

# A clinical study of ocular manifestations in HIV infection and their correlation with selected variables

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## Abstract

**Aim and objective:** To study visual deterioration caused by various ocular manifestations in HIV positive patients. To study correlation between ocular findings and CD4 count in HIV/AIDS patients. **Methodology:** This is a hospital based cross sectional study of 100 patients diagnosed for HIV having various ocular manifestations conducted in tertiary care hospital. **Discussion:** In the present study 78% belonged to the economically productive age group of 21-50 years. Posterior segment lesions showed significant association with low CD4 count. Most of the posterior segment lesions had CD4 count less than 200cells/mm<sup>3</sup>


**Keywords:** Ocular manifestations, CD4 Count.

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## INTRODUCTION

Human immunodeficiency virus (HIV) is a lentivirus (a member of the retrovirus family) that causes acquired immunodeficiency syndrome (AIDS) a condition in which progressive failure of the immune system allows life threatening opportunistic infection and cancer to thrive. Infection with HIV occurs by the transfusion of blood, drug abusers, semen, vaginal fluids, pre-ejaculates, or breast feeding. Within these bodily fluids, HIV is present as both, free virus particles and virus within infected immune cells.<sup>1</sup>

The four major routes of transmission are

1. Sexual transmission: HIV predominantly a sexual transmitted disease (STD). the most common mode of infection is by heterosexual transmission,<sup>2</sup>

2. Contaminated needle: Needle or cut with sharp object (approx. 0.3%)<sup>2</sup>
3. Direct exposure to contaminated blood and blood products
4. Transplacental or perinatal transmission: Mother to infant transmission rates vary from 25-35%. Infants can become infected in utero, during the birth process, or more commonly through breast feeding. High maternal viral load is a risk factor for the transmission.<sup>3</sup>

Screening of blood products for HIV has largely eliminated transmission through blood transfusions or infected blood products because of strict law for donor and blood banks. HIV infected person is diagnosed with AIDS when his or her immune system is seriously compromised and manifestations of HIV infection are severe. The Centre for Disease (CDC) in USA extended the definition of AIDS to include all those persons who are severely immunocompromised (CD4+ T cells count < 200/cumm) irrespective of the presence or the absence of the indicators of disease.<sup>4</sup> The total number of HIV patients in the world is estimated to be 35 millions in 2014. HIV has the capability to affect every organ system in the body through direct damage by the virus or by rendering the host susceptible to opportunistic infections. Ocular manifestations have been reported in up to 70% of individuals infected with HIV and it has become apparent that the ocular manifestations almost invariably reflect

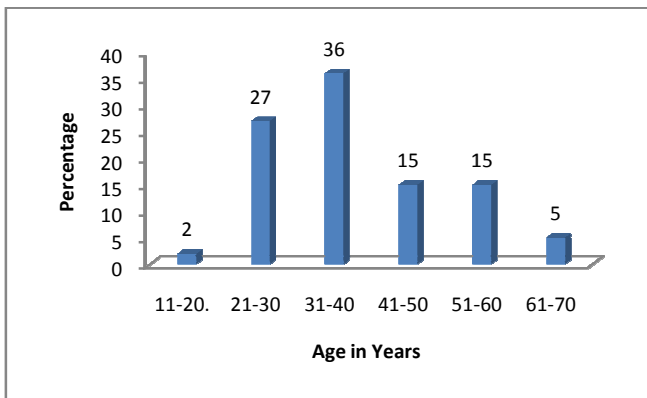
systemic disease and may be the first sign of disseminated sign in many cases. Ocular manifestations in HIV patients range from simple blepharitis to severe blinding conditions like CMV retinitis. As HIV is an illness that interferes with immune system making people with AIDS much more likely to get infections, including opportunistic infections and tumours that do not affect people with working immune systems. Ocular complications if detected at an early stage and managed properly, can be helpful to prevent or minimize potential visual damage. Ocular complications are common, affecting 50% to 75% of all such patients at some point during the course of their illness. Cytomegalovirus retinitis is by far the most common cause of vision loss in patients with AIDS. Less frequent but important cause of bilateral vision loss in patients with HIV/AIDS includes ocular tuberculosis, varicella zoster virus and herpes simplex virus retinitis, HIV-related ischaemic microvasculopathy, ocular syphilis, cryptococcal meningitis, and ocular toxic or allergic drug reaction.

