



A STUDY OF OCULAR MANIFESTATIONS IN PATIENTS WITH HIV/AIDS INFECTION AND ITS CO-RELATIONSHIP WITH CD4 CELL COUNT

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ABSTRACT

Background: This study was conducted to evaluate the ocular lesions of HIV/AIDS in relation to CD4 count and the visual impairment they cause.

Methods: This was a hospital-based cross-sectional study conducted among 387 patients at A.R.T. Centre S.R.N. Hospital, M.L.N. Medical College, Allahabad, from August 2013 to July 2014, after obtaining clearance from the institutional ethics committee and written informed consent from the study participants.

Results: One of the main causes of eye disorders and visual impairment, including blindness, was HIV/AIDS. There was a substantial correlation between the low CD4 count and the incidence of ocular symptoms and vision impairment. Ocular symptoms were substantially more common in patients with a CD4 count of 0–100 cells/mm³ than in other patients. Patients with low CD4 levels had more severe ocular symptoms of HIV/AIDS in terms of visual decline.

Conclusion: Early diagnosis and prompt treatment will go a long way in preventing visual impairment. We hereby conclude that HIV/AIDS affects the reproductive age group with male preponderance.

Keywords: Ocular Manifestations, HIV/AIDS, Co-relation, CD4 Cell Count.

INTRODUCTION

One of the most dreaded viral diseases of the late 20th century is AIDS (acquired immunodeficiency syndrome) caused by the HIV (Human Immunodeficiency Virus).^[1] Since its discovery in 1981, AIDS has become an unparalleled emergency and a worldwide health concern of extraordinary magnitude. The virus has spread to almost every part of the world thirty years after it was first discovered, significantly altering public health priorities, modern medical practice, and every facet of contemporary life.^[2] 35 million individuals were estimated to be living with HIV/AIDS in 2013, according to the most recent figures on the worldwide HIV/AIDS epidemic released by UNAIDS, WHO, and UNICEF. AIDS patients are prevalent in India, which has the third-largest AIDS patient population worldwide. An estimated 2.39 million persons in India are expected to be HIV positive,

according to a report released by the National AIDS Control Organisation. From 5 cases reported in homosexual men in 1981, the disease has grown into a global pandemic with an estimated 34.6 million people infected throughout the world, two-thirds of them in sub-Saharan Africa and one-fifth in Asia. The estimated number of HIV positive patients in India has been recently scaled down by the National AIDS Control Organization (NACO) to approximately 2.5 million (from last year's 5.5 million).^[3] The HIV virus is a member of the retroviridae family's Lentivirus subgroup. HIV-1: The virus that infects people all around the world. HIV-2: Initially discovered in 1986 in individuals from West Africa. The patient's immunological status (i.e., CD4 count) determines how severe HIV symptoms are. At varying CD4 counts, various visual symptoms may appear. The illness has a wide range of effects on people, including on their health, social lives, education, and the economy. Individuals with HIV/AIDS experience a wide range of infection-related consequences. The virus and associated illnesses affect every organ in the body.

The eye is an organ with wide spectrum HIV-related manifestations. The disease can have adnexal, anterior segment, posterior segment, orbital, and neuro ophthalmic manifestations. posterior segment manifestations are CMV retinitis, microangiopathies, acute retinal necrosis, and other opportunistic infections of the eye, which are mostly seen in severely immune compromised patients with fewer CD4 cell counts. Other ocular manifestations that also occur are chorioretinitis, uveitis, complicated cataract, Herpes zoster ophthalmicus, molluscum contagiosum, disc edema, dry eyes, external hordeolum, myopic fundus with cotton wool spots, Bell's palsy, Kaposi sarcoma, corneal opacity and Episcleritis.^[4] HIV vasculopathy or microangiopathy is the most common manifestation (40–60%) of AIDS in developed countries, which includes retinal haemorrhages, cotton-wool spots, microaneurysms, ischaemic maculopathy, and telangiectatic vessels, while large vessel disease is rarely seen.^[5]

