

Role of vitamin D in vascular complications and vascular access outcome in patients with chronic kidney disease

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In recent years, a growing interest has prompted research to find new links between vitamin D and the renin-angiotensin-aldosterone system (RAAS), cell proliferation, and anti-apoptotic cell paths in the vascular system. The activation of vitamin D receptors (VDRs) on endothelial cells induces changes in the metabolic activity of the endothelium and is responsible for cell survival, proliferation and neoangiogenesis.

Recent studies linked [vitamin D](#) deficiency with cardiovascular diseases. For example, studies have shown that normal levels of vitamin D have a pivotal role in reducing the physiological activity of RAAS, due to the suppression of the renin gene, renin reduced disposal and the decrease of its circulating levels, thereby down-regulating the RAAS.

In particular, vitamin D blunts the compensatory increase of renin synthesis occurring during chronic administration of anti-RAAS agents.

Indeed, in experimental models, the administration of vitamin D analogs blocked the compensatory increase of renin expression ameliorating the efficacy of RAAS inhibitors.

Deficiency of vitamin D in patients with [chronic kidney disease](#) (CKD) or in patients with end stage renal disease (ESRD) receiving hemodialysis is not only a key factor in the development of secondary hyperparathyroidism, but it is also associated with other complications. The immunomodulatory and anti-inflammatory effects of vitamin D may have particular relevance in CKD patients and in ESRD patients, as the uremic state induces biochemical changes that turn in a marked condition of inflammation and oxidative stress as observed in calcitriol deficiency status.

Few and very recent studies have directly investigated the role of vitamin D in vascular access. Two retrospective studies and one randomized, double-blind prospective study analyzed the effects of vitamin D on arteriovenous fistula (AVF) patency with contrasting results. Therefore, to better define the relationship between vitamin D and AVF outcomes, more studies involving a large number of patients are required.

More information: Domenico Santoro et al, Role of Vitamin D in Vascular Complications and Vascular Access Outcome in Patients with Chronic Kidney Disease, *Current Medicinal Chemistry* (2016). DOI:

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