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Ocular manifestations of HIV in patients attending selected centers in Khartoum State

Abstract

Aims: To detect the ocular manifestation of Human Immunodeficiency Virus infection/ Acquired immunodeficiency syndrome (HIV/AIDS) in Khartoum state-Sudan.

Methods: This study was carried out in voluntary counseling and testing centers in Omdurman and the Military hospitals. 50 patients with HIV/AIDS were asked to fill a questionnaire and underwent a full ophthalmic examination.

Results: Mainly the disease and so the ocular manifestations affect youth; the mean age is 34years. Male 52%, female 48%, 52 are married, 26% unmarried, the rest are divorced or widowed. Only 48% presented with ocular symptoms. The most common manifestation found to be HIV retinopathy and HIV conjunctiva Microvasulopathy 32% 30% respectively. Kaposi sarcoma 6%, KCS10%, molluscum Contagiosum 6%, HZO 10%, Keratitis 8%, iritis 4%,CMV retinitis 6%, toxoplasmosis and orbital cellulitis 2% for each. CD4 count was 500 cells/µl or more in 14%, 200-499 cells/µl in most cases 54% and <200 cells/µl in 32% and include those who have severe complications like CMV retinitis.

Conclusion: Ocular manifestations of HIV/AIDS are common and may be asymptomatic. Ophthalmic examinations of all HIV/AIDS patients are recommended.

Keywords: AIDS, ocular manifestations, CD4, CMC retinitis, Sudan, Khartoum state

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Abbreviations: AIDS, acquired immunodeficiency syndrome; HIV, human immunodeficiency virus; HZO, herpes zoster ophthalmicus; KS, kaposi sarcoma; VZV, varicella-zoster virus; HSV, herpes simplex virus keratitis; IRU, immune recovery uveitis; HAART, highly active antiretroviral agents; TB, tuberculosis; TUBT, tear film breakup time

Introduction

Acquired immunodeficiency syndrome (AIDS) is a non-curable viral disease that caused by Human Immunodeficiency Virus (HIV).[1] AIDS affected since the beginning of the HIV epidemic, almost 78 million people and about 35 million people were living with HIV at the end of 2013.[2]

Virology and epidemiology

Human Immunodeficiency Virus (HIV) which is a retrovirus member of the Lentivirinae family. Retroviruses are enveloped RNA viruses characteristically possessing RNA-dependent DNA polymerase termed reverse transcriptase. Two types of virus are known to causes AIDS; HIV-1 and is found worldwide and HIV-2 which is confined to African. In its extracellular form, the virus exists as a lipid-encoated cylindrical nucleocapsid which contain the binding region(glycoprotein [gp] 120) that attaches to the CD4 receptor on host cells (T-lymphocyte helper cells, activated monocytes and macrophages, and glial cells). After fusing with the cell membrane and entering the cytoplasm, the virus loses its envelope, and reverses transcription of RNA to DNA occurs.[1]

The most profound consequence of HIV infection is impairment of cell-mediated (T cell) immunity. HIV binds directly to the CD4 receptor of the T helper cell, resulting in progressive depletion of this T-cell population.[1] Sub-Saharan Africa remains most severely affected area, with nearly 1 in every 20 adults living with HIV and accounting for nearly 71% of patients, worldwide.[2] Sudan has the biggest AIDS epidemic in Middle East and North Africa. The estimated number of people living with HIV/AIDS in Sudan is 35000 people (2005) and 53000 (2014). Adults aged 15 and up living with HIV are 49,000, while women are 23,000 and Children aged 0 to 14 living with HIV are 4,300.[3]

Ocular manifestations of AIDS

The presentation of ocular HIV infection is very variable. These ocular manifestations include; HIV-related microangiopathy, opportunistic (viral, bacterial, and fungal infections), Kaposi sarcoma, lymphomas (involving the retina, adnexal structures, and orbit) and squamous cell carcinoma of the conjunctiva.[4] Herpes Zoster Ophthalmicus (HZO) affects about 5-15% of HIV patients mostly from the reactivation of latent VZV infection. Infectious and inflammatory changes that occur as consequence of HZO can affect almost all ocular layers, adnexa and orbital tissues. These processes may manifest as a keratitis or vasculitis, iritis, ischemic papillitis or retrobulbar optic neuritis, and orbital vasculitis. Cranial nerve palsies have been reported in as many as 33% of cases of HZO; the third cranial nerve being the most frequently affected.[4,5] Kaposi sarcoma (KS) is a multifocal, malignant sarcoma affecting 10% of patients with AIDS of which 20% show ophthalmic involvement. Adnexal involvement typically occurs late but also may be the initial manifestation of AIDS. Orbital involvement can cause proptosis, ptosis, eyelid edema, and ocular nerve palsies.[4,5]

In patients with AIDS, Molluscum contagiosum lesions are larger, bilateral, more rapid in onset, and more numerous than in general population. Resistance to standard therapies is higher.