Between 50 and 75 percent of these patients suffer from ocular illness, which remains a significant cause of morbidity. Ten to twenty percent of HIV/AIDS patients experience visual loss in one or both eyes due to CMV retinitis, despite the availability of HAART. Up to 40 to 50% of AIDS patients may develop cytomegalovirus retinitis, the most prevalent ocular opportunistic infection associated with AIDS, before starting HAART. Nearly all individuals with cytomegalovirus retinitis had CD4+ levels less than 50 cells/ μ l. Increasing use of ART is improving the survival of AIDS patients and changing the scenario of ocular manifestations. Since keeping these aspects in view, this study has been undertaken and the present work aims at evaluating the ocular lesions of HIV/AIDS in relation to CD4 count and the visual handicap caused by the same.

AIMS AND OBJECTIVES

- To research HIV/AIDS patients' ocular symptoms.
- To investigate the connection between HIV/AIDS patients' ocular findings and CD4 count.
- To study the visual deterioration caused by ocular manifestations.
- To study the relationship between various ocular lesions and visual deterioration with respect to CD4 count.
- Through early identification and timely treatment of opportunistic infections, HIV/AIDS patients can avoid visual impairment.

MATERIALS & METHODS

This was a hospital-based cross-sectional study conducted among 387 patients to study the ocular manifestations in HIV/AIDS patients at A.R.T. Centre S.R.N. Hospital, M.L.N. Medical College, Allahabad, from August 2013 to July 2014, after obtaining clearance from the institutional ethics committee and written informed consent from the study participants.

Exclusion Criteria

- Diabetes mellitus.
- Systemic hypertension.
- Age-related macular degeneration and other types of macular degeneration.

- Systemic hypertension.
- Individuals receiving immunosuppressants or steroids for an extended period of time for any surgical or medical disorders.
- Individuals whose metastases have spread.
- HIV/AIDS patients who are too sick or unconscious to get a full examination.
- Patients who refuse to be examined.
- Every patient underwent a comprehensive personal interrogation, and a thorough history was obtained, including information on past medical history and any visual symptoms. At the initial visit, all patients had CD4 levels.

RESULTS

Age (in years)	Number of Patients	Percentage
01 - 10	3	1
11 - 20	7	2
21-30	79	20
31-40	191	49
41-50	94	24
51-60	11	3
61-70	2	1
Total	387	100
Age Distribution		
Gender	Number of Patients	Percentage
Males	210	54
Females	177	46
Total	387	100
Sex Distribution		

Table 1: Demographic Distribution

The age distribution of patients in this study. The youngest patient was a 5-year-old girl, and the eldest was a 68-year-old male. All patients were 35.9 ± 8.9 years old on average. 364 patients (93%) were between the ages of 21 and 50, which is considered an economically earning age group. The patients' sex distribution. The male to female ratio in this study was 1.19:1, with 54% of participants being men and 46% being women.

Vision	Right Side		Left Side	
	No. of Patients	Percentage	No. of Patients	Percentage
6/6 – 6/12	294	76	271	70
6/18 – 6/36	68	18	95	25
6/60 or less	25	6	21	5
Total	387	100	387	100
<i>Distribution of Patients According to Visual Acuity in Right and Left Side</i>				
CD4 Count in Cells/mm ³	Number of Patients		Percentage	
1-100	67		17	
101-200	96		25	
>200	224		58	
Total	387		100	
<i>Distribution of Patients Based on CD4 Count</i>				

Table 2

Patients are distributed based on their visual acuity. In this study, 76% of participants experienced modest visual (6/6–6/12) degeneration in their right eye and 70% in their left. Of all patients, 18% of right eyes and 25% of left eyes had moderate visual impairment (6/18–63). Of the 387 patients in this study, 6% had severe vision impairment (6/60 or less) in their right eye and 5% in their left.

The distribution of CD4 across all 387 study participants. 17% of research participants had severe CD4 count depletion (1-100 cells/mm³). Of the 100 patients, 58% had mild depletion (>200 cells/mm³) and 25% had moderate depletion (100–200 cells/mm³). The study's CD4 count ranged from 24 to 1006, with a median of 232.

