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Original Article

Higher nocturnal systolic blood pressure in patients with restless legs syndrome compared with patients with insomnia

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ABSTRACT

Background: There is evidence linking restless legs syndrome (RLS) with increased blood pressure (BP), but the mechanism of this relation remains unclear. Is the BP increased due to some features of RLS or to deterioration of sleep caused by RLS? This study compared values of nocturnal BP in patients with RLS and patients with insomnia. If increased BP in RLS is a consequence of disordered sleep, then it should be similar to increased BP in insomnia.
Methods: Polysomnographic recordings of patients admitted to a sleep center with RLS or insomnia were analyzed. Demographic and clinical data, objective sleep parameters, and nocturnal BP were compared.
Results: Recordings of 35 patients with RLS and 33 patients with insomnia were analyzed. The groups did not significantly differ in terms of demographic traits or prevalence of other comorbidities. Patients with RLS had significantly higher systolic BP during the night (122.4 ± 13.8 vs 116.3 ± 13.4; $p = 0.03$) and during sleep (121.4 ± 13.3 vs 115.7 ± 13.3; $p = 0.04$). The only significant difference in sleep architecture was an increased number of periodic limb movements in sleep (PLMS) and PLMS with arousal in the RLS group (25.5 ± 24.6 vs 13.9 ± 22.7; $p = 0.02$ and 4.7 ± 5.4 vs 2.1 ± 3.4; $p = 0.01$).
Conclusion: Our results suggest that patients with RLS have higher nocturnal BP than patients with insomnia, and that increased PLMS is related to the increase in BP.

1. Introduction

Restless legs syndrome (RLS) is a neurological disorder characterized by the presence of troublesome discomfort in the lower extremities and an urge to move the legs. These symptoms appear at rest in the evening or night, and are relieved by moving the legs [1]. Another characteristic of RLS is the presence of periodic limb movements in sleep (PLMS), an involuntary flexing of the lower extremities during sleep [1]. The prevalence of RLS is estimated at 5–8.8% of the general population [2].

Epidemiologic data have shown that RLS may be related to an increased risk of hypertension [3–5] and to a nondipping pattern of circadian blood pressure (BP) changes [6]. One hypothesis explaining increased BP in RLS is based on the observation that each PLMS leads to a transient increase in BP, which results in numerous increases in BP during the night [7–9].

An alternative explanation of the relation between RLS and higher BP is that disordered nocturnal sleep (eg, short total sleep time, disturbed proportion of sleep stages, high number of awakenings) is itself a factor triggering increased nocturnal BP [10–12]. Patients with RLS have poorer nocturnal sleep compared with normal populations, which may explain the increased nocturnal BP independently of the presence of periodic limb movements.

One method of clarifying whether nocturnal BP is increased in patients with RLS due to specific clinical features of this disease (eg, presence of PLMS) or simply due to presence of sleep disturbance is to compare patients with RLS (examined group) and patients with other diseases leading to disordered sleep (control group). If nocturnal BP in patients with RLS is not significantly different from control groups, it can be concluded that disturbed sleep is sufficient to increase nocturnal BP. If, however, nocturnal BP is higher in the RLS group, some clinical features of RLS (other than disturbed sleep) may lead to increased BP.

Insomnia, primarily characterized by disordered sleep, constitutes a natural control condition for such comparisons, as it has been shown that patients with insomnia have higher nocturnal BP than healthy subjects [13].

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This study compared nocturnal BP in patients with RLS and patients with disordered sleep due to insomnia. It also compared objective sleep parameters in RLS and in insomnia with regard to nocturnal BP values.

2. Methods

The protocol for this study was approved by the Independent Bioethical Committee for Scientific Research at the Medical University of Gdansk.

2.1. Subjects

The study design was based on a comparison of nocturnal values of BP in two groups of patients: patients with disordered sleep due to RLS, and patients with disordered sleep due to insomnia.

The following inclusion criteria were used: full polysomnographic (PSG) recordings with beat-to-beat measurement of BP and either RLS diagnosed according to the International Restless Leg Syndrome Study Group (IRLSSG) [1] diagnostic criteria or insomnia diagnosed according to the International Classification of Sleep Disorders, second edition [14]. Exclusion criteria were as follows: presence of sleep-related breathing disorders, defined as the presence of apnea/hypopnea index (AHI) greater than five; presence of diagnosed/treated mood disorders or other psychiatric conditions; and unstable intake of any drugs within the two weeks preceding PSG recordings. The selection of subjects participating in the study is shown in Fig. 1.

