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Plasma Total Testosterone and Incident Cardiovascular Events in Hypertensive Patients

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Abstract

BACKGROUND Androgen deficiency confers an independent risk for cardiovascular events and total mortality. Hypertension, a major contributory factor to the development of cardiovascular disease, has also been associated with increased prevalence of low testosterone. We investigated whether low androgen concentration predicts incident major adverse cardiovascular events (MACE) in middle-aged nondiabetic hypertensive patients without clinical atherosclerosis.

METHODS MACE in relation to total testosterone (TT) were analyzed with proportional hazards models in 228 male patients (mean age 56 years).

RESULTS During a mean follow-up of 44 months, 19 of 228 participants (8.3%) experienced a MACE. Compared to patients who did not experience MACE, hypertensive subjects who developed MACE had lower TT concentration (3.9±0.7ng/ml vs. 4.6±1.5ng/ml, $P < 0.01$) and a higher prevalence of hypogonadism (36% vs. 16%, $P < 0.05$). Subjects in the lowest TT tertile (<4.0ng/ml) had a statistically significant higher risk of MACE compared to those in the highest tertile (>4.9ng/ml) in multivariate Cox models adjusted for age, systolic blood pressure, and risk factors (all $P < 0.05$). A TT plasma level of 5.04ng/ml was associated with a negative predictive value (ability to "rule out" MACE) of 97.2%. Addition of TT to standard risk factors model yielded a net reclassification improvement of 38.8 % ($P < 0.05$).

CONCLUSIONS Our results show that low plasma testosterone is associated with increased risk for a MACE in hypertensive patients. Low endogenous androgen concentration improves risk prediction when added to standard risk factors and may represent a valuable biomarker of prediction of cardiovascular disease risk in these patients.

Key words androgen deficiency blood pressure hypertension major adverse cardiovascular events risk prediction total testosterone.