A Randomized Cross-over Controlled Study on Cognitive Rehabilitation of Instrumental Activities of Daily Living in Alzheimer Disease

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Objective: *The goal of the study was to investigate the effectiveness of a memory rehabilitation program to re-learn instrumental activities of daily living (IADLs) in patients with Alzheimer disease (AD).* **Design:** *This was a 6-month block-randomized cross-over controlled study.* **Setting:** *All evaluation and training sessions were performed at each patient's home.* **Participants:** *Twenty participants with mild to moderate AD.* **Intervention:** *The trained IADL was chosen by the patient and his/her caregiver in order to target the patient's needs and interests. Participants were trained twice a week for 4 weeks with the errorless learning (ELL) and spaced retrieval (SR) cognitive techniques. After training, there were several follow-ups over a period of at least 3 months.* **Measurements:** *Performance on the trained IADL was assessed by a Direct Measure of Training (DMT), an observational instrument adapted from a well-validated scale. General cognitive function, everyday memory functioning, quality of life, neuropsychiatric symptoms and ADL/IADL of patients, as well as the caregiver's burden were assessed as secondary outcomes.* **Results:** *A statistical significant difference was found between the trained and untrained groups on the DMT immediately following the intervention. Improvements were maintained for a 3-month period. The training did not have effects on any other measures.* **Conclusions:** *The present study showed that it is possible for AD patients to relearn significant IADLs with the ELL and SR techniques and to maintain these gains during at least 3 months. The findings of this study emphasize the importance to design robust but individualized intervention tailored on patients' particular needs.* (Am J Geriatr Psychiatry 2013; ■:■−■)

Key Words: Alzheimer disease, cognitive rehabilitation, errorless learning, spaced retrieval, instrumental activities of daily living

With the aging of the population, an increasing number of individuals will be affected by Alzheimer disease (AD) in the future. In addition to the impact on patients and their family, AD has dramatic consequences for public health and its financing.[1] Because there is currently no cure for AD,

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it is necessary to develop interventions addressing the management of the numerous difficulties associated with the disease.

Recent systematic reviews and a meta-analysis found cognition-focused interventions to be effective to improve cognition and function.[2–4] Reviews of literature[5,6] concluded that the errorless learning (ELL) and the spaced retrieval (SR) techniques, designed, respectively, to support the encoding of material in memory and to help the recall of newly learned material, were the most promising paradigms for training memory in AD. With ELL, errors are reduced to a minimum during learning,[7] whereas in SR the recall of information is done by gradually increasing the delay between each correct recall.[8]

Most of the previous studies on cognitive intervention in AD were designed to help patients learn or re-learn items unrelated to functional task, or not tailored to patients' particular needs. Some studies, however, suggested that the benefits associated with cognitive training do not transfer to untrained tasks or situations.[3,9] Because the diagnostic criteria for AD involve a significant alteration in the realization of instrumental activities of daily living (IADLs),[10] it is important to develop interventions specifically designed to improve everyday functioning in AD patients. IADLs refer to adaptive tasks used by an individual to cope with his or her environment and involve various domestic, social, and administrative activities such as handling money and telephoning.[11] Some studies aimed at improving IADLs in AD gave promising results, but for the most part were not randomized controlled trials (RCTs).[12–15] Nevertheless, a recent RCT conducted in early AD patients with a goal-oriented cognitive rehabilitation approach[16] showed significant improvement on the primary outcome, a self-rated measure of performance and satisfaction. Although this finding is important, some questions remain unanswered. For instance, given that the primary outcome was not administered blindly to participants and because there was no attempt to correlate this instrument with a measure of a patient's awareness of deficits, it is possible that the improvement was only the result of participants' expectations. In addition, it is unclear on which IADL tasks the patients actually improved their performances.

Our team tried to alleviate these issues in a multiple-baseline case report study using ELL and SR to train IADLs. We found that the performances of two AD patients reached 96.9% and 100.0% of success during training. The ameliorations were maintained over 5 weeks.[14] There was no randomization, no control, and no long-term follow-up in this study.

The main goal of the present study, therefore, was to investigate the effectiveness of a goal-oriented memory rehabilitation program using ELL and SR paradigms to re-learn IADLs in patients with mild-to-moderate AD using a 6-month randomized controlled design and a blind assessment of the participants' performance by an objective rater.

METHODS

Participants

Twenty patients were recruited from May 2008 to March 2011 at the Alzheimer Society (Quebec City Division) (N = 6), at homes for the elderly (N = 5), using public advertisement and local papers (N = 5), at Memory Disorders Clinic (N = 3), and through an ongoing research project (N = 1). The participants had to meet the following inclusion criteria: 1) diagnosis of AD,[10] confirmed by medical records, history, and results of the neuropsychological evaluation performed at screening; 2) be in mild to moderate stages of AD determined by an age- and education-adjusted Mini-Mental State Examination (MMSE)[17] score between 16 and 27;[18] 3) present an IADL deficit that could be re-learned with a cognitive training program; 4) psychotropics, nootropics, and other medications stabilized for at least 3 months. Potential participants were excluded if they: 1) had any other medical disorders known to alter cerebral and/or cognitive integrity; 2) were taking any antipsychotic or other medication known to affect cognition (but low doses of benzodiazepines at bedtime only and antidepressant medications were accepted per inclusion criterion number 4); 3) had a current/past history of alcohol or drug abuse. Each participant's principal caregiver was asked to enter the study in order to gather information about the patient's symptoms and his or her own burden, and also to practice the task with the patient between the training sessions with the research assistant. This research was approved by local ethics committees.