

## Syphilis a risk factor for HIV

Shashi Chopra

Associate Professor & Head, Department of Microbiology, Punjab Institute of Medical Sciences, Jalandhar City, Punjab, Pin code- 144001

E-mail : dr.shashichopra@yahoo.com

Submitted : 21.04.2012

Accepted : 29.05.2012

Published : 10.9.2012

### Abstract

Sexually transmitted diseases (STD) that cause inflammatory or ulcerative lesions of genital tract act as important cofactor in increasing the risk of transmission of human immunodeficiency virus (HIV) through sexual contact. When syphilis is present there is about 2-5 fold increased rate of acquiring HIV infection. The incidence of HIV can be reduced by preventing and treating the syphilis and other agents causing sexually transmitted infections (STIs). The current prospective study was conducted over a period of three years (2005-2007). A total of 500 blood samples were collected from patients having history of genital ulcers (study group) and 250 persons with history of non ulcerative lesions (control group) referred from skin and STD department of Guru Nanak Dev Hospital in the Integrated Counseling and Testing Centre (ICTC) attached to Microbiology department, Government Medical College Amritsar. Blood samples were collected after obtaining their written consent after pretest counseling. Serum samples were screened for the presence of HIV-1, HIV-2 antibodies and Syphilis by E/R/S and venereal diseases Research laboratory (VDRL) test respectively. VDRL reactive sera were confirmed by Treponema Pallidum Hemagglutination Assay (TPHA). Out of the 500 patients screened 75% were males and 25% were females. Out of these 20(4%) persons were sero reactive for HIV-1 infection and none for HIV-2 infection. Thirty three (6.6%) persons were reactive for Syphilis. Co-infection of HIV and syphilis was 45% in HIV sero reactive patients. Out of 250 control group patients 0.8% were sero reactive for HIV-1. HIV sero prevalence rate was significantly higher amongst genital ulcer disease (GUD) patients as compared to patients with history of having non ulcerative lesions. ( $p < 0.001$ ). It is concluded that HIV prevalence was significantly higher in patients having GUD.

### INTRODUCTION

Syphilis is still a common Sexually Transmitted Disease (STD) in many areas of the world, despite the availability of effective therapy.<sup>[1]</sup> It causes ulcerative lesions of genital tract and act as an important cofactor in increasing the risk of transmission of HIV through sexual contact.<sup>[2]</sup> As per National AIDS Control Organization (NACO) 340 million new cases of curative Sexually Transmitted Infections (STI) occurs every year in the world. Out of which 75 to 85% cases are present in developing countries. Out of these new cases 12 million are of syphilis, 62 million are of gonorrhea, 90 million are of Chlamydia and 176 million are of trichomoniasis.<sup>[3]</sup> Genital Ulcer Disease (GUD) and non ulcerative STDs promote HIV transmission. But the majority of HIV infections occur through the mucosal disruption either on the penis or the cervix.<sup>[4]</sup> The overall relative risk and population attributable fraction for GUD in facilitating HIV transmission are consistently higher than for other STIs and STI syndromes.<sup>[5]</sup> The strong association between syphilis and HIV sero prevalence suggests that acceleration of direct linkages between STI testing and HIV counseling and testing would be useful in enhancing the control of STI and HIV in India. The present study was undertaken to know the sero prevalence of HIV and syphilis infection among patients presenting with GUD and their correlation.

### MATERIAL AND METHOD

The current prospective study was conducted over a period of three years (2005-2007). A total of 500 blood samples were collected from patients (16yrs-50yrs) having history of genital ulcers (study group) and 250 patients without any history of genital ulcers as a control group referred from skin and STD department of Guru Nanak Dev Hospital in the Integrated Counseling and Testing Centre (ICTC) attached to Microbiology department, Government Medical College Amritsar. The study protocol was approved by an institutional ethical committee prior

to the investigation. Patients complete history, including demographic characters and risk behavior for HIV infection, were recorded. Pretest counseling was given and informed consent was taken before testing. Fresh serum was subjected to Enzyme Linked Immuno Sorbent Assay (ELISA) test (J Mitra and Co. Pvt. Ltd.) for detection of HIV-I and 2 antibodies. ELISA positive sera were then subjected to another 2 E/R/S [Retroquic (Qualpro diagnostic) and Tridot (J. Mitra and Co. Pvt. Ltd.)] test according to manufacturers instructions and NACO guidelines.<sup>[6]</sup> Serum samples were also screened for Syphilis by venereal diseases Research laboratory (VDRL) test and then confirmed by Treponema Pallidum Hemagglutination Assay (TPHA)<sup>[7]</sup>

### RESULTS AND DISCUSSION

Out of 500 patients (Study group) screened 375 (75%) were heterosexual males and 125 (25%) were heterosexual females. The 459 (91.8%) persons were seen in the reproductive age group (16yrs-50yrs). Out of 500 persons 260 (52%) belonged to rural area and 240 (48%) persons belonged to urban area (Table I). Out of 500 sera 20 (4%) were reactive and 480 (96%) were non reactive for HIV I antibodies.