**MATERIAL AND METHOD**

A total 100 patients with various age groups, irrespective of male or female were studied. Patients admitted in the Tertiary care hospital who are diagnosed with HIV infection were included in the study. Data was collected using interview, clinical examination and laboratory

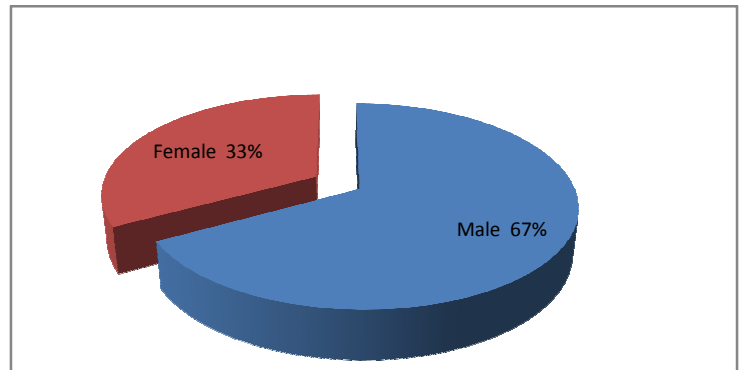
investigations (ELISA, CD4 counts etc.) Detail demographic profile of the patients including age, gender, ethnic group and duration of HIV infection diagnosed was undertaken. History of receiving antiretroviral therapy, risk factors for the transmission of HIV was assessed. All patients were personally interrogated thoroughly and a detailed history was taken including the past history and of ocular complaints was also enquired. All the patients had CD4 values at first visit. A detailed and meticulous physical examination was done and recorded in the proforma. Relative investigations as advised by the attending physician were carried out and their reports noted. A detailed ophthalmic examination was carried out in all patients. All patients irrespective of symptoms were subjected to visual acuity assessment with Snellen’s chart, Schirmer’s test, Slit lamp examination, and direct ophthalmoscopic examination (after full dilatation of the pupils with phenylephrine and/tropicamide eye drops). Gonioscopy, 90 D, Indirect ophthalmoscopy with 20 D, Tonometry (Perkins tonometer) examination was also carried out as required on the case basis. Visual acuity was recorded as finger counting in illiterate and bedridden patients. Documentation was done by fundus diagrams, slit lamp photographs and photographs of eyes with adnexal and anterior segment lesions.

**OBSERVATION AND RESULTS**



**Figure 1:** Age distribution of patients studied

The mean age of all patients was 39.41±11.94 years. 78 patients (78%) were in the economically earning age group of 21 to 50 years.



**Figure 2:** Gender distribution

In this study, 67% were males. The male: female ratio was 2.03:1

**Table 1:** Distribution of patients based on CD4 count

CD4 count in cells/mm <sup>3</sup>	Number of Patients	%
1-100	36	36.00
101-200	30	30.00
>200	34	34.00
<b>Total</b>	<b>100</b>	<b>100.0</b>

Mean ± SD: 211.04± 192.01, Median CD4 count: 146, Range: 15-890.

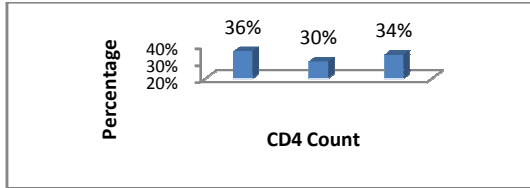


Figure 3: Distribution of patients based on CD4 count

Severe depletion of CD4 counts was seen 36% of the study subjects (1-100 cells/mm<sup>3</sup>). Moderate depletion (100-200 cells/mm<sup>3</sup>) was seen in 30% of the 100 cases and mild depletion (>200 cells/mm<sup>3</sup>) in 34%. Median CD4 count in this study was 146 with the range of 15-890.

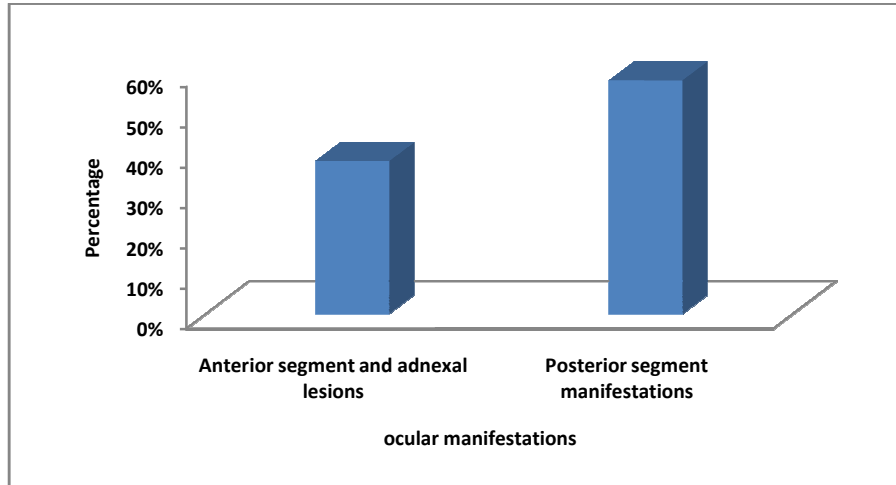


Figure 4: Classification of the patients based on the ocular manifestations in different segments of the eye

58% of the patients had posterior segment involvement and 38% in the anterior segment of the eye, some of them had involvement of the both and in such case the findings are counted separately.

