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A Study of Seroprevalence of Hepatitis B in HIV Positive Cases of ICTC at Tertiary Care Centre

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A B S T R A C T

The study was conducted to assess the extent of seropositivity of Hepatitis B among HIV positive patients at tertiary care hospital in Rajkot from JUNE 2016 to MAY 2017 and evaluate the need of routine screening for this infection among such patients. The samples were tested for HIV as per Strategy III of National AIDS control organization by using different system of testing to establish diagnosis of HIV. The HbsAg test is a one-step immunochromatographic assay based on the antigen capture or "Sandwich" principle. Out of total 300 HIV positive patients, 69.67% were male and 30.00% were female. Only one was transgender. Out of 300 samples tested, 7(2.33%) samples were positive for HBsAg with 6(2.87%) of male and 1(1.11%) of female patients. Higher prevalence was observed in age group of 31-60yrs and in male patients. We believe our data could help health professionals to deal better with HIV infected patients. We also believe our data reinforces the need of prevention programs on HIV transmission, which also lead to reduction in prevalence of Hepatitis B.

Introduction

Human Immunodeficiency Virus (HIV) causes Acquired Immunodeficiency Syndrome (AIDS). It is a serious disorder of the immune system in which the body's normal defenses against infection break down, leaving it vulnerable to a host of life-threatening infections (Sejul Antala, 2006). Almost 35 years have now elapsed. Thirty-five years, in which HIV infection has changed from a fatal condition to a manageable chronic illness. Thirty-five years, in which the development of antiretroviral therapy (ART) has been one of the dramatic advances in the history of medicine. However, for the vast majority of people living with HIV/AIDS, ART is still light years away largely inaccessible in resource-poor countries where HIV continues to devastate families, communities and societies, especially the poor and the socially marginalized (Harshakumar, 2011).

Hepatitis B virus is the most important causative agent of transfusion-associated hepatitis. Humans are the only reservoir of

Hepatitis B virus (HBV). Blumberg *et al.,* discovered Hepatitis B virus in 1965 in the serum of an Australian aborigine and thus its antigen is also called as Australia antigen. Dr. Baruch Blumberg awarded The Noble Prize in Physiology and Medicine in 1976 for discovery of Hepatitis B virus. The virus particle (virion) is a small complex double-shelled structure having an external diameter of 42 nm with a nucleocapsid core and lipoprotein coat. This particle was first discovered by Dane and his colleagues in 1970 and thus is called Dane particle. It represents the complete HBV. The nucleocapsid core is 27 nm in diameter. It replicates in the nuclei of infected hepatocyts and possesses a distinct antigen called hepatitis core antigen (HBcAg). The virion core antigen contains DNA polymerase and double stranded DNA molecule (Mandell *et al.,* William Lee, 1997; Sheila Sherlock, 1989; Krugman *et al.,* 1967; Krugman and Giles, 1970; Blumberg *et al.,* 1965).

Both HBV and HIV share similar mode of transmission and risk factors (Ansa *et al.,* 2002), HIV-infected people are frequently co-infected with HBV. Hepatitis B virus infection is associated with significant morbidity and mortality in patients with HIV infection. (Piliero and Faragon, 2002; Thio *et al.,* 2002) Co-infection of HIV with HBV affects change number of patients worldwide. (Nelson *et al.,* 2002) Among people with HIV, 70 to 90% have been found to have HBV exposure, while 10 to 15% have chronic HBV infection. (Seattle Treatment Education Project, 2002) Although, very few co-infection studies have been carried out in Africa but since sub-Saharan Africa is a home of about 29.4 million HIV infected people, high HIV/HBV confection is expected. However results are contradictory. While in Kenya, 32(78%) out of 41 patients with AIDS had serological evidence of exposure to HBV (Ogutu *et al.,* 1990), a study among pregnant women attending ante-natal clinics in Burkina Faso, showed a low co-infection rate of 0.88% (Dao *et al.,* 2001).

Materials and Methods

This study is undertaken to determine sero-positivity rate of Hepatitis B virus surface antigen (HBsAg) among Human Immunodeficiency Virus (HIV) reactive cases attending Integrated Counselling and Testing Centre (ICTC), P. D. U. Goverment Medical College & Hospital, Rajkot. Serums from 300 HIV positive cases were collected from June 2016 to May 2017. These samples were already tested for HIV as per Strategy III of National AIDS control organization by using different system of testing to establish diagnosis of HIV.

Test-1 – (Comb Aids Test)

Test-2– (Meriscreen Immunochromatographic Card Test)

Test-3 – (AIDSCAN Trispot test)

Care has been taken to maintain confidentiality regarding HIV status of an individual and all samples were collected after pretest counselling by counsellor at ICTC centre. Reports were dispatched after post test counselling of an individual by maintaining confidentiality between counsellor and individual tested. No one was allowed to access patient's personal data except Age, Sex & Identification Mark that have to be written on laboratory form. Counsellor at ICTC centre gave all patients unique identification number.

Detection of HbsAg (By HEPA^{TM}CARD) Immunochromatographic Assay

HEPA^{TM}CARD is a qualtitative test based on immunochromatographiy sandwich principle. The test card includes a combination of

monoclonal anti-body gold conjugate (colloidal gold) and monoclonal solid phase antibodies which selectively binds Hepatitis B surface antigen with high degree of sensitivity.

Results and Discussion

Out of total 300 HIV positive patients, 69.67% were male and 30.00% were female. Only one was transgender. Out of 300 samples tested, 7(2.33%) samples were positive for HBsAg with 6(2.87%) of male and 1(1.11%) of female patients. Higher prevalence was observed in age group of 31-60yrs and in male patients. Table 1 and 3 shows that out of total 300 HIV positive patients, Only 7 patients were HBV positive in which 2 patients were positive in each age group of 31-40 yrs, 41-50yrs and 51-60 yrs. Only 1 patient was positive in 21-30 yrs age group (Table 5).

