

# Severe Dysphagia After Inferior Alveolar Nerve Block Preceded By Cervical Botulinum Toxin Injection: A Case Report

Gholamali Shahidi<sup>1</sup>, Arash Poorsattar Bejeh Mir<sup>2,\*</sup>, Ramin Khatib Shahidi<sup>1</sup>, Pouya Balmeh<sup>2</sup>

<sup>1</sup>Division of Movement Disorder, Department of Neurology, Rasool-e Akram Hospital, Tehran University of Medical Sciences, Tehran, IR Iran

<sup>2</sup>Dentistry School, Babol University of Medical Sciences, Babol, IR Iran

\*Corresponding author: Arash Poorsattar Bejeh Mir, Dentistry School, Babol University of Medical Sciences, Babol, IR Iran. Tel/Fax: +98-1513216383, E-mail: arashpoorsattar@yahoo.com.

**Received:** July 25, 2012; **Revised:** December 28, 2012; **Accepted:** March 29, 2013

A 39-year-old Iranian female patient who was a known case of primary cervical dystonia since 10 years ago presented to a private office for Dysport injection. The patients experienced severe dysphagia after inferior alveolar nerve block which was preceded by cervical botulinum toxin injection. A possible synergistic effect of botulinum toxin and lidocaine to produce severe dysphagia is presented in this case report.

**Keywords:** Deglutition Disorders; Anesthesia, Local; Botulinum Toxins; Cervical Dystonia; Side Effect

## 1. Introduction

Idea for possible therapeutic usage of botulinum toxin (BTX) dates back to 18th and 19th century proposed first by Justinus Kerner (1786 - 1862). He called this toxin "sausage poison" (i.e. botulus means sausage in Latin) (1). Since 1895 and explanation of BTX mechanism of action, a variety of beneficial effects treating various diseases are introduced. BTX decreases muscular activity by reducing the release of presynaptic neurotransmitter acetylcholine on the cholinergic nerve terminals; hence confer paralysis at the level of neuromuscular junction (1). Four main types of BTX for cosmetic and therapeutic purposes are currently being manufactured: Onabotulinum toxin A (Botox), Abobotulinum toxin A (Dysport), Incobotulinum toxin A (Xeomin) and Rimatoxin B (Myobloc). Indications for BTX therapy in head and neck region may be addressed to the treatment of hemifacial spasm, headache, myokimia, myoclonus of tensor veli palatini, hypersialorrhea, blepharospasm, tics, strabismus, cervical dystonia, temporomandibular joint disorders related to the muscular spasticity and hyperkinetic lines in forehead and around the eyes (1).

Up to one-third of patients may suffer any of BTX injection complications (2). Neck weakness, pain at the site of injection and dysphagia are among the most common complaints. Most reports of dysphagia are mild to moderate and more severe forms are not common (1). Inferior alveolar nerve block (IANB) is commonly used to give anesthesia over the soft and hard tissue of the cor-

responding quadrant with the exception of buccal area of molars that receive sensory branches from the buccal nerve. Inadvertent vascular injection may be best avoided by proper direction and twice aspiration. Severe neurologic complications may occur after the incidental vascular injections and even total body hemiparesis may be preceded by circulation of the anesthetic to the brain. Rarely, inadvertent insult to prevertebral space and stellate ganglion during IANB may lead to Horner syndrome (3). A possible synergistic effect of botulinum toxin and lidocaine to produce severe dysphagia is discussed in this case report.

## 2. Case Presentation

A 39-year-old Iranian female patient who was a known case of primary cervical dystonia since 10 years ago presented to a private office for Dysport injection. She was otherwise a healthy person with no other systemic problem. She took 2 mg trihexyphenidyl and 1 mg clonazepam daily. The patient received her first BTX injection about six years ago, although details regarding the amounts and sites of injections were not available. She abandoned Dysport injection due to the finical problems. On physical examination, she has right torticollis, left laterocollis, head shaking and shoulder elevation with no other clinical problem. Her second injection was performed by the following dosages and sites: 200 U at right splenius capitis, 100 U at left sternocleidomastoid, 100 U at left scalen, 50 U at left splenius capitis and 50 U at left trapezius muscle.

### Implication for health policy/practice/research/medical education:

It is wise to postpone non-emergent procedures such as dental care with lidocaine administration that have serious common side effect of dysphagia with BTX injection, especially when injected in the cervical region and more than 100u.

