Introduction & Aims

Verbal fluency impairments are the earliest and most typical cognitive deficits in Parkinson’s disease (PD). Verbal fluency tasks employed in PD have demonstrated mixed results when performance on phonemic and semantic fluency tasks are compared. Semantic fluency shows more significant impairment than phonemic fluency in PD (Henry and Crawford, 2004). Furthermore, studies have also reported that PD patients with semantic fluency impairments were far more susceptible to progress to PDD than those without such semantic fluency deficits (Janvin et al., 2006; Williams-Gray et al., 2007). There are currently no studies investigating neural connections in PD in relation to verbal fluency and non specific to PD-MCI.

• To compare and contrast performance in verbal fluency between PD-MCI, PD-NC and healthy controls (HC)
• To examine neural mechanisms of semantic fluency deficits in PD-MCI

Method

Subjects

37 PD patients (13 PD-MCI, 24 PD-NC) and 20 sex- and age-matched healthy controls participated in this study. Participants with dementia (< 24 MMSE), high depression or anxiety were excluded. PD-MCI were identified using <1.5SD in level 2 MDS criteria (Litvan, Goldman et al. 2012). All assessments were conducted in the ‘ON’ state.

Data Acquisition

A Siemens 3T Prisma (Siemens, Erlangen) and 20-channel head coil were used to perform MRIs. 260 BOLD sensitive gradient EPI were acquired during each block with 4 dummy scans at the start of each session (TE = 30ms, TR = 2050ms, flip angle = 80°, slice thickness = 2.6mm, interslice gap = 0mm, field of view = 190x190mm2). Three-dimensional high resolution structural T1-weighted MP2RAGE scans were also obtained (TE = 2.09ms, TI = 700ms, FA = 3, field of view = 256 x 240 x 176 mm3).

PD-MCI performed worse than PD-NC and HC during verbal fluency tasks

• Patients with PD-MCI performed significantly worse than PD-NC and HC during phonemic, semantic and semantic switching fluency. There was no difference between PD-NC and HC.
• Phonemic fluency impairment was greater than the semantic fluency impairment in PD-MCI. The ratio between phonemic and semantic fluency was significantly lower in patients with PD-MCI compared to PD-NC and HC.

Discussion

Increased activity in the right angular was negatively correlated with participants’ performance on semantic fluency, semantic fluency category switching and phonemic fluency outside the scanner, demonstrating a significant association between the right angular gyrus and verbal fluency impairment in PD.

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References


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