

Clinical study on ocular manifestations in HIV/AIDS relation to CD4 count in tertiary care hospital, Andhra Pradesh

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Abstract

Purpose: Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions affecting multi system disorder caused by infection with the retrovirus, Human immunodeficiency virus (HIV). Ocular manifestations in HIV positive patients range from simple blepharitis to severe blinding condition like CMV retinitis. The virus infect T lymphocytes resulting in profound immunodeficiency leading to opportunistic infections and neoplasms. The severity of ophthalmic sequel of HIV infection increases as immune competency decreases, which is related to CD4+ T cell count. One marker of immune activation, CD38 expression by CD4 and CD8 cells, has been shown to be an important prognostic marker for mortality or disease progression that is independent of viral load (VL). The main aim of the study is to determine the patterns of ocular manifestations of HIV/AIDS and their correlation with CD4+Tcells count and to emphasize on the need of developing a specific ophthalmic examination for the management of ocular manifestations in the care of HIV infected patients.

Materials and Methods: It is a prospective study with purposive sampling. Total 100 cases of All HIV-infected patients who presented or were referred to our ophthalmology department by other departments of our tertiary care hospital between January 2019 and February 2020 were included in the study. They grouped in three categories as patients with CD4 count <100cells/uL, Between 100-200 cells/uL and >200cells/uL. Inclusion criteria are Registered HIV positive patients, Patients the age above 10 years, Willing to give prior consent for evaluation. Exclusion criteria are patients less than 10 years of age, Disseminated metastasis, AIDS who are terminally ill. Method is detailed history taking regarding the symptoms and duration of the HIV infection diagnosed, CD4 and CD8 counts and careful and detailed ocular examination was done.

Results: A total of 100 patients who were HIV positive were examined. CD4 and CD8 counts were done for all patients. Among them females were 64 and males were 56. Eleven patients had received treatment with anti retroviral drugs. CD4 counts of < 100 cells/μL were found in 11 patients (11%), between 100 and 200 cells/μL in 32 patients (32%), and > 200 cells/μL in 57 patients (57%). A total of 100 cases, 27 (27%) patients had ocular lesions. Posterior segment lesions like CMV retinitis and other retinal diseases are more common in CD4 count less than 100cells/uL. In this study, among the ocular lesions Anterior Uveitis / Iridocyclitis, CMV retinitis and complicated cataract were the frequent ocular lesions.

Conclusion: We hereby conclude that the severity of ocular manifestation in HIV/AIDS in respect to visual morbidity is higher in patients having lower CD4 count. So early detection and appropriate management is essential to prevent ocular morbidity by examining the HIV/AIDS patients along with CD4 counts. Special care should be taken for patients with low CD4 count.

Keywords: HIV/AIDS, CD4 count, Ocular manifestations, anterior and Posterior segment lesions.

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I. Introduction

Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) is a spectrum of conditions affecting multi system disorder caused by infection with the retrovirus, Human immunodeficiency virus (HIV).^{[1][2][3]} The aetiological agent of AIDS, HIV, belongs to the family of human retroviruses and the subfamily of lentiviruses. The virus infects the T-lymphocytes, resulting in profound immunodeficiency leading to opportunistic infections and neoplasms such as Kaposi's sarcoma.[4] HIV first described in 1981 in Los Angeles, USA, HIV was detected in India in 1986[5]The original description of ocular involvement in patients with AIDS by Holland and coworkers in 1982.[6] The first two cases of ocular lesions in AIDS patients in India were reported by Biswas et al in 1995.[7]

The recent World Health Organization (WHO) estimate of the total HIV burden in the world is 33.2 million (30.6–36.1 million).^[8] In India, that in view of the large population size, a mere 0.1% increase in prevalence rate would increase the numbers of patients living with HIV infection by over half a million.^[9]

