TREATMENT OF SPASTICITY DUE TO THROMBOTIC BRAIN INJURY WITH INCOBOTULINUMTOXINA: A CASE REPORT

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INTRODUCTION AND OBJECTIVES

Acquired brain injury (ABI) is damage to the brain by a traumatic or nontraumatic injury. ABI can result in a wide range of physical, cognitive, emotional and social impairments. If the injury affects the motor cortex, the patient's voluntary movement can be affected and an early development of spasticity, pain and associated orthopedic sequelae can appear. Severe spasticity causes limb contractures leading to poor bed posture, limited movement, activity limitation and pain, which greatly complicated daily living in individuals (1). The injection of botulinum neurotoxin (BoNT) into the affected muscles is a recognized treatment for severe disabling spasticity. Several studies have reported the use of incobotulinumtoxinA (IncoBoNT) for the treatment of spasticity. IncoBoNT has shown good tolerability and lack of secondary nonresponse in spasticity of various etiologies such as stroke, traumatic brain injury, multiple sclerosis o cerebral palsy (2,3). We report a case of ABI derived from cranial arteriovenous fistulas with sinus thrombosis in which a comprehensive multipattern treatment approach for upper and lower limb spasticity with individualized doses of IncoBoNT was implemented.

METHODS

A 16-year-old man with a history of tetraplegia due to ABI secondary to dural sinus thrombosis in the context of multiple arteriovenous fistulas bilaterally at the transverse sinus. The patient was affected of a sensorimotor deficit, which caused him a situation of dependency. He presented tetraparesis, presenting a pattern of internal rotation/adducted shoulder of the right upper limb, flexed elbows, flexed wrists, pronated forearms, thumbs-in palm, and tendency to clenched fist, external rotation of both hips, flexed knees, and bilateral pes equinovarus. He had tendency to metacarpophalangeal (MTC-P) and interphalangeal (IP) joints flexed in hands, hip rotation and knees flexion. Spasmolytic medication (baclofen) was initiated with very poor tolerability. A comprehensive IncoBoNT treatment approach based on three ultrasound-guided cycles of injections was performed (Figure 1). The grade of spasticity and spasticity-related pain were determined at baseline and four weeks after each injection cycle. The number of injection sites per muscle, doses injected, and treatment intervals were individualized to allow the maximum benefit for the patient considering the treatment goals and objectives established.

RESULTS

- Basal mean Modified Ashworth Scale (MAS) score of 2 in the left and right upper limb and left and right lower limb. Basal visual analogue scale (VAS) score for pain in shoulders was 8 out of 10.
- The first injection cycle corresponded a total body dose of 800 U IncoBoNT injected into 14 muscles of the upper and lower limbs, bilaterally (Table 1). This first injection session was focus on obtaining a general improvement of spasticity clinical manifestations and was mainly focused on the clenched fist and adducted/ internally rotated shoulder spasticity upper limb patterns and flexed hip, flexed knee and adducted thigh spasticity lower limb patterns. The results showed a significant improvement of spasticity with gain of joint range (mean MAS score of 1), ability to start in-hand manipulation activities and spontaneous mobilization of the lower limbs at four weeks postinjection. Visual Analog Scale score for the shoulders improved from 8 to 0.
- Seven weeks after the first IncoBoNT injection, a second injection cycle with 800 U was administered with a special focus on improving functionality of the lower limb, i.e. obtaining a stable standing position and walking, mainly focusing on the flexed hip, flexed knee and adducted thigh spasticity patterns (Table 2).
- The results were very good regarding efficacy and no adverse effects were observed. The patient was discharged from the Rehabilitation Unit.
- A 500 U dose was injected after seven weeks to maintain a stable standing position and walking. In advance the patient was in a quite stable condition and he only received periodical injections in the gastrocnemius and hamstrings. No side effects or complications were found following IncoBoNT injections.

Figure 1. IncoBoNT injection in gastrocnemius, ultrasound-guided technique

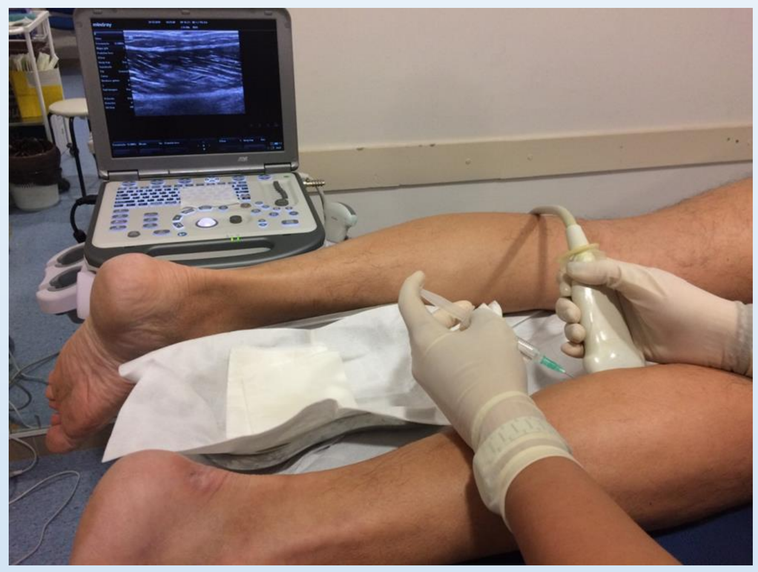

Table 1. First injection session of IncoBoNT. Dose: 800 U distributed bilaterally in upper and lower limbs.

Upper Limb	Right	Left	Lower Limb	Right	Left
Pectoralis*	25	25	Sartorius	50	50
Teres Mayor*	25	-	Gastrocnemius	100	100
Subscapularis	25	-	Soleus	75	75
Flexor digitorum profundus	25	-	Hamstring	100	100
Flexor digitorum superficialis	25	-	-	-	-

Table 2. Second injection session of IncoBoNT. Dose: 800 U distributed bilaterally in lower limbs.

Lower Limb	Right	Left
Biceps femoris	100	100
Semimembranous	100	100
Soleus	100	100
Gastrocnemious	100	100

CONCLUSIONS

- Several reports and studies have shown that in patients with severe and disabling spasticity, the use of an individualized treatment with regards to doses injected and times of injection can better modulate spasticity with a good safety profile (2, 3, 4, 5, 6, 7).
- In this patient with severe upper and lower limb spasticity after ABI an individualized multipattern treatment scheme with IncoBoNT based on the administration of doses adapted to the patient's condition (multipattern approach), together with an adjustment to the medical needs of the intervals between doses, resulted in improved clinical outcomes and patient comfort with good tolerability.

REFERENCES

1. Burchiel KJ et al. Spine 2001;26: S146–S160) 2. Barnes M. et al. Acta Neurol Scand. 2010: 122:295-302. 3. Wissel J. et al. Neurology 2017; 88:1-8 4. Ianieri, G. et al. Toxins 2018, 10, 140, 5. Intiso D. et al. NeuroRehabilitation. 2014;34(3):515-22; 6. Dressler, D. et al. J. Neural Transm. 2015, 122, 327–333; 7. Santamato A. et al. Expert Opinion on Drug Metabolism & Toxicology. 2016; 12(8):843-6.