



A COMPARATIVE STUDY ON SEROPREVALENCE OF HEPATITIS-B AND HEPATITIS-C INFECTION AMONG HIV POSITIVE AND HIV NEGATIVE INDIVIDUALS IN A TERTIARY CARE HOSPITAL

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Abstract :

BACKGROUND Human immunodeficiency virus (HIV), Hepatitis B virus (HBV), and Hepatitis C virus (HCV) are major public health concerns. HIV positive individuals are at increased risk of coinfection with HBV and HCV infections due to the high degree of epidemiological similarity between these viruses in terms of routes of transmission, associated risk factors and the presence of these viruses in various body fluids. With the decline in HIV-associated morbidity and mortality following the introduction of highly active antiretroviral therapy (HAART), liver disease caused by chronic HBV and HCV coinfection in HIV positive individuals has emerged as a leading cause of hospitalization. **AIM** To determine and compare the prevalence of HBV and HCV infection serologically in HIV positive and HIV negative individuals. To assess the risk factors among the HIV infected individuals. **MATERIALS AND METHODS** The study population included 100 HIV positive infected patients, tested in ICTC

(Integrated Counselling and Testing Centre), and 100 HIV negative individuals who were volunteer blood donors. Blood samples were subjected to serological analysis for HBsAg and anti-HCV antibodies, using Rapid Immunochromatography test and Enzyme Linked Immunosorbent Assay (ELISA). **RESULTS** Out of 100 HIV positive individuals, HBV coinfection was detected in seven (7 percent) patients and HCV coinfection was detected in only one (1 percent) patient. None of the HIV infected patients were positive for both HBV and HCV infections. The most common risk factor of HIV, HBV and HCV, in our study population, was found to be the sexual behaviour. Among the 100 HIV negative individuals, two (2 percent) participants were having HBV infection. HCV antibodies was not detected among the HIV negative population. **CONCLUSION** The prevalence of HBV (7 percent) and HCV (1 percent) infection, among the HIV positive individuals, was higher, when compared with HIV negative individuals.

HBV-HIV and HCV-HIV coinfections were more common in patients, belonging to the age group of 35 to 55 years, mostly in men, and in those who were married and exhibited polygamous activity. Clearly, all HIV infected patients should be screened for HBV and HCV, taking into account shared pathways of transmission.

Keyword : Human immunodeficiency virus (HIV), Hepatitis- B virus(HBV), Hepatitis- C virus (HCV), Coinfection.

INTRODUCTION:

Hepatitis B and Hepatitis C viral infections are highly prevalent among HIV-infected persons, generally as a result of shared transmission routes. ^[1] Improved survival due to the success of highly active antiretroviral therapy (HAART) has enabled conditions with long latency, such as chronic viral hepatitis, to become a major source of comorbidity in HIV-infected population. ^[2] HIV modifies the natural history of Hepatitis- B virus (HBV), with higher rates of chronic HBV infection, replicative disease, and progression to advanced liver disease among persons with HIV-HBV coinfection. ^[2] The impact of HBV on HIV natural history is less certain. ^[1,3]

HIV also modifies the natural history of Hepatitis-C virus (HCV) infection, with clear evidence of higher HCV viral load and accelerated liver disease progression in persons with HIV-HCV coinfection. ^[4] As with HBV, there is contradictory evidence on the effects of HCV on HIV disease progression. ^[5]

Furthermore, coinfection with Hepatitis viruses may complicate the delivery of antiretroviral therapy by increasing the risk of drug related hepatotoxicity and may interfere with the selection of specific agents. ^[6]

Worldwide, HIV is responsible for 38.6 million infections as estimated at the end of 2005 while HBV and HCV account for around 400 million and 170 million chronic infections, respectively.

Moreover, among the HIV infected patients, 2-4 million are estimated to have chronic HBV coinfection while 4-5 million are coinfecting with HCV. ^[7] Screening for HIV, HBV and HCV prevents the transmission of these viruses by blood and organ donation, and also alerts the health-care providers to follow the necessary safety precautions.

This study aimed to determine HBV and HCV coinfection in HIV-positive patients serologically, and the involving factors so that the results could increase clinical information in order to assess and treat the infections.

MATERIALS AND METHODS

The study was cross sectional, undertaken over a period of 3 months, in a tertiary care hospital. The study was approved by the Institutional Ethical Committee. Informed consent was obtained from the study population. All patients satisfying the inclusion criteria were documented. Patients were interviewed by structured questionnaire. Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) by a statistician. The proportional data of this cross-sectional study were tested using Chi-Square Analysis test.

Inclusion Criteria:

1. 100 HIV positive patients, above 12 years of age, tested in Integrated Counselling and Testing Centre (ICTC) as per NACO (National AIDS Control Organisation) guidelines.
2. 100 HIV negative voluntary blood donors, tested as per NACO guidelines.

Exclusion Criteria:

Indeterminate HIV test results and individuals below 12 years of age were excluded from this current study.

