Response inhibition in Parkinson's disease patients with STN-DBS

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BACKGROUND

‣ Deep brain stimulation (DBS) improves PD motor symptoms, but also shows noticeable cognitive adverse effects in some patients
‣ E.g. response inhibition (Jahanshahi et al., 2015) - here measured with the stop-signal task
‣ Explanation via interaction between electrode location & individual anatomy?

PARADIGM

<table>
<thead>
<tr>
<th></th>
<th>time (min)</th>
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</thead>
<tbody>
<tr>
<td>UPDRS-III (~10 min)</td>
<td>-60</td>
<td>0</td>
</tr>
<tr>
<td>Stim change (~10 m)</td>
<td>90</td>
<td>180</td>
</tr>
<tr>
<td>Stop-signal (~15 min)</td>
<td>270</td>
<td>330</td>
</tr>
<tr>
<td>DBS-stand</td>
<td>DBS OFF</td>
<td>DBS DORSAL/VENTRAL</td>
</tr>
<tr>
<td></td>
<td>DBS DORSAL/VENTRAL</td>
<td>DBS ON + MED</td>
</tr>
</tbody>
</table>
* Neurological exam (MMSE, MDI; ~45 min)

METHODS

STOP-SIGNAL TASK

ELECTRODE LOCALIZATION

(MEYEG) TRACTOGRAPHY

(PRELIMINARY) BEHAVIORAL RESULTS (N = 8)

‣ Both VENTRAL and DORSAL stimulation in STN relieve motor symptoms (UPDRS-III)
‣ Response inhibition seems largely unaffected at the group level
‣ However, the noticeable individual variation will be investigated using MEG and tractography with larger N

MOTOR SYMPTOMS

RESPONSE INHIBITION

Subset of PD patients experiencing effects on their response inhibition with more ventral DBS > individual differences in anatomy of STN?

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References:
Jahanshahi et al. (2015), Nat Rev Neurosci 16(10), 715-726