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Analysis of HIV variants in blood and semen in serodiscordants by heteroduplex mobility assay

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Purpose of the study

The resistance of antiretroviral drugs is mainly attributed by the generation of HIV variants in different secretions of the same individual; distinct viral variants have been detected in different cells and body fluids of the same individual. Genotypic and phenotypic characterization of viral variants in blood and urogenital secretions may provide strategies for designing modalities in prevention of sexual transmission of HIV and to explore the mechanism of sexual transmission of human immunodeficiency virus type 1(HIV-1).

Methods

HIV viral RNA and/or DNA will be isolated from PBMCs, seminal leukocytes, sperm and seminal plasma of HIV-positive individuals. Genotypic characterization will be done by heteroduplex mobility assay (HMA) and by sequencing of viral DNA/RNA. Phenotypic characterization of the virus will be done co-culturing the cells of the infected individuals with PBMCs from the normal donor. The phenotypic characterization will also be evaluated by CD4/CD8 count by flow cytometry and viral load by real time PCR (Cobas Taqman) Roche.

Summary of results

HIV variant analysis by HMA shows multiple heteroduplex patterns in serodiscordants and the HMA pattern of the sperm and PBMCs of the same individual showed the distinct pattern. Sequence analysis showed 97% homology of C2/V3 region of HIV-1 C env from sperm while that with the PBMCs of the same individual showed 91% homology. We found undetectable viral load in blood plasma but the presence of high viral RNA copies in seminal plasma in the same individual showing the the escape of HIV from the antiretrovirals. So it is necessary to explore the tropism usage by the virus in PBMCs and seminal components of the same individuals

Conclusion

Presence of distinct viral variants in blood and semen play an important role in escape of the HIV in different components and showing the shedding pattern to escape from the effective antiretrovirals, Presence of virus in the sperm shows that the spermatozoa are also another factor responsible for sexual transmission of HIV.