

Augmented Acetylcholine-Mediated Vasodilation In Aorta Of Diabetic Vitamin D-Deficient Rats After Treatment With Calcitriol

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INTRODUCTION:

Recent evidence suggests that vitamin D-deficiency is associated with endothelial vascular dysfunction and increased risk of cardiovascular diseases. The prevalence of vitamin D-deficiency is high in diabetes mellitus (DM) patients. It is not well-known whether vitamin D supplementation in diabetic patients with vitamin D-deficiency will cause reduction in endothelial dysfunction. The aim of this study is to evaluate the effect of oral vitamin D supplementation on the aortic endothelial function of rats with vitamin D-deficiency.

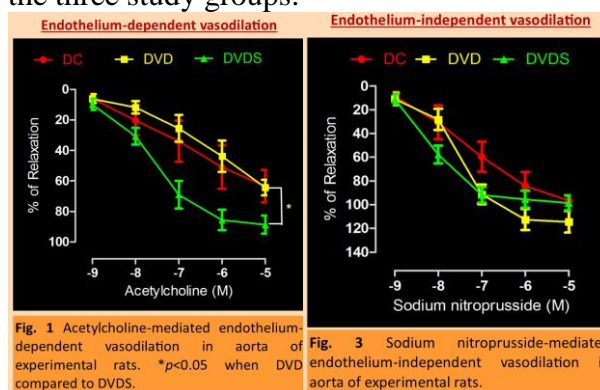
MATERIALS & METHODS:

Diabetic rats (n=24) were induced with 50 mg/kg streptozotocin and were divided into three equal groups: diabetic controls that received normal diet throughout study duration (DC), diabetic vitamin D-deficient rats without supplement (DVD), and diabetic vitamin D-deficient rats with supplement (DVDS). Diabetic vitamin D-deficient rats were developed by using vitamin D-deficient diet throughout 10 weeks of study duration. The rats in DVDS received oral gavage of 0.15 µg/kg calcitriol supplement for four weeks. At the end of 10 weeks, rats were sacrificed and aortic rings with and without endothelium were studied in tissue organ baths for isometric force measurement.

RESULTS:

Body weight of rats in DVD group were significantly increased compared to baseline (Week 10; 332.38±16.28g vs. Baseline; 253.75±9.16g), whereas showed reduction in DVDS (Baseline; 272.25±12.13g vs. Week 10; 230.25±12.53g) ($p<0.05$). The endothelium-mediated vasodilation to acetylcholine was similar in aorta of DC and DVD. Acetylcholine-induced endothelium-mediated vasodilation was significantly increased in aorta of DVDS

(89.05±6.093%) compared to those in DC (63.47±10.65%) and DVD groups (61.88±5.06%) ($p<0.05$). There was no significant difference in vasodilation to sodium nitroprusside and contraction to either calcium ionophore or phenylephrine between aortas of the three study groups.



DISCUSSIONS:

This study demonstrates that vitamin D-deficiency does not exacerbate endothelial and smooth muscle dysfunction in aorta of diabetic rats. Interestingly, rats that received vitamin D supplement show significant reduction in body weight. Treatment with calcitriol improves endothelium-dependent vasodilation in aorta of diabetic rats with vitamin D-deficiency.

CONCLUSION:

Vitamin D can be an adjunct therapy to reduce cardiovascular risks in diabetic patients. Further studies to support the use in clinical setting is warranted.

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