None of them were reactive for HIV- 2 antibodies. The age and sex wise distribution of HIV sero reactive and nonreactive persons is shown in table II. Out of 500 persons 33 (6.6%) were reactive for VDRL test and 467 (93.4%) were non reactive for VDRL test. Out of 33 sero reactive persons for syphilis 24 (72.7%) were males and 9 (27.3%) were females. Out of 20 HIV sero positive persons 9 (45%) were co-infected with Syphilis (Table III).

Out of 250 control group patients 140 were males and 110 were females in the reproductive age group. Out of which only one male (0.7%) and one female (0.9%) was sero reactive for HIV-I. HIV sero prevalence rate were significantly higher amongst GUD patients as compared to patients with history of having non ulcerative lesions ( $p < 0.001$ ). (Table IV).

**Table 1:** showing Rural / Urban Distribution

RURAL / URBAN	MALE	%AGE	FEMALE	%AGE
RURAL	230	61.3	30	24
URBAN	145	38.7	95	76
TOTAL	375	100	125	100

**Table 2:** Age and sex wise distribution of HIV Seropositive Cases

AGE IN YEARS	MALE	%AGE	FEMALE	%AGE
16-30	2	10	4	20
31-45	7	35	5	25
46-60	2	10	–	
TOTAL	11	55	9	45

**Table 3:** Correlation of HIV and Syphilis in Gud patients

Reactivity	HIV	Percentage	Syphilis	Percentage
HIV (alone)	11	55	–	–
SYPHILIS (alone)	–	–	24	72.7
COINFECTION	9	45	9	27.3
TOTAL	20	100	33	100

**Table 4:** Comparison of HIV Seropositivity in Study Group and Control Group

No. of cases	Study group	Percentage	No. of cases	Control group	Percentage
Male (n=375)	11	2.9	Male (n=140)	1	0.7
Female (n=125)	9	7.2	Female (n=110)	1	0.9
Total (500)	20	4	Total (250)	2	0.8

The venereal transmission of HIV can occur in high risk group persons. In the current study male outnumbered female patients in the ratio of 3:1 in having GUD where as other worker reported it to be 12:1 up to 15:1.<sup>[8]</sup> This might be due to the fact that males practice high risk behavior and acquire more STIs than females. Among the 500 serum samples screened for HIV 4% were found to be sero reactive for anti HIV antibodies. The incidence is almost the same (4.9%) as reported by Kamali A et al<sup>[9]</sup> where as other workers reported it to be 2.3%, 30%, 75%<sup>[10-12]</sup>. HIV positive individual having other STIs are more likely to transmit HIV to others by shedding or releasing HIV cells in both ulcerative and inflammatory genital secretions<sup>[13]</sup>. In the present study 2.9% males and 7.2% females were sero positive for HIV infection where as other workers reported it to be 4.11% and 5.17% respectively<sup>[14]</sup>. In the control group 0.8% were sero reactive for HIV where as other workers reported it to be 1.7%.<sup>[15]</sup>

In the present study rural and urban cases were nearly equal in number with slight preponderance of rural cases i.e 52% where as Girgila et al<sup>[16]</sup> in their study observed that 64.94% cases belong to rural area. This may be due to the fact that being an agriculture state, large number of patient reporting to our hospital belonged to rural area. Though HIV infection is still low in this population the high prevalence of STIs indicates that potential is there for an explosive spread of HIV/AIDS epidemic.

In present study 6.6% persons were reactive for VDRL test where as other workers reported it to be 14% and 22% respectively.<sup>[12,11]</sup>

Out of these 72.7% were males and 27.3% were females where as other workers reported it to be 12.9% and 12.6% respectively<sup>[9]</sup>. The prevalence of *T. palladium* was significantly higher among men ( $p=0.001$ ), similar findings were reported by Moodly P et al<sup>[12]</sup> ( $p=0.03$ ). The high prevalence rate of syphilis in males may be due to extramarital relations from where it spreads to females. These data strongly indicate that some GUD patients are engaged in high risk sexual behavior. In our study the incidence of co- infection of syphilis in HIV sero reactive persons were 45% where as other workers reported it to be 31%.<sup>[17]</sup> It is well known fact that the presence of ulcerative STD increases the transmission of HIV many folds.

