

Seroprevalence of Hepatitis B and C Co-Infection in HIV Positive Patients from a Tertiary Care Hospital.

Sanjiv Ahuja, Shalini Malhotra, Ankit Chauhan, Charoo Hans

Dept of Microbiology, Dr. R. M. L. Hospital & PGIMER, New Delhi, India

Abstract: The co-infection of Hepatitis B or Hepatitis C virus with HIV accelerates disease progression and may complicate the management of patients infected with HIV. This study is planned to evaluate the prevalence of HIV co-infection with Hepatitis B and C viruses in Central Delhi and adjoining areas. A total of 877 patients enrolled in the ART centre were retrospectively analyzed for the presence of HBV and HCV on the basis of the presence of HBsAg and anti-HCV (Ig G). In 877 HIV seropositive patients, 43 (4.9%) were positive for HBV and 15 (1.7%) for HCV and no case was simultaneously positive for both HBV and HCV. The prevalence rate of co-infection of HCV as compared to HBV with HIV is more in Western countries and is vice-versa in Indian sub-continent due to diverse factors. Having acquired the knowledge about the importance of such a co-infection, it is essential that all the HIV infected patients be screened for HBV and HCV co-infection.

INTRODUCTION

Human immunodeficiency virus (HIV) and Hepatitis B and C virus (HBV&HCV) are three most common chronic viral pathogens of major public health concerns^{1,2}. These viruses have similar routes of transmission, namely through blood and blood products, sharing of needles to inject drugs and sexual activity¹. People at high risk for HIV are also likely to be at risk for other infectious pathogens, including HBV or HCV enabling co-infection with these viruses a common event^{1,3}. Co-infections of HBV and HCV 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 therapy².

Thus expert guidelines developed in the United States and Europe recommend screening of all individuals infected with HIV for infection with HCV and HBV to help inappropriate management of such patients. In developing countries like India, no such uniform guidelines are available. Moreover literature regarding the prevalence of HIV co-infection with HBV &/or HCV in India is sparse. Thus the present study with a large sample size, was undertaken to detect the current seroprevalence of HBV&/or HCV co-infection in patients infected with HIV in Central Delhi & the adjoining areas.

MATERIAL AND METHODS

A total of Eight hundred and seventy seven (877), serum samples were received from the ART centre in the department of Microbiology, Dr Ram Manohar Lohia (RML) Hospital and Post Graduate Institute of Medical Education and Research (PGIMER), New Delhi from 1st January 2008 to 31st December 2009 for detection of HBV &HCV markers. For HBV, the marker used for routine screening was hepatitis B surface antigen (HBsAg).The test was performed using solid phase enzyme linked immunosorbent assay (ELISA) based on Direct Sandwich principle and the ELISA kit was manufactured by J.Mitra & Co.Pvt.Ltd. For HCV, anti HCV (IgG) ELISA was performed using third generation ELISA test from J.Mitra & Co.Pvt.Ltd. The ELISA tests were performed as per the manufacturer's instructions along with validity check and incorporation of internal controls in each run. Samples positive for HBsAg antigen &/or anti HCV antibody by first test were retested by rapid test for HbsAg and HCV Ig G antibodies using chromatographic immunoassay (Acon Biotech. Co.Ltd).All borderline samples were

tested in duplicate and if both duplicate retest sample absorbance value was less than the cut off value, the specimen was considered non-reactive. If any one of the duplicate retest absorbance value was found to be equal to or greater than the cut off, the specimen was considered to be reactive for HBsAg/HCV Ig G antibodies.

RESULTS

A total of 877 blood samples were received from confirmed HIV positive patients from ART clinic over a period of 2 years. Out of these 62% (545) were male and 38% (332) were female patients. The mean age of the study group was 32.57 years and ratio of males over female was 1.64:1. The age wise distribution of these patients is given in Figure 1.

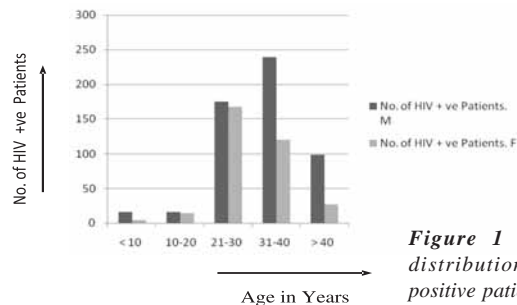


Figure 1 : Age wise distribution of HIV positive patients

The prevalence of HIV positive patients co-infected with HBV was found to be 4.9% (43) and those co-infected with HCV was 1.7% (15). Co-infection of both hepatitis B and hepatitis C with HIV was found to be 0%. The distribution of HBV and HCV co-infection in patients infected with HIV is shown in Table 1.