Number of Patients	Number of Patients (n=387)	Percentage
Patients with anterior segment manifestation	17	4
Patients with posterior segment manifestation	49	13
Patients without ocular manifestation	323	83

Table 3: Classification of the Patients Based on the Ocular Manifestations in Different Segments of the Eye

Some patients had both anterior and posterior segment manifestations. The classification of patients was based on the ocular involvement in different segments of the eye. 13% of the patients had posterior segment involvement and 4% in the anterior segment of the eye; some of them had involvement of both, and in such cases the findings are counted separately.

Ocular Manifestations	Right (N = 385)		Left (N = 386)	
	No.	%	No.	%
Anterior segment and adnexal lesions	15	3.90	9	2.33
1. Uveitis	5	1.30	3	0.78
2. Complicated Cataract	3	0.78	2	0.52
3. HZO	1	0.26	1	0.26
4. Episcleritis	2	0.52	0	0.00
5. External Hordeolum	0	0.00	1	0.26
6. Corneal Opacity	4	1.04	2	0.52
Posterior Segment Manifestations	33	8.57	23	5.96
1. HIV Microangiopathy	15	3.90	11	2.85
2. CMV Retinitis	12	3.12	8	2.07
3. Chorioretinitis Healed	4	1.04	3	0.78
4. Active Tuberculoma	2	0.52	1	0.26

Classification of Ocular Manifestations and Their Distribution Based on Eye Affected

Ocular Manifestations	CD4 count		
	1-100 (N = 67)	101-200 (N = 96)	>200 (N = 224)
1. Uveitis	3 (4.5%)	2 (2.1%)	0 (0.0%)
2. Complicated Cataract	1 (1.5%)	2 (2.1%)	0 (0.0%)
3. HZO	2 (3.0%)	0 (0%)	0 (0%)
4. Episcleritis	0 (0%)	1 (1.0%)	1 (0.5%)
5. External Hordeolum	0 (0%)	0 (0%)	1 (0.5%)
6. Corneal Opacity	1 (1.5%)	2 (2.1%)	1 (0.5%)
7. HIV Microangiopathy	18 (26.9%)	3 (3.1%)	1 (0.5%)
8. CMV Retinitis	17 (25.4%)	1 (1.0%)	0 (0%)
9. Healed Chorio-retinitis	0 (0%)	3 (3.1%)	3 (1.3%)
10. Active Tuberculoma	2 (3.0%)	0 (0.0%)	0 (0.0%)

Correlation of Ocular Manifestations According to CD4 Counts

Table 4

- 15 had anterior segment manifestations in the right eye and 9 of them in the left eye.
- 33 had posterior segment manifestations in the right eye and 23 in the left eye.
- However, few of the patients had more than one manifestation in any one or both eyes. In that case, each of these manifestations is counted separately.

The classification of ocular manifestations by anterior segment and adnexal lesions and posterior segment lesions in each eye separately. Amongst 387 patients studied here, 15 patients had anterior segment and adnexal lesions in the right eye, and 9 had anterior segment and adnexal lesions in the left eye. The findings, if present in both anterior and posterior segments in the same eye, were counted separately. Amongst the anterior segment and adnexal lesions of study subjects, uveitis is the most common finding (1.30% in right eye and 0.78% in left eye), followed by corneal opacity (1.04% in right eye and 0.52% in left eye), complicated cataracts (0.78% in right eye and 0.52% in left eye), and herpes zoster ophthalmicus (0.26% in right eye and 0.26% in left eye). External hordeolum was observed (0.26% only in the left eye) as acute lesions in 387 patients.

Out of 387 patients of this study, 33 patients had lesions in right eye and 23 patients had lesions in left eye. The CWS (Cotton Wool Spots)/HIV retinopathy/HIV microvasculopathy was the most common lesion (3.90% in right eyes and 2.85% in left eyes). The next common posterior segment lesions observed in these patients were cytomegalovirus (CMV) retinitis (3.12% in right eyes and 2.07% in left eyes), chorioretinitis (1.04% in right eye and 0.78% in left eye), and active tuberculoma (0.52% in right eye and 0.26% in left eye of the study subjects).

