International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Comparing Cd4 Counts in Syphilitic and Non Syphilitic HIV Patients, Luwero District Uganda

Sadala Cassim[a*], Enoch Muwanguzi[b], Richard Apecu Onyuthi[c], Caesar Oyet[d]

[a,b,c]*Mbarara University of Science and Technology, P. O Box 1410, Mbarara Uganda*

[d]*International Health Sciences University, P. O Box 7782, Kampala Uganda*

[a]*Email: sadycasy@gmail.com*

[b]*Email: muwanguzienoch@gmail.com*

[c]*Email: apecurich@yahoo.co.uk*

[d]*Email: coyet@ihsu.ac.ug*

Abstract

Close to 12 million people living with Human Immunodeficiency Virus (HIV) infection were infected with syphilis in 2004. Most of these infections occurred in developing countries with sub-Saharan Africa and South East Asia dominating. The global efforts to tackle syphilis infection are mostly aimed at pregnant women yet such kind of localized interventions leave other susceptible individuals at risk of infection leaving great public and clinical impact.

The aim of our study was to compare CD4 counts in HIV positive syphilis negative and syphilis positive Highly Active Antiretroviral therapy (HAART) naïve patients. The study was approved by Research and Ethic Committee and Institutional Review Committee of Mbarara University of Science and Technology. We recruited 212 HIV positive participants and blood samples were collected for CD4 count, Rapid Plasma Reagin (RPR) and *Treponema Pallidum* Haem Agglutination (TPHA) tests. The data was analyzed using STATA 12.0E (STATACORP LP TEXAS USA). 95% confidence level was used and where a predictor and outcome are compared, a p-value of < 0.05 was considered significant.

---

* Corresponding author.

Our study recorded a high prevalence (11.3%, 95% CI: 9.2 – 14.8%) of syphilis in HIV HAART naïve patients. The current study reports lower CD4 count in syphilis positive HIV patients (mean 318/µl) compared to syphilis negative HV positive patients (mean 656/µl), p value < 0.0001.

As a conclusion; there is high prevalence of syphilis – HIV co-infections in Uganda. Syphilitic HIV patients tends to have lower CD4 counts compared to non syphilitic HIV patients.

Keywords: HIV; syphilis; CD4; HAART naïve; coinfection.

1. Introduction

There have been a rise in prevalence of syphilis in HIV positive individuals [1] with many unreported or undiagnosed cases [2]. This have created a public health concern as both diseases though transmitted in similar ways may expose affected individuals to devastating morbidity and mortality [3-4]. The global prevalence of HIV and syphilis co – infection have been rising [5] and developing countries are more affected [6-7]. An estimated 12 million HIV positive people were infected with syphilis in 2004 of which about 70% were in sub-Saharan Africa and South East Asia [8-9]. The global efforts to tackle syphilis infection mostly aimed at pregnant women and such kind of localized interventions leave other susceptible individuals at risk of infection leaving syphilis to gain significant public and clinical impacts [10].Different countries show different seroprevalence of syphilis HIV co-infection, for example the prevalence varies from 5% in Thailand to 12.9% in Turkey [11-13]. Uganda have reported varied prevalence of HIV syphilis co-infection with some studies reporting up to 64.3% [14-18]. The course of syphilis infection in HIV-positive patients differ from that in HIV negative patients and is associated with an increase in viral load and reduction in CD4 cell count [19]. This precipitates the progression of HIV infection and can lead to early death in HIV patients. In Uganda, syphilis is routinely screened only in pregnant women. This leaves other groups with danger of emerging syphilis prevalence. HIV positive individuals are not screened for syphilis unless they present with signs and symptoms of syphilis infection. This practice however leaves HIV patients to battle with many complications resulting from the deleterious effect of syphilis which would be easier. Syphilis will later if not treated in time accelerate progression of HIV infection to AIDS. Early diagnosis and treatment of syphilis in HIV patients may prevent infection-associated complications in most instances. Consequently, prevention of syphilis and other sexually transmitted diseases is of great importance for patients infected with HIV. The study therefore was conducted to establish the prevalence of HIV and syphilis co – infection and to compare CD4 levels in syphilitic and non syphilitic HIV patients.

