Changes of Fractional Anisotropy in Ischemic White Matter in Childhood Moyamoya Disease: Correlation with Perfusion MRI.

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BACKGROUND AND PURPOSE

With diffusion tensor (DT) imaging advancing, fractional anisotropy (FA) have been applied to several pathological conditions, including Moyamoya disease. However, the correlation between DTI and perfusion MRI in Moyamoya disease have not been well established. The purpose of this study is to evaluate the clinical relevance to FA measurement in white matter suffering from decreased perfusion in moyamoya disease, through the correlation between FA value and perfusion MRI.

MATERIALS AND METHODS

Fluid attenuation inversion recovery (FLAIR), DT images (apparent diffusion coefficient, trace and FA maps), and time to peak (TTP) maps of 37 childhood Moyamoya patients and 24 age-matched controls were reviewed retrospectively. The hemisphere with more delayed TTP in each Moyamoya patient was determined by visual analysis. FA values of bilateral centrum semiovales in Moyamoya patients and controls were measured by regions of interest (ROI) method. Comparison of FA values between patient and control groups was done by using unpaired *t* test.. And then FA value in the hemisphere ipsilateral to more delayed TTP (FA-CS_{ipsi}) were compared with those the contralateral hemisphere (FA-CS_{contra}) by using paired *t* test. Asymmetry indices (AIs) were used to identify regional asymmetries.

RESULTS

There was high concordance rate (92%) between hemispheres with lower FA and delayed TTP. The intergroup comparison showed that FA value was significantly lower in patient group than control group (P=0.043). FA-CS_{ipsi} was significantly lower than FA-CS_{contra} (P<0.0001). AI was significantly higher for the patient group than for the control group (P=0.005).

CONCLUSION

In the areas of chronic hypoperfusion in MMD, FA was decreased significantly although overt infarct was not demonstrated. Diffusion tensor imaging can be used in the assessment of intergrity of white matter suffering from chronic ischemia