HIV Neuropsychiatry

13th and 14th June 2014
Barcelona, Catalonia, Spain

CROI 2014 Conference on Retroviruses and Opportunistic Infections

Oral Communication #2

- - -

Accuracy of the NEU Screen to Detect Cognitive Impairment in Virologically Suppressed Patients with HIV Infection

Muñoz-Moreno JA[1,2], Prats A[1,2], Pérez-Álvarez A[1,3], Fumaz CR[1,2], Ferrer MJ[1,2], Garolera M[4,5] and Clotet B[1,2,6,7]

[1] Lluita contra la SIDA Foundation – Germans Trias i Pujol University Hospital (Badalona); [2] Autònoma de Barcelona University (Bellaterra); [3] Politècnica de Catalunya University (Barcelona); [4] Consorci Sanitari Terrassa Hospital (Terrassa); [5] Grup Consolidat de Recerca en Neuropsicologia - Barcelona University (Barcelona); [6] Institut per a la Recerca de la SIDA - IrsiCaixa (Badalona); [7] Universitat de Vic (Vic)

FLS FUNDACIÓ LLUITA CONTRA LA SIDA

Background

- ✓ Several methods have been proposed to screen for neurocognitive impairment (NCI) in HIV infection, although none of them has achieved a clear consolidation in the clinical practice.
- ✓ The ***NEU Screen***[1] is a recently proposed tool that includes 3 cognitive measures and shows a sensitivity of 74.5% and specificity of 81.8%.
- ✓ We aimed to study the accuracy of the NEU Screen to detect NCI in virologically suppressed patients with HIV.

[1] *Muñoz-Moreno JA, et al, JAIDS, Aug 2013*

Methods (I): Study Population

- Study analyses were developed in data from **156 HIV-infected outpatients** in the HIV Unit of the Germans Trias i Pujol University Hospital (Badalona, Catalonia, Spain).

- Subjects were **≥18 years old**, had undergone a **comprehensive neuropsychological assessment**, and had **undetectable plasma viral load for ≥6 months** prior the evaluation.

- None of those individuals had participated in the original study of the NEU proposal.

Methods (II): Study Variables and Instruments

- Relevant **demographic and clinical variables** were recorded.
- Neurocognitive functioning was assessed by the application of a standard **comprehensive battery of neuropsychological tests** (15 measures, 7 domains, 2-3 hours).
- NCI was defined as performing **≥1 standard deviation** below the normative mean in **≥2 cognitive areas**.
- T scores were used for all comparisons and were based on **available normative data**.

Methods (III): Statistical Analyses

- NCI was considered as **gold standard**, and sensitivity and specificity tests were applied to study the accuracy of the NEU Screen.
- A proposal of an **abbreviated battery** also offered in the NEU Study was additionally tested (7 scores, 7 domains, 35 minutes).
- **Logistic regression** was used to analyze variables linked to the correct classification. Both samples of the original NEU Study (106 subjects) and the present one (156 subjects) were combined to investigate potential related variables more consistently (N=262).
- We also developed analyses in sub-groups of patients according to different **demographic and clinical factors**.

Methods (IV): NEU Screen + Abbreviated Battery

A Brief and Feasible Paper-Based Method to Screen for Neurocognitive Impairment in HIV-Infected Patients: The NEU Screen

Jose A. Muñoz-Moreno, PhD,† Anna Prats, MS,*† Núria Pérez-Álvarez, MS,*‡ Carmina R. Fumaz, PhD,*† Maite Garolera, PhD,§|| Eduardo Doval, PhD,† Eugènia Negredo, PhD,*† Maria J. Ferrer, MS,*† and Bonaventura Clotet, PhD,*†¶ for the NEU Study Group*

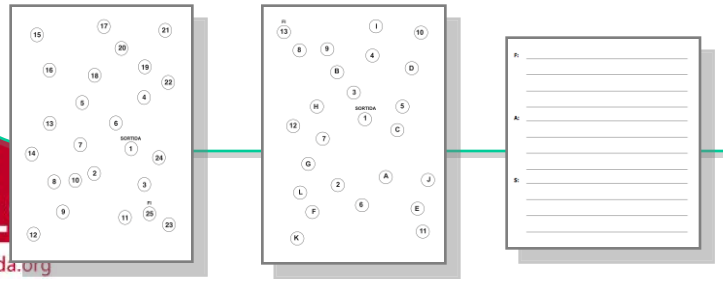
J Acquir Immune Defic Syndr • Volume 63, Number 5, August 15, 2013

Tests	Scores	Cognitive Domains
TMT-A	Total time	Information Processing Speed
TMT-B	Total time	Executive Functioning
COWAT	Total score	Verbal Fluency

	Statistical Properties
Sensitivity	**74.5 (60 ; 85.2)**
Specificity	**81.8 (68.6 ; 90.4)**
PPV	79.1 (64.6 ; 89)
NPV	77.5 (64.4 ; 87)

