Comparing the sensitivity of brief cognitive assessments in detecting behavioural variant frontotemporal dementia.

RS Conway1, KM Moore1, M Bocchetta1, LL Russell1, CV Greaves1, MR Neason1, R Shafei1, IOC Wooliscott1, JD Warren1, JD Rohrer1

1Cerebra Research Centre, University College London, Queen Square Institute of Neurology, London

BACKGROUND

Behavioural variant frontotemporal dementia (bvFTD) is a complex neurodegenerative disease that presents with personality change and cognitive impairment. Measuring the degree of cognitive impairment is a useful tool for aiding the diagnosis of bvFTD, however, formal neuropsychometry is time consuming. Brief cognitive assessments have proven useful in measuring mild cognitive impairment (MCI) and cognitive impairment in Alzheimer’s disease (AD)1,2, but research into other diseases is limited. Here we investigate the effectiveness of brief cognitive assessments in detecting cognitive abnormalities in bvFTD.

METHODS

31 individuals with a clinical diagnosis of bvFTD were recruited consecutively from the UCL Dementia Research Centre FTD cohort, and were tested on: the Edinburgh Cognitive and Behavioural ALS Screen (ECAS), the Mini-Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA), Addenbrooke’s Cognitive Examination (ACE-III), and formal neuropsychometry. Predefined cut-off scores for abnormal cognition were used to determine the sensitivity of each assessment.

Subtests of brief cognitive assessments were correlated with scaled neuropsychometry scores within matching domains to ensure validity. The neuropsychometry tests included were: the Graded Naming Test (GNT), the Recognition Memory Test (RMT) for Words and Faces, the Camden Paired Associated Learning (CPAL) test, Stroop Ink Naming, Trail Making task part B, the Visual Object and Space Perception (VOSP) object decision task, and the WASI Block Design task.

RESULTS

Participant demographics are shown in Table 1. The ECAS and the MoCA were the most sensitive assessments in detecting bvFTD with 87% (27/31) of participants falling below the cut-off point in both tests (McNemar’s test, p<0.001). The ACE-III detected 74% (23/31) of participants, and the MMSE 71% (22/31). Four participants did not score abnormally on any of the tests, including three C9orf72 mutation carriers with a slowly progressive illness and one MAPT mutation carrier. Mean scores for brief cognitive assessments and their subtests are shown in Table 2.

Using the Spearman’s rank correlation we found that language subtests for the ECAS, MoCA, and ACE-III respectively, correlated highly with the GNT (p<0.001), see Tables 3-5. Memory subtests for the ECAS and the ACE-III significantly correlated with RMT Words, RMT Faces, and CPAL tests (p<0.01). Memory subtests for the MoCA correlated with RMT words (p=0.036), and CPAL (p=0.012) but not RMT faces (p=0.076). Subtests of executive function/attention were highly correlated with Stroop Ink Naming and Trails B for the ECAS and MoCA (p<0.001), but no significant correlations of executive function were found for the ACE-III. Lastly, the Block Design test correlated with visuospatial subtests in the ECAS, MoCA, and ACE-III (p<0.001), however, the VOSP only significantly correlated with the MoCA (p=0.008).

CONCLUSION

The ECAS and the MoCA are the most sensitive assessments for detecting cognitive impairment in bvFTD. This is likely due to their inclusion of tests of executive function, (and in the case of the ECAS, social cognition). Only one test of executive function (the Serial 7 Subtraction task) is contained within the attention subtests of the ACE-III. This is likely to explain a lower sensitivity of the ACE-III in detecting bvFTD as well as a lack of correlation between subtests of attention/executive function and formal neuropsychometry. All other subtests among the brief cognitive assessments correlated well with neuropsychometry scores within matching domains. The MoCA is a shorter assessment compared to the ECAS and may therefore be the most practical brief cognitive test to use in the clinic for helping to detect bvFTD.

REFERENCES


ACKNOWLEDGMENTS

The present research was supported by Alzheimer’s Research UK, Brain Research Trust, and The Delfih Foundation. The work was supported by the National Institute for Health Research University College London Hospitals Biomedical Research Centre, the National Institute for Health Research University College London Hospitals Centre (NIHR UCLH Biomedical Research Centre), and the National Institute for Health Research Queen Square Biomedical Research Centre (NIHR QSBRC). 318024/DK/15.

Table 1: Participant demographics of 31 individuals with bvFTD. Standard deviations are in parentheses, CBIR: Revised Cambridge Behavioural Inventory; FRII: FTD Rating Scale.

Table 2: Test battery performance of 31 individuals with bvFTD. Standard deviations are in parentheses. CBIR: Revised Cambridge Behavioural Inventory; FRII: FTD Rating Scale.

Table 3: Spearman’s correlation between subtests of the ECAS, MoCA, and ACE-III respectively, and formal neuropsychometric measures. All correlations are highlighted with a * = p<0.05, ** = p<0.01, *** = p<0.001.