Performance of Four Tools to Screen for HIV-Associated Cognitive Impairment

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Background

A high but varying prevalence of HIV-associated neurocognitive disorders (HAND) has been reported among HIV-infected individuals, despite treatment with combination antiretroviral therapy (cART).[1,2] Neuropsychological assessment (NPA) is the recommended method for the diagnosis of HAND.[3,4] However, NPA is a time-consuming and expensive examination. Therefore, a short and accurate cognitive screening tool would be useful to identify those at increased risk for HAND allowing targeted referral for NPA.

[1] Cysique LA et al. J Neurovirol. 2011; 17: 176-83.
[2] Simioni et al. AIDS. 2010;24:1243-50.
[3] Antinori et al. Neurology. 2007;69:1789-99.
[4] Schouten et al. AIDS. 2015; in press.

Objectives

To assess diagnostic characteristics of four cognitive screening instruments: Mini Mental State Examination (MMSE), HIV Dementia Scale (HDS), Montreal Cognitive Assessment (MoCA), and the 3-item questionnaire as published by Simioni et al (Simioni questionnaire)[2]

Methods

Study cohort: The AGE$_h$IV Cohort Study is a prospective comparative cohort study investigating age-associated comorbidities and their risk factors among HIV-infected and highly comparable HIV-uninfected participants, all aged ≥45 years, in Amsterdam.

Inclusion in AGE$_h$IV Cohort Study
598 HIV+ 550 HIV-

Biennial study visits in which participants undergo standardized screening for age-associated co-morbidities, organ dysfunction and risk factors.

Inclusion in substudy

Substudy inclusion criteria: (1) male gender
(2) plasma HIV-1-RNA <40c/mL for ≥12months on cART
Substudy exclusion criteria: neurological/psychiatric disorder, current IV drug use, use of illicit drugs or excessive alcohol consumption, insufficient command of Dutch daily use language

Inclusion in nested cognitive substudy
103 HIV+ 74 HIV-

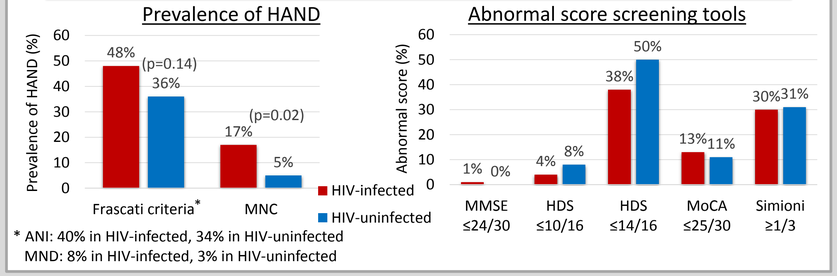
NPA, covering 6 cognitive domains commonly affected by HAND, and 4 cognitive screening tests were performed in all substudy participants. HAND was classified using Frascati criteria[3] and MNC[4] (multivariate normative comparison). Screening tests were defined as abnormal when meeting the following cutoffs: MMSE≤24/30, HDS≤10/16, HDS≤14/16, MoCA≤25/30, Simioni questionnaire≥1/3 "yes, definitely".

Statistical analysis: In HIV-infected participants, sensitivity and specificity of MMSE, HDS, MoCA and Simioni questionnaire was calculated, and a receiver operating characteristic (ROC) analysis was performed using Frascati criteria and MNC as the gold standard, respectively.

Results: Cohort Characteristics

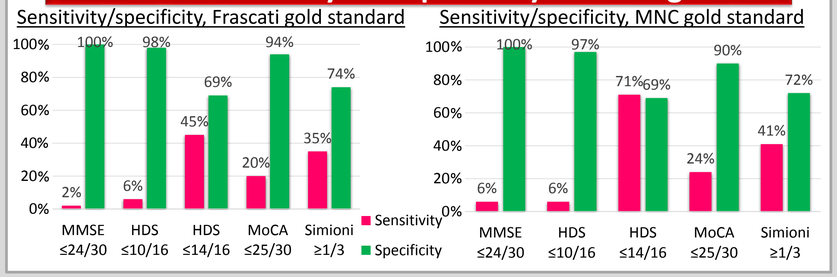
	HIV-infected individuals (median (IQR) / %, n=103)	HIV-uninfected individuals (median (IQR) / %, n=74)
Age (years)	54 (49-62)	54 (49-61)
Men who have sex with men	93%	90%
Dutch as native language	91%	95%
Education (ISCED level)	6 (5-6)	6 (5-6)
Premorbid intelligence (IQ)	101 (95-111)	103 (96-111)
Subjective cognitive complaints (CFQ ≥42)	13%	5%
Depressive symptoms (BDI >13)	6%	4%
Weekly to monthly use of ecstasy	2%	13%
Years of known HIV-infection / ART use	13.5 (7.4-17.1) / 11.6 (4.9-14.9)	
ART-naïve at start cART	80%	
Prior AIDS	35%	
Mean nadir/current CD4 (cells/mm^3)	170 (60-250) / 625 (475-800)	
CPE score of current cART regimen	7 (7-8)	

Results: Prevalence HAND/Abnormal Screening Test

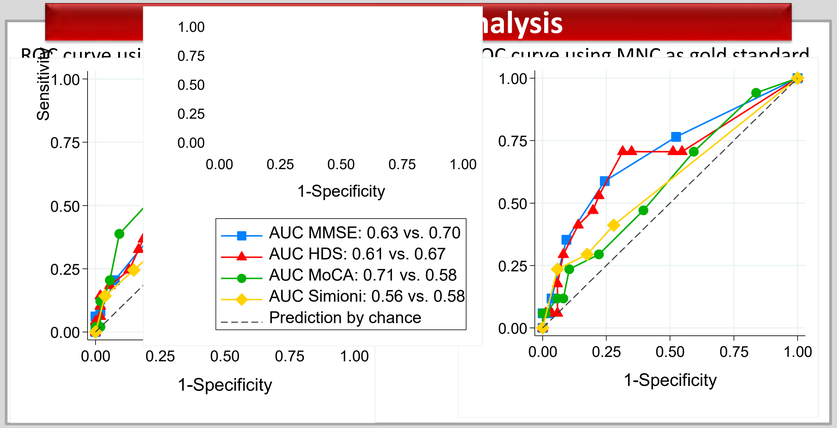


* ANI: 40% in HIV-infected, 34% in HIV-uninfected
MND: 8% in HIV-infected, 3% in HIV-uninfected

Results: Sensitivity and Specificity Screening Tools



Results: Diagnostic Analysis



Conclusions

Cognitive screening instruments performed poorly for detecting HIV-associated cognitive impairment

NPA and cognitive screening tools in HIV-infected and HIV-uninfected men

- HAND was diagnosed in 48% of HIV-infected, but also in 36% of HIV-uninfected men using Frascati criteria (p=0.14)
- MNC classified 17% of HIV-infected men as cognitively impaired compared to 5% in HIV-uninfected controls (p=0.02)
- All screening tools showed comparable proportions of abnormal scores among patients and controls

Diagnostic characteristics cognitive screening tools in HIV-infected participants

- Sensitivity of screening tools: low to moderate
- Specificity of screening tools: moderate to high
- Optimal cutoffs: no large improvement sensitivity/specificity
- ROC analysis: low to moderate area under the curve for all screening tools; no instrument had superior performance

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