P94

CSF biomarkers profile of patients with Parkinson's disease treated with different MAO-B inhibitors in add-on

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Introduction: Monoamino oxidase type B inhibitors (iMAO-Bs) are a group of widely-used antiparkinsonian agents which showed, at experimental level, neuroprotective properties in Parkinson's disease (PD) models. However, human-based proofs that iMAO-Bs exert neuroprotection are very limited and not completely univocal. Because of the proximity with the brain, cerebrospinal fluid (CSF) mirrors pathological changes occurring in neurodegenerative diseases, allowing tracking molecular events by the measurement of neurodegeneration-related peptides levels.

Objective: Analyse the CSF profile of classical neurodegeration-related biomarkers in PD patients chronically treated with different iMAO-Bs to identify biochemical signatures suggestive of potential neuroprotective effects.

Methods: The study involved 35 PD patients in add-on therapy with iMAO-Bs for at least one year (n=13 rasagiline, n=9 selegiline, n=13 safinamide). Levels of amyloid-β-42 (Aβ42), amyloid-β-40 (Aβ40), total and 181-phosphorilated tau (t-tau and p-tau) and lactate were measured following standard procedures. Aβ42/ Aβ40 ratio was also calculated. MDS-UPDRS part III, MoCA scores and levodopa equivalent daily dose (LEDD) were collected for each patient. Clinical and biochemical parameters were compared among the groups.

Results: No differences resulted in demographics and clinical parameters among patients under different iMAO-Bs. CSF t-tau, p-tau and lactate levels, instead, significantly differed. Post hoc analysis with Bonferroni correction and pairwise comparison revealed that patients under selegiline had higher levels of CSF t-tau (p=0,001), p-tau (p=0,019) and lactate levels (p=0,028) when compared to those under safinamide, and higher levels of CSF t-tau (p=0,005) and p-tau (p=0,030) when compared to those under rasagiline.

Conclusion: This pilot study showed that distinct iMAO-Bs could be associated to different profiles of CSF neurodegeneration-related biomarkers in PD. In particular, we found lower levels of tau proteins and lactate in patients under rasagiline and safinamide, compared to those under selegiline, which may depend on the respective pharmacological properties of each drug. Future studies are now needed to confirm and extend these preliminary findings.