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Hepatitis B and C Virus Co-Infection in HIV Patients of Northern India

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1. Abstract

1.1. Introduction: Hepatitis B and hepatitis C virus (HBV and HCV) which have potential not only for causing both acute and chronic hepatitis but also are responsible for coinfection in HIV-infected patients.

1.2. Aims and Objectives: The aim of present study was to determine the co-infection of hepatitis B and C virus in serum samples of HIV positive individuals attending HIV clinic in Tertiary care centre of Northern India.

1.3. Material and Methods: The present study was conducted to determine the Co-infection of hepatitis B and C virus in stored serum samples of HIV-positive individuals attending the HIV Clinic at Post Graduate Institute of Medical Sciences in North India. A total of 3311 serum samples of HIV confirmed patients, who were coming on daily basis in HIV Clinic for consultation and treatment were used for the detection of HBV and HCV infection.

1.4. Observations: HBV Co-infection was seen in 65 patients (1.96%) was found to be comparable to HCV Co-infection which was seen in 67 patients (2.02%) amongst the HIV seropositive. The maximum number of HBV & HCV Co-infected patients were seen in 20-40 yrs of age group.

1.5. Results: HBV and HCV Co-infection was found to be1.96% & 2.02% respectively in HIV-positive individuals which is surprisingly less in comparison to seen in normal population in Haryana which is hotspot both for hepatitis B & C.

2. Introduction

HBV and HCV which can cause both acute as well as chronic hepatitis, has already infected two billion and 170 million people respectively [1]. In human immunodeficiency virus (HIV)-infected patients, about 2-4 million & 4-5 million patients have been reported to have chronic HBV & HCV Co-infection respectively [2] and severity of same depends on many factors like age, mode of transmission and immune status at the time of infection. Globally, around 38.6 million of HIV infections are estimated to have occurred at the end of 2005 [3] while chronic HBV and chronic HCV were reported in about 370 and 130 million respectively. It is estimated that approximately 7.4% of HIV are chronically HBV infected; conversely, about 1% of those with chronic HBV infection are HIV infected [4]**.** The highest rates are found in Asia and Africa, primarily affecting vulnerable populations of low-/middle-income countries [5, 6]. The HCV-HIV Co-infection rate varies from 0.7%to 29.9% in different countries [7, 8]. According to UNAIDS 2017, India has second highest number of HIV patients in the world i.e. 2.1 million cases [9]. There are many Indian studies which have reported variable HIV-HBV Co-infections rates like 6%, 7.5% & 16% of HIV-HBV Co-infection from Chennai [10]**,** Chandigarh [11] and Mumbai [12] respectively and these Co-infections are responsible for one-third of deaths due to liver diseases in HIV-infected patients [13]**.** The HBV, HCV and HIV infection have similar route of transmission [14]**,** thus leading to Co infections which are associated with reduced survival, increased risk of progression to liver disease and hepatotoxicity associated with antiretroviral therapy [15]**.** In India, HIV infection is predominantly acquired through heterosexual route and there is differential transmission rate and role of demographic factors affecting HBV or HCV prevalence in HIV-positive persons [16]**.**

Table 1: Showing Sex Distribution in Total Pool of HIV patients

Total Number of HIV Patients	MALE	FEMALE	TRANSGENDER
3311	1821 (55%)	1488 (44.94%)	2 (0.06%)

Table 2: Showing Percentage of HIV-HBV & HIV-HCV Co-infection.

Total Number of HIV Patients	HIV-HBV Coinfected Patients	HIV-HCV Coinfected Patients
3311	65 (1.96%)	67 (2.02%)

Table 3: Showing Sex Distribution in HIV-HBV and HIV-HCV Co-infected patients

Total Number of HIV-HBV Co-infection	MALE	FEMALE	TRANSGENDER
65	49 (75.32%)	15 (23.07%)	1 (1.53%)
Total Number of HIV-HBV Co-infection			
67	42 (62.68%)	25 (37.31%)	0

Table 4: Showing Age Distribution in HIV-HBV and HIV-HCV Co-infected patients

Age Group Distribution	HIV-HBV Coinfected Patients	HIV-HCV Coinfected Patients
10- 20 yrs	4 (6.15%)	2 (2.98%)
20-30 yrs	16 (24.61%)	20 (29.85%)
30-40 yrs	27 (41.53%)	25 (37.31%)
40-50 yrs	14 (21.53%)	15 (22.38%)
50-60 yrs	2 (3.07%)	4 (5.975%)
60-70 yrs	2 (3.07%)	1 (1.49%)

3. Aims and Objectives

The aim of present study was to determine the Co-infection of hepatitis B and C virus in serum samples of HIV positive individuals attending HIV clinic in Tertiary care centre of Northern India.

