

Ocular Manifestation of Human Immunodeficiency Virus

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Abstract

Background: HIV is a dreaded virus that significantly deteriorates the quality of life of affected individuals. The main source of HIV infection in India is involved in high-risk behaviours. Early recognition of ocular manifestations of HIV/AIDS is essential since these ocular manifestations may be the primary or only presentation. This has implications for the prognosis of the disease. **Aim and objective:** To document various ocular manifestations in HIV/AIDS cases. **Subjects and Methods:** objective: To document various ocular manifestations in HIV/AIDS cases. Material and methods: This was a hospital-based observational study done at a tertiary eye care centre in north India, over 5 years period (January 2017 to January 2022). Overall, 92 patients were enrolled for the study. **Results:** Out of 92 HIV patients, 69 (75%) were males and 23 (25%) were females. Maximum eyes had visual acuity ranging from 6/6-6/12. 74 patients (59 males and 15 females) had heterosexual exposure, and 11 patients (6 males, 4 females and 1 child) had blood transfusion as a risk factor. Out of 92 HIV patients 35 patients (38%) had ocular involvement. Maximum patients 13 (37%) with Cytomegalovirus (CMV) retinitis followed by 7 (20%) were of HIV retinopathy. The associated systemic disorders included 48 patients with pulmonary tuberculosis. **Conclusion:** Ophthalmologists need to be highly aware of various ocular and systemic spectrums of HIV. Increased emphasis on early diagnosis, treatment and regular ophthalmic examination in all HIV/AIDS patients is the rule.

Keywords: Human Immunodeficiency Virus, C.M.V Retinitis, H.I.V Retinopathy, Acute Retinal Necrosis

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Introduction

HIV is a dreaded virus that significantly deteriorates the quality of life of affected individuals. It has 2 subtypes HIV 1 and HIV 2 which cause Acquired immune deficiency syndrome (AIDS).^[1] Even after various awareness programmes, it is believed to be one of today's most stigmatized clinical conditions. The main pathologic process involved is CD4+ T cell depletion., CCR5 and CXCR4 are two essential chemokine receptors involved in the pathologic process.^[1]

According to the latest HIV report (2019) of the Government of India, it is estimated that around 23.49 lakh people are living with HIV/AIDS (PLHIV) in 2019. Although there is an overall decreasing trend in our country with estimated yearly novel HIV infections declining by 37% between 2010 and 2019. The main source of HIV infection in India is involved in high-risk behaviours. It includes unprotected heterosexual behaviour, unprotected homosexual behaviour, and unsafe injecting drug use behaviour.^[2] Maclean was the first to describe the ocular manifestations of HIV infection.^[3] The ocular manifestations may involve the adnexal, anterior, and posterior segments, as orbital and neuro-ophthalmic manifestations. Anterior segment involvement usually results in tumours and infections while posterior segment

involvement usually results in HIV-retinopathy and opportunistic infections like tuberculosis, cytomegalovirus, candida infections etc, of the retina and the choroid.^[4,5] Early recognition of these ocular manifestations of HIV/AIDS is essential since these ocular manifestations may be the primary or only presentation. This has implications for the prognosis of the disease. Hence, the aim and objective of our study is to document various ocular manifestations in HIV/AIDS cases.

Subjects and Methods

This was a hospital-based observational study done at a tertiary eye care centre in north India, over 5 years period (January 2017 to January 2022). The study adhered to the tenets of the Declaration of Helsinki. Written informed consent was obtained from all patients. Overall, 92 patients were enrolled for the study. Most of the patients had been diagnosed to have HIV infection and were referred to us for evaluation of their ophthalmic status. A detailed history of the patient regarding name, age, sex, occupation, address, family history, drug history, any history of trauma or inflammation, presenting symptoms, duration, associated conditions, and past medical history was recorded. Systemic lesions were analysed. Visual acuity and refraction were

assessed using an illuminated Snellen's chart, near vision with Jaegger's chart, intraocular pressure, and detailed ocular examination of the anterior and posterior segment (with+90d/+78d lens) was done by slit lamp biomicroscope. Indirect ophthalmoscopy was carried out using a + 20d condensing lens. The diagnosis was established by ELISA method. Western blot/ polymerase chain reaction confirmation was done in doubtful cases.

Results

Out of 92 HIV patients, 69 (75%) were males and 23 (25%) were females. The age ranged from 5 to 65 years, with the age group of 20 -40 was most affected (76.1%). The age group of 21-30 years included 23 males and 9 females and the 31-40 years age group included 34 males and 4 females. The age and gender distribution are shown in.

