

Restless legs syndrome and impact on work performance

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ABSTRACT

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Restless legs syndrome (RLS) is a neurological sensorimotor disorder characterized by unpleasant sensations in the legs and an uncontrollable urge to move them for relief. The RSL prevalence in the general population is 0.1% - 11.5%, and increases with age, with the highest effect of producing a primary sleep disorder (70%-80%). Women appear to be at increased risk, as do individuals with certain chronic conditions, including renal failure and anemia. The pathophysiology of RLS is incompletely understood, but it probably results from derangements in dopamine and iron metabolism, and has a genetic component. RSL could be idiopathic or secondary (usually related with iron deficiency, terminal renal failure, pregnancy, and spinal cord lesions). RLS patients usually have sleep disorders, so the disease can cause difficulties and problems in occupational and social life. Subjects with RLS symptoms appear to experience significantly more daytime problems, including being late for work, making errors at work, or missing work because of sleepiness. The diagnosis of RLS is made by following the criteria of the International Restless Legs Syndrome Study Group (IRLSSG). Pharmacologic RLS therapy, in which dopaminergic drugs constitute the first line, is effective and may have a dramatic effect on symptoms and quality of life. Identifying and treating RLS may improve sleep quality, daytime function and work performance.

Keywords: Restless legs syndrome, sleep disorder, workers

INTRODUCTION

Restless legs syndrome (RLS) is a neurological sensorimotor disorder characterized by by unpleasant sensations in the legs and an uncontrollable urge to move them for relief. The patients complain of a burning sensation, of worms moving, of a sudden

pulling movement of the leg, or of ants crawling within the legs. The sensations range from uncomfortable to irritating and painful.^(1,2) The urge to move the legs has a circadian pattern most occur in the evening or at night when the patient is not active, at which time RLS symptoms are manifested as sudden movements of the legs, such that this condition is frequently

accompanied by sleep disturbances.⁽²⁾

RSL may have a negative impact on the quality of life because it causes unpleasant waking up, chronic sleep disorders, and stress. This condition has an effect on various aspects of life, such as occupational and social problems and difficulties in family life. Disturbed sleep and intolerance to activities where the individual has to remain without moving, may cause loss of work, inability to enjoy life and relational problems.⁽³⁾

Epidemiology

In the general population, the prevalence of RSL ranges from 0.1% to 11.5%, with the occurrence of a primary sleep disorder as the highest effect (70%-80%).⁽⁴⁾ Studies conducted by *The RLS Epidemiology, Symptoms and Treatment* (REST) have shown that among the majority of patients seeking relief, only 6.2% was diagnosed as RSL. The symptoms are more frequently associated with conditions such as back pain, arthritis, or peripheral neuropathy.⁽⁵⁾ The ratio of females to males with RLS is 2:1, but this ratio does not differ significantly from the female to male ratio of respondents in all surveys⁶. A survey in Japan found that 5% of respondents had symptoms of RSL, whilst clinically significant RSL amounted to 1.5%.⁽⁷⁾ In the RLS Epidemiology, Symptoms, and Treatment (REST) survey of 16,202 individuals in the United States and 5 European countries, which is perhaps the largest study conducted to date, 7% of participants screened positively for RLS.⁽⁸⁾ A telephone interview of a random sample of 1803 adults in predominantly rural Kentucky found an age-adjusted RLS prevalence of 10%.⁽⁹⁾ Results were similar in the Wisconsin Sleep Cohort, a prospective community-based epidemiologic study, in which 10.6% of 2821 participants reported RLS symptoms occurring at least weekly.⁽¹⁰⁾ Rangarajan et al reported their findings of a door to door survey on all

individuals in Bangalore, India. They found a prevalence of 2.1% based on the International Restless Legs Syndrome Study Group (IRLSSG) criteria, and 1.2% of RSL patients had sleep disturbances.⁽¹¹⁾

A high prevalence of RLS symptoms was observed in one Idaho primary care population. Based on the Restless Legs Syndrome Questionnaire (RLSQ), this study found that 504 (24.0%) of the 2099 patients surveyed reported all 4 basic diagnostic symptoms of RLS.⁽¹²⁾

Etiology

The main cause of RSL is not known. RSL may be idiopathic or secondary (usually associated with iron deficiency, terminal renal failure, pregnancy, and spinal cord lesions). Additional studies indicate that RSL is associated with type 2 diabetes mellitus and multiple sclerosis. Half of patients with idiopathic RLS have a positive family history of RLS.^(2,4)

Several studies also found that caffeine, alcohol, and tobacco may induce symptoms in individuals with a predisposition for developing RLS. A number of studies have shown that using a reduced amount of the substances, or not using them at all, may relieve the symptoms, although it is unclear whether elimination of these substances could altogether prevent the occurrence of RLS symptoms.⁽¹⁾

