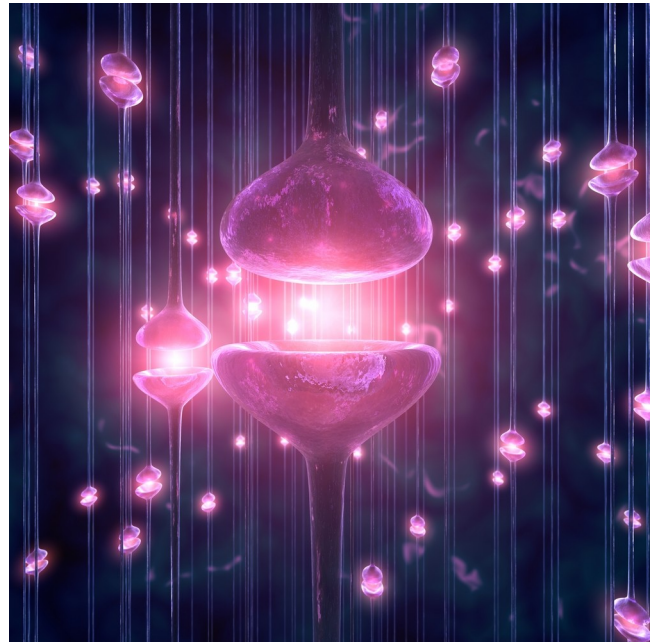


Parkinson's disease is a neurodegenerative disease with a classic triad of symptoms consisting of skeletal muscle tremor, muscle rigidity, and akinesia (impaired body movement). Symptoms often begin as a loss of arm swing when walking or loss of head rotation when turning the body. As the disease progresses, a mask-like expression with limited eye-blinking develops and emotional responses appear limited. It is associated with diaphragmatic spasms, oculogyric crises, depression, and dementia. There is no known cause for Parkinson's disease, but it has a high association with manganese exposure in welders and a genetic component has been identified.

The fundamental pathology is a loss of dopaminergic fibers in the basal ganglia resulting in a decreased concentration of dopamine. Because dopamine is responsible for inhibiting the firing of extrapyramidal neurons, the result of its absence is unopposed stimulation of these neurons by acetylcholine.

Treatment of Parkinson's disease is aimed at increasing the amount of dopamine in the basal ganglia or suppressing the neuronal effects of acetylcholine. Levodopa is a precursor to dopamine. It is combined with a decarboxylase inhibitor to prevent the peripheral conversion of levodopa to dopamine and increase levels in the central nervous system. Side effects include dyskinesias (in over 80% of patients after one year of treatment), hallucinations, paranoia, and mania. Increases in cardiac contractility and heart rate occur. Orthostatic hypotension is also common in these individuals and levodopa therapy may result in nausea and vomiting as a result of stimulation of the chemoreceptor trigger zone.



*The loss of dopaminergic fibers in the basal ganglia results in unopposed stimulation of extrapyramidal neurons by acetylcholine.*

Surgical treatment of Parkinson's is reserved for cases refractory to medical therapy or severely disabling stages of the disease. Pallidotomy, a procedure where a small probe is inserted into the globus pallidus (one of the basal ganglia) and heated, so that the ganglia is destroyed, is associated with marked improvement in levodopa-induced dyskinesias. A deep brain stimulator may also be inserted to stimulate the subthalamic nuclei to reduce tremors.

When preparing a patient with Parkinson's disease for surgery, it is important to recognize that the half-life of levodopa is short and missing even a single dose can result in skeletal muscle rigidity which can impair ventilation. Oral levodopa may be administered about 20 minutes before induction and continued via orogastric tube if surgery lasts longer than 6 – 12 hours.

Hypotension and cardiac arrhythmias can result from the use of levodopa and should be anticipated prior to induction of anesthesia. Butyrophenones such as droperidol and haloperidol should be avoided as they can antagonize the effects of dopamine in the basal ganglia. Alfentanil has been reported to result in acute dystonic reactions, presumably due to central dopaminergic transmission. Ketamine can theoretically result in exaggerated sympathetic responses, but has been used safely in these patients.

*Stoelting RK, Dierdorf SF. Anesthesia & Co-Existing Diseases. 5th ed. New York, NY: Churchill-Livingston; 2008: 227-228.*