The eye is an organ with wide spectrum HIV-related manifestations. The ocular manifestations can be the presenting sign of a systemic infection in an otherwise asymptomatic HIV-positive person. The disease can have adnexal, anterior segment, posterior segment, orbital, and neuroophthalmic manifestations.^[10] Blindness, due to HIV-related complications, is also one of the problems endangering the life of people living with HIV.^{[11,12].}

The virus infect T lymphocytes resulting in profound immunodeficiency leading to opportunistic infections and neoplasms. There are presently more than 40 million cases of HIV worldwide [13]. More than 90% of all HIV sufferers live in developing country. Up to 50-75% of Patients have at least one ocular manifestation in their lifetime [14]. It can involve any part of the eyeball. Ocular manifestations invariably reflect systemic disease and can be the initial manifestations of HIV in many cases. The severity of ophthalmic sequel of HIV infection increases as immune competency decreases, which is related to CD4+ T cell count [15]. Ocular manifestations in HIV positive patients range from simple blepharitis to severe blinding condition like CMV retinitis. CMV retinitis is by far the most frequent cause of vision loss in patients with AIDS [16]. Although introduction of HAART has reduced the risk of non-refractive visual morbidity and opportunistic infections in AIDS [17], an understanding of ocular sequel of HIV infection can lead to the early diagnosis of AIDS, which along with an early and effective treatment might be able to reduce the ocular and general morbidity in AIDS.

The hallmark of untreated HIV infection is a remarkable CD4 T-cell depletion in the majority of patients, yet the mechanisms leading to this depletion in vivo remain uncertain. Immune activation appears to play a major role in the pathogenesis of HIV infection and probably contributes to this CD4 depletion. [18,21]. One marker of immune activation, CD38 expression by CD4 and CD8 cells, has been shown to be an important prognostic marker for mortality or disease progression that is independent of viral load (VL). [22,23] A major manifestation of immune activation is an increase in cell proliferation and death, especially of CD4 and CD8 T cells.

The main aim of the study is to determine the patterns of ocular manifestations of HIV/AIDS and their correlation with CD4+Tcells count and to emphasize on the need of developing a specific ophthalmic examination for the management of ocular manifestations in the care of HIV infected patients.

II. Materials and Methods

All HIV-infected patients who presented or were referred to our ophthalmology department by other departments of our tertiary care hospital between January 2019 and February 2020 were included in the study. Total 100 cases were taken for this study. It is a prospective study with purposive sampling. As per the NACO guidelines, the definitive diagnosis of symptomatic patients was made, confidentiality was maintained and the personal details of the patients not maintained. They grouped in three categories as patients with CD4 count <100cells/uL, Between 100-200 cells/uL and >200cells/uL.

Inclusion criteria

Registered HIV positive patients with or without ocular manifestations
Both male and female patients.
Patients the age above 10 years
Willing to give prior consent for evaluation.

Exclusion criteria

Patients less than 10 years of age..
Patients suffering from diabetes, any type of glaucoma, or any other pre-existing retinal disorder were excluded.
Disseminated metastasis
AIDS who are terminally ill.

Method

Detailed history taking regarding the symptoms and duration of the disease, profile of the patients including age, gender, occupation, residence and duration of HIV infection diagnosed. A careful and detailed ocular examination was carried out which includes:

Best corrected visual acuity.

Ocular motility was tested with torch light in cardinal gazes.

Examination of adnexae and extra ocular structures included the examination of face, orbits, eyebrows, eyelids, palpebral fissure using slit lamp.

Examination of anterior segment was carried out by slit lamp.

Examination of posterior segment - under mydriasis by Direct and Indirect ophthalmoscopy.
Lacrimal sac examination was done by lacrimal sac syringing.
Ultrasonography was performed.
Routine laboratory investigation like complete hemogram, serum creatinine, blood urea, blood sugar.
Viral marker test along with CD4 and CD8 T lymphocyte count was performed.