Pathophysiology

The basic pathophysiologic mechanism of RLS is incompletely understood. Pharmacologists, physiologists, pathologists, and neuroradiologists have found an association of RLS with dopamine transmission. Dopamine is a messenger molecule responsible for transmission of signals between one area of the brain, i.e. the substantia nigra, and the next relay station in the brain, which is the corpus striatum, resulting in smoothly coordinated activity of muscles as intended. It

is this dopamine transmission that is believed to play a role in the development of RLS.^(1,13) Additionally, the development of RSL is also thought to be associated with a low iron store in the neurons of the substantia nigra and with spinal cord dysfunction.^(2,13)

Symptomatology

Patients with RSL have uncomfortable sensations in the legs, particularly when sitting or lying down, accompanied with an urge to move the legs. These sensations are usually felt in the legs between the knee and the ankle, but occasionally also in the feet, thighs, arms and hands. The sensations mostly appear on both sides of the body (bilaterally), but may also be on one side only (unilateral). Most of the symptoms are ignored in daytime settings and are only felt in the evening or at night, particularly when asleep. Most of the symptoms disappear by morning, when the patient is at last able to get some sleep. The symptoms may occur at any stage of life, but commonly become increasingly frequent with advancing age.⁽¹⁾

Restless legs syndrome and work performance

Most patients with RLS suffer from a sleep disorder called periodic limb movements in sleep (PLMS). Individuals with both RLS and PLMS have difficulty in falling asleep and staying asleep, and usually fall asleep at daytime because of difficulty in falling asleep in the early morning hours.

The National Sleep Foundation 2005 poll on 1,506 adults found associations for persons at risk for RLS and sleep behaviors, who had shorter durations of sleep (less than six hours nightly) and had symptoms of insomnia. In comparison to persons not at risk for RSL, they also stayed up longer than intended (several nights per week), took more than 30 minutes to fall asleep, and had more daytime fatigue ($p <$

0.05).⁽¹⁴⁾

The RLS epidemiology, symptoms, and treatment (REST) study in which 16,202 adults aged ≥ 18 years participated, showed that more than 75% of the RLS sufferers reported at least one sleep-related symptom. Disrupted sleep, an inability to fall asleep, and insufficient hours of sleep are expected consequences of the sensorimotor abnormalities of RLS, which are worse at night and while at rest.⁽¹⁵⁾ Consequently persons suffering from RLS have problems at work, in social life and in recreational activities.⁽¹⁶⁾ They frequently come late to work and make errors at work, due to sleepiness.⁽¹⁴⁾

The study by Ulfberg et al in 200 women between 18-64 years of age, using multivariate logistic regression, found that 11.4% of the women suffered from RLS. These women with RLS had more sleep disturbances than those without RLS. The sleep disorder had an impact on their daily life, where RSL sufferers were five times more likely to complain of headaches, and tended to have diminished performance at work. In consequence, these conditions caused 9 times more problems at work among women with RSL.⁽¹⁷⁾

A number of studies, including the National Sleep Foundation 2005 Poll, have consistently reported the presence of a strong association between mental and physical health problems on the one hand and RLS symptoms on the other.^(14,18,19)

Diagnostic criteria

Because of a lack of objective biological diagnostic signs, the diagnosis is based on the clinical criteria of the International Restless Legs Syndrome Study Group (IRLSSG), consisting of four essential and four supportive criteria. The four essential criteria are (i) an urge to move the legs, (ii) worse at rest or when inactive, (iii) relief by activities such as walking, and (iv) worse in the evening or at night. Supportive

Table 1. Diagnostic Criteria for Restless Legs Syndrome⁽²⁰⁾

<p>Essential Diagnostic Criteria</p> <ul style="list-style-type: none"> ▪ Symptomatic urge to move the legs usually accompanied or caused by uncomfortable/unpleasant sensations in the legs ▪ Symptom complex begins or worsens during periods of rest or inactivity ▪ Symptom complex is partially or totally relieved by movement ▪ Symptom complex is at its worst or only occurs in the evening or night <p>Supportive Clinical Features</p> <ul style="list-style-type: none"> ▪ Family history ▪ Response to dopaminergic therapy ▪ Periodic limb movements (while asleep or awake) <p>Associated Features</p> <ul style="list-style-type: none"> ▪ Natural clinical course of the disorder ▪ Sleep disturbance ▪ Typically normal neurologic exam result

clinical conditions include (i) family history of RSL, (ii) response to dopaminergic therapy, and (iii) periodic movement of the extremities at sleep or when awake but relaxed, and (iv) chronic symptoms occurring with varying degrees of sleep disturbance and generally without neurological abnormalities on examination (Table 1).⁽²⁰⁾ The movements usually occur periodically, on average at 20-second intervals. The most common movement is dorsoflexion of the ankle and flexion of the knee or hip.⁽³⁾ In a number of dubious cases, neurophysiological examinations, such as polysomnography and/or immobilization tests, may be needed for confirmation of RSL.⁽⁴⁾