Any manifestation present either in the right or left eye is considered to be present, and data has been prepared as the patient basis for correlation.

The distribution of the patient's ocular manifestations by CD4 count into three categories. 67 (17.3%) patients belonged to the first category with a CD4 count range of 1-100 cells/mm³. Of the 67 patients, 44 (68.7%) exhibited ocular symptoms, including complex cataract and corneal opacity 1 (1.5%) each, HIV microangiopathy 18 (26.9%), CMV retinitis 17 (25.4%), uveitis 3 (4.5%), Herpes zoster ophthalmicus 2 (3.0%), and active tuberculoma 2 (3.0%). 96 patients (24.8%) belonged to the second category with a CD4 count range of 100-200 cells/mm³. Out of 96 patients, 14 (14.6%) had ocular manifestations, HIV microangiopathy and healed chorioretinitis 3 (3.1%) each, uveitis, complicated cataract and corneal opacity 2 (2.1%) each, CMV retinitis, and episcleritis 1 (1.0%) each. 224 patients (57.9%) belonged to the third category with a CD4 count >200 cells/mm³. Out of 224 patients, 7 (3.1%) had ocular manifestations. In these patients healed chorio-retinitis 3 (1.3%) and episcleritis, external hordeolum, corneal opacity, and HIV microangiopathy 1 (0.5%) each.

Ocular Manifestations	CD4 Count in Cell/mm ³ (Percentage)		
	1-100 (n=67)	101-200 n=96	>200 (n=224)
Anterior segment and adnexal lesions	10.5	7.3	1.5
Posterior segment manifestations	55.3	7.2	1.8
Correlation of Ocular Manifestations According to CD4 Counts			
Ocular manifestations	Mean CD4 count in cell/mm ³		
Patients with ocular manifestations	93		
Patients without ocular manifestations	278		
Mean CD4 Count			

Table 5

The distribution of ocular manifestations into anterior and posterior segment lesions and categorizing them based on immune status (CD4 count). Amongst 387 patients studied, among them 67 (17.3%) belonged to the first category with a CD4 count range of 1-100 cells/mm³, of which 7 (10.5%) were anterior segment and adnexal lesions, whereas 37 (55.3%) were posterior segment lesions. The second category contained 96 (24.8%) patients with a CD4 count of 101–200 cells/mm³, 7 (7.3%) were anterior segment and adnexal lesions, and 7 (7.3%) had posterior segment lesions. The third category

of patients were 224 (57.9%) with CD4 count >200 cells/mm³, 3 (1.5%) had anterior segment and adnexal lesions, and 4 (1.8%) had posterior segment lesions.

Patients with the ocular manifestation group have a mean CD₄ cell count of 93 cells per mm³, significantly lower than the patients without ocular manifestations group, who have a mean CD₄ cell count of 278 cells per mm³.

DISCUSSION

Since its discovery, one of the biggest health issues facing the world in recent years has been HIV infection. AIDS is a multisystemic illness brought on by the HIV (Human Immunodeficiency Virus), a member of the retrovirus lentivirus subfamily. Several ophthalmic manifestations, which are of the opportunistic type, develop due to decreased immunity, but the incidence and prevalence of these manifestations have decreased in the era of free HAART. HIV targets the CD₄⁺ T cell, causing a steady decline in the absolute number of these cells, leading to progressive immune deficiency, particularly cell-mediated type.

In this study, we studied the prevalence of various ophthalmic manifestations in HIV patients and their correlation with the CD₄ count current scenario at the ART center, Swaroop Rani Hospital, M.L.N. Medical College, Allahabad.

Age Distribution

In the present study, the mean age of patients is 35.9 (±8.9 years). The mean age of other studies also has the same finding, like Shah S. U et al. (2009)^[6] found a mean age of 38.96 years, Sophia Pathai et al. (2009)^[7] found a mean age of 36 (±8 years), Amarre et al., (2011)^[8] 40 years, Wang et al. (2012)^[9] 41.26 years (±12 years), Ifeanyi et al. (2013)^[10] 36.80 (±10.36 years). Other authors, like Jyothirmay Biswas et al. (1999)^[11] found patients in the 21-50 year age group at 76% and Acharya et al. (2012)^[12] 80%.

