IV/AIDS has emerged as a global health problem since its first description in 1981. It affects more than 35.3 million people worldwide. The syndrome was first recognized in June 1981. The etiological agent was identified in 1983 in France and the US and was subsequently named the Human Immunodeficiency Virus. The first case of HIV infection in India was reported in 1986 amongst female sex workers in Chennai.1 In Kerala the first case of HIV was identified in 1987.

**Acquired Immunodeficiency Syndrome (AIDS)**

The etiological agent of AIDS is the Human Immunodeficiency Virus (HIV), belonging to the Human Retrovirus family, and subfamily of Lentiviruses. The CD4+ T cell counts is the best indicator of the state of the immunological status of HIV infected patient. The normal CD4+ T lymphocyte count is 500 -1600 cells/ mm³.

Ocular Manifestations Of HIV/AIDS

Ocular manifestations of HIV/AIDS are primarily due to the opportunistic infections and neoplasias that accompany the syndrome. The HIV virus has been found in the tear film and other ocular structures such as the cornea, vitreous and chorioretinal tissue. The ocular manifestations involve the adnexae and anterior and posterior segments of the eye and also present with orbital and neuro-ophtalmic manifestations. Anterior segment involvement results in tumours and external infections while posterior segment involvement results in HIV-retinopathy and a number of opportunistic infections of the retina and the choroid.2 Early detection of the ocular manifestations of HIV/AIDS is important because these ocular manifestations may be the primary presentation of the systemic infection.

Adnexal Manifestations

1. **Keratoconjunctivitis sicca (KCS):** Symptoms are foreign body sensation, photophobia and decreased visual acuity.

2. **Blepharitis and Blepharoconjunctivitis:** Due to reduced ability to control the normal flora that the eye is exposed to.

3. **Herpes Zoster Ophthalmicus (HZO):** Painful vesiculobullous dermatitis which results from a reactivation of Varicella-Zoster virus infection. HZO usually begins as pain over the first division of the trigeminal nerve and is followed by erythematous macules which progress within days into papules and vesicles and later pustules which rupture and crust. When the nasociliary branch is involved, a vesicle may appear on the tip or side of the nose- Hutchinson’s sign. Corneal involvement is in the form of epithelial keratitis.

4. **Kaposi sarcoma (KS):** Caused by Kaposi Sarcoma associated Herpes virus. It presents as a painless vascular tumour. KS on eyelids presents as red or purple lesions, while in the conjunctiva, it appears as persistent subconjunctival hemorrhage or raised purplish red marks.

5. **Molluscum Contagiosum (MC):** A highly contagious dermatitis caused by DNA Pox virus. The lesions appear as multiple small painless umbilicated lesions.

6. **Conjunctival Microvasculopathy:** Micorvascular changes in conjunctiva include capillary dilatation, irregular vessel caliber and microaneurysms.

**Anterior Segment Manifestations**

1. **Infectious Keratitis:** This may be caused by viral, bacterial, fungal or protozoal cause. The most common cause of infectious keratitis in HIV positive individuals are Varicella zoster and Herpes simplex viruses. Varicella zoster keratitis is usually associated with HZO and it’s complications include subepithelial infiltrates, stromal keratitis, disciform keratitis, uveitis and secondary glaucoma. Complications of Herpes simplex keratitis include dendritic and geographic epithelial keratitis, stromal keratitis and iridocyclitis. Fungal keratitis are mainly caused by Candida, Fusarium and Aspergillus species.3

2. **Iridocyclitis:** Uveitis is a manifestation of several chronic infections commonly seen in HIV infected
persons and also due to medications commonly prescribed for such patients. It presents as one of the earlier signs of tuberculosis, syphilis, histoplasmosis, coccidiodomycosis and toxoplasmosis. Medications like rifabutin and zidovudine can also cause iridocyclitis. Uveitis in HIV positive individuals is most commonly due to posterior segment disease, most common of which is CMV retinitis.

**Orbital Manifestations**

Orbital manifestations of HIV infection include orbital cellulitis and orbital lymphoma. Causative organisms include Aspergillus, Propionibacterium acne, Staphylococcus aureus, Pseudomonas aeruginosa, Trypanosoma pallidum, Rhizopus arrhizus, Toxoplasma gondii and Pneumocystis carinii.

**Neuro-Ophthalmic Manifestations**

Neuro-ophthalmic manifestations include optic nerve disease (edema, inflammation and atrophy), papilledema due to raised intracranial pressure, retrobulbar neuritis, cortical blindness, pupillary defects, cranial nerve palsies, ocular motility disorders and visual field defects. Most of these conditions are caused by infective lesions of the CNS.

**Iatrogenic/Post Treatment Manifestations**

**Immune Recovery Uveitis (IRU):** This condition is defined as “new inflammation in an eye with controlled CMV retinitis or other opportunistic infection, not attributable to an alternative cause, following substantial recovery of immunity.” It is most frequent if patients with CMV retinitis who receive HAART. Manifestations of IRU include cataract, vitritis, macular edema, optic disc edema and epiretinal membrane.

Steven Johnson Syndrome: SJS is an immune complex mediated hypersensitivity disorder. It is a syndrome that affects skin and mucous membranes and in patients with HIV/AIDS and is drug induced or viral in etiology.

**Posterior Segment Manifestations**

Posterior segment manifestations are seen in up to 50 percent patients with HIV/AIDS. These disorders are broadly categorized into disorders associated with non-infectious causes and those associated with infectious causes. Majority of these diseases are seen in severely immunocompromised individuals with CD4+ T cell counts of less than or equal to 100 cells/mm3. Most common posterior segment manifestations of HIV/AIDS are retinal microangiopathic and CMV Retinitis.

