EFFECT OF SPIRONOLACTONE ON THE COURSE OF RENAL FAILURE AND CARDIOVASCULAR SYSTEM IN RATS WITH 5/6 NEPHRECTOMY

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OBJECTIVES

The incidences of cardiovascular morbidity and mortality are significantly enhanced in chronic kidney disease. Recently has suggested that aldosterone and specifically activation of the mineralocorticoid receptor (MR) in nonepithelial cells can induce cardiovascular damage by induction of vascular smooth muscle cell hypertrophy, endothelial dysfunction, and cardiac fibrosis that can be prevented by the simultaneously administered spironolactone.

The aim of study was to evaluate the effects of the spironolactone on the course of experimental uremia, blood pressure (BP) and myocardial hypertrophy in Wistar rats with 5/6 nephrectomy (NE).

METHODS

Animals were divided into 3 Groups: Group 1 – sham-operated (control, C; n=12); Group 2 – NE rats (n=10); Group 3 – NE rats receiving spironolactone (0.2 mg/day; n=9). The animals were observed during 2 months after the NE. Serum urea (S_{Ur}, mmol/l), creatinine (S_{Cr}, mmol/l), potassium (K+, mmol/l) and plasma aldosterone concentration (PAC, pg/ml) levels were assesed. Mean BP (mm Hg) was measured in the awaked rats by the tail cuff method. The degree of left ventricular hypertrophy was estimated as a ratio: left ventricular mass/body mass (LVH, mg/g).

Graphs and tables

RESULTS

NE in rats from Groups 2 and 3 was associated with significant rise of S_{Ur} (18.6±2.5 in Group 2; 18.7+0.9 in Group 3 vs 6.1±0.2 in C; $p<0.05$ in both cases), S_{Cr} (0.07±0.003 in Group 2; 0.07±0.003 in Group 3 vs 0.04±0.002 in C; $p<0.05$ in both cases) and K^+ (7.91±0.3 in Group 2; 7.91±0.3 in Group 2; 7.73±0.2 in Group 3 vs 4.51±0.2 in C; $p<0.05$ in both cases). There were no statistically significant differences in the levels of S_{Ur}, Cr and K^+ between Groups 2 and 3. BP in Groups 2 (151.3±2.7) and 3 (151.3±2.3) were significantly higher than in C (121.2±1.8; $p<0.001$ in both cases). There were no statistically significant differences in the levels of BP between Groups 2 and 3. In Group 3 LVH (2.52±0.06) did not differ significantly from those in the C (2.35±0.09; p=NS). However in Group 2 (2.80±0.11) it was significantly higher than in C ($p<0.05$). There were no statistically significant differences in the LVH between Groups 2 and 3. PAC in Group 3 (281.7±39.0 was significantly higher, than in C (145.4±17.4; $p<0.05$). There were no differences in the levels of PAC between Groups 2 (207.6±32.9) and 3 or between Group 2 and C (p=NS in both cases).

CONCLUSIONS

In rats with NE spironolactone has cardioprotective effect independent of the influence on BP, degree of renal dysfunction or PAC level.

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