Chronic follicular conjunctivitis frequently is present.[4,5] Conjunctival microvasculopathy are commonly seen in HIV-positive patients during the course of the disease. These changes include segmental vascular dilation and narrowing, microaneurysm, and comma-shaped vascular fragments.[4,5] More than 50% of HIV patients manifest anterior segment complications, including keratoconjunctivitis sicca, keratitis, and iridocyclitis. Dry eyes are seen in about 10-20% of HIV patients, usually during later stages of the disease. Varicella-zoster virus (VZV) keratitis occurs in fewer than 5% of HIV patients. Herpes simplex virus keratitis (HSV) prevalence is higher in HIV patients compared to the general population. Candida species are the most common fungal organisms causing keratitis in HIV-positive patients, especially in intravenous drug users.[4,5]

Posterior segment involves in more than 50% of patients who are HIV positive. Cytomegalovirus retinitis is the most common cause of intraocular infection in patients with AIDS. The reactivated CMV infection is responsible for the vision and life-threatening complications of this infection. Reactivation of the latent CMV is commonly seen in patients with a $CD4^+$ count less than 100 cells/μL. Immune recovery uveitis (IRU) is the Highly Active Antiretroviral Agents (HAART) - dependent inflammatory response that may occur in up to 63% of patients with regressed CMV retinitis and elevated CD4 counts and is associated with vision loss from epiretinal membrane, cataract, and cystoid macular edema. HIV Retinopathy is the most common retinal pathology in HIV patients, occurring in up to 70% of cases often manifesting as retinal hemorrhages, microaneurysms, cotton-wool spots.[4,5]

HIV retinal Microvasulopathy occurs in as many as 50-70% of HIV patients. However, the increased use of the HAART has lowered the prevalence of the retinal Microvasulopathy seen in these patients.[4,5] Tuberculosis (TB) still represents a significant cause of granulomatous uveitis in patients who are HIV positive and account for close to 90% of new cases of ocular tuberculosis. Complications of TB include conjunctivitis, oculoglandular syndrome, interstitial keratitis, phlyctenular keratitis, anterior uveitis (most common), endophthalmitis, scleritis, chorioretinitis, disseminated choroiditis, choroidal neovascularization, and optic atrophy.[4,5] The Toxoplasmosis lesions in patients with AIDS are larger in size and bilateral in up to 40% of cases. Solitary, multifocal, and miliary patterns of retinitis have been observed.[4]

Material and methods

This is centers and hospitals based cross section, descriptive study done in Khartoum state from December 2006 to June 2008. Patients who were attended VCT centers and Omdurman teaching hospital and the military hospital were selected. Fifty patients (50) (100 eyes) were randomly targeted. They were above 18 years old and have HIV/AIDS. Data was collected by filling questionnaire papers about age, sex, complain, ocular and medical history, investigation done and diagnosis. Then we did complete eye examination for all patients, with slit lamp, and including visual acuity, intraocular pressure, Schirmer's-1 test, tear film breakup time (TUBT) and fluorescein staining. Diagnosis of ocular diseases was clinically by symptoms and signs and diagnostic tests. CD4 count was done for all patients. Biopsy for suspected cases of Kaposi sarcoma was carried out. Statistic analysis was done by SPSS system and weighting the data with the age (age-adjusted) for the Pearson chi-square tests (p-value).

Results general characteristic of the groups

The age of the study group ranged 19-40 years with a mean±standard deviation of 30±12 years. Because of the sample size, the study group was divided according to the age into two groups only, group 1 from 19 to 29 years old and group 2 from 30 to 40 years. The number of males was 27 (54%) and the number of the females was 23 (46%) patients. Fifty tow percent are married, 22% divorced and 26% unmarried.

Discussion

As far as we know, no studies except one study have been undertaken to explore the different ocular manifestations of HIV/AIDS in Sudan. The mean of age of the patients was 30 years which is near to that found by Abdeen WMA 34 year (range 25-43)[6] and DK Sahu et al.,[7] Our results concerning the originally states of the patients are different from that found by Abdeen WMA[6] most have lower percent. The states of lower percents were southern states 18% (Abdeen WMA -23.3%), western states 18% (Abdeen WMA -23.3%),[6] central states 16% (Abdeen WMA -20%) and the percent of patients from others countries was low 10% (Abdeen WMA -20%).[6] While the eastern states was found to be higher 14% (Abdeen WMA -6.7%),[6] Khartoum state14% and northern states 10% are not included separately in the others studies. These differences may be due to the developments of AIDS centers in the others states(Tables 1–3).

