

SEROPREVALENCE OF HIV, HBV & HCV IN HIGH RISK GROUPS

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Abstract

Keywords:

HIV, HBV, HCV, Sexually transmitted diseases(STD), ELISA, Co Infection.

Aim: The present study is to know the seroprevalence of HIV, HBV, HCV in "high risk groups" i.e STD patients, hemophiliacs and patients undergoing repeated dialysis voluntary blood donors and also the incidence of co-infections.

Materials and Methods: A serological screening was carried out during the period November 2005 to September 2007 to assess the risk of infection with HIV and co-infection with HBV, HCV at Siddhartha Medical College, Vijayawada. A total of 200 samples collected and were tested by ELISA with commercial test kits which were commonly used for HIV, HBV, HCV.

Results: Among the 200 samples serological reactivity was detected for HIV 13(15.5%), HBV in 16(8%), HCV in 18(9%). All the three viruses shown no incidence in STD patients. Co infection with all the three viruses was noted in 3 cases out of 200 cases, which happened to be from STD O.P. 7 cases out of 200 cases were positive for HIV and HCV of which all 7 were STD patients. 4 patients from STD group were positive for both HIV and HBV.

Conclusion: Screening procedures for hepatotropic viruses and HIV should be made mandatory. Health education to people about Safe Sexual practices and awareness about these viruses.

Introduction

Human Immunodeficiency Virus (HIV):

In recent years, Acquired Immune Deficiency Syndrome (AIDS) has emerged as the greatest threat to human existence. It was projected that the number of people with HIV might increase from 40 million now to 60 million by 2015. Sub-Saharan Africa is the region that is most affected with devastating effect on life and socio-economic activities. This region harbours 68% of people living with HIV and recorded 76% of HIV related deaths in 2007^[1-4].

Since the beginning of the Pandemic, three main routes of transmission for HIV have been identified. They are: 1. Sexual route, 2. Blood or Blood products, 3. Mother to child transmission (MTCT).

Apart from HIV, several other Viral Infections are transmitted by above routes of transmission. Among them, most important being HBV & HCV, which cause morbidity and mortality in the infected patients^[5].

HEPATITIS B Virus (HBV):

Hepatitis B virus infection (HBV) is a global public health problem. Nearly two billion people in the world have been acutely infected by HBV and there are nearly 350 million people chronically infected with HBV^[6-8]. At least 15-25% of chronically HBV infected people will die due to liver disease caused by HBV and this constitutes nearly one million people each year. It is the most common cause of chronic liver disease, including cirrhosis of the liver and hepatocellular carcinoma worldwide. An effective vaccine is available for over two decades and has brought about remarkable changes in the global epidemiology of HBV infection^[8].

HEPATITIS C (HCV):

According to WHO estimations, about 3% of the world population may be infected with HCV. At present there are an estimated 170-200 million people all over the world infected with HCV^[10]. In patients with hepatitis C virus

(HCV) infection the increased risk appears to coincide with the establishment of cirrhosis, when the yearly incidence varies between 3 and 8% [9]. 20% of HCV infection is prevalent in India about 12.5million cases . A quarter of all chronic Hepatitis cases in India are believed to be due to HCV Infection. Infection with HCV type 1b, cirrhosis and high viral load are associated with poor response.^[11]

Hence the present study was taken up to know the incidence of HIV, HBV and HCV in high risk group of people who are attending Government General Hospital, Vijayawada and other medical establishments, in and around Vijayawada.

Material and Methods

The material for the present study (2006-2007) was collected from persons who are at high risk of exposure to HIV, HBV and HCV infections and tested at Government General Hospital, Vijayawada, and private hospitals at Vijayawada and Mangalagiri, and subjected to ELISA test for HIV, HBV and HCV. They were counseled and consent was taken.

The study included a total of 200 persons belonging to different risk groups viz.,

1. Patients attending to STD O.P with history of multiple exposures – 87
2. Patients undergoing repeated dialysis and attending Nephrology clinic – 30
3. Haemophiliacs taking frequent blood transfusion and / or factors-33
4. Voluntary blood donors attending blood bank - 50

Collection of Sample:

Following Universal precautions 5 ml of whole blood was collected from each of the selected persons under strict aseptic conditions. Disposable syringes and needles were used.

Separation of Serum :

Blood was allowed to clot; the clear serum was transferred into sterile test tubes. It was then centrifuged and the clear supernatant is transferred into small screw capped autoclavable plastic vials (Lax brow vials) for preservation.

Preservation of Serum:

Serum was collected in Lax brow vials and preserved at 2-8⁰C in the refrigerator until the test procedure was performed.

Test employed for HIV:

Microwell (ELISA) test for the detection of antibodies to HIV -1 (Including sub group O & C) and HIV – 2 in human serum/plasma Manufactured by J.Mitra & Co.pvt. Ltd, New Delhi, India.

Test employed for HBV:

Microscreen ELISA test for the detection of Hepatitis B Surface antigen (HBsAg) in human Serum / Plasma .Manufactured by Span diagnostic limited, SURAT. India.

