

Brain connectivity markers in degenerative cervical myelopathy patients with depression for predicting the prognosis following decompression surgery

Objective: To determine if brain functional connectivity (FC) is associated with the prognosis in depressed degenerative cervical myelopathy patients (DCM) and to investigate the possible brain functional mechanism.

Methods: Resting-state fMRI scans and peripheral blood cell counts from 33 depressed DCM patients, 33 age and gender-matched DCM patients without depression were analyzed. All patients were evaluated using Japanese Orthopedic Association score before and 6 weeks after decompression surgery. JOA recovery rate was calculated to assess the functional recovery for DCM patients. For each participant, seed-based functional connectivity maps based on sub-regions centered on the striatum were computed and compared between groups. Pearson correlations were performed to explore the relationships between clinical measures and brain alterations in depressed DCM patients. To further investigate the relationships between brain alterations and clinical measures in depressed DCM patients, mediation analyses were performed. Flow cytometry was also performed on the three of the 33 depressed DCM patients, and the results were analyzed.

Results: In comparison to patients without depression, DCM patients exhibited lower FC between the dorsal caudate (dC) and the inferior frontal operculum, which is located in the dorsal lateral prefrontal cortex (dlPFC). In depressed DCM patients, the altered dC-dlPFC FC was associated with inflammation as determined by the

neutrophils/lymphocyte's ratio and prognosis. Furthermore, the mediation analysis demonstrated that the dC-dlPFC FC mediated the effect of inflammation on prognosis.

The outcomes of our three cases followed a similar pattern to these findings.

Conclusion: In conclusion, our findings imply that inflammation slowed the functional recovery in depressed DCM patients through the striatal-frontal FC pathway.