

Comparison of Fractional Anisotropy Values of Corticospinal Tract and Corpus Callosum between 6- and 25-Direction Diffusion Tensor Images in Normal Subjects

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Purpose : To investigate the difference of fractional anisotropy (FA) values between 6- and 25-direction diffusion tensor images (DTI) in normal adult brain.

Materials and Methods : DTI was performed in 28 normal subjects (15 subjects with 6-direction, 13 subjects with 25-direction) in a 1.5 T MR system. DTI was done with SE-EPI sequence with TR/TE/NEX 10000/84/1, 5mm slice thickness and b=1000 s/mm². FA values were measured from 8 different anatomical locations which included both cerebral peduncles, both posterior limbs of the internal capsules, both corona radiata, genu and splenium of the corpus callosum. Statistical difference of FA was tested between 6- and 25-direction DTI.

Results : FA values were found to make no significant difference between 6- and 25-direction images except right corona radiata. Mean FA values in 6-direction images were cerebral peduncles (R:0.660.03, L:0.660.02) ,posterior limbs of the internal capsules (R:0.630.03, L:0.640.04) ,corona radiata (R:0.560.05, L:0.570.03) ,genu and splenium of the corpus callosum (G:0.710.06, S:0.720.05) ,and mean FA values in 25-direction images were cerebral peduncles (R:0.680.11, L:0.680.10) ,posterior limbs of the internal capsules (R:0.620.08, L:0.620.09) ,corona radiata (R:0.640.10, L:0.630.09),genu and splenium of the corpus callosum (G:0.680.07, S:0.730.14).

Conclusion : There is no significant difference of FA values in the corticospinal tract and corpus callosum between 6- and 25- direction DTI in normal adult brains. The significant difference of FA values of right corona radiata is probably due to measurement errors caused by indistinct boundary of the corona radiata and asymmetry of FA map.