

Subthalamic Stimulation, Apomorphine, and Levodopa Infusion in Parkinson's Disease

Citation: Dafsari, H. S., Martinez-Martin, P., Rizos, A., Trost, M., dos Santos Ghilardi, M. G., Reddy, P., & Barbe, M. T. (2019). EuroInf 2: Subthalamic stimulation, apomorphine, and levodopa infusion in Parkinson's disease. *Movement Disorders*, s34(3), 353-365.

Introduction:

The aim of this study was to compare 3 well-established, safe and effective treatments for symptoms in Parkinson's Disease (PD) to assist with improving quality of life. This is the first study to compare the different treatment effects of the following 3 therapeutic strategies in individuals with PD:

- 1) Deep Brain Stimulation of the subthalamic nucleus (**STN-DBS**)
- 2) Intrajejunal levodopa infusion (**IJLI**)
- 3) Apomorphine infusion (**APO**)

Methods:

This study was a prospective, nonrandomized, study with observation with a 6 month follow up period across 5 movement disorders centers throughout the world (Cologne, London, Venice, Sao Paulo, and Ljubljana).

Groups were as follows with average age of 62.3 and with 12.1 years disease duration.

- 1) 101 patients underwent STN-DBS
- 2) 33 received IJLI
- 3) 39 received APO

Clinical assessments performed at preoperative baseline and at 6-month follow up after surgery:

- The Unified Parkinson's Disease Rating Scale (UPDRS-III and IV) – Measure of motor impairment
- The Hoehn and Yahr Scale (H&Y) – Measure of symptom progression
- The Parkinson's Disease Questionnaire – 8 (PDQ-8) – Measure of quality of life
- Non-Motor Symptoms Questionnaire (NMSQ)

Results:

- In all 3 groups, quality of life, motor and non-motor symptoms improved significantly at follow up (See Table 1).

Table 1. Treatment impact on motor symptoms, non-motor symptoms, and quality of life

	Motor Symptoms	Non-Motor Symptoms	Quality of Life
STN-DBS	Showed an improvement of ON state at follow up.	Improved sleep/fatigue, mood/cognition, perceptual problems/hallucinations, urinary symptoms, sexual functions, pain, inability to smell/taste and excessive sweating.	Significant correlation between quality of life and urinary symptoms.
Intrajejunal levodopa infusion	Showed an improvement of ON state at follow up.	Improved sleep, mood/cognition, gastrointestinal symptoms and inability to taste/smell.	Significant correlation between quality of life and sleep/fatigue.
Apomorphine infusion	Showed an improvement of ON state at follow up.	Improved mood/cognition, perceptual problems/hallucinations, attention/memory, weight change and excessive sweating.	Significant correlation between quality of life and attention/memory and cardiovascular domains.

Conclusions:

All three treatments had significant beneficial effects on non-motor symptoms, as well as motor symptoms and quality of life. Considering statistical magnitude of relative changes across the 3 groups, the IJLI and DBS groups seemed to be favorable over the APO group regarding improvement of the Non-Motor Symptom Questionnaire Total Score. However, APO improved cognition and psychiatric symptoms and seemed to improve quality of life.

This study supports the need for holistic assessments of motor and non-motor symptoms of PD to better personalize treatment options based on patient's specific PD profiles.