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## Decreased spasticity in primary lateral sclerosis after botulinum toxin injection: A case report<sup>☆</sup>



## Mejoría de la espasticidad en esclerosis lateral primaria tras la inyección de toxina botulínica. A propósito de un caso

Dear Editor:

Primary lateral sclerosis (PLS) is a variant of amyotrophic lateral sclerosis (ALS) in which the upper motor neuron and, secondarily, the corticospinal tract degenerate, with no clinical or neurophysiological involvement of the lower motor neuron.<sup>1</sup> Clinically, the disease is characterised by progressive spasticity and poor limb coordination. Prognosis of PLS is significantly better than that of classic ALS, with slower progression and higher survival rates.<sup>2</sup> Treating spasticity can have a meaningful impact on patients' quality of life, although few studies have addressed this topic. We present the case of a patient with PLS presenting with severe spasticity from onset, whose symptoms improved significantly following treatment with botulinum toxin (BTX).

The patient is a 37-year-old man who began experiencing gait alterations in 2010. Examination revealed hyperreflexia, spasticity, and poor coordination of the lower limbs, with no sensory involvement. Blood testing (including an autoimmune study and monoclonal component detection) and a lumbar puncture yielded normal results. The neurophysiological study ruled out lower motor neuron involvement. A brain magnetic resonance imaging (MRI) scan revealed hyperintensity in the corticospinal tracts on the FLAIR sequence, with an SWI sequence revealing a hypointense rim in the precentral gyrus (Fig. 1). Based on these findings, we diagnosed the patient with suspected PLS and initiated treatment with riluzole. As the disease progressed, the patient presented pyramidal signs in the upper limbs, and spastic dysarthria. An additional electromyography performed 4 years after symptom onset ruled out lower motor neuron involvement; we were therefore able to establish a definitive diagnosis of PLS.<sup>1</sup> Initial treatment with tetrazepam reduced spasticity, but caused

generalised weakness which prevented the patient from standing. In September 2012, the patient displayed spastic gait and was only able to walk short distances. He required 2 canes to walk indoors, with frequent falls, and a wheelchair to move outdoors. He also had poor coordination in the right hand and had a tendency to drop objects. The patient scored 32 on the ALS Functional Rating Scale (ALSFRS-R) (Table 1) and 3-4/5. Deep tendon reflexes were hyperactive in the lower limbs, with persistent clonus and extensor cutaneous plantar reflexes. Spasticity scored 2 on the Ashworth Scale and increased when he began walking, with the patient experiencing freezing. The 10-Metre Walk Test could not be performed, as he was unable to walk 10 metres.

We began treatment with Lioresal<sup>®</sup> in combination with stretches in the therapeutic gymnasium and hydrotherapy. Lioresal<sup>®</sup> was not tolerated, and gait function did not change with the physiotherapy. We therefore proposed attempting to control spasticity with local BTX injections. In February 2013, 50 units of BTX were injected into the left and right solei. The patient continued with the physiotherapy programme, progressively performing stretches, muscle toning, balance control exercises, and gait re-education. One month later, there was a significant improvement in the patient's spasticity, resulting also in a functional improve-

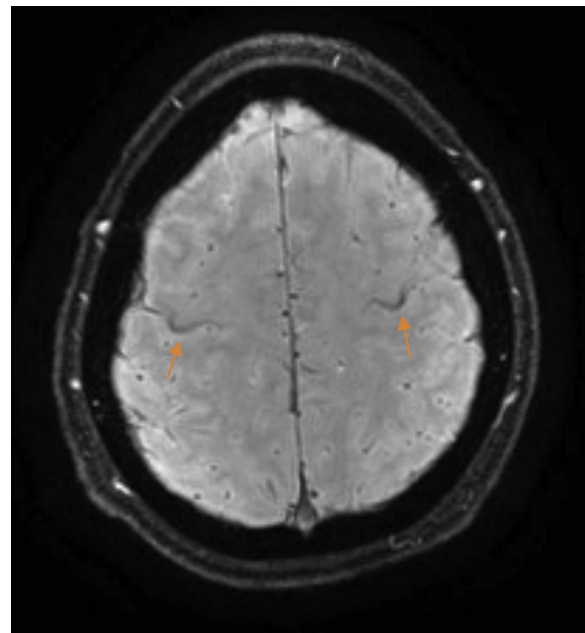


Figure 1 Brain MRI, SWI sequence. A hypointense rim is visible on the hand knob of the precentral gyrus.

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**Table 1** Changes in the patient's ALS Functional Rating Scale (ALSFRS-R) score.