2. Methods

The study was approved by Research and Ethic Committee and Institutional Review Committee of Mbarara University of Science and Technology. We recruited two hundred and twelve HIV positive males and females attending Makulubiita Health Centre III between March and July 2015. Questionnaires were used to collect demographic data. Ten (10) millitres of venous blood was collected from each consented participant into a plain vacutainer and EDTA^{TM} vacutainer (BD plain tube^{TM}, New Jersey USA). Blood in the plain vacutainers were allowed to clot for 30 minutes before serum could be separated. Blood in the EDTA was used for CD4 count.

The CD4 counts were measured using PIMA™ machine (Alere™, USA) following manufactures' user manual and results reported in counts/ml of blood. Serum samples were screened for syphilis serostatus using RPR (Cypress diagnostics, Hulshout, Belgium) and all serum samples were subjected to confirmation using TPHA (Cypress diagnostics, Hulshout, Belgium) irrespective of the RPR result. The data was analyzed using STATA 12.0E (STATACORP LP TEXAS USA). Chi square test was used to compare categorical variables and students' t-test was used to compare continuous variables. 95% confidence level was used and where a predictor and outcome are compared, a p-value of < 0.05 was considered significant.

3. Results

We recruited 212 males and females aged between 18 and 70 years. The mean age of the participants was 38 years with the mean age for males being 36 years (95% CI 30 – 41 years), the mean age for female participants was 39 years (95% CI 34 – 43 years). The smallest age of the participants was 19 years and the largest age was 65 years.

The general prevalence of syphilis (denoted as TPHA positive) was 24 (11.32%, 95% CI: 9.2 – 14.8%), table 1.1

Table 1.1: Syphilis serostatus (n=212)

	RPR		TPHA		P – value
	Negative	Positive	Negative	Positive	
Males	48	13	53	8	0.0356
Females	131	20	135	16	

Table 1.2: Comparing RPR in syphilis screening (n=212)

	Positive syphilis (TPHA positive)		
	Yes	No	Total
RPR positive	24	9	33
RPR negative	2	177	179
Total	26	188	212

Sensitivity of RPR: 92%; Specificity of RPR: 94%. PPV: 72.7% and the NPV: 99%

The mean CD4 count for syphilitic participants was 318/µl (95% CI 222 – 414/µl) and the mean CD4 count for non syphilitic participants was 656/µl (95% CI 611 – 700/µl), p value < 0.0001. However, the mean CD4 count of male participants was 509/µl (95% CI 461 – 557/µl) and that of female participants was 661/µl (95% CI 605 – 718/µl) p value 0.0015.

4. Discussion

In the last decade, patients with HIV infection have had an increased incidence of not only early syphilis but also other STDs, primarily due to a resurgence of high-risk sexual behaviours. A longitudinal study conducted among US military personnel found that 5.8% of 4239 newly diagnosed HIV infections also had serological evidence of syphilis infections [20]. Most countries including Uganda have not adopted screening for syphilis when testing for HIV or during HIV disease progression monitoring. This has left syphilis co infection in HIV unchecked yet there are profound medical and public health impact of this negligence. Our study recorded a high prevalence (11.3%) which was comparative to that of a cohort conducted in Mozambique where the prevalence of syphilis among HIV positive HARRT naïve individuals was 16.7% [21]. However, other studies have reported much higher seroprevalence of syphilis in HIV positive HARRT naïve individuals. A study in Ethiopia for example showed a seroprevalence of 38% [22] of HIV positive HAART naïve individuals (blood donors). Interactions between syphilis and HIV infection are not fully documented in HIV positive HAART naïve individuals. But several studies have found link between syphilis infection in HIV-positive individuals and reduced CD4 cell count [19, 23]. The current study found out that CD4 count was lower in syphilitic HIV patients (mean 318/µl) compared to non syphilitic HV patients (mean 656/µl). Several studies across the globe [24-27] found similar trend, yet this would mean HIV positive patients infected with syphilis will progress rapidly to AIDS (as a result of low CD4 count), a morbidity that will leave many of them suffering from constant opportunistic infections [28-29] and increases their mortality rate [30-31].

