

Alterations in regional homogeneity of resting-state brain activity in patients with Chronic Prostatitis/Chronic Pelvic Pain Syndrome

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TARGET AUDIENCE: Scientists and clinicians who are interested in Chronic Prostatitis/Chronic Pelvic Pain Syndrome.

PURPOSE: The prevalence rate of Chronic prostatitis/Chronic pelvic pain syndrome (CP/CPPS) is approximate 9-16% in the world.¹ However, the pathogenesis of CP/CPPS has been largely unknown so far. We aimed to explore the central mechanism of CP/CPPS without spontaneous pelvic pain during resting-state scanning by regional homogeneity (ReHo) method.

MATERIALS AND METHODS: We used a ReHo method to investigate CP/CPPS-related modulations of neural activity in the resting state. 29 male patients (average 36 years) with chronic prostatitis/chronic pelvic pain syndrome, as well as 29 age-and-gender matched healthy controls were enrolled in this study. All subjects were right-handed. 38 axial slices covering the whole brain were acquired by using a 3.0T MR scanner with an eight channel phase array head coil (TR/TE 2000/30 ms, flip angle 90°, matrix 64 × 64, FOV 24 cm, thickness 4 mm, no gap, total 210 time points). Data preprocessing included slice timing and realignment for temporal and spatial adjustment using SPM8, followed by spatial normalization to warp all the images into the same stereotactic space for group comparison. An in-house software DPARSF was used for ReHo analysis (<http://www.restfmri.net>). All the time series were de-trended and band-pass filtered (0.01-0.08Hz). ReHo was calculated based on a cluster size of 27 voxels and standardized by the global mean within the whole brain. At the second-level analysis, two-sample t-tests was adopted to show ReHo-related differences between CP/CPPS patients and healthy controls.

RESULTS: For two-sample T test, CP/CPPS-patients group showed increased ReHo in the left thalamus and decreased in the bilateral anterior insula (AI) and the bilateral anterior cingulate cortex (ACC) ($p < 0.05$, family discovery rate corrected) as compared to the control group.

DISCUSSION: The increased ReHo in the left thalamus of patients with CP/CPPS, in the dominant hemisphere, could lead to hyperalgesia which increased the sensitivity to pain perception.² The decreased ReHo in the bilateral AI and ACC in the patients without spontaneous pelvic pain implied an impaired descending pain inhibitory mechanism that exists in CP/CPPS. This finding also predicted the reduction in efficacy of endogenous opioid receptors in the AI and ACC in CP/CPPS.³

CONCLUSION: The results of this study demonstrate altered cerebral activity in the resting state in patients with CP/CPPS. Our findings may be helpful for further study on the central mechanism of CP/CPPS.

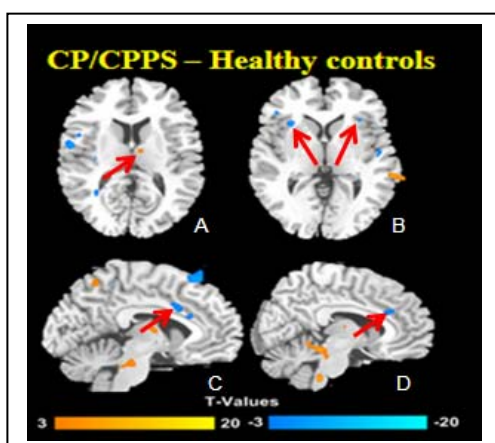


Figure. CP/CPPS-patients group shows increased ReHo in the left thalamus (Fig.A), and decreased ReHo in the bilateral anterior insula (Fig.B) and the bilateral anterior cingulate cortex (Fig.C and D) ($p < 0.05$, family discovery rate corrected) as compared to the control group.

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