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Plasma GFAP and NfL levels in a group of Parkinson's disease patients. A study on clinical parameters and motion sensor tests

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Introduction: Glial fibrillary acid protein (GFAP) has been recently studied as a biomarker for diagnostic and prognostic purposes of Alzheimer's disease and other neurodegenerative, neuroinflammatory or traumatic brain conditions. Plasma neurofilament light chain (NfL) has been identified as one of the most promising biomarkers for predicting disease burden and progression in several neurological conditions [MOU1] . Recent studies suggest that mobile health technologies could be more sensitive in detecting motor impairment in patients affected by Parkinson's Disease (PD).

Objective: To measure plasma levels of GFAP and NfL in blood samples from drug naïve PD patients, and to compare these biomarkers with clinical parameters and motion sensors tests.

Methods: We measured plasma GFAP and NfL using Single molecule array (Simoa) assays in consecutive drug naïve PD patients. All PD patients underwent an extensive motor and non-motor assessment. In a subgroup of patients, the motor assessment included a kinematics study with inertial motion sensors. The correlation between plasma biomarkers and motor scores at baseline and at follow-up were evaluated using linear and partial correlation analyses, corrected for age and gender.

Results: forty-two PD patients entered the study. GFAP and NfL did not show any correlation with clinical parameters. In PD patients, both GFAP and NfL correlated with several motion sensors recorded parameters: for GFAP, normal pace step length (R= -0,340 '=0.039) balance in semi-tandem position (R=0.322 p=0.040), gait and timed up and go angular velocity (R=-0.379 p=0.032); for NfL: straight walk normal pace step length asymmetry (R=-0.329 p=0.050), dual task straight walk times, balance jerks (R=0.433 p=0.004), timed up and go maximum speed (R=-0.344, p=0.04)

Conclusions: Our study shows that plasma GFAP and NfL correlate with subtle differences in motor performances in drug naïve PD patients, not identifiable by standard UPDRS-III assessment but measurable by mobile health technologies.