Test employed for HCV:

III Generation “Anti – HCV – EIA – Avicenna”, Enzyme immunoassay for detection of antibodies to Hepatitis C virus (HCV) in human serum /plasma, Manufactured by Avicenna medical Center, Moscow, Russia and Marketed by : Ensure Biotech (P) Ltd., Hyderabad.

Results and Discussion

Two hundred samples from various risk groups were screened for anti HIV, HBsAg and anti HCV belonging to different risk groups. HIV, HBV and HCV are major worldwide health problems. The emergence and Pandemic spread of the acquired immunodeficiency syndrome (AIDS) have posed the greatest challenge to public health in modern times.

Prevalence of HIV antibodies, HBV antigen and HCV antibodies are depicted in table 1. The percentage of positivity for anti HIV was 15.5%, HBsAg was 8% and anti HCV was 9%.

Table 1: Prevalence of Anti HIV, HBsAg, Anti HCV

No. of cases Screened		No. of cases Positive	% Positive
Anti HIV	200	31	15.5
HBsAg	200	16	8
Anti HCV	200	18	9

In the present study HIV, HBsAg and HCV positivity among different risk groups has shown in table 2, where HIV positivity observed only in STD patients. In line with this study Devinder et.al,^[5] 1999 reported 23.2% HIV positivity in STD patients. 23.52% positivity observed by Tungatkar et.al^[12]. In contrast to this study Hussain T et.al^[13] reported 2.4%. Bajaja et.al^[14] reported 10.9%. AIIMS, New Delhi surveillance reports from coastal areas of Andhra Pradesh shows 30 to 40% positivity for HIV antibodies in STD patients^[15]. This difference may be due to difference in awareness about STD in different areas. The Incidence of HIV in dialysis patients in the present study was NIL. Ashwani K et.al^[16] has reported a carrier rate of 0.1% of HIV in India.

Table 2. Incidence of Anti HIV, HBs Ag, Anti HCV in different risk groups

Risk Group	No. Screened	Anti HIV		HBs Ag		Anti HCV	
		Positive	%	Positive	%	Positive	%
STD Patients	87	31	35.6	13	13.8	12	14.95
Dialysis Patients	30	NIL	0	1	3.33	4	13.33
Hemophiliacs	33	NIL	0	NIL	0	2	6.06
Blood donors	50	NIL	0	2	4	NIL	0
Total	200	31	15.5	16	8	18	9

This study shown an incidence of 13.8% positivity of HBsAg amongst STD patients. 10% positivity for HBsAg was observed by Devinder et .al^[5], Hussain T et.al^[13] reported 2.9%. The HBV carriage rate was 6.15% in the study by Anup kumar. R. et.al^[17]. The Incidence of HBV in dialysis patients in the present study was 3.33%. Gupta et.al^[18] reported 3.4% to 42%. V.Lakshmi et.al^[19] observed 1.4% positive for HBsAg.

An incidence of 14.95% was observed for HCV infection in STD group in the present study. Anti HCV prevalence varies from 2 to 16% in sexually promiscuous individuals^[20]. Thomas et.al^[21] reported 15% incidence from Baltimore. The Incidence of HCV in dialysis patients was 13.33% in this study. The Prevalence of HCV in dialysis patients varies considerably throughout the world. The high incidence was probably due to small number of subjects taken.

HBV infection is less prevalent than HCV in haemodialysis units. Introduction of HBV vaccination, regular surveillance for HBV infection dramatically reduced the spread of HBV in this setting.

From the study on Hemophiliacs, No Positive case was observed for HIV and HBsAg. The incidence of 6.06% was observed for anti HCV positivity. Bhattacharya et al^[22] reported HIV seropositivity in hemophiliacs as 4.4% and HCV is 25%. Devinder et.al^[5] observed 12.1% positive for HIV infection. low incidence of HCV infection in the present study was probably due to transfusion of screened blood/factors.

In the present study No HIV and HCV positive cases were observed amongst Voluntary Blood Donors. An Incidence of 4% positivity of HBsAg was noted. R.M. Joshi et.al.^[23] reported an incidence of 2.28% and Sunite et.al.^[24] reported 4% for HBsAg. Anup kumar et.al.^[17] reported 0.82% HBV carriage in Voluntary Blood Donors.

