**Original Article**

# Ocular Manifestations in HIV/AIDS Patients Undergoing Highly Active Antiretroviral Therapy

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**Purpose:** To study Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS) related ocular manifestations in patients undergoing highly active anti-retroviral therapy (HAART) in Jeddah, Saudi Arabia.

**Study Design:** Descriptive study.

**Place and Duration of Study:** Ophthalmology Clinic of East Jeddah Hospital. Kingdom of Saudi Arabia, during 2016-2017.

**Material and Methods:** All patients who were positive for HIV/AIDS and taking highly active anti-retroviral therapy seen in the department of Infectious diseases of our hospital were included in the study. The data for the 47 HIV/AIDS positive referrals was collected from the Infectious Diseases Department by taking history, clinical examinations, and laboratory investigations. The ophthalmological examination consisted of adnexal examination, best corrected visual acuity, Intraocular pressure (IOP), anterior and posterior segment examination, B-scan and MRI.

**Results:** There were 47 patients included in the study. There was one patient each of retinal necrosis, anterior uveitis “and” neovascular glaucoma, pterygium, sixth nerve palsy, bacterial conjunctivitis and adenoviral conjunctivitis. Two cases presented with HIV microangiopathy, blepharitis, cortical blindness after brain abscess, herpes infection, Kaposi sarcoma and cytomegalovirus (CMV) retinitis. Three patients presented with meningitis and six with dry eyes. Eight patients presented with cataracts and ten with refractive errors tuberculosis.

**Conclusion:** Ocular manifestations of HIV infection are relatively infrequent in patients on HAART as this has reduced the HIV-related complications in ophthalmology.

**Keywords:** Human Immunodeficiency Virus, Acquired Immunodeficiency Syndrome, Highly Active Anti-Retroviral Therapy.

AIDS is caused by HIV and may affect any part of the body[1]. Nearly 36.7 million people are living with HIV/AIDS, and the mortality rate worldwide was 1.1 million reported cases up to 2015[2]. Kingdom of Saudi Arabia is one of the least affected states in the world HIV map[3,4].

Since HIV leads to disruption of the immune system, all body parts are susceptible to infection, including eye. Healthy HIV patients are not liable to encounter eye issues identified with a decreased immune system. However, 70 percent of patients with AIDS experience ocular diseases[5].

Eye complications, as a result of suppressed immune system consist of HIV retinopathy, tiny hemorrhages and cotton wool spots in the retina. One of the severe eye problems associated with AIDS is cytomegalovirus (CMV) retinitis, which is seen in some individuals who have further developed stages of AIDS where CD4 lymphocyte count is < 50 cells/μL. It shows consistent inflammation of the retina, often leading to retinal deterioration and visual loss within few months.

CMV retinitis can lead to a detached retina, causing severe vision loss unless treated surgically[6]. Kaposi's sarcoma is an uncommon type of malignancy that happens in patients with AIDS. This growth can cause violet sores to form on eyelids, and purple, plump lesions to develop on the conjunctiva. Kaposi's sarcoma may appear unexpectedly, although it mainly does not hurt the eye, and can be easily treated[7]. Research has demonstrated that increased number of cases presenting with conjunctival squamous cell carcinoma is related to exposure to daylight combined with infection with the human papilloma virus infection (HPV) sometimes identified with HIV disease[8]. The occurrence of eye diseases, related with a sexually transmitted disease, might be more typical in patients with HIV, such as herpes infection, toxoplasmosis, gonorrhoea, chlamydia, candida, microsporidia and pneumocystis[5].

The objective of this study is to determine HIV/Acquired Immunodeficiency Syndrome (AIDS) related ocular manifestations during a one year study conducted at East Jeddah Hospital, Jeddah, Saudi Arabia.

## MATERIAL AND METHODS

A one year retrospective study was conducted in the clinic of East Jeddah Hospital, in the western region of Kingdom of Saudi Arabia during 2016-2017. All patients who were positive for HIV/AIDS and taking highly active anti-retroviral therapy seen in the Infectious disease of our hospital were included in the study. All patients with other infectious diseases were excluded from the study. The data for the 47 HIV/AIDS positive referrals was collected from the Infectious Diseases Department by taking history, clinical examinations and laboratory investigations. The ophthalmological examination consisted of adnexal examination, best corrected visual acuity, Intraocular pressure (IOP), anterior and posterior segment examination, B scan and MRI.

## RESULTS

There were 47 patients diagnosed and treated with an eye-related problem due to AIDS. There were single cases of retinal necrosis, anterior uveitis, neovascular glaucoma, pterygium, sixth nerve palsy, bacterial conjunctivitis and adenoviral conjunctivitis each. Two cases presented with HIV microangiopathy, blepharitis, cortical blindness after brain abscess, herpes infection, Kaposi sarcoma, cytomegalovirus (CMV) retinitis and two patients presented with Molluscum contagiosum. Three patients presented with tuberculous meningitis, and six with dry eyes. Eight patients presented with cataracts, and ten with refractive errors (Figure 1).

