Vitamin D Deficiency is Associated with Depletion of Circulating Endothelial Progenitor Cells and Endothelial Dysfunction in Patients with Type II Diabetes

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Background

- Vitamin D deficiency is a common condition in patients with type II diabetes.
- On the other hand, vitamin D deficiency is associated with endothelial dysfunction.
- However, the relationship between vitamin D deficiency, circulating endothelial progenitor cells (EPCs) and endothelial dysfunction in patients with type II diabetes remains unclear.

Methods

- Baseline demographic data, CVD risk factors and cardiovascular medications were documented. Serum hydroxyvitamin D (25(OH)-D) and circulating CD133/KDR+ EPCs were measured by ELISA kit and flow cytometry respectively.
- Patients with a serum concentration of 25(OH)/D 20 - 30ng/mL were defined as vitamin D insufficient, while those with a concentration < 20ng/mL as vitamin D deficient.
- Endothelial function was measured as flow-mediated dilatation of the brachial artery assessed by vascular ultrasound following a standard protocol.

Results

- The study population consisted of 282 pts. Their baseline characteristics are summarized in Table 1.
- Their mean age was 68±10 years: 61% of them were men. 42% of subjects were vitamin D insufficient [25(OH)-D 20-30 ng/mL] and 35% of subjects were vitamin D deficient [25(OH)-D < 20 ng/mL].
- As shown in Table 2, patients with 25(OH)/D level > 30 ng/mL were more likely to be older, male sex, ever smoker, treated with lipid lowering agents, and had lower BMI and LDL-C level.
- Significantly, patients with the vitamin D deficiency had significantly lower brachial FMD and CD133/KDR+ EPCs compared with those with sufficient serum 25(OH)/D concentration (Figure).
- After adjustment for age, sex and cardiovascular risk factors using a backward stepwise regression model, vitamin D deficiency was significantly associated with an absolute 1.07% (95% CI: 0.26 to 1.88, P=0.01) decrease in FMD and an absolute 0.11% (95% CI: 0.03 to 0.20, P=0.01) decrease in CD133/KDR+ EPC.
- On the other hand, there was no relationship between FMD and CD133/KDR+ EPCs, suggesting vitamin D level was associated with increased FMD and CD133/KDR+ EPCs independently.

Conclusion:

Our results demonstrated that serum 25 (OH)-D level was significantly associated with brachial arterial FMD and circulating CD133/KDR+ EPCs, suggesting vitamin D deficiency might contribute to depletion of EPC and endothelial dysfunction in type II DM patients.