controls (HC) participated in the study. PD participants were diagnosed with MCI based on the Movement Disorders Society Task force, Level II assessment (comprehensive assessment). Participants were asked to inhale gas enriched in CO_2 to elicit a vasodilatory response while undergoing bold oxygen level-dependent magnetic resonance image (MRI). Whole brain fit to an end-tidal CO_2 regressor and delay were used to quantify CVR in each participant. An analysis of covariance (ANCOVA) was used to evaluate group differences between HC, PD-NC, and PD-MCI in the whole brain fit and delay CVR measures accounting for age, sex, and education. Multiple regressions were conducted for each cognitive variable with whole brain fit and delay as the dependent variables adjusting for age, sex, and education.

Results: A significant main effect of group was observed for whole brain CVR latency ($F_{(2, 23)}$ = 4.227; p = 0.027). Post hoc tests were not significant, though indicated a trend that PD-NC (18.14 ±1.94) and PD-MCI (18.15 ± 1.55) patients exhibited longer delays relative to HC (15.84 ± 2.37). Regression results indicated limited relationships between CVR measures and cognitive functioning.

Conclusions: PD patients (PD-NC and PD-MCI) exhibited longer CVR delays relative to HC, suggesting a delayed vasodilatory response in PD. Examination of the association between CVR metrics and cognition were not significant, though these results should be interpreted with caution given the small sample size.

Categories: Movement and Movement Disorders
Keyword 1: Parkinson's disease
Keyword 2: cerebrovascular disease
Keyword 3: mild cognitive impairment
Correspondence: Sephira G. Ryman, Ph.D. Assistant Professor Mind Research Network (www.mrn.org) sryman@mrn.org

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26 Correlates of Neuropsychological Decline Following Deep Brain Stimulation in Patients with Parkinson's Disease

Sofia Magee[1], Christine G St Clair[2], Joohi Jimenez-Shahed[2], Christina A Palmese[2]

[1]William Patterson University of New Jersey, Wayne, NJ, USA. [2]Icahn School of Medicine, New York, NY, USA

Objective: Deep Brain Stimulation (DBS) is an FDA-approved treatment for Parkinson's Disease (PD), for which the medical workup includes routine pre- and post- operative neuropsychological assessment to determine potential surgical cognitive risk. Existing research suggests that cognitively normal individuals experience good cognitive outcome, whereas those with pre-existing cognitive deficits are prone to accelerated cognitive decline post-DBS. The goal of this study is to identify characteristics that determine which individuals with PD are at risk for accelerated post-DBS cognitive loss, and to characterize the nature of the decline in this population.

Participants and Methods: We conducted a retrospective chart review of PD- DBS patients who completed their DBS workup and surgery at Mount Sinai Hospital NYC between 2015 and 2022. Non-English speakers were excluded from this study due to small sample size and use of a neurocognitive battery different from that of English speakers. Using repeated measures t-tests, chi square, and regression analyses, we explored variables related to disease (e.g., duration, L-Dopa burden, DBS target), socio-demographic background (e.g., age onset, current age, education), assessment modality (telehealth vs in-office), neurocognitive performances (e.g., WMS-IV Logical Memory (LM), HVLT-R, WASI-II Matrix & Similarities, WAIS-IV Digit Span), and cognitive diagnosis (amnestic vs non-amnestic MCI) for all individuals in the sample. At the individual level, we utilized Reliable Change Indices (RCI) to identify clinically significant cognitive differences from pre- to post-DBS exam. We considered LM- Delayed Recall (LMDR) as a proxy for memory loss, as this cognitive function is expected to remain generally unchanged post PD-DBS. Therefore, decline on this measure in the first year after DBS could indicate a change in global memory function and possible evidence of accelerated postoperative decline.