Table - 1: Distribution of HBV / HCV co-infection in HIV + patients.

Age in Yrs.	No. of HIV + patients.		No. of HIV + patients with HBV		No. of HIV + patients with HCV		No. of HIV + patients with HBV & HCV	
	M	F	M	F	M	F	M	F
< 10 (n=20)	16	4	2	0	0	0	0	0
10-20 (n=30)	16	14	1	0	0	0	0	0
21-30 (n=342)	175	167	12	7	0	2	0	0
31-40 (n=359)	239	120	13	4	8	2	0	0
> 40 (n=126)	99	27	4	0	1	2	0	0

DISCUSSION

HIV accounts for an estimated 40 million chronic infections while Hepatitis C and HBV cause 130 million and 370 million chronic infections respectively².

The prevalence of HIV in India is quite high and it has the second highest number of people living with HIV³. Among HIV infected patients, 2-4 million are estimated to have chronic HBV infection while 4-5 million are co-infected with HCV^{1,2}. An estimated one third of deaths in HIV patients are directly or indirectly related to liver diseases². Our study showed male predominance (62%) amongst HIV infected patients, which was much in concordance with other studies (73% and 86%) supporting the fact that male subjects are significantly at high risk of developing HBV/HCV co-infection^{1,3}. The mean age found in our study was 32.5% which is the normal age for HIV positivity in India¹. This also suggest that sexual route could be the commonest mode of transmission for HIV & HBV.

We found that the seroprevalence of HBV and HCV was 4.7% and 1.7% in HIV positive patients. This was significantly higher than the HBV and HCV seroprevalence in non HIV infected general population^{4,5} but much lower than the results obtained in another Indian study performed on HIV positive patients (9 & 2.2% respectively)¹. However another study performed in Nigeria reported a much lower prevalence 0.4% co-infection of HIV and HBV & 0% of HIV and HCV co-infection. This could be because the study group chosen by them composed of blood-donors while we picked up categorically HIV positive patients⁶. Another study from Iran showed a much higher (14.5%) co-infection of HIV and HBV & (72%) of HIV and HCV co-infection². Moreover in US and Europe, HIV/HBV co-infection has been found to be (6 to 14%) prevalence of HIV/HCV varies from (25-50%)². The higher prevalence rate of HCV in HIV-positive patients in comparison to the rate for HBV positivity in HIV infected patients could be considered as noticeable and it could be attributed to diverse factors particularly lack of vaccine for HCV contrary to the existence of multiple vaccines for HBV. Also sexual transmission of this virus is lower as compared to HBV and it is transmitted mostly via injection (especially in drug addiction) because of the increasing rate of addiction in certain countries². In Brazil the results of a study showed the rates of (6.4&5%) for HbsAg and HCV -Ab co-infection in HIV-positive patients². Our results were much in concordance with a South Indian study group where HBsAg was positive in (6.4%) of HIV positive patients and (2.1%) demonstrated HCV antibody⁷. Moreover, in India, a study showed that the prevalence rate of HBsAg in HIV positive patients was (3.4%) while the rate for HCV-Ab was reported to be (0%)⁸. In a similar study in northern India performed on 620 HIV-positive patients, the rate for HBV was (2.25%), for HCV (1.6%) and for both HBV/HCV co-infections it was less than (1%)⁹. Another study performed in Maharashtra which is a state with high prevalence of HIV, (25.8% and 5.6%) prevalence of HBV and HCV was found in HIV positive patients¹⁰.

