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E-Mail: roxana.oana@gmail.com Primary Category: Neuroradiology/Head and Neck
Secondary Category: Brain: MR, Other Parkinson's Disease patient classification using brain MRI FA map histograms

R O Teodorescu, DIPLENG, , Timisoara, Timis ROM; D Racoceanu, DSc, ; W K Leow, DSc, ; C H Huang, DSc, ; H Mueller, PhD; K O Lovblad, MD; et al. (roxana.oana@gmail.com, daniel.racoceanu@ens2m.fr) **PURPOSE**

The fractional anisotropy (FA) in diffusion tensor imaging (DTI) has been shown to be sensitive to changes in the substantia nigra in Parkinson's disease (PD) and correlating with clinical severity. The purpose of this study is to evaluate if the histogram information prelevated from the FA color map on the green channel running in an anterior-posterior direction in the midbrain, is a sensitive indicator of degeneration of the striatonigral tracts in the midbrain.

METHOD AND MATERIALS

Thirty-five patients (mean age 62, SD 9.91; 20 men and 15 women) clinically diagnosed with PD underwent DTI imaging (TR/TE 4300/90; 12 directions; 4 averages; 4/0 mm sections; 1.2 x 1.2 mm in-plane resolution) after giving informed consent. The FA color map at the slice that contains substantia nigra and red nucleus was cropped and split according to the three color channels (RGB) using imageJ toolkit. Assuming that the striato-nigral tracts ran more in an anterior-posterior rather than superior-inferior direction, the green channel from the color map was analyzed. The variation of the pixel number in the green channel extracted from the cropped region of interest (ROI) was correlated with the clinical Hoehn & Yahr (H&Y) score. We used 12 pixel intensities (20-35) that were present in a different amount for each patient. Each pixel intensity from the patients' histogram was correlated with the H&Y scale. The clinical demographics and green channel histogram were tabulated and compared between patients using the student t test (SPSS software).

RESULTS

The preliminary findings show that the green channel histogram values for pixels intensities between 20 and 35 were able to classify the PD patients based on clinical severity. The *p* value was ranging between 0.001 and 0.009 for the selected pixel intensities on the green channel. A correlation was found between the pixel values and the clinical H&Y score.

CONCLUSION

Our findings show that green channel histograms from FA maps could predict the clinical severity for PD and provide an objective classification similar to the H&Y scale.

CLINICAL RELEVANCE/APPLICATION

FA color maps can classify patients according to clinical severity and may represent a marker for clinical progression in PD patients.