BMC Proceedings

Poster presentation

Open Access

JC virus in bone marrow of HIV-positive and HIV-negative patients

C Sabrina Tan*[1,2], B Dezube[3], P Bhargava[4], C Wuethrich[1], P Autissier[1] and IJ Koralnik[1,5]

Address: [1]Division of Viral Pathogenesis, Beth Israel Deaconess Medical Center, Boston, MA, USA, [2]Division of Infectious Diseases, Beth Israel Deaconess Medical Center, Boston, MA, USA, [3]Division of Hematology/Oncology, Beth Israel Deaconess Medical Center, Boston, MA, USA, [4]Department of Pathology, Beth Israel Deaconess Medical Center, Boston, MA, USA and [5]Department of Neurology, Beth Israel Deaconess Medical Center, Boston, MA, USA

Email: C Sabrina Tan* - ctan@bidmc.harvard.edu

* Corresponding author

from Infectious diseases of the nervous system: pathogenesis and worldwide impact
Paris, France. 10–13 September 2008

Published: 23 September 2008

BMC Proceedings 2008, **2**(Suppl 1):P66

This abstract is available from: http://www.biomedcentral.com/1753-6561/2/S1/P66

Background

Progressive multifocal leukoencephalopathy (PML) is caused by reactivation of JC virus (JCV) infection. To determine whether the bone marrow (BM) is a site of viral reactivation, we compared the prevalence of JCV infection in archival BM biopsy samples and fresh BM aspirates of HIV$^+$ and HIV$^-$ patients without PML, and characterized the phenotype of JCV-infected cells.

Results

Of 41 HIV$^+$ patients, 38 were male (93%) and indications for BM biopsies were lymphoma (20), pancytopenia (8), anemia (6), MGUS (2), polycythemia (2), leucopenia (1), splenomegaly (1), and thrombocytopenia (1). Mean age was 47 (range 32–71), mean CD4 count 211 (2–928), 27% had undetectable plasma HIV RNA, and 75% were on HAART. The 47 HIV$^-$ controls, matched for indications for BM biopsy, included 32 males (65%), and mean age was 56 (range 27–93). Quantitative PCR detected JCV DNA in BM samples of 19/41 (46%) HIV$^+$ vs 3/47 (6%) of HIV$^-$ ($p < 0.001$). Preliminary immunohistochemistry (IHC) experiments suggest that JCV T antigen is detectable in a fraction of JCV DNA positive bone marrows samples, while JCV VP1 protein was not. Furthermore, JCV was detected by double IHC in some of the plasma cells, myeloid, and lymphoid cells. We then tested fresh BM aspirates, blood and urine samples from 30 HIV$^-$ and 6 HIV$^+$ patients. JCV DNA was detectable in 10/36 (28%) fresh BM aspirates, 7/26 (27%) peripheral blood samples, and 9/20 (45%) urine samples. In HIV$^+$patients, 3/6 (50%) had detectable JCV DNA in BM aspirates vs 7/30(23%) of HIV$^-$ patients. The JCV$^+$-cell subpopulations in HIV$^+$ patients included B, T, NK and NKT cells, with a JC viral load ranging from 2–1080 copies/ug DNA, while HIV$^-$ patients had JCV in the same subpopulations, as well as PMN and monocytes, with a viral load ranging from 2–250 copies/ug DNA. Six of the HIV$^+$ and one HIV$^-$ bone marrow samples underwent RR amplification by PCR. Analysis of JCV regulatory sequence is in progress and will be presented.

Conclusion

JCV is not present in BM of most HIV$^-$ individuals who required bone marrow biopsy, which suggests that BM is not a common reservoir for JCV in HIV$^-$ individuals. However, half of HIV$^+$ patients harbored JCV in their BM. JCV reactivation in BM may require profound immunosuppression as seen in HIV infection, and potentially specific depletion of CD4$^+$ and CD8$^+$ T cells.