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ASSOCIATION BETWEEN NOCTURNAL VOIDING, AROUSAL DURING SLEEP AND THE INCIDENCE RATE OF FALLS: A COMMUNITY-BASED STUDY WITH HOME-VISIT INTERVIEW

Hypothesis / aims of study

Falls are one of the leading causes of conditions that entail long-term care among older adults. It is known that older adults with sleep disturbance and/or nocturnal voiding have a high fall risk^{1, 2)}. Sleep disturbance is a common problem in older adults, and is strongly associated with nocturia³⁾. However, few studies have compared the incidence rate of falls between subjects with arousal during sleep accompanied with nocturnal voiding and subjects with arousal during sleep that is not necessarily accompanied with nocturnal voiding. The present study aimed to clarify the association between arousal during sleep, nocturnal voiding, and the incidence rate of falls in community-dwelling older adults.

Study design, materials and methods

We carried out a comprehensive geriatric health survey of all residents aged 65 years or older in a village along the Sea of Japan in 2012. Trained interviewers visited houses and performed face-to-face interviews including the Mini-Mental State Examination (MMSE). Lower urinary tract symptoms over the past month were assessed using the International Prostate Symptom Score (IPSS) and overactive bladder symptom score (OABSS). Overactive bladder (OAB) definition was based on once a week or more frequency of urinary urgency and eight or more frequency of voiding per day. We inquired the incidence of falls over the past year and the frequency of arousal during sleep per night over the past month. Based on the survey results, subjects who had the same frequency of arousal during sleep and nocturnal voiding were placed in the matched group, and subjects with a greater frequency of arousal during sleep than nocturnal voiding were placed in the mismatched group. Both groups were divided into 4 subgroups according to the frequency of arousal during sleep, with subgroups for subjects who were aroused once, twice, 3 times, and 4 or more times per night. We compared the matched group with the mismatched group in each frequency of arousal during sleep. The analysed subjects were older adults who had 24 or more points in the MMSE. Statistical analysis of the data was conducted using the Pearson's correlation coefficient test, Student's t-test, and chi-square test.

Results

Japanese subjects (N=1103) participated in the survey (participation rate: 86.4%). Of the 1103 subjects, 850 who had 24 or more points in the MMSE were selected for the analysis. Among these, 459 were female and 391 were male. The mean age was 74.3 years (range 63 to 99). 787 Subjects (92.6%) had 1 or more incidents of arousal during sleep, and 731 (86.0%) had 1 or more episodes of nocturnal voiding. 63 Subjects (7.4%) had neither arousal during sleep nor nocturnal voiding. A significant correlation ($p < 0.0001$, $r = 0.8047$) was observed between the frequency of nocturnal voiding and frequency of arousal during sleep. For 590 subjects (69.4%), the frequency of nocturnal voiding matched that of arousal during sleep. This association was not seen in 260 subjects (30.6%). In the matched group, we placed 234 subjects (39.7%) in the once subgroup, 194 subjects (32.9%) in the twice subgroup, 78 subjects (13.2%) in the 3-times subgroup and 21 subjects (3.6%) in the 4-times or more subgroup. In the mismatched group, we placed 35 subjects (13.5%) in the once subgroup, 122 subjects (46.9%) in the twice subgroup, 70 subjects (26.9%) in the 3-times subgroup and 33 subjects (12.7%) in the 4-times or more subgroup. The IPSS score in the matched group was significantly higher than in the mismatched group at each frequency (Fig.1). The ratio of the subjects with OAB was significantly higher in the matched than in mismatched group in the twice and 3-times subgroups. The incidence rates of falls are shown in Figure 2. The incidence rate of falls was higher in the matched than in the mismatched group at each frequency of arousal during sleep. In the 3-times subgroup, the incidence rate of falls in the matched group was significantly higher than in the mismatched group ($p < 0.01$).

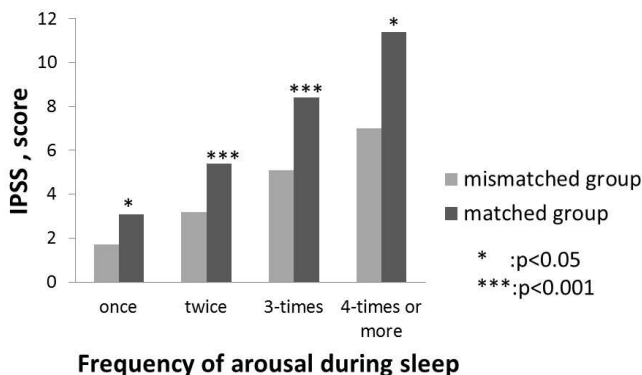


Figure 1. A comparison of the IPSS score between the matched and mismatched groups according to the frequency of arousal during sleep.

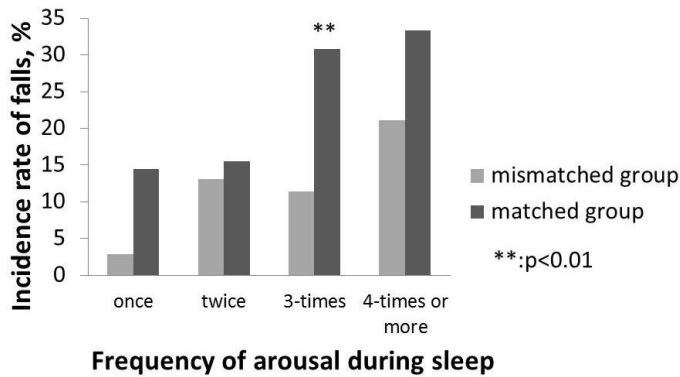


Figure 2. A comparison of the incidence rate of falls between the matched and mismatched groups according to the frequency of arousal during sleep.

Interpretation of results

In this study, the frequency of arousal during sleep was strongly associated with the frequency of nocturnal voiding. The IPSS score was higher in the matched than in the mismatched group at each frequency. Further, older adults with arousal during sleep that was necessarily accompanied with nocturnal voiding had a higher risk of falls. In particular, older adults with a frequency of arousal during sleep of 3 times per night matched with nocturnal voiding had a significantly higher risk of falls. This information is important in order to prevent falls in community-dwelling older adults. Moreover, it is necessary to treat older adults with the same frequency of nocturnal voiding and arousal during sleep for nocturia in order to prevent falls.

Concluding message

We conclude that arousal during sleep with the same frequency of nocturnal voiding was associated with a higher fall risk.

References

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Disclosures

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