Neuroinflammation in Asymptomatic HIV-infected Subjects on Effective cART

Jaimie H Vera, Qi Guo1,2,3,4, Iain Rabiner1,4, Paul Matthews1,4, Roger Gunn1,2,5, Alan Watson1

1 Sections of Infectious Diseases, Imperial College London, London, UK, 2 Institute of Brain Sciences, Imperial College London, London, UK, 3 Institute of Psychiatry, King’s College London, London, UK, 4 UCL Centre for Imaging Sciences, London, UK, 5 Department of Imaging Science, University College, Oxford, UK, 6 MRC, National Institute of Neurological Disorders and Stroke, Bethesda, UK

Introduction

CART may contribute to the pathogenesis of HIV-associated neurocognitive impairment

- Positive emission tomography (PET) imaging allows in vivo quantification of neuroinflammation by measuring the density of the 18kDa peripheral benzodiazepine receptor (PBR)
- PBR is a transmembrane protein highly expressed in microglia

Methods

- Eligible subjects were HIV-infected, neurologically asymptomatic adults receiving stable antiretroviral therapy (cART), with at least 2 years on cART
- All HIV subjects completed a computerized assessment of cognitive performance (CogState Ltd, Melbourne, Australia) which was previously validated in this condition
- Significant differences between groups were identified using FSL
- Significant increases in DVR were observed in the basal ganglia (BG) in HIV cases compared to controls
- Significant local increases in DVR in HIV cases compared to controls were found in the parietal cortex (p=0.01) and global subiculum (p<0.01) with a significant decrease in the midbrain in the midbrain (p<0.01) and temporal cortex (p<0.01)

Results

- Significant local increases in DVR in HIV cases compared to controls were found in the parietal cortex (p=0.01) and global subiculum (p<0.01) with a significant decrease in the midbrain in the midbrain (p<0.01) and temporal cortex (p<0.01)

Figure 2: [13C]PBR28 in rCBV in selected regions of interest investigated for HIV cases and controls. rCBV: high affinity binder, tCBV: low affinity binder.

Conclusions

- In asymptomatic HIV-infected patients, a significant increase in microglial activation is present suggesting persistent microglial activation despite control of virus.
- The putative increase in brain rCBV appeared during the pre-treatment stages of HIV infection, possibly related to persistent microglial activation even after virus control has been achieved.
- Neuroinflammation was present in brain areas involved with mediating attention and working memory such as basal ganglia, temporal cortex and parietal cortex. These findings suggest that neuroinflammation is implicated in a pre-symptomatic neurocognitive process.
- Finally, we observed brain areas with decreases in rCBV in HIV cases (midbrain and lateral temporal cortex) compared to controls suggesting different microglial/inflammation activation patterns within specific anatomical regions.

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