

## Mayo Clinic Arizona

### Introduction

The impact of deep brain stimulation (DBS) surgery on cognition in patients with Parkinson's Disease (PD) can be a major obstacle to quality of life in this population. We investigated the effects of DBS of the globus pallidus pars interna (GPi) or subthalamic nucleus (STN) on cognitive function six months following DBS surgery in patients with medically refractory PD.

### Methods

A historical cohort study of 32 patients with medically refractory PD undergoing bilateral GPi DBS (13) or STN DBS (19) were studied. All patients underwent neuropsychological batteries at baseline and six months post DBS surgery. Boston Naming Test (BNT), Wechsler Adult Intelligence Scale-IV Verbal Comprehension Index (WAIS-IV VCI), Wechsler Adult Intelligence Scale-IV Working Memory Test (WAIS-IV VMI) and Wechsler Adult Intelligence Scale-IV Processing Speed Test (WAIS-IV PSI) were used.

### Results

We observed no significant difference in GPi patients between baseline and follow-up test scores on any of the four neuropsychological tests. STN patients showed significant cognitive decline on follow-up as compared to baseline on three of the four cognitive tests: WAIS-VCI (104.95 [SD 12.9] vs. 100.89 [12.4];  $p=0.0044$ ), WAIS-WMI (99.32 [14.1] vs. 92.68 [12.5];  $p<0.001$ ), and WAIS-PSI (92.95 [12.9] vs. 81.89 [12.2];  $p<0.001$ ). When we compared the changes in baseline and follow-up scores between the GPi and STN patients, we observed a significant difference on three (WAIS-VCI, WAIS-WMI, WAIS-PSI) of the cognitive tests

### Conclusions

Our results indicate that STN DBS, but not GPi DBS, is associated with a less favorable cognitive outcome in the domains of processing speed, attention/concentration, and language. From a cognitive health perspective, these findings suggest that GPi may be a preferred target for DBS in patients with medically refractory PD.

### Learning Objectives

Comparison of GPi and STN DBS in PD patients regarding cognition.

Utility of neuropsychological testing in DBS patients.

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