Myasthenia Gravis in a Chronic Spinal Cord Injury Patient: Case Report

Miastenia Gravis em Doente com Lesão Medular Crónica: Relato de Caso

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Abstract

Myasthenia gravis (MG) is an acquired autoimmune disorder characterized by fluctuating weakness and fatigability of skeletal muscle that is worse by the end of the day. We report a very rare case of a patient with a previous spinal cord injury (SCI) that was diagnosed with MG.

A 50-year-old man with AIS C quadriplegia, neurologic level C5, a central cord syndrome of traumatic etiology with an intrathecal baclofen pump and the need of regular botulinum toxin application in the upper limbs due to severe spasticity. In August 2018 he started complaining of fluctuating diplopia, headache, dysphagia, hypophonia and muscular weakness. Due to MG suspicion, he was admitted in October 2018 in a Neurology ward.

The complementary exams detected antibodies to the acetylcholine receptor and a decreasing response in repetitive nerve stimulation confirmed the diagnostic. He started treatment with corticosteroids and immunoglobulin with clinical improvement.

Since botulinum toxin worsens MG symptoms, it was not further applied, limiting spasticity treatment and deteriorating his functionality.

This case reports the coexistence of two unusual simultaneous entities: SCI and MG. The patient presented an incomplete SCI and severe spasticity which difficulted management of both pathologies, making this case uniquely challenging.

Keywords: *Botulinum Toxins, Type A/therapeutic use; Muscle Spasticity; Myasthenia Gravis; Spinal Cord Injuries.*

Resumo

A miastenia gravis (MG) é uma doença autoimune adquirida caracterizada por fraqueza e fatigabilidade musculares flutuantes com agravamento vespertino. Este caso relata o raro surgimento de MG num doente com lesão medular prévia.

Homem, 50 anos, com tetraplegia AIS C nível neurológico C5 síndrome centro-medular de etiologia traumática, com bomba de baclofeno intratecal e necessidade de aplicação regular de toxina botulínica (TB) nos membros superiores por espasticidade severa. Inicia em agosto de 2018 queixas flutuantes de diplopia, cefaleias, disfagia, hipofonia e fraqueza muscular. Por suspeita de MG, em outubro de 2018, foi internado em Neurologia. Os exames realizados detetaram anticorpos anti-recetores de acetilcolina séricos e uma "resposta decremental significativa e reprodutível compatível com doença da junção neuromuscular pós-sinática" no teste de Estimulação Nervosa Repetitiva que confirmaram a suspeita diagnóstica. Iniciou tratamento com corticoterapia e imunoglobulina com melhoria. Sendo a TB agravante da sintomatologia da MG, não foi novamente aplicada, tendo-se verificado um agravamento da espasticidade.

Este caso relata a presença concomitante de duas entidades raras: lesão medular e MG. O facto de se tratar de uma lesão incompleta num doente com espasticidade severa, apresenta desafios adicionais a ambas as entidades e tornam este caso excecionalmente desafiante.

Palavras-chave: Espasticidade Muscular; Lesão Medular; Miastenia Gravis; Toxina Botulínica Tipo A/uso terapêutico.

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Introduction

Myasthenia gravis (MG) is an acquired autoimmune disorder that affects the acetylcholine receptors at the neuromuscular junction. It is characterized by fluctuating weakness and fatigability of skeletal muscle usually exacerbated by the end of the day. Ocular muscles may be solely involved (ocular myasthenia) or in association with appendicular, bulbar and respiratory muscles.[1] Although MG is the most common neuromuscular junction disease, its annual incidence is about 5 to 30 cases per million.[2]

This case reports the occurring of MG in a patient with a previous spinal cordinjury (SCI). We could only find one more similar case in the literature.[3] However, it was a complete SCI with no mention of spasticity and the patient died shortly after the diagnosis of MG. In this case, of a spastic quadriplegic patient, MG seemed to have no impact on his spasticity. Also, his spasticity was previously managed with botulinum toxin (BT), which may be problematic in MG patients.

