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SEX DIFFERENCES IN STRESS INDUCED PRESSURE NATRIURESIS IN AFRICAN-AMERICAN YOUTHS
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African-Americans are characterized by an increased prevalence of essential hypertension, with a greater prevalence for males than females. We have hypothesized that stress induced impaired sodium regulation contributes to disparity. Therefore, the purpose of this study was to examine the factors related to changes in urinary sodium excretion (UNaV) during an extended stress period in African-American youths. Methods: The 40 subjects were 21 males and 19 females aged 15 to 18 years. The subjects were placed on a controlled sodium intake (4,000±200 mg/day) for 3 days prior to testing to bring them into similar levels of sodium balance. The test was performed on the fourth day. It consisted of a two hour baseline period, a one hour stress period (competitive video game), and a two hour recovery period. The subjects were provided with water throughout the study. Urine samples were collected hourly and blood pressure (BP) each 15 minutes. Overall, UNaV increased from the baseline to the stress period (10±5 v 13±8 mEq/hr; p<0.002) and decreased from stress to recovery (7±4 mEq/hr; p<0.0001). Systolic BP (SBP) increased from the baseline period to the stress period (115±10 v 119±12 mm Hg; p=0.009) and decreased during the recovery period (112±10 mmHg; p<0.07). However, different patterns were observed for males and females. Females had significant increases in UNaV form baseline to stress (9±5 v 14±9 mEq/hr; p<0.002), and a significant decrease during recovery (7±4 mEq/hr; p<0.0001). SBP did not increase during stress. In contrast, males did not show a significant change in UNaV during stress; however, they did show a significant increase in SBP (116±10 v 124±11 mmHg; p<0.002) which was still elevated into the second hour of recovery (118±10 mmHg; P<0.01). In conclusion, these results are consistent with our hypothesis that stress induced impaired pressure natriuresis resulting in an increased BP load contributes to the increased prevalence of hypertension in African-American males.

Key Words: Sodium handling, Blood pressure, Pressure natriuresis

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CHANGES IN BLOOD PRESSURE OVER LONG-TERM OBSERVATION. THE ROLE OF GENDER AND ANGIOTENSIN-CONVERTING ENZYME INSERTION/DELETION POLYMORPHISM
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Present knowledge indicates that in the general population, baseline blood pressure is not influenced substantially by angiotensin-converting enzyme (ACE) insertion(I)/deletion(D) polymorphism. However, the effect of ACE I/D polymorphism on BP may be gender specific. We investigated the association between ACE I/D polymorphism and gender with changes in 24-hour BP after long-term observation (mean observation time 4.8±1.9 years). We studied 204 mild, never treated hypertensives (153 males and 51 females, mean age 33±9 years) from the HARVEST study. 24-hour ambulatory BP was measured using Spacelabs 90207. Changes in 24-hour BP were defined as a difference between a subject’s baseline 24-hour BP and a subsequent 24 hour BP measurement obtained about 4 years later. The effect of ACE I/D polymorphism and gender on 24-hour BP changes in long-term observation was tested using a two-way ANCOVA. Changes in BP were used as the dependent variable and adjusted for age, BMI, physical activity, marital status, family history of hypertension, alcohol and coffee intake, duration of hypertension, smoking, changing of habits and body weight during long-term observation.

BMI, age and baseline BP did not vary among genotypes. ACE I/D allele frequencies (II 19%, ID 52%, DD 29%) were in Hardy-Weinberg equilibrium and were not different in women and men. ACE I/D polymorphism (F=4.96, p=0.008) and gender (F=10.97, p=0.001) were independently associated with 24-hour SBP changes in long term observation. Moreover, an independent association between the ACE I/D-gender interaction and 24-hour SBP changes was observed (F=4.15, p=0.024). Indeed, in long-term observation, significant increases in 24-hour SBP were observed only in II (11.0±4.2 mmHg) and DD (13.7±3.4 mmHg) women (p<0.05 in all comparisons) while in other groups (namely in men and in ID women), SBP did not increase more than 3 mmHg. ACE I/D polymorphism and gender were not related to changes in 24-hour DBP.

Our results suggest that in mild hypertensive women, the homozygotic state of ACE I/D polymorphism may serve as a marker for an enhanced age related increase in systolic blood pressure.

Key Words: angiotensin-converting enzyme I/D polymorphism, 24-hour blood pressure, gender differences