

Association of vitamin D levels, lipid profile and intima media thickness in HIV positive patients

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ABSTRACT

Background: People with HIV are living decades longer than before due to combination ART; however, complications including CVD, osteoporosis and non AIDS defining malignancies are higher than in the general population. Many of the emerging complications related to chronic HIV infection represent disease processes where vitamin D is known to play an important role. **Objectives:** A single point cross sectional case control study was conducted in a tertiary care hospital to determine the prevalence of vitamin D deficiency and its association with carotid intima media thickness (CIMT) in HIV patients and to study the association of lipid profile with HIV infection. Out of the 45 HIV positive cases, vitamin D deficiency was found in 42 cases (93.33%) whereas only 33 out of 45 (73.33%) healthy controls. Fifty one point eleven percent of cases had dyslipidemia compared to 15.55% of controls. A positive association was seen between CD4 levels and 25 hydroxy vitamin D. An inverse co-relation between CD4 count and triglycerides and VLDL levels while a positive co-relation with total cholesterol, LDL cholesterol and HDL cholesterol levels was seen. No significant difference was seen in CIMT in cases and controls.

Key words: CD4 count, CIMT, HIV, lipid profile, Vitamin D

INTRODUCTION

People infected with HIV-1 are at an increased risk of cardiovascular disease (CVD).^[1] HIV-infected adults have increased levels of proinflammatory cytokines and endothelial activation markers,^[2] which have been associated with CVD in the general population.^[3] In addition, the carotid intima-media thickness (CIMT), a surrogate marker for atherosclerosis, is associated with levels of proinflammatory cytokines and endothelial activation markers.^[4] Vitamin D insufficiency is associated with decreased arterial compliance^[5] and increased CIMT.^[6] Dyslipidemia is an important metabolic change that

may occur in individuals with HIV infection which may contribute to cardiovascular disease.

Aims

The present study was conducted with the aim to determine the prevalence of vitamin D deficiency and its association with carotid intima media thickness in HIV patients and to study the correlation of lipid profile and HIV infection.

MATERIALS AND METHODS

The study was conducted in a tertiary care hospital in Allahabad from July 2011 to July 2012. Forty-five HIV positive cases diagnosed by ELISA, who were 18 years and above and 45 healthy age and sex matched controls were studied. Thorough clinical and biochemical examination was done for all cases and controls and they were assessed for fasting blood glucose, fasting lipid profile, HIV 1 and 2, CD4 count, ECG, CIMT, 25(OH)Vitamin D.

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RESULTS

Out of the 45 HIV +ve cases, vitamin D deficiency (25(OH) D levels < 30 ng/ml) was found in 42 cases (93.33%) and 33 out of the 45 (73.33%) age and sex matched healthy controls. ($P = 0.0016$). Twenty-three cases (51.11%) and only 7 controls (15.5%) has deranged lipid profile ($P = .0003$). Cases were grouped into 4 groups according to their CD4 counts: >500/mm³, 201-500/mm³, 50-200/mm³, and <50/mm³. An inverse relationship between CD4 count and triglyceride levels (r value = -0.221) and VLDL levels (r value = -0.234) was seen while a gradual decline of total cholesterol levels, LDL levels and HDL levels with decreasing CD4 count was observed (r values = 0.057, 0.013 and 0.217 respectively). Out of the 45 cases, none (0%) had CIMT < 6mm, 23(51.11%) had CIMT measuring 6 mm, 7 (15.55%) had CIMT measuring 7mm, 15 (33.33%) had CIMT measuring 8 mm and none (0%) measuring >8 mm compared to controls with 1 (2.22%) who had CIMT < 6 mm, 16(35.55%) with CIMT measuring 7 mm, 19 (42.22%) had CIMT measuring 7 mm, 9 (20%) had CIMT measuring 8 mm and none (0%) measuring > 8 mm. By using statistical analysis, no significant difference in the CIMT of HIV positive cases and HIV negative controls was present ($P = 1.00$).

DISCUSSION

In this study, the prevalence of vitamin D deficiency in HIV positive cases was 93.33% as compared to a prevalence of 66.66% in the healthy population. Lipid profile, in the present study was altered with a prevalence of 51.11% in HIV infected population and 15.55% in the healthy population. Alteration in the lipid profile occurred even during the early stages of HIV infection and, more so, as the disease progressed. The fasting total cholesterol, HDL and LDL were significantly lower in the HIV positive subjects as compared to the healthy subjects. Whereas fasting triglycerides and VLDL were significantly higher in HIV positive cases compared to the HIV negative controls. As the disease progresses with drop in CD4 count, there is a progressive decline in HDL, LDL, and total cholesterol levels and a rise in triglycerides and VLDL levels of HIV positive subjects. These observations were consistent with results of earlier studies. All the 45 HIV positive cases in our study were assessed for CIMT by ultrasonography. Percentage of CIMT > 8 mm, 8 mm, 7 mm, 6 mm and < 6 mm among the HIV positive population was found to be 0%, 33.33%, 15.55%, 51.11% and 0% as compared to 0%, 20%, 42.22%, 35.55% and 2% in the HIV negative population respectively. There was no significant difference in CIMT between the HIV positive cases and the HIV negative controls with a $P = 1.00$. In previous studies, right and left CIMT were significantly higher in HIV

positive groups as compared to the HIV negative controls.^[2] Significant predictors of CIMT measurements in uninfected controls were body mass index and homocysteine, but only the duration of ART therapy was predictive of CIMT in the HIV infected group. Out of the 45 cases in this study, 42 had vitamin D deficiency and their mean CIMT was 0.65mm compared to the 33 out of the 45 healthy controls who are vitamin D deficient with mean CIMT = 0.68 mm. There was no significant difference between the two groups, which was contrary to findings of previous studies where the relationship between vitamin D insufficiency and increased CIMT in HIV positive patients remained significant even after adjustment for traditional risk factors for hardening of the arteries, HIV related factors like viral load and duration of antiretroviral therapy and lipid levels.

CONCLUSIONS

Vitamin D deficiency was significantly higher in HIV patients as compared to age and sex matched healthy controls and hence such patients would benefit from vitamin D supplementation given at initiation of ART as it would offer a safe and effective means of augmenting the immune restoration response to treatment. It can also be concluded that lipid profile may be a good index of disease progression in HIV patients.

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