Effect of vitamin D deficiency and replacement on endothelial function in asymptomatic subjects.


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CONTEXT: Vitamin D receptors are present in many tissues. Hypovitaminosis D is considered to be a risk factor for atherosclerosis.

OBJECTIVE: This study explores the effects of vitamin D replacement on insulin sensitivity, endothelial function, inflammation, oxidative stress and leptin in vitamin D deficient subjects.

DESIGN, SETTING AND PATIENTS: Twenty-three asymptomatic vitamin D deficient subjects with 25(OH)D levels below 25 nMol/L were compared with a control group that had a mean 25(OH)D level of 75 nMol/L. The vitamin D deficient group received 300,000 IU i.m. monthly for 3 months. The following parameters were evaluated before and after treatment: vitamin D metabolites, leptin, endothelial function by brachial artery flow mediated dilatation (FMD), insulin sensitivity index based on oral glucose tolerance test and lipid peroxidation as measures of thiobarbituric acid reactive substances (TBARs).

RESULTS: FMD measurements were significantly lower in 25(OH)D deficient subjects than controls (p=0.001) and improved after replacement therapy (p=0.002). Post-treatment values of TBARs were significantly lower than pre-treatment levels (p<0.001). A positive correlation between FMD and 25(OH)D (r:0.45, p=0.001) and a negative correlation between FMD and TBARs (r:-0.28, p<0.05) were observed. There was a significant increase in leptin levels after therapy and the leptin levels were positively correlated with 25(OH)D levels (r:0.45, p<0.05).

CONCLUSIONS: This study shows that 25(OH)D deficiency is associated with endothelial dysfunction and increased lipid peroxidation. Replacement of vitamin D has favorable effects on endothelial function. Vitamin D deficiency can be seen as an independent risk factor of atherosclerosis. Hypovitaminosis D associated endothelial dysfunction may predispose to higher cardiovascular disease in the winter.

PMID: 19584181