**Manifestations Not Due To Opportunistic Infections**

**HIV Microangiopathy:** This is found in 70% of patients with HIV/AIDS. It is also referred to HIV retinopathy, HIV related ocular microangiopathic syndrome or retinal microvasculopathy. It is a non infectious microvascular disorder characterized by cotton wool spots, microaneurysms, retinal hemorrhages, Roth spots, telangiectatic vascular changes and areas of capillary non perfusions. HIV retinopathy is a late manifestation of AIDS and is seen in less than 50 percent of patients with CD4+ T cell count of less than 50 cells/mm3.

i. **Cotton wool spots (CWS):** Most common ocular microangiopathic manifestations of HIV. HIV retinopathy resembles diabetic and hypertensive retinopathy, but lacks the hard exudates found in these disorders.

ii. **Retinal Hemorrhages:** These appear as flame shaped hemorrhages when they affect the nerve fibre layer and as dot and blot hemorrhages when they affect deeper layers of retina.

iii. **Telangiectatic Vascular Changes:** These are characterized by irregular dilatation, microaneurysms and vessel failure.

**Manifestations Due To Opportunistic Infections**

1. **Cytomegalovirus Retinitis (CMV Retinitis):** CMV is the most common viral opportunistic infection in HIV/AIDS. CMV is found in up to 40% individuals with advanced HIV. The most common presentation of CMV in the body is CMV Retinitis, with infections of gastrointestinal tract, lungs and the nervous system reported less frequently. Generally, clinical manifestations of CMV disease are delayed until the CD4+ T cell count drops below 100 cells/mm3. Increased risk of occurrence of CMV disease with CD4+ T cells counts less than 50/mm3.

There are 3 clinical forms of CMV retinitis:

a. Classical form or Pizza pie retinopathy or Cottage cheese with ketchup, characterised by confluent retinal necrosis with hemorrhage, mainly in the posterior retina. Over several weeks, untreated lesions progress to full thickness necrosis with resultant retinal gliosis and pigment epithelial atrophy.

b. Indolent form is recognized as granular lesion in the peripheral retina with little or no hemorrhage.

c. Frosted branch angitis.

Fifteen percent of active CMV retinitis are asymptomatic. Routine screening with dilated indirect ophthalmoscopy is recommended at 3 month interval in patients with CD4+ cell count less than 50/mm3. CMV retinitis may result in serous or rheumatogenous retinal detachment. After the introduction of HAART, there has been a significant decline
in the incidence of CMV retinitis and alteration in its clinical course. Treatment of CMV disease includes anti retroviral therapy continued indefinitely, and specific anti CMV medication continued until the immune status improves to a CD4+ T cell count of more than 100/mm3. Currently available anti CMV agents include Ganciclovir and its prodrug Valganciclovir, Foscarnet, Cidofovir, Fomiviren, Ganciclovir implant and oral Valganciclovir.9

2. Toxoplasma Retinochoroiditis: Toxoplasma retinochoroiditis is a rare manifestation of toxoplasmosis with less frequent vitritis than in immunocompetent individuals. Toxoplasma retinitis in immunocompromised individuals is often bilateral, multifocal and not associated with chorioretinal scars and retinal hemorrhage.8

3. Ocular Tuberculosis: The most common ocular manifestation is granulomatous uveitis, which is usually accompanied by chorioiditis. It presents as multifocal choroidal tubercles with discrete yellow lesions mainly at the posterior pole, associated with exudative retinal detachment and vitritis.

4. Fungal Retinitis: Most common organism causing fungal retinitis is Candida, while Histoplasmosis and Aspergillus infection more often affect choroid. Candida retinitis is characterised by fluffy white mound of retinal infiltrates which may enlarge to involve the vitreous also.

5. Bacterial Retinitis: Ocular syphilis is the most common intraocular bacterial infection. It presents as necrotic retina infiltrated with multiple histiocytes. Other posterior segment manifestation of syphilis are retinal perivasculitis, intraretinal hemorrhage, papillitis and panuveitis.

6. Cryptococcus Chorioretinitis: Causative agent is Cryptococcus neoformans. Papilledema is common due to increased Intra Cranial Pressure (ICP) from cryptococcal meningitis.

7. Pneumocystis Choroiditis: Pneumocystis carinii is the causative agent and choroiditis is the most common ocular manifestation. Clinical lesions are slowly progressive, multiple yellowish, well demarcated choroidal lesions in the posterior pole referred to as frothy, vacuolar, eosinophilic choroidal infiltrates which contain cystic and crescentic organism.

8. Acute Retinal Necrosis (ARN): It is a progressive necrotic herpetic viral retinitis. Varicella zoster virus is the most common causative organism, while Herpes simplex virus and CMV also are known to cause this manifestation. ARN is common in healthy persons and AIDS patients with only mild immune dysfunction and elevated CD4 counts. It causes severe bilateral visual loss. ARN is characterised by peripheral retinal whitening that progresses to necrosis within several days.9

9. Progressive Outer Retinal Necrosis (PORN): This is also a form of necrotizing herpetic retinitis. Unlike ARN, Herpes simplex virus type I is the major etiological agent. PORN is most often bilateral, and is characterised by severe visual loss occurring within weeks. It is characterised by retinal lesions which are multiple punctate white spots that coalesce. In contrast to ARN, severe immune compromise and previous herpetic infection is necessary for presentation of PORN. Risk factors are low CD4+ cell count and recurrent recent or current cutaneous, cerebral or visceral VZV or HSV infection.10

Reference