T2 RELAXOMETRY USING 3.0-TESLA MAGNETIC RESONANCE IMAGING (MRI) OF THE BRAIN IN EARLY- AND LATE- ONSET RESTLESS LEGS SYNDROME (RLS)

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Objective: Previous T2 relaxometry studies provide evidence for regional brain iron deficiency of RLS patients. With respect to the iron content of several brain regions especially substantia nigra (SN) measured by T2 relaxometry in early-onset and late-onset RLS patients, there were inconsistent results. In this study we assess the regional iron content in patients with early-onset and late-onset RLS using magnetic resonance imaging (MRI) and compared these results with those of the controls.

Methods: 37 patients with idiopathic RLS (20 early-onset and 17 late-onset RLS patients) and 40 control subjects were studied with 3.0-tesla MRI with the gradient-echo sampling of free induction decay and echo (GESFIDE) pulse sequence. We measured the regions of interest (ROI) independently by two trained analysts by using software known as MIPAV (medical image processing, analysis, and visualization), and compared the results and conducted a correlation analysis to investigate which areas related to RLS clinical variables.

Results: The iron index was significantly lower in patients with late-onset RLS than in controls in the substantia nigra ($p = 0.033$), while in patients with early-onset RLS there was no significant difference. There was no significant correlation between the substantia nigra iron index of the late-onset RLS group and clinical variables such as disease severity.

Conclusions: Late-onset RLS is associated with decreased iron content of substantia nigra. Low iron content in the substantia nigra may support the role of regional brain iron deficiency in the pathophysiology of late-onset RLS.