

# Double Trouble: HIV and Hepatotropic Viruses Co-Infection at a Tertiary Care Center

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## ABSTRACT

**Introduction:** Human immunodeficiency virus (HIV), Hepatitis-B Virus (HBV) and Hepatitis-C Virus (HCV) viruses share similar mode of transmission and risk factors. Objectives was to estimate the prevalence of HIV and HBV/HCV co-infections; and to analyze the opportunistic infections(OIs) among these co-infections.

**Material and methods:** A total of 22,700 samples were sent for HIV screening are included as the study population. A retrospective study was conducted at a tertiary care hospital in south India including HIV-HBV and HIV-HCV co-infections documented from January 2011 to June 2016. The relevant clinical and laboratory data was obtained from patient case records. HIV Infections were diagnosed as per NACO guidelines (category III) with a combination of fourth generation ELISA (Biorad)/Chemiluminescence (Architect i1000SR, Abbott); Immunoconcentration (HIV Tridot, Jmitra Labs) and Immunodot (Signal HIV) based immunoassays. HBsAg for HBV co-infection was detected by Immunochromatography (Hepacard) and ELISA (Biorad), Anti HCV Antibodies for HCV co-infection was detected by Immunoconcentration (HCV Tridot, Jmitra Labs) and ELISA (Biorad).

**Results:** In our study population the most common mode of transmission was sexual transmission (80%), followed by spouse positivity (10%) and history of blood transfusion (6%). We noticed that a high proportion (74.4%) of the people diagnosed with these co-infections were on antiretroviral therapy.

**Conclusion:** We noticed that the patients with HIV-HBV co-infection had liver cirrhosis when compared with that of the HIV-HCV infection, 20.5% of HIV- HBV co-infected individuals landed up with cirrhosis. The most common opportunistic infections (OIs) were pulmonary and extra-pulmonary tuberculosis and candidiasis being most common followed by toxoplasmosis and one patient had syphilis among the study population. It is clear that apart from other infections like TB, HIV infected patients have high possibility of getting HBV/HCV infection due to immunocompromised state and shared route of transmission also plays an important role among these individuals.

**Keywords:** Human Immunodeficiency Virus (HIV), Hepatitis-B Virus (HBV), Hepatitis-C Virus (HCV), Hepatotropic Viruses, Co-Infection.

important cause of morbidity due to liver disease throughout the world<sup>3,4</sup>. It has been reported that the prevalence of HBV and HCV is usually high in HIV infected patients than the individuals without HIV<sup>5,6</sup>. Estimated HIV chronic infection burden is 40 million, HCV and HBV cases accounts for 130 and 370 million respectively<sup>16</sup>. India has the highest population of people living with HIV, Among the HIV infected people 2-4 million are estimated to have HBV infection and 4-5 million with HCV- Co-infection<sup>11</sup>

Among people with HIV/AIDS characteristics of HIV infected individuals co-infected with hepatotropic viruses. Objectives was to estimate the prevalence of HIV and HBV/HCV co-infections; and to analyze the opportunistic infections (OIs) among these co-infections.

## MATERIAL AND METHODS:

A total of 22,700 samples sent for HIV screening are included in the present study after obtaining ethical clearance from the Institutional Ethical Committee. A retrospective study was conducted at tertiary care hospital in south India including HIV-HBV and HIV-HCV co-infections documented from January 2011 to June 2016. The relevant clinical and laboratory data was obtained from patient case records.

HIV Infections were diagnosed as per NACO guidelines (category III) with a combination of fourth generation ELISA (Biorad)/Chemiluminescence (Architect i1000SR, Abbott); Immunoconcentration (HIV Tridot, Jmitra Labs) and Immunodot (Signal HIV) based immunoassays. HBsAg for HBV co-infection was detected by Immunochromatography (Hepacard) and ELISA (Biorad), Anti HCV Antibodies for HCV co-infection was detected by Immunoconcentration (HCV Tridot, Jmitra Labs) and ELISA (Biorad).

