

SEASONAL ALTERATIONS IN NOCTURIA: A FIVE-YEAR LONGITUDINAL RETROSPECTIVE STUDY

Hypothesis / aims of study

Patients often complain that nocturia worsens in winter and subsides in summer. However there were only a few previous papers which suggested seasonal alterations in nocturia. The objective of this study was to evaluate whether nocturia altered with four seasons in a town of east Japan and to identify risk factors among patients who developed increased nocturia in winter.

Study design, materials and methods

We conducted a longitudinal retrospective study of nocturia in 300 patients who regularly visit our hospital with benign prostatic hyperplasia or overactive bladder. Data were obtained from medical records in every three month for five years [2009-2013] and partitioned by four seasons. We evaluated differences in frequency of night-time voiding of four seasons within each year and over total five years. All pairwise comparisons were tested by a one-way repeated measures analysis of variance (ANOVA) followed by Tukey-Kramer's post hoc test.

We also assessed the correlation between patients with an increase in nocturia from summer to winter and the following factors: sex, age (≥ 80 , 70-79, ≤ 69 years) and comorbidities (insomnia, hypertension [HT], diabetes mellitus [DM], stroke, and coronary artery disease [CAD]).

Results

Of 300 Japanese patients, 263 were male and 37 were female. Mean age (\pm standard deviation) was 73.4 (± 8.0) years. The seasonal average of night-time frequency of five years was 2.223 times in spring, 2.153 times in summer, 2.241 times in autumn and 2.272 times in winter (Table1). Increases from summer to winter were statistically significant (0.149 times, $P=0.0004$) over five years (Table2). However, increases were insignificant in each year except 2010.

The number of patients who developed a ≥ 0.5 times increase in nocturia from summer to winter was 84 of 283. Univariate Chi-square testing demonstrates a statistically significant association with HT ($P=0.0263$), however multivariate logistic regression did not show any risk factors including HT (Table3).

Table 1. Mean frequency of night-time voiding for five years

Season	LMS(times)	Mean(times)	SE
Spring	2.111	2.132	0.032
Summer	2.106	2.136	0.028
Autumn	2.256	2.284	0.030
Winter	2.283	2.308	0.032

LMS, Least Mean Square; SE, Standard Error

Table 2. Differences of nocturia in each season for five years

Season	-Season	Difference	P value	95% CI	
Summer	Winter	-0.149	0.0004	-0.244	-0.053
Summer	Autumn	-0.095	0.0586	-0.192	0.002
Spring	Winter	-0.089	0.0891	-0.186	0.009
Summer	Spring	-0.060	0.3974	-0.158	0.038
Autumn	Winter	-0.054	0.4733	-0.150	0.042
Spring	Autumn	-0.035	0.7995	-0.064	0.133

95% CI, 95% confidence interval

Table 3. Risk factors of increased nocturia from summer to winter

	Number of Patients (%)	Increased ≥ 0.5 times	Increased < 0.5 times	Univariate Chi-square	Multivariate Logistic Regression
Total	283	84	199		
Sex				P=0.2827	P=0.2717
Male	247 (87.3)	76	171		
Female	36 (12.7)	8	28		
Age				P=0.9345	P=0.9853
≥ 80	64 (22.6)	20	44		
70-79	145 (51.2)	43	102		
≤ 69	74 (26.2)	21	53		
Comorbidities					
Insomnia	79 (27.9)	30	49	P=0.0608	P=0.1225
HT	150 (53.0)	53	97	P=0.0263	P=0.1469
DM	101 (35.7)	30	71	P=0.9954	P=0.4190
Stroke	91 (32.2)	29	62	P=0.5808	P=0.8769
CAD	86 (30.4)	32	54	P=0.0701	P=0.3583

HT, hypertension; DM, diabetes mellitus; CAD, coronary artery disease

Interpretation of results

In this study, a longitudinal observation for multiple years among same patients demonstrates a significant increase in nocturia in winter.

Cold stress is known to induce detrusor overactivity through C-fiber afferent nerves. Autonomic reaction to cold exposure is also reported to induce HT.

Previous large-scale studies reported a significant association of nocturia. Several mechanisms such as glomerular hyperfiltration and nocturnal polyuria are considered for the association.

Concluding message

This study demonstrates a statistically significant increase in nocturia in winter when compared to summer. In addition, hypertensive patients are more likely to increase in nocturia in winter.

References

1. Urology. 2007 May;69(5):864-70.
2. Int J Urol. 2013 Jul;20(7):661–669.
3. J Am Soc Hypertens. 2013 Jan-Feb;7(1):75-84.

Disclosures

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