

ORIGINAL RESEARCH

HIV Retinopathy: Correlation of fundus changes with changes in visual parameters

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ABSTRACT

Cotton wool spots are seen by ophthalmoscopy as a result of microinfarction of nerve fibre layer of the retina. In AIDS these lesions usually are confined to the posterior pole near optic disc. Cotton wool spots are ophthalmoscopically visible for 6 to 12 weeks owing to the transient nature of lesion and it is apparent noninfectious cause, treatment not indicated. All patients who were attending ART center who are on HAART were screened for HIV retinopathy. Patients found to have retinal changes were evaluated further in Ophthalmology OPD. We also found that visual dysfunction was more common with patients who had less CD4 count. In our study abnormal contrast sensitivity was present in 10 patients and 5 out of 10 were in 1-100 cells/ μ l range and 3 were in 100-200cells/ μ l group.

Key words: Visual parameters, HIV retinopathy, CD4 count

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INTRODUCTION

Ocular complications are common in HIV infected individuals with at least 50-75% of infected individuals expected to develop ocular disease at some point of time during the course of the disease in pre era-HAART.¹ Opportunistic infections develop when there is deterioration of the immune status of the individual which can be measured with the help of CD4 cell counts. Posterior segment lesions, especially Cytomegalovirus (CMV) retinitis are associated with severe visual morbidity and can develop in up to 40 to 50% patients of AIDS patients prior to HAART.² Corneal and anterior segment lesions affect more the 50% of all HIV patients. Ocular adnexal complications, seen in about 25% of patients, can be a sign of severe immunosuppression patients on highly active antiretroviral therapy (HAART) are less likely to be affected by blinding posterior segment infections and there has been marked reduction even in the occurrence of anterior segment and adnexal lesions. More than 90% of HIV-infected individuals live in developing countries. HAART-led immune recovery in general is beneficial but 10 to 25% patients may develop immune recovery inflammatory problems.^{3,4} Non infectious retinopathy refers to cotton wool spots, retinal haemorrhages and microvascular abnormalities that do not progress, enlarge or cause visual symptoms.

Cotton wool spots are the most common ocular lesions seen in AIDS, occurring in 25% to 50% of patients and in up to 75% of cases by autopsy examination. In one study up to 92% of AIDS patients were found to have evidence of microvascular change when examined using fluorescein angiography.⁵ Cotton wool spots are seen by ophthalmoscopy as a result of microinfarction of nerve fibre layer of the retina. In AIDS these lesions usually are confined to the posterior pole near optic disc. Cotton wool spots are ophthalmoscopically visible for 6 to 12 weeks owing to the transient nature of lesion and it is apparent non infectious cause, treatment not indicated.⁶

In cross sectional study, the median CD4 count (per μ l) in patients with cotton wool spots was 14 cells (range 0-160) and was 8 (0-42) cells in patients with CMV retinitis. Morphologic studies have shown that the number of retrobulbar optic nerve fibres in patients with AIDS is decreased compared with the number of optic nerve fibres in normal control eyes as result of axonal degeneration and an associated decrease in the number of optic nerve axons. Infarction of the nerve fibre layer develops in most patients with AIDS and the number of such infarction increases over time.⁷

Visual dysfunction associated with multiple nerve fibre layer infarctions may be manifested by defects in

colour vision and contrast sensitivity testing in patients with AIDS. This is consistent with dysfunction of macula or optic nerve. Interestingly *in vivo* studies of the retinal nerve fibre layer have shown both broad and slit like defects suggesting the retinal nerve fibre layer and optic nerve fibre loss are related to the subclinical visual loss in HIV patients without infectious retinitis.⁸

Retinal haemorrhages in AIDS are seen in association with CMV retinitis, cotton wool spots or as an isolated finding. These lesions have been reported in up to 30% of AIDS patients.

Retinal haemorrhages usually take the form of flame shaped lesions in the posterior pole, dot blot haemorrhages or as punctate intraretinal haemorrhages peripherally.

Microvascular changes are common in AIDS patients. Microvascular pathologic findings in AIDS as demonstrated by fluorescein angiography include microaneurysms, telangiectasia, focal areas of nonperfusion and capillary loss.

