

Relationship between copeptin and nocturnal blood pressure in young and healthy adults

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PURPOSE

Stress has been implicated in the pathogenesis of hypertension. In the current study we assessed the relationships between copeptin, a vasopressin related stress hormone, and 24-hour ambulatory blood pressure (BP) levels. We also evaluated potential differences between daytime and nighttime BP levels.

METHODS

Healthy individuals aged 25 to 41 were enrolled in the population based 'Genetic and Phenotypic Determinants of Blood Pressure and Other Cardiovascular Risk Factors' (GAPP) Study. Individuals with a BMI >35kg/m² or prevalent cardiovascular disease were excluded.

24h-BP was obtained every 15 minutes from 7.30 to 22.30 and every 30 minutes during nighttime, using a validated device (BR 102plus, Schiller AG, Switzerland). Daytime and nighttime was defined according to an individual diary. Nighttime hypertension was defined as a systolic BP ≥120 and/or diastolic BP ≥70mmHg.

Copeptin and other biomarkers were assayed from fasting venous blood sample.

Multivariable linear and logistic regression models were adjusted for sex, age, BMI, smoking status, lipid profile, glomerular filtration rate (GFR), glycated hemoglobin (HbA1c), uric acid and high sensitivity C-reactive protein.

RESULTS

Baseline characteristics of 1662 participants stratified by sex are presented in **Table 1**. In multivariable linear regression analyses a strong relationship between copeptin levels and nighttime BP emerged among men (β -coefficient for systolic BP 1.79 (95% confidence interval (95% CI) 0.49; 3.09), $p=0.007$; β -coefficient for diastolic BP 1.49 (0.56; 2.43), 0.002). These relationships were not significant among women (**Table 2**). In men, the fully adjusted odds ratios (OR) for nighttime hypertension across increasing quartiles of copeptin were 1.0 (reference), 0.80 (95% CI 0.52; 1.21), 1.32 (0.86; 2.01) and 1.54 (1.01; 2.38) (p for linear trend = 0.009) (**Figure 1**).

Table 1 Baseline characteristics

	Men N = 785 (47.2%)	Women N = 877 (52.8%)	p-value
Age (y)	38 (32-41)	38 (32-40)	0.65
BMI (kg/m ²)	25.6 (23.6-27.9)	22.7 (20.8-25.4)	<0.0001
Current Smoker (%)	189 (24)	164 (19)	<0.0001
BP sys day (mmHg)	133 (127-140)	120 (114-126)	<0.0001
BP dia day (mmHg)	85 (80-90)	78 (74-83)	<0.0001
BP sys night (mmHg)	113 (107-121)	103 (97-109)	<0.0001
BP dia night (mmHg)	69 (65-75)	63 (59-68)	<0.0001
Copeptin (pmol/l)	3.8 (2.6-5.9)	2.3 (1.6-3.5)	<0.0001

Data are median (interquartile range) or number (percentage).
BP = blood pressure; sys = systolic; dia = diastolic

Table 2 Copeptin and nighttime BP among men and women (Multivariable linear regression analysis)

Men	β	95% CI	p-value
BP systolic night	1.79	0.49; 3.09	0.007
BP diastolic night	1.49	0.56; 2.43	0.002
Women	β	95%CI	p-value
BP systolic night	-0.05	-1.02; 0.91	0.09
BP diastolic night	0.02	-0.70; 0.74	0.28

Adjusted for sex, age, BMI, smoking status, lipid profile, GFR, HbA1c, uric acid and hs-CRP. BP = blood pressure.

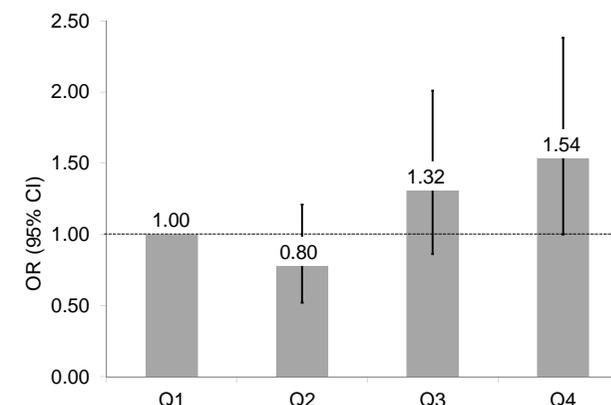


Figure 1 Copeptin quartiles and nighttime hypertension among men (Multivariable logistic regression analysis)

CONCLUSION

In this large population based study of young and healthy adults, the stress hormone copeptin was significantly associated with elevated nighttime but not daytime BP levels in men. Our data suggest that stress may be involved in BP elevations during sleep.

Declaration of interest: None