76 Detecting differences with magnetoencephalography (MEG)-urodynamics study of somatosensory processing normal desire to void and maximum desire to void sensation

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Kitta T. [1], Shiraishi H. [2], Yagyu K. [2], Shimojo A. [2], Egawa K. [2], Kanno Y. [1], Ouchi M. [1], Higuchi M. [1], Togo M. [1], Takahashi Y. [1], Tsukiyama M. [1], Moriya K. [1], Ariga T. [2], Shinohara N. [1]

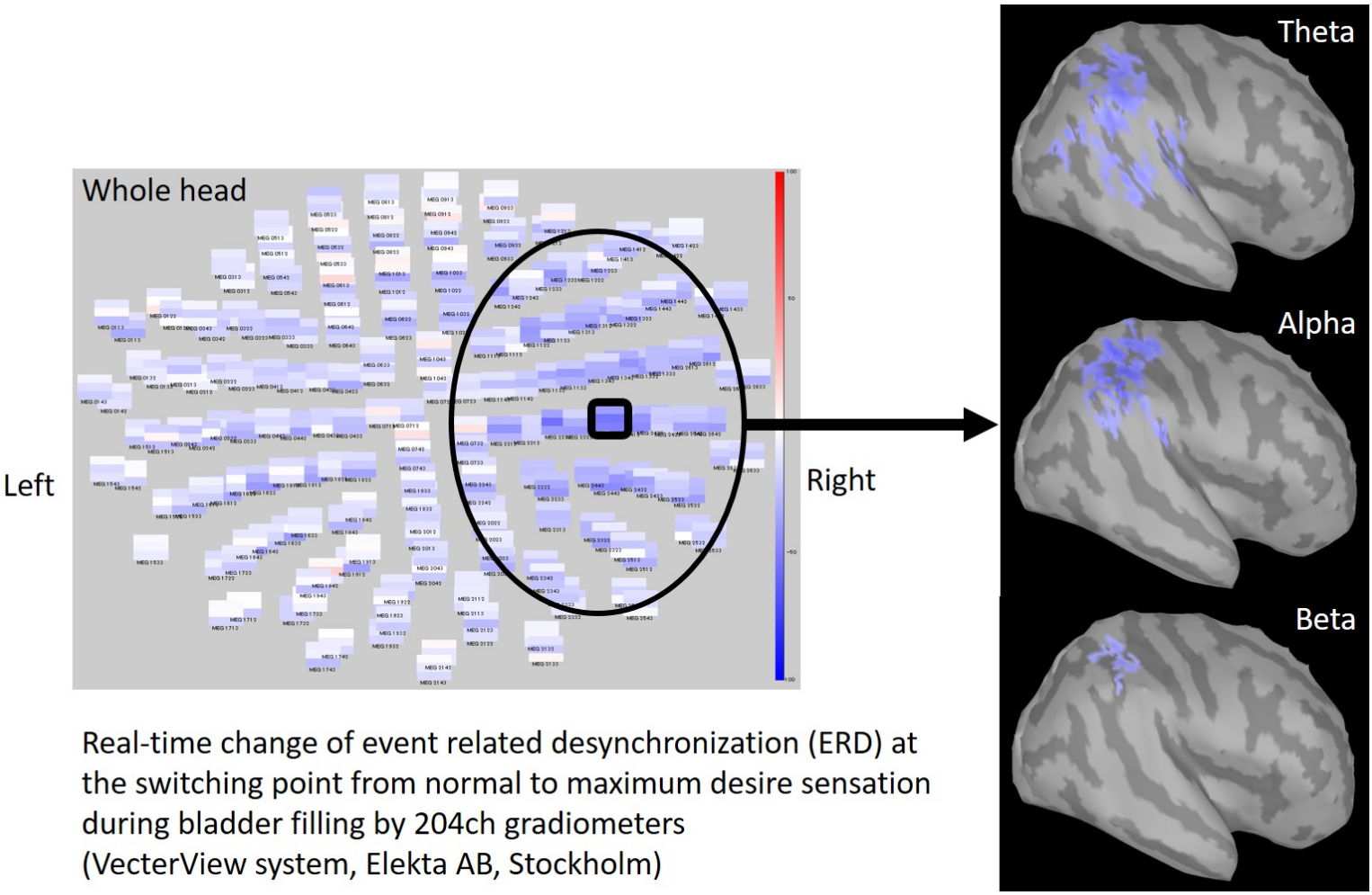
[1]Hokkaido University, Dept. of Urology, Sapporo, Japan, [2]Hokkaido University, Dept. of Pediatrics, Sapporo, Japan

Introduction & Objectives: Fully understanding and defining how the normal brain responds to bladder filling is essential for identifying central abnormalities in patients with voiding dysfunction. Neuroimaging studies PET or functional-MRI revealed multiple brain activation areas. However, the temporal resolutions of PET and MRI are not high enough to investigate the real time change of sensation. Magnetoencephalography (MEG) is a noninvasive tool and provides high temporal resolution so as to obtain sensory activities in experimental condition. The aim of our study is to clarify changes in brain activity at switching from sensation of normal desire to maximum desire sensation during bladder filling using MEG-urodynamics study.

Materials & Methods: We performed real-time MEG-urodynamics in 6 healthy male aged from 30 to 46 years (mean 38). The present study applied MEG to measure the brain responses switching from sensation of normal desire to maximum desire sensation. Measurement of event related desynchronization (ERD) at the switching point by MEG may be more suitable to localize the source position and define the change of brain activity because MEG has higher temporal and spatial resolution than scalp electroencephalography which is affected by the inhomogeneous head conductivity. A urethral catheter was placed and intravesical pressure was monitored throughout the procedure. MEG signals obtained by 204ch gradiometers (VecterView system). ERD at the vicinity of maximum desire to void during 35 seconds (-30 to 5 seconds) was calculated by hilbert transform using Brainstorm software.

Results: Mean bladder capacity was 360ml (270-480). Detrusor overactivity was never noted throughout the study. Compared with the normal desire to void sensation and maximum desire sensation, real-time change of ERD on cerebral cortex was defined at the right parietal lobe

around primary somatosensory cortex (figure).



Real-time change of event related desynchronization (ERD) at the switching point from normal to maximum desire sensation during bladder filling by 204ch gradiometers (VecterView system, Elekta AB, Stockholm)

Conclusions: In this preliminary study, with consideration for the somatosensory processing of micturition reflex, we succeeded in visualizing brain activities at switching from sensation of normal desire to maximum desire sensation. As MEG is completely non-invasive and adaptable to repetitive examinations, the present methods can be applied to elucidate the pathophysiological condition and optimal treatment for voiding dysfunction.