Serum neurofilament light chain levels and cognitive performance in multiple sclerosis: a longitudinal retrospective 5-year study

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Objective: To assess the associations between serum neurofilament light chain (sNfL) levels and cognitive performance in multiple sclerosis (MS) patients and age-matched healthy controls (HCs) over 5 years.

Background: The neurodegenerative pathology in MS patients is associated with poorer cognitive performance. sNfL is an emerging biomarker of neuroaxonal injury.

Design/Methods: 127 MS patients (85 relapsing-remitting MS and 42 progressive MS), 20 clinically isolated syndrome (CIS) patients and 52 HCs were followed for a mean of 5.5 years. At baseline and follow-up, the sNfL levels were measured using sensitive Simoa assay and quantified in pg/ml. At the follow-up, the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS) was utilized and scores regarding processing speed, verbal, and visuospatial memory were obtained. Cognitively impaired (CI) status was derived using HC-based z-scores. ANCOVA and regression models adjusted for age and years of education were used.

Results: Follow-up sNfL levels were associated with poorer processing speed performance (β=-0.228, p=0.024) and visuospatial memory (β=-0.284, p=0.024) in MS patients. Baseline sNfL levels predicted poorer processing speed (β=-0.185, p=0.04) and verbal memory (β=-0.199, p=0.027) 5 years later. CI MS patients had higher sNfL levels (mean 35.8 vs. 24.4, p=0.019), after adjusting for age and disease duration. Over 5 years, the CI MS patients had higher absolute increase in sNfL when compared the non-CI MS patients (mean 6.4 vs. 0.9, p=0.04). Patients with follow-up sNfL ≥30 pg/ml (n=46) had poorer processing speed performance when compared to patients with <30 pg/ml (43.7 vs. 51.9, p=0.024). In the HCs, the follow-up sNfL levels showed associations with processing speed (β=-0.316, p=0.036) and visuospatial memory (β=-0.499, p=0.001).

Conclusions: Higher sNfL levels are associated with poorer processing speed and visuospatial memory performance in both the MS patients and HCs. Within the MS group, baseline sNfL levels are associated with future poorer processing speed performance.