Title

Low-Chloride Diet Prevents the Development of Arterial Hypertension and Protects Kidney Function in Angiotensin II-Infused Mice

Abstract

Introduction: A comprehensive pathophysiological mechanism to explain the relationship between high-salt intake and hypertension remains undefined. Evidence suggests that chloride, as the accompanying anion of sodium in dietary salt, is necessary to develop hypertension. We evaluated whether reducing dietary Cl? while keeping a standard Na+ intake modified blood pressure, cardiac hypertrophy, renal function, and vascular contractility after angiotensin II (AngII) infusion. Methods: C56BL/6J mice fed with standard Cl? diet or a low-Cl? diet (equimolar substitution of Cl? by a mixture of Na+ salts, both diets with standard Na+ content) received AngII (infusion of 1.5 mg/kg/ day) or vehicle for 14 days. We measured systolic blood pressure (SBP), glomerular filtration rate (GFR), natriuretic response to acute saline load, and contractility of aortic rings from mice infused with vehicle and AngII, in standard and low-Cl? diet. Results: The mice fed the standard diet presented increased SBP and cardiac hypertrophy after AngII infusion. In contrast, low-Cl? diet prevented the increase of SBP and cardiac hypertrophy. AngII-infused mice fed a standard diet presented hampered natriuretic response to saline load, meanwhile the low-Cl? diet preserved natriuretic response in AngII-infused mice, without change in GFR. Aortic rings from mice fed with standard diet or low-Cl? diet and infused with AngII presented a similar contractile response. Conclusion: We conclude that the reduction in dietary Cl? as the accompanying anion of sodium in salt is protective from AngII pro-hypertensive actions due to a beneficial effect on kidney function and preserved natriuresis.

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