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Research Article

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: 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. The study population included 120 HIV positive infected patients, tested in ICTC (Integrated Counselling and Testing Centre), and 120 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). Out of 120 HIV positive individuals, HBV coinfection was detected in eight (6.7%) patients and HCV coinfection was detected in only one (0.8%) 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 HIV negative individuals, two (1.7%) participants were having HBV infection. HCV antibodies were not detected among the HIV negative population. The prevalence of HBV and HCV infection among the HIV positive individuals was higher, when compared with HIV negative individuals. HBV-HIV and HCV-HIV co-infections 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.
Keywords: 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, co-infection 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 co-infection while 4-5 million are co-infected 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 co-infection 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, from December 2011 to February

2011, in the Department of Microbiology, Rajiv Gandhi Government General Hospital, and Chennai. 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

- 120 HIV positive patients, above 12 years of age, tested in Integrated Counselling and Testing Centre (ICTC) as per NACO (National AIDS Control Organisation) guidelines.
- 120 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 120 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, Retrocheck HIV WB and COMBAIDS-RS Advantage-ST.

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 120 HIV negative individuals (voluntary blood donors) who were also screened for the presence of HBV and HCV infection. 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 and SD BIOLINE HCV) and ELISA kits (Microscreen-HBsAg ELISA Test Kit and SD HCV ELISA 3.0) which were carried out according to the manufacturers' instructions.

RESULTS

Among the 120 HIV positive patients, 76.7% were males and 23.3% 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 (70%). The p-value obtained was <0.002 (significant), which predicts that risk was higher for age groups of more than 25 years than age groups of less than 25 years. Overall, the prevalence rates of co-infection of HBsAg and anti-HCV antibodies in HIV-positive patients were 6.7% and 0.8%, respectively (Fig. 1)

Of the eight HBV-HIV co-infection patients investigated, six (75%) were males and two (25.0%) were females. The rate of HBV-HIV co-infection was more in the age group of 35 to 55 years (87.5 %). The prevalence of the HCV-HIV co-infection was 0.8%, 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 120 HIV seropositive subjects were various sexual practices (63.3%) like premarital sex, exposure to multiple sexual partners, extramarital sex, sexual contact with a HIV positive person, tattoos (16.7%), previous surgery (18.3%), blood transfusion (13.3%), dental extractions (6.7%), intravenous drug use (5%), sharing blades (7.5%) and presence of genital ulcers (12.5%). Of the HIV positive subjects, 83.3% were married and living with the spouse and 16.7% were single. Among the eight patients with HBV- HIV co-infection, 6 (75.0%) patients were having risky sexual practices. Blood transfusion and history of surgery was noticed in one patient (12.5%) each. History of multiple sexual partners and intravenous drug abuse was presented by the patient with HCV-HIV co-infection. HBV-HIV and HCV-HIV co-infection rates were higher in patients with suspicious sexual relationship than those with other risk factors.

Out of the 120 HIV-negative subjects screened, two (1.7%) individuals tested positive for HBsAg, and no HCV seropositivity was demonstrated (Fig. 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 eight HBV-HIV co-infection cases, Rapid Immunochromatography test was negative in two (25.0%) patients, but ELISA was positive in these two cases (Table 1). In other subjects, both the test results of Rapid Immunochromatography test and ELISA were the same.

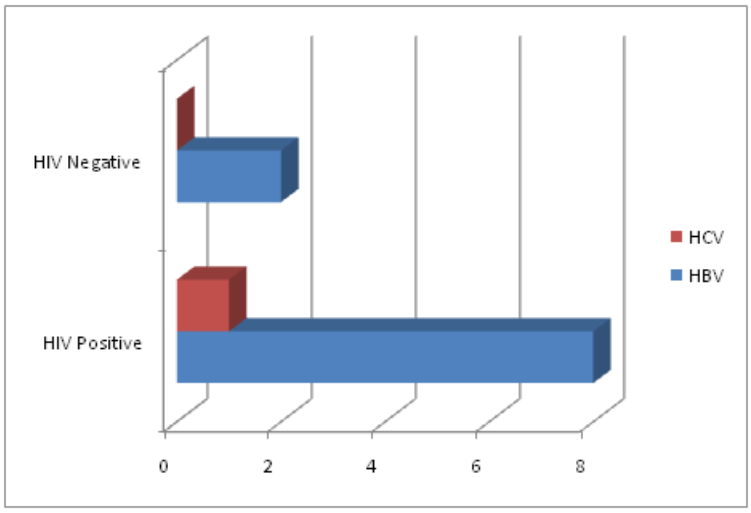

Fig. 1: Prevalence rate of HBV and HCV positivity

Table 1: **Comparison of Rapid test and ELISA**

HIV positive, n=120	**Rapid Test (No. of +ve samples)**	**ELISA (No. of +ve samples)**
HBsAg +ve	6	8
Anti-HCV antibodies +ve	1	1
HIV negative, n=120		
HBsAg +ve	2	2
Anti-HCV antibodies +ve	0	0

