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Original Research Paper

Medicine

PREVALENCE OF HEPATITIS B INFECTION IN HIV POSITIVE PATIENTS AT A TERTIARY CARE HOSPITAL OF NORTH INDIA

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ABSTRACT

Introduction: In India hepatitis B virus (HBV) and human immunodeficiency virus (HIV) co-infection is estimated to vary between 2% and 14% in various studies. HIV negatively impacts the disease outcome of hepatitis B and HBV increases hepatic complications in HIV.

Objective: To study the prevalence of HBsAg positivity in HIV infected patients attending the anti-retroviral therapy center of Guru Nanak Dev Hospital, Amritsar.

Material and methods: This retrospective cross-sectional study involved the collection of the results of hepatitis B virus surface antigen (HBsAg) test of all HIV patients who were registered over a period of one year. The data was tabulated and analyzed statistically.

Results: Of the 435 participants 285 (65.52%) were males and 150 (34.48%) were females, the hepatitis B surface antigen positivity rate was 3.68%. Males in the age group of 19 to 40 years and injection drug users were more susceptible.

Conclusion: Analyzing this data lead to certain helpful insight that the prevalence of almost 3.68 % stresses upon the need of testing for HBsAg in HIV infected patients. For prevention of hepatic complications early treatment should be initiated and those who are negative should be vaccinated.

KEYWORDS : human immunodeficiency virus, hepatitis B virus, co-infection, epidemiology.

INTRODUCTION

Hepatic involvement is one of the prominent causes of mortality and morbidity in HIV patients and infection with hepatitis B virus (HBV) is one of the important health concerns amongst HIV infected individuals particularly as their transmission is very similar. Liver involvement is now the most prominent cause of mortality among HIV patients, accounting for 14-18% of all-cause mortality in this population and about 50% of deaths among HIV-infected patients who are hospitalized.1 In setting of HBV co-infecting HIV, the latter significantly worsens the course of HBV infection.2 With limited epidemiological data produced by studies on HBV-HIV co-infection in India, relevant data is needed for the future research regarding this serious co-infection.

WORLDWIDE EPIDEMIOLOGY OF HBV AND HIV

HBV-HIV co-infection has shown world-wide inhomogeneity in its epidemiological design. The developed countries like that of Europe, Australia and USA have a low prevalence of hepatitis B virus infection (HBsAg prevalence < 2%) while the developing countries of sub-Saharan Africa have an endemicity of HBV infection (HBsAg prevalence ≥ 8%). The global trend HBV-HIV co-infection is depicted in Table 1.3 India has the third largest population living with HIV infection and is among the intermediate prevalence countries of hepatitis B infection (HBsAg prevalence between 2%-7%), reports on HIV-HBV co-infection in India are scarce in number and show wide geographic variations.[4]

Table 1

PREVALENCE of HBsAg	MODE OF TRANSMISSION	REGION
LOW (<2%)	Sexual transmission	Western Europe, USA, Australia
INTERMEDIATE (2-7%)	Perinatal, horizontal	Asia
HIGH (> 8%)	Horizontal, perinatal, unsafe blood transfusions, sexual mode	Sub-Saharan Africa

Prevalence of hepatitis B infection in western countries was reported to be between 5%-14% among HIV-positive individuals.[5-9] However the prevalence of HBV-HIV co-infection was reported to be higher in countries of high prevalence 10%-20%.[2] A multi-national cohort study involving 11 nations concluded that America, Asia and Europe have similar co-infection rates.[10]

HBV-HIV Co-infection in India

Sporadic reports from various parts of India have shown wide variations in prevalence of HBV-HIV co-infection, which varies between 2-15%.[11-18] These studies have taken their observation generally from single type of risk groups like sex workers, injection drug users or data has been taken from the patients attending various ART centers. Only two studies have shown a high co-infection rate of more than 20%.[11,15] The differences in prevalence seem to accrue from single risk group study or smaller sample size. Other findings were that the co-infection rate was more prevalent in males as compared to female patients[19,20] and heterosexual transmission was the predominant route of HIV-HBV co-infection in India.[11-14]