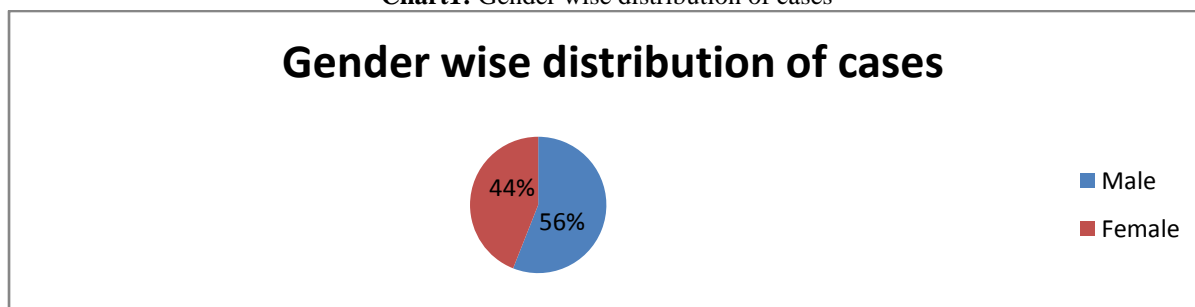
To prevent cross contamination, the instruments were irrigated with tap water and then disinfected by soaking in absolute alcohol for 10 minutes and rinsed with tap water and allowed to dry for 10 minutes after each procedure. For dilated fundus examination 1% tropicamide with or without phenylephrine was used and to anaesthetize the surface of the eye during intraocular pressure measurement and gonioscopy, 4% lignocaine eye drop was used. For some patients, based on their clinical finding, toxoplasmosis and syphilis serology tests were done. Histo-pathologic technique was used to confirm cases of tumor. For all patients, CD4 count was done during the study.

III. Results

In this study we screened 100 patients, among 100 patients males are 56% and females are 44%. In our study among the patients with ocular manifestations the patients having Visual acuity 6/6 to 6/24 were 16, patients having the visual acuity 6/24 to 6/60 were 5, the patients having 6/60 to PL were 6.

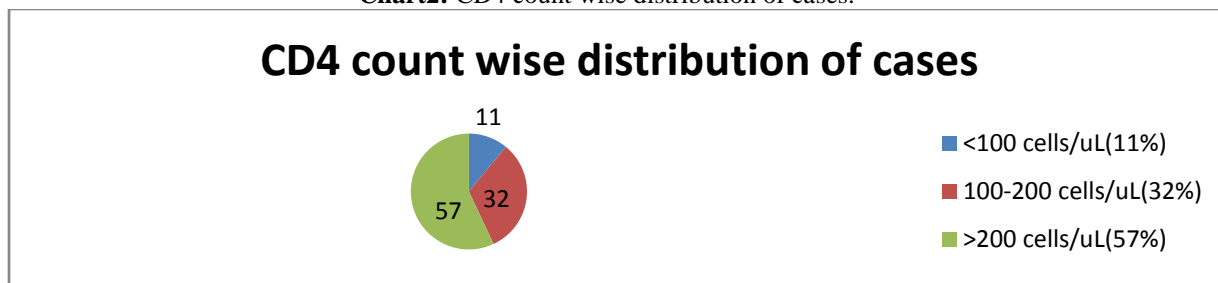
Among the patients without ocular manifestation Visual acuity 6/6 were 48, visual acuity 6/24 to 6/60 were 21, the patients having visual acuity 6/60 to PL were 4

Chart1: Gender wise distribution of cases



A total of 100 patients who were HIV positive were examined. CD4 and CD8 counts were done for all patients. Among them females were 64 and males were 56. Eleven patients had received treatment with anti-retroviral drugs. CD4 counts of < 100 cells/ μ L were found in 11 patients (11%), between 100 and 200 cells/ μ L in 32 patients (32%), and > 200 cells/ μ L in 57 patients (57%) as shown in chart2

Chart2: CD4 count wise distribution of cases.

