

Poster ME-5

Evaluation of the effect of testosterone supplementation on the brain activity associated with sexual arousal in hypogonadal patients: Functional MRI

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Purpose : The Purpose of this study was to evaluate the quantitative variation of brain activity evoked by visual sexual stimulation before and after testosterone supplementation in hypogonadal patients by using BOLD functional MR imaging.

Materials & method : Five male patients (mean age: 28) with hypogonadism were examined for this study. The treatment intervals with testosterone supplementation were in the range of 2-5months(mean, 3.4 months). Blood-oxygenation-level-dependent (BOLD) functional MRI was performed on a 1.5T MR scanner (GE Signa Horizon) with a birdcage head coil to create functional maps reflecting the local brain activities. The fMRI data was obtained from 7 oblique planes using gradient-echo EPI with 90 flip angle, 50ms TE, 6000ms TR, 26cm×26cm FOV, 128×128 matrix, 10 mm slice thickness, 1 NEX and 73 phases. The sexual stimulation paradigm consisted of two alternating periods of rest and activation: 1 minute rest with non-erotic film and 2 minute stimulation with erotic video film. Functional MR images were analyzed by using statistical parametric mapping (SPM99) software. The total numbers of pixels activated in the cerebrocortical regions were used to compare the activation index before and after testosterone therapy, where the significance of the differences before and after hormone supplementation was evaluated by using Student's t-test.

Results : The brain activation after testosterone supplementation was enhanced by 7.2 times as compared with the case prior to hormone therapy. Especially precentral and postcentral gyri, inferior frontal gyrus, anterior temporal gyrus, cingulate gyrus, globus pallidus, thalamus, and putamen were significantly activated by visual stimulation. In the limbic areas, there were some variation with individual, but globus pallidus was significantly increased than any other areas. Although the brain activation of hypogonadal patients is much less than that with normal volunteers, overall activation with testosterone supplementation was dramatically enhanced by 287% in the frontal lobe, 76.7% in the temporal lobe, 590% in the parietal lobe, 4.6% in the occipital lobe, 2,879% in the cingulate gyrus, and 464% in the limbic area, where the cingulate gyrus, parietal lobe, limbic area and frontal lobe are superior to any other brain regions.

Conclusion : In this study, we found that brain activities in hypogonadal patients were enhanced with testosterone supplementation. In addition, this findings might be useful to understand the effect of testosterone and neuronal mechanism for the hypogonadal patient.