## RESULTS

A total of 22,592 samples were sent for HIV screening was

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## INTRODUCTION

Human immunodeficiency virus (HIV), Hepatitis-B Virus (HBV) and Hepatitis-C Virus (HCV) viruses share similar mode of transmission and risk factors<sup>1,2</sup>. Since the last two decades HIV co-infection with HBV and HCV has arisen as

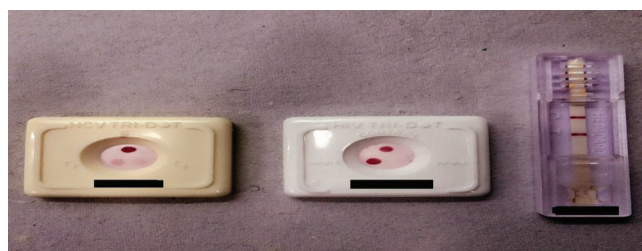
Year	Total samples screened	HIV Positive	HIV-HBV co-infection	HIV-HCV co-infection
2011	3,874	241 (6.22%)	4 (1.65%)	1 (0.4%)
2012	4,311	180 (4.17%)	11 (6.1%)	1(0.5%)
2013	4,517	419 (9.27%)	2 (0.4%)	1(0.2%)
2014	4,552	103 (2.26%)	5 (4.8%)	NIL
2015	4,375	83 (1.89%)	10 (12%)	1.2%
2016	5,122	103 (2.01%)	3 (2.9%)	NIL

**Table-1:** Annual distribution of HIV positive cases among the individuals screened for HIV and co-infection's in with HBV/HCV among the study population.

evaluated retrospectively for HBV and HCV co-infection in HIV infected population. Among 22,592 patients screened, 682 (3.1%) were positive for HIV. In these 682 patients 39 hepatotropic infections were found in HIV infected patients with mean age of 47.3 years and Males were infected more commonly than females with Male: Female ratio being 8.8: 1. HBV/HCV co-infections were noted in 5.7% of all HIV infections diagnosed during the study period.

In our study population the most common mode of transmission was sexual transmission (80%), followed by spouse positivity (10%) and history of blood transfusion (6%). The occupation of people with these co-infection are as follows driver 28.4%, cooly 25.7%, business man 20.3% and 4.1% are students. Majority of the HIV positive individuals had co-infection with HBV (5.1%) followed by HCV 1.4 %. We documented the annual distribution of HIV positive individuals and HIV –HBV/HCV co-infection rates during the study period (Table 1). Among HIV infected patients, we collected the data retrospectively and found that the presence of HBeAg and anti-HBe antibodies was seen in 4.4%. HBV DNA and HCV RNA were positive in 24 of 39; HBV DNA test data was not available in rest of the patients and in all anti-HCV positive samples. All patients with HIV-HBV co-infection had HbsAg was positive. Triple infection with HBV, HCV and HIV was seen in one patient.

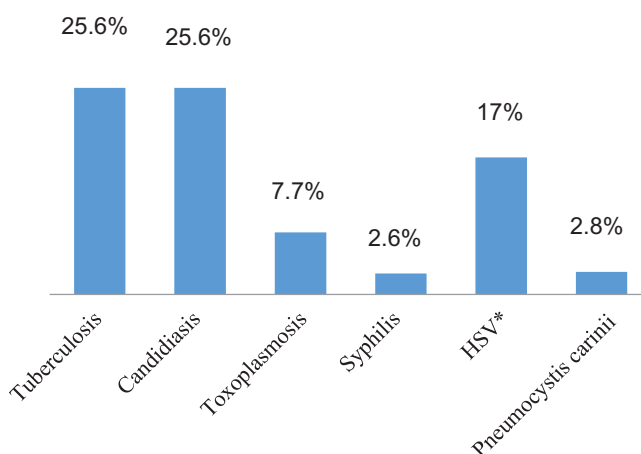
We noticed that a high proportion (74.4%) of the people diagnosed with these co-infections were on antiretroviral therapy. As literature says that there is a risk of hepatotoxicity with ART therapy, we evaluated the liver function test in every patient and we found that the elevated liver enzymes were seen in 5.2% of patients. We noticed that the patients with HIV-HBV co-infection had liver cirrhosis when compared with that of the HIV-HCV infection, 20.5% of HIV- HBV co-infected individuals landed up with cirrhosis. The most common opportunistic infections (OIs) were pulmonary and extra-pulmonary tuberculosis and candidiasis being most common followed by toxoplasmosis and one patient had syphilis among the study population. (Figure 2) illustrates the information regarding the OI's among HIV and hepatotropic viruses co-infection mainly HIV and HBV co-infection as none of them had any OI's in case of HIV-HCV. HIV-HBV co-infected cases had significantly lower CD4<sup>+</sup> counts (median: 216 cells/mm<sup>3</sup>). Hepatocellular carcinoma was seen in 25% patients with HCV co-infection.



