

Use of a novel online cortical test in HIV infected subjects undergoing screening for neurocognitive impairment

H Tam¹, TJ Barber², D Ratcliffe³, A Margetts³, C Trustring-Eve⁴, M Boffito³, J Catalan³, B Gazzard², S Mandalia¹, A Pozniak²

¹Imperial College London, London; ²St Stephen's Centre, Chelsea and Westminster Hospital NHS Foundation Trust, London; ³Department of Psychological Medicine, Chelsea and Westminster Hospital NHS Foundation Trust, London; ⁴Food For The Brain, London
Contact: herman.tam08@imperial.ac.uk

Introduction

HIV associated neurocognitive disorders (HAND) are a spectrum of impairments diagnosed by neuropsychological testing and interference in daily functioning¹. Existing screening tools concentrate on subcortical features. Additional cortical testing, especially in an aging HIV infected population, may enhance detection rates. It may also detect non-HIV-related causes of dementia such as Alzheimer's Disease. An online screening test for mild cognitive impairment recently made front page news in the UK for use in those aged 50-70². We aimed to pilot this online test in our HIV cohort presenting for screening for HAND.

Methods

Subjects from our HIV Neurocognitive Clinic were given details about the foodforthebrain.org Cognitive Function Test (CFT) to complete at home. Our standard tests include screening for depression (PHQ9) and anxiety (GAD7), Brief Neurocognitive Screen (BNCS), International HIV Dementia Scale (IHDS), and Everyday Memory Questionnaire (EMQ). Results of the CFT were emailed in and compared with HIV neurocognitive screening results. Normal scores were defined using standard criteria for each test.

Table 1. Domains Tested by Neurocognitive Tests.

Test	Domains tested
BNCS	Cognitive Processing Speed (Trail Making A) Executive Functioning (Trail Making B) Processing Speed (WAIS-R Digit Symbol Task)
IHDS	Psychomotor Speed Motor Speed Memory Recall
EMQ	Memory Retrieval Memory Attentional Tracking
CFT	Executive Functioning (Symbol Matching Test) Processing Speed (Pattern and Letter Comparison Test) Episodic Memory (Delayed Recall Test)
PHQ-9	Depression symptoms and functional impairment
GAD-7	Anxiety symptoms

Results

7/30 (23%) patients (median 46 years, range 37-69) completed the CFT (mean score 46, range 17-71). 3/7 (43%) showed impairment on the CFT. Of those, 2/3 (66%) were impaired on components of the BNCS as well as the IHDS, and 1/3 (33%) was impaired on the EMQ. Interestingly, the person scoring lowest on the CFT had no impairment on any of our neurocognitive screening tests.

Subject	CFT	BNCS: TMA	BNCS: TMB	BNCS: DST	IHDS	EMQ (Total)	EMQ: R	EMQ: A
S1	17	52	118	34	11	16	13	2
S2	30	33	177	33	7.5	32	21	7
S3	33	58	74	32	9.5	9	5	3
S4	48	24	82	54	12	10	9	0
S5	57	20	82	59	12	26	13	10
S6	65	26	122	53	12	18	14	4
S7	71	37	65	56	12	13	8	3

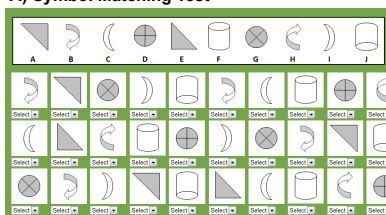
Table 2. Performances on Neurocognitive Testing.

Abnormal scores in red.
TMA: Trail Making A; TMB: Trail Making B; DST: Digit Symbol Task; R: Retrieval; A: Attentional Tracking

Normal ranges defined as:

CFT: 54.2±11.0; BNCS TMA: 39.0±20.3; BNCS TMB: 94.7±49.7; BNCS DST: 47.4±13.7; IHDS: >10; EMQ Total: Total/13<2.07, EMQ R: R/7<2.68, EMQ A:A/4<1.89

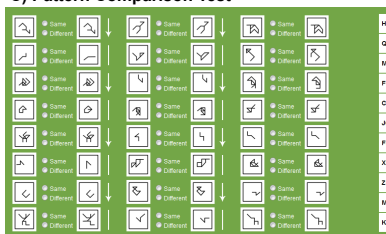
A) Symbol Matching Test



B) Delayed Recall Test



C) Pattern Comparison Test



D) Letter Comparison Test

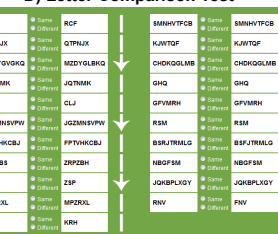


Figure 1. Screenshots of Cognitive Function Test.

Table 3. Potential factors for poor results and low uptake of CFT.

- ❖ Connection Issues
- ❖ Screen Size
- ❖ Separate mouse vs touch pad
- ❖ Interruptions
- ❖ Completing Examples

Conclusion:

There appears to be some correlation between an abnormal cortical test result and our clinic based subcortical screening test. Analysis was limited by the small sample population and low uptake rate. Online testing has logistical and financial benefits. Interpretation of online tests at home should taken into account non-standardised conditions and selection bias of computer literacy and equipment speed. Incorporating a cortical test into neurocognitive screening may be beneficial in the setting of HIV to enhance detection of HAND.

Benefits	Limitations
<ul style="list-style-type: none"> ❖ Logistics ❖ Financial ❖ User flexibility 	<ul style="list-style-type: none"> ❖ Non-standardised testing conditions ❖ Computer literacy ❖ Access to computer and internet ❖ Repeated testing

Table 4. Benefits and Limitations of Online Testing.

Future Directions:

- ❖ Provide more online neurocognitive testing for our patients
- ❖ Investigate reasons for low uptake of CFT
- ❖ Compare results of cortical and subcortical tests in more patients

References:

- Antinori et al. Neurology. 2007. 69(18):1789-99.
- Cognitive Function Test. http://www.foodforthebrain.org/content.asp?id_Content=1820. Food For The Brain.

Acknowledgements:

Funding body. St Stephen's AIDS Trust.
All members of the research group.

