ORIGINAL RESEARCH PAPER

General Medicine

ASSESSMENT OF LIVER FUNCTION TESTS AMONG CASES WITH HUMAN IMMUNODEFECIENCY VIRUS (HIV)

KEY WORDS: HIV, co-infection, liver function TESTS, CD4 COUNT

S.Hema Akilandeswari Senior Assistant Professor , Department of General Medicine, Thanjavur Medical College ,Thanjavur.

B.Kavitha Senior Assistant Professor , Department of General Medicine, Thanjavur Medical College ,Thanjavur.

C.Maghil Belinta* Assistant professor, Department of General Medicine , Govt. Mohan Kumaramangalam Medical College ,Salem *Corresponding Author

ABSTRACT

Background: Co-infection of HIV with HBV and HCV can alter the natural history of these hepatotropic viruses leading to chronic hepatitis, cirrhosis and increases the risk of developing hepatocellular carcinoma. Hence this study was conducted to estimate the sero prevalence of HBV and HCV co-infection among the HIV infected individuals and to assess the association of co-infection with liver enzyme levels and CD4+ T cell levels.

Methods: This study was conducted as a cross sectional study in the Department of General medicine in Thanjavur Medical College and hospital, Thanjavur, a tertiary care Government teaching hospital during the period of October 2018 to August 2019. A total of 159 HIV cases were included in the study. All the cases were assessed by detailed history, clinical examination, serology for HIV infection. Patients were tested for co-infection with HBV , HCV and CD4 count. Data was entered and analysed using Graph Pad Prism version 5 software.

Results: BMI was significantly low among cases with HIV associated with co-infection compared to HIV infection alone whereas SGOT, SGPT and ALP were significantly high among cases with HBV co-infection compared to HIV infection alone.

Conclusion: This shows that there is higher risk of liver disease among the patients with HIV along with co-infection. The risk is further aggravated by exposure to opportunistic infections, alcoholism and anti retro viral drugs. Hence co-infection with HBV or HCV among the HIV seropositive cases should be estimated earlier before treatment with antiretroviral drugs.

BACKGROUND

Human immunodeficiency virus (HIV) infection and Acquired immunodeficiency disorder (AIDS) is a spectrum of conditions , caused by the retro virus called the Human Immunodeficiency Virus. In the year 1983 Human Immunodeficiency Virus , was isolated from a patient with lymphadenopathy and HIV was clearly demonstrated to be the cause for AIDS in the year 1984. India's first case of AIDS was reported from Chennai in the year 1986[1].

With the advancements in treatment for HIV/AIDS with effective anti retro viral drugs, there is a marked decrease in mortality and morbidity due to HIV per se and its associated opportunistic infections. This has led to the increased survival of the HIV patients . However , liver diseases due to co-infection with hepatitis B virus (HBV) and hepatitis C virus (HCV) is being recognised as a significant problem[2]. Co-infection of HIV with HBV and HCV can alter the natural history of these hepatotropic viruses leading to increased rate of viral replication, decrease in the spontaneous resolution of the infection, increased reactivation of the latent infection, rapid progression of the disease to chronic hepatitis and cirrhosis of liver. Also the co-infection increases the risk of developing hepatocellular carcinoma[3].

Due to these reasons liver diseases due to HIV, HBV and /or HCV co-infection may emerge as a great public health problem than before. Hence knowledge on the prevalence of HBV/HCV co-infection with HIV is necessary in order to develop a clear strategy on the prevention and treatment of the above co-infection[4,5]. Further, establishing a reliable estimate of the HIV/HBV or HIV/HCV co-infection burden in the country will guide in provision of appropriate ART regimens that are effective in both the HIV and HBV or HCV co-infected patients and can also prevent the unnecessary development of mutant or drug resistant strains[6]. Thus this study was conducted to estimate the sero prevalence of HBV and HCV co-infection among the HIV infected individuals and to assess the association of co-infection with liver enzyme levels and CD4+ T cell levels.

MATERIALS

This study was conducted as a cross sectional study in the Department of General medicine in Thanjavur Medical College and hospital, Thanjavur, a tertiary care Government teaching hospital, during the period of October 2018 to August 2019. Patients with HIV infection aged more than 12 years, from both genders were included in the study. Patients with obesity, Diabetes mellitus, systemic hypertension, metabolic syndrome, patients on chronic hepatotoxic drugs other than Anti Retroviral Therapy were excluded from the study. A total of 159 HIV cases who attended the outpatient and inpatient department of General medicine during the study period were included in the study. All the cases were assessed by detailed history, clinical examination, serology for HIV infection. patients were tested for co-infection with HBV/HCV and CD4 counts. Data was entered and analysed using Graph Pad Prism version 5 software. Mann Whitney U test and Unpaired T tests were used, appropriately to calculate the statistical significance. P value of < 0.05 was considered as statistically significant.