A total of 100 HIV positive patients (both voluntary and referred) confirmed in Integrated Counselling and Testing Centre (ICTC), Institute of Microbiology, as per NACO guidelines, were taken up for the study of HBV and HCV coinfection. The HIV tests done were SD BIOLINE HIV-1/2 3.0 (SD STANDARD DIAGNOSTICS, INC., Korea), Retrocheck HIV WB (QUALPRO DIAGNOSTICS, Goa) and COMBAIDS- RS Advantage-ST (Span Diagnostics Ltd., Surat).

All patients were interviewed using a standard questionnaire designed to identify a series of parameters, including known risk factors for HIV infection, such as previous blood transfusion, intravenous drug use (IDU), sexual habits, sexual intercourse with HIV-infected or HIV-suspected partners, tattoos, previous surgeries and dental extractions, and sharing any sharps like blades. The study population also comprised of 100 HIV negative individuals (voluntary blood donors) who were also screened for the presence of HBV and HCV infections.

HBV and HCV serology tests included detection of Hepatitis-B surface antigen and anti-HCV antibodies by commercially available Rapid Immunochromatography test (SD BIOLINE HBsAg, SD BIO STANDARD DIAGNOSTICS PVT. LTD., Haryana and SD BIOLINE HCV, SD STANDARD DIAGNOSTICS, INC., Korea) and ELISA kits (Microscreen HBsAg ELISA Test Kit, Span Diagnostics Ltd., Surat and SD HCV ELISA 3.0, SD BIO STANDARD DIAGNOSTICS PVT. LTD., Haryana) which were carried out according to the manufacturers' instructions.

RESULTS:

Among the 100 HIV positive patients, 76% were males and 24% were females. Since the p-value obtained was <0.05 , statistically, no significant difference was observed between male and female patients. Majority of the HIV-positive patients were in the age group of 25 to 45 years (64%). The p-value obtained was <0.002 (significant), which predicts that risk was more for age groups of more than 40 years than age groups of less than 40 years.

Overall, the prevalence rates of coinfection of HBsAg and anti-HCV antibodies in HIV-positive patients were 7.0% and 1.0%, respectively. [TABLE 1] Of the seven HBV-HIV coinfection patients investigated, five (71.4%) were males and two (28.6%) were females. The rate of HBV-HIV coinfection was more in the age group of 35 to 55 years (85.7 %). The prevalence of the HCV-HIV coinfection was 1.0%, and was observed in a 36 year old, male patient.

The risk factors for HIV, HBV and HCV transmission observed in this study, among the 100 HIV seropositive subjects were various sexual practices (60%) like premarital sex, exposure to multiple sexual partners, extramarital sex, sexual contact with a HIV positive person, tattoos (18%), previous surgery (15%), blood transfusion (11%), dental extractions (4%), intravenous drug use (5%), sharing blades (7%) and presence of genital ulcers (15%). Of the HIV positive subjects, 86% were married and living with the spouse and 14% were single.

Among the seven patients with HBV- HIV coinfection, 5 (71.4%) patients were having risky sexual practices. Blood transfusion and history of surgery was noticed in one patient (14.3%) each.. History of multiple sexual partners and intravenous drug abuse was presented by the patient

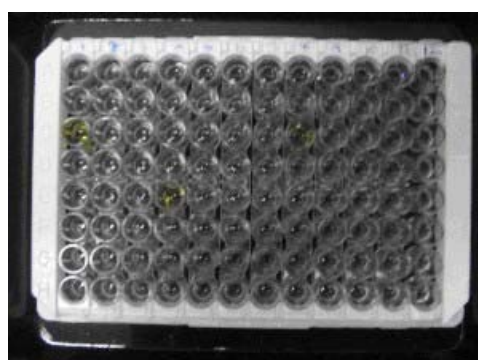
with HCV- HIV coinfection. HBV-HIV and HCV-HIV coinfection rates in patients with suspicious sexual relationships was more than those for other risk factors.

Out of the 100 HIV-negative subjects screened, two (2.0%) individuals tested positive for HBsAg, and no HCV seropositivity was demonstrated. [TABLE 1]

HBV and HCV infection was detected by the presence of Hepatitis-B Surface antigen and anti-HCV antibodies in the serum by Rapid Immunochromatography assay and ELISA. Among the seven HBV-HIV coinfection cases, Rapid Immunochromatography test was negative in two (28.6%) patients, but ELISA was positive in these two cases. [TABLE 2] In other subjects, both the test results of Rapid Immunochromatography test and ELISA were the same.



RAPID TEST



ELISA

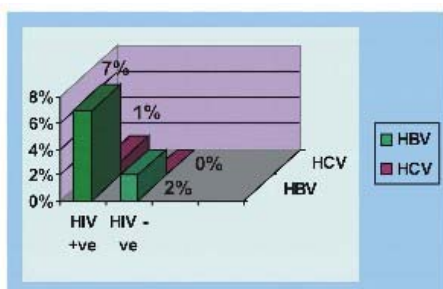


TABLE 1

Prevalence rate of HBV and HCV in HIV positive and HIV negative individuals

	HBsAg +ve	Anti-HCV antibodies +ve
HIV positive (n=100)	7	1
HIV negative (n=100)	2	0

Comparison of Rapid test and ELISA

	RAPID TEST (no. of +ve samples)	ELISA (no. of +ve samples)
HIV positive, n=100		
HBsAg +ve	5	7
Anti-HCV antibodies +ve	1	1
HIV negative, n=100		
HBsAg +ve	2	2
Anti-HCV antibodies +ve	0	0

DISCUSSION:

The objective of this study was to determine the prevalence of HBV and HCV infection in HIV positive and HIV negative individuals. The risk factors of HIV, HBV and HCV infections were also investigated among the HIV infected patients.