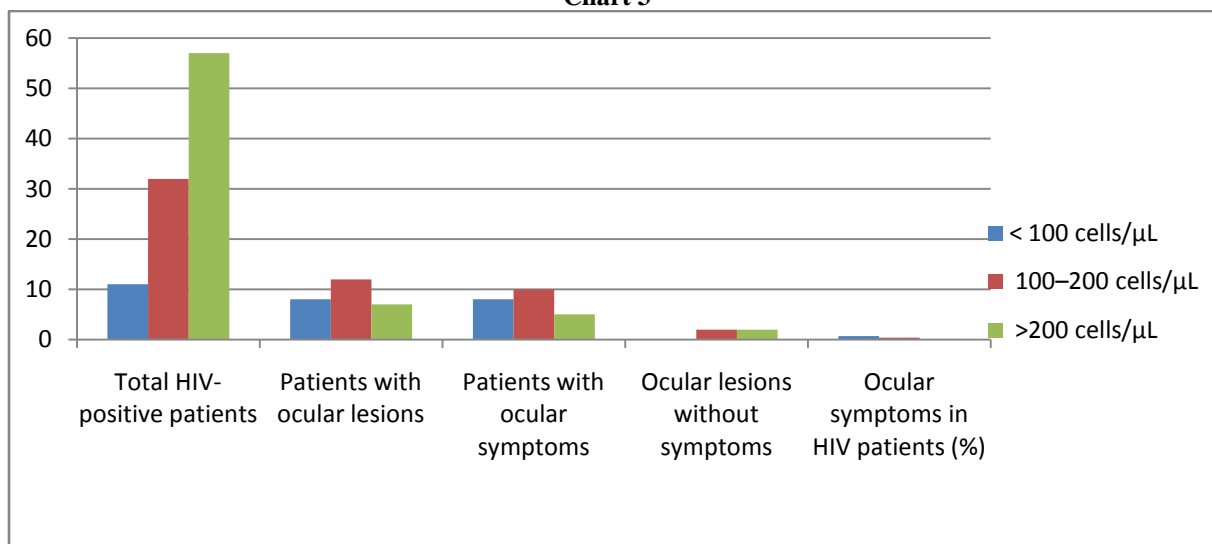


A total of 100 cases, 27 (27%) patients had ocular lesions and 23 patients had ophthalmic symptoms. Diminution of vision was the commonest symptom in 16 (13.6%) patients followed by other ocular symptoms were 11. (11.2%) Among the patients other ocular symptoms other than diminished vision were redness of eyes in 12 patients, pain in 6 (3.2%) patients, and only lid related in 3 patients (0.8%). The incidence of ocular lesions and ophthalmic symptoms in relation to the CD4 counts of the patients related to CD4 count is given in Table 1 and chart3

Table 1: Ophthalmic symptoms relation to CD4 counts

	< 100 cells/ μ L	100–200 cells/ μ L	>200 cells/ μ L
Total HIV-positive patients	11	32	57
Patients with ocular lesions	8	12	7
Patients with ocular symptoms	8	10	5
Ocular lesions without symptoms	0	2	2
Ocular leisons in HIV patients (%)	72.7	37.5	12.2