Table 1: Age and Gender Distribution

Age	Male (N)	Females(N)
1-10	0	1
11-20	2	1
21-30	23	9
31-40	34	4
41-50	60	5
51-60	2	2
61-70	1	1
TOTAL	69	23

The visual acuity ranged from 6/6 to no PL/PR. Maximum eyes had visual acuity ranging from 6/6-6/12. 3 eyes had only PL+ visual acuity and 2 eyes were PL denied. Visual acuity distribution is shown in [Table 2].

Table 2: Tabulation of Visual Acuity

VISUAL ACUITY AT PRESENTATION (N=92)		
VISUAL ACUITY	OD	OS
6/6-6/12	62	64
6/18-6/36	18	16
6/60-1/60	9	10
PL+	2	1
NO PL/PR	1	1

74 patients (59 males and 15 females) had heterosexual exposure, and 11 patients (6 males, 4 females and 1 child) had blood transfusion as a risk factor. 1 patient had intravenous drug abuse, 2 children had vertical transmission, and 4 had inconclusive histories. The mode of transmission is tabulated in [Table 3].

Table 3: Tabulation of Mode of Transmission

MODE OF TRANSMISSION IN HIV CASES (N=92)				
RISK FACTORS	MAL E	FEMAL E	CHILDRE N	OVE R ALL
HETEROSEXUAL	59	15	-	74
HOMOSEXUAL	0	0	-	0
BLOOD TRANSFUSION	6	4	1	11
I.V DRUG USE	1	0	0	1
VERTICAL	-	-	2	2

HISTORY UNKNOWN	1	2	1	4
TOTAL	67	21	4	92

Out of 92 HIV patients 35 patients (38%) had ocular involvement. Amongst these 35 patients, 23 (65.7%) were males and 12 (34.3%) were females. In the panorama of ocular manifestations maximum patients 13 (37%) with Cytomegalovirus (CMV) retinitis followed by 7 (20%) were of HIV retinopathy, 3 (8.5%) patients with retinal detachment, 3 (8.5%) patients of herpes zoster ophthalmicus, 2 (5.7%) of chorioretinitis, 2 (5.7%) patients of optic atrophy, 1 (2.8%) patient of acute retinal necrosis (ARN), vitreous haemorrhage and molluscum contagiosum each. [Table 4]

Table 4: Tabulation of Different Ocular Lesions in HIV Patients

DIFFERENT OCULAR LESIONS	N, %
CMV RETINITIS	13, 37%
HIV RETINOPATHY	7, 20%
RETINAL DETACHMENT	3, 8.5%
HERPES ZOSTER OPHTHALMICUS	3, 8.5%
CHORIORETINITIS	2, 5.7%
OPTIC ATROPHY	2, 5.7%
ARN SYNDROME	1, 2.8%
VITREOUS HAEMORRHAGE	1, 2.8%
MOLLUSCUM CONTAGIOSUM	1, 2.8%

Amongst the 7 eyes with corneal involvement, there were 2 cases of herpes simplex keratitis (HSVK), 2 of superficial punctate keratitis (SPK), 2 of dry eyes and 1 case of fungal corneal ulcer. Out of 13 patients with CMV retinitis 5 patients had spill-over anterior uveitis, 5 patients of CMV papillitis, 2 patients of Frosted branch angiitis and 1 had mixed presentation. The associated systemic disorders included 48 patients of pulmonary tuberculosis, 12 patients of oropharyngeal candidiasis, 21 patients of HIV enteropathy, 3 patients of cutaneous zoster, 2 patients of central nervous system (CNS) toxoplasmosis, 5 patients of hepato-splenomegaly and 1 patient of genital wart. [Table 5]

Table 5: Systemic Diseases in HIV Patients

DISEASES	N
PULMONARY TUBERCULOSIS	48
HIV ENTEROPATHY	21
OROPHARYNGEAL CANDIDIASIS	12
HEPATOSPLENOMEGALY	5
CUTANEOUS ZOSTER	3
CNS TOXOPLASMOSIS	2
GENITAL WART	1
TOTAL	92

Discussion

Ophthalmic manifestations of HIV/AIDS infection are multifaceted. Extraocular, anterior, and posterior segment involvement can be there which may even lead to blindness. The previous studies on this subject stated the prevalence of ophthalmic manifestations of HIV/AIDS infection ranges from 10 to 20%. The patients on highly active antiretroviral therapy (HAART) have shown variation in the prevalence and pattern of lesions.^[6,7] In the present study, out of 92 patients with HIV that presented to our outpatient department, 35 patients (38%) had ocular involvement. In

previously done studies, the ocular involvement sample size ranged from 100 to 781 in different studies. The percentage of ocular involvement also ranged from 40% - 66%. [Table 6].^[8,9] The variation in ocular involvement may be due to differences in the cohort, prevalence of HIV in a particular region, and effectiveness of highly active antiretroviral therapy (HAART).

