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Sialic Acid Profile and Sialidase Activity in HIV-Infected Individuals

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Abstract : Sialic Acids and sialidases have been implicated in many disease states particularly bacterial and viral infections which are common opportunist infections of HIV disease. Their role in HIV/AIDS is contemplated. A study was carried out to determine Sialic Acid profile and Sialidase Activity in HIV infected and Apparently Healthy individuals, and also determine the relationship between the sialic acid levels and sialidase activity. Blood samples were collected from 200 subjects (150 HIV infected individuals and 50 apparently healthy individuals divided into four groups- HIV ART Naïve, HIV Stable (on ART but have been stable with no clinical episodes), HIV-OI (on ART with opportunistic infections), and Apparently Healthy). Complete Blood Count, Erythrocyte Surface Sialic Acid (ESSA), Free Serum Sialic Acid (FSSA) concentrations and Sialidase activity were determined for all 200 subjects. Analysis of variance (ANOVA) was used to compare the results of the different groups of HIV infected individuals as well as controls. The mean haemoglobin (HGB), Packed Cell Volume (PCV) and Red Blood Cells (RBC) concentrations were significantly lower ($P \leq 0.05$) in the HIV groups compared with the apparently healthy groups. Anaemia and neutropaenia were the most common heamatological abnormalities observed in this study with highest prevalence of anaemia found in the ART naive group. The mean FSSA was 0.4±0.4mg/ml. There was a significant difference ($p \leq 0.05$) between some groups. The highest levels of FSSA was observed in the HIV ART naïve (0.65±0.5mg/ml). The mean ESSA value for the study population was 0.54±0.35mg/ml with no significant difference ($p \leq 0.05$) between groups. The mean sialidase activity values were 0.52±0.1 µmol/min/µl, 0.40±0.1 µmol/min/µl, 0.45±0.1 µmol/min/µl and 0.41±0.1 µmol/min/µl for the HIV ART naïve, HIV stable, HIV/OIs and apparently healthy groups respectively. No significant difference ($p \leq 0.05$) was found between groups and also in gender and age. The finding in this study of higher mean sialidase activity and FSSA levels in the ART naïve HIV group compared with other groups indicate that the virus and other opportunistic pathogens may be sialidase producers in vivo which cleave off sialic acids from erythrocytes surface, leading to high levels of FSSA, anaemia and neutropaenia seen in this group. The higher ESSA concentration found in the HIV stable group along with lowest FSSA concentration in the group suggests the presence of sialyltransferases.

Keywords : erythrocyte surface sialic acid, free serum sialic acid, HIV, sialidase
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