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Sex differences in cortical hemodynamic response to levodopa in Parkinson's disease patients: a functional NIRS study

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Objective: The aim of this study was to investigate sex differences in hemodynamic response of the cortical motor system after levodopa intake, in patients affected by Parkinson's disease (PD) with levodopa-induced dyskinesias (LID), by means of functional near-infrared spectroscopy (fNIRS).

Patients and Methods: Patients fulfilling UK Brain Bank criteria for PD, referring to the Movement Disorders Center of the University "Magna Graecia" of Catanzaro, were consecutively recruited. Main inclusion criteria were a) presence of LID; b) duration of levodopa treatment greater than 6 months; c) stable dosages of levodopa treatment for at least 4 weeks. All patients were evaluated by means of motor UPDRS and AIMS scale at baseline (T0), after 1 (T1), and 2 (T2) hours from levodopa intake. NIRS study was performed at the same time-points.

Results: Nine PD patients with LID were included. Four were females (age: 60.83 ± 4.17 years, mean ± SD) and five were males (age: 61.00 ± 14.00 years; p=0.978). In NIRS study, in men a gradual increase in oxygenated-hemoglobin (HbO) concentrations of motor cortex was observed at T1 and T2, in comparison to T0. By contrast, women showed a reduction in HbO concentrations at T1 in comparison to T0, followed by a return to baseline hemodynamic activation levels after 2 hours from levodopa intake.

Discussion and Conclusions: Our preliminary results of this fNIRS study showed a significant difference in the motor cortical haemodynamic responses to levodopa intake in male and female patients with PD and dyskinesias. Further studies on sex-disaggregated data to interpret differential cortical activation in PD are needed.