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Does deep brain stimulation lead to personality change? A pilot study in Parkinson's disease

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Introduction: Deep brain stimulation (DBS) has emerged as one of the most effective treatment modalities for Parkinson disease (PD). There is, however, increasing evidence that subthalamic nucleus-DBS (STN-DBS) may be associated with a higher incidence of adverse changes in behavior when compared to other stimulation sites [1].

Objective: To date, no study has investigated the effect of the amount of total electrical energy delivered (TEED) on behavioral adverse changes. To characterize this issue, we assessed personality traits correlated with TEED in twenty PD patients.

Methods: 20 PD patients (12 women, mean [±SD] age 57.6±7.6 years) with advanced L-dopa responsive PD were included in this study. We tested psychological issues before and 12 months after bilateral DBS-STN. To assess personality we used MMPI-2 according to CAPSIT-PD procedure [2].

Results: After 12 months of DBS, patients showed significant changes in some MMPI-2 scales. Specifically, we observed higher scores in the D scale ($p = 0.015$), DEP scale ($p = 0.009$), LSE scale ($p = 0.023$) and WRK scale ($p = 0.002$). We found a correlation between the changes in MMPI-2 subscale D and TEED on the right hemisphere (Spearman's rho = -0.68, $p = 0.007$) after 12 months.

Conclusions: Different influences of multiple factors contribute to impact the personality traits such as TEED, intra/postsurgical coping mechanisms and outcome expectations. Our study encourages broader research programs focused on increasing our knowledge of the TEED effect on mood and personality traits. Further studies should be designed based on longer follow-up, in order to clarify the duration of the potential stimulation effects on patients' mood and personality traits.

References

[1] Hannah et al. Neuropsychol Rev 2015;25(4):439-54.
[2] Defer et al. J Mov Disord 1999;14(4):572-84.