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The Analysis of Salt-Sensitive Hypertension Gene in Young Male Tanzanian

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Summary

It has been recognized that environmental factors such as dietary habits play an important role in the development of hypertension. Excess salt intake is one of the important environmental risks. Yamori et al. reported ethnic differences in salt sensitivity, and Tanzanian subjects were more salt-sensitive than Brazilian or Japanese subjects. Experiment with animal models indicated that the ACE locus at the chromosome 10 associates with the hypertension, especially salt-sensitive hypertension. ACE polymorphism influences the activity of the renin-angiotensin-aldosterone system. In this study, the relationship between ACE insertion/deletion (I/D) polymorphism and excessive salt intake was tested in young male Tanzanians.

Two hundred male volunteers aged 25 to 35 were recruited from Temeke in Dar es Salaam. Informed consent for participation was obtained from all subjects. Subjects with cardiovascular diseases, renal diseases, and diabetes mellitus were excluded. Sixty-five healthy male subjects attempted to develop a two-week intervention consisting of saltloading and a diuretic treatment period of one week each. In this method, subjects take 140 mEq of NaCl from a consommé soup and supplement per day and 25 mg of hydrochlorothiazide daily while maintaining their customary diet. At the baseline and the last day of each period, blood sampling and 24-hour urine collection were made. Blood pressure (BP) was measured at the three points (first, fourth, seventh day) of each period. ACE I/D polymorphism was detected by PCR method.

In 40 male Tanzanian subjects, serum ACE concentration of the subjects with more than 5% change in mean BP (MBP) during the transition from the salt-loading to the diuretic treatment period (S, n = 10) was significantly higher than subjects with less than 5% change in MBP (R, n = 30) (before salt-loading R: 21.6 ± 2.2 IU/L, N: 16.3 ± 0.8 IU/L, $p < 0.01$; after salt-loading S: 22.0 ± 2.5 IU/L, N: 16.0 ± 0.8 IU/L, $p < 0.01$; diuretic treatment S: 19.4 ± 2.3 IU/L, N: 16.2 ± 0.8 IU/L, $p = 0.106$). Serum ACE concentration in subjects with DD genotype was high compared with other genotypes (before salt-loading DD: 19.3 ± 1.5 IU/L, DI: 17.3 ± 1.5 IU/L, II: 15.4 ± 1.0 IU/L, $p = 0.265$; after salt-loading DD: 19.7 ± 2.0 IU/L, DI: 16.8 ± 1.4 IU/L, II: 15.0 ± 1.0 IU/L, $p = 0.157$; diuretic treatment DD: 19.9 ± 1.7 IU/L, DI: 15.3 ± 1.0 IU/L, II: 15.1 ± 1.2 IU/L, $p = 0.03$).

The results from this study suggested that an interaction might exist between the renin-angiotensin-aldosterone system and the ACE I/D polymorphism during salt-loading and diuretic treatment in young male Tanzanians.