

# Abstract

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## 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.

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