

Ocular manifestations of AIDS

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SUMMARY

The acquired immune deficiency syndrome (AIDS) is a lethal multisystem disease. Its ocular manifestations have received relatively little attention in the literature. Between 73% and 100% of AIDS patients develop ocular lesions. The commonest lesions seen are retinal - either infectious or noninfectious retinopathy. Involvement of the conjunctiva with Kaposi's sarcoma, infected tears and infected cornea as well as the vitreous are less common. Infections with cytomegalovirus and varicella zoster virus are common causes of visual loss and can be treated with antiviral agents such as ganciclovir and foscarnet. This greatly increases the quality of life in these patients by preventing visual loss.

Introduction

Ocular manifestations of acquired immune deficiency syndrome (AIDS) may be seen in 100% of individuals infected with the human immunodeficiency virus (HIV) (1). Retinal involvement may lead to blindness and may add further misery to the life of a patient with AIDS. Ocular lesions can to a large extent be treated and therefore it becomes important to carry out an eye examination in all cases with AIDS.

The changes seen in AIDS can be classified as follows (2-8).

Common

Cotton wool spots and noninfectious retinopathies
Cytomegalovirus (CMV) retinitis
Conjunctival Kaposi's sarcoma.

Uncommon

Herpes zoster ophthalmicus
Retinal toxoplasmosis
Choroidal *Pneumocystis carinii* infection
Herpes simplex and herpes zoster retinitis:
acute retinal necrosis (ARN)

Cryptococcal choroiditis.

Rare

Choroidal infection with *Mycobacterium avium intracellulare*
Histoplasma capsulatum chorioretinitis
Keratitis sicca
Cranial nerve palsies
Roth spots
Papilloedema
Perivasculitis
Fungal corneal ulcers.

It is interesting to note that candida and toxoplasma retinitis are uncommon in these patients (8). The common lesions will be discussed in detail.

Noninfectious manifestations

The commonest lesions seen in the retina in AIDS are a retinal vasculopathy characterized by cotton wool spots, retinal haemorrhages and microvascular abnormalities. These are of unclear aetiology but are not due to specific infections. A decrease in cerebral blood flow was shown in 25 patients with AIDS and this correlated well with the number of cotton wool spots in the retina (9).

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Cotton wool spots

These are the commonest lesions seen in AIDS and were demonstrated in 75% of cases on autopsy (6). Fluorescein angiographic studies demonstrated retinovascular disease in 92% of patients in one study (10). Cotton wool spots are nonspecific and may be seen in many conditions including hypertension, diabetes mellitus, leukaemia, anaemia and systemic lupus erythematosus. They represent an infarct of the retinal nerve fibre layer and are seen near the optic disc in AIDS.

Histopathologically, these spots are seen to represent a collection of cytooid bodies representing swollen interrupted axons and accompanying oedema (11).

The cause of the infarct seems to be ischaemia of the nerve fibre layer without any accompanying inflammation or leakage on fluorescein angiography. Attempts to isolate an infectious agent from the cotton wool spot have been unsuccessful.

These spots should be differentiated from infective lesions in the retina such as those caused by CMV and *Pneumocystis carinii*. Unlike the latter instance, cotton wool spots are transient and disappear within 6-12 weeks.

The CD4-lymphocyte cell count in cases with cotton wool spots was found to be 14 cells/ μ l as compared to 8 cells/ μ l when CMV retinitis was present (12).

Retinal haemorrhages

These are a manifestation of the AIDS infection itself and are not associated with loss of vision. They may be flame shaped, dot and blot or punctate intraretinal as seen in the periphery. Occasionally Roth spots may be seen (haemorrhages with a white central area).

Haemorrhages are seen in up to 30% of cases and are not related to a bleeding diathesis or a coagulopathy (13).

They may be seen in association with a CMV retinitis. When they occur in isolation or in conjunction with cotton wool spots, the treatment is conservative.

