Impact of Cognitive Impairment on Mini-BESTest and EMG Activity During Balance for Patients with Parkinson’s Disease (PD)

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Aim Statement

Compare cognitive measure (MoCA) score with balance outcome measures (Mini-BESTest and EMG activity) in patients with Parkinsonism.

Background

Parkinson’s Disease (PD) causes profound balance problems and falls, resulting in significant morbidity, mortality, healthcare expense, and reduced quality of life. Currently, there is a gap in knowledge as to how cognitive impairments influence balance reactions in patients with PD. The MoCA is a brief screening instrument designed to assess various cognitive domains while the Mini-BESTest is a clinical measure designed to challenge distinct balance domains. The measures used in this study were chosen based on reliability and frequency of use among health professionals. We hypothesized that participants chosen based on reliability and frequency of use among health professionals. We hypothesized that participants with MoCA scores below 26/30 would perform worse on subdomains of the Mini-BESTest involving a cognitive component.

Study Design

Prospective cross-sectional study embedded within an longitudinal study of fall risk in Parkinson’s patients.

Study Variables:
- Montreal Cognitive Assessment (MoCA)
- Mini Balance Evaluation Systems Test (Mini-BESTest),
- Lower leg EMG recordings during balance testing (McKay et al., in review)

Methods

Data Collection:
1. Informed consent and study enrollment
2. Collection of demographic information
3. Cognitive assessments: MoCA
4. Functional assessments: Mini-BEST
5. Movement Disorders Society Unified Parkinson’s Disease Rating Scale (MDS-UPDRS-III) Rated by SA Factor, DO
6. Preparation and collection of EMG data
7. Monthly fall report collection for 12 months
8. Data analysis performed by G. Dolce

Examples of Destabilizing Feedback EMG

<table>
<thead>
<tr>
<th>Subdomain</th>
<th>Range</th>
<th>Overall (N=65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean, SD)</td>
<td></td>
<td>Overall (N=65)</td>
</tr>
<tr>
<td>MDS-UPDRS-III (Motor)</td>
<td>67.2(7.5)</td>
<td>34.3(14.0)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td>Overall (N=65)</td>
</tr>
<tr>
<td>Female</td>
<td>24(36.9%)</td>
<td>7.8(5.3)</td>
</tr>
<tr>
<td>Male</td>
<td>41(63.1%)</td>
<td>0.7(22.0)</td>
</tr>
<tr>
<td>MoCA Destabilizing Feedback</td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>Total</td>
<td>26.3(2.7)</td>
<td>2.8(1.4)</td>
</tr>
<tr>
<td>Range</td>
<td>19.0-30.0</td>
<td>9.0-28.0</td>
</tr>
</tbody>
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Conclusions

There is likely an association between low MoCA scores and low subdomain scores of the Mini-BESTest. There is a stronger association in the dynamic gait subscore compared to the other subdomains. We hypothesize that MCI causes a decreased MoCA and impacts the cognitive component of the Mini-BESTest. Overall, a strong association was found and supports the hypothesis that PD patients with MCI will score lower on Mini-BESTest Dynamic Gait and Sensory Orientation subdomains than PD patients.

References