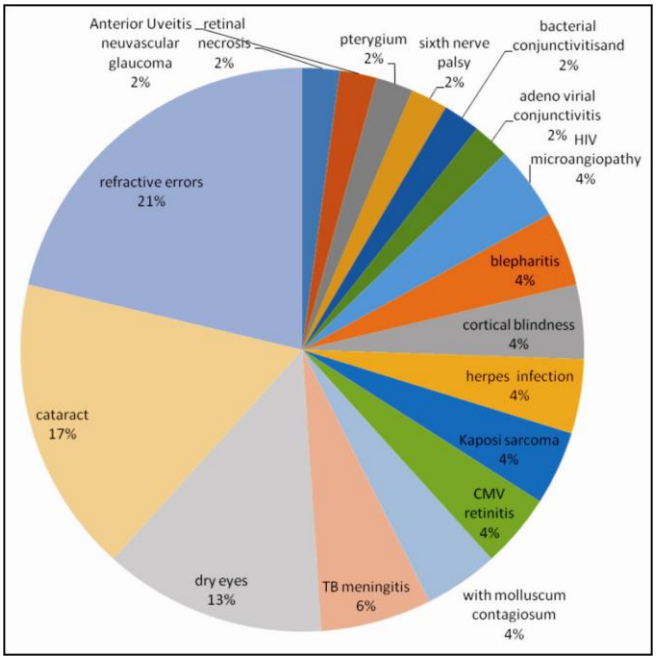


**Fig. 1:** Pie chart of the ocular manifestations of HIV/AIDS at East Jeddah Hospital, Jeddah, KSA.

The descriptive statistics of observed patients is shown in Table 1. Ocular manifestations also occur in patients with different viral load levels. All severe blinding complications we encountered, presented in newly-diagnosed patients with high viral loads and a CD4 count less than 100. The balance of male/female patients in our study is shown in Fig 2. The frequency of males living with HIV/AIDS is almost threefold the number of female patients. Out of 10 patients, seven were male.

**Table 1:** Descriptive Statistics of observed patients.

| | N | Minimum | Maximum | Mean | | Std. Deviation | Variance |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Std. Error | Statistic | Statistic |
| Age | 47 | 9 | 74 | 49.85 | 2.197 | 15.064 | 226.912 |
| CD4 | 47 | 18 | 1392 | 530.11 | 47.345 | 324.582 | 105353.445 |
| Valid N (list wise) | 47 | | | | | | |

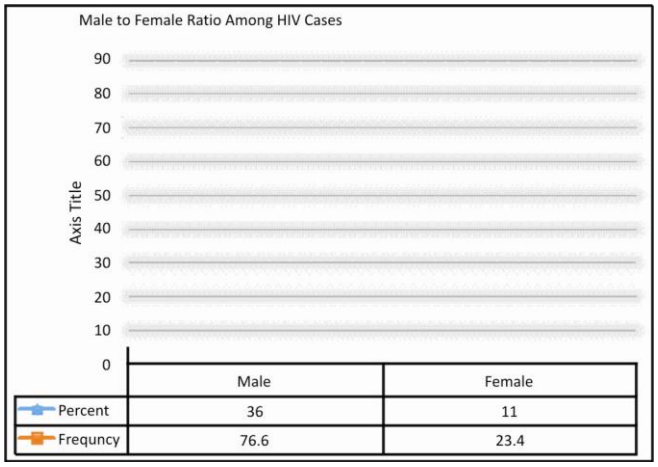


**Fig. 2:** HIV/AIDS patients presented in eye unit East Jeddah Hospital.

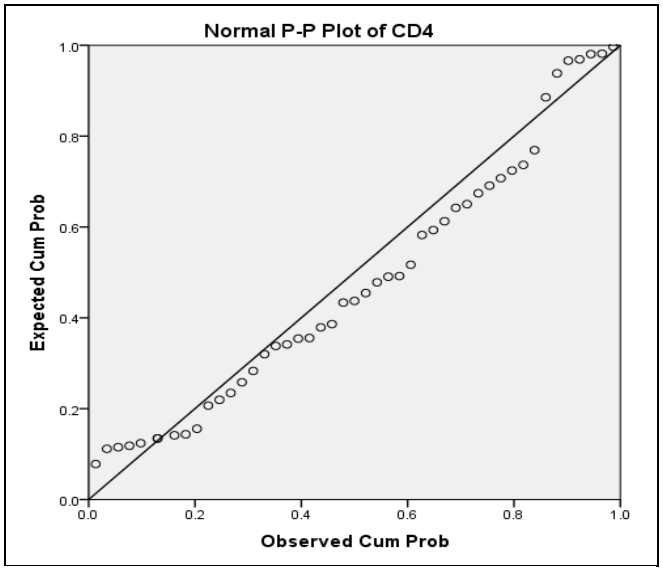


**Fig. 3:** The correlation coefficient of CD4 ratio with the complication and HIV manifestations.

The correlation coefficient of CD4 ratio with the complication and HIV manifestations is shown in Fig. 3, which shows a strong positive correlation between CD4 and HIV manifestation.