Microvascular abnormalities

These are best seen by fluorescein angiography and are quite similar to those changes seen in diabetes mellitus (microaneurysms, telangiectasia, focal areas of nonperfusion and capillary loss). These may be a direct consequence of rheological abnormalities due to hypergammaglobulinaemia and immune complex formation (8). A similar microangiopathy can be seen in systemic lupus erythematosus and leukaemia.

Infectious retinopathy

Cytomegalovirus retinitis

CMV retinitis occurs in 15-40% of patients with AIDS and may be the first sign of a systemic CMV infection (3). It may be accompanied by fever, arthralgia, pneumonitis, leukopenia and hepatitis. Visual loss may also occur due to central nervous system (CNS) involvement in the form of subacute encephalitis. This condition is characterized by progressive dementia, frontal release signs, occasional motor defects, headache and hemianopsia. The cerebrospinal fluid (CSF) shows an elevated protein level in about 75% of cases and changes of cerebral cortical atrophy are seen on the computed tomography (CT) scan (14).

CMV is a neurotropic virus and infects the neural tissues and retina. Necrosis without much surrounding inflammatory response in the retina is typical of CMV retinitis.

Clinically, the lesions may be found in the posterior pole or periphery or in both areas. The lesions may be unilateral or bilateral. The lesions are characterized by:

- white intraretinal lesions
- infiltrate
- necrosis along the vascular arcades in the posterior pole
- prominent retinal haemorrhages along the leading edge
- patches of atrophic retina as the retinitis advances.

Peripheral lesions are less intense but are now being found to be more common than central lesions. These may present with symptoms of floaters with or without a scotoma.

Retinal oedema, perivascular sheathing and exudative retinal detachment may accompany these changes, which may become bilateral if the infection is untreated. Vitritis and anterior uveitis are occasionally seen. Optic atrophy often follows widespread destruction of the retina.

Treatment of CMV retinitis

Trials with ganciclovir (dihydroxypropoxy-methyl guanine or DHPG), a drug similar to acyclovir, has been found to be very useful in the treatment of CMV retinitis. It acts by inhibiting the viral DNA elongation. It is given initially in a dose of 5mg/kg every 12 hours and then in a maintenance dose of 5mg/kg/day. The most serious toxicity is granulocytopenia and CMV resistance. Alternative therapy with foscarnet (a pyrophosphate analogue) is another possibility in these cases. This agent acts by blocking the DNA polymerase of the virus and also the reverse transcriptase in a dose-dependent way. AZT and foscarnet have synergistic activity against the virus in vitro. Recently intravitreal administration of ganciclovir has been used for the treatment of CMV retinitis.

Acute retinal necrosis

This is a devastating disease characterized by the rapid onset of a fulminant panuveitis with retinitis. It is caused by varicella zoster virus (VZV) and is often accompanied by retinal necrosis and retinal breaks leading to retinal detachment, anterior uveitis and scleritis. Treatment is with ganciclovir.

Nonviral intraocular infections in AIDS

The following infections have been documented in AIDS patients (3,5,6):

- Pneumocystis carinii* choroidopathy
- Ocular toxoplasmosis
- Candida albicans* endophthalmitis (uncommon)
- Cryptococcus neoformans*
- Histoplasmosis
- Aspergillosis
- Coccidiomycosis
- Syphilis
- Mycobacterial retinitis.

Neoplasms

- Primary intraocular lymphoma
- Kaposi's sarcoma of the conjunctiva.

Newer developments in the management of retinitis

Retinal and vitreous biopsy can be carried out to determine the agents responsible for the retinitis and/or vitritis. An endoretinal biopsy can be carried out and a 2x5 mm piece taken from the gliotic or necrotic retina so that there is no further visual loss.

In summary, the commonest retinal manifestations of AIDS include infectious and noninfectious retinopathy. The antiviral agents used have proved to be useful in preventing blindness and improve the quality of life in AIDS patients but the serious toxicity and nonavailability of oral preparations are problems in the management of these conditions.

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