‘Old dog learning new tricks’: carbamazepine for the symptomatic management of painful hemifacial spasm

Vianney Ribeiro, Katarzyna Czarny, Benjamin Salmon and Nathan Moreau
Oral Medicine and Oral Surgery, Bretonneau Hospital (AP-HP), France

Corresponding author: Dr N Moreau, Oral Medicine and Oral Surgery, Bretonneau Hospital (AP-HP), France. Email: nthmoreau@gmail.com

Abstract:
Introduction: Hemifacial spasm (HFS) is a movement disorder characterised by unilateral clonic/tonic contractions of facial muscles secondary to vascular compression of cranial nerve VII. This debilitating disease is classically treated by microvascular decompression (MVD), but unfit/unwilling patients are instead offered the alternative of botulinum toxin type A (BTX-A) injections. In some cases, medical management of HFS can be quite complex.

Case presentation: We present the symptomatic management of a 64-year-old female patient with left HFS/left tinnitus secondary to neurovascular conflicts with nerves VII/VIII who refused MVD from fear of complications. Carbamazepine (CBZ) treatment was proposed and was effective in relieving the facial spasms, the tinnitus and even the related insomnia and psychological comorbidities.

Discussion: Carbamazepine has been proposed in HFS since 1967 but was abandoned around 1985 with the advent of BTX-A. Nevertheless, it remains an interesting option for vascular compression-related symptoms (such as tinnitus) as it suppresses ephaptic transmission and ectopic discharges (which BTX-A does not).

Conclusion: Although the use of CBZ in the symptomatic management of HFS seems somewhat forgotten currently, this old dog can learn new tricks (or more adequately remember old ones) and be an interesting second-line option for patients insufficiently relieved by BTX-A.

Key words: Hemifacial spasm, facial hemispasm, carbamazepine, tinnitus, medical management


INTRODUCTION

Hemifacial spasm (HFS) is a neuromuscular movement disorder characterised by unilateral clonic or tonic contractions of facial muscles secondary to vascular compression of cranial nerve VII at the root exit zone.1,2 The neurovascular conflict is usually caused by posterior inferior cerebellar, anterior inferior cerebellar or verteobasilar artery compression.3 There is a female predominance (2:1) with a prevalence of approximately 1/10000 patients.4 This very debilitating disease is classically treated by microvascular decompression (MVD),2 the treatment option with the best long-term efficacy.5 Nevertheless, as with other neurosurgical procedures, MVD can result in facial paralysis, hearing loss, other cranial nerve lesions, brainstem infarction, cerebrospinal fluid leakage, infection, hematoma or even death.5,7 For patients unfit or unwilling to undergo MVD, symptomatic management is obtained with regular injections of Botulinum toxin A (BTX-A) in the affected muscles.2 This results in safe, predictable, temporary muscle paralysis with few, usually tolerable side effects, although several cases of diminished efficacy after long-term use have been reported.1,8 Nevertheless, in some patients, symptomatic management of HFS can be challenging.

CASE PRESENTATION

A 64-year-old healthy female patient was referred to the orofacial pain clinic of Bretonneau Hospital in Paris for management of a painful HFS diagnosed six years previously. She reported suffering from left HFS associated with persistent tinnitus and chronic insomnia. She was otherwise healthy and not under any medication. Complete workup including MRI imaging studies previously conducted in a neurosurgery department had evidenced neurovascular conflicts of cranial nerves VII (Figure 1) and VIII (Figure 2) by a large loop of the
left vertebral artery (VA) and of the anterior inferior cerebellar artery (AICA) respectively, resulting in a mass effect on the brainstem and the emergence of the left acoustic-facial bundle. MVD had been proposed but the patient refused due to the risks of the intervention. Symptomatic treatment with BTX-A injections was therefore conducted every 3-4 months with an estimated 70% improvement of facial contractions (and related pain). However, after four years of BTX-A injections, there was a reoccurrence in the number of spasms (several times daily) with significant alteration of the patient’s quality of life and a strong negative psychological impact (as reported by the patient and her family). She started developing depressive symptoms and suicidal ideations. Consequently, she sought our advice regarding other possible treatments for her condition.