IMPACT OF HBV CO-INFECTION IN HIV

A retrospective study done by Bodsworth found that there was an increased rate of HBV chronicity in HIV-infected homosexual men than those who were HIV negative(23% vs 4%).[21] As per certain studies co-infected patients showed a decreased rate of HBeAg sero-clearance.[22] A French study showed that HBeAg seroclearance was reduced by five times in HIV-infected individuals than HIV-negative persons after a 5 years follow up.[23] Co-infected patients who had a positive HBeAg had higher HBV DNA levels as compared to persons who were HBeAg negative.[22,23] The impact of HIV co-infection on hepatitis B disease course showed higher rates of liver associated morbidity and mortality as compared to those with hepatitis B alone.[24,25] Co-infected patients were more prone to have liver disease related deaths as compared to HBV mono-infected persons by as much as 17 times.[25]

Lamivudine monotherapy for 4 years in HBV-HIV co-infected lead to development of drug resistance in 94% of patients while the incidence of development of drug resistance in HBV mono-infected patients was only 67%.[26,27] Similar studies done world over showed an increased incidence of double and even triple mutant viral genome in HBV-HIV co-infected individuals.[27-30]These triple mutations are associated with generation of vaccine escape mutant HBV virus which may infect even vaccinated individuals.[31] It was also demonstrated that double and triple mutations were quiet prevalent in patients only on lamivudine.[32]

HBV has an impact on HIV infection related immune suppression, co-infected individuals have lower CD4+ count as compared to matched HIV mono-infected patients.[10,33] There was an increased risk of chronicity of HBV infection in HIV patients which reduced after effective anti-retroviral treatment.[34]

MATERIALS AND METHODS

A retrospective cross-sectional study was performed which consisted of all HIV infected patients registered with the Anti-Retroviral Therapy (ART) center at Guru Nanak Dev Hospital and Government Medical College, Amritsar in the year 2015. The study population consisted of adult (aged 18 years or above) HIV infected patients presenting to the ART Centre from January 2015 to December 2015. Information regarding all patients was obtained from an existing database.

The relevant data like age, sex, mode of transmission, CD4 counts and HBsAg positivity of the study group was collected and tabulated. The data thus obtained was analyzed statistically. For those patients whose data was incomplete due to lack of follow-up or other reasons were excluded from the study.

RESULTS

A total 435 HIV infected patients registered with the ART center of Guru Nanak Dev Hospital and Government Medical College, Amritsar during 2015 were studied of which there were 285 (65.52%) males and 150 (34.48%) females. HBsAg co-infected persons were 16 in number taking the overall percentage of HIV HBsAg co-infectivity to 3.68% in this study. Out of these 15 (93.75%) were males which was significantly higher than in females (6.25%).

Age distribution of the above population is shown in table 2

Table 2. Age distribution

Age Group (in years)	Males		Females	
	Number	Percentage	Number	Percentage
<18	15	3.45	11	2.53
19-40	203	46.67	99	22.76
41-60	61	14.02	37	8.50
>60	6	1.38	3	0.69
TOTAL	**285**	**65.52**	**150**	**34.42**

This demographic distribution shows that HIV infection is more prevalent in Indian males in the age group of 19-40 years.

Age distribution in HBV-HIV Co-infected patients is seen in table 3

Table 3 Age distribution in HBV-HIV Co-Infected Patients

Age Group (in years)	Males		Females	
	Number	Percentage	Number	Percentage
<18	0	0	0	0
19-40	13	81.25	0	0
41-60	2	12.5	1	6.25
>60	0	0	0	0
TOTAL	**15**	**93.75**	**1**	**6.25**

This shows that HBV-HIV coinfection is much more prevalent in males than females; with a predilection for 19-40 year age group.

