Reduced Spontaneous Neural Activity in psychogenic Erectile Dysfunction:A Resting-State Functional Magnetic Resonance Imaging Study.

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Purpose

Psychogenic erectile dysfunction (ED) is defined as the persistent inability to attain and/or sustain an erection sufficient to allow sexual performance, mainly or exclusively due to psychological or relationship factors[1].Little is known about the central pathological mechanism of psychogenic ED.Resting-state functional MR imaging, by analyzing the low-frequency fluctuations of BOLD signal,are thought to be of physiologic importance and reflect spontaneous neuronal activity[2]. Regional homogeneity (ReHo) is a method for measuring local synchronization of spontaneous activity within neighboring voxels in the resting state and has been successfully used to investigate the functional modulations in patients with neurodegenerative deseases as well as phychiatric diseases[3].Thus we aim to investigate neural activity in the resting state of psychogenic ED by using resting-state functional magnetic resonance (MR) imaging and the ReHo method.

Subjects and Methods

This prospective study was approved by the appropriate ethics committee, and written informed consent was obtained from each participant.35 patients with psychogenic ED and 33 control subjects participated.Resting-state functional MR imaging was performed on GE MR Discovery 750 using a T2* gradient-echo-planar imaging sequence. ReHo was calculated by using Statistical Parametric Mapping(SPM8) (http://www.fil.ion.ucl.ac.uk/spm) and Data Processing Assistant for RS-fMRI(DPARSF, http://www.restfmri.net) software.Voxel-based analysis of the ReHo maps within group was performed using one-sample t test and the analysis between groups was performed using two-sample t test.Statistical maps were set at $P < 0.05$ and were corrected for multiple comparisons.

Results:

One-sample t test showed regions with increased ReHo value were distributed in the posterior cingulate(PCC), medial prefrontal (mPFC) and bilateral inferior parietal areas in both groups(Figure 1).These regions mainly constitute Default Mode Network(DMN). Two-sample t test showed that compared with control subjects, regions with decreased ReHo value were observed in left ventral medial prefrontal cortex (LVMPFC) and right hippocampus (Figure 2).

Discussion

Our results displayed decreased coherence of local BOLD signal fluctuations in the left VMPFC and right hippocampus in psychogenic erectile dysfunction patients.VMPFC has been reported to be contribute to the integration of emotional and cognitive processes and playing a central role in the disengagement from the evaluation of the content of erotic stimuli[4]. The hippocampus might be involved in the control of sexual behavior through a possible role of hypothalamic trigger of erection[5]. Decreased ReHo value in these two regions reflected the destruction of local synchronization of spontaneous low-frequency BOLD fluctuations and may implies functional deficits.

Conclusion

Compared with control subjects, psychogenic ED exhibited decreased ReHo in the left VMPFC and right hippocampus, suggesting functional deficits of these regions. The present study for the first time reveals resting-state abnormalities in psychogenic ED and may lead to further improvement of the understanding of the pathogenetic mechanism.

References

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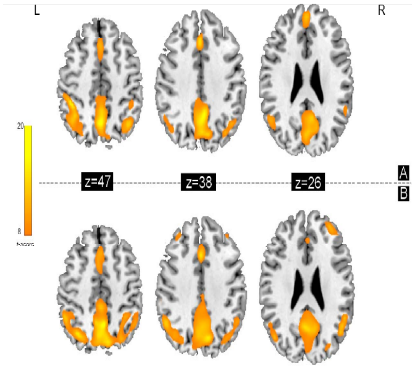

Figure1. One-sample t test showed regions with increased ReHo values were distributed in the posterior cingulate(PCC), medial prefrontal (mPFC) and bilateral inferior parietal areas in both groups.

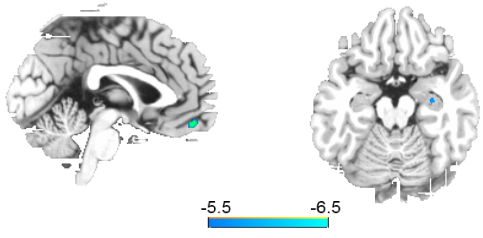

Figure2. Two-sample t test showed regions with decreased ReHo value were left ventral medial prefrontal cortex (LVMPFC) and right hippocampus compared with control subjects.