EFFECT OF HEPATITIS-B VIRUS CO-INFECTION ON CD4 CELL COUNT AND LIVER FUNCTION OF HIV INFECTED PATIENTS

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Abstract

Background: Liver disease caused by chronic hepatitis B virus (HBV) is emerging as a significant cause of morbidity and mortality among human immunodeficiency virus (HIV)-infected individuals.

Methods: This study is conducted in J. L. N. Medical College & Associated groups of Hospitals patients attending from ICTC (G). 500 samples are taken randomly from January 2018 to June 2018

Results: In the co-infected patients, ALT, AST and ALP were higher than normal. The mean serum level of ALT, AST and ALP were significantly higher in the co infected patients than in the HIV mono infected patients. The mean level of CD4+ count was significantly lower in the co infected patients than in the HIV mono infected patients.

Conclusion: Hepatitis B virus co-infected HIV positive patients are more likely to have abnormal liver function test than the mono-infected patients.

Keywords: HIV, Hepatitis B, CD4 count, co-infection

Introduction:

HIV patients may be co-infected with other infectious organisms which are transmitted through common modes of transmission. In majority of the cases (>90%), mode of transmission is unsafe sexual contact. Thus patient may be co-infected with HBV, through common modes of transmission. Liver disease caused by chronic hepatitis B virus (HBV) is emerging as a significant cause of morbidity and mortality among human immunodeficiency virus (HIV)-infected individuals. Since HIV and HBV have epidemiological similarities with regard to routes of transmission, patients of HIV have a high probability of getting co-infection with HBV. In the Middle East and Indian subcontinent an estimated 2–5% of the general population is chronically infected with HBV. [Approximately 10% of the HIV-infected population worldwide suffers from chronic hepatitis B] Co-infection rates of HBV in HIV patients vary worldwide and largely depend upon the geographical location, risk groups, the type of exposure involved and the socioeconomic condition of that particular region. In

Europe and the United States of America, HIV/HBV co-infection is around 6–14%. In India there are only few reports of the prevalence of HBV in HIV-infected patients. Though the mortality and morbidity rate from HIV/Acquired Immunodeficiency Syndrome (AIDS) have declined as a result of highly active antiretroviral therapy (HAART), liver disease due to chronic HBV infection has become a leading cause of death. In HIV/HBV co-infections, HIV infection causes increased rate of persistent HBV infection, cirrhosis, liver-related mortality and risk of hepatocellular carcinoma at lower CD4 T cell counts.¹

There is paucity of data regarding correlation of liver enzymes and CD4 T-cells among HIV/HBV co-infected patients. Therefore, the present study was undertaken to find the prevalence of HBV co-infection in HIV patients in North-West Rajasthan and to assess the pattern of liver enzymes and CD4 T-cell counts in both HIV-infected and HIV/HBV co-infected patients.²

Co-infections of HBV and in HIV positive patients are associated with reduced survival and an increased

risk of progression to severe liver diseases with higher susceptibility towards hepato-toxicity due to antiretroviral therapy.³

Material and Methods

This study is conducted in J. L. N. Medical College & Associated groups of Hospitals patients attending from ICTC (G). 500 samples are taken randomly from January 2018 to June 2018

Sample Collection- 5ml blood was collected in a plain vial from the HIV positive patients using aseptic precautions. Blood was allowed to clot at room temperature for 30 minutes. After clotting the tubes centrifuged at 3000 rpm for 10 minutes. The clear serum was withdrawn and transfer to a sterile plastic vial for storage. Sample is stored in freezer (0°C).

A total of 500 samples from HIV infected individuals are screened for Hepatitis B Virus infection, are the following:

1. Detection of HBsAg by rapid card test.
2. Detection of CD4 COUNT by BDFACS Count
3. Detection of liver enzyme by Automated autoanalyser

Data analysis

To collect required information from eligible patients a pre-structured pre-tested Proforma was used. For data analysis Microsoft excel and statistical software SPSS-20 was used and data was analyzed with the help of frequencies, figures, proportions, measures of central tendency, appropriate statistical test .

Results

Table 1: Effects of HIV, HBsAg on T-lymphocytes subset CD4+ of subjects examined

Patient profile	Sex	No. of patient examined	Mean CD4+ Cells/ μ l
HIV[only]	M	267	388.73
	F	233	404.77
HIV & HBsAg	M	15	328
	F	2	323

The mean level of CD4+ count was significantly lower in the co infected patients than in the HIV mono infected patients.

Table 2: Effects of HIV, HbsAg on liver enzymes of subjects examined

Patients profile	Sex	No. of Infected / Examined	Mean ALT [IU/L]	Mean AST [IU/L]	Mean ALP [IU/L]
HIV[only]	M	267	28.75	39.24	164.92
	F	233	27.96	35.69	150.59
HIV and HBsAg	M	15	77.46	94.4	702
	F	2	47.5	60	680

In the co-infected patients, ALT, AST and ALP were higher than normal. The mean serum level of ALT, AST and ALP were significantly higher in the co infected patients than in the HIV mono infected patients.

Discussion

This study is undertaken among HIV positive patients attending ICTC & ART Centre, JLN Medical College and Hospital, Ajmer. Serum samples from 500 cases collected from January 2018 to June 2018.

Hepatitis B virus is a major cause of chronic liver disease worldwide. Hepatic toxicity is also a well-known complication of treatment of HIV infection with HAART. Accurate assessment of HBV infection in HIV co-infected individuals is necessary in order to make therapeutic decisions. World Health Organization (WHO) advocates HBsAg testing especially in areas of high HBV prevalence, but additional testing for HBV markers such as HBeAg and HBV DNA and tests to assess stage of liver disease (e.g. liver enzymes, liver biopsy, etc) may not be widely available in many resource limited countries.⁴

HBsAg and assay of liver enzymes are done routinely before commencement of HAART. This is to help the physician to decide on the appropriate regimen in terms of avoiding those that are hepatotoxic in patients who already have derangement of the liver function and also the use of drugs that are also effective against HBV for HBsAg positive patients.

In our study shown that CD4 count of the HIV mono-infected patients was significantly higher than that of the patients co-infected with HBV and also shown that the level of serum ALT and ALP is higher in HIV and HBV co-infected patients compared to HIV mono-infected patients. This is consistent with a previous study done in Nigeria and South Tamil Nadu.^{5,6}

Routine estimation of Alanine aminotransferase (ALT) is an inexpensive and non-invasive means of assessing liver disease as it reflects the activity of hepatotropic viruses and status of liver during therapy with various hepatotoxic drugs. Even though it is well known that ALT may even be normal in the presence of advanced liver disease, in resource limited countries like Nigeria it still remains the affordable test in the assessment of liver function in the management of HIV/AIDS patients.

Elevated ALT at baseline is an indication that the liver is already compromised and so drugs that are hepatotoxic will have to be avoided in order not to further compromise the liver function. Those with co-infection with HBV are usually given drugs that are also effective for treatment of HBV.

Baseline CD4 count which used to be a standard requirement for commencement of antiretroviral therapy may also be used as a surrogate test for liver function especially in co-infected patients.

Conclusion

Hepatitis B virus co-infected HIV positive patients are more likely to have abnormal liver function test than the mono-infected patients. We recommend that hepatitis B virus co-infected HIV positive patients

should be given first-line antiretroviral drugs that are non-hepatotoxic.

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