



Long-term use of low-dose spironolactone in spontaneously hypertensive rats: Effects on left ventricular hypertrophy and stiffness

Marcelo P. Baldo¹, Ludimila Forechi¹, Elis A.S. Morra², Divanei Zaniqueli¹, Rebeca C. Machado¹, Wellington Lunz^{1,2}, Sérgio L. Rodrigues¹, José Geraldo Mill¹

¹Department of Physiological Sciences, Federal University of Espírito Santo, Av. Marechal Campos, 1468, Maruípe – 29042-755 – Vitória, ES, Brazil

²Centre of Physical Education and Sport, Federal University of Espírito Santo, Av. Fernando Ferrari, 514, Goiabeiras – 29075-910 – Vitória, ES, Brazil

Correspondence: Marcelo P. Baldo, e-mail: marcelobaldo@ymail.com

Abstract:

The aim of the present study was to evaluate the effect of low-dose spironolactone initiated during the early stages of hypertension development and to assess the effects of chronic pressure overload on ventricular remodeling in rats. Male spontaneously hypertensive rats (SHRs) (4 weeks) were randomized to receive daily spironolactone (20 mg/kg) or vehicle (mineral oil) from 4 weeks to 8 months of age. Systolic blood pressure was measured non-invasively by tail-cuff pletysmography at baseline, 4 and 8 months. Hemodynamic assessment was performed at the end of treatment by arterial and ventricular catheterization. An *in situ* left ventricular pressure-volume curve was created to evaluate dilatation and wall stiffness. Systolic blood pressure at 1 month of age was higher in SHRs than in the Wistar group; it increased throughout the follow-up period and remained elevated with treatment (Wistar: 136 ± 2 , SHR: 197 ± 6.8 , SHR-Spiro: 207 ± 7.1 mmHg; $p < 0.05$). Spironolactone reduced cardiac hypertrophy (Wistar: 1.25 ± 0.03 SHR: 1.00 ± 0.03 , SHR-Spiro: 0.86 ± 0.02 g; $p < 0.05$) and left ventricular mass normalized to body weight (Wistar: 2.51 ± 0.06 , SHR: 2.70 ± 0.08 , 2.53 ± 0.07 mg/g; $p < 0.05$). Moreover, the left ventricular wall stiffness that was higher in SHRs was partially reduced by spironolactone treatment (Wistar: 0.370 ± 0.032 ; SHR: 0.825 ± 0.058 ; SHR-Spiro: 0.650 ± 0.023 mmHg/ml; $p < 0.05$). Our results show that long-term spironolactone treatment initiated at the early stage of hypertension development reduces left ventricular hypertrophy and wall stiffness in SHRs.

Key words:

hypertension, spironolactone, ventricular hypertrophy, ventricular stiffness
