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Scientific Abstract

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Role of Diffusion Tensor Imaging Parameters and White Matter Lesions to Predict Deterioration of Cognitive Function in between Fallers and Non Fallers Group.

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Background & Objectives:

To study the longitudinal microstructural white matter changes via diffusion tensor imaging (DTI) parameters and white matter lesion volume with associated clinical impacts in fallers and non-fallers.

Methods:

29 participants (13 fallers and 16 non-fallers) were re-recruited and repeat scan performed at year 3 or 4 using 3.0T MRI machine. Severity of white matter lesions (WML) was categorized from 0 to 3 using the Fazekas grade. WML volume was calculated using the Lesion Segmentation Tool (LST) in SPM12. Tract-based spatial statistic (TBSS) analysis of fractional anisotropy (FA) and mean diffusivity (MD) data were obtained from selected white matter tracts. Cognitive assessment (MMSE and MoCA) were used to assess clinical impacts of falls in both groups.

Results:

The percentage of fallers compared to non-fallers was significantly higher in the group of high WML grades and percentage of non-fallers compared to fallers was significantly higher in the group of low WML grade ($p < 0.05$).

The WML volume of the fallers is significantly higher at follow-up MRI compared to baseline MRI ($p < 0.05$). The WML volume of non-fallers is also significantly higher at follow-up MRI compared to baseline MRI ($p < 0.05$).

TBSS analysis for both groups showed multiple regions with significant decrease FA/increase MD at follow-up MRI.

Conclusion:

DTI is useful adjunct tools to predict deterioration of cognitive function in fallers and non-fallers groups. Both have statistically significant longitudinal changes in white matter lesion volume and TBSS analysis parameters from its baseline measurement.