Study of Hepatitis B Virus and Hepatitis C Virus Co-infection in Human Immunodeficiency Virus Seropositive Cases

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Research Article

Abstract: Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) are the three common chronic viral infections seen in the world. The study was done to know the prevalence of co-infection with Hepatitis B and Hepatitis C in HIV infected persons. The specimen for study was the HIV positive samples from the blood samples sent to the serology lab of the Department of Microbiology. The actual study was the detection of HBsAg (Surface antigen of HBV) and antibodies to Hepatitis C virus in the HIV positive blood samples collected and preserved. The co-infection with Hepatitis B virus in HIV seropositive cases was 5.5%. The co-infection with Hepatitis C virus in HIV seropositive cases was 4.4%.None where co-infected with both Hepatitis B and Hepatitis C.

Keywords: Hepatitis B virus, Hepatitis C virus, HIV, Co-infection.

Introduction

Human immunodeficiency virus from 1983, when it was first isolated by French scientist Prof. Montagnier and co-workers as the causative viral agent of Acquired immunodeficiency syndrome (AIDS), to the present day has been widely studied. Presently the spectrum of opportunistic and co-infection with other viral as well as infections with other microorganisms in HIV infected persons are widely reported and studied. One such co-infection, which has gained global interest, is co-infection with Hepatitis B Virus and Hepatitis C Virus in Human Immunodeficiency Virus infected patients. Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) are the three common chronic viral infections seen in the world. All three virus share common modes of transmission and hence co-exist in the same host at significantly high rate. HIV induced immunosuppression has deleterious effect on the natural history, pathophysiology, diagnosis, therapeutic responses to hepatitis viruses. Response to HBV vaccination is impaired in persons with HIV infection. Co-infection with hepatitis viruses and HIV is likely to become a major health care catastrophe in coming years.[1] The data from western studies reveal the incidence of HBV co infection in HIV patients as 9-12%.[2] and HCV co-infection as 9-16%[3]. The prevalence of co-infection in HIV patients in India may be different as the mode of transmission and the load of infection in the population affect this.[4,7] In a study done by in northern India HBV co-infection was detected in 2.25%. Patients and HCV co-infection in 1.61% patients and dual co-infection with HBV and HCV in 0.16% of HIV infected patients.[5]

Materials and Methods

The present study was done in the department of microbiology, Rajah Muthiah Medical College, Annamalaingar, Chidambaram, Tamilnadu. The specimen for study was the HIV positive samples from the blood samples sent to the serology lab of the Department of Microbiology. The relevant personal and clinical data of the patients were collected from the case sheets maintained in the medical records department.

Source of the study specimen

The blood samples sent to the serology lab for detection of antibodies to HIV-1 and HIV-2 in the serum from various departments of the hospital was tested using microwell ELISA for detection of antibodies to HIV-1 (including O & C) and HIV-2 in human serum / plasma. If a sample was found to be positive to antibodies of HIV-1 and HIV-2 with the first assay, a second and third assay was done using separate assay kits of different manufactures. The use of three different kits of three different manufacturers virtually eliminated any false positive assay results. No other confirmatory assay for HIV detection was done.

Number of HIV positive samples studied

A total of 90 HIV positive blood samples were collected and studied in the study period

Preservation

The HIV positive samples were preserved at -20^0 C in a deep freezer.

Methods and materials used for the actual study

The actual study was the detection of HBsAg (Surface antigen of HBV) and antibodies to Hepatitis C virus in the HIV positive blood samples collected and preserved.

Detection of HBsAg (Surface antigen of HBV)

Microwell ELISA for the detection of Hepatitis B surface antigen (HBsAg) in Human serum / Plasma is used to detect HBsAg in the HIV positive blood samples under study.

Detection of Antibodies to Hepatitis C virus

Microwell ELISA for the detection of antibodies of Hepatitis C virus in human serum / plasma is used to detect antibodies to Hepatitis C virus in the HIV positive blood sample under study.

