

Study of Ocular manifestations in patients with HIV AIDs and its correlation with CD4+T cell count.



Ophthalmology

KEYWORDS: CD4 count,Hiv,heterosexuality

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ABSTRACT

Aims: To study the pattern of ocular manifestations of HIV AIDs and their correlation with CD4 count.

Methods: A cross sectional observational study was done on 50 patients admitted in tertiary care centre. Data was collected, clinical examination and laboratory investigations were recorded and analysed using SPSS 15 software. Statistical test applied and $p < 0.05$ was considered significant. **Results:** Of 50 patients 35 were males,15 were females. The common age group was 30-50 years, with heterosexuality as commonest risk factor. The overall prevalence of ocular manifestation were common in patients with CD4 count < 200 cells/cmm common adnexal manifestation was HZO and molluscum, anterior segment was cataract,iridocyclitis and in posterior segment it was HIV retinopathy,CMV retinitis. There was statistically significant association between ocular manifestations and CD4 count. $p < 0.05$
Conclusion: The lower CD4 count is a risk and predictor for ocular manifestations like iridocyclitis, retinopathy, CMV retinitis

Introduction

Acquired immune deficiency syndrome is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV 1 & 2).1,2,3 HIV is a retrovirus that primarily infects components of the human immune system such as CD4+ T cells, macrophages and dendritic cells and destroys them.4 It was first described in 1981 and three years later, the causative virus currently known as human immunodeficiency virus (HIV) was reported by Luc Montagnier and colleagues 5,6,7. In 1985, the first serological test Enzyme Linked Immuno Sorbent Assay (ELISA) became available for detection of anti-HIV antibodies. AIDS has become a global pandemic affecting more than 36.7 million people worldwide and causing enormous human, social and economic burden. 8 There is broad spectrum of HIV disease ranging from asymptomatic infected individuals upto advanced clinical disease which is referred as AIDS.

Ophthalmic abnormalities are common in patients with AIDS, occurring in more than 90% of patients. 9 Most abnormalities results from the opportunistic infections and malignancies common to the syndrome, although the direct effects of HIV and the immunological changes seen in AIDS may also result in ocular diseases. Visual morbidity can be severe and blindness has been suggested as a leading cause of suicide in those with AIDS. Approximately 70-80% of the infected individuals will be treated for an HIV associated eye disorder during the course of the illness.10,11 The visualization of human retina, the sole part in the body whose blood supply can be directly visualized reflects not only the devastating effects on the body's most vital organs by deadly virus but also the health status of the body in general. With little hope at the present time yet for complete cure of the AIDS and increased life span in these cases, the medical fraternity has a crucial role to play in view that at least the visual outcome should outlive the systemic morbidity, thereby increasing the disability adjusted life year (DALY) score.12

In our study of 50 cases of HIV infected /AIDS patients, we made an effort to study the magnitude of ocular findings in relation to the spectrum of disease caused by HIV and their correlation with CD4 count.

MATERIALS AND METHODS

This prospective study was conducted on 50 patients (100eyes), who attended the Ophthalmic out patient department or were admitted in the wards of our tertiary care hospital during 2011 to 2013. The study was approved by Institutional Ethics Committee. Patients of all ages, both sex, diagnosed HIV infection by ELISA test were included and those with diabetic or hypertensive retinopathy with maculopathy changes were excluded. Written informed consent was

taken. History included chief complaints, marital status, sexual behaviour, blood transfusion, intravenous drug abuse, infectious diseases, systemic illness or any surgical intervention done. On examination, best corrected visual acuity was recorded. On external examination any adnexal or ocular surface abnormalities was noted. Slit lamp examination was done for anterior segment examination. Lids were examined for vesicles, bullae, tumour, umbilicated nodule, blepharitis. Conjunctiva for the presence of congestion, papillae, follicles, cysts, tumor and tear film. Sclera for any congestion, nodule or abnormal pigmentations. Cornea was examined for opacity, infiltrate, ulceration or vascularisation. Sensation was tested in cases of corneal ulcer. Anterior chamber was examined for cells, flare or hypopyon. Iris for colour, nodule or synechia. Lens for any opacities. Pupillary reaction was checked. Fundus examination was done by indirect ophthalmoscopy and slit-lamp biomicroscopy with 78D. Ultrasound Bscan was done where fundus was not visualized.