Age wise distribution of cases has shown for anti HIV, HBsAg, and anti HCV in table 3. In case of HIV antibody the highest incidence of positivity was noted in the age group of 21-30 (27.6%) followed by 11-20 years (12.5%). The incidence of HBsAg positivity is 8% with highest positivity rate in the age group of 61-70 years (33.33%) and 31-40 years (17.78%) from STD patients. The prevalence of anti HCV positivity was 9% with highest incidence of 66.66% in the age group of 61-70 years (Patients attending dialysis unit) followed by 33.33% in the age group of 51-60 years. M.Pistello et.al.^[25] reported 6.3% anti HCV in the age group of less than 20 years, 62% in the age group of 20 to 40 years and 63% in the age group of more than 40 years

Table 3. Age wise incidence of HIV, HBV and HCV

Risk Group	No. Screened	Anti HIV		HBs Ag		Anti HCV	
		Positive	%	Positive	%	Positive	%
0 – 10	4	0	0	0	0	0	0
11 – 20	56	7	12.5	6	10.7	4	7.2
21 – 30	65	18	27.6	2	3.1	8	12.30
31 – 40	45	5	11.11	8	17.7	2	4.4
41 – 50	18	1	5.5	NIL	0	5	11.11
51 – 60	6	NIL	0	NIL	0	2	33.33
61 – 70	6	NIL	0	2	33.33	4	66.66

Age wise and Sex wise study on the incidence of HIV, HBV and HCV infection observed that the percentage of Positivity for anti HCV more in females with 11.5% and in males 8.7%. 15.3% females were positive for HBsAg. Among the males highest percentage of HBsAg positivity was seen in the age group of 31 to 40 years (10.5%) followed by 21 to 30 years (7.6%). In females it was 100% in the age group of 11 – 20 years and followed by 61 – 70 years (50%).

The apparently high incidence in females was probably due to small number of females screened. HIV positivity was more in Females (30%) than in Males (13.22%). The highest incidence was seen in males in the age group of 21 – 30 years (21.1%) and in the females it was 38.5% in the same age group, which highlights the trends of HIV infection in younger age group.

The work of various authors revealed that age and sex has no definite relation to the prevalence of the three Viruses HIV, HBV and HCV with common mode of transmission, but positivity rate depends on the population screened and it is found to be maximum for HCV and HBV in dialysis patients and for HIV in STD patients.

Urban and Rural distribution of positive cases for anti HIV, HBsAg and anti HCV shown in Table 4. Out of 200 cases screened 148 were urban and 52 were rural.

Table 4: Urban and Rural distribution of Positive cases

Screened Cases		Anti HIV		HBs Ag		Anti HCV	
Area	No.	Positive	%	Positive	%	Positive	%
Urban	148	24	16.2	11	7.4	12	8.1
Rural	52	7	13.4	5	9.6	6	11.5
Total	200	31	15.5	16	8	18	9

The prevalence was less in rural cases for anti HIV with 13.46% and in urban cases it was 16.21%. For HBsAg it was 9.6% in rural and 7.4% in urban cases. Among HCV the prevalence was more in rural cases with 11.53% than in urban with 8.1%. HIV in Urban areas more become of high risk behavior due to their professions like truck drivers etc.

W.H.O. Collaborative study in which 21 Laboratories from 20 countries participated (1980) showed that there was a trend for higher prevalence of HBsAg in Urban than Rural and in males than in females.

Sharing the common routes of transmission especially through Blood and Blood products, the Blood borne Viruses HCV, HBV and HIV were gaining epidemiological importance worldwide. Co-infection with one of these Viruses was positivity because of same route of transmission. In the present study an attempt was made to reveal the incidence of co-infection with HIV, HBV and HCV (Table 5).

Co infection with all the three viruses was noted in 3 cases(1.5%) out of 200 cases, which happened to be from STD O.P. 7cases(3.5%) out of 200 cases were positive for HIV and HCV of which all 7 were STD patients. 4 (2%) patients from STD group were positive for both HIV and HBV. One out of 16 HBsAg positive cases was HCV positive also. With regard to HCV and HIV the co-infectivity was relevant in I.V.drug users and Hemophiliacs. Interactions between HIV and Hepatitis Viruses may alter the natural history of both the diseases ^[26].

As observed above, HIV, HBV and HCV share common modes of transmission and there is a chance of prevalence of these infections individually and also as co-infections, especially in people with high risk.

Table 5. Incidence of Co-Infection of HIV, HBV and HCV.

INCIDENCE OF CO INFECTION OF HIV HBV AND HCV																				
No Screened	Anti HIV HBsAg		Anti HIV						HBsAG						Anti HCV					
	&		No.		%				No.		%				No.		%			
200	Anti HCV		31		15.5				16		8				18		9			
			Only Anti HIV		Anti HIV & Anti HCV		Anti HIV & HBsAg		Only HBsAg		HBsAg & HCV		HBsAg & Anti HIV		Only Anti HCV		Anti HCV & HBsAg		Anti HCV & anti HIV	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
	3	1.5	19	9.5	7	3.5	4	2	9	4.5	1	0.5	4	2	8	4	1	0.5	7	3.5

Conclusion

From this study I conclude that the screening procedure for Hepatotropic Viruses and HIV should be made mandatory. Universal precautions and infection control procedures must be followed to, reduce the transmission of these viruses, in Hospital setup, to reduce the risk of nosocomial infection. Available specific prophylaxis should be advocated to prevent the long term effects, like, increase in the carrier rate in community by horizontal and vertical transmission and reduce the risk of long term hazards like predisposition to chronic liver disease and Hepatocellular Carcinoma. Health education to People about epidemiology and prevention. We hopefully look forward for the discovery of an effective, safe and economical vaccine for HCV and HIV.

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