RESULTS

In the present study majority of the study participants (66.7%) belong to 30-50 years of age group with slight male predominance (53.5%). Mode of transmission of HIV was found to be heterosexual in 96% of cases and 57.9% of cases were in clinical stage 1. Also 35.2% of cases were below the normal BMI category. In the present study 93.7% of cases were found to have HIV infection alone , whereas 6.3% of cases had co-infection either with HBV or HCV or both. (Table 1)

Table 1: Clinical profile of the study participants

Variables	Number (n)	Frequency (%)
Age (in years)		
18 – 30 years	20	12.5
31 - 50 years	106	66.7
> 50 years	33	20.8
Gender		
Male	85	53.5

Female	74	46.5
Mode of transmission of HIV		
Heterosexual	153	96.2
Homosexual	2	1.3
Organ transplantation	1	0.6
Parent to child	3	1.9
Type of clinical staging		
Stage 1	92	57.9
Stage 2	43	27
Stage 3	20	12.6
Stage 4	3	1.9
Not determined	1	0.6
BMI category		
<18.5	56	35.2
18.5 - 25	100	62.9
25.01 - 30	3	1.9
Proportion of cases with infection		
HIV alone	149	93.7
HIV with co-infection (Hep B or Hep C)	10	6.28

History of blood transfusion was more among cases with HIV alone , whereas none had history of blood transfusion in the co-infection group. Also CD4 counts were less than 200 in 10% of patients with HIV infection alone and in 20% of cases HIV with co-infection . CD4 count between 201-500 was reported among 31.5% of cases with HIV infection alone and in 80% of cases HIV with co-infection. CD4 count more than 500 was reported among 58.4% of cases with HIV infection alone. (Table 2)

Table 2: Comparison of cases with history of blood transfusion and CD4 counts

Variables	HIV alone		HIV with co infection	
	n	%	n	%
History of Blood transfusion				
Yes	10	6.71	0	0
No	138	92.61	10	100
Not known	1	0.67	0	0
Cd4 count (per mm^3)				
< 200	15	10.1	2	20
201 to 500	47	31.5	8	80
>500	87	58.4	0	0

Mean (±SD) BMI was found to be 21.03±3.3 in patients with HIV infection alone and 18.1±2.5 in cases with HIV with co-infection and the difference was found to be statistically significant. Mean SGOT was found to be 28.4±16.1 and 88.4±111.1 in cases with HIV infection alone and HIV with co-infection, respectively and the difference was found to be statistically significant. Mean SGPT was found to be 29.5±17.4 and 83.1±62.3 in cases with HIV infection alone and HIV with co-infection, respectively and the difference was found to be statistically significant. Mean ALP was found to be 69.1±27.6 and 84.4±24.8 in cases with HIV infection alone and HIV with co-infection, respectively and the difference was found to be statistically significant, in this study. (Table 3)

Table 3: Comparison of BMI and LFT among cases with HIV alone and co-infection

Parameters	HIV alone		HIV with co-infection		P value
	Mean	SD	Mean	SD	
BMI	21.03	3.3	18.1	2.53	0.0007*
SGOT (IU/mm^3)	28.37	16.1	88.4	111.1	<0.0001*
SGPT (IU/mm^3)	29.5	17.4	83.1	62.3	<0.0001*
ALP (IU/mm^3)	69.1	27.6	84.4	24.8	0.0400*

*Significant

DISCUSSION

Lukman et al[7] has described in his study, on the prevalence and burden of HIV and hepatitis B co-infection with data from seventeen states in Nigeria , that the overall prevalence of HIV/HBV co-infection was 17% . Chandra et al[8] conducted a similar study in around 120 HIV patients in South India and estimated the prevalence of HBV and HCV to be 15% and 8% respectively. Alberto et al[9] in his study, on the prevalence of HIV/HCV co-infection in Midwestern Brazil found that the prevalence of hepatitis B and C infection among the HIV patients was around 3.8% and 9.7%. Ahuja et al[10] studied seroprevalence of hepatitis B and C co-infection in HIV positive patients in New Delhi, India and found the prevalence to be (4.9%) for HBV and (1.7%) for HCV respectively. This gives an example of the Indian scenario. This is almost similar to the prevalence of the HBV, HCV infection in TMCH as per my study.