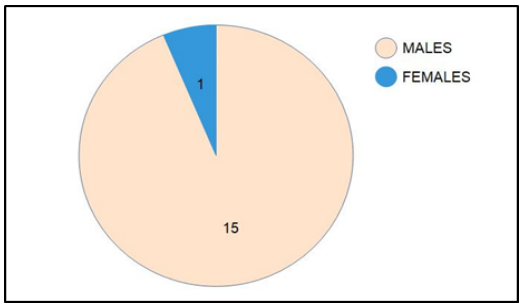

Image 1. Gender distribution of HBV-HIV co-infection.

Mode of transmission

HIV and Hepatitis B virus have a similar mode of spread which includes injection drug use (IDU), heterosexual route (HS), male sex with male (MSM), mother to child transmission (MtoC), unsafe injection/tattoo (UI) and blood transfusion related (BT). The distribution is shown in the following table no. 4.

Table 4. Mode of transmission

Mode of Transmission	HIV Infected Patients		HBsAg HIV Co-infected Patients	
	Number	Percentage	Number	Percentage
Injection drug use (IDU)	124	28.50	13	81.25
Heterosexual (HS)	160	36.78	2	12.5
Male sex with male (MSM)	6	1.38	0	0
Mother to Child (MtoC)	30	6.90	0	0
Unsafe Injection/tattoo (UI)	37	8.50	0	0
Blood Transfusion (BT)	19	4.37	0	0
Unknown	77	17.70	1	6.25

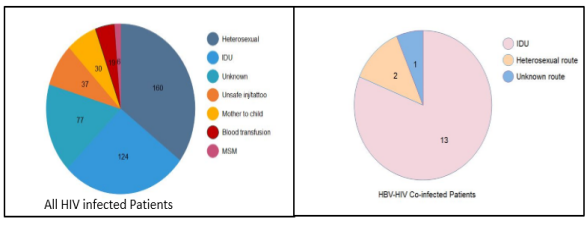

Image 2. Mode of transmission

Heterosexual transmission is the most common route (36.78%) in HIV infected population; being followed by injection drug use (28.5%), unsafe injection and tattoo, mother to child vertical transmission, blood transfusion related and the cause may be uncertain in 17.7% of patients.

In the co-infected sub-population (16 cases) injection drug use was the most prevalent (in 13 cases i.e. 81.25%) mode of transmission followed by heterosexual route (in 2 cases i.e. 12.5%). The cause was uncertain in one case.

Relationship with CD4 Count

The mean CD4 count was 528.2 cells per µL in HIV infected persons whereas it was 413.9 cells per µL which wasn't significantly lower (p value 0.1) in the co-infection group.

DISCUSSION

In our study out of 435 patients studied 65.52% were males and 34.48% were females with a male to female ratio of 1.9. Hepatitis B co-infection was found in 16 persons that is a prevalence of 3.68%. Various studies all over India have shown a prevalence of co-infection between 2-15%.[11-18] This is in tune with the prevalence elsewhere in India. Higher incidence was reported in studies where sample population included small specific groups like sex workers and injection drug users. Co-infection was much more prevalent in males (93.75%) as compared to females (6.25%). HBV-HIV co-infection was more prevalent in the age group of 19-40 years It has been shown in various studies that HIV is prevalent maximally in this age group and mode of transmission is similar for these diseases. This was the global trend shown by Thio and Idoko in their respective studies.[10,19]

Regarding the mode of transmission injection drug use was the most prevalent mode accounting for 81.25% of cases followed by heterosexual transmission (12.5%). This was unlike most studies done in India which had shown heterosexual transmission as the most prevalent mode of transmission in co-infected population.[12-15] This may be attributable to higher prevalence of injection drug use amongst this population in recent times and common mode of transmission of both viruses. The mean CD4 counts were lower in the HBV-HIV co-infected persons but the difference was not statistically significant. Similar results were shown in a study done by King.[35]

CONCLUSION

HBV-HIV co-infection is a global phenomenon. As per the findings of our study, the incidence of HBV/HIV co-infection is 3.68%. There was a predilection for 19-40 year aged male injection drug users. More studies are imperative in this aspect for outlining more potent treatment strategies and implementation of effective vaccination protocols for primary prevention of HBV-HIV co-infection.

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