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Neuroimaging and behavioral abnormalities in progressive supranuclear palsy

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Introduction: Progressive supranuclear palsy (PSP) is an atypical parkinsonism often complicated by neuropsychiatric symptoms, with a high prevalence of impulsivity and apathy [1,2]. Currently, little is known about possible correlations between these aspects and cerebral morphological measurements, specially when it comes to subcortical structures.

Objective: To explore the relationship between behavioral abnormalities and brain measurements in PSP patients.

Methods: PSP was diagnosed according to the Movement Disorder Society criteria [3]. 54 patients went through Neuropsychiatric Inventory Questionnaire (NPI) and 3-Tesla magnetic resonance imaging (MRI). Regions of interest were identified with the Desikan-Killiany cortical atlas [5]. Computed cerebral measurements were thickness, area and volume. Correlations between NPI and imaging output were calculated with Spearman's Rho. Post-hoc comparisons were run with Bonferroni test. The significance level was set at ≤ 0.05.

Results: A moderate correlation was found between severity of apathy and left pallidum volumes (*rho* (52) = -0,688892081; p = 0,002). Smaller pallidum volumes were associated with more severe apathy.

Conclusions: Our data showed a possible link between apathy and atrophy of subcortical structures in PSP patients. These results are further supported by prior studies concerning the role of globus pallidus in the regulation of motivation and reward [6]. In fact, it has already been proved that globus pallidus lesions may determine a severe apathy syndrome, either isolated or in the context of the so-called pallidal dementia [7].
Further studies are warranted to better explain the role of basal ganglia in behavioral manifestations of PSP.

References:

[1] Gerstenecker A, Duff K, Mast B, Litvanc I, for the ENGENE-PSP study group, 2013. Behavioral abnormalities in progressive supranuclear palsy. Psychiatry Res 210 (3), 1205-1210.
[2] Kok ZQ, Murle AG, Rittman T, Rowe J, Passamonti L. 2021. Co-Occurrence of Apathy and Impulsivity in Progressive Supranuclear Palsy. Mov Disord Clinical Practice 8(8), 1225-1233.
[3] Höglinger GU, Respondek G, Stamelou M, et al., 2017. Clinical diagnosis of progressive supranuclear palsy: the movement disorder society criteria. Mov Disord 32, 853–864.
[4] Cumming JL, Mega M, Gray K, Rosenber-Thompson S, Carusi DA, Gornbein J 1994. The Neuropsychiatric Inventory: comprehensive assessment of psychopathology in dementia. Neurology 44(12), 2308-2314.

[5] Desikan RS, Ségonne F, Fischl B, Quinn, BT, Dickerson BC, Blacker D, Buckner RL, Dale AM, Maguire RP, Hyman BT, Albert MS, Killiany RJ 2006. An automated labeling system for subdividing the human cerebral cortex on MRI scans into gyral based regions of interest. Neuroimage 31, 968–980.
[6] Levy R, Dubois B 2006. Apathy and the functional anatomy of the prefrontal cortex-basal ganglia circuits. Cerebral Cortex 16, 916-928.
[7] Levy R, Czernecki V 2006. Apathy and the basal ganglia. J Neurol 253 [Suppl 7], VII/54-VII/61.