tion when she was 7 years old, the clinical features had changed. Indeed, gait clearly improved and she presented only a mild dystonia of the left leg, right arm and to a lesser extent, the trunk and cervical muscles. In comparison to what was observed 3 years before, the lower limb dystonia was dramatically reduced and the girl was now able to run easily. However the myoclonus worsened and led to major impairment in writing, lifting a cup, or eating with a spoon. The myoclonus, which was mild at the beginning of the disease, became severe and disabling. The myoclonus was brief, shock-like, and triggered by action. To summarize, a progressive modification of the clinical presentation was noted from a predominantly dystonic form to a predominantly myoclonic form in 4 years.

Routine laboratory testing including blood counts, copper, ceruloplasmin, and cupruria were normal. Standard EEG, EEG with back averaging as well as magnetic resonance imaging of the brain and sensory evoked potentials were normal.

Family history revealed that her father presented a mild cervical dystonia without myoclonus, while two of her sisters and her brother presented generalized myoclonus with or without mild neck dystonia. Molecular analysis revealed a deletion in exon 7 (c.832_836delAAAAC) of the *SGCE* gene.

In our family, the phenotype associated predominant myoclonus and mild dystonia with intersubject variability, which is classical in myoclonus-dystonia related to SGCE mutations.[1,3] The major interest of the present report is the illustration of the modifications over time of the clinical signs for a single subject. In our case, the initial presentation consisted in lower limb dystonia that progressively improved to become mild whereas the myoclonus worsened.

Although such an evolution has been previously reported, myoclonus usually appears first followed 3–5 years later by dystonia.[1,3] In addition, the symptomatology usually predominantly affects the upper limbs, which was not the case in the present case.[1,3] This, of course, does not rule out the diagnosis of DYT 11 dystonia but illustrates the great variability of the clinical features.

As the disease begins in childhood, we could speculate that this modification of the clinical presentation could reflect the brain maturation, in particular, the progressive functional maturation of the striatal indirect pathways in the first decades as this has been discussed for doparesponsive dystonia.[4]

Finally this spontaneous evolution of motor symptoms has to be kept in mind when surgical approaches are proposed to patients. Indeed, pallidal deep brain stimulation has proven its efficacy in alleviating motor symptoms in myoclonus-dystonia.[5,6] Despite the safety of the procedure, rare but severe complications may occur such as brain hemorrhages. Therefore we suggest that GPi stimulation should be proposed only after several years of disease evolution.

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Restless Legs Syndrome Induced by Zonisamide

Restless legs syndrome (RLS) is a phenomenon characterized by an intense and irresistible urge to move the legs associated to sensory complaints and motor restlessness. Symptoms usually occur at night and lead to disrupted sleep and daytime

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fatigue. The pathophysiology of this syndrome remains unclear, although a central dopaminergic dysfunction has been proposed. There are several treatments including levodopa, dopamine agonists, benzodiazepines, and antiepileptic drugs.[1] We report a case of RLS induced by zonisamide. As far as we know there is only one case of zonisamide-induced RLS[2] and none of RLS induced by other antiepileptic drugs.

We present a 50-year-old woman, hypertensive without other pathologic antecedents, diagnosed of chronic migraine according to International Headache Society criteria.[3] She had been suffering from headaches for 9 years with no response to several prophylactic drugs including propranolol, flunarizine, topiramate, valproic acid, tryptizol, and oral magnesium. She had developed an abuse of medication of triptans and antiinflammatory drugs.

A regimen of zonisamide 50 mg twice daily was established for 14 days and then it was increased till 100 mg twice daily. During titration, the patient complained of an unpleasant sensation in her legs and urge to move them, especially during prolonged periods of inactivity and in the late evening and each episode lasted 20–40 min. This discomfort was relieved by movement, resulting in motor restlessness and insomnia. She denied occurrence of any similar symptoms in the past and had no relatives with this pathology. However during the treatment with zonisamide, both the frequency and the intensity of the headache improved and there were not more adverse effects associated. Despite this, the treatment with zonisamide was suspended and the symptoms rapidly disappeared. General and neurological evaluations, including jerks were absolutely normal. Serum studies, with complete blood count, electrolytes, renal and liver functions, thyroid stimulating hormone, and serum magnesium levels were within normal levels. Ferritin was normal (73 ng/ml) and iron was in the lower limit (56 μg/100 ml).

Although zonisamide was originally used as a broad-spectrum antiepileptic agent, it has demonstrated effectiveness in other pathologies like impulse control disorders, chronic pain,[4] or refractory migraine.[5] It has multiple mechanisms of action, including blockage of sodium and T-type calcium channels, inhibition of carbonic anhydrase, inhibition of glutamate release, and dopaminergic activity. In the dopaminergic system, therapeutic doses of zonisamide increase intracellular and extracellular dopamine in the rat striatum.[6] On the contrary, supratherapeutic doses reduce intracellular dopamine. Thus, zonisamide has biphasic effects on the dopaminergic system. In a randomized, double-blind study, this drug has demonstrated to be effective and well tolerated at 25–100 mg/day as an adjunctive treatment in patients with Parkinson disease.[7] Many dopaminergic medications are beneficial for symptomatic relief of RLS, so the effect of zonisamide in our patient is confuse. Whether the biphasic effect may play an important role in the pathogenesis of this syndrome is unknown although other drugs with dopamine-modulating activity, like fluoxetine, sertraline, paroxetine, olanzapine, or quetiapine[8] have been associated with RLS. Because of the increase of potential uses of the new antiepileptic drugs, we alert clinicians of potential dopaminergic effects of zonisamide.

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Repetitive Transcranial Stimulation for Freezing of Gait in Parkinson's Disease

Freezing of gait (FOG) in Parkinson's disease (PD) is very disabling, and only partly responsive to deep brain surgery. A possible involvement of the caudate nucleus and its frontal projections is hypothesized besides other theories, but the pathophysiology remains unclear.[1] Several studies have shown that high-frequency repetitive transcranial magnetic stimulation (rTMS) of hand or leg projections in the motor cortex (MC) or combined MC and dorsolateral prefrontal cortex (DLPFC) stimulation may improve motor symptoms of PD, including the walking speed.[2,3]

In this pilot study, we hypothesized an improvement of *off*-related FOG after repeated rTMS of the left DLPFC and/or the MC of the leg, with which the first movement after FOG was usually executed. The selection of MC and DLPFC targets for rTMS is based on dopamine release in putamen and caudate, respectively.[4,5]

We studied six PD patients (five men and one woman; mean age, 63.7 ± 7.7 years) with *off*-related FOG without dementia and/or depression. The study was approved by the ethics committee of St. Anne's Hospital in Brno. rTMS (Magstim Super Rapid stimulator; a figure-of-eight coil, 10 Hz, 1,350 pulses per session, intensity 90% of the resting motor threshold) was delivered in the *on* state without dyskinesias, once at the same time of day, over 5 consecutive days. Neurologists blinded to the stimulation site performed the motor examination part of the Unified Parkinson's Disease Rating Scale,[6] the gait questionnaire,[7] and a video analysis of the specific 80 m walking task[8] prior to and after each rTMS treatment in the *off* state. For safety reasons, a brief neuropsychological battery of tests evaluating memory and executive functions was administered repeatedly in the *on* state.

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