Axial symptoms predict mortality in patients with Parkinson disease and subthalamic stimulation

Brian Lau, PhD, Niklaus Meier, MD, Giulia Serra, MD, et al.

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Study objective and summary result
This study examined whether disease progression in patients with Parkinson disease (PD) is associated with mortality after deep brain stimulation of the subthalamic nucleus (STN-DBS), and it found that axial disability levels predict mortality in such patients after STN-DBS.

What is known and what this paper adds
Results from past studies suggest that the relationship between disease progression and mortality in patients with PD who undergo STN-DBS may differ from the relationship in patients with PD who do not undergo STN-DBS. This study clarifies the relationship in STN-DBS–treated patients.

Participants and setting
The investigators consecutively enrolled 143 STN-DBS–treated patients with PD through the Pitié-Salpêtrière Hospital (Paris, France) between February 1996 and December 2003. Selection for STN-DBS was based on baseline ages <70 years, Hoehn and Yahr stages ≥2.5, >40% decreases in motor symptom severities with levodopa treatment, and disabling levodopa-induced motor complications despite optimal treatment.

Design, size, and duration
The participants were assessed 1–3 months before surgery and at 1-, 2-, 5-, and 10-year postoperative timepoints. To assess disease progression, the Unified PD Rating Scale (UPDRS) part III was used to evaluate each participant for akinesia, rigidity, tremor severity, and axial disability; the Mattis Dementia Rating Scale to evaluate each participant for changes in cognitive status; and item 4 of the UPDRS part I to evaluate each participant for the severity of hallucinations. Linear mixed models characterized the progression of each symptom; and joint models were used to link symptom progression to mortality.

Main results and the role of chance
Over follow-up (median duration, 12 years), cognitive decline and worsening of akinesia, rigidity, and axial disability occurred, with death in 41 participants. Axial disability levels were associated with mortality (p = 0.012).

Bias, confounding, and other reasons for caution
The UPDRS part III subscores were calculated from relatively few items. Other clinical scales such as the Gait and Balance Scale may be more appropriate for assessing axial disability.

Generalizability to other populations
This study’s single-center nature may limit the generalizability of the results.

Study funding/potential competing interests
This study was funded by the French and Swiss governments and Sanofi-Aventis. Some authors report receiving personal fees, nonfinancial support, and grants from various healthcare companies and the Michael J. Fox Foundation. Go to Neurology.org/N for full disclosures.

Table

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Hazard ratio for mortality per unit of square-root-transformed score</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akinesia</td>
<td>1.79</td>
<td>0.116</td>
</tr>
<tr>
<td>Rigidity</td>
<td>1.93</td>
<td>0.127</td>
</tr>
<tr>
<td>Tremor severity</td>
<td>1.25</td>
<td>0.370</td>
</tr>
<tr>
<td>Axial disability</td>
<td>4.30</td>
<td>0.012</td>
</tr>
<tr>
<td>Hallucinations</td>
<td>1.69</td>
<td>0.349</td>
</tr>
<tr>
<td>Cognitive decline</td>
<td>1.36</td>
<td>0.262</td>
</tr>
</tbody>
</table>

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The authors of the full-length article and the journal editors edited and approved the final version.
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