

## **Newsletter-Comment (April 2010)**

### *Vitamin D and Hypertension*

There is an interesting editorial in the current issue of The Journal of Clinical Hypertension reviewing the relationship between Vitamin D levels and cardiovascular disease, and hypertension in particular<sup>1</sup>.

It is well known that Vitamin D has an important role in calcium absorption and bone health, but in recent years there has been an accumulating literature on it's importance in the immune system, cancer, and cardiovascular disease. It now appears that vitamin D has a direct effect on the vascular smooth muscle cell, endothelial function, and the renin angiotensin system.

The commonest biochemical definition of vitamin D deficiency is a 25 OH-D level <50nmol/l, while levels 51-75 nmol/l are considered insufficiency. Many postmenopausal women and elderly of both sexes fall in to these categories.

There is a fair amount of epidemiological evidence linking vitamin D deficiency with hypertension, particularly for those with 25 OH-D levels below 35nmol/l. The Framingham Offspring Study demonstrated a higher relative risk for a cardiovascular events and hypertension with lower vitamin D levels. In the Health Professionals Follow-Up Study and Nurse's Health Studies individuals whose 25-OH D levels were < 35nmol/l vs those >75 nmol/l, the relative risk of developing hypertension was 3.18 (6.13 men, 2.67 women).

Vitamin D receptors (and the 1-alpha-hydroxylase enzyme which converts 25-OH D to the physiologically active 1,25-hydroxy vitamin D) are ubiquitous in the human body including juxtaglomerular cells in the kidney, cardiac and vascular smooth muscle cells, and suggest widespread action of vitamin D on tissue beyond calcium homeostasis. Animal studies have shown that 1,25-OH vitamin D improves endothelial function, and inhibits proliferation of vascular smooth muscle cells. There is also a lot of clinical and animal evidence linking vitamin D depletion to activation of the renin-angiotensin system.

There are few intervention studies looking at the effect of Vitamin D replacement on hypertension. A couple of small studies have shown blood pressure lowering in vitamin-D deficient individuals with Vitamin-D supplementation. Another showed significant improvement in 24 hour mean BP (6/6) in individuals treated with thrice-weekly UVB radiation, which also increased 25-OH D levels by 162%.

Large randomised trials are required to take this further, but at the present time, given the other risks associated with Vitamin-D deficiency, it would seem not unreasonable to check Vitamin D levels in individuals with hypertension, and provide supplementation to those below 75nmol/l.

*1. Should the Concentration of Vitamin D Be Measure in All Patients With Hypertension? Boldo A et al. J. Clin. Hypertens 2010(March);12:149-152*