Thus different studies depict that co-infection rates of HBV & HCV in HIV patients are variable worldwide depending on geographical region, risk group and also the type of exposure. Within India only, HBV & HCV co-infection among HIV positive patients varies from one region to other as is evident from different studies. The co-

infection for HBV varies from 9-30% and for HCV 2-8%^{1,10}. Moreover, it has been reported in literature that the co-infection rate rises with disease progression¹⁰. In our study the patients were referred from ART centre and were probably in different stages of HIV disease. The co-infection has pronounced effect on natural history of HIV. Although effect of HBV infection on HIV is uncertain, HIV has marked influence on HBV because it affects the quality and quantity of cytotoxic T lymphocytes response which has a bearing on outcome of liver damage in HBV infected patients. Moreover HIV-HBV co-infection also leads to increased persistence of HBV along with increase in HBV viral load. It also leads to increased incidence of HBV reactivation and re-infection. However, liver necrosis is less as the activity and number of CTL are decreased by presence of HIV¹⁰.

The co-infection of HCV with HIV is associated with a loss of immunological control of HCV and more rapid progression of HCV diseases¹⁰. HIV&HCV co-infection may lead to early onset of advanced liver diseases. Moreover HCV clearance is associated with development and persistence of strong virus specific response by CTL & helper T cells. The loss of these cells by HIV has been linked to re-emergence of viremia⁸.

CONCLUSION

It is thus clear that apart from other infections like TB, HIV infected patients have high probability of getting HBV/HCV infection due to enhanced immunodeficiency by HIV. Shared route of transmission also plays significant role and is of epidemiological importance in our country. Thus routine screening of HIV infected patients for concurrent infection with HBV & HCV should be made mandatory because co-infection with these hepatitis viruses will increase the risk of cirrhosis, liver deficiency and mortalities in comparison to when a person is infected with only one of these viruses². It may complicate the delivery of anti-retroviral therapy (ART) by increased risk of drug related hepato-toxicity and interference with selection of specific agent. There is also an urgent need to conduct detailed studies on the interplay of HIV and hepatotropic viruses in the Indian community with a plethora of multipronged approaches to investigate the real crisis of HIV/hepatotropic viral infection pattern at the earliest to efficiently control and manage the situation.

REFERENCES

1. Saravanan S, Velu V, Kumarasamy N, Nandakumar S, Murugavel KG, Balakrishnan P, et al. Coinfection of hepatitis B and hepatitis C virus in HIV infected patients in South India. *World J Gastroenterol* 2007;13:5015-20.
2. Mohammad M, Talel G, Sheikhan A, Ebrahimzade F, Pournia Y, Ghaseemal E, et al. Survey of both hepatitis B virus (HBsAg) and hepatitis C virus (HCV-Ab) co-infection among HIV positive patients. *Virology journal* 2009;6:202.
3. Jain M, Chakravarti A, Verma V, Bhalla P. Seroprevalence of hepatitis virus in patients infected with human immunodeficiency virus. *Indian J Pathol Microbiol* 2009;52:17-9.
4. Tandon BN, Acharya SK, Tandon A. Epidemiology of hepatitis B virus infection in India. *Gut* 1996;38 Suppl 2:556-9.
5. Chandra M, Khaja MN, Farees N, Poduri CD, Hussain MM, Aejaz, Habeeb M. Prevalence, risk factors and genotype distribution of HCV and HBV infection in the tribal population: a community based study in south India. *Trop Gastroenterol* 2003;24:193-5.
6. Egah DZ, Banwat EB, Audu ES, Iya D, Mandong BM, Anelle AA, et al. Hepatitis B surface antigen, hepatitis C and HIV antibodies in a low-risk donor group, Nigeria. *East Mediterr Health J* 2007;13:961-6.
7. Padmapriyadarshani C, Chandrabose J, Victor L, Hanna LE, Arunkumar N, Swaminathan S. Hepatitis B or Hepatitis C co-infection in individuals infected with human immunodeficiency virus and effect of anti-tuberculosis drugs on liver function. *J Postgrad Med* 2006;52:92-6.
8. Mahajan A, Tandon VR, Verma S, Singh JB, Sharma M. Prevalence of Tuberculosis, Hepatitis B, Hepatitis C and Syphilis co-infection among HIV/AIDS patients. *Indian J Med Microbiol* 2008;26: 196-207.
9. Tripathi AK, Khanna M, Gupta N, Chandra M. Low prevalence of Hepatitis B virus and Hepatitis C virus co-infection in patients with human immunodeficiency virus in Northern India. *JAPI* 2007;55:429-31.
10. Tankhiwale SS, Khadase RK, Jalgoanker SV. Seroprevalence of anti HCV and hepatitis B surface antigen in HIV infected patients. *Indian J Med Microbiol* 2003;21:268-70.