Table 2 and 4 shows that out of total 300 HIV positive patients, Only 7 patients were HBV positive in which Majority i.e. 6 were male and only 1 was female. HBsAg prevalence among HIV positive cases varies from 0.70% to 38.60% in different studies.

Present study shows HBsAg prevalence rate of 2.33% among HIV infected patients. This is nearly similar to findings of P Santiago-Munoz, Shazia M Ahsanand Rui Alberto. The study by Philippa C shows very low prevalence rate of just 0.70%. The study by Maria Cássia J shows prevalence rate as high as 38.6 %, which is very high compared to present study. Indian studies by Dhanvijay AG and Tankhiwale SS shows prevalence rate of 28% and 30.91% respectively among HIV positive patients. In present study, difference in prevalence may be due to variation in epidemiological, other risk factors and methods of testing among various studies. The fact that HIV and HBV share a common mode of transmission (predominantly blood and high risk sexual behaviors) attributes to the significant association between HBV and HIV.

Table.1 HBV Prevalence among HIV positive cases in various age groups

Age (Years)	Positive		Negative		Total	
	No.	%	No.	%	No.	%
0 - 10	00	00.00	09	100.00	09	03.00%
11 - 20	00	00.00	15	100.00	15	05.00%
21 - 30	01	01.54	64	98.46	65	21.67%
31 - 40	02	02.13	92	97.87	94	31.33%
41 - 50	02	03.30	64	96.70	66	22.00%
51 - 60	02	05.00	38	95.00	40	13.33%
≥ 61	00	00.00	11	100.00	11	03.67%
Total	07	2.33%	293	97.67%	300	100%

Table.2 HBV Prevalence among HIV positive cases according to sex

Sex	Positive		Negative		Total	
	No.	%	No.	%	No.	%
Male	06	02.87	203	97.13	209	69.67%
Female	01	01.11	89	98.89	90	30.00%
Transgender	00	00.00	01	100.00	01	00.33%
Total	07	2.33%	293	97.67%	300	100%

Table.3 Comparison of HBsAg prevalence among HIV positive cases

Sr. No.	Study	Total Sample	HBsAg positive (%)
1	Philippa C	1022	72 (0.70)
2	P Santiago-Munoz	455	07 (1.5)
3	**PRESENT STUDY**	**300**	**07 (2.33)**
4	Shazia M Ahsan	200	07 (3.5)
5	Rui Alberto	1000	37 (3.70)
6	Carmen Pittman	2844	143 (5.06)
7	Pavan MH	226	12 (5.30)
8	Maria Helena P	226	12 (5.31)
9	Treitinger A	93	23 (24.30)
10	N Shire	3867	967 (25.01)
11	Uneke	490	127 (25.92)
12	Mustapha	200	53 (26.50)
13	Dhanvijay AG	175	49 (28.00)
14	Tankhiwale SS	110	34 (30.91)
15	Maria Cássia J	1693	654 (38.60)

Table.4 Comparison of HBsAg Prevalence according to Sex among HIV positive cases

SEX	Present Study Positive %	Mustapha (Mustapha and Jibrin, 2004) Positive %
Male	2.87%	2.7%
Female	1.11%	2.2%

Table.5 Comparison of HBsAg prevalence according to age group among HIV positive cases

Age Group	Mustapha (Mustapha and Jibrin, 2004)		Uneka (Uneke *et al.*, 2005)		Dr. Antala (Sejul Antala, 2006)		Present Study	
	Number (positive)	%	Number (positive)	%	Number (positive)	%	Number (positive)	%
≤20	00 (05)	00.0	04 (015)	26.67	00 (11)	00.00	00 (19)	0
21–30	14 (50)	28.0	40 (184)	27.74	18 (85)	21.18	01 (65)	1.53
31–40	17 (79)	21.52	53 (188)	28.19	14 (71)	19.72	02 (94)	2.13
41–50	24 (48)	50.00	19 (078)	24.36	05 (26)	19.23	02 (66)	3.3
≥ 51	02 (18)	11.11	11 (025)	44.00	02 (07)	28.57	02 (51)	3.92
TOTAL	53(200)	26.50	127 (490)	25.92	39 (200)	19.50	07 (300)	2.33

The rate of co-infection in males (2.87%) is higher than females (1.11%), which is comparable to (Mustapha and Jibrin, 2004) having males (2.7%) and females (2.2%). The reason for this disparity is not clear. However it is known that males are less likely to clear HBsAg and have a higher risk of progression to cirrhosis.

Age wise distribution showed that the higher rate of HBsAg prevalence is found among ≥51 (3.92%) age group which is also noticed in study of Mustapha and Uneke.

In keeping with the endemic nature of HBV in this environment, HBsAg positivity is found in all the age groups except in the ≤ 20 years age group in which no cases were recorded in present study as well as by Mustaphaand Dr. Antalabut Uneke shows prevalence rate of 26.67 % in this age group.

The most likely explanation for this observation is the low number of subjects in that age group compare to other age groups. Highest prevalence is observed among age group ≥51 (3.92%), which may be due to more chances of exposure to various risk factor over such a long period of life.

Out of 300 samples tested, 7(2.33%) samples were positive for HBsAg with 6(2.87%) of male and 1(1.11%) of female patients. Higher prevalance was observed in age group of 31-60yrs and in male patients. Our results are comparable with some of the studies conducted in India and abroad.

We believe our data could help health professionals to deal better with HIV infected patients.

We also believe our data reinforces the need of prevention programs on HIV transmission, which also lead to reduction in prevalence of HBV.

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