Fig. 2: Rapid Test

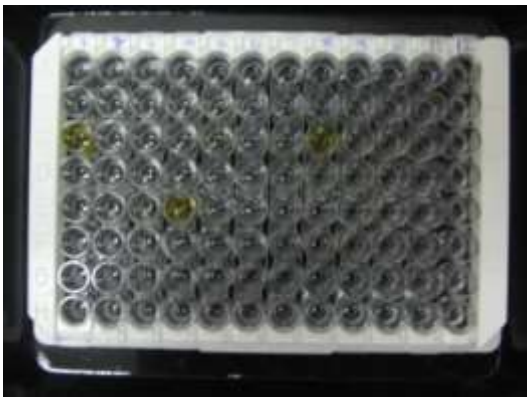

Fig. 3: ELISA

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 120 HIV positive patients was 76.7%, as compared with 23.3% 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 confections 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 co-infection and 2.1% for HCV- HIV co-infection [9]. A study in Nairobi reported 6% HBV and HIV co-infection and 1% HCV and HIV co-infection, among the HIV seropositive individuals [10]. Data from the present study also observed similar findings, with the prevalence rate of 6.7% and 0.8% for HBV-HIV and HCV-HIV co-infections, respectively. In the present study under discussion, HIV positive individuals predominantly belong to the age group of 25-45 years (70%). Of different risk factors considered in the study, history of the various sexual habits like premarital sex, multiple sexual partners, extramarital sex and sexual contact with a HIV positive person accounted for 63.3%. Among the eight HBV-HIV co-infection, the prevalence was higher in the 35-55 years age-group (87.5%). Sexual behaviour (75.0%) was found to be the commonest risk factor, in these patients. These findings are supported by the study 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 with HCV-HIV co-infection (0.8%). This observation is in accordance with the study from Brazil, who have evaluated the sexual risk factors and intravenous drug use for HCV acquisition among HIV-positive patients [12]. Among 120 HIV negative patients enrolled in our study, HBsAg was positive in two cases (1.7%), 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 was done in the present study. Among the eight HBV infected cases in HIV positive individuals, 2 (25.0%) 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 120 HIV positive individuals tested in ICTC and 120 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 co-infection in HIV-positive patients with HBV and HCV were 6.7% and 0.8%, respectively. The prevalence of HBV infection, among the HIV negative individuals, was 1.7%. No co-infection 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 patient's exposure to these other viruses. The study demonstrated a significant correlation between co-infection 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.

REFERENCES

1. Polsky B, Kim AY, Chung RT; Human immunodeficiency virus and hepatitis B and C coinfection: pathogenic interactions, natural history and therapy. AIDS Clin Rev., 2000-2001: 263-306.
2. Dore GJ, Cooper DA; The impact of HIV therapy on co-infection with hepatitis B and hepatitis C

viruses. Curr Opin Infect Dis., 2001; 14(6): 749-755.
3. Puoti M, Airoldi M, Bruno R, Zanini B, Spinetti A, Pezzoli C,*et al*.; Hepatitis B co-infection in human immunodeficiency virus-infected subjects. AIDS Rev., 2002; 4(1): 27-35.
4. Benhamou Y, Bochet M, Di Martino V, Charlotte F, Azria F, Coutellier A *et al*.; Liver fibrosis progression in human immunodeficiency virus and hepatitis C virus coinfected patients. Hepatology, 1999; 30(4): 1054-1058.
5. Pol S, Vallet-Pritchard A, Fontaine H; Hepatitis C and human immune deficiency coinfection at the era of highly active antiretroviral therapy. J Viral Hepatitis, 2002; 9(1): 1-8.
6. Jain M, Chakravarti A, Varma V, Bhalla P; Seroprevalence of hepatitis viruses in patients infected with the human immunodeficiency virus. IJPM, 2009; 52(1): 17-19.
7. 2006 Report on the Global AIDS Epidemic. Available from http://www.unaids.org/en/HIV_data/2006GlobalReport/default.asp
8. Mahajan A, Tandon VR, Verma S, Singh JB, Sharma M; Prevalence of Tuberculosis, Hepatitis B, Hepatitis C and Syphilis Co-infections among HIV/AIDS Patients. IJMM, 2008; 26(2):196-207.
9. Padmapriyadarshini 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. JPGM, 2006; 52(2): 92-96.
10. Harania RS, Karuru J, Nelson M, Stebbing J; HIV, hepatitis B and hepatitis C coinfection in Kenya. AIDS, 2008; 22(10): 221-1222.
11. 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(37): 5015-5020.
12. Segurado AC, Braga P, Etzel A, Cardoso MRA; Hepatitis C Virus Coinfection in a Cohort of HIV-Infected Individuals from Santos, Brazil: Seroprevalence and Associated Factors. AIDS Patient Care and STDs, 2004; 18(3): 135-143.
13. El-Hazmi, Malak M; Prevalence of HBV,HCV,HIV-1,2 and HTLV-I/II infections among blood donors in a teaching hospital in the central region of Saudi Arabia. Saudi Medical Journal 2004; 25(1): 26-33.
14. Torane VP, Shastri JS; Comparison of ELISA and rapid screening tests for the diagnosis of HIV, hepatitis B and hepatitis C among healthy blood donors in a tertiary care hospital in Mumbai. IJMM, 2008; 26(3): 284-285.