Computerised cognitive testing can identify year by year declines in non-demented elderly aged 70 to 90 years

Keith Wesnes, Ph.D.¹; Brian Saxby²

¹Bracket, Goring-on-Thames, UK and Centre for Human Psychopharmacology; Swinburne University, Melbourne, Australia; ²Newcastle University, K
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Keith Wesnes, Ph.D.¹; Brian Saxby²

¹Bracket, Goring-on-Thames, UK and Centre for Human Psychopharmacology, Swinburne University, Melbourne, Australia; ²Newcastle University, Keel

keith.wesnes@bracketglobal.com

BACKGROUND

The deficits to cognitive function which occur in normal aging can potentially be treated with pharmaceutical and other products.

Further, as criteria have now been proposed for Preclinical Alzheimer’s disease (Sperling et al, 2011), trials are now being planned with compounds designed to prevent or reduce cognitive decline in groups of ‘healthy volunteers’ identified to be at risk of developing Alzheimer’s disease.

However, in order to conduct such trials, cognitive tests need to be employed which can reliably assess such change.

PRECLINICAL AD

SPERLING ET AL, 2011

BACKGROUND TO DATE

The CDR System was developed in the 1980s to provide an automated cognitive test system which can be repeatedly administered over hours, days or years in any clinical population.

The CDR System has identified improvements to cognitive function in volunteers and numerous patient populations in over 150 publications.

The CDR System has been used in:

- >1300 Clinical Trials
- >2500 Sites in patient studies in 60 countries
- >500 Compounds
- >60 Patient populations

The CDR System has:

- > 50 alternate forms of each test
- >60 language versions
- >300 peer-reviewed publications
- >600 conference abstracts

CDR SYSTEM TESTS

Simple Reaction Time
Choice Reaction Time
Digit Vigilance
Numeric Working Memory
Spatial Working Memory
Immediate and Delayed Word Recognition
Delayed Picture Recognition

VALIDATED COMPOSITE SCORES USED IN THIS ANALYSIS

Power of Attention
- Derived from the sum of the speed scores from the 3 attention tasks

Quality of Working Memory
- Derived from the sensitivity indices from the articularatory & spatial working Memory

Quality of Episodic Memory
- Derived from the sensitivity indices from the three episodic recognition memory tests

Speed of Memory Retrieval
- Derived by summing the speed scores from the two working memory tasks and three episodic recognition tasks

STUDY POPULATION

- 256 healthy (113 females), normotensive individuals
- Mean age 76 years (Range 70 to 90 years)
- MMSE average 28.8 (Range 23-30)
- Tested yearly for up to 5 years

The deficits to cognitive function which occur in normal aging including those now starting in Preclinical Alzheimer’s disease

THE PROBLEM

It has been known for 10 years that repeated administration of standard neuropsychological tests to the elderly results in training effects which can last for years (Wesnes & Pincock, 2002; Wilson et al, 2002).

Wesnes & Schneider at this meeting show similar effects with the neuropsychological tests used in ADNI

Neuropsychological tests which show such training effects will not be fit for purpose of identifying treatment effects in trials of normal and pathological aging including those now starting in Preclinical Alzheimer’s disease

CONCLUSIONS

Age-related cognitive decline should be a treatable condition.

Preclinical AD trials will require the detection of greater than expected rates of decline in certain individuals in later middle age.

Neuropsychological tests with notable training effects such as those used by Wilson et al (2002) and in ADNI (Wesnes & Schneider, this meeting) may fail to detect age-related cognitive declines and also treatment effects.

This study has demonstrated that the use of validated and sensitive automated tests of cognitive function designed for repeated administration can detect decline over a 5-year period in healthy elderly volunteers.

Such testing is therefore fit for purpose for the evaluation of treatments aimed at preventing or even reversing age-related declines in cognitive function, as well as treatments which may delay the onset of Alzheimer’s disease in high risk but otherwise healthy populations.

REFERENCES