Copyright © 2013, Iranian Red Crescent Medical Journal; Licensee Kowsar Ltd. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

On the 2nd following day, she sought dental care for mandibular molar root canal therapy. Inferior alveolar nerve block was performed by local administration of 1.8cc containing lidocaine 2% and 1:80,000 epinephrine. Dental procedure was uneventful and she was discharged with routine analgesic prescription. The patient suffered from difficulty with swallowing solid foods in a progressive manner that she was unable to drink 24 hours after IANB. Thereafter, she was admitted to the hospital for severe dysphagia. Supportive care initiated and she was kept NPO and received fluids by gastric gavage for five consecutive days. On hospital examination, she was mildly dysphonic; she had mild dystonia and cervical weakness and was totally unable to initiate to swallow when a spoon of water was distilled in her mouth. Her neurologic examination except weakness of the bulbar musculature was normal otherwise. There was no electrolyte disturbance and no further imaging study accomplished. Her dysphagia was gradually improved and she switched to soft liquid at 5th day of admission and the patient was discharged at the 7th day. She was followed two and 25 days after hospital discharge. On her last visit, dysphagia was completely improved; however she had a mild cervical dystonia.

### 3. Conclusions

A case of severe dysphagia following inferior alveolar nerve block and botulinum toxin injection at cervical region is presented. Our patient experienced progressive dysphagia with difficulty swallowing solid foods that then liquids. To our knowledge, it is the first report that introduces possible synergistic effect of lidocaine and BTX lead to severe dysphagia with the both oropharyngeal and esophageal transitions affected. Reviewing literature, there are reports of severe dysphagia after therapy with Botox and Dysport, although severe form does not occur on a frequent basis (4). Overall, higher rates of complications are reported when women or sternocleidomastoid are injected. Dysphagia is the most remarkable complication reported after BTX injection to treat cervical dystonia. As high as one-third of patients experienced dysphagia receiving their first injection, especially when sternocleidomastoid was targeted and dose exceeded 100 U. Repetitive injection with accumulation of toxin increases the chance for such distant side effects (4). Also, a bolus single site and high dose injection increases the risk for blood-stream spreading of the toxin as a consequent of attenuated *in situ* bindings to the cholinergic terminals.

It is unlikely that dysphagia in the case presented was related to systemic infusion of anesthetic or deep penetration into the pharyngeal spaces and stellate ganglion blockade. Since cranial nerves were intact (e.g., gag reflex was present, uvula was not deviated and shoulder elevation, facial expression and pupil size were normal) direct

invasion of carotid sheath was not presumed to be the case. Briefly, possible mechanisms for the explanation of dysphagia preceding IANB and BTX therapy are as the followings: 1-diffusion of either lidocaine or BTX to the adjacent carotid sheath and paralysis of within IX-XIth cranial nerves, 2- direct diffusion to the adjacent muscles and induction of paralysis at motor-end-plate or neuromuscular junction level with possible synergistic effect of lidocaine and BTX. Botulinum toxin may diffuse 30 - 45mm around the site of injection, although further spreading depends on anatomic features of the location, dosage and probably the type of botulinum toxin and its preparation (4). An explanation to combined deficient oropharyngeal and esophageal phases may be the paralysis of corresponding muscles to both phases. As mandibular branch of 5th cranial nerve enters the inferior alveolar nerve canal, it gives rise to motor branch named mylohyoid nerve (MHN) just 15 mm above the canal. This nerve innervates anterior belly of digastric muscle and mylohyoid muscle. These muscles are important for initiating of the oral phase of swallowing by backward rotation of mandible and elevation of the floor of the mouth. In addition, a sensory motor to lingual nerve is described that may adversely affect the eating when get paralysed (5). Since documentation of this aberrant branch needs surgical exploration, we are uncertain of the presence of this communication. It is noteworthy to mention that proper functioning mylohyoid muscle is essential for phonation, inspiration, chewing and swallowing. Mild dysphonia in this patient probably was the consequence of affected mylohyoid muscles and direct diffusion of toxin into the laryngeal supporting muscles or even paralysis of recurrent laryngeal nerve, as previously described.

In this certain case, based on recent history of BTX injection and IANB and no significant past medical history suggestive of mechanical causes for dysphagia, most probable reason for such acute and severe form of dysphagia was the injections. Functional dysphagia could be appropriately worked up by video fluoroscopy or Flexible Endoscopic Evaluation of Swallowing (FEES). These diagnostic tools were not available at the hospital where the patient was admitted. She was uncooperative to perform a barium swallow study; hence no additional imaging study was carried out for her. Proposed synergistic effect of botulinum toxin and lidocaine needs future *in-vitro* and *in-vivo* approval investigations. There are evidences of beneficial features of lidocaine to alleviate pain and improve dystonia in patients with secondary dystonia due to parkinson disease or complex regional pain syndrome (CRPS) previously known as reflex sympathetic dystrophy syndrome (RSDS) (6, 7). