An Instrument to Assess Improvements in Attention and Information Processing in Therapeutic Stroke Trials

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HIGHLIGHTS CONT'D

- One hundred and fifty elderly stroke survivors (> 75) without dementia and 30 elderly controls
- Seventy three percent of the non-demented stroke patients fulfilled criteria for age-associated cognitive decline on measures of attention compared to 32% of memory tasks
- Attention measures correlated with more than 50% of the Bristol ADL Scale item
- Impairment of cognitive processing speed, working memory, executive function, and measures of cognitive processing speed and attention and executive function

- One hundred and ten previously continent patients with an acute stroke who were tested between days 7 and 15 after stroke
- Incontinent patients had significantly poorer scores than continent patients
- Power of Attention, Continuity of Attention and Speed of Memory were strongly related to poor outcome
- Older age (> 85) was an independent and significant risk factor for power of attention and continuity of attention but not speed of memory
- Attentional deficits are more likely to be associated with urge incontinence and to be a risk factor for mortality

- Ninety six stroke patients (> 75) without dementia and 23 age matched controls were evaluated 3 months post stroke
- Stroke patients had significantly greater impairment of global cognition, executive function, performance, executive function, reaction times and aspects of attention
- Total volume of white matter hyperintensities (WMH) and the volumes in the temporal lobe and frontal lobes areas were greater in the stroke patients
- Cognitive processing speed and attention were associated with total WMH and frontal WMH
- Memory impairment was associated with WMH in the temporal lobe

Comparison of Effect Sizes of Impairment Among Adult ADHD and Stroke Subjects on CDR Composite Scores
- The effect size of CDR System’s Power of Attention is nearly 1.5 times greater than patients with Adult ADHD
- Stroke patients also showed greater Fluctuations in Attention when compared with Adult ADHD patients

DISCUSSION/CONCLUSION
- In stroke, the predominant and most clinically relevant deficits are to attention and information processing
- CDR system is sensitive to changes in cognitive function, especially attention and information processing over long trials
- CDR System measures are more sensitive than traditional non-automated tests in identifying deficits to cognitive function
- CDR System is highly sensitive in a wide variety of conditions including stroke
- CDR System is perfectly feasible for use in large, long-term international stroke studies

CDR SYSTEM BACKGROUND
- The CDR System is an integrated set of automated tests of major aspects of cognitive function that was designed specifically for use in international clinical trials.
- The system has been extensively validated and is highly sensitive to change.
- The CDR System has been in use in worldwide clinical trials for over 25 years, with over 1,300 trials being completed to date.
- It has shown high utility in all phases of drug development, has been used in over 50 clinical populations, is available in over 60 languages and has over 50 parallel forms.
- Chapters in the CDR System have been the subject of over 300 peer-reviewed papers and chapters.
- The CDR System has been used extensively in stroke research.

The CDR System Core Domains and Tests
- Attention, Concentration, Vigilance
  - Simple Reaction Time - 2 minutes
  - Choice Reaction Time - 2 minutes
  - Digit Vigilance - 3 minutes
- Working Memory & Executive Control
  - Numeric Working Memory - 2 minutes
  - Spatial Working Memory - 2 minutes
- Testing Duration < 20 minutes
- The CDR System measures are more sensitive of conditions including stroke
- The various measures from the CDR System showed firm correlations with the clinical scales
- The improvement over 6 weeks in speed of information processing also correlated appropriately with the changes on these scales: NIH (r=0.59), Barthel (r=0.52) and Rankin (r=0.38)
- This study confirmed the CDR System identified cognitive deficits in stroke patients and the cognitive changes had clear clinical and everyday relevance

Assessed patients (mean age 67 years; range 50-85) with acute anterior circulation (cortical) ischemic stroke, all of whom had hemiparesis and cortical signs (e.g. dysphasia, inattention)
- Patients were seen on average 5 days from stroke onset
- All patients were able to perform the CDR System and did not report anxiety. For some patients, it was necessary for them to use one hand to operate the CDR System button box, which was perfectly satisfactory under these circumstances.
- The patients showed marked cognitive impairments, to the level of mild-moderate Alzheimer’s disease (AD), which reduced over 8 weeks, though the deficits were still marked compared to normals and were close to those of mild-AD
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HIGHLIGHTS
- The CDR System has been used extensively in therapeutic trials, including PRoFESS-COG, an international substudy of the Prevention Regimen For Effective Stroke (PROTECT) studies.
- The study in 956 stroke patients was performed at 43 sites in 9 countries using a language version of the CDR System.
- The most notable cognitive deficit at study outset was Power of Attention with an effect size of 2.1.
- Test-retest reliability was highly satisfactory in this study, being 0.83 and 0.87 for measures of attention and information processing

Disorders Causing Impaired Cognition

Supporting Information

Poster presentation at the 8th World Stroke Congress Brasilia, Brazil 10-13 October 2012.