Management

Not all patients with RLS need pharmacological treatment. Confirmation of diagnosis and reassurance is sufficient for most patients with RLS, and only approximately 20% of all RLS patients may have symptoms severe enough to merit pharmacological treatment.⁽²¹⁾ RSL can be cured, although determining the most suitable treatment and dosage may take time, and treatment may occasionally have to be individually modified. Treatment should begin by examining the patient's lifestyle and looking for opportunities to initiate lifestyle changes, especially with regard to substances known to exacerbate symptoms (Table 2).⁽²²⁾

Table 2. Factors influencing treatment of RLS⁽²²⁾

<ul style="list-style-type: none"> ▪ Age of the patient <ul style="list-style-type: none"> – side effects of benzodiazepines in the elderly – postural hypotension related to aging may be aggravated by dopamine agonists/levodopa ▪ Symptom severity ▪ Frequency and regularity of symptoms <ul style="list-style-type: none"> – many patients have paroxysmal RLS and may need “targeted/timed” or “on demand” treatment ▪ Presence of co-morbidity (such as cardiac disease) and pregnancy

Abbreviation: RLS, restless legs syndrome

Table 3 Recommendations for primary RSL therapy⁽²³⁾

Name of drug	Dosage	Characteristics
Pramipexole	0.25-0.75 mg/d	Improvement of RSL symptoms, quality of sleep and quality of life, and PLMS
Ropinirole	1.5-4.6 mg/d	Improvement of RSL symptoms, quality of life, duration of sleep and PLMS
Rotigotine	Transdermal patch 4.5 mg	Improvement of RSL symptoms
Pergolide	0.4-0.55 mg/d	Improvement of RSL symptoms, quality of sleep
Cabergoline	0.5-2 mg/d	Improvement of RSL symptoms
Levodopa/benserazide	Average dose 159/40mg/waktu tidur	Improvement of RSL symptoms, quality of life, quality of sleep and PLMS
Gabapentin	800-1800 mg/d	Improvement of RSL symptoms, efficacy of sleep, and PLMS

Abbreviation: RLS, restless legs syndrome; PLMS : periodic limb movements in sleep

The principal drugs used in pharmacological management of RSL are L-DOPA, dopamine agonists, anticonvulsants and benzodiazepines. Significant recovery with therapy occurs after a sufficiently long period of time.⁽²⁾

The study conducted by Montagna indicated that dopaminergic drugs constituted the first line in pharmacology for treatment of RSL, at least for a short period of time (Table 3).⁽²³⁾

Although most patients require pharmacologic treatments, non-pharmacologic treatments are available from which patients may also benefit.⁽²⁴⁾ Most of the non-pharmacologic treatments for RLS are from case series or case reports; however, one small randomized study assessed the effects of exercise on RLS in 28 individuals.⁽²⁵⁾ Participants were assigned to no exercise (n=17) or thrice weekly lower body resistance training and treadmill walking (n=11). Severity as measured by the International Restless Legs Syndrome (IRLS) scale decreased by 39% during the first 6 weeks of the intervention. This improvement was maintained for the remaining 6 weeks of the study period. In

addition to moderate exercise, good sleep hygiene, including rising and going to bed at the same times each day, should form the basis for non-pharmacologic treatment of RLS.^(26,27) Little information is available about the effects of lifestyle on the symptoms of RLS. Limiting caffeine, tobacco, and alcohol use may improve symptoms. Activities that provide mental stimulation may also provide relief. One survey showed a higher prevalence of RLS in persons who were sedentary and overweight.⁽²⁸⁾ Many experts recommend abstaining from alcohol, caffeine, and nicotine. Activities that improve mental alertness (crossword puzzles, video games) may also reduce RLS symptoms.⁽²⁹⁾ Hot baths, massage, and stretching may also improve symptoms.⁽³⁰⁾

Prognosis

RLS has a variable course, but symptoms tend to progress with advancing age. Some individuals may experience spontaneous improvement in their symptoms for a period of time, but symptoms tend to recur.⁽³¹⁾ Individuals with RLS secondary to an underlying condition may have improvement of symptoms if the underlying condition is treated. Medications, when needed, may provide relief of symptoms.

CONCLUSIONS

RLS is a disorder that frequently causes sleep disturbances, which if sufficiently severe will result in impairment of daily activities of life and thus may cause work-related problems. Therefore an accurate diagnosis of RLS needs to be made to prevent increasing the numbers of patients with sleep disturbances, which will have an impact on their work. The physician should have an increased understanding and awareness of the condition, to prevent misdiagnosis and consequent ineffective treatment. Identifying and treating RLS may improve sleep quality and daytime function.

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