Effects of Vitamin D Supplementation on Carotid Intima-Media Thickness in HIV+ Youth

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ABSTRACT

BACKGROUND

- HIV-infected patients are at an increased risk of cardiovascular disease (CVD)
- HIV-infected youth also appear to be at an increased CVD risk as assessed by carotid intima-media thickness (IMT), a marker of subclinical atherosclerosis
- Vitamin D Insufficiency is associated with CVD risk in HIV
- No studies to date have assessed changes in carotid IMT with vitamin D repletion in HIV

OBJECTIVES

- The primary objective of this study was to determine the effects of vitamin D on carotid IMT in HIV-infected youth after 24 months of supplementation
- Secondary objective included comparing the results to an uninfected healthy control group

METHODS

- STUDY DESIGN
  - Randomized, active-controlled, double-blind trial investigating two doses of oral vitamin D3: 600 IU daily and 2400 IU daily
  - Study duration: 24 months
  - Oral supplementation: via capsules
  - Randomization stratified by current EFV

- SELECTOR OF SUBJECTS

- All youth aged 8-21 years with plasma HIV RNA < 50 copies/mL for at least 3 months prior to enrollment

- STUDY MEASUREMENTS

- Clinical and laboratory evaluation: Questionnaires, extensive chart review, weight, height, waist, BMI, and smoking history
- Vitamin D evaluation: plasma 25-hydroxyvitamin D (25(OH)D)
- Carotid ultrasound: measurements of the IMT at both the near and far walls of the left and right common carotid artery (CCA) at measurements were averaged and required to be a single measurement between 0.02 mm and 0.04 mm
- Abnormal IMT was defined as ≥0.70 mm

- STATISTICAL ANALYSIS

- Changes in continuous variables were tested using paired t-tests for within-group comparisons, and ANOVA for between-group comparisons
- Correlational analyses were conducted using Pearson’s correlation coefficient

RESULTS

- Figure 1. Changes in (A) CCA IMT and (B) Carotid Bulb IMT in HIV-infected Subjects

Figure 2. Correlations for (A) all HIV+ Subjects Combined and (B) by Dosing Arm

CONCLUSIONS

- Among the HIV-infected subjects, plasma 25(OH)D concentrations increased significantly after 24 months of monthly oral vitamin D supplements in both arms, those receiving a medium or high (supplementation) dose and those receiving a standard (control) dose; however, 25(OH)D increased significantly more in the supplementation arm
- Carotid IMT did not change significantly within the supplementation arm, but decreased significantly in the bulb region and approached significance in the CCA within the control arm
- Differences in bulb IMT changes were statistically significant between the supplementation and control arms, and bulb IMT was statistically lower at 24 months in the control arm
- In bivariate analyses, increases in bulb IMT were significantly correlated with increases in plasma 25(OH)D, with this association driven by subjects in the supplementation arm
- Being in the supplementation arm was independently associated with increases in bulb IMT
- Increases in plasma 25(OH)D concentrations trended toward an independent relationship with increases in bulb IMT
- HIV-infected subjects had increased CCA, ICA, and bulb IMT compared to healthy uninfected controls at baseline
- Over 24 months, healthy uninfected controls had similar increases in plasma 25(OH)D concentrations compared to the HIV-infected subjects, but only a trend toward a significant decrease in bulb IMT within the control group (without any significant between-group differences in arm for IMT)
- The relationship between changes in IMT and 25(OH)D observed in the HIV-infected group were not seen among the healthy uninfected control subjects

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