This signifies how important the disease is because morbidity and mortality in this age group have had a considerable impact on the livelihood of their family and ultimately a significant dent in the economy of any country.

Sex Distribution

In the present study, we found there is male preponderance; various studies also found female preponderance, and few studies have female preponderance also. In our study, the M:F ratio was 1.19:1.

Prevalence of Ocular Manifestations

In our study, a percentage of ocular manifestation was found to be 17.0%, which can be comparable with the findings of Sophia Pathai et al., (2009)^[7] 17.5%, Shah S. U et al. (2009)^[6] 13%. Amarre et al., (2011)^[8] 21.4%, Acharya et al. (2012)^[12] 16.9% Wang et al., (2012)^[9] 26.3% and Ifeanyi et al., (2013)^[10] 14%.

It has been well documented by Venketesh, Biswas et al., (2008)^[13] that in the pre-HAART era, incidence and prevalence of ocular manifestation are higher, which is markedly decreased by the introduction of HAART treatment. It can also be seen in previous studies before 2005, as Jyotirmay Biswas et al., (1999)^[11] ocular manifestation 45.7%, Balo K P et al., (1999)^[14] 60.5%, and Ausayakhun S et al., (2003)^[15] 44.6%.

In our study, the most common ocular manifestation is HIV microangiopathy, which is 5.7% (22/387), and the second most common ocular manifestation is CMV retinitis, which is 4.7% (18/387). In other posterior segment manifestations, healed cho-rio retinitis 1.6% (6/387) and active tuberculoma 0.8% (3/387) are found. Total posterior segment manifestations are 12.7% (49/387).

Among anterior segment manifestations most common are uveitis 1.3% (5/387), and all other anterior segment manifestations are below 1%, like complicated cataract 0.8% (3/387), Herpes zoster ophthalmicus and episcleritis 0.5% (2/387), corneal opacity 1% (4/387), and external hordeolum 0.3% (1/387). Total over all anterior segment manifestation counts for 4.4% (17/387).

Shah SU et al. (2009)^[6] conducted a cross-sectional study of 112 HIV-positive patients on HAART. In this study, 8% (nine out of 112) of HIV/AIDS patients receiving HAART had ocular symptoms. HIV retinopathy (5%), immune recovery uveitis (3%), immunological recovery vitritis (3%), and cytomegalovirus retinitis (2%) were among the ocular symptoms. Ocular manifestations were far more common in individuals with a CD4 count of 0–100 cells/ml than in other patients, and HAART may be the reason why the prevalence of ocular disorders and visual impairment in HIV/AIDS patients has decreased.

Sophia Pathai et al. (2009)^[7] enrolled patients (n = 149) in India who enrolled for antiretroviral treatment with a median CD4 cell count of 180 cell/ μ l. The prevalence of HIV-associated ocular disease was 17.5% (95% CI) in all participants. Vitreo-retinal disease was the most common manifestation, of which CMV retinitis was the most frequent retinal infection (overall prevalence 8.7%, ocular TB and toxoplasmosis 2.7%, HIV retinopathy 4.7%, and optic neuropathy 2%).

Bemnet Amare et al., (2011)^[8] did a cross-sectional study of patients (n = 126). HIV-associated ocular illness was present in 21.4% of cases. In 9 (7%), retinal microvasculopathy was the most frequent result. Uveitis 4 (3.2%), ophthalmic Herpes Zoster 3 (2.4%), seborrhoeic blepharitis 3 (2.4%), and Molluscum contagiosum 3 (2.4%) were among the additional ocular symptoms they discovered. It was discovered that one patient had eyelid-related diffuse Kaposi sarcoma. Based on the findings of this study, they came to the conclusion that ocular symptoms are more significant in patients with ocular complaints or CD4 counts less than 200 cells/ μ L, although they can also be observed in patients with high CD4 or no ocular complaints.

