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Investigating physical and cognitive changes over two years in patients with moderate to late stage Parkinson's disease in Northumbria

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Background

- Parkinson's disease (PD) patients face both motor and non-motor symptoms, with non-motor shown to have a greater impact on quality of life[1].
- Studies suggest that the Montreal Cognitive Assessment (MoCA) is more sensitive than the Mini Mental State Exam (MMSE) for detecting cognitive decline in PD[2].
- Grip strength has been shown to be a better predictor of decline in function compared to gait and balance[3].

Methods

- The Northumbria Care Needs Project is investigating the care requirements of Hoehn and Yahr score III-V PD patients. Only patients with complete baseline and follow-up data were included.
- Follow up data were collected between 23/11/16 and 29/01/19, two years after patients were seen at baseline.
- We assessed changes in timed up and go (TUG), grip strength, MoCA and MMSE scores, and explored which areas of cognition were most commonly affected. TUG was defined as normal (≤10s), good (≤20s) or problematic (>20s).
- Decline in grip strength was compared against patient's MDS-UPDRS scores for hand movements (question 3.5).

Results

Physical changes:

- TUG 75/162 patients were analysed:
  - 33% had a decrease
  - 15% had an increase
  - Of the patients with no change, around half had a "problematic" TUG at baseline.
- Grip strength 56/162 patients were analysed:
  - There was an overall decline in grip strength
  - Very few showed a reduction in hand movement (11% right hand, 7% left hand). Surprisingly the majority improved (47% right, 65% left).

Figure 1: Change in TUG over two years

	Increase in TUG	Decrease in TUG	No Change
Number of sample	12	25	A: 17
			B: 21

A: "Problematic" at baseline
B: Not "Problematic" at baseline

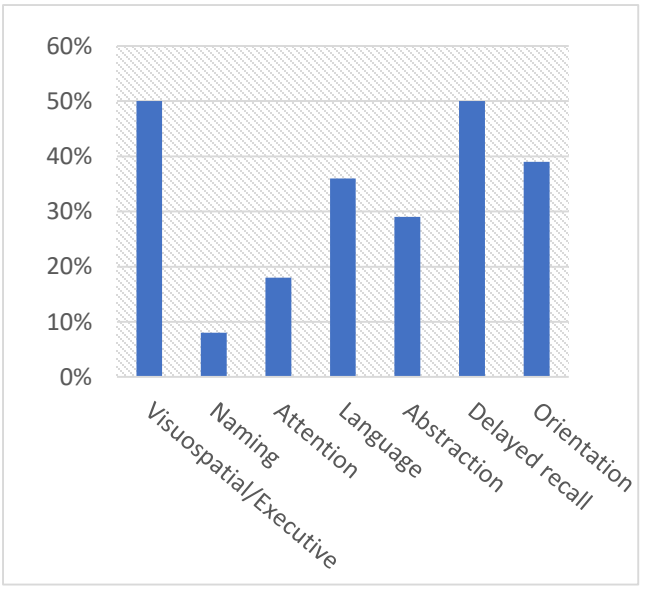
Cognitive changes:

- 64/162 patients completed cognitive assessment.

Figure 2: Average % change in total score over 2 years

MMSE	-10%
MOCA	-39%

Figure 3: % of cohort with decreasing cognition in each section of the MoCA



Conclusion/Discussion

- Cognitive decline is more apparent on testing with the MoCA than the MMSE. Visuospatial/executive function and delayed recall are most, and naming difficulty least, commonly affected.
- The majority of patients TUG rating stayed static although this may have been due to many having already progressed to "Problematic".
- Improvements in TUG and grip strength may be due to input from physiotherapy and medication changes.
- There was no link between decline in grip strength and assessment of hand movements by MDS-UPDRS scale.

1 Martinez-Martin P, Rodriguez-Blazquez C, Kurtis MM, Chaudhuri KR. The impact of non-motor symptoms on health-related quality of life of patients with Parkinson's disease. Movement Disorders. 2011;26(3):399–406.
2 Nazem S, Siderowf AD, et al. Montreal Cognitive Assessment Performance in Patients with Parkinsons Disease with "Normal" Global Cognition According to Mini-Mental State Examination Score. Journal of the American Geriatrics Society. 2009; 57(2):304–8.
3 Jones GR, Roland KP, Neubauer NA, Jakobi JM. Handgrip Strength related to Long-Term Electromyography: Application for Assessing Functional Decline in Parkinson's Disease. Archives of Physical Medicine and Rehabilitation 2017;98(2):347-352