ECRONICON OPEN ACCESS

EC NEUROLOGY
Case Report

Effectiveness of Ultrasound Guided Botulinum Toxin Injections in Severe Multiple Sclerosis Dysarthria; A Case Report

Paola Diaz Borrego*, Marta Montes Cátedra, Marina López Ruiz, Maria Dolores Romero Torres, Rafaela Figueroba Murillo, Manuel Rodríguez-Piñero Durán and Maria Belén Romero Romero

Virgen Macarena University Hospital, Seville, Spain

***Corresponding Author:** Paola Diaz Borrego, Virgen Macarena University Hospital, Seville, Spain

Received: June 14, 2019; **Published:** July 29, 2019

DOI: 10.31080/ecne.2019.11.00555

Abstract

Despite the frequency with which dysarthria occurs in Multiple Sclerosis (MS), little is known about the effectiveness of available treatments. This report describes a great, and not previously published, result of ultrasound guided botulinum toxin injections (USgi-BT) in severe dysarthria secondary to MS. The accurate identification and typing of tone abnormalities can be an important confirmatory component in dysarthria diagnosis. USgi-BT could be a complementary option in motor speech disorder treatment secondary to hypertonia/spasticity in MS.

Keywords: *Multiple Sclerosis; Dysarthria; Spasticity; Botulinum Toxin*

Abbreviations

MS: Multiple Sclerosis; USgi-BT: Ultrasound Guided Botulinum Toxin Injections; PPMS: Primary Progressive Multiple Sclerosis

Introduction

Multiple sclerosis (MS) can affect the speech motor system and result in dysarthria. It affects about 40 - 60% of individuals with MS. Its severity, often indexed by measures of speech intelligibility, varies from mild to severe [1-3], primarily consisting of a combination of spastic and ataxic components. The most prevalent symptoms include slower speech rates, increased pause frequency/duration, and a prosodic-articulatory disorder [1,3].

Despite the frequency of dysarthria in MS, no efficacious treatments are available to improve speech motor deficits in individuals with MS. Botulinum toxin is used in MS to treat spasticity, but no studies have been reported in the literature about the potential effects of local spastic treatment with ultrasound guided botulinum toxin injections (USgi-BT), as a complementary therapy for severe spastic dysarthria in MS.

Case Presentation

A 33-year old male, with connatal encephalopathy (and right hemiparesis as a consequence) presented to the Rehabilitation Unit of Virgen Macarena University Hospital. At the first visit, he was a gardener and referred to be independent in performing his daily activities the year previous to be diagnosed with Primary Progressive Multiple Sclerosis (PPMS), with an ataxic-spastic component. While being treated in our Rehabilitation Unit for motor function deterioration, he developed a severe, progressive dysarthria to the point where his speech was completely unintelligible

Physiatrist/Phoniatric Assessment:

Oromotor (Oral motor performance) [4]

1. Slowed but complete praxis performance
2. Normal oral rest tone and oral sensitivity
3. Diadochokinesis Impossibility to achieve.

Speech Evaluation (perceptual assessment based on audio recordings of a Platero y Yo passage of the Platero and I book (La Elegía, I Platero) and a spontaneous speech sample over 1 min):

1. Great phonatory and articulatory effort
2. Important compensatory cervical and facial muscles strain (in particular, masticatory muscles that obstructed jaw opening during speech) (Figure 1), with lack of coordination in word articulation

Figure 1: *Image of phonatory and articulation effort during speech.*

3. No more than some vocalic sound production and occasionally a monosyllabic word with /p/ or /b/.

Final diagnosis

Anarthria (severe unintelligibility speech: Visual Analog Scale (VAS): 1 and complete lack of oral communication.

Due to this, he was using his mobile phone as an effective communication aid.

During the rehabilitation program, he attended speech-language therapy sessions and his current oral antispastic medication dose (baclofen) was increased to 40 mg/8h without clinical improvement. Therefore, it was decided to relax the strongest muscles in word production with a local antispastic treatment in order to improve his oral articulatory ability.

