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Independent association between 1,25-dihydroxyvitamin D, 25-hydroxyvitamin D and the renin-angiotensin system: The Ludwigshafen Risk and Cardiovascular Health (LURIC) study.

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Abstract

BACKGROUND: Antihypertensive and tissue-protective properties of vitamin D metabolites are increasingly attributed to the inhibition of renin synthesis by 1,25-dihydroxyvitamin D [1,25(OH)₂D] in the kidney.

METHOD: We aimed to document a potential association between 25-hydroxyvitamin D [25(OH)D], 1,25(OH)₂D and the circulating renin-angiotensin system (RAS) in a large cohort of patients referred (n=3316) to coronary angiography.

RESULTS: Of the 3316 subjects, 3296 (median age: 63.5 (56.3-70.6)years; 30.2% women) had a baseline measurement of 25(OH)D [median: 15.6(10.1-23.0)microg/L], 1,25(OH)₂D [median: 33.2(25.2-42.9)pg/mL], plasma renin concentration [PRC; median: 11.4(6.0-24.6)pg/mL] and angiotensin 2 [median: 20.0(12.0-35.0)ng/L]. Multivariate adjusted ANCOVA showed a steady increase of PRC values across declining deciles of 25(OH)D and 1,25(OH)₂D values (P=0.013 and P=0.045), respectively. Additionally, mean angiotensin 2 values increased significantly across decreasing 25(OH)D and 1,25(OH)₂D values (P=0.020 and P=0.024, respectively). In contrast, multivariate adjusted ANCOVA revealed no significant associations between aldosterone, aldosterone-to-renin ratio and 25(OH)D/1,25(OH)₂D values. In multivariate stepwise regression analyses both, 25(OH)D and 1,25(OH)₂D emerged as independent predictors of plasma renin and angiotensin 2 concentrations.

CONCLUSIONS: Our data showed for the first time in humans that both, lower 25(OH)D and 1,25(OH)₂D values are independently related to an upregulated circulating RAS.

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