A cross-sectional study of 553 patients was conducted by Acharya et al. (2012).^[12] They discovered that 7%, 9.94%, and 5.79% of the patients had anterior segment, posterior segment, and neuro-ophthalmic symptoms, respectively. Recurrent lid infections (1.45%), corneal opacity (1.08%), herpes zoster ophthalmicus (0.9%), healed anterior uveitis (0.9%), acute iridocyclitis (0.54%), and molluscum contagiosum (0.54%) were the most prevalent anterior segment manifestations, whereas HIV microangiopathy (5%) was the most prevalent posterior segment manifestation. Additional results included healed choroiditis (0.36%), active toxoplasmosis (0.36%), and CMV retinitis (2.54%).

In order to examine ocular problems in eastern China during the period of highly active antiretroviral therapy (HAART), Wang Z et al. (2012)^[9] studied 787 HIV/AIDS patients. They discovered that 26.30% had problems with their eyes. Ocular microangiopathy had the second-highest incidence (9.4%, 74/787), while CMVR had the greatest prevalence (10.6%, 83/787) among these ocular sequelae. They discovered that the ocular problems group's median CD4 T-cell count was 43 cells/ μ L, which was substantially higher than that of the asymptomatic group (116.5 cells/ μ L).

A descriptive study was conducted on all consecutive HIV-infected patients by Ifeanyi et al. (2013).^[10] During the course of this investigation, 150 HIV-positive patients were evaluated. Twenty-one individuals between the ages of eight and sixty-six showed signs of HIV/AIDS infection in their eyes. It was shown that 14% of people with HIV/AIDS had ocular symptoms (95% CI: 8.4–19.6). The most prevalent ocular manifestations in this population were uveitis (each 24%) and HIV-related microvasculopathy, which were followed by retrobulbar optic neuritis (19.2%) and Herpes zoster ophthalmicus (9.6%). More than two-thirds of ocular manifestations were caused by retrobulbar optic neuritis, uveitis, and HIV-related microvasculopathy. Conjunctiva microvasculopathy, CMV retinitis, and Herpes zoster ophthalmicus are further findings.

Correlation of Ocular Manifestation with CD4 Count

In our study, we found that among patients with ocular manifestations of HIV, 67.7% (44/65), in those patients who have a CD4 cell count below 100 cells/mm³. Among patients who have CD4 cell count of 100-200 cells/mm³ 21.5% (14/65) and in patients having a CD4 cell count >200 cells/mm³ 10.8% (7/65). They also found that the mean CD4 cell count of 93 cells/mm³ in those patients with ocular manifestations significantly differs from the asymptomatic group's mean CD4 cell count of 278 cells/mm³.

This study shows that ocular manifestation decreases when CD4 cell count increases. It is supported by the correlation coefficient, which is calculated as -0.9, which is a strong negative that shows when CD4 cell count increases, ocular manifestation decreases.

Various studies have shown similar findings that were found in our study: as CD₄ cell count decreases, ocular manifestation increases.

Douglas A. Jabs et al. (2007)^[16] found ocular manifestations in 389 patients, with 198 patients (51%) having a CD4 cell count of 0-100 cells/mm³, 86 patients (22%) having a CD4 cell count of 100-200 cells/mm³, and 101 patients (26%) having a CD4 cell count >200 cells/mm³.

Sophia Pathai et al. (2009)^[7] performed the study on 149 patients. They found ocular manifestations in 26 patients; in these 13 (50%) patients have a CD4 cell count of 0-100 cells/mm³, 7 patients (26.9%) have a CD4 cell count of 100-200 cells/mm³, and 6 patients (23.1%) have a CD4 cell count >200 cells/mm³.