After careful evaluation and in light of the underlying pathophysiology of her disease (neurovascular conflict resulting in ectopic discharges and ephaptic transmission within the facial nerve) we considered using carbamazepine (CBZ), a sodium-channel blocker classically used for management of trigeminal neuralgia; a neurological disorder of similar pathophysiology. We hypothesised that CBZ could significantly reduce the ectopic activity within the facial nerve and cochleo-vestibular nerve resulting in the alleviation of muscles spasms (and the resulting pain) and even tinnitus. The patient consented to this symptomatic treatment option and after proper biological evaluation (complete blood count [CBC] and liver function tests to rule out possible preexisting leucopenia or hepatic cytolysis) CBZ was initiated at the dose of 100mg twice daily orally and regular follow-up instated with focus on the evolution of symptoms (intensity of painful spasms measured using an 11-point visual analogue scale [VAS]) and global quality of life (treatment effectiveness) and CBZ-related clinical and biological side-effects (treatment tolerance). After 7 days of treatment (at 200mg/day), she reported an estimated 50% decrease in number of facial spasms and in the intensity of spasm-related pain (from VAS 8 to 4), a complete disappearance of her tinnitus and a slight improvement of her insomnia. CBZ was very well tolerated with no clinical (no nausea, dizziness, drowsiness or ataxia) or biological (normal CBC and liver enzymes levels) side effects. The following week CBZ was increased to 400mg/day, resulting in increased improvement of the muscle spasms and considerable improvement of sleep quality, without any side effects. Despite decreasing efficacy of her BTX-A injections, she continued regular injections since the first consultation, with CBZ as an adjunct treatment. After 2 years of palliative CBZ treatment, the patient reported major improvement in facial symptoms, without any recurrence of tinnitus or insomnia, with total clinical and biological tolerance. Most importantly, she (and her family) reported the disappearance of her suicidal ideations.

DISCUSSION
Symptomatic management of patients unwilling or unable to undergo curative treatment can be a complex medical challenge. Resorting to atypical or even forgotten treatment options can thus be of use. In the present case, although carbamazepine has been reported in the symptomatic treatment of HFS as early as 1967, this option had not been considered so far in the management of the patient’s symptoms. A bibliographic search of the MEDLINE database (using the following equation: « hemifacial spasm » OR « facial hemispasm ») AND (carbamazepine) found several case reports advocating CBZ usage in the management of HFS in the 1970’s-1980’s. After 1985, CBZ monotherapy was abandoned owing to the efficacy and growing popularity of BTX-A injections, but also because of inconstant results and side effects of CBZ. Nevertheless, on a case-by-case basis, we believe it to be an interesting, albeit temporary, treatment option, providing well-needed palliative symptom relief; at least until CBZ effects wane (as is often observed in patients undergoing long-term CBZ treatment for trigeminal neuralgia). In such a case, switching to other similar drugs such as oxcarbazepine can be useful.

Figure 1: Volumetric T2-weighted DRIVE brain MRI showing a neurovascular conflict between a vascular loop from the left vertebral artery (VA) and the left facial nerve (VII).

Figure 2: Volumetric T2-weighted DRIVE brain MRI showing a neurovascular conflict between the anterior inferior cerebellar artery (AICA) and the left cochleo-vestibular nerve (VIII).
newer drug eslicarbazepine could also be promising, although no study has tested it yet for HFS.

Current data on HFS pathophysiology suggest major roles of ephaptic transmission and ectopic activity within the facial nerve, secondary to vascular compression. Such nerve activity results in unpleasant facial muscle contractions. Carbamazepine, an antiepileptic drug typically used for seizure disorders and trigeminal neuralgia, is a potent voltage-dependent sodium channel blocker that can significantly alter neuronal high-frequency firing of trains of action potentials, without reducing the amplitude or duration of a single action potential. This pharmacological effect, very interesting in conditions such as trigeminal neuralgia, can also be of use in other neurovascular conflict-related disorders such as HFS or typewriter tinnitus. This is of clinical relevance in patients with multiple vascular-compression-induced disorders (as in the present case) as it has been show that botulinum toxin -the current standard for medical (pharmacological) treatment of HFS- has no effect on ephaptic transmission and subsequent symptomatology.

In the present case, carbamazepine was effective in alleviating the painful facial muscle spasms, tinnitus and insomnia. Treatment efficacy was only evaluated via patient-reported outcome measures as she consulted solely for palliative symptomatic relief. Although, the imputability of CBZ in the alleviation of neurovascular compression-related symptoms seems evident, its effect on sleep is unclear. Relevant studies are conflicting: several conclude that CBZ reduces sleep latency and arousals while increasing sleep efficiency and slow wave sleep, whereas others suggest that CBZ increases arousal instability and worsens sleep quality or has no significant effect at all. Another simpler explanation for increased sleep while under CBZ treatment is the increased nighttime symptomatic relief resulting in fewer arousals and overall better sleep quality.

**CONCLUSION**

Although the use of CBZ in the symptomatic management of HFS seems somewhat forgotten in 2019, this old dog can learn new tricks (or, more correctly, remember old ones) and be an interesting temporary second-line treatment for HFS patients insufficiently relieved by BTX-A injections (especially in patients with additional non-muscular symptoms such as tinnitus).
References


24. Bazil CW. Effects of antiepileptic drugs on sleep structure: are all drugs equal? CNS Drugs 2003; 17: 719-728.