Observations and Results

A total of 90 HIV seropositive samples were studied. The presence of co-infection with Hepatitis B virus and Hepatitis C virus in HIV infected persons were studied by looking for the presence of HBsAg (Surface antigen of HBV) and antibodies to Hepatitis C virus. Sex wise distribution of the study group of 90 HIV seropositive cases is tabulated

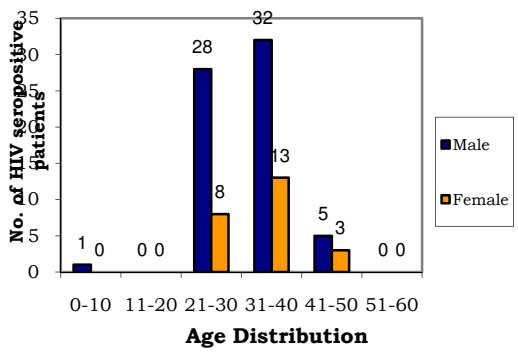
Table 1: Sex wise distribution of the study group (HIV seropositive patients)

Male (%)	Female (%)	Total
66 (73.3 %)	24 (26.6%)	90

The number of males in the study group of 90 HIV seropositive cases is 66 which is 73.3% and the number of females in the study group is 24 that is 26.6% of the 90 HIV seropositive study group

Table 2: Age wise and sex wise distribution of study group (HIV seropositive patients)

Age	No of persons (%)	Male	Female
0-10	1 (1.1 %)	1	-
11-20	-	-	-
21-30	36 (40 %)	28	8
31-40	46 (51.1 %)	32	13
41-50	8 (8.8 %)	5	3
51-60	-	-	-
Total	**90**	**66**	**24**



Actual Study Results

Table 3: HBsAg positive samples / cases

HBsAg positive (%)	HBsAg negative (%)	Total
5 (5.5 %)	85 (94.4 %)	90

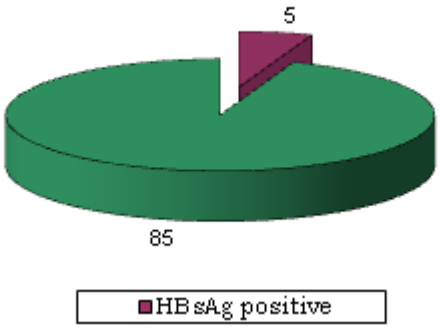


Table 3 shows the number of HBsAg positive cases and negative cases among the 90 HIV seropositive study group.

Table 4: Sex wise distribution of HBsAg positive samples / cases

Male (%)	Female (%)	Total
3 (60 %)	2 (40 %)	5

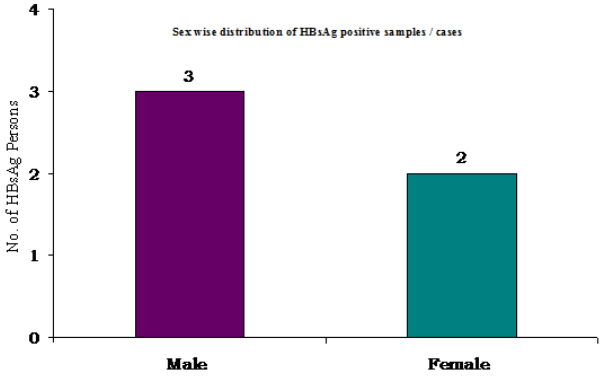


Table 4 shows the sex wise distribution of HBsAg positive samples / cases among the 90 HIV seropositive study group.

Table 5: Age wise and sex wise distribution of HBsAg positive samples / cases

Age group	HBsAg positive samples / cases			
	Male		Female	
	No. of positive	%	No. of positive	%
0-10	-	-	-	-
11-20	-	-	-	-
21-30	2	40%	1	20%
31-40	1	20%	1	20%
41-50	-	-	-	-
51-60	-	-	-	-

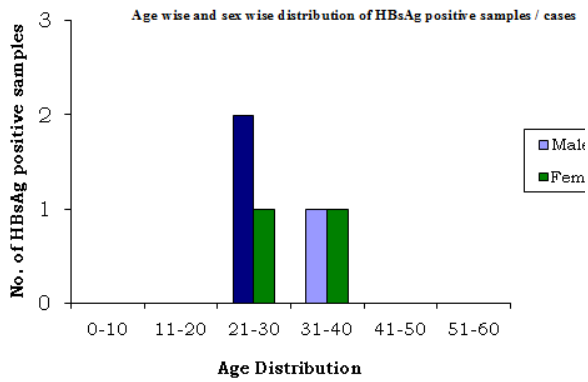


Table 5 shows the age wise and sex wise distribution of HBsAg positive sample / cases in the 90 HIV seropositive study group.