**Figure-1:** Tridot - Test results.



**Figure-2:** Architect i1000SR, Abbott.



**Figure-3:** Opportunistic Infections in HIV-HBV Co-Infection. \*HSV (Herpes simplex virus)

We observed that people with HIV- HBV co-infection have a predisposition for abscess formation than with HIV-HCV infection. Most common abscess being perianal abscess (8.5%) followed by parotid (5.7%) and gluteal abscess (2.8%).

## DISCUSSION

Few reports with highly variable prevalence rates among HBV/HCV in HIV patients are available from our country<sup>9,10,11,12</sup>. Prevalence of HIV and HBV-Co infection in India ranges from 4.9% to 16% and HIV and HCV co-infection varies 4.8% to 21.4% in south and 30% in Mumbai and 92% in north-east<sup>17</sup>. 30.4 per cent from Nagpur<sup>9</sup>, 2.25 per cent from Lucknow<sup>10</sup>, 7.7 per cent from Chennai<sup>11</sup> and 3.5 per cent from Mumbai<sup>12</sup>. According to different study report's there is variability in the co-infection rates of HBV & HCV in HIV patients 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. In our study we noticed 5.1% of the study population had HIV and HBV co-infection and 1.4% of the population had HIV-HCV co-infection. Sanjiv ahuja et al (2013) a total of 877 HIV positive samples were screened for co-infections with HBV/HCV, 4.9% had HIV-HBV co-infection and 1.7% had HIV-HCV co-infection our study findings are almost similar to this which was done in northern part of India and this study was done in the west-costal region of India . In the current era there is an increased survival rate of people living with HIV /AIDS with HAART therapy. Hepatotropic virus induced liver damage in this group is more severe with increased mortality rather than a monoinfection of HBV/HCV. In our study liver cirrhosis was noted in 22.86% in HIV patients with HBV co-infection and none of the individual with HIV and HCV co-infection had cirrhosis but 2.8% had Hepatocellular carcinoma. This implies that the progression of HCV in HIV individuals is faster leading to end stage liver disease. CD4 counts of less than 300 (215 cells/ $\mu$ l) are seen in more number of patient with hepatotropic virus co-infection than with HIV than alone (550 cells/ $\mu$ l). When compared to the other studies our study population had little high CD4 counts, other studies reported that CD4 counts less than 200 cells /  $\mu$ l among the individuals with hepatotropic virus and HIV co-infection<sup>18</sup>

## CONCLUSION

It is clear that apart from other infections like TB, HIV infected patients have high possibility of getting HBV/HCV infection due to immunocompromised state and shared route of transmission also plays an important role among these individuals. Thus routine screening of HIV infected individuals for concurrent infection with hepatotropic viruses helps in early diagnosis of these co-infections. However, considering their similar routes of transmission, all HIV infected individuals should be screened for co-infections with HBV and HCV which will help in providing appropriate patient care and prevents the progression of disease and decreases the risk of cirrhosis and liver failure, These hepatotropic co-infections interferes with selection of specific ART has a risk of hepatotoxicity. With this study we would like to recommend a mandatory screening for HIV and HBV/HCV has to be implemented for HIV positive cases which help in choosing appropriate drug with less

hepatotoxicity and reducing the added risk to progressing disease.

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