A USgi-BT protocol was designed which included bilateral temporal and masseter muscles, using a dosage of 20 IU botulinum toxin (incobotulinumtoxinA, Xeomin®, Merz Pharmaceuticals GmbH, Frankfurt am Main, Germany) bilateral, injected at only one point per muscle. The patient was injected with incobotulinumtoxinA 100U reconstituted with 1 ml of sodium chloride 0.9% with final concentration of 10 U per 0.1 ml. Treatment was administered into the temporal and masseter muscles using a 30 G 1/2 needle and 1 ml syringe. The injection was performed at a 45-degree angle to skin, with the patient in a supine position. Contact with periosteum was avoided. The incobotulinumtoxinA dose was determined according to pre-existing bibliography. Ultrasound guided injections were performed following a lateral approach by positioning the head facing away from the side to be injected. A pre-injection color Doppler ultrasound

examination was carried out to assess the location, echogenicity and vascular structures. The injection site of BoNT-A injection into the temporalis muscle was located at least 45 mm from the zygomatic arch to avoid injecting into the tendon. For masseter muscle injections, the maximum thickness was located at the level of the ramus of the mandible in transverse axis. At that position, patient was asked to bite and one point on the skin was selected in the center of the muscle. A linear transducer was applied in a longitudinal and out of plane position in both muscles.

The frequency probes used had a range from 7 to 12 MHz. Gel was applied for enhancing ultrasound probe transmission during the pre-injection and post-injection ultrasound examinations; however, during the injection procedure, chlorhexidine gluconate was used.

After the ultrasound guided confirmation of the location of the tip of the needle within the muscle the injection of Botulinum toxin type A was performed.

After 4 weeks, the patient showed a great improvement. The new assessment revealed faster praxis performance, slow but complete oral diadochokinetic and a complete intelligibility of spontaneous speech (VAS: 10) (Figure 2). We still observed a light prosodic distortion by speech inflections reduction and slightly slowed rate (secondary to a smooth syllabication). His oral communication function was fully achieved at this point. He did not need any communication aids again, and he was able to speak with strangers without comprehension difficulties. These beneficial effects were still maintained three months after the injection.

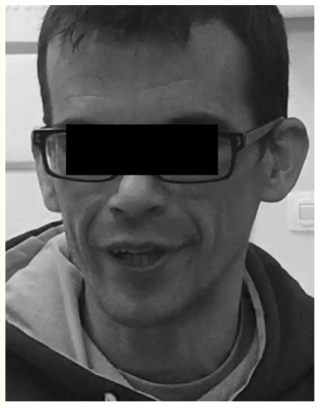

Figure 2: *Image of phonatory and articulation relaxation during speech after BT-USgi treatment.*

Discussion

This study is the first to investigate the effect of USgi-BT in severe dysarthria secondary to MS. Treatment is unclear and is usually individualized based on symptoms and associated conditions.

The accurate identification and typing of tone abnormalities can be an important confirmatory component in dysarthria diagnosis. Its analysis, during speech, could provide important information that would improve our therapeutic planning in MS motor speech disorders [5]. Great efforts in jaw movements due to chewing muscles hypertonia during speech, leaded us to hypothesize that their relaxation could improve patient word articulation, as demonstrated by the results. Great effects of botulinum toxin treatments in hypertonia/spasticity reported in the scientific literature encouraged us to prove this option, although there was not any similar case published before about its use in speech motor disorders. The implementation of an ultrasound guide was another interesting point to consider. An accurate injection of botulinum toxin could improve the results of the treatment. This case report can also lead to the development of new treatment approaches for persons with dysarthria.

Conclusion

The case presented here shows that the use of USgi-BT could be a complementary therapeutic option in motor speech disorder secondary to hypertonia/spasticity in MS. Further studies are needed to confirm its effectiveness in dysarthria

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

Our institution does not require ethical approval for reporting individual cases or case series.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Informed Consent

Verbal informed consent was initially obtained from the patient(s) for their anonymized information to be published in this article. In addition, a written consent was obtained and signed by the patient on 3 November 2016.

Bibliography

1. Feenaughty L., *et al*. "Speech and pause characteristics in multiple sclerosis: A preliminary study of speakers with high and low neuropsychological test performance". *Clinical Linguistic and Phonetics* 27.2 (2013): 134-151.
2. Danesh-Sani SA., *et al*. "Clinical assessment of orofacial manifestations in 500 patients with multiple sclerosis". *Journal of Oral Maxillofacial Surgery* 71.2 (2013):290-294.
3. Rusz J., *et al*. "Characteristics of motor speech phenotypes in multiple sclerosis". *Multiple Sclerosis and Related Disorders* 19 (2018): 62-69.
4. Kent RD. "Nonspeech Oral Movements and Oral Motor Disorders: A Narrative Review". *American Journal of Speech-Language Pathology* 24.4 (2014): 763-789.
5. Dietsch AM., *et al*. "Perceptual and instrumental assessments of orofacial muscle tone in dysarthric and normal speakers". *Journal of Rehabilitation Research and Development (JRRD)* 51.7 (2014): 1127-1142.

Volume 11 Issue 8 August 2019