## DISCUSSION

In 2007, there were almost 33 million people diagnosed with HIV throughout the world. Out of which 95% deaths occurred in the developing countries[9]. It is usually transmitted via sexual contact, contact with infected blood or blood products (specifically by sharing of needles) and from the infected mother to child in utero. Diagnosis is by detection of virus-specific antibodies confirmed by a blood test and monitoring by PCR.

To date, Kingdom of Saudi Arabia is a low HIV-prevalence nation. There is an active testing program in place for non-Saudis, who apply for or renew work contracts (34%), for new residents (23%) and prisoners (15%). A significant portion of non-Saudi HIV cases, as a rule, have ready access to testing[4]. Kingdom of Saudi Arabia has kept up a coordinated effort to keep up-to-date with the National AIDS Program (NAP), UN agencies, and local civil society organizations (CSO)[9].

In this study, we tried to find out eye manifestations of HIV/AIDS in patients ranging from 9-74 years with a mean of 49.85 years. Out of these 76.6% of them were male. The presenting cases were split: 21% with reflective errors, 17% with cataracts, 13% with dry eyes, 6% with TB meningitis and, 4% with CMV retinitis, Kaposi sarcoma, herpes infection, cortical blindness, blepharitis and HIV microangiopathy. Whereas a diagnosis of adenoviral conjunctivitis, bacterial conjunctivitis, sixth nerve palsy, pterygium, anterior uveitis and retinal necrosis presented in 2% of the total patients. This result could be explained by the fact that in Saudi Arabia male adult patients are more affected by HIV Ocular manifestations dependent upon CD4+ T-lymphocyte counts. Generally, Kaposi sarcoma, herpes zoster ophthalmicus, candidiasis, and lymphoma have been commonly seen in earlier stages.

Comparative to other studies, tuberculosis, toxoplasmosis and pneumocystis were observed in advanced cases. Cytomegalovirus retinitis and mycobacterium-avium complex infection were noted in patients with severely reduced CD4 counts[6].

Majority of cases seen in the current study (mean CD4 530.11) presented with significant dry eyes. In six patients (13% of the sample) Dry Eye Syndrome was present. The causes of dry eye can vary from blepharitis to lacrimal glands disturbance. According to Acharya et al[5-20], occurrence of lid infections is higher in these patients. Lid lubrication was maintained for longer than usual periods and omega 3 was recommended to be taken in multivitamin form and from natural plant sources.

The second leading ocular manifestation related to patients living with HIV/AIDS in our study was occurrence of cataracts, 17% presented earlier than non-HIV/AIDS-affected populations[-7]. Herpes zoster ophthalmicus is documented as occurring in early and advanced stages of HIV/AIDS and at 4.3% among our study. We noted 2.0% of patients with outer retinal necrosis, characterized by fulminant vitreous inflammation, often leading to blindness of both eyes consecutively. There have been several studies, in Africa illustrating high prevalence in groups similar to our study cohort[9-10] reflecting the efficiency of maintaining HAART therapy with reduced ocular complications related to HIV/AIDS[18−17-19]. Kaposi sarcoma (KS) is a multifocal vascular tumor, the most common cancer related to HIV 11-14 and is related to the herpes virus 8 (HHV-8) infection. Kaposi's sarcoma may cause lesions in multiple sites such as lymph nodes, skin, liver, spleen, lungs, and digestive tract[12,15,16]. Although Kaposi sarcoma can occur at any time, it tends to manifest at CD4 count < 350 cells/mm$^3$ [13-21].

## CONCLUSION

In our one year study, 47 patients were observed with dominant incidences of dry eyes, cataracts, and refraction. HAART treatment is responsible for decreasing the HIV related complications in ophthalmology. The treatment with HAART is highly effective in controlling disease, but it is not enough for the prevention of some ocular complications, some of which may lead to irreversible blindness, if untreated. Therefore, we strongly recommend obtaining a strategy for visiting an ophthalmologist early on after diagnosis.

We strongly recommend that if a patient is living with a diagnosis of HIV/AIDS, they should see their ophthalmologist immediately if they experience blurred vision, floating spots or "spider-webs," flashlights or blind spots.

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