Chart 3

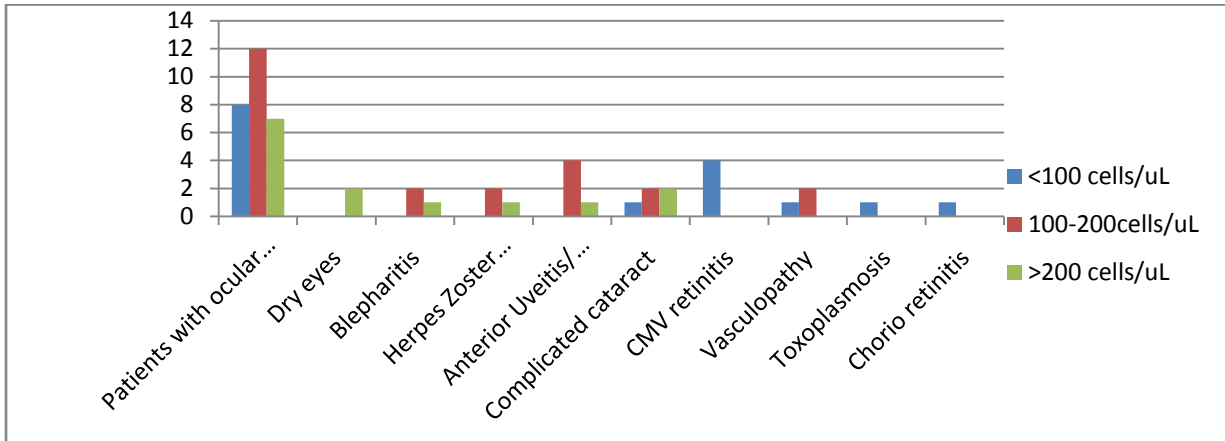


The anterior segment lesions like blepharitis, dry eyes, complicated cataract, Anterior uveitis more common when CD4 is more and Posterior segment lesions like CMV retinitis, Toxoplasmosis, Vasculopathy, Chorioretinitis are more common in CD4 count less than 100cells/uL as shown table2 and chart 4.

Table2: Ocular lesions relation to CD4 counts

Patients with ocular lesions	< 100 cells/ μ L	100-200cells/uL	>200 cells/uL
Total patients	11	32	57
Patients with ocular lesions	8	12	7
Patients without ocular lesions	3	20	50
Dry eyes	0	0	2
Blepharitis	0	2	1
Herpes Zoster ophthalmicus	0	2	1
Anterior Uveitis/ Iridocyclitis	0	4	1
Complicated cataract	1	2	2
CMV retinitis	4	0	0
Vasculopathy	1	2	0
Toxoplasmosis	1	0	0
Chorio retinitis	1	0	0

Chart 4: Ocular lesions relation to CD4 counts



Among the 100 patients, 27 patients show ocular lesions. Among these 27 patients, Anterior uveitis and complicated cataract share 18.5% each, mostly common when the CD4 count is between 300 cells/uL and CMV retinitis (14.8%) and other retinal diseases share 29.61%. The retinal disease most commonly seen in CD4 count less than 100 cells/uL as shown in chart 5.