Results: Of 65 charts reviewed, 44 patients were native English-speaking and included in our analyses. At the group level, there were no significant differences in disease characteristics, socio-demographic variables, or cognitive classification between those who declined versus those who did not decline on

LMDR. Regression statistics for predictors of cognitive decline also were non-significant. Of the eight individuals who declined on LMDR, one patient declined on a total of one neuropsychological measure, four declined on a total of two measures, two declined on a total of three measures, and one declined on a total of four measures. Two of these eight individuals had a diagnosis that changed to amnestic MCI based on concomitant interval history of ADL compromise. Of these two individuals, one declined in two tests and the other declined in four tests. Six of the eight individuals who declined also showed abnormalities in their imaging with either edema or hemorrhage.

Conclusions: Our analysis is unique in that we explored cognitive decline at both the group and individual levels. Despite this, we did not find predictors of post-DBS cognitive decline. Further detailed analysis of additional post-operative factors that might play a greater role in our understanding of this phenomenon is warranted. This said, our data do support that the majority of individuals with non-amnestic MCI did not decline cognitively.

Categories: Movement and Movement Disorders
Keyword 1: deep brain stimulation
Keyword 2: Parkinson's disease
Keyword 3: cognitive functioning
Correspondence: Sofia Magee MA, William Patterson University of New Jersey, magees3@student.wpunj.edu

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27 Neuropsychiatric Sequela of COVID-19 Among Persons with MS

Anjali Patel[1], Yixuan Sun[1], Michelle Chen[2]
[1]Rutgers University, New Brunswick, NJ, USA.
[2]Institute for Health, Health Care Policy, and Aging Research, Rutgers University, New Brunswick, NJ, USA

Objective: To evaluate changes in neuropsychiatric symptoms among patients with multiple sclerosis (MS) following coronavirus disease of 2019 (COVID-19) infection using the National COVID Cohort Collaborative (N3C). The N3C represents the largest cohort of COVID-19 cases, through the unification of electronic health records from over 60 medical centers.

Participants and Methods: Out of 5,631,225 COVID-19 confirmed positive patients, we identified a cohort of patients with MS who were diagnosed with COVID-19. Conditions were searched using terms denoting common neuropsychiatric comorbid diagnoses, including anxiety, depression, pain, sleep disorders, fatigue, and cognitive disorders. We examined descriptively the percentages of patients who were newly diagnosed with each comorbid condition after COVID-19 infection. Additionally, we searched for various patient-reported outcome measures in the N3C dataset; only the Patient Health Questionnaire-9 (PHQ-9) had an adequate sample size in our cohort for analysis. To control for variability due to non-COVID-19 factors, we only included PHQ-9 scores that were reported one year before and after COVID-19 infection. A repeated-measures analysis of variance (ANOVA) was conducted to analyze the difference between PHQ-9 scores before and after COVID-19 diagnosis among MS patients.

Results: In our final dataset, there were 40,690 patients who were diagnosed with MS and COVID-19. Among patients without pre-existing anxiety conditions, 9.18% were diagnosed with an anxiety disorder after COVID-19 infection. Among those who did not have a pre-existing cognitive disorder, 1.73% had such diagnoses after COVID-19 infection. Among those without previous depressive disorders, 8.89% were diagnosed with a depressive disorder after COVID-19 infection. Of those without fatigue conditions prior to COVID-19 in their medical records, 8.81% had documented fatigue in their records after contracting COVID-19. Of those without pain conditions in their medical records, 11.37% had documented pain in their records after COVID-19 infection. Finally, among patients without pre-existing sleep disorders, 8.71% were diagnosed with sleep disorders after COVID-19 infection. Regarding PHQ-9 scores, 50 patients had documented scores before their COVID-19 diagnosis and 50 after COVID-19 diagnosis (17 had scores for both before and after COVID-19 diagnosis). There was no significant difference in PHQ-9 scores before and after COVID-19 diagnosis ($F_{(df)} = 0.326$, $p = 0.572$; $mean_{before} = 8.77$, $mean_{after} = 9.32$).

Conclusions: Approximately 2-11% of MS patients developed new neuropsychiatric conditions after COVID-19 infection, with pain being the most common, followed by anxiety, fatigue, depression, and sleep disorders. Cognitive disorders were the least prevalent new