Tests	Scores	Cognitive Domains
Letters-Numbers (WAIS-III)	Total score	Attention/Working Memory
TMT-A	Total time	Information Processing Speed
CVLT-II	Long-term recall	Verbal memory
CVLT-II	Total A list	Learning
TMT-B	Total time	Executive Functioning
COWAT	Total words	Verbal Fluency
McQuarrie Test	Non-dominant hand score	Motor Function

	Statistical Properties
Sensitivity	**100 (91.2 ; 100)**
Specificity	**96.3 (86.3 ; 99.3)**
PPV	96.2 (85.9 ; 99.3)
NPV	100.5 (91.5 ; 100)



www.flsida.org

Results (I)

- Sample Characteristics:

☑ Mostly men (81%), infected via MSM (47%), with a median age (IQR) of 43 (38; 50) years.

☑ Median current CD4 count of 522 (380; 718) cells/µL and nadir CD4 of 88 (80; 285) cells/µL.

- Presence of NCI:

☑ NCI was present in 82 (52%) subjects, 42 (54%) reported cognitive complaints.

☑ Time since HIV diagnosis was related to presence of NCI (p=0.01).

	Study Sample (N=156)
Age, years	43 (38 ; 50)
Gender, women (%)	29 (19)
Education, years	12 (8 ; 15)
Employed (%)	109 (70)
MSM (%)	70 (47)
Time since HIV diagnosis, years	11 (6 ; 15)
Time since first ART, years	8 (4 ; 11)
Time on current treatment, months	14 (51 ; 139)
Current CD4 cell count, cells/µL	522 (380 ; 718)
Nadir CD4 cell count, cells/µL	188 (80 ; 285)
Zenith plasma viral load, copies/mL	87500 (15750 ; 214000)
AIDS condition (%)	24 (16)
Coinfection with HCV (%)	31 (21)
Potential comorbidities for NCI (%)	42 (27)

Results (II)

- Statistical Results:

	Virologically Suppressed (n=156)	NEU Study (n=106)
NEU Screen		
Sensitivity	**73.1 (62 ; 82)**	**74.5 (60 ; 85.2)**
Specificity	**74.3 (62.6 ; 83.4)**	**81.8 (68.6 ; 90.4)**
PPV	75.9 (64.7 ; 84.5)	79.1 (64.6 ; 89)
NPV	71.4 (59.8 ; 80.8)	77.5 (64.4 ; 87)
NEU Abbreviated Battery		
Sensitivity	**97.5 (90.6 ; 99.5)**	**100 (91.2 ; 100)**
Specificity	**100 (93.8 ; 100)**	**96.3 (86.3 ; 99.3)**
PPV	100 (94.2 ; 99.8)	96.2 (85.9 ; 99.3)
NPV	97.3 (89.9 ; 99.5)	100.5 (91.5 ; 100)

Results (III)

- Variables Related:

☑ According to logistic regression none of the demographic or clinical variable were significantly associated with the correct classification.

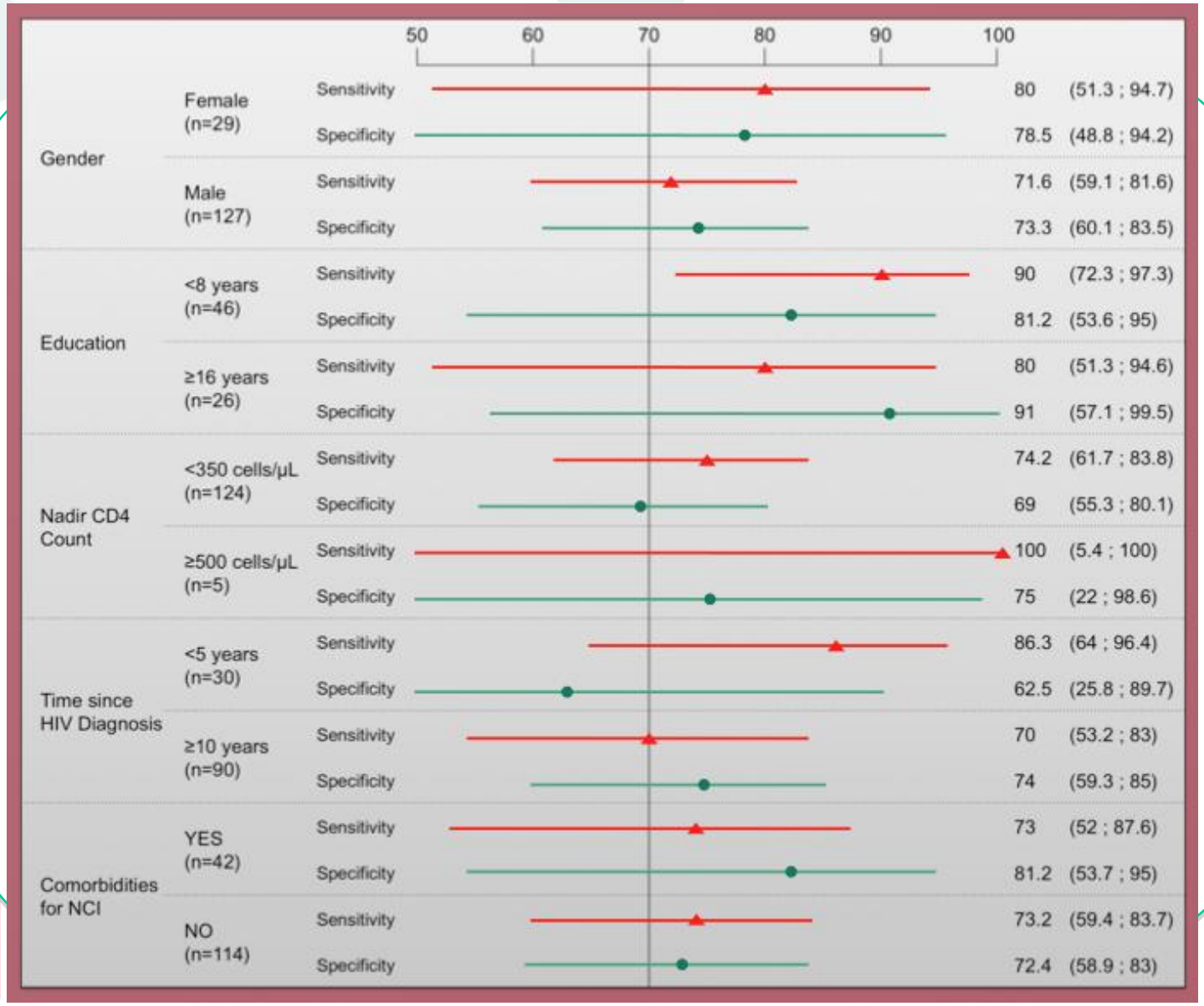
☑ When the NEU sample and the present sample were joined (262 subjects) analyses still did not find any factor in association.

- Subtypes of Patients:

☑ When different subgroups were compared in terms of representative demographic and clinical variables the highest accuracies were observed in:

Women (sensitivity: 80%, specificity: 78.5%);
Patients with <8 (90%, 81.2%) or ***≥16*** (80%, 91%) ***years of education***; and
Patients with <5 years since HIV diagnosis (86.3%, 62.5%).

Results (IV)


50
60
70
80
90
100
Gender
Female (n=29)
Sensitivity 80 (51.3 ; 94.7)
Specificity 78.5 (48.8 ; 94.2)
Male (n=127)
Sensitivity 71.6 (59.1 ; 81.6)
Specificity 73.3 (60.1 ; 83.5)
Education
<8 years (n=46)
Sensitivity 90 (72.3 ; 97.3)
Specificity 81.2 (53.6 ; 95)
≥16 years (n=26)
Sensitivity 80 (51.3 ; 94.6)
Specificity 91 (57.1 ; 99.5)
Nadir CD4 Count
<350 cells/µL (n=124)
Sensitivity 74.2 (61.7 ; 83.8)
Specificity 69 (55.3 ; 80.1)
≥500 cells/µL (n=5)
Sensitivity 100 (5.4 ; 100)
Specificity 75 (22 ; 98.6)
Time since HIV Diagnosis
<5 years (n=30)
Sensitivity 86.3 (64 ; 96.4)
Specificity 62.5 (25.8 ; 89.7)
≥10 years (n=90)
Sensitivity 70 (53.2 ; 83)
Specificity 74 (59.3 ; 85)
Comorbidities for NCI
YES (n=42)
Sensitivity 73 (52 ; 87.6)
Specificity 81.2 (53.7 ; 95)
NO (n=114)
Sensitivity 73.2 (59.4 ; 83.7)
Specificity 72.4 (58.9 ; 83)

Conclusions

- *The present work confirms a fairly high sensitivity and specificity of the NEU Screen to detect NCI in virologically suppressed HIV-infected patients.*
- *This method includes 3 cognitive tests, has an expected time for administration of ≤10 minutes, and is based on a pencil-and-paper use.*
- *Demographic and clinical factors, such as gender, education or immunological status, may play a relevant role in the accuracy of screening tools when detecting NCI in people with HIV infection.*

Caveats

Perspective from the research, instead of a clinical approach.

Representation limited to a reduced European area (Catalonia).

A quarter of the sample with potential confounding comorbidities for NCI .

Acknowledgements

FUNDACIÓ LLUITA CONTRA LA SIDA

Germans Trias i Pujol Hospital
Institut Català de la Salut

UAB Universitat Autònoma de Barcelona

UPC

CST Consorci Sanitari de Terrassa

Universitat de Barcelona

IrsiCaixa Institut de Recerca de la Sida

UVIC UNIVERSITAT DE VIC

FLS
www.flsida.org

Thanks for your attention!

FLS
www.flsida.org

www.flsida.org