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RESEARCH ARTICLE

PREVALENCE OF HUMAN T-CELL LYMPHOTROPIC VIRUS AMONG HIV PATIENTS IN MANGU LOCAL GOVERNMENT, PLATEAU STATE

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ABSTRACT

Background: Human T-cell Lymphotropic Virus (HTLV) is a retrovirus associated with depression of the immune system. Patients with dual human T-cell lymphotropic virus (HTLV-1) and HIV infections may present with a more serious stage of HIV disease especially at their first medical examination than patients with HIV infection alone, hence the reason for the study.
Methodology: The research involved 180 Human Immune Deficiency Virus (HIV) positive individuals. Five (5) mls of blood was collected in EDTA container from each of them and the plasma were tested using ELISA method.
Result: The prevalence of HTLV among HIV positive individuals discovered in the study was 0.6 %. The study also revealed that the only positive sample tested was from a 40 year female subject.
Conclusion: infection with HTLV poses a great threat to HIV positive individuals whose immunity has already been altered

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INTRODUCTION

Human T-cell Lymphotropic Virus (HTLV) is a retrovirus associated with depression of the immune system. Several different retroviruses are classified in the HTLV family, including HTLV-I and HTLV-II. The differences between the various HTLVs are primarily related to geographic distribution and the precise effects of the virus on the body (Smith, 2012). HTLV-1 is the causative agent of adult T cell leukemia/lymphoma (ATLL) and HTLV-I-associated myelopathy/tropical spastic paraparesis/ (HAM/TSP) (Osame *et al*., 1986). Cases of ATLL and HAM/TSP can be found in all endemic areas, but prevalence and incidence rates vary substantially across geographic areas (Proietti *et al*., 2005). The vast majority of infected persons are thought to remain asymptomatic and only a small fraction of them develops ATLL or HAM/TSP. It is estimated that HTLV-I carriers have a < 2% risk of developing HAM/TSP and ~5% lifetime risk of developing ATLL when infected before the age of 20 (Manns *et al*., 1999). HAM/TSP is a debilitating illness of slow and progressive onset, characterized by spastic paraparesis.

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Although most HTLV-I-infected persons do not develop any complications, there are recent data showing an increased prevalence of erectile dysfunction, bladder function abnormalities, and peripheral neuropathy in HTLV-I carriers who do not fulfil the WHO diagnostic criteria of HAM/TSP (Castro *et al*., 2003). HTLV-I infection has also been linked to other clinical manifestations, but the spectrum of diseases caused by HTLV-I remains unclear. There is increasing evidence that HTLV-I infection might be associated with inflammatory conditions such as uveitis, Sjogren's syndrome, polymyositis, lymphocytic alveolitis, and arthritis (Murphy *et al*., 2004). It has also been associated with infectious complications (Marsh, 1996): infective dermatitis in children (LaGrenade *et al*., 1990), increased carriage of Strongyloides stercoralis and high risk of disseminated strongyloidiasis (Carvalho and Porto, 2004), and increased incidence of bladder or kidney infection (Murphy *et al*., 2004).

HTLV-I differs morphologically and genetically from HIV and does not cause the acquired immune deficiency syndrome (AIDS) (Cabrea *et al*., 2000). Rather, HTLV-I has become the subject of intense research because of its association with ATLL and TSP/HAM. ATLL is an aggressive T-cell malignancy, while TSP/HAM is a chronic neurologic disorder

characterized by the insidious onset of spastic lower extremity paresis with relentless progression (Caskey *et al*., 2008). In endemic areas, HTLV-1 seropositivity is clustered in families, especially among women, suggesting that transmission occurs more easily from men to women than from women to children. HTLV-1 is the more clinically significant of the two, as it has been proven to be the etiologic agent of multiple disorders. Mortality and morbidity due to HTLV infections are primarily associated with diseases caused by HTLV-1. Infected individuals have a cumulative lifetime risk of 1-4% of developing ATL or HAM/TSP (Proietti *et al*., 2005). The latency period for ATL is typically 30-50 years. ATL is usually rapidly progressive and fatal, with a median survival time of 2 years (Yasunaga and Matsuoka, 2007). HAM/TSP can occur as early as 3 months after blood transfusion–related HTLV-1 infection. Three years of latency is more typical, and 20-30 years is possible. Case reports have linked HTLV-2 infection with pneumonia, bronchitis, arthritis, asthma, and dermatitis (Zunt *et al*., 2006).