Shah SU et al. (2009)^[6] conducted a cross-sectional study of 112 HIV-positive patients on HAART. 88.8% of ocular manifestations are present in those patients having a CD4 cell count of 0-100 cells/mm³, and 11.1% are present in patients having 100-200 cells/mm³. The prevalence of ocular manifestations and visual impairment was higher with the CD4 count of 0-100 cells/microl ($p = 0.002$). Additionally, they discovered that individuals with WHO clinical stages 3 and 4 had a higher prevalence of ocular symptoms ($p = 0.017$). There was a substantial correlation between the CD4 count and the HIV/AIDS WHO clinical stage and the incidence of ocular symptoms and vision impairment. CD4 count and WHO clinical stage may help predict their occurrence.

Lamichanne et al. (2009)^[17] performed a study on 117 patients. They found ocular manifestations in 55 patients, with 31 patients (56.3%) having a CD4 cell count of 0-100 cells/mm³, 16 patients (29%) having a CD4 cell count of 100-200 cells/mm³, and 101 patients (14.4%) having a CD4 cell count >200 cells/mm³. They concluded that as CD4 cell count decreases, ocular manifestations increase.

Col Poninder Kumar et al. (2011)^[5] performed a cross-sectional study to determine the CD4 cell counts as a strong indicator of ocular manifestations in HIV/AIDS patients. Of the 125 patients, they found that 43 of them experienced symptoms related to their eyes. Ocular lesions were present in 16 out of 21 patients, or 76.2% of those with a CD4 count < 100 cells/ μ L. Only 15.9% (10 of 63 patients) of patients with a CD4 count > 200 cells/ μ L had ocular lesions, compared to 43.9% (17 of 41 patients) of patients with a CD4 count between 100 and 200 cells/ μ L. The severity of the ocular disease is likely indicated by the greater frequency of ocular symptoms in patients with low CD4 levels. When the CD4 count was less than 200 cells/ μ L, all ocular symptoms were much more prevalent than when it was higher. They came to the conclusion that a low CD4 count is a significant indication of ocular lesions and is strongly associated with both the increased prevalence of ocular lesions and ocular discomfort.

In order to examine ocular problems in eastern China during the period of HAART (Highly Active Antiretroviral Therapy), Wang Z et al. (2012)^[9] studied 787 HIV/AIDS patients. They discovered that out of 207 individuals with ocular symptoms, 136 (65.7%) had a CD4 cell count between 0 and 100 cells/mm³, and 71 (34.3%) had a count greater than 100 cells/mm³. They discovered that the ocular problems group's median CD4 T-cell count was 43 cells/ μ L, which was substantially higher than that of the asymptomatic group (116.5 cells/ μ L).

348 HIV-positive patients participated in a cross-sectional study conducted by Bekele S et al. (2013).^[4] According to this study, individuals with ocular manifestation had a lower mean CD4+ T cell count (308.74 cells/ μ L) than patients without ocular manifestation (386.56 cells/ μ L). Additionally, they discovered that patients with a CD4+ T cell count of less than 200 cells/ μ L frequently experienced ocular manifestations. This study demonstrated a robust correlation between a low CD4+ T cell count and the incidence of ocular manifestations in HIV/AIDS patients.

CONCLUSION

The most prevalent ocular symptom in our study was HIV microangiopathy, which was characterised by vision decline and a patient's weakened immune system (low CD4 count). The next prevalent lesion is CMV retinitis, which has a very low CD4 count and a significant degree of visual

deterioration. Chorioretinitis, uveitis, complicated cataract, herpes zoster ophthalmicus, external hordeolum, corneal opacity, active tuberculoma, and episcleritis were the other ocular symptoms of HIV/AIDS that we examined. In this investigation, posterior segment lesions were more common than anterior segment lesions. HIV/AIDS is a major cause of ocular illnesses and visual impairment, including blindness, according to the study's findings. There was a substantial correlation between the low CD4 count and the incidence of ocular symptoms and vision impairment. Ocular symptoms were substantially more common in patients with a CD4 count of 0–100 cells/mm³ than in other patients. The prevalence of ocular symptoms in HIV/AIDS patients may have decreased with the introduction of HAART.

Patients with low CD4 levels had more severe ocular symptoms of HIV/AIDS in terms of visual decline. For treatment and a better visual prognosis, patients with a serological diagnosis of HIV/AIDS should have their ocular involvement evaluated and associated with their CD4 level.

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