS.

Methods: We studied 29 subjects who were fishermen at Chonbuk Buan province in Korea, including 16 subjects (six males) who had transient MdDS (t-MdDS) or land sickness (less than 12 hours of symptoms after boating) and 13 subjects who do not have symptoms. They were undertaken a neurological examination, vestibular function tests including video-oculography, video head impulse test, ocular and cervical vestibular evoked myogenic potentials (VEMPs), and visuospatial function tests including block design and the Corsi block task. Brain MRI and functional imaging with 18F-FDG brain PET were also performed.

Results: We compared the vestibular, visuospatial functions, and functional imaging findings of subjects with t-MdDS (n=16) to those of asymptomatic normal control (n=13). Vestibular functions were within normal range and structural brain lesion was not detected in any subjects. However, the Corsi block test was scored as a mean of 6.40 in t-MdDS subjects and 5.31 in the control group (p-value=0.016). 18F-FDG brain PET imaging analysis revealed increased glucose metabolism in the primary visual cortex, prefrontal and inferior parietal lobules bilaterally in the setting of decreased inferior cerebellum metabolism in subjects with transient MdDS.

Conclusion: Our results show that the patients of t-MdDS revealed better performance of visuospatial memory task of the Corsi block test and hyper-metabolism in neural systems involving visual spatial working memory such as primary visual and frontal cortices with hypometabolism in cerebellum. These findings indicate that MdDS may be a disorder of over-synchronization of visuospatial memory networks caused by persistent background low-amplitude oscillating environments coupled with an inability to subsequently desynchronize the activity of these networks reflected by hypometabolism in the cerebellum.

Biography

Sun-Young Oh is a Neurology Specialist at Chonbuk National University, School of Medicine and has been practicing for 20 years. She graduated from Chonbuk National University School of Medicine in 1999 and received her medical degree from Chonbuk National University Hospital. She specializes in Neurology especially Neuro-ophthalmology and Neurotology.

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