Association between plasma homocysteine levels and signs of axonal injury in untreated HIV

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**Background**

Many HIV infected patients without antiretroviral treatment suffer from neurological symptoms in a varying range of severity. Most patients with and several without neurological symptoms have elevated levels of neurofilament protein light (NFL) in CSF, as a marker of ongoing axonal injury. Hyperhomocysteinemia is associated with diseases of neurological impairment. The metabolism of homocysteine is related to levels of B12-vitamin and folic acid. Patients with hyperhomocysteinemia suffering from mild cognitive impairment, who were treated with B-vitamins showed a significant reduction of the rate of brain atrophy in parts of the brain related to Alzheimer’s disease. Our aim was to investigate the correlation between homocysteine levels and axonal injury in HIV infected patients.

**Method**

Homocysteine and B12-vitamin levels were analyzed in plasma with stable isotope dilution liquid chromatography tandem mass spectrometry (LC-MS/MS), and electrochemiluminescence immunoassay respectively, from 80 neurological asymptomatic HIV-infected patients without antiretroviral treatment. Those results were compared to CSF levels of NFL analyzed with ELISA.

**Results**

We found a significant correlation between the plasma level of homocysteine and CSF level of NFL in untreated patients, \((r = 0.52, p < 0.0001)\). 20 patients had hyperhomocysteinemia (>15 µmol/L) and 20 had elevated levels of CSF NFL (age dependent). There were also a significant inverse correlation between homocysteine and B12 levels \((r = -0.41, p < 0.001)\) but no significant correlation between B12 and CSF NFL.

**Conclusions**

- A significant correlation was found between plasma homocysteine and CSF NFL levels in neurologically asymptomatic HIV-infected subjects without antiretroviral treatment.
- These data call for further research into the role of homocysteine or functional vitamin B12 deficiency in CNS injury in HIV-infected patients.

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