184

Gao Y[1], Liao L[1]
1. *Dept of Urology, China Rehabilitation Research Centre*

A RESTING STATE FMRI COMPARATIVE STUDY ON BLADDER STORAGE FUNCTION BETWEEN NORMAL VOLUNTEERS AND NEUROGENIC OVERACTIVITY BLADDER

Hypothesis / aims of study

In order to observe central responses during naturally occurring urinary bladder storage in healthy subjects and neurogenic overactive bladder, we examined brain areas that control strong bladder sensation by resting state functional magnetic resonance imaging (rs-fMRI).

Study design, materials and methods

The fifteen healthy volunteers and fifteen neurogenic OAB patients were recruited. All subjects were scanned twice under the following two conditions: empty bladder and full bladder ('strong desire to void') without the use of filling with a catheter. Brain imaging software MATLAB, SPM8, DPABI, DPARSF, REST and BrainNet Viewer were adopted to analyze the difference in brain-blood perfusion between the two conditions. Voxel-based analysis of the regional homogeneity (Reho) maps and functional connectivity (FC) between empty and full bladder were performed with t test. Statistical maps were set at P value <0.05 and were corrected for multiple comparisons.

Results

1. The responses became stronger in the state of strong desire to void with healthy volunteers ($P < 0.05$). Increased activity regions during strong desire to void were observed in the bilateral prefrontal cortex (PFC), anterior cingulate cortex (ACC), hypothalamus, temporal lobes and left caudate nucleus. 2. Increased activity regions during strong desire to void with neurogenic OAB patients were observed in the bilateral frontal cortex (FC), anterior and middle cingulate cortex (ACC, MCC), temporal lobes. 3. Increased activity regions in "strong desire to void" compared neurogenic OAB subjects with healthy subjects were observed in the bilateral frontal cortex (FC), temporal lobes, and left middle cingulate cortex (MCC).

Interpretation of results

With five exciting area as the seed point of Neurogenic OAB patients with urinary storage, excitatory area of whole brain functional connectivity were anterior cingulate, frontal cotext, occipital lobe, paracentral lobule, globus pallidus, insular lobe; inhibitory area were hippocampus, precentral gyrus, lentiform nucleus, cerebellum, medial superior frontal gyrus.

Concluding message

Our results suggest that the bilateral prefrontal lobe, anterior cingulate cortex, hypothalamus, temporal lobe and left caudate nucleus may play a role in the control of bladder with healthy subjects during strong desire to void. The activation of the left middle cingulate cortex, and the over-activation of the bilateral frontal lobes, bilateral temporal lobes might be the cause of the emergence of overactive bladder in patients with neurogenic OAB. It was demonstrated that rs-fMRI could be used to study the mutual association between the bladder and the brain.

References

1. Griffiths D, Tadic SD, Schaefer W, et al. Cerebral control of the bladder innormal and urge-incontinent women. Neuroimage 2007; 37: 1–7.
2. Blok BF, Antoon T. M. Willemsen, et al. A PET study on brain control of micturition in humans. Brain 1997; 120: 111–21.

Disclosures

Funding: Beijing Scientific Research Funds of Capital Medical Development (No. 2014-2-4141 **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Ethics Committee of China Rehabilitation Research Center **Helsinki:** Yes **Informed Consent:** Yes