## CONCLUSION

It is concluded that HIV prevalence was significantly higher in patients having GUD like syphilis.

Thus screening for HIV antibody prevalence in GUD is likely to help in understanding the reality of spread of HIV infection and indicate that positive syphilis serology is an unbiased criterion for identifying individuals at increased risk of HIV infection.

## REFERENCES

1. World Health Organization. 2001. Global Prevalence and incidence of Selected Curable Sexually Transmitted Diseases: overview and Estimates. WHO/HIV/AIDS/2001.02 World Health Organization, New York. N.Y.
2. Kreiss JK, Combs R, Plummer F, Holmes KK, Nikara B, Cameron W. et al. Isolation of human immunodeficiency virus from genital ulcer in Nairobi prostitutes. *J. Infectious Dis.* 1989; 160: 380-4.
3. Ahmed S, Daver R, Gogate A, Gangakhedkar RR, Gupta SD, Joshi J et al. National AIDS Control Organization.

Guidelines on Prevention, Management and Control of Reproductive Tract infections including Sexually Transmitted Infections, Ministry of Health and Family Welfare, New Delhi, August, 2007:1-60.

4. Farrill No. Genital ulcers, stigma, HIV and STI control in Sub Saharan Africa. *Sex. Transm. Infect.* 2000; 78:143-46.
5. Nigel O' fairel. Targeted interventions required against genital ulcers in African countries worst affected by HIV infection. *Bull World Organ* 2001; 79(6): 569-77.
6. NACO, Laboratory Diagnosis of HIV/AIDS. Specialist's Training and Reference Module. National AIDS Control Organization, Ministry of Health and Family Welfare India, 2002.
7. Spirochetes. In: Ananthanarayan R, Paniker CKJ. Text book of Microbiology. 8<sup>th</sup> ed. India: 2009. p371-386.
8. Bedi BMS. Study on genital ulcer diseases and its association with HIV and HBV infection at Delhi. Abstract book: 7<sup>th</sup> International Congress of Dermatology, 1994. Abstract book: Abstract no. 132:29.
9. Kamali A, Nunn AJ, Mulder DW, Van Dyck E, Dobbins JG and Whit Worth. Seroprevalence and incidence of genital ulcer infection in a rural Ugandan population, *Sexually Transmitted Infections*, 1999; 75(2); 98-102.
10. Mitra K, Roy AK, Dutta PK, Neogi DK. Seroprevalence of concomitant HIV and Syphilitic infections among the STD clinic attending in Calcutta. *Indian J. Dermatol.* 2000; 45(4): 182-5.
11. Maniar JK, Desai V. International Conference on AIDS. Genital ulcer diseases and HIV status correlation in Bombay, India. *Int Conf AIDS*, 1992 Jul 19-24; 8:B172 (abstract no. PoB 3513)
12. Moodley. P, Sturm. PDJ, Vanmali. T. Wilkinson. D, Connolly C and Sturm AW. Association between HIV-I infection, the etiology of genital ulcer disease and response to syndromic management. *Sex. Transm. Dis.* 2003; 30 (3) 241-245.
13. Specialists Training and Reference Module: NACO: Ministry of Health and Family Welfare. Government of India. 2000.
14. Saritha N, Ramani Bai J T, Suprakasan S. Seroprevalence of HIV and Syphilis among high and low risk groups. *The Journal of the Academy of Clinical Microbiologists* 2007; 9 (2) :71-76.
15. Rottingen JA, Cameron DW, Garnett GP: A systemic review of the epidemiologic interactions between classic sexually transmitted disease and HIV: How much really is known? *Sex Transm Dis* 2001; 28:579-597.
16. Girgila PS, Dewan SP, Arora S. HIV antibody sero status in STD patients. Thesis for MD approved by Guru Nanak Dev University, Amritsar, Punjab 1995, 60-111.
17. Jay G.S, Michele R.D, Gupta J, Dharmadhikari A, George R, Seage III, Raj A. Syphilis and Hepatitis B co-infection among HIV infected sex trafficked women and girls, Nepal. *Emerging Infectious diseases*, 2008; 14(6):932-934.