From this study , it is observed that in patients with mono infection, 54.7% had CD4 count >500. However among the 80% of the patients co-infected with either HBV or HCV had CD4 count between 201-500 and 20% of them had below 20%.

On comparing the mean CD4 counts between the mono infected and the co-infected individuals , it was found that the mean CD4 count was lower in both males and females of the co-infected groups. However the difference between their mean values was statistically significant only among the females. These studies confirm that , the lower level of CD4 counts among the co-infected individuals was due to the increase in the cytopathic effects of the HIV virus, on co-infection with the HBV or HCV.

Yemanebrhane et al[11] undertook a study on Magnitude of Hepatitis B Virus and Hepatitis C Virus among Patients on HAART and Association with Liver and Renal Function and CD4+ T cell Level among 384 patients in Ethiopia. They reported that the mean CD4 count was lower among the co-infected patients when compared with the mono infected patients.

This is comparable to the study by Mayaphi et al[12] which observed that there was an increased HBV prevalence in HIV patients with CD4 count of ≤100cells/μL . It indeed carried a major impact on increase in HBV replication in patients with co - infection. In another study done by Wondimeneh et al[11] , among 400 HIV patients the mean CD4 count was lower among the co-infected HIV patients compared to the mono infected patients and this again is supporting the present study. The lower level of CD4 count is an indication that HBV/HCV infection can aggravate the propensity of the pathogenesis of AIDS in HIV infected persons, as CD4 count is directly proportional to the level of immunosuppression.

Comparison was done on the level of liver enzymes between the mono infected and the co-infected patients. The mean levels of SGOT, SGPT, and ALP were assessed in the two groups and the difference between these mean levels of liver enzymes, were statistically significant with a p value of $p<0.0001$, $p<0.0001$ and $p<0.04$ for SGOP, SGPT and ALP respectively. In our study SGOT was elevated in 50% of the co-infected patients and SGPT was elevated in 80% of the co-infected patients.

Wondimeneh et al[13] studied the liver enzyme levels among 400 HIV patients at North West Ethiopia. Despite the absence of statistically significant difference in the mean levels of the liver enzymes between HIV-monoinfected and HIV-viral hepatitis co-infected individuals, raised AST, ALT and ALP were found in both the monoinfected and the co-infected individuals. However, in a study which was conducted in South Africa by Lodeneo H et al[14], 70% of HIV-HBV and HIV-HCV co-infected study participants had significantly elevated SGOT, SGPT and 56% of them had elevated ALP. Similarly, a study done by Tripathi et al[15] in India, reported, significantly raised ALT among 14% of HIV/HBV co-infections and 20% in

HIV/HCV co-infected patients. The difference in the liver enzyme levels between various studies may be due to difference in study design, duration of the viral hepatitis as well as the patient's habits like chronic alcoholism or factor like drug induced hepatotoxicity. In addition, HIV can also infect the hepatic or kupffer cells which can further lead to the development of liver fibrosis and elevated liver enzyme levels[16]. However, the magnitude of the complication of the liver injury may be higher if the HIV positive patients are co-infected with HBV or HCV as indicated above.

CONCLUSION

It is evident from this study that the HIV infected individuals, have a higher probability of getting co-infected with HBV or HCV. The lower level of CD4 count among the HIV/HBV or HIV/HCV co-infected patients, is an indication that HBV/HCV infection aggravates the propensity of the pathogenesis of AIDS in HIV infected persons as CD4 count is directly proportional to the level of immunosuppression. There is a higher risk of progression of liver disease among the patients with HIV/HBV or HIV/HBC co-infection. The risk is further aggravated by exposure to opportunistic infections, alcoholism and anti retro viral drugs. Hence co-infection with HBV or HCV among the HIV seropositive cases should be estimated earlier before treatment with antiretroviral drugs, for apt choice of drugs and to avoid progression of liver disease and to prevent complications from opportunistic infections , toxicity of antiretroviral drugs and other toxins(alcohol). It is also mandatory for a strict monitoring of the liver enzymes and the CD4 T cell count regularly among these individuals in order to minimise the complications of the liver injury and for effective HIV treatment.

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