

NOCTURIA IS ASSOCIATED WITH THE INCIDENCE OF METABOLIC SYNDROME: A FOUR-YEAR LONGITUDINAL STUDY IN JAPANESE MEN AND WOMEN.Hypothesis / aims of study

Few studies have investigated the association between nocturia and the incidence of metabolic syndrome (MetS). We hypothesized that nocturia may be associated with the incidence of MetS and conducted a 4-year longitudinal study that investigated the possible association.

Study design, materials and methods

We collected data on 5,701 individuals who participated in a multiphasic health screening in Fukui, Japan, in 2003 (baseline) and 2007, and were ≤65 years at baseline. After excluding participants with MetS at baseline, data from 5,234 participants (1,173 men and 4,061 women) were subjected to analysis.

MetS diagnoses were made using the modified Japanese criteria, in which MetS was diagnosed when obesity plus two or more of following criteria were present: HDL cholesterol <40 mg/dL or triglycerides ≥150 mg/dL; systolic blood pressure ≥130 mmHg, diastolic blood pressure ≥85 mmHg, or on therapy; and fasting plasma glucose ≥110 mg/dL, or in therapy. Obesity was defined as a body mass index ≥25.0 kg/m². Waist circumference was not included in the definition of obesity because this measurement was not available in this study. Subjects were considered to have MetS if they were taking medication for hypertension, hypercholesterolemia, hypertriglyceridemia or diabetes mellitus. Nocturia was defined as two or more voids/night (experienced "sometimes" or "always").

The relationship between nocturia and the incidence of MetS was analyzed using logistic regression modeling. P-values <0.05 were considered statistically significant.

Results

The participants' mean age was 55.6 years (range, 23-65 years) at baseline. The overall prevalence of nocturia was 6.2% at baseline and was higher in older age groups. A total of 210 participants (4%) developed MetS during the four-year study period.

After adjusting for age and gender, a significant association was observed between the incidence of MetS and nocturia (experienced "sometimes" or "always"). For the incidence of MetS, the multivariate odds ratios (95% Confidence Intervals) of "sometimes" and "always" nocturia were 2.31 (1.14-4.72) and 2.90 (1.08-7.87), respectively (Table).

Interpretation of results

The results of our study indicate that the incidence of MetS is associated with nocturia. In previous studies, the components of MetS, such as obesity, diabetes, and hypertension were risk factors for nocturia [1-3]. The components of MetS are not mutually exclusive and could interact with each other. Therefore, nocturia may increase during the progression of MetS or MetS components. As such, nocturia may also be a marker for the incidence of MetS.

Concluding message

The results of our epidemiological study indicate that nocturia can be a precursor of MetS. Therefore, clinicians may need to consider MetS and its other precursors in the differential diagnosis of nocturia.

Table. Multivariate analysis of risk factors for the incidence of metabolic syndrome in Japanese men and women.

		Odds ratio	95% CI	P-value
Age		1.03	1.01-1.05	<0.01
Gender	Male/Female	2.52	1.89-3.34	<0.01
Nocturia (≥2)	"None"	1 (ref.)		
	"Sometimes"	2.31	1.14-4.72	<0.05
	"Always"	2.90	1.08-7.87	<0.05

*95%CI, 95% Confidence Intervals.

References

1. Tikkinen KA, Auvinen A, Huhtala H, Tammela TL. Nocturia and obesity: a population-based study in Finland. *Am J Epidemiol*. 2006; 163: 1003-11.
2. Yoshimura K, Terada N, Matsui Y, Terai A, Kinukawa N, Arai Y. Prevalence of and risk factors for nocturia: analysis of a health screening program. *Int J Urol* 2004; 11: 282-7.
3. Asplund R. Nocturia in relation to sleep, somatic diseases and medical treatment in the elderly. *BJU Int* 2002; 90: 533-536.

Disclosures

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