Critically Appraised Topic (CAT) 1

UK PARKINSON'S Excellence Network

How accurate are patient and carer-reports of cognitive impairment in Parkinson's?

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Clinical bottom line

There is a lack of robust evidence to address this question. One study provided weak evidence that patient and carer reports were inaccurate in assessing deficits in specific cognitive domains.[1] Pending better studies among a representative spectrum of subjects, with independent blind and consistent reference test comparison, patient or caregiver-reported cognitive impairment should be interpreted cautiously.

Background

Reports of cognitive impairment – either by patients with Parkinson's or their carers – may contribute to clinical suspicion of mild cognitive impairment. It would be useful to know the accuracy of such reports pertaining to a number of key cognitive domains.

Search terms

idiopathic parkinson's disease[MeSH Terms] AND cognitive impairment, mild[MeSH Terms] AND accuracy AND (self-report* OR patient-report* OR carer*)

Search strategy

PubMed, and adapted for Cochrane Library. All searches from earliest date to current.

Evidence

A single study was found.[1] A critical appraisal is provided below.

Copeland, J.N., Lieberman, A., Oravivattanakul, S. and Tröster, A.I., 2016. Accuracy of Patient and Care Partner Identification of Cognitive Impairments in Parkinson's Disease – Mild Cognitive Impairment. Movement Disorders, 31(5), pp.693-698.

Summary

This was a comparison between subjective reports and objective assessments of cognitive deficits among 42 patients who met UK Brain Bank Criteria for Parkinson's and the Movement Disorder Society Task Force Level II criteria for PD-MCI. Subjective data were collected from patients and carers in a structured interview, for the following cognitive domains: attention, memory, language, visuoperceptual skills and executive functioning. Patients were assessed in these domains using a standardised battery of neuropsychological tests. Sensitivity, specificity, and positive and negative predictive values of patient and carer reports at detecting objective deficits were calculated (see Table). There was little agreement between patient reports and objective measurements ($k<0.02$), and between carer reports and objective measurements ($k<0.09$). However, patient and carer subjective reports agreed moderately in all domains except attention (k ranged from 0.43 to 0.49). Patients and carers were generally better at identifying the absence of cognitive deficit than its presence. The most impressive PPVs were for detecting memory loss (0.88 in both patients and carers). The authors concluded: "PD-MCI patients and their care partners may not be accurate in identifying specific cognitive deficits... Overreliance on patient and care partner reports of specific impairments may distort epidemiologic estimates of mild cognitive impairment subtypes and misdirect cognitive rehabilitation at incorrect domains."

Table

Sensitivity, specificity, positive and negative predictive values of patient and carer subjective reports in detecting objective deficits in five cognitive domains.

Subjective report by cognitive domain	Sn	Sp	PPV	NPV
Patient report				
Attention	0.42	0.53	0.26	0.70
Memory	0.39	0.67	0.88	0.15
Language	0.44	0.38	0.30	0.53
Visuoperceptual abilities	0.23	0.70	0.45	0.45
Executive functioning	0.14	0.86	0.67	0.33
Carer report				
Attention	0.33	0.63	0.27	0.67
Memory	0.42	0.67	0.88	0.16
Language	0.44	0.65	0.44	0.65
Visuoperceptual abilities	0.27	0.80	0.60	0.35
Executive functioning	0.14	0.93	0.80	0.35

Sn, sensitivity; Sp, specificity; PPV, positive predictive value; NPV, negative predictive value.

The following points should be noted, pertaining to the quality of this study:

- Patient and carer-reports of cognitive difficulties were not evaluated in a representative spectrum of patients. Years since diagnosis was not disclosed for individual subjects. Selection was neither random nor consecutive.

- The study population all had PD-MCI. It does not, therefore, represent the population a clinician is likely to encounter when assessing the probability of PD-MCI. As predictive values are affected by the prevalence of the target condition in the test population – 100% in this case – the reported positive and negative predictive values should be disregarded. This issue can be illustrated if we focus on the most impressive PPV of 0.88 for the correct detection of memory impairment. This means that in the study population, 88% of positive subjective reports were correct. However, with a sensitivity and specificity (for carer-reports) of 0.42 and 0.67 respectively, the likelihood ratio of a positive test (LR+) is 1.3. Between pre-test probabilities of 10% and 90%, the change in probability of a condition given a positive test can be estimated by a constant (0.19) multiplied by the natural log of LR+.[2] Given the prevalence of PD-MCI of 20% among those newly diagnosed with Parkinson's,[3] this is a reasonable assumption. This calculation yields a change in probability of PD-MCI memory loss of only 5%. Therefore, if a newly-presenting patient's carer were to report memory loss, the probability of PD-MCI jumps from 20% (the prevalence among newly-presenting patients) to 25%. This looks rather less impressive than the reported PPV of 88%.
- The same reference standard battery of neuropsychiatric tests was not applied in all subjects. Alternative tests were applied in some subjects for assessment of visuoperceptual and executive functioning domains. This could result in ascertainment bias.
- Objective neuropsychiatric tests were not applied independently or blind to the patient or carer reports. Again, this could result in ascertainment bias.
- Patients and carers were interviewed together. It is possible that the cognitive status of the carers (which was untested) could have impacted on their perception of the patient's cognitive symptoms.
- Overall, the quality of this study was poor, but it provides a salient warning regarding the possible inaccuracy of patient and carer reports of cognitive deficit.

References

1. Copeland JN, Lieberman A, Oravivattanakul S, Troster AI. Accuracy of Patient and Care Partner Identification of Cognitive Impairments in Parkinson's Disease-Mild Cognitive Impairment. Movement Disorders. 2016;31(5):693-698.
2. McGee S. Simplifying likelihood ratios. Journal of general internal medicine. 2002;17(8):647-650.
3. Aarsland D. Cognitive impairment in Parkinson's disease and dementia with Lewy bodies. Parkinsonism and Related Disorders. 2016;22:S144-S148.