The prevalence of HTLV-1 and HTLV-2 infections increases with advancing age. The onset of ATL or HAM/TSP is often delayed until later in life because of the prolonged latency state; vertical transmission is associated with an elevated risk of ATL or HAM/TSP (Szczypinska, *et al.,* 2012). Patients with dual HIV and human T-cell lymphotropic virus (HTLV-1) infections may present with a more serious stage of HIV disease at their first medical examination than patients with HIV infection alone, which may be due to patient age and diagnostic circumstances (William, 2012). Chavance and co-researchers reviewed the medical records of 774 HIV-infected people, 65 of whom were also infected with HTLV-1. Approximately 48% of patients with dual infections presented with HIV symptoms at their first medical examination compared with 26.5% of patients with HIV infection alone. Most patients with dual infections were diagnosed because of HIV symptoms or through screenings at sexually transmitted diseases clinics (Chavance *et al*., 1995).Studies also showed that coinfection of HIV-1with HTLV-1 induced viral replication in the latent viral reservoirs (Permanyer, 2012)

Human T-cell lymphotropic virus type I (HTLV-I) was the first human retrovirus identified (Poiesz *et al*, 1980). It is estimated that 15–20 million people live with HTLV-I infection worldwide. High prevalence rates are found in a few areas such as Japan, parts of West Africa, Caribbean Islands, and South America (Proietti *et al*., 2005). In Brazil, the highest prevalence is found in Salvador, the capital of the state of Bahia (1.76% in the overall population) (Dourado *et al*., 2003). Several individual behaviors and exposures have been associated with HTLV-I seropositivity, corresponding to the known modes of transmission: from mother to child, predominantly through breastfeeding; via sexual intercourse and via parenteral transmission by transfusion of infected cellular blood products or sharing of needles and syringes (Manns *et al*., 1999) Although the biological mechanism of transmission still needs to be clarified, infected cells seem to be essential for transmission, whether the exposure to the virus is through blood, sexual contact or breastfeeding. HTLV-I endemic areas are in the tropics, infection tends to cluster among families and neighbours and a decline in seroprevalence are observed in subsequent generations of people migrating from endemic to nonendemic areas (Miller *et al.*, 1994). These observations strongly suggest the presence of biological or social cofactors influencing HTLV-I transmission (Maloney *et al*., 1991). The highest rates of HTLV-1 transmission are due to breastfeeding, and in southern Japan, the overall infection rate of breastfed children by HTLV-1-carrier mothers is estimated at 10–30%. Mother to child transmission occurs in 20% of offspring from an infected mother, and has been related to mother's proviral load, high antibodies titers and prolonged breastfeeding (Kinoshita *et al.,* 1984 and Ureta-Vidal *et al.,* 1999). Studies by Forbi and Odetunde (2007) on pregnant women in south west Nigeria also indicated that 16.7% of them were found to have antibodies against HTLV. Postnatal infection by breastfeeding seems to play the most important role in horizontal transmission.

Treatment is primarily focused on managing the conditions associated with HTLV, since no cure has been developed (Smith, 2012). A combination of interferon-alpha and zidovudine had been reported to be effective in treating ATL patients. A combination of zidovudine, danazol, and Vitamin C is used in providing temporary relief for TSP patients. There is no established treatment program for HAM/TSP, although some patients may be given steriods. Clinical studies using interferon-alpha and plasmapherisis have not shown significant patient improvement. Spasticity may be treated with baclofen or tizanidine. Urinary dysfunction should be treated with self-catheterization or oxybutynin (Machigashira *et al*., 2012). Therapies studied include corticosteroids plasmapherisis, cyclophosphamide and interferon, which may produce a temporary symptomatic improvement in myelopathy symptoms. Valproic acid has been studied to determine if it might slow the progression of HLTV disease by reducing viral load. Screening of blood donations for HTLV-I should be routinely carried out both in low and high prevalence areas in order to prevent infection and spread of the virus. Antenatal screening for HTLV-1 antibody should be carried out for pregnant women so that those who are positive should be advised not to breastfeed their infants (HPA, 2012).

MATERIALS AND METHODS

One hundred and eighty (180) volunteered HIV positive patients of age from eighteen (18) months and 70 years drawn from the General hospital Mangu (n=90) and COCIN hospital Panyam (n= 90), Plateau state, Nigeria, were used for the study. Both sexes (men – 135, women – 45) were involved in the research work. Questionnaires were administered to consenting subjects while 4mls of blood were also collected in an EDTA vacutainer tubes from each of them. The serum was separated and tested for the presence of HTLV antibody using: an Anti- HTLV1/2 ELISA kit (By Diagnostic Automation Incorporation, Calabasaa. Cat # No. 8196-12). The assay was carried out using the kit manufacturer's instructions with the controls being tested concurrently with the test samples.