Table 2: Classification of ocular manifestations and their distribution based on eye affected

Sr.No.	Ocular Manifestations		
	Anterior segment and adnexal lesions	No. of Patients	%
1	Uveitis	9	9
2	Molluscum contagiosum	5	5
3	Complicated Cataract	8	8
4	Kaposi sarcoma/SCC	0	0
5	HZO	7	7
6	Episcleritis	1	1
7	External hordeolum	3	3
8	Dry eye	4	4
9	Chronic dacryocystitis	0	0
10	Corneal opacity	1	1

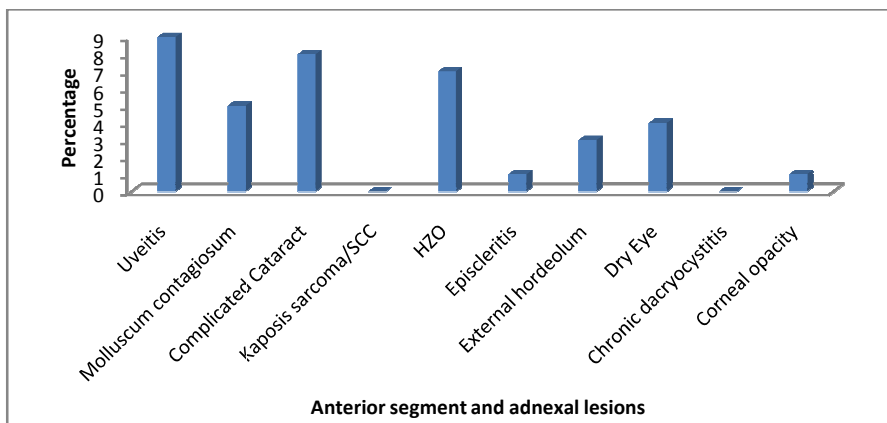
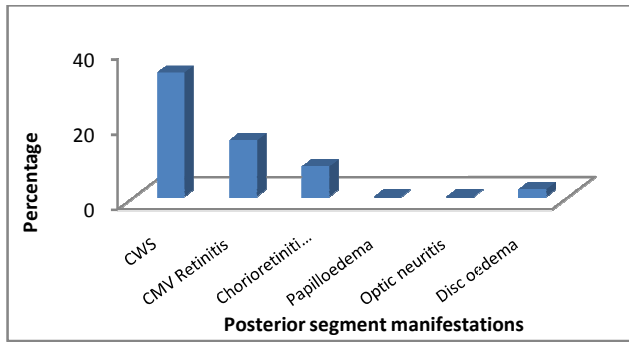


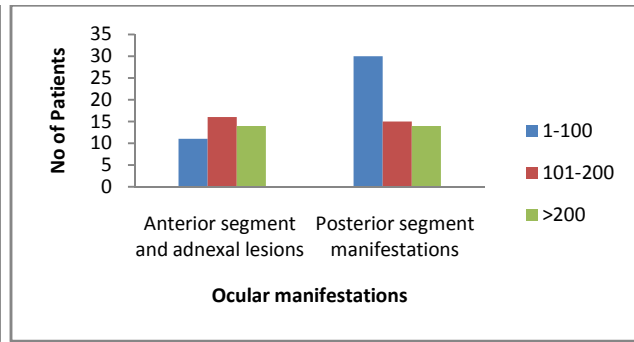
Figure 5: Classification of ocular manifestations and their distribution based on eye affected

**Table 3:** Classification of ocular manifestations and their distribution based on eye affected

Sr.No.	Ocular Manifestations		
	Posterior segment manifestations	No of Patients	%
1	CWS	33	33
2	CMV Retinitis	15	15
3	Chorioretinitis(Active/healed)	8	8
4	Papilloedema	0	0
5	Optic neuritis	0	0
6	Disc oedema	2	2