In our study, patients who were positive by ELISA and/or Western blot assay were included. CD4+Tcell count was done. All routine blood investigations were done. Erythrocyte sedimentation rate (ESR), chest Xray, Mantoux test and sputum examination for acid fast bacilli was done to rule out tuberculosis. Conjunctival swabs and corneal scraping were taken in cases of corneal ulcer for Grams, KOH or Gomori methanamine silver staining with culture and sensitivity. Urine and serum CMV titers were done in selected cases. The collected data was tabulated, statistically analysed and the prevalence of ocular manifestations and their correlation with CD4 count was studied.

RESULTS

The mean age of the patients in our study was 34.72+/-8.6 years range (18-59) and majority of them (66%) were in age group of 31-50 years. Patients of age 31-50 years were more likely to have ocular manifestations than those compared to other age group.

The majority of patients were males 35 (70%) and thus prevalence of eye findings was common in them. 43patients(86%)had heterosexual exposure. Out of 100 eyes examined 66% had ocular findings. The mean CD4 count was (185.98+/- 90.32). 37eyes out of 56(66%) with CD4 count (< 200 cells/cmm) had ocular manifestations as compared to 3 eyes out of 6(4.54%) with CD4 count > 350 cells/cmm.

Adnexal manifestations was seen in 15 eyes, commonest being blepharitis and (40%) of them had low CD4 count < 200 cells/cmm ; (32%) patients had anterior segment findings with commonest being iridocyclitis (9eyes) followed by presenile cataract (8eyes). 5 out 9 eyes with iridocyclitis (55%) and 6 out 8eyes with presenile

cataract(75%) had CD4 count <200cells/cmm. This was statistically significant. (p=0.03)32% patients had posterior segment findings with commonest being HIV retinopathy (14eyes) followed by Cytomegalovirus (CMV) retinitis (10eyes).The majority of them 8 out of 14 eyes with retinopathy(57%) and 6 out of 10 eyes CMV (60%) had CD4 count of <200cell/cmm. This was statistically significant. (p=0.02)We had 34 & 32 patients with ocular findings of duration <5 & >5years respectively. But this difference was not statistically significant.

Discussion

HIV infection causes impairment of cell mediated (Tcell) immunity. HIV binds directly to the CD₄ receptor of the T helper cell, resulting in their gradual but progressive depletion. The helper T cell is responsible for inducing effective immune response in other T cell and B cell compartments. With loss of this T cell, the immune system is less able to mount cytotoxic T cell responses to virally infected cells or cancers, to form delayed type hypersensitivity reactions and to process new foreign substances presenting to the immune system.^{6,7} Herpes zoster ophthalmicus(HZO) is a painful, vesiculobullous dermatitis, which results from the reactivation of previous VZV infection. In our study, we had (12.5%) 4 out of 32 eyes with HZO all in age group 20-40 years. Engstrom RE and Holland GN stated HZO to be occurring in 73% of HIV infected persons.¹⁵ HZO occurs with a peak incidence in 5-7th decade. Age and immune status are the most common predisposing factors for HZO.¹⁰ Thus, when seen in younger age groups is a clinical marker for the immune deficiency.

