

**Title: Measurement of immune response to Hepatitis B vaccine in HIV 1 infected and healthy children.**

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Objectives

To assess the CD4+ T cell and the B cell memory response against Hepatitis B vaccine in HIV-infected children and healthy children .To quantify the difference in the anti HBs antibody titre in HIV-infected children and healthy children. To determine the impact of ART in anti-HBs kinetics among HIV-infected Children.

Material and Methods

In this cross sectional study, whole blood sample were collected from HIV infected children (n=42) and healthy children (n=38) between 2 to 15 years of age who were vaccinated for Hepatitis B. In both study groups, CD4 count was measured by flow cytometry (BD FACSCCount) and anti HBs titer by CMIA (Chemiluminescent Microparticle Immunoassay).In a proportion of the samples,HIV infected (n=14) and healthy controls (n=15), Hepatitis B surface antigen specific CD4 T cell (IFN $\gamma$  cytokine) and memory B cell responses were detected by flow cytometry (BD FACSCanto II). The markers used for CD4 T cell were CD4+, IFN $\gamma$ +, CD69+ and for memory B cell were CD19+, CD20+, CD27+. All the children who were reactive for anti-HBc were excluded.

## Results

This study was conducted on 42 HIV infected children and 38 healthy controls. The median CD4 + T cell count in HIV infected children was 725.5 while in healthy children was 980 which was statistically significant ( $p = 0.002$ ). Median CD4 + T cell % in HIV infected children was 27. while the median CD4+ T cell % in healthy children was 29.44 ( $p$  value = 0.067). Among the 42 HIV infected children 4(10%) had protected level of Anti HBs and out of the 38 healthy children 18 (47%) were protected ( $p=0.0006$ ) which was not significant ( $p=0.42$ ). There is not much difference between the median anti HBs titers in HIV infected children on ART and treatment naïve. Percentage of CD4 +T cells producing Hepatitis B surface antigen specific IFN- $\gamma$  in HIV infected children showed a median of 0.3 and 0.2 in healthy children which was statistically significant ( $p = 0.0427$ ). Percentage of Hepatitis B surface antigen specific memory B cell in HIV infected children showed a median of 1.05 and 0.5 in healthy children and was not statistically significant ( $p =0.694$ ).

## Conclusion

The levels of CD4 + T cell and anti HBs titre were higher in healthy controls compared to HIV infected children as expected. However, the percentage of HBV specific IFN $\gamma$  producing CD4 + T cell and the memory B cell response were relatively equal or higher among HIV infected children than the healthy controls. giving a booster dose of Hepatitis B vaccine in the HIV infected children should be considered to bring in good immune response Anti-HBs titer decay and antibody kinetics among HIV infected children needs further detailed investigation to maximize the benefits of HBV vaccination in HIV infected individuals.