Table 6: HCV antibody positive samples / cases

HCV antibody positive (%)	HCV antibody negative (%)	Total
4 (4.4 %)	86 (95.5 %)	90

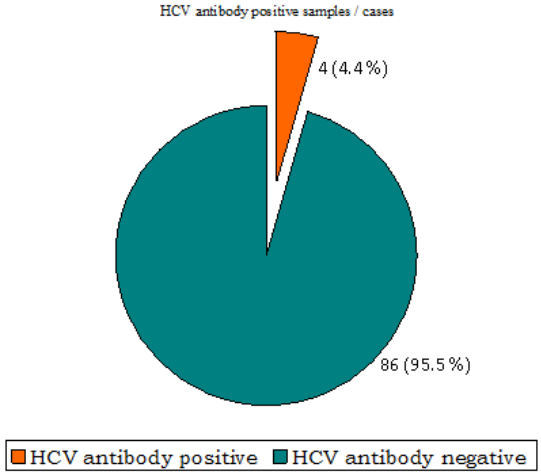


Table 6 shows the HCV antibody positive and negative persons in the total of 90 HIV seropositive study group.

Table 6: Sex wise distribution of HCV antibody positive samples / cases

Male (%)	Female (%)	Total
3 (75 %)	1 (25 %)	4

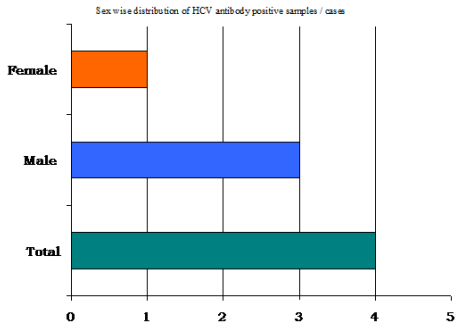


Table 6 shows the sex wise distribution of the HCV antibody positive samples / cases in the 90 HIV seropositive study group.

Table 7: Age wise and sex wise distribution of HCV antibody positive samples / cases

Age group	HCV Antibody positive samples / cases			
	Male		Female	
	No. of positive	%	No. of positive	%
0-10	-	-	-	-
11-20	-	-	-	-
21-30	1	25%	-	-
31-40	2	50%	1	25%
41-50	-	-	-	-
51-60	-	-	-	-

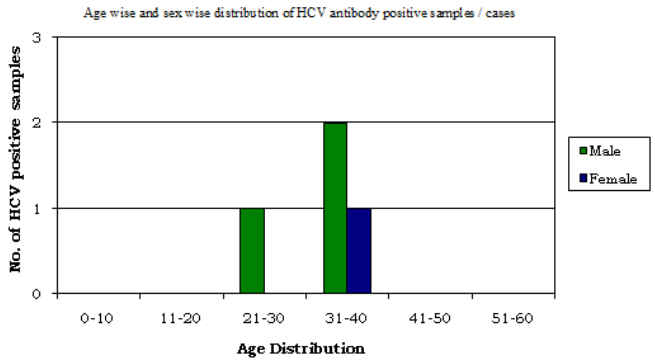


Table 7 shows the age wise and sex wise distribution of HCV antibody positive sample cases among the 90 HIV seropositive study group.

Discussion

HIV (Human Immunodeficiency Virus) Infection by itself is a pandemic, which has stirred up the minds of medical scientists and governments globally. The reality of co-infection with opportunistic and other microorganisms is even disastrous for the human race at present. The co-infection with viruses like Hepatitis B virus (HBV) and Hepatitis C virus (HCV) in HIV infected persons is already a scenario worth studying and analyzing. The study was an attempt to at least study the prevalence of co-infection with Hepatitis B virus and Hepatitis C virus in HIV infected persons. As the study was conducted in a rural tertiary health care centre that is the Rajah Muthiah Medical College situated in Chidambaram in Cuddalore district of Tamilnadu, the study helped in giving an insight in to the prevalence of co-infection with HBV and HCV in HIV infected persons in a rural setup. The laboratory diagnostic procedures were also limited to the routine, serological diagnostic procedures, so that the ground reality followed in a rural tertiary health care centre could be duplicated. The laboratory diagnostic procedures followed were the ELISA for the detection of HBsAg and HCV antibody in the HIV infected samples. The specificity and sensitivity of these tests proved useful in the present study. The