Table 1 Shows the distribution of patients according to their original state

Original state	Number of patients	Percent
Khartoum	7	14
Central States	8	16
North States	5	10
East States	7	14
West States	9	18
South State (before separation)	9	18
Others Countries	5	10
Total	50	100

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Table 2 Shows frequencies of and p-value of ocular manifestation and CD4 count of HIV patients

Disease	No	p-value
Kaposi's Sarcoma	3	0
Molluscum Contagiosum	3	0
HZO	5	0
Conjunctival Microvasulopathy	16	0
KSC	5	0
Keratitis	4	0
Iritis	2	0
HIV Retinopathy	15	0.005
CMV Retinitis	3	0
Toxoplasmosis	1	0
Orbital Cellulitis	1	0

Table 3 Shows ocular manifestation of HIV patients according to their CD4 count

Disease	CD4 count		
	500 cells/μL	200-499 cells/μL	<200 cells/μL
Kaposi's Sarcoma	0	1	2
Molluscum Contagiosum	2	1	0
HZO	0	2	3
Conjunctival Microvasulopathy	4	12	0
KSC	0	2	3
Keratitis	0	1	3
Iritis	0	1	1
HIV Retinopathy	2	12	1
CMV Retinitis	0	0	3
Toxoplasmosis	0	0	1
Orbital Cellulitis	1	0	0

HIV retinopathy and conjunctival Microvasulopathy were the most common 30% and 32% respectively, they are less percentages comparing to 50% and 80% found in a study by ET Cunningham et al.,[8] this may be caused by the effect of treatment took by our patients which increase the CD4 count and decrease the viral load. CMV retinitis was found to be 6% comparing to 10% founded by DA Jab in johns Hopkins university study.[9] This may be due to HIV-infected patients in developing countries often dying before their CD4 count fall low enough to put them at risk for CMV reactivation. KCS was found in 10% of patients which is low when comparing to 20% found by Lucca JA et al.[10] HZO was found in10% of patients which is low when comparing to 36.4% found by BO Adegbehingbe et al.[11] Toxoplasmosis was found in one patient (2%) comparing to 9% found by Nagata Y et al.[12]

In our study Kaposi sarcoma was found to be 6% less than in literature (10%), although Biswas et al.,[13] reported no case of Kaposi, this explained by Biswas et al.,[13] by lesser homosexuality and less HPV infection in India. There are no data to support that the homosexuality in Sudan is less than in the Western countries. Molluscum Contagiosum affected 3 of patients (6%), almost the same result as in a study done by Yared Assefal et al.,[14] Keratitis found in 3 patients (6%) similar to that found in a study done by ET Cunningham et al.,[8] Concerning CD4 count we found CMV retinitis and toxoplasmosis in patients in whom CD4 count was <200 cells\μL which is high when comparing to <100 for CMV and nearly same when comparing to <250 cells\μL for toxoplasmosis in a study by ET Cunningham et al.,[8]

We found one case of orbital cellulitis with CD4 count of ≥500C cells\μL, in this patient; he may have another cause which facilitated the infection in spite of good CD4 count, like sinusitis. CD4 count in HZO was between 200 and 499 cells\μL in 2 patients and <200 cells\μL in 3 patients while it was <500 cells\μL in study by ET Cunningham et al. [8]. This may indicate that HZO occurs when the CD4 count is <500 cells\μL. CD4 count in patients with Kaposi' sarcoma was found to be 200-499 cells\μL in 2 patients and <200cells\μL in one patient nearly same result as in study done by ET Gunningham et al.,[8] in which the CD4 count was <500 cells\μL.

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CD4 count in molluscum Contagiosum was between 200-499 cells\μL in all 3 patients. CD4 count in patients with KCS was 200-499 cells\μL in 2 patients and <200 cells\μL in 3 patients, although 2 of them were severely ill patients, still the CD4 count in molluscum Contagiosum is high when compared to study done by ET Gunningham and TP Margilos et al.,[8] In which the CD4 count was <100 cells\μL. In iritis one patient have CD4 count 200-499 cells\μL and one have <200 cells\μL and in keratitis one patient have CD4 200-499 cells\μL and 2 patients have <200 cells\μL We found CD4 counts ≥500 cells\μL in 4 patients and 200-499 cells\μL in 14 patients with conjunctival microvasculopathy. While HIV retinopathy CD4 count was ≥500 cells\μL in 2 patients, 200-499 cells\μL in 12 patients and ≤200 cells\μL in one patient. In both conjunctival Microvasulopathy and HIV retinopathy few patients has CD4 counts less than 200 cells\μL, which is high when compared to CD4 count <100 cells\μL which was found in study done by ET Cunningham et al.,[8] The CD4 count in these patients is generally higher; this may be explained by that our patients were already in the HAART treatments which increase the CD4 count.

Conclusion and recommendations

HIV infections/AIDS have their effects on the eye and vision. These effects tend to increase by multifactor. The risk of permanent functional damage of eye is high at long term. Ocular manifestations appear to vary between different studies and the reasons for this variability is unclear. These groups of patients need special ophthalmological follow up and assessment of regular interval i.e. every 3-6 month. Still these problems need a lot of research to determine the different aspect of the disease e.g. the ocular pathological changes in certain CD4 count.

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Conflicts of interest

The author declares there are no conflicts of interest.

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