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EFFECTIVENESS OF LEVODOPA VS. DOPAMINE AGONISTS IN PARKINSON'S DISEASE

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Parkinson's disease (PD) is a chronic neurodegenerative disorder caused by the progressive loss of dopamine-producing neurons in the substantia nigra, resulting in characteristic motor symptoms such as tremors, muscle stiffness, slowed movement, and balance difficulties. The disease's underlying pathology involves oxidative stress, mitochondrial dysfunction, and abnormal protein accumulation, though its exact cause remains unknown. The main treatment options work by replacing dopamine, either with levodopa or dopamine agonists (DAs). However, choosing the right treatment involves considering their different benefits, side effects, and long-term outcomes.

Levodopa, the most effective medication for PD, provides rapid and significant symptom relief by converting into dopamine in the brain. Despite its effectiveness, prolonged use often leads to complications like involuntary movements (dyskinesias) and fluctuating motor responses, greatly due to its short duration of action and irregular dopamine stimulation. In contrast, DAs, which directly activate dopamine receptors (mainly D2), and offer more stable stimulation and are associated with a lower risk of motor complications. Research shows that starting with dopamine agonists (DAs) early, especially in younger patients, can delay the need for levodopa by several years and lower the chance of developing dyskinesias later on. However, DAs don't control symptoms as strongly as levodopa, and they come with their own risks, including hallucinations, impulse control problems, and other behavioral side effects.

While levodopa clearly works better for controlling symptoms, both treatments seem to help patients' daily lives about equally in the long run. Interestingly, some brain scan studies suggest dopamine agonists might actually protect nerve cells - they appear to slow down dopamine neuron damage compared to levodopa. However, these findings are not absolute, and the observed differences could be due to drug effects rather than true disease modification. Cost also plays a role, as DAs are more expensive, though they may lower long-term healthcare expenses by reducing complications.

The choice between levodopa and DAs depends on individual factors such as age, disease progression, and personal preferences. In conclusion, the effectiveness of levodopa versus dopamine agonists in Parkinson's disease remains uncertain, as neither treatment has definitive research proving superiority. Levodopa offers immediate symptom relief but is associated with significant side effects, while dopamine agonists provide more stable stimulation and may delay levodopa-related complications. Both treatments have their pros and cons, making individualized choices essential based on patient factors. Future research should explore long-term effects, neuroprotective effects, and individual treatments to enhance PD care. Ultimately, an effective Parkinson's care requires combining clinical evidence with the treatment outcomes, which is essential to optimize treatment and improve quality of life in PD.