Chart 5: Percentage of ocular manifestation in HIV

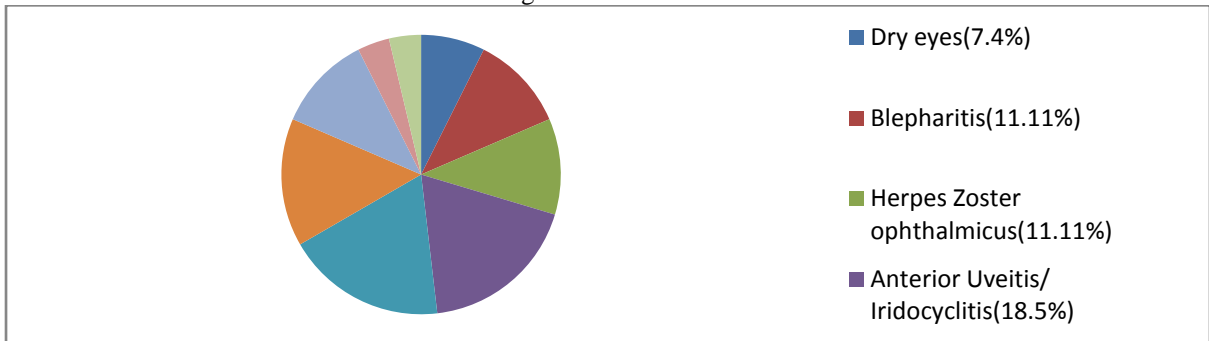


Chart 6: CD4 count wise clinical presentation of anterior and posterior segment

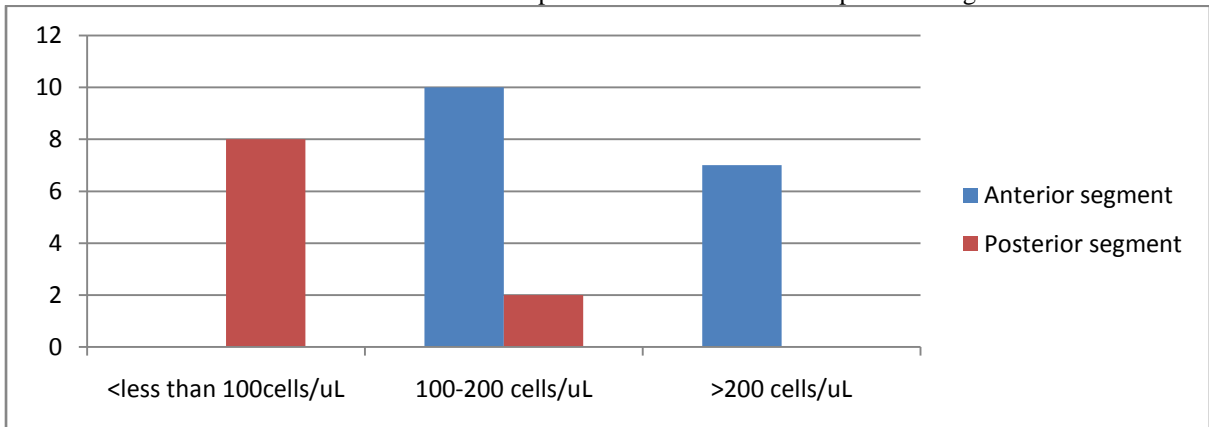
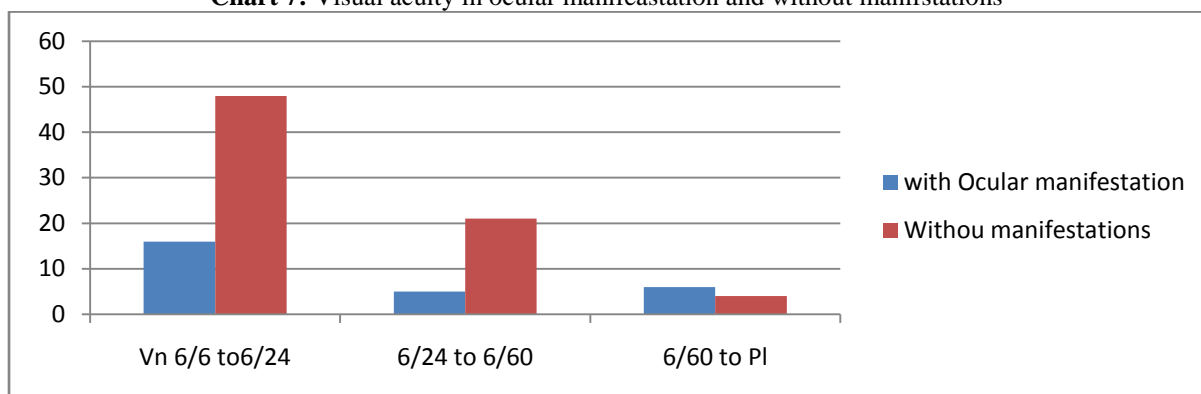


Chart 7: Visual acuity in ocular manifestation and without manifestations



IV. Discussion

In this study, among total 100 patients male patients more compared to female. Males are 56% and females are 44%. The ratio among male and female is 1.27:1. It is consistent with the study of Yared Aseefa et al, ia 1.23:1.