RESULTS

The 180 subjects tested neither involved in intravenous drug use nor practiced same sex. However, none of the subjects that used condom during sexual intercourse was tested positive for

HTLV (Tables 1). There was only 1(0.6%) subject that was tested positive for HTLV indicating the prevalence rate of 0.6% (Table 2). The results showed a 0.6% coinfection rate between HTLV and HIV in the study conducted. The only HTLV positive sample was from a 40 year old female patient attending COCIN hospital Panyam with none from the General hospital Mangu, Plateau State, Nigeria (Table 3).

Table 1. Seroprevalence of HTLV by Risk Factors Among HIV Patients in Mangu Local Government, Plateau State

Risk Factors	No Tested	HTLV Positive	% Positive
Use of Condom			
Yes	115	0	0
No	65	1	0.6
No. of Sex Partner			
0	39	0	0.0
1	125	1	0.6
≥ 2	16	0	0
Heterosexual			
Yes	180	1	0.6
No	0	0	0.0
	Kissing		
Yes	82	0	0
No	98	1	0.6
Intravenous Drug Use			
Yes	0	0	0.0
No	180	1	0.6

Table 2. Seroprevalence of HTLV Based on Sex in Mangu Local Government, Plateau State

Sex	No Tested	HTLV	%Positive	X	P-Value
Male	45	0	0.0	0.00	0.992
Female	135	1	0.6	0.08	0.772
Total	180	1	0.6	0.00	0.992

Table 3. Distribution of HTLV Among HIV Patients in the Two Hospitals studied

Hospital	Viruses	No Tested	No Positive	HTLV% Prevalence
Panyam	HTLV	90	1	1.1
Mangu	HTLV	90	0	0.0

Table 4. Seroprevalence of HTLV According to Age Group in Mangu Local Government, Plateau State

Age Group	No Tested	No Positive	% Positive
1-5	5	0	0.0
6-10	1	0	0.0
11-15	0	0	0.0
16-20	3	0	0.0
21-25	19	0	0.0
26-30	38	0	0.0
31-35	38	0	0.0
36-40	31	1	0.6
41-45	16	0	0.0
46-50	15	0	0.0
51-55	6	0	0.0
56-60	5	0	0.0
61-65	0	0	0.0
66-70	3	0	0.0

DISCUSSION

The research investigated the prevalence of HTLV-1/2, among HIV patients in Mangu Local Government Area of Plateau State, Nigeria. Similar studies have been done in countries such as Brazil and Mozambique and even in the south western part of Nigeria. However, the prevalence data about HIV patients on this viral agent is not common in Nigeria. The low prevalence rate of 0.6 % of HTLV-1/2 among HIV positive subjects observed in this study agrees with the work done by Afiono *et al*., 2013, who had a prevalence rate of 1.3% in a study among drug abuser inmates in Central Javan, Indonesia. In this study, no patient has had a history of a receipt of influenza vaccine within the period under study and therefore there was no case of false positive HTLV due to influenza vaccination. This concurs with the report by the centre for disease control (CDC, 1993), that serologic tests for HTLV-1 among blood donors following influenza vaccination gave false positive HTLV results. Condom use was likely the reason for the low rate of acquisition or transmission of HTLV-1/2 among the subjects.

This might be possible because HIV positive patients are always provided with condoms and counselling in the clinics on the need to avoid acquisition and spread of resistant HIV strains and other infections that could worsen their conditions. The result could also be attributed to the low number of people infected with HTLV in Plateau State and Nigeria at large. In this study, it was shown that the only positive patient was a female of forty (40) years old. This research is consistent with the work done by CDC, 2003 who reported that the seroprevalence of HTLV tend to increase with age and that in elderly groups, the rates are generally higher among women. Though, scientific documentation to back up this assertion has not been made available. The result however, is not statistically significant. To compare the HTLV seroprevalence between the two hospitals, General hospital Mangu has 0.0% while COCIN hospital Panyam recorded 0.6%. The difference however is not significant; it could just be due to research coincidences.

Conclusion

The study shows that HTLV prevalence among HIV positive individuals is low in Mangu Local Government area of Plateau State, Nigeria. Coinfection of HIV with HTLV can cause more deadly consequences with complications that could result to diseases such as; adult T-cell leukemia and HTLV-1 associated myelopathy/Tropical spastic paraparesis. However, with early detection and treatment the disease can be better managed.

Recommendation

HIV patients and blood donors should be screened routinely for HTLV considering the debilitating nature of the diseases it cause.

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