We performed a retrospective analysis of PSG recordings of 35 patients diagnosed with RLS and 33 patients diagnosed with insomnia. All participants were Finnish. The mean age was 48.6 ± 13.7 years in the RLS group and 46.5 ± 11.2 years in the insomnia group. There were 14 men in the RLS group and 17 men in the insomnia group. The examined and control groups were selected to detect a 10% difference in BP values with power test of 0.75 (sample size: RLS = 35, insomnia = 33; sampling ratio = 1.1 RLS/insomnia).

All patients underwent the diagnostic process in Vitalmed Helsinki Sleep Clinic. The analyzed PSG recordings were performed prior to initiation of any therapy that might interfere with sleep architecture.

2.2. PSG recordings

All the patients underwent a single night of polysomnographic recording. All recordings were performed with the SOMNOscreen

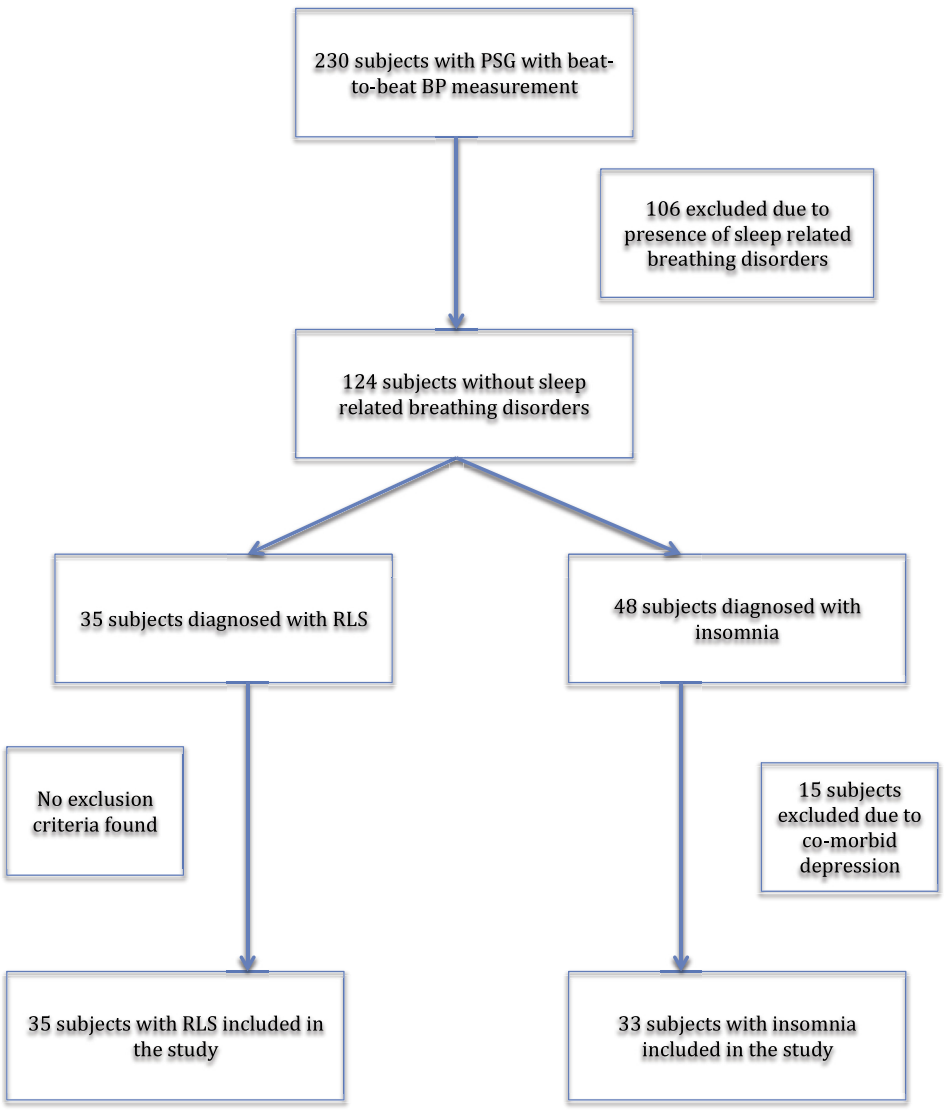

Fig. 1. Selection of subjects participating in the study. PSG – polysomnography; BP – blood pressure; RLS – restless legs syndrome.

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