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Impact of vinpocetine on the therapeutic effectiveness of L-DOPA using rat model of Parkinson's Disease

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Background: Parkinson's disease (PD) represents the most common movement disorder which is characterized by progressive degeneration of dopaminergic neurons as well as dysfunction of the basal ganglia. L-DOPA is still the gold standard effective therapy in PD despite the periodic increase of dosage to achieve stable therapeutic effects along with the long-term treatment side effects. Vinpocetine (Vinp) has been used for treatment of cerebrovascular disorders and may be promising as neuroprotective and PD modifier.

Objective: The objective of this study is to evaluate and compare the efficacy of Vinp and/or L-DOPA against rotenone-induced PD in rats as well as the possibility of L-DOPA dosage reduction without compromising the therapeutic effectiveness.

Methods: Rats were divided to normal group and five rotenone (RT) groups. One of RT (2.5 mg/kg) groups served as control PD model while the others were treated with either L-DOPA (10 or 25 mg/kg), Vinp (6 mg/kg) or both Vinp and L-DOPA (10 mg/kg) all for 19 days. Motor and cognitive performances were assessed using catalepsy, open-field and Y-maze tests. Striatal dopamine, norepinephrine, serotonin and acetylcholinesterase as well as mitochondrial complex I, MDA, SOD, TAC, IL-1β, TNF-α, and caspase-3 expression were measured in addition to histopathological examination of different brain regions.

Results: Concurrent treatment with Vinp and/or L-DOPA significantly ameliorated the impairments in locomotor activities and cognition as well as attenuated the depletions in monoamines and mitochondrial complex1 contents. In addition, the elevations in acetylcholinesterase activity, oxidative stress and inflammatory markers as well as caspase 3 expression induced by RT were also decreased. Combination of Vinp with low dose L-DOPA has an equivalent or almost better effect than the higher dose of L-DOPA alone.

Conclusion: Vinp has beneficial motor, cognitive, neurochemical effects and represents a promising adjuvant to L-DOPA therapy that can be translated into a serious reduction of its therapeutic doses and consequently reduction of the long-term therapy side effects. Consequently, Vinp could be recommended as a disease-modifying therapy of PD especially when given early with L-DOPA.

Biography

Azza A Ali has completed her PhD specialized in Pharmacology and Toxicology from Faculty of Pharmacy, Cairo University, Egypt. Her Postdoctoral studies included different scientific aspects especially on neurodegenerative disorders. She has also developed research line of behavioral pharmacology in Egypt. She is member of many scientific societies as (AAPS) and Alzheimer's Association (ISTAART). She is also the Editorial Board Member of many international Journals such as *Brain Disorder & Therapy, Acta Psychopathologica, EC Pharmacology and Toxicology* as well as Organizing Committee Member at the 7th International Conference on Dementia and Care Practice. She has published more than 50 papers in reputed journals, supervised and discussed more than 80 PhD and MSc thesis and actively participated by oral and posters presentations at many international conferences especially on Alzheimer's disease and Dementia as Dementia Conferences 2015, 2016 and Alzheimer's Association International Conference (AAIC 2016). She has many appreciation certificates and certificate of best presentation award at 19th International Conference on Environmental Pollution and Pollution Control (ICEPPC 2017). Currently, she is the Head of Pharmacology and Toxicology Department at Al-Azhar University, Egypt.

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