

HYPERTENSION AND TYPE 2 DIABETES MELLITUS ARE HIGHLY ASSOCIATED WITH NOCTURIA THAN METABOLIC SYNDROME IN JAPANESE POPULATION.

Hypothesis / aims of study

Nocturia is one of the symptom that affect seriously for quality of life in lower urinary tract symptoms (LUTS). A previous study founded that type 2 diabetes, hypertension, were associated with an increased risk of LUTS (1) (2) (3). However, few studies have investigated the possible association of metabolic syndrome (MS) with LUTS, especially nocturia. The main aim of this study was to investigate the relationship between MS and nocturia.

Study design, materials and methods

During 2 months' period, a total 1,061 cohort (555 men and 506 women) aged 23-84 (mean: total 50.23, men 50.57, women 49.87) years participating in a voluntary health care check including all factors associated with the metabolic syndrome (MS), getting in complete response to all questionnaires, in the JA Yamanashi Koseiren, were assessed in Yamanashi Prefecture in Japan.

Nocturia and other lower urinary tract symptoms (LUTS) were also assessed by the Japanese version Nocturia Quality Of Life Questionnaire (N-QOL Questionnaire), International Prostate Symptom Score (IPSS), and Overactive Bladder Symptom Score (OABSS). To estimate the prevalence of the MS, we used diagnostic criteria as defined The Japanese Society of Internal Medicine, The Japanese Circulation Society, and other 6 societies in Japan. The primary outcome was association between MS and nocturia. In addition, secondary outcomes were association between nocturia and other LUTS, and QOL disorders by nocturia. Statistical analysis was made using unpaired t-test, Multivariable analysis, Univariable analysis, and odds ratio and 95% confidence intervals estimated using logistic regression models.

Results

Table 1 shows the background of the study cohort. Among 1,061 people, 434 (40.9%) had nocturia, and 119 (11.2%) was defined as MS.

Table 2 shows correlation among nocturia and metabolic syndrome and other metabolic syndrome-related factors.

The highest odds ratio with nocturia was systolic blood pressure (SBP) ≥ 130 mmHg or diastolic blood pressure (DBP) ≥ 85 mmHg or medication use (OR=2.22 ; 95%CI: 1.70-2.91), then elevated fasting blood sugar (OR=1.69; 95%CI: 1.20-2.38), MS (Odds Ratio (OR) =1.54; 95% confidence interval (CI): 1.05-2.26), and waist circumference (OR=1.53; 95%CI: 1.17-1.99), however, as a result of logistic regression models, lipid abnormality was not associated with nocturia (lipid abnormality; OR=1.19, 95%CI: 0.90-1.56).

Among IPSS, daytime frequency was the most prevalent symptoms.

Among IPSS, feeling of incomplete emptying, daytime frequency, intermittency, urgency, slow stream, and straining to void showed positive significant correlation with nocturia.

Among OABSS, urgency showed significant positive correlation with nocturia ($p < 0.001$), however, urgency urinary incontinence score did not ($p = 0.08$).

The highest score in N-QOL questionnaire components was sleep disorders, then necessity of a nap.

Interpretation of results

High blood pressure, then elevated fasting blood glucose are more significantly correlated with nocturia than MS, and waist circumference.

Concluding message

Hypertension and type 2 DM may be the most important risk factors for nocturia in Japanese population.

Table 1. Background of the study cohort

| Main variables | Sub-variables | Number |
|-------------------------------------|---------------------------------------|------------------------------|
| Age | 20-29 years old | 14 |
| | 30-39 years old | 179 |
| | 40-49 years old | 320 |
| | 50-59 years old | 336 |
| | 60-69 years old | 159 |
| | 70-79 years old | 48 |
| | 80-89 years old | 5 |
| | Total | 1,061 (mean 50.23 years old) |
| Sex | Male | 555 |
| | Female | 506 |
| Nocturia | (+) | 434 (40.9%) |
| | (-) | 627 |
| Factors for metabolic syndrome (MS) | Serum lipid (high TG, or low HDL) (+) | 289 |

| | | |
|--|---------------------------------|-------------------------|
| | High fasting blood glucose (+) | 156 |
| | Hypertension (+) | 320 |
| | Larger waist conference (+) men | 320 (men 260, women 60) |
| | Defined as MS | 119 (11.2%) |

Table 2. Correlation among nocturia and metabolic syndrome and other metabolic syndrome-related factors.

| | Odds ratio | 95% Confidence interval |
|------------------------------|------------|-------------------------|
| Metabolic syndrome | 1.54 | 1.05-2.26 |
| High blood pressure | 2.22 | 1.70-2.91 |
| Waist circumference | 1.53 | 1.17-1.99 |
| Elevated fasting blood sugar | 1.69 | 1.20-2.38 |
| Serum lipid abnormality | 1.19 | 0.90-1.56 |

References

1. Urology 68(2):318-23, 2006.
2. BJU Int. 2009.
3. Eur Urol .52(2):407-15.2007.

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| <i>What were the subjects in the study?</i> | HUMAN |
| <i>Was this study approved by an ethics committee?</i> | Yes |
| <i>Specify Name of Ethics Committee</i> | Ethics Committee, University of Yamanashi |
| <i>Was the Declaration of Helsinki followed?</i> | Yes |
| <i>Was informed consent obtained from the patients?</i> | Yes |