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REDUCED WHITE MATTER INTEGRITY AT SPLENIUM OF CORPUS CALLOSUM CONNECTING TO SOMATOSENSORY CORTEX IN ADOLESCENT IDIOPATHIC SCOLIOSIS (AIS) COMPARED WITH NORMAL CONTROL – A CEREBRAL DIFFUSION TENSOR IMAGING (DTI) STUDY

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Introduction: Increasing evidence shows the possibility of an underlying neurological disorder for adolescent idiopathic scoliosis (AIS), such as the disturbed somatosensory functions. In this study, we examined the cerebral white matter fiber bundles in AIS using diffusion tensor imaging (DTI), a magnetic resonance imaging (MRI) technique to measure the white matter integrity, e.g. fiber density, and myelination in white matter reflected by the fractional anisotropy (FA). We will focus in the largest white matter fiber bundles, corpus callosum (CC) which is acting as a bridge to link the two hemispheres of the brain (left and right) because morphological changes in CC have been reported by our group previously [1].

Subjects and Methods: Thirty three AIS patients (girl, right thoracic curve, age 14.9 ± 1.4) and thirty age-matched normal control (NC) (girl, age 14.7 ± 0.9) underwent DTI along 32 non-linear directions using a 3T MRI scanner. 3D segmentation of the CC was performed semi-automatically using ITK-SNAP 2.4, followed by regional segmentation of the CC using a well-known CC template, Witelson, et al. template.

Results: In the 3D segmentation, significantly lower mean FA values of the genu of the CC interconnecting the premotor cortex and splenium of the CC interconnecting somatosensory cortex were found in AIS patients compared to those in normal control ($p < 0.001$), while the other regions also showed a lower FA value in AIS though have not yet reached statistical significance.

Discussion and Conclusion: Generalized lower FA values in CC of the AIS patient indicates that there is a reduced white matter integrity of CC, in particular the genu and the splenium of the CC fibers interconnecting the premotor cortex, as well as the somatosensory cortex respectively. This coincides with our clinical observation of significantly prolonged latency of somatosensory evoked potentials (SSEP) over the somatosensory cortex on the side of the major curve [2]. Along with our previous study which showed a reduction of white matter integrity within the cervical cord [3], we observe a general reduction of white matter integrity in major fibers connecting to somatosensory cortex in AIS.

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ASSESSMENT OF LARGE JOINT DESTRUCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS USING FDG-PET/CT

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Introduction: The assessments of joint damage in patients with rheumatoid arthritis (RA) are mainly restricted to small joints in the hands and feet. However, the development of arthritis in RA patients often involves the large joints, such as the shoulder, elbow, hip, knee and ankle. Few previous reports have studied the predictive value of radiographic findings for destruction of the large joints in RA patients. 18F-fluorodeoxyglucose positron emission tomography combined with computed tomography (FDG-PET/CT) precisely visualizes the disease activity in large joints affected by RA. Furthermore, the response on FDG-PET correlates with the clinical response to biologic treatment. However, it is not thoroughly understood whether FDG-PET/CT findings correlate with the severity of destruction in the large joints of the RA patients. The purpose of this study is to investigate the associations between destruction of the large joints and FDG-PET/CT findings, the disease activity and laboratory parameters after the administration of biological therapy in patients with RA.

Subjects and Methods: Twenty-three RA patients (six males and 17 females; mean age of 66.9 ± 7.9 years) were assessed in this study. FDG-PET/CT was performed before the initiation of biological therapy and six months after the therapy. The extent of FDG uptake in large joints (shoulder, elbow, hand, hip, knee and ankle) was analyzed using the maximum standardized uptake value (SUVmax). Radiographs of the 12 large joints per patient, for a total of 276 joints, were obtained at baseline and after two years. Twelve joints had previously been treated with joint replacement surgery at baseline and were excluded from this analysis. A total of 264 large joints were assessed according to Larsen's method. The disease activity and laboratory parameters were evaluated at baseline and six, 12 and 24 months after the therapy. A logistic regression analysis was performed to determine the factors most significantly contributing to the progression of joint destruction within two years.

Results: Among the 264 joints, radiographic progression of joint destruction was detected in 33 joints. The SUVmax at baseline and six months and the disease activity score (DAS) 28 – erythrocyte sedimentation rate (ESR) at six, 12 and 24 months were significantly higher in the group with progressive joint destruction. The multivariate logistic regression analysis revealed the SUVmax at baseline and DAS28-ESR at six months were found to be factors associated with joint destruction at two years ($p < 0.05$).

Discussion and Conclusion: The FDG uptake was significantly higher in the large joints demonstrating radiographic progression of destruction at two years after the initiation of biological therapy. The SUVmax at baseline and the DAS28–ESR