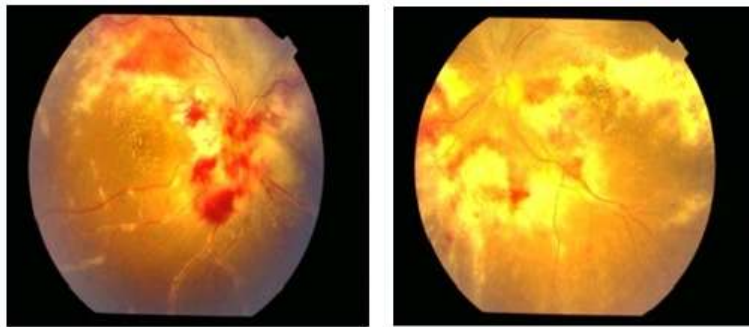
**Figure 6**



**Figure 7**

**Figure 6:** Classification of ocular manifestations and their distribution based on eye affected.

**Figure 7:** Correlation of Ocular manifestations according to CD4 counts



**Figure 8:** Active CMV retinitis

**DISCUSSION**

According to study of Jyothirmay Biswas *et al*<sup>5</sup> 76% patients belonged to the economically productive age group of 21-50 years whereas in Aartee Palsule *et al*<sup>6</sup> all the percentage was 58.2 % and Lamichhanne<sup>7</sup> all it was 78.6%. In the present study 78% belonged to the economically productive age group of 21-50 years which is consistent with previous studies. This needs emphasis as the morbidity of these patients has a considerable impact on the economy of the whole country and their family. Male –to-female ratio was 2.03:1 in our study. Various other studies related to ocular manifestations in HIV ranges male to female ratio from 4.26:1 (Douglas A. Jabs *et al* 2010)<sup>8</sup> to 1.23:1. (Yared Aseefa *et al* 2004)<sup>11</sup> In our study the CD4 count was less than 100 cells/cu.mm in 36% of patients whereas in various other studies it ranged from 88.8 % (Shah SU *et al* 2009)<sup>10</sup> to 31.8% (Aratee Palsule *et al* 2007)<sup>6</sup>. 30% patients had CD4 counts between 101 – 200 cells/cu.mm where as in other studies

it ranged from 29 % (Lamichhanne *et al* 2009)<sup>7</sup> to 11.1 % (Shah SU *et al* 2009)<sup>11</sup>. 34% patients had CD4 counts more than 200 cells/cu.mm where as in other studies it ranged from 48.8% % (Aratee Palsule *et al* 2007)<sup>6</sup> to 0 % (Shah SU *et al* 2009)<sup>10</sup>. 66% of the patients having CD4 count less than 200cells/mm<sup>3</sup> had ocular manifestations of HIV in our study. Compared to other studies having patients with CD4 count less than 200 cells/mm<sup>3</sup>, ocular manifestations were found to be 66% in our study. Baring study by Palsule *et al* (51%) all other studies had ocular involvement ranging from 73% (Douglas A *et all*)<sup>8</sup> to 100% (Shah SU *et al* 2009 )<sup>11</sup>. Though the difference was not statistically significant, lesser percentage of ocular involvement due to HIV in our study can be explained by the fact that 62% of our patients were on HAART therapy. Hence, it may be safe to conclude that HAART therapy decreases ocular manifestations of HIV though this may need further studies. Posterior segment lesions showed significant

association with low CD4 count. Most of the posterior segment lesions had CD4 count less than 200cells/mm<sup>3</sup>. All active cases of CMV retinitis had CD4 count less than 100 cells/mm<sup>3</sup> which showed that low CD4 count is a good predictor for CMV retinitis and posterior segment manifestations. However, its diagnosis cannot be excluded based on CD4 count alone in patients taking HAART. In exceptionally rare instances, CMV retinitis may develop in patients with elevated CD4 count shortly after initiation of HAART.<sup>8</sup> There was no significant association found between cotton wool spots and CD4 count. We found a significantly higher correlation of ocular manifestations of HIV with lower CD4 count this suggest that HIV related ocular manifestations is related to the degree of immune suppression in HIV infected patients.

### CONCLUSION

Majority of patients were aged 21-50yrs. The prevalence of ocular manifestations was higher in males (67%) than females (33%) The common ocular manifestations encountered in this study were HIV retinopathy, CMV retinitis, chorioretinitis, uveitis, complicated cataract, HZO and molluscumcontagiosum. Posterior segment lesion were more commonly observed in this study than anterior segment lesions. 9% of these patients had coexisting systemic manifestation of HIV/ AIDS, which were pulmonary tuberculosis, tuberculous meningitis and oral candidiasis. Severity of ocular manifestations in HIV/AIDS with respect to visual impairment was higher in patients with CD4 counts < 200cells/mm<sup>3</sup>

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