Remote assessment of cognition with the unsupervised version of the Cogstate Brief Battery: Association of composite endpoints with Alzheimer’s disease biomarkers

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SUBMISSION DETAILS

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Methodological Issue Being Addressed With increasing desire to treat preclinical Alzheimer's disease, ability to run decentralized trials and thus administer cognitive assessments unsupervised is important. This abstract shows that performance on an unsupervised memory assessment is associated with Alzheimer's disease biomarkers.

Introduction In people at risk for Alzheimer’s disease (AD), access to cognitive assessment can be increased through use of internet-based registries, which can be linked to disease management clinics for comprehensive follow-up. The Cogstate Brief Battery (CBB) has been optimized for unsupervised use in registries. This study aimed to determine relationships between performance on the unsupervised CBB, defined using conventional Cognigram and novel composite scores, and in-clinic CSF AD biomarkers and cognition.

Methods Seventy-six cognitively unimpaired (CU) adults (67% female; Mage (SD) 58.4 (6.7)) enrolled in the Healthy Brain Project (healthybrainproject.org.au) completed unsupervised CBB assessments, and subsequent in-clinic assessment of AD biomarkers and cognition. CBB tests included Detection (DET; psychomotor-function), Identification (IDN; attention), One Card Learning (OCL; learning) and One Back (OBK; working memory). The Cognigram Learning/Working Memory Composite, and the Cognigram Psychomotor/Attention composite were derived from these. Two novel composites were also computed. The OCL speed/accuracy composite combined standardized data for speed and accuracy of performance on the OCL test alone. The OCL-OBK speed/accuracy composite combined speed and accuracy data from the OCL and OBK tests. The aim of inclusion of these composites was to determine whether inclusion of speed in learning (e.g., OCL) and working memory (e.g., OBK) added sensitivity when compared to the validated CBB composite performance measures. In-clinic assessments included the International Shopping List, Logical Memory, and Digit Symbol Substitution Tests, and Mini Mental Status Examination to provide a Preclinical Alzheimer’s Cognitive Composite (PACC) score. CSF Aβ42, total tau (t-tau), and tau phosphorylated at threonine 181 (p-tau181) were measured by immunoassay (Roche Elecsys®) and CSF neurofilament light (NfL) was measured using ELISA. Associations with CSF Aβ42, t-tau, p-tau181, NfL and PACC were determined for each CBB composite using a series of linear regressions, with age, sex and estimated intelligence as covariates.

Results The Cognigram Learning/Working memory composite, the OCL speed/accuracy composite, and the OCL-OBK speed/accuracy composite were associated with PACC scores and with t-tau,

p-tau181, and Nfl levels. Magnitude of relationships were similar across composites (Table 1). No cognitive composite was associated with CSF Aβ42. Performance on the Cognigram Psychomotor/Attention composite was unrelated to AD biomarkers or PACC scores.

Conclusion In CU older adults, unsupervised performance on CBB composites containing learning and working memory measures were associated with in-clinic neuropsychological outcomes and AD biomarkers. The addition of performance speed to accuracy did not add substantively to the sensitivity of composite scores of learning and working memory. Remote measurement of cognition can validly assess aspects of learning and working memory disrupted by early AD processes such as increases in tau and could be useful for identification of individuals with early disease.

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Guidelines I have read and understand the Poster Guidelines

Disclosures Kaycee Sink and Paul Maruff are employees of Cogstate, Inc.

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