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Vitamin D biology in heart failure: molecular mechanisms and systematic review.

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Abstract

Vitamin D has recently been suggested as an important mediator of blood pressure and cardiovascular disease, including heart failure. In patient with heart failure, low vitamin D levels are associated with adverse outcome and correlate with established clinical correlates and biomarkers. Many precursor states of heart failure, such as hypertension, atherosclerosis, and diabetes are more prevalent in subjects with low vitamin D levels. Recent experimental data have provided clues how vitamin D might exert cardioprotective effects. The steroid hormone vitamin D regulates gene expression of many genes that play a prominent role in the progression of heart failure, such as cytokines and hormones. Specifically, vitamin D is a negative regulator of the hormone renin, the pivotal hormone of the renin-angiotensin system. Mechanistic insights were gained by studying mice deficient for the vitamin D receptor, which develop hypertension and adverse cardiac remodeling mediated via the renin-angiotensin system. Furthermore, vitamin D receptor is expressed in the heart and regulated under pro-hypertrophic stimuli and vitamin D as receptor has been associated with the expression of other hypertrophic genes such as natriuretic peptides. So, epidemiological data and mechanistic studies have provided strong support for a potentially cardioprotective effect of vitamin D. It remains unclear if vitamin D supplementation is beneficial in preventing heart failure or if it could be a therapeutic addendum in the treatment of heart failure. This review summarizes current knowledge on vitamin D and its biology in heart failure.

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