In this study, we found male preponderance (75%) as compared to females. This is in concordance with previous studies which also found male predilection (54.3% - 88%).^[8,9] [Table 6]

Table 6: Comparisons of Previous Studies with The Current Study

STUDIES	AWA N et al Kenya 1996	Jabs et al USA 1995	Biswas et al India 2000	Mandal et al India 2007	Our study
SAMPLE SIZE	102	781	100	175	92
MALE (%)	62	88	72	54.3	75
HOMOSEXUAL (%)	0	60	5	0	0
OCULAR LESIONS (%)	66	50	40	40.6	38.6
KAPOSI SARCOMA	2	2	0	0	0

According to the Centre for diseases control and Prevention (CDC), in 2018, men accounted for 30,691 (81%) of the 37,968 new HIV diagnoses in the United States and dependent areas. The reason for the above may be a higher risk of transmission of male-to-male sexual contact, I.V. drug abusers.^[10]

The maximum number of study patients had a mild visual disturbance in the present study which is also seen in various studies conducted worldwide. Although we did not correlate the visual acuity with CD4 cell count, usually the severe visual disturbance is seen mostly in patients with severe immunosuppression (less CD4 count) as seen in previous studies.^[11,12] In the current study, the most common route of transmission was the sexual route (81%) followed by blood transfusion (12%). Various other studies done by Biswas J et al., Dinesh K Sahu et al., also showed a similar most common mode of transmission.^[9,13] Amongst the HIV patients with ocular involvement, a maximum of patients 13 (14.13%) were of CMV retinitis followed by 7 (7.6%) were of HIV retinopathy. Biswas et al., in their study also found maximum patients of CMV retinitis (17%) followed by patients of HIV retinopathy (15%). [9] Jabs et al., on the contrary, found the maximum number of patients with HIV retinopathy.^[8] [Table 7]

Table 7: Comparisons of Ocular Lesions Amongst Different Studies

STUDIES	AWA N et al Kenya 1996	Jabs et al USA 1995	Biswas et al India 2000	Mandal et al India 2007	Our Study
CMV RETINITIS	3%	4.73 %	17%	10.65%	14.13 %

HIV RETINOPATHY	25%	6.40 %	15%	10.65%	7.6%
ARN	-	-	1%	2.36%	1.08%
OPTIC ATROPHY	3%	4.73 %	7%	-	2%

The inconsistency in the presence of ocular lesions in HIV patients in various studies may be attributed to the variable immune status of patients, duration of disease, the efficacy of HAART therapy, presence and absence of other systemic opportunistic infections and variable duration of diagnosis and presentation for ocular examination. There were 7 patients (7.6%) out of 92 HIV patients that had corneal involvement. In the study done by Kumari K et al., there were 9.1% of patients with tear film disturbance and corneal involvement (dry eye and keratitis).^[14] In the current study, we found that the most common systemic association in HIV patients was with pulmonary tuberculosis. This was consistent with studies by Rathee R et al from North India, and Kumarasamy et al, from Southern India, who also found pulmonary tuberculosis as the most common opportunistic infection in their analysis.^[15,16] However, few studies support extrapulmonary tuberculosis and candidiasis as the most common opportunistic infection.^[17] This difference in findings may warrant further research for susceptibility to opportunistic infections in patients living with HIV. Recurrent gastrointestinal infections/ HIV enteropathy is very common in patients living with HIV/AIDS. It has been reported that in AIDS patients the occurrence of diarrhoea is 90% in developing countries and 30-60% in developed countries. The second most common systemic association in our study was HIV enteropathy.^[15]

Conclusion

We, ophthalmologists, need to be highly aware of various ocular and systemic spectrums of HIV. Increased emphasis on early diagnosis, treatment and regular ophthalmic examination in all HIV/AIDS patients is the rule. A multidisciplinary approach is needed to manage HIV/AIDS cases. Further multi-centric trials need to be done for providing insight, awareness, better management and improve the quality of life of PLHIV.

Limitation

The small cohort is one of the main limitations of the study. CD4+ T cells count association with the presence of different ocular and systemic lesions was not done. Correlation of ocular and systemic lesions could also have been done. An assessment of HAART therapy was also not done.

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