4. Material & Methods

This study was conducted by Department of Medical Gastroenterology in collaboration with HIV Clinic at Post Graduate Institute of Medical Sciences, Rohtak, India from 1st January,2021 to 31st March,2021. The consecutive confirmed cases of HIV who reported on daily basis in HIV clinic for treatment were being checked for HIV Viral load and CD4 counts and serum samples from them were taken for screening for HBV and HCV co-infection by rapid card test, after proper consent from the patients. A total of 3311 consecutive serum samples were taken for the study. About 5 ml of whole blood was collected aseptically by venipuncture. The collected blood was allowed to clot; serum was separated by centrifugation at room temperature and then were tested for HCV and HBV using rapid card test kits. The detection of the HBV & HCV infection was done using Lateral flow immuno chromatographic test, as per manufacturer's instructions, in serum samples of HIV-positive patients.

5. Observations

A total of 3311 HIV infected patients were screened for HBV & HCV Co infection and out of them 65 (1.96%) were found to be having HBV Co-infection and 67 patients (2.02%) had HCV Co-infection and none had both the Co-infection i.e. triple Co-infection. Out of these total65 patients with HIV- HBV Co-infection, there was male predominance i.e. 49 patients (75.32%), 15 (23.07%) were females and 1 patient (1.53%) was transgender. In HIV-HCV Co-infection group also same pattern was observed i.e. out of total 67 patients, 42 patients (62.68%) were males and 25 (37.31%) were females. The age group in coinfection either with HBV or HCV varied from 10- 70 yrs with maximum number of patients were seen in 20-40 yrs of age. In HIV-HBV Co-infection, 4 patients (6.15%) were in 10-20 yrs of age group, 16 patients (24.61%) in 20-30 yrs of age group, 27 patients (41.53%) were in 30-40 yrs of age group, 14 patients (21.53 %) were in 40-50 yrs of age group, 2 patients (3.07%) each in 50-60 yrs & 60-70 yrs of age group were seen. In HIV-HCV Co-infection, 2 patients (2.98%) were in 10-20 yrs of age group, 20 patients (29.85%) in 20-30 yrs of age group, 25 patients (37.31%) were in 30-40 yrs of age group, 15 patients (22.38 %) were in 40-50 yrs of age group, 4 patients (5.97%) in 50-60 yrs age group and 1 patient (1.49%) was seen in 60-70 yrs of age group. As we had only access to blood samples which had limited details like age and sex only, thus other clinical, familial or demographic parameters could not be evaluated.

6. Discussion

The present study highlighted the presence of HBV-HCV co-infection amongst the HIV-infected patients. In our study, majority of HIV seropositive patient's age was 21-40 yr and they were sexually active. This finding was in concordance to that reported previously [17, 18]**.** Moreover, the isolated HBV and HCV Co-infections are also most commonly seen in younger age group only and this fact has been highlighted in the study conducted by Malhotra et al [19-21]**.** There was male predominance in our study group which is in agreement with study conducted with Gupta etal in which HCV

Co-infection was higher in HIV-positive male patients in comparison to female group, perhaps attributable to higher rate of sexual promiscuity [22]**.** The reason for male predominance can also be explained on basis of overall more number of males in total pool of HIV patients who were enrolled in the study i.e.55%. HBV (1.96%%) and HCV (2.02%) Co-infection in HIV seropositive was lower than with previous studies from India [23, 24]**.** Our findings on HBV Co-infection in HIV-infected patients were characteristically less then with the study reported by Mudawi et al [25]**.** On comparison with our study group, HIV-HBV Co-infection percentage was comparable but lower for HIV-HCV Co-infection than those reported by Abera et al [26] from Sudanese and Ethiopian population, respectively. One important aspect which is reflected in our large study group of 3311 HIV patients, is low percentage of patients having HBV and HCV Co-infection, despite being collected from an area which is hot spot both for hepatitis B and hepatitis C. Normally, it is seen that chances of HBV/HCV Co-infection in HIV patients are less if there is sexual route of transmission then in comparison to intravenous drug abusers where there are higher chances of Co-infection. As we had no access to patient records, hence we cannot exactly report about mode of the transmission in our study group but the way unexpectedly lower percentage of Co-infection was detected, then it seems that sexual route of transmission must have been there in our study group. The other point which should be thought, is that whether there is any possibility that HBV, HCV and HIV inhibit each other in the human body as already proved in case of HBV and HCV infection where usually one virus is predominant, HCV being in most of cases. This requires further research before reaching to any definitive conclusion. In conclusion, our findings showed that the HIV seropositive individuals had a high risk of acquiring HBV and HCV Co-infections, thus every HIV seropositive individuals should be screened HBV and HCV co- infection.

7. Limitation of Study

As we had only access for serum samples and hence detailed Epidemiological and Clinical presentation was not evaluated at this stage but now these patients are being referred to Medical Gastroenterology Department for treatment, hence detailed evaluation and response to treatment are being assessed.

8. Results

HBV and HCV Co-infection was found to be1.96% & 2.02% respectively in HIV-positive individuals which is surprisingly less in comparison to seen in normal population in Haryana which is hotspot both for hepatitis B & C. Our study has provided the stimulus for further research which requires detailed analysis of Clinico-epidemiological factors of infected patients before reaching any definitive conclusion.

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