In this study among the patients with ocular manifestations the patients having Visual acuity 6/6 to 6/24 were 16, patients having the visual acuity 6/24 to 6/60 were 5, the patients having 6/60 to PL were 6. Among the patients without ocular manifestation Visual acuity 6/6 were 48, visual acuity 6/24 to 6/60 were 21, the patients having visual acuity 6/60 to PL were 4. 64% were having visual acuity of 6/6 to 6/24, 26% were having 6/24 to 6/60 and 10% were having 6/60 to PL. this study correlates with A prevalence study of ocular manifestations in HIV positive patients on highly active anti-retroviral therapy done by Hemal S Hothi, Neepa R Gohil, Nilesh V Parekh and Sagar S Patel, *Biomed Res Clin Prac*, 2019.

In our study, 27 (27%) cases were having ocular manifestations and 73(73%) cases were not having ocular manifestations. The prevalence of ocular lesions is marginally lower compared to other studies which can perhaps be explained by the fact that many of our patients were recently diagnosed.

In our study, among the total 100 cases 11 were having the CD4 count less than 100 cells/ μ L. The cases having CD4 count between 100–200 cells/ μ L were 32 and cases having CD4 count >200 cells/ μ L were 57. The Patients with < 100 cells/ μ L having ocular lesions were 8, the patients with CD4 count between 100–200 cells/ μ L having ocular lesions were 12 and the patients with CD4 >200 cells/ μ L having ocular complications were 7. Percentage of Ocular lesions in HIV patients < 100 cells/ μ L 72.7%, in patients between 100–200 cells/ μ L 37.5%, and in patients >200 cells/ μ L 12.2%. The study in Percentage of Ocular lesions in HIV patients < 100 cells/ μ L is correlates with Shah SU et al, 2009, Percentage of Ocular lesions in HIV patients 100-200 cells/ μ L is slightly correlates with Lamichanne et al 2009.

In this study, among the ocular lesions Anterior Uveitis / Iridocyclitis and Complicated cataract(18.5%) were the frequent ocular lesions. CMV retinitis were 14.8%, Dry eyes 7.4%, Blepharitis 11.11%, Herpes Zoster ophthalmicus 11.11%, Vasculopathy 11.11%, Toxoplasmosis 3.7% Chorioretinitis 3.7%.

Low CD4 count is strongly related to the increased prevalence of ocular lesions as well as ocular symptoms. Cytomegalovirus retinitis is much more common in low CD4 counts. The high incidence of ocular symptoms in patients with low CD4 counts probably signifies the gravity of the ocular disease. This data is quite comparable to the other series from the published literature. All ophthalmic manifestations were much more common when the CD4 count was < 200 cells/ μ L, than being above.

In this study Posterior segment lesions were more common in patients having low CD4 count less than 200 cells/ μ L. The anterior segment lesions are common in groups but more common in CD4 100 to 200 cells/ μ L. The study is consistent with other published literature.

V. Conclusion

In the patients serological diagnosed HIV/AIDS, majority cases having CD4 count more than 200 cells/ μ L. The ocular manifestations are more common in patients having CD4 count less than 200 cells/ μ L. The posterior segment ocular lesions are more common in patients having low CD4 count less than 100 cells/ μ L.

Anterior Uveitis/ Iridocyclitis and Complicated cataract are the common ocular lesions in HIV/AIDS. Retinopathy and retinal diseases are the most common ocular manifestations encountered in our study leading to visual deterioration. CMV retinitis is the common lesion with varied degree of lesions and CD4 count range. The other ocular manifestations are Dry eyes, Blepharitis, Herpes Zoster ophthalmicus, Vasculopathy and Toxoplasmosis.

In the patients having ocular manifestations at some point during the course of illness and many times leading visual disability and making them socio-economically unproductive. Early diagnosis and prompt treatment will go a long way in preventing the visual handicap.

We hereby conclude that the severity of ocular manifestation in HIV/AIDS in respect to visual morbidity is higher in patients having lower CD4 count. So early detection and appropriate management is essential to prevent ocular morbidity by examining the HIV/AIDS patients along with CD4 counts. Special care should be taken for patients with low CD4 count.

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