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Serum S100B represents a biomarker for cognitive impairment in patients with end-stage renal disease

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Objectives: Cognitive impairment (CI) has been recognized as a complication of end-stage renal disease (ESRD) and its treatment. Neuron-specific enolase (NSE) and S100B protein are known neuro-biochemical markers of brain damage. The aim of this study was to investigate the potential role of serum NSE and S100B levels in predicting CI in patients with ESRD.

Methods: Thirty patients with ESRD were prospectively enrolled. All of them were receiving maintenance hemodialysis three times weekly for 180 days. We analyzed the potential value of serum NSE and S100B levels for distinguishing patients with CI from those without CI. The Mini-Mental State Examination was used for neuropsychological assessment. The differences between the groups were analyzed using demographic and laboratory profiles as independent variables.

Results: Of the 30 patients with ESRD, 13 had CI, whereas the other 17 did not. The demographic profiles, including age, and laboratory profiles, including S100B level, were significantly different between the patients with and without CI. The patients with CI were older than those without CI. Additionally, serum S100B levels in patients with CI were significantly higher than those in patients without CI. However, serum NSE levels did not differ between the groups. The best cut-off values for predicting CI were 17.7 mg/mL for NSE and 36.1 pg/mL for S100B, respectively, based on receiver operating characteristic analysis. Multiple logistic regression analyses showed that serum S100B level was a statistically significant independent predictor of CI.

Conclusions: We found that approximately 40% of patients with ESRD had CI. Serum S100B levels but not serum NSE levels are significantly increased in patients with ESRD. These findings suggest that CI in patients with ESRD is associated with glial cell dysfunction in the brain rather than neuronal cell dysfunction.