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## Case Report

## Restless legs syndrome and akathisia as manifestations of acute pontine infarction

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## ABSTRACT

Although restless legs syndrome (RLS) and akathisia have similar clinical manifestations and seem to share a common pathophysiology, they are regarded as distinct clinical syndromes. We present three patients with acute pontine infarction and RLS or akathisia as clinical manifestations. They presented with abrupt onset of restlessness of various body parts, as well as other neurological signs including dysarthria or weakness of the legs. Brain MRI of all three patients showed acute pontine infarction. The clinical syndrome in two of the patients was compatible with RLS and one with akathisia. Their symptoms improved after a brief period. Our finding of secondary RLS and akathisia as manifestations of acute pontine infarction provides information that assists in understanding the common anatomical and pathophysiological basis of RLS and akathisia.

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## 1. Introduction

Inner restlessness and the urge to move with relief resulting from movement of body parts are the core symptoms in both akathisia and restless legs syndrome (RLS).<sup>1</sup> The differential diagnosis of RLS and akathisia largely depends on the interpretation of the symptoms of motor restlessness.<sup>1,2</sup> The diagnosis of RLS requires fulfillment of essential criteria, specifically an irresistible urge to move the limbs, accompanied by uncomfortable sensations, where the urge is relieved by movement, associated with sleep disturbances.<sup>3</sup> A recent study showed that leg motor restlessness in Parkinson's disease patients which did not meet the criteria for RLS can be considered part of the spectrum of akathisia.<sup>2</sup> We present three patients with acute pontine infarction with akathisia and RLS.

## 2. Case reports

## 2.1. Patient 1

A 67-year-old woman was admitted to our hospital due to the sudden onset of right limb weakness and involuntary movement of the right leg 3 days earlier. She had a history of hypertension. She had not been taking any antipsychotic drugs. Her neurological examination revealed mild (grade IV) weakness in her right limbs and dysarthria. Her sensory functions were normal. She reported an uncomfortable feeling in her right leg at night, which prevented

her from falling asleep. In addition, she reported that her right leg shook periodically and that this brought transient comfort. Diffusion-weighted brain MRI showed high signal intensity in the left medial pons (Fig. 1A). She was treated with pramipexole to relieve her RLS symptoms and antiplatelet drugs. After 2 days, her RLS symptoms disappeared completely. Three months later the motor power of her right leg had improved to normal without RLS symptoms. However, she continued taking pramipexole, because cessation of the drug caused a recurrence of RLS symptoms.

## 2.2. Patient 2

A 53-year-old woman was admitted due to the abrupt onset of dysarthria and agitation 1 day earlier. She had taken antihypertensive drugs for 20 years, but no antipsychotic drugs. She reported restlessness, an uncomfortable feeling, an inability to keep still and continuous wandering. She also reported an inexplicable discomfort in her chest, along with crying and tearing her clothes. Her neurological examination revealed dysarthria. Her motor power and sensory functions were normal. Diffusion-weighted brain MRI showed hyperintensity in the ventral pons (Fig. 1B). She was treated with propranolol and clonazepam, and with an antiplatelet drug. Her restlessness and discomfort resolved completely after 1 month. However, she continued taking these drugs, because cessation caused a recurrence of the akathisia.

## 2.3. Patient 3

A 60-year-old man was admitted due to dysarthria and weakness of the left leg, which had developed abruptly 1 day earlier.

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**Fig. 1.** Axial diffusion-weighted brain MRI showing high signal intensity in the left pons of Patients 1 (A) and 3 (C) and in the bilateral pons of Patient 2 (B).

He had no medical or neurological disorders, and did not take any drugs at all. His neurological examination was normal, except for mild dysarthria, and the motor power of his right leg was decreased to grade IV. His arm power was normal. He also reported an uncomfortable feeling in his right leg, without any changes in sensory functions. Shaking or rubbing his leg resulted in transient relief of his discomfort. Diffusion-weighted brain MRI showed high signal intensity in the left pons (Fig. 1C). Ropinirole, along with an antiplatelet drug, improved restlessness in his leg within 1 week. Three months later, monoparesis had improved to nearly normal power. However, RLS symptoms persisted without ropinirole.

### 3. Discussion

The three patients described here presented with an abrupt onset of restlessness, along with other neurological signs, including dysarthria or weakness of the leg. The symptoms in Patients 1 and 3 were compatible with RLS, whereas those in Patient 2 were consistent with akathisia. Brain MRI of these patients showed pontine infarction, suggesting that both akathisia and RLS may be clinical manifestations of pontine infarction. The symptoms in Patients 1 and 3 were consistent with the diagnostic criteria proposed by an international RLS study group.<sup>3</sup> RLS symptoms in Patients 1 and 3 occurred in the leg with paresis. Leg weakness completely resolved, although RLS symptoms persisted for months when dopamine agonists were discontinued. This clinical course suggests that RLS symptoms in these patients were not secondary to the weakness in their legs. Akathisia is characterized by a feeling of inner restlessness and an inability to sit or stand still,<sup>1</sup> which was shown in Patient 2.

Akathisia and RLS overlap clinically, with both having similar subjective and objective symptoms. Some investigators thus re-

gard RLS as a “focal akathisia”.<sup>2</sup> The features of our three patients suggest that RLS and akathisia may have a common pathophysiological mechanism related to the pontine region of the brain. In a large survey of stroke patients, RLS was quite frequent at 12%.<sup>4</sup> Many locations of subcortical infarction were associated with RLS, although RLS was rare after cerebral cortical infarction.<sup>4</sup> The authors propose that the development of RLS in patients with pontine infarction might be caused by pathological recruitment of propriospinal or segmental spinal reflexes, with some similarities to the pathophysiology of propriospinal myoclonus.<sup>4,5</sup>

In conclusion, our finding of secondary RLS or akathisia as manifestations of acute pontine infarction in three patients provides information that assists in understanding the common anatomical and pathophysiological basis of RLS and akathisia.

### Conflict of interest/disclosure

The authors declare that they have no financial or other conflicts of interest in relation to this research and its publication.

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