

Cognitive Changes in Patients Living with HIV

Yale SCHOOL OF MEDICINE

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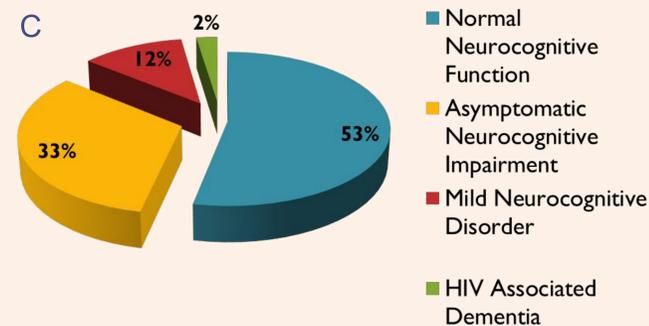
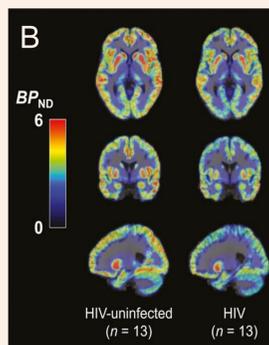
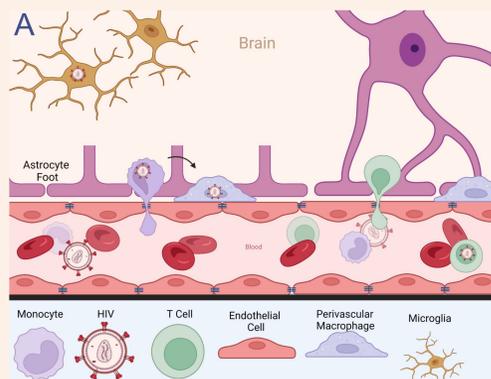


Abstract

HIV positive patients on antiviral therapy have a similar life expectancy as a non-infected individual. **Cognitive decline persists even for individuals on treatment** with undetectable HIV viral loads.¹ We evaluated 81 HIV positive and 26 control patients with a series of ten separate neuropsychological tests over a five-year period. Previous studies have indicated cognitive decline was present in HIV positive patients at a greater rate than controls. We analyzed cognitive performance among this HIV positive cohort compared to the control as well as longitudinally within six selected patients.

Background

>40% of patients on treatment have some form of HIV associated neurological deficit (HAND)²



(A) HIV escape, crossing through the blood brain barrier: the “Trojan horse” method; hidden inside monocytes and CD4 T cells, and through diffusion. (B) PET scan displaying lower synaptic density in HIV positive patients. (C) Charter cohort (n=1555) dispersal of neurocognitive deficit types.

Methods

We used a battery of ten neuropsychological tests: Timed Gait, Wide Range Achievement Test (WRAT-4) Reading test, Hopkins Verbal Learning Test (HVLt-R), Trailmaking A and B, Grooved Pegboard, Wechsler Adult Intelligence Scale (WAIS- 3), Digit Symbol, WAIS-3 Symbol Search, HVLt-R Delayed recall/recognition, Stroop Interference task, and Verbal Fluency. HIV+ (n=81) and control cohorts (n=26) were analyzed using Mann-Whitney test. Longitudinal data was selected for patients with greater than three visits over the five years. Longitudinal data was normalized for scale and scores were corrected to show decreasing values for increased scores that showed a decrease in cognition.

Future Directions

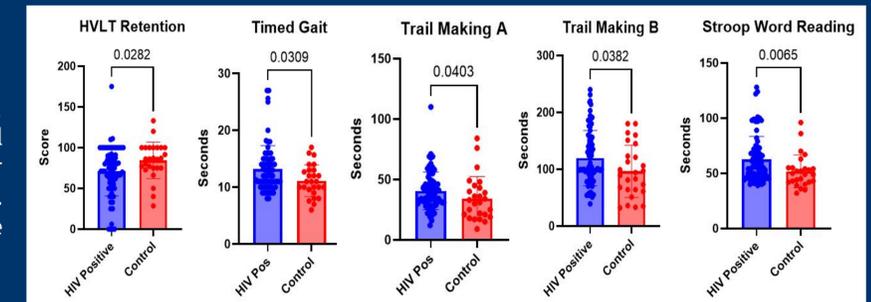
Assess if similar patterns of specific test deficit exist among other cohorts

Match test patterns to CD4 count and PET imaging

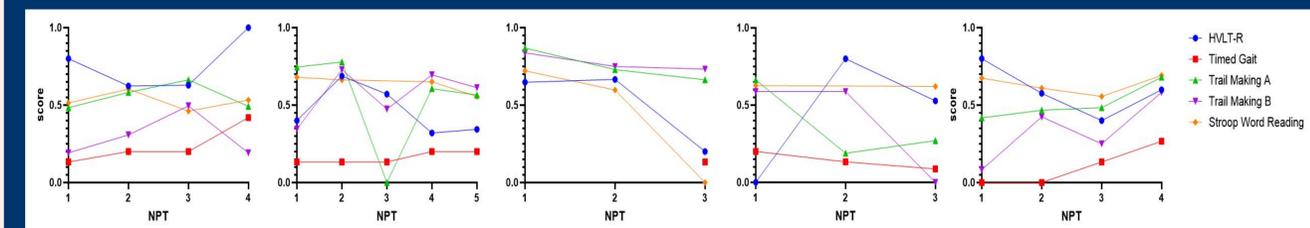
Compare test data to socio-economic conditions to find correlations

Comparisons of the HIV positive and control cohort showed lower scores

In five of the fifteen cognitive domains. Hopkins Verbal Learning Test-Revised, Timed Gait, Trail Making A and B, and Stroop Word Reading all showed statistically significant lower scores than those in the control group. None of the other tests were significant.



- HVLt correlates with memory
- Timed Gait Gross with motor speed
- Trial Making with visual attention and task switching



Selected longitudinal data from the HIV positive cohort

Acknowledgements

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Graphic A was created in BioRender

References

[1]CHARTER Study. Neurology. 2010 Dec 7;75(23):2087-96 [2] Systematic review, HAND. Front.Neurol. 2020 Dec