

Effects of dopaminergic medication on reactive and proactive inhibitory control

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Objective: Inhibitory control plays a crucial role in decision-making, allowing behavioral flexibility in a continually changing world [1]. This executive function is severely impaired in Parkinson's disease (PD), [2-5], dramatically impacting patients' ability to pursue future-oriented goals. Paradoxically, even though it is well known that the midbrain's dopamine neurons have a key role in decision making [6-7], the effects of dopaminergic medication on inhibition are still largely unclear. However, understanding the impact of dopamine on inhibitory control has crucial clinical implications.

Methods: To shed light on this issue, we took into consideration two aspects previously almost neglected. First, we compared the stop-signal task performance in early- (Hoehn and Yahr stage 1.5/2, n=20) versus moderate-to-advanced (Hoehn and Yahr stage 2.5/3, n=20) PD patients both in ON and in OFF medication. Second, we evaluated both neuropsychological domains of inhibitory control for each cohort of patients, i.e., reactive (the ability to react to a stop signal) and proactive inhibition (the ability to adapt the motor strategies according to the current context flexibly). The latter domain has never been studied in such a context.

Results: We found that medication benefited proactive and reactive inhibitory control in patients with shorter disease duration differently from moderate-to-advanced patients.

Conclusions: Such findings indicate that in a more advanced stage of PD the efficacy of dopaminergic drugs is diminished possibly because there are few remaining dopaminergic cells for the drugs to operate on. Thus, the effect of dopaminergic drugs on inhibitory control could potentially provide critical insights into the state of the disease.

References

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