Case Report

The patient is a 50-year-old man with AIS C spastic quadriplegia, neurological level C5, due to a traumatic SCI that occurred in March 2014 and caused a central cord syndrome. His spasticity was managed with an intrathecal baclofen pump with lumbar catheter (mainly for lower limbs); and regular application of BT in the upper limbs allowing him to walk short distances using a walker. Oral treatment with baclofen (and other muscle relaxants as diazepam and tizanidine) had already been tried and stopped due to excessive somnolence. Functionally, although he could walk around 100 m with a walker, he could not drive a manual wheelchair as he had a central cord syndrome and worst spasticity in upper limbs (grade 2 in Ashworth Modified Scale in shoulder adductors and elbow and wrist flexors).

In July 2018, he went to an Emergency Room due to intermittent diplopia and headache. A brain computed tomography (CT) scan excluded an acute ischemic or hemorrhagic lesion. It was presumed a right IV cranial nerve paresis of microvascular etiology and acetylsalicylic acid was prescribed as secondary prevention. Valproic acid was prescribed for the headache.

One month later, he was readmitted in our Rehabilitation Center and BT was applied in the upper limbs (in brachialis, brachoradialis, biceps, pectoralis major, flexor carpi radialis and flexor carpi ulnaris). Two weeks later, he started presenting occasional fluctuating symptoms, namely diplopia, headache, dysphagia (for liquids), hypophonia and muscular weakness predominantly at the end of the day. The patient did not value these symptoms as he thought they were due to the valproic acid. Initially, the symptoms were occasional and followed by complete remission. The medical doctors could not confirm the symptoms and requested a brain magnetic resonance imaging (MRI) that did not reveal significate abnormalities.

As the symptoms were persevering, the patient was transferred to a Neurology ward with the diagnostic suspicion of MG. The blood tests showed the presence of acetylcholine receptors antibodies and the Repetitive Nervous Stimulation test revealed a “significate and reproducible decreasing response compatible with post-synaptic neuromuscular junction disease”. A thoracic CT-scan that showed no changes in the thyme.

During his hospital stay he started treatment with corticosteroids and immunoglobulin with clinical improvement of the dysphagia and diplopia.

His spasticity showed no improvement and he maintained pump refilling. BT was no longer considered as it can worsen MG symptoms. Spasticity on the upper limbs was managed with physical therapy (stretching, passive movements); however it got worse and the patient got functionally more dependent, mainly by limited walker utilization and consequent reduction of walking capacity.

Discussion

This case reports the concomitant presence of two unusual entities: SCI and MG. The fact of being an incomplete lesion in a patient with severe spasticity, presents additional challenges. The weakness and fatigue complaints due to MG were harder to interpret due to the previous SCI. The presence of spasticity makes more difficult muscle strength evaluation. In this case, the bulbar symptoms were determinant to make this diagnosis.

Moreover, after MG, the upper limb spasticity was similar. Considering MG physiopathology, we should expect a spasticity decrease due to the reduced muscle contractility. We could not find any explanation or cause for this.

To our best knowledge, there is not a single case in the bibliography and this is the first published case of MG in a patient with spasticity.

Werner in a prospective study concluded that distal muscles were more commonly affected than previously reported and extensor muscles were the most disturbed distally.[4]

However, spasticity predominates in the flexor muscles in the upper limbs, a fact that may explain the lack in improvement of spasticity.

Additionally, BT in the upper limbs was no further applied due to the risk of worsening the MG symptoms, resulting in functional deterioration.[5,6] The widespread and growing utilization of BT for aesthetical and therapeutical reasons has been reinforcing this correlation. However, recently, a review with eight case reports was published in which patients were safely and successfully treated with BT in lower doses after adequate MG treatment and proper systemic evaluation.[7] Although, the cases were of cervical dystonia and overactive bladder and therefore a correlation cannot be established.

Other non-pharmacological interventions could be considered as such transcutaneous electric nerve stimulation, transcranial direct current stimulation, shock waves, vibratory stimulation, electromyography biofeedback, repetitive transcranial magnetic stimulation, therapeutic ultrasound, acupuncture, orthoses, thermotherapy, and cryotherapy. In spite of low evidence of efficacy and lack of treatment parametrization protocols, there is also a very low rate of adverse effects reported with these techniques.[8,9]

The management of this simultaneous pathologies (SCI and MG) and its sequels (spastic quadriplegia and muscles weakness and fatigue) is very challenging. The literature has very few data in this matter to support the clinical decision of applying BT.

The decisions were based on a speculative "reasoning" based on balance between the MG and SCI spasticity pathophysiology and functionality, taking in consideration the secondary risk of any medication.

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