study group consisted of 90 HIV seropositive samples. The study result of the study group that is the 90 HIV seropositive samples showed that 73.3% of the study group were males compared to 26.6% females , this correlates to an earlier study done, which shows a male predominance of 70.5% and female HIV positive cases were 29.4% of the total HIV positive cases in India.[6] The age wise distribution of the study group of 90 HIV seropositive persons showed that the maximum number of persons were in the age group 31-40 years, that is 46 persons, which is a percentage of 51.1%, followed by the age group 21-30 years in which 36 persons or 40% of the study group were from and 8 persons belonged to the age group 41-50 years, which was 8.8% and the least number was from the age group 0-10 years, which was 1 and the percentage was 1.1%. The age wise distribution of HIV seropositive persons also correlates to the distribution seen in earlier study.[6] The actual study was to detect the prevalence of HBsAg (Surface antigen of HBV) and antibody against HCV in the 90 HIV seropositive samples. The numbers of HBsAg positive samples in the 90 HIV seropositive cases were 5 that is 5.5% of the total study group.In a previous study the prevalence of HBV infection in HIV Seropositive persons in the western world and the data indicates that 9-12% of the HIV seropositive cases were co-infected with HBV.[2] In a similar study done in northern India, showed that the prevalence of co-infection with HBV in HIV seropositive cases is 2.25%.[5] The present study throws light to the fact that the results obtained, that is 5.5% of the cases studied were, co-infected with Hepatitis B Virus. This result shown that in the study group the co-infection with HBV in HIV seropositive cases in less than that is seen in western countries and is more than what is encountered in the north Indian population. This difference in prevalence of co-infection with HBV in HIV infected persons may be due to the difference in mode of transmission and load of infection in the study population. [4, 7] In the present study of 90 HIV seropositive cases out of the 5 HBsAg positive cases 3 were males that is 60% of the HBsAg positive cases and 3.3% of the total study group. The numbers of HBsAg positive cases who where females were 2 that is 40% of the HBsAg positive cases and 2.2% of the total of 90 HIV seropositive cases. In a previous study done, 14.2% of the HBV co-infected persons in HIV infected persons were females. In the same study 85.7% of the HIV seropositive persons co-infected with HBV were males.[5] So the present study shows a marked difference in the male to female sex distribution. In the age wise and sex wise distribution of the HBV co-infected in HIV seropositive study group. The maximum number of HBV co-infected are in the age group of 21-30 years that is 60% of HBV co-infected persons. 40% of HBV co-infected persons belong to the age group of 31-40 years. The number of Hepatitis C virus antibody positive samples in the study group of 90 HIV seropositive were 4 that is 4.44% of the total study group. The data from studies done on western population revealed that 9-16 % of HIV seropositive cases were co-infected with Hepatitis C virus[3]. Studies done in northern India by tells that 1.61% of the total HIV seropositive cases studies were co infected with Hepatitis C virus.[2] The present study shows that in the study population in southern India that is in Chidambaram of Cuddalore district. The prevalence of co-infection with Hepatitis C virus in HIV seropositive cases is more than what is seen in northern India and in much less than what is seen in the western world. This difference in prevalence rate of co-infection with Hepatitis C virus in HIV seropositive cases may be due to the difference in mode of transmission and load of the infection in the study population as mentioned by a study done .[4,7] In sex wise distribution of the HCV co-infected persons in HIV seropositive cases. 75% of the HCV co-infected persons in the study are males. This correlates to the study done previously.[5] 25% of the HCV co-infected persons in the study were females and this correlates the study done earlier.[5] In the age wise distribution of the HCV co-infected case in the study group of 90 HIV seropositive cases. 75% of the HCV co-infected were in the age group of 31-40 years and 25% of the HCV co-infected were in the age group of 21-30 years. Out of the 90 HIV seropositive cases studied dual co-infection with both Hepatitis B virus and Hepatitis C virus were not seen in any case. But in the study done by in northern India dual co-infection with HBV and HCV was seen in 0.16% of the study group of HIV seropositive cases. [5]

Conclusion

A total of 90 HIV seropositive samples were studied for presence of HBsAg and HCV antibody using Enzyme linked immunosorbent assay (ELISA) for the respective viruses.

The study revealed that

1. The co-infection with Hepatitis B virus in HIV seropositive cases was 5.5%. This was much less than similar studies in western countries, which was around 9-12%, and more than what was seen in studies done in northern India, which was 2.25%.
2. The co-infection with Hepatitis C virus in HIV seropositive cases was 4.4%. This too was less than the percentage of 9-16, which was seen in the studies done in western countries and more than the percentage of 1.61%, which was seen in similar studies done in northern India.

3. The difference in prevalence pattern of co-infection with Hepatitis B virus and Hepatitis C virus in HIV seropositive cases in the present study done in southern India rural region, when compared to similar studies elsewhere may be due to the difference in mode of transmission and load of infection in the study population when compared to similar studies in western countries and northern India.

This study to some extent justifies routine screening for co-infection with Hepatitis B virus and Hepatitis C virus in HIV infected persons.

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