A Diffusion tensor imaging study to compare normative fractional anisotropy values with patients suffering from parkinson's disease in the brain white matter

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Abstract

Background: The robust technique for Parkinson's disease (PD) imaging has been the use of DTI. FA is one of the most frequently used quantitative brain diffusion measurements. Objective: To compare FA values between patients's with early Parkinson's disease and healthy controls.

Materials and Methods: In this phase of the study, 40 subjects were employed with early PD and 40 healthy controls to evaluate changes in microstructural white and gray matter in the brain using DTI. Comparison of FA values in the brain white and grey matter of patients with Parkinson's disease and age matched controls at the corpus callosum, centrum semiovale, pons, putamen, caudate nucleus, substantial nigra, cerebral peduncles and cerebellar peduncles, was done using a ROI technique, with b-value of 1000 s/mm2 and TE=100 milliseconds using 1.5 T MRI system. We used a ROI of 8 voxels at the corpus callous, centrum semi vale and pons while rest of the regions we employed a ROI of single voxel size. At the cerebellar peduncles, a ROI of 4 voxel size was used.

Results: Our study revealed the presence of damage in the substantial nitro, corpus callosum, putamen and cerebral peduncles mainly in the PD group.

Conclusion: Our findings indicate that DTI and ROI methods can be used in patients with early PD to study microstructural alterations mainly in the substantia nigra. We also consider FA at the putamen as an early predictor of PD.

Keywords: FA; DTI, Parkinson's disease/parkinsonism [PD], MRI.

Biography:

Rahul P Kotian, Professor In Medical Imaging., Ph.D., MSc MIT, BSc MIT is a doctorate in Magnetic Resonance Imaging who received his Ph.D., degree from Manipal College of Health Professions, Manipal Academy of Higher Education, Manipal, Karnataka, India where he also won the best outgoing student award at the graduate and post-graduate level. He is currently working as the Principal at NIMS Paramedical College, NIMS University, Jaipur, and Rajasthan, India. He has contributed extensively to the world medical imaging literature with 37 publications appearing in scopus indexed and springer nature publications. He is recognized international leader in the field of Medical Imaging in DTI and FA imaging in Parkinson's disease.

Speaker Publications:

1. "A diffusion tensor imaging study to compare normative fractional anisotropy values with patients suffering from Parkinson's disease in the brain grey and white matter".
2. "Estimating the proportion of bone mineral density loss in patients with normal kidney function among South Indian population".
3. "Correlation Of Bone Mineral Density Measured In Quantitative Computed Tomography With Hounsfield Unit".

[2nd Global Meeting on Oncology and Radiology](#); Webinar- December 10, 2020

Abstract Citation:

Rahul P Kotian, A Diffusion tensor imaging study to compare normative fractional anisotropy values with patients suffering from Parkinson's disease in the brain white matter, Radiology and Oncology 2020, 2nd Global Meeting on Oncology and Radiology; Webinar- December 10, 2020 (https://radiology-oncology.annualcongress.com/)