5. Conclusion

Syphilis co-infection with HIV is common among HIV positive patients in Uganda. Blood CD4 cell count is lower in syphilitic HIV positive patients compared to non syphilitic HIV patients. This means syphilis affect CD4 counts in HIV patients negatively.

6. Recommendations

Syphilis screening should be incorporated into the national HIV screening and testing program. Patients living positively with HIV should have mandatory routine syphilis screening for early diagnosis and treatment of the condition.

Acknowledgement

We acknowledge the contribution of Mr. Webo Fred, our research assistant and the entire staff of Mbarara University for supporting the study

References

[1] M. E. Patton, et al., "Primary and secondary syphilis--United States, 2005-2013," MMWR. Morbidity and Mortality Weekly Report, vol. 63, pp. 402-6, May 9 2014.

[2] CDC, "Morbidity and Mortality Weekly Report (MMWR): Primary and Secondary Syphilis — United States, 2005–2013," Centre for Disease Control and Prevention, vol. May 9, 2014 / 63(18);402-406, 2015.

[3] M. Endris, et al., "Seroprevalence of syphilis and human immunodeficiency virus infections among pregnant women who attend the University of Gondar teaching hospital, Northwest Ethiopia: a cross sectional study," BMC Infect Dis, vol. 15, p. 111, 2015.

[4] A. A. Moura, et al., "Prevalence of syphilis, human immunodeficiency virus, hepatitis B virus, and human T-lymphotropic virus infections and coinfections during prenatal screening in an urban Northeastern Brazilian population," International Journal of Infectious Diseases, vol. 39, pp. 10-5, Oct 2015.

[5] S. Dougan, et al., "Sexually transmitted infections in Western Europe among HIV-positive men who have sex with men," Sexually Transmitted Diseases, vol. 34, pp. 783-90, Oct 2007.

[6] M. Melku, et al., "Magnitude of HIV and syphilis seroprevalence among pregnant women in Gondar, Northwest Ethiopia: a cross-sectional study," HIV AIDS (Auckl), vol. 7, pp. 175-82, 2015.

[7] S. E. Msuya, et al., "Prevalence of sexually transmitted infections among pregnant women with known HIV status in northern Tanzania," Reprod Health, vol. 6, p. 4, 2009.

[8] S. C. Kalichman, et al., "Prevalence of Sexually Transmitted Co-Infections in People Living with HIV/AIDS: Systematic Review with Implications for using HIV Treatments for Prevention," Sexually Transmitted Infections, vol. 87, pp. 183-90, Apr 2011.

[9] W. A. Lynn and S. Lightman, "Syphilis and HIV: a dangerous combination," Lancet Infect Dis, vol. 4, pp. 456-66, Jul 2004.

[10] WHO, "The global elimination of syphilis: rationale and strategy for action. Geneva, Switzerland: World Health Organization; 2007.," 2007.

[11] O. A. Aydin, et al., "Seroprevalence and risk factors of syphilis among HIV/AIDS patients in Istanbul, Turkey," Central European Journal of Public Health, vol. 23, pp. 65-8, Mar 2015.

[12] S. Kukanok and S. Kiertiburanakul, "Prevalence of positive syphilis serology among HIV-infected patients: role for routine screening in Thailand," Southeast Asian Journal of Tropical Medicine and Public Health, vol. 45, pp. 435-41, Mar 2014.

[13] L. Lopes, et al., "[Syphilis: Prevalence in a Hospital in Lisbon]," Acta Medica Portuguesa, vol. 29, pp. 52-5, Jan 2016.