Histologic findings of PAS thickening of blood vessels and precapillary arteriolar closure also correlate with findings in diabetes mellitus. Abnormalities of retinal blood flow have been reported in HIV patients and may contribute to the pathogenesis of microvascular abnormalities.

METHODOLOGY

All patients who were attending ART center who are on HAART were screened for HIV retinopathy. Patients found to have retinal changes were evaluated further in Ophthalmology OPD.

INCLUSION CRITERIA

1. All patients aged between 20 to 55 years referred from ART centre who are HIV seropositive and are on treatment with HAART
2. Clear media/ no media opacity
3. Patients without retinal or choroidal lesions which affect visual function (eg neoplasia, maculopathy, opportunistic infections)
4. CD4 counts

EXCLUSION CRITERIA

1. Diabetes Mellitus
2. Malignant Hypertension
3. SLE
4. Leukemia
5. Cataract
6. Hereditary color vision defects
7. Collagen vascular disease

The following ophthalmologic data were collected for each eye of all subjects: best corrected visual acuity, contrast sensitivity score, fundus examination. All examinations were carried on same day. Only data from one eye of each patient were used for analysis. Right eye was taken for analysis.

RESULTS

Table 1: Correlation of Contrast Sensitivity, Colour vision, according to duration of HIV

Variables	Duration in years (HIV)			P value
	1-2(n=8)	2-5(n=76)	5-10(n=16)	
Contrast Sensitivity				
<=1.5	0	8(10.5%)	2(12.5%)	0.729
>1.5	8(100.0%)	68(89.5%)	14(87.5%)	
Color Vision				
Normal	8(100.)	67(88.)	14(87.)	0.743
Abnormal	0	9(11.8)	2(12.5)	

Contrast sensitivity and colour vision is not statistically associated with duration of HIV $p>0.05$

Table 2: Correlation of Contrast Sensitivity, Colour vision, according to CD4 count

Variables	CD4 count				P value
	1-100(n=37)	101-200(n=33)	201-300(n=20)	>300(n=10)	
Contrast Sensitivity					
<=1.5	5(13.5%)	3(9.1%)	2(10%)	0(0%)	0.809
>1.5	32(86.5%)	30(90.9%)	18(90%)	10(100%)	
Color Vision					
Normal	32(86.5%)	30(90.9%)	19(95%)	8(80%)	0.576
Abnormal	5(13.5%)	3(9.1%)	1(5%)	2(20%)	

Contrast sensitivity and Color vision are not statistically associated with CD4 count

DISCUSSION

Studies conducted by parthokalyani, sapnagangagupta showed increased risk of changes in retinal vasculature and contrast sensitivity with increased

duration of disease. We compared change in contrast sensitivity with duration of disease where in our study 76% of patients are seropositive since 3-5 years and contrast sensitivity abnormality was seen in 10.5% of those 76 patients.⁹

We found that nadir CD4 count of patients with HIV retinopathy is 37% in 1-100 cells/mm³ group and 33% in 101-200cells/mm³ group. Mean CD4 of our study is 169.36± 148.52cells/μl. We compared it with other studies. In study conducted by Kayur shah *et al*¹⁰ mean CD4 was 101±130 and median was 56. Study conducted by William freeman¹¹ showed CD4 to be 42. Study conducted by showed that CD4 count in their study was 166cells/μl. Study conducted by Stephan A Geier showed mean CD4 to be 213±28.91cells/μl.¹²

We also found that visual dysfunction was more common with patients who had less CD4 count. In our study abnormal contrast sensitivity was present in 10 patients and 5 out of 10 were in 1-100 cells/μl range and 3 were in 100-200cells/μl group.

CONCLUSION

- Reduced contrast sensitivity was seen in 10% patients out of which 8% patients were suffering from HIV since 2-5 years and 2% since 5-10 years. Reduced contrast sensitivity increased with duration of disease but not statistically significant.
- Abnormal color vision was seen in 11% patients out of which 9% of patients were suffering from HIV since 2-5 years and 2% since 5-10 years. Reduced color vision increased with duration of disease but not statistically significant.

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