We had (21.87%) incidence of corneal ulcer while the study on Western population by Dres Gonzalo et al it was 1-3%.¹⁴We attribute this difference to low socioeconomic status and poor ocular hygiene in our set up. The natural defenses of normal eyelid function, adequate tear production and an intact corneal epithelium are critical for reducing the risk of corneal infection in HIV infected patient. We had 3 fungal ulcer all Candidial in origin. Candidial species were the most common organisms causing fungal keratitis in HIV infected patients.^{10,11,15} 8 eyes(25%) showed visually conspicuous lenticular opacity with no other ocular findings and normal fundus. Similar studies to determine the incidence of cataractous changes in HIV patients were not found. However, we hypothesize that the HIV infection might have accelerated the age related cataractous changes in the lens. In our study, 9 eyes (28.12%) had iridocyclitis. The incidence varies with associated infections like HSV,HZV,CMV, bacterial or fungal that may affect uveal tissue.^{10,11} Cotton wool spots(CWS)were the most common lesions seen in AIDS, occurring in 25.5% of patients.¹⁶ 8 eyes (25%) had isolated retinal CWS without associated systemic condition. The studies conducted by William R Freeman et al, and Jyotirmay Biswas et al had CWS incidence of 25-40% and 15% respectively.^{5,17} However, the study conducted on HIV infected Spanish population showed the incidence of HIV retinopathy to be 50%.¹⁸

The incidence of CMV retinitis in our study was 31.25%, while in the study conducted on Spanish population by Dres Gonzalo; on Thailand population by Mahidol University, and on Indian population by Biswas et al it was 30%, 24% and 17% respectively.^{15,19,20} Gallo CR(1987) and Henderly DE(1989), in separate studies, have noted that the risk of CMV retinopathy is inversely related to the level of CD4 lymphocytes, with most cases occurring only after the CD4 counts have fallen below 100 cells/cmm^{21,22}

We had 12.5% with papilloedema secondary to tuberculoma & 6.25 % with secondary optic atrophy following TB meningitis, while the study by Dres Gonzalo et al on Spanish population the incidence of neurophthalmic manifestation was 3-6%.^{15,23} The difference is attributed to high prevalence of tuberculosis in our country. India has the highest burden of TB. The WHO statistics for 2015 gave an estimated incidence figure of 2.2million cases of TB for India out of a global incidence of 9.6million and prevalence figure of 2.5million.²⁴ In our study, the CD4 count <200, 200-350 & >350 cells/µl were (56%), (38%) & (6%) respectively. In our study, amongst the group with CD4

count<200 cells/ul there were 66.07% with ocular manifestations . Of this 48.64% had anterior segment involved with iridocyclitis as commonest & blepharitis as commonest adnexal finding. 54.05% had fundus findings with HIV retinopathy as commonest. While in the group of CD4 count >350 only 4.54 % had eye findings. Biswas J(2002) states that a strong correlation exists between level of immune suppression (CD4 count) and the appearance of opportunistic infections.⁵ Cunningham ET Jr(1998) also states that CD4 count is a reliable predictor of ocular complications of HIV.²⁵

Conclusion

Lower the CD4 count, higher the prevalence of HIV related ocular manifestations. Ocular involvement may often precede systemic disease. Thus, the role of ophthalmologist in the diagnosis and management of ocular manifestations in AIDS is crucial as they not only save sight, but also assist in making a life-saving diagnosis.

TABLE 14 : CORELATION OF CD4 COUNT WITH ANTERIOR SEGMENT MANIFESTATIONS

		ANTERIOR SEGMENT MANIFESTATIONS							
		Molluscum contagiosum	HZO	Conjunctivitis	Corneal ulcer	Blepharitis	Iridocyclitis	Cataract (Presenile and mature)	Total no. of eyes involved
CD4 Count	< 200	1	0	2	3	6	5	6	17
	200-350	0	3	0	4	7	4	2	13
	> 350	1	1	0	0	2	0	0	2
Total		2	4	2	7	15	9	8	32

CORRELATION OF CD4 COUNT WITH POSTERIOR SEGMENT MANIFESTATIONS

		POSTERIOR SEGMENT MANIFESTATIONS					Total
		CMV Retinitis	Optic atrophy	Papilloedema	HIV Retinopathy	Vitritis	
CD4 Count	< 200	6	2	2	8	1	19
	200-350	4	0	2	6	0	12
	> 350	0	0	0	0	1	1
Total		10	2	4	14	2	32

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