[14] E. J. Kim, et al., "Sexually transmitted infections associated with alcohol use and HIV infection among men who have sex with men in Kampala, Uganda," Sexually Transmitted Infections, Sep 30 2015.

[15] M. O. Osinde, et al., "Sexually transmitted infections in HIV-infected patients in Kabale Hospital, Uganda," J Infect Dev Ctries, vol. 6, pp. 276-82, Mar 2012.

[16] Y. C. Manabe, et al., "Integration of antenatal syphilis screening in an urban HIV clinic: a feasibility study," BMC Infect Dis, vol. 15, 2015.

[17] G. W. Rutherford, et al., "University students and the risk of HIV and other sexually transmitted infections in Uganda: the Crane survey," Int J Adolesc Med Health, vol. 26, pp. 209-15, 2014.

[18] T. Shimelis, et al., "Syphilis among people with HIV infection in southern Ethiopia: sero-prevalence and risk factors," BMC Infect Dis, vol. 15, 2015.

[19] O. Kotsafti, et al., "Early syphilis affects markers of HIV infection," International Journal of STD and AIDS, Jun 24 2015.

[20] A. Ganesan, et al., "Results of a 25-year longitudinal analysis of the serologic incidence of syphilis in a cohort of HIV-infected patients with unrestricted access to care," Sexually Transmitted Diseases, vol. 39, pp. 440-8, Jun 2012.

[21] C. R. Pearson, et al., "Modeling HIV transmission risk among Mozambicans prior to their initiating highly active antiretroviral therapy," AIDS Care, vol. 19, pp. 594-604, May 2007.

[22] B. Tessema, et al., "Seroprevalence of HIV, HBV, HCV and syphilis infections among blood donors at Gondar University Teaching Hospital, Northwest Ethiopia: declining trends over a period of five years," BMC Infect Dis, vol. 10, p. 111, 2010.

[23] V. Spagnuolo, et al., "Predictors of lack of serological response to syphilis treatment in HIV-infected subjects," J Int AIDS Soc, vol. 17, p. 19654, 2014.

[24] R. Palacios, et al., "Impact of syphilis infection on HIV viral load and CD4 cell counts in HIV-infected patients," Journal of Acquired Immune Deficiency Syndromes, vol. 44, pp. 356-9, Mar 1 2007.

[25] W. Jarzebowski, et al., "Effect of early syphilis infection on plasma viral load and CD4 cell count in human immunodeficiency virus-infected men: results from the FHDH-ANRS CO4 cohort," Archives of Internal Medicine, vol. 172, pp. 1237-43, Sep 10 2012.

[26] K. Buchacz, et al., "Syphilis increases HIV viral load and decreases CD4 cell counts in HIV-infected

patients with new syphilis infections," AIDS, vol. 18, pp. 2075-9, Oct 21 2004.

[27] K. Kofoed, et al., "Syphilis and human immunodeficiency virus (HIV)-1 coinfection: influence on CD4 T-cell count, HIV-1 viral load, and treatment response," Sexually Transmitted Diseases, vol. 33, pp. 143-8, Mar 2006.

[28] J. N. Jarvis, et al., "Is HIV-associated tuberculosis a risk factor for development of cryptococcal disease?," AIDS, vol. 24, pp. 612-4, Feb 20 2010.

[29] J. L. Castilho, et al., "CD4+/CD8+ ratio, age, and risk of serious noncommunicable diseases in HIV-infected adults on antiretroviral therapy," AIDS, vol. 30, pp. 899-908, Mar 27 2016.

[30] F. Caby, et al., "Determinants of a Low CD4/CD8 Ratio in HIV-1-Infected Individuals Despite Long-term Viral Suppression," Clinical Infectious Diseases, vol. 62, pp. 1297-303, May 15 2016.

[31] M. T. May, et al., "Mortality according to CD4 count at start of combination antiretroviral therapy among HIV positive patients followed for up to 15 years after start of treatment: collaborative cohort study," Clinical Infectious Diseases, Mar 29 2016.