The percentage of male patients among the 100 HIV positive patients was 76%, as compared with 24% for female patients. This result is in agreement with the study from New Delhi, in which the study group comprised predominantly of a male population (73%), which is significantly higher than the female population (27%).^[6]

The study considered the common belief that most of HBV and HCV coinfections in HIV-positive patients are due to the shared routes of transmission of the viruses. The prevalence of co-infection with HIV varies widely in different studies within India and outside. A study in India (Jammu and Kashmir), showed that the prevalence rate of HBsAg and anti-HCV antibodies in HIV-positive patients was 3.4% and 0% respectively.^[8] In the study conducted in Tuberculosis Research Centre, Chennai, the prevalence rate reported was 6.4% for HBV-HIV coinfection and 2.1% for HCV-HIV coinfection.^[9] A study in Nairobi, reported 6% HBV and HIV coinfection, 1% HCV and HIV coinfection, among the HIV seropositive individuals.^[10] Data from the present study also observed similar findings, with the prevalence rate of 7.0% and 1.0% for HBV-HIV and HCV-HIV coinfections, respectively.

In the present study under discussion, HIV positive individuals predominantly belong to the age group of 25-45 years (64%). Of different risk factors considered in the study, history of the various sexual habits like pre-marital sex, multiple sexual partners, extra-marital sex and sexual contact with a HIV positive person accounted for 60%. Among the seven HBV-HIV coinfection, the prevalence was higher in

the 35-55 years age-group (85.7%). Sexual behaviour (71.4%) was found to be the commonest risk factor, in these patients. These findings are supported by the study conducted in South India, in which the study group predominantly comprised of heterosexually acquired HIV infections (72%) than other mode of transmission, and the male gender were significantly (86% vs 14%) higher than female. The data also showed that the maximum levels of co-infection for HBV-HIV occurred in the 31-40 age-group (58%), which is similar to other Indian studies.^[11] Among the co-infected patients the predominant risk factor observed was heterosexual (70%).

History of having multiple sexual partners and intravenous drug use was observed in the patient (1.0%) with HBV-HIV coinfection. This observation is in accordance with the study from Brazil, in which the sexual risk factors and intravenous drug use for HCV acquisition among HIV-positive patients were evaluated.^[12]

Among 100 HIV negative patients enrolled in our study, HBsAg was positive in two cases (2.0%), and anti Hepatitis C antibody was present in none of the cases. These results are in line with the study in Saudi Arabia, in which the prevalence rates of HBV, HCV, and HIV in blood samples taken from blood donors reported were 1.5%, 0.4%, and 0%, respectively.^[13]

A comparative evaluation of ELISA and rapid test results were done in the present study. Among the seven HBV infected cases in HIV positive individuals, 2 (28.6%) cases were negative by Rapid test (SD BIOLINE HBsAg), but positive by ELISA (Microscreen HBsAg ELISA Test Kit). This finding is in agreement with the study from Mumbai, which showed that the

rapid tests have low sensitivity, compared to ELISA, and ELISA is the preferred screening technique.^[14]

CONCLUSION:

The present prospective study included 100 HIV positive individuals tested in ICTC and 100 HIV negative volunteer blood donors, over a period of 3 months. This study aimed to detect HBV and HCV serologically among the HIV positive and HIV negative participants. The shared and significant risk factors in HIV positive individuals were also studied. Serological markers of HBV and HCV (HBsAg and anti-HCV antibodies) were analysed using commercially available Rapid Immunochromatography test and ELISA kits.

The results of this study indicated that the prevalence of coinfection in HIV-positive patients with HBV and HCV were 7.0% and 1.0%, respectively. The prevalence of HBV infection, among the HIV negative individuals, was 2.0%. No coinfection with HCV was detected among the HIV negative participants.

Data from the current study, showed prevalence of HBV and HCV infection to be significantly greater among HIV-infected patients in comparison to the HIV negative participants. These observations confirm the high frequency of HIV-infected patients exposure to these other viruses.

The study demonstrated a significant correlation between coinfection with HCV and HBV among HIV-positive patients depending on different variables including sex, age, socioeconomic status and marital status, exposure to risk factors. Among the risk factors, sexual behaviour was highly associated with the transmission of these three viruses. Studies on risk factors have paramount importance to undertake effective preventive measures.

Coinfection with the three viruses will increase the risk of cirrhosis, liver malignancy, and mortalities in comparison to when a person is infected with only one of these viruses. Therefore, diagnosing HBV and HCV in HIV-positive patients is vital in order to take care of them and allot resources in health plans so that all HIV-positive patients have to be tested for both HBV and HCV.

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