ALSFRS-R	January 2012	July 2013	June 2014
Speech	Normal speech processes	Normal speech processes	Detectable speech disturbance
Salivation	Normal	Normal	Slight but definite excess of saliva in mouth; may have night-time drooling
Swallowing	Normal eating habits	Normal eating habits	Early eating problems; occasional choking
Handwriting	Slow or sloppy; all words are legible	Slow or sloppy; all words are legible	Slow or sloppy; all words are legible
Cutting food	Can cut most foods, although clumsy and slow; some help needed	Can cut most foods, although clumsy and slow; some help needed	Can cut most foods, although clumsy and slow; some help needed
Dressing and hygiene	Needs assistance for most tasks	Intermittent assistance or substitute methods	Independent and complete self-care with effort or decreased efficiency
Turning in bed	Can turn alone or adjust sheets, but with great difficulty	Somewhat slow and clumsy, but no help needed	Somewhat slow and clumsy, but no help needed
Walking	Non-ambulatory functional movement only	Early ambulation difficulties	Walks with assistance
Climbing stairs	Cannot do	Needs assistance	Needs assistance
Dyspnoea	None	None	None
Orthopnoea	None	None	None
Respiratory insufficiency	None	None	None
Time since symptom onset (years)	1-2	3-5	5-10
Total [0 = worst, 48 = best]	Score: 32	Score: 38	Score: 36

ment. The patient was able to walk indoors with one cane and short distances outdoors with 2. Falls had become less frequent. This made the patient feel safer and enabled him to improve his physical condition by performing his pool and toning exercises, according to the instruction he had received, outside the setting of the therapeutic gymnasium (ALSFRS-R, [Table 1](#)). Examination revealed improved strength and spasticity; clonus had resolved. The patient completed the 10-Metre Walk Test in 20 seconds, taking 21 steps.

Four months later (June 2013) and at subsequent sessions, the patient received injections of 50 units of BTX, distributed between the left and right solei and gastrocnemii. The patient's current ALSFRS-R score is 36 due to the appearance of bulbar symptoms ([Table 1](#)). During this time, the patient has continued walking, although he currently requires 2 canes to walk both indoors and outdoors.

Numerous studies have demonstrated the effectiveness and safety of BTX in treating sialorrhoea in patients with ALS, with no cases describing a global worsening of the disease.<sup>3-5</sup> We found only 2 references to BTX use for the treatment of spasticity associated with ALS, and none for PLS. Kent et al.<sup>6</sup> present the case of a patient who responded poorly to the treatment, with remote secondary effects (dysphagia and dysarthria). Deffontaines-Rufin et al.<sup>7</sup> describe a series of 39 patients with ALS,

over half of whom displayed improved spasticity following an initial injection of BTX; however, this was reported in a communication delivered at a congress, and clinical data are unavailable. One of these patients developed transient respiratory symptoms; no other secondary effects were reported. There is no physiological basis to contraindicate the use of BTX in patients with PLS; there should therefore be no worsening of the disease if the proper dose is administered.<sup>8-10</sup>

In the light of the above, and given our patient's poor response to medical treatment and physiotherapy, we decided to begin treatment with local injections of BTX, aiming to achieve functional results. Infiltrations were administered periodically for over 2 years, achieving the desired functional objective and with no secondary effects.

The improvement in such an important function as gait, and being able to continue partaking in social activities, have afforded our patient a significantly higher quality of life, despite the progression of his condition, which is following the expected course for PLS.

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## Conflict of interest

The authors have no conflicts of interest to declare.

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## Parkinsonism hyperpyrexia syndrome<sup>☆</sup>



### Síndrome de parkinsonismo-hiperpirexia

Parkinsonism hyperpyrexia syndrome (PHS), otherwise known as neuroleptic malignant-like syndrome, akinetic crisis, or dopaminergic malignant syndrome, is a rare, potentially fatal complication of Parkinson's disease. It is characterised clinically by hyperthermia, autonomic dysfunction, altered level of consciousness, muscle rigidity, and increased serum creatine phosphokinase (CPK) levels. The syndrome is most frequently triggered by the withdrawal or sudden dose reduction of antiparkinsonian drugs. Favourable outcomes require timely diagnosis and appropriate treatment (with levodopa and dopamine agonists).

### Clinical case

The patient was a 60-year-old man with an 8-year history of Parkinson's disease, and associated dyslipidaemia; he was receiving pramipexole at 2.1 mg/day, levodopa at 800 mg/day, rasagiline at 1 mg/day, and simvastatin at 20 mg/day. Family members brought the patient to the

emergency department due to a 6-day history of fever (reaching 39 °C), sleepiness, disorientation in time and space, visual hallucinations, increased limb rigidity, and increased tremor and bradykinesia, which caused gait instability and frequent falls. Because of these symptoms, the patient was considerably limited in many activities of daily living. One week prior to admission, the patient decided to stop taking all medication, including antiparkinsonian drugs, following symptoms of depression. Physical examination showed a fever of 38.5 °C; pronounced rigidity in all 4 limbs, scoring 3/4 on the Unified Parkinson's Disease Rating Scale (UPDRS); resting and postural tremor in both hands; and generalised bradykinesia (finger taps, foot taps, pronation-supination, leg agility), scoring 3/4 on the UPDRS. Examination of the abdomen and thorax yielded normal results. The patient was admitted to the emergency department, where studies were performed to analyse the fever of unknown origin, and empirical treatment was administered. A complete blood count revealed mild leukocytosis (11 300 leukocytes/mm<sup>3</sup>) and high levels of CPK (5000 IU/L); urine analysis, thoracic radiography, and urine and blood cultures all returned normal results. Transoesophageal echocardiography was performed due to suspicion of endocarditis, with no findings. Despite treatment, all initial symptoms persisted. At this point, the neurology department was asked to assess the patient. Upon observing that infection had been ruled out, and suspecting PHS, neurologists decided to restart dopaminergic medication at the original, pre-admission dose. Two days thereafter, rigidity, bradykinesia, and the patient's level

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