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11 β Hydroxysteroid dehydrogenase type 2 and dietary acid load are independently associated with blood pressure in healthy children and adolescents.

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BACKGROUND:

The reduced activity of 11 β hydroxysteroid dehydrogenase type 2 (11 β HSD2) contributes to elevated blood pressure (BP) in clinical syndromes, but its effect on BP in the physiologic range is unclear.

OBJECTIVES:

We examined the association of 11 β HSD2 activity with BP in healthy children independent of known BP-related dietary and other factors and determined whether the diet-dependent acid load may constitute a dietary factor related to BP.

DESIGN:

We conducted a cross-sectional analysis in 267 healthy children (age range: 4-14 y) who provided a 24-h urine sample, a parallel 3-d weighed dietary record, and 1-3 BP measurements \pm 1.5 y around the urine collection. The ratio of urinary free cortisone to cortisol measured by using a radioimmunoassay was used as an index for 11 β HSD2. Urinary net acid excretion and the urinary and dietary potential renal acid load (PRAL) were used to predict the diet-dependent acid load. The PRAL was calculated as the sum of major mineral nonbicarbonate anions minus the sum of mineral cations. Sex-, age- and height-independent SD scores (SDSs) of systolic and diastolic BP were used as outcomes in linear regression analyses.

RESULTS:

11 β HSD2 was inversely associated with systolic BP SDSs in basic models and in analyses adjusted for body size, maternal BP, breastfeeding, and dietary intakes of total energy, salt, and fruit and vegetables ($P = 0.03$). In models that included indexes of dietary acid load instead of fruit and vegetables, all 3 acid-load biomarkers were significantly ($P = 0.006-0.02$) directly related to systolic BP.

CONCLUSION:

A lower 11 β HSD2 activity and higher dietary acid load may independently contribute to higher systolic BP in healthy children.