

Screening for HIV related neurocognitive impairment (NCI) in clinical practice

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Background

Controversies exist regarding how best to screen for neurocognitive problems in HIV-infected individuals, the impact on functional/subjective quality of life in those with asymptomatic/moderate impairment, and the contribution of cortical and subcortical processes to observed deficits.

Work in our Unit to date has focussed on screening those aged over 50. We have established an HIV neurocognitive screening clinic for those aged 18-50 years in collaboration with Psychological Medicine, at all three clinical sites within our Directorate.

Methods

HIV infected patients 18-50 years of age can be referred (or self refer), whether symptomatic of NCI or with any related concern.

Patients undergo screening for anxiety (GAD-7), depression (PHQ-9) and subjective memory concerns (Everyday Memory Questionnaire (EMQ)).

We use the following tests to assess for NCI: International HIV Dementia Score (IHDS) and Brief NeuroCognitive Score (BNCS - TrailMaking A (TMA) and B (TMB), Digit Symbol Testing (DST)).

BNCS has been used in studies looking at HIV but concerns exist around sensitivity and specificity¹. IHDS was the only recommended test for screening in the recent EACS guidelines (now superseded). The aim here was to screen for anxiety and depression, then use a subjective assessment of memory (EMQ) as well as the IHDS and BNCS as objective measures of NCI.

A formal diagnosis of NCI requires testing in at least 5/7 cognitive domains, with impairment >1s.d. away from the mean in at least 2 of these, and the diagnosis is further subdivided on the basis of NCI related symptoms².

Further investigations may be indicated including MRI scanning, lumbar puncture, psychology (formal neuropsychometric testing) or psychiatry referral.

Results

We are currently defining the normal range of our own patients in terms of composite BNCS score. For this study we took being >1s.d. away from the mean in at least 1/3 tests to be abnormal. This is likely to overestimate NCI given that standard analyses have counted abnormal as being >1s.d. away from the mean in at least two tests¹, or formed a composite neuropsychometric z (NPZ) score from all 3 tests. Future analyses will use these methods, as well as comparing screening outcomes to standard population norms.

From February to end 2011:

Category	Median (unless mean stated) (25th centile, 75th centile)
Total screened	79 (7 female)
Age	42 (37, 46)
PHQ9	9 (3, 15)
GAD7	8 (2, 14)
Mean EMQ total*	1.38 (0.54, 2.38)
IHDS	11 (10, 12)

*not broken down in terms of accrual/retrieval scores

Results (cont.)

Subjects have not been stratified according to symptomatology in this audit of the clinic data to date.

Of 79 subjects screened 42 (53%) were identified as having anxiety (GAD7>10) and/or depression (PHQ9>10) and managed appropriately.

This left 37 subjects suitable for analysis of BNCS scores.

If we look at scores 1 SD from the mean (below for DST, above for TMA/TMB), 11 (29.7%) were abnormal in at least 1 test, 0 (0%) in two tests and 1 subject (2.7%) in all three BNCS tests as compared to the rest of the group. 25 (67.6%) were entirely normal.

Using a more stringent cut off of 2 SD we found 7 (18.9%) to be abnormal in at least 1 tests, 1 (2.7%) in the traditionally used criteria of abnormality in two tests, and 0 (0%) in three tests. 29 (78.4%) of subjects were normal in all three tests using a 2 SD cut off.

25 (32%) had an IHDS ≤10

It is worth noting that there is significant correlation between a high total EMQ score (a marker of subjective memory impairment) and depression/anxiety determined by high PHQ9 ($p < 0.001$) or GAD7 ($p < 0.001$) scores. This to be expected. We have not yet analysed our EMQ data after exclusion of anxiety and depression, but overall 26 (33%) had a total EMQ score above the average cut off of 2.07. Furthermore 25 (32%) had a subjective problem in memory accrual (average >1.89) and 22 (28%) had a problem in retrieval (average >2.68).

5/37 were referred for formal neuropsychometric testing on the basis of their pattern of abnormal test results (abnormalities in EMQ + abnormalities in at least 1 of IHDS or any of the BNCS tests). No suitable composite score has yet been derived for the combined analysis of these three testing modalities (EMQ, IHDS and BNCS).

No patients were confirmed to have NCI at formal testing.

Conclusions

- Depression and anxiety are common features in our clinic and each showed a clear association with subjective memory impairment as expected
- Further analyses are planned as described above on a total of over 200 patients now screened
- These simple screening tools are easily deliverable in a routine clinic setting with minimal training, but may not provide sufficient sensitivity to detect all neurocognitive impairment
- Further work is needed to construct a composite score from our three tests used (EMQ, IHDS and BNCS) following exclusion of those with depression and anxiety detected at screening
- No formal diagnosis of NCI has been made in any of the patients with impairment detected at screening in our clinic to date

References

- 1 Ellis et al. Clinical Validation of the NeuroScreen. Journal of NeuroVirology, 11: 503–511, 2005.
- 2 Antinori et al. Updated research nosology for HIV-associated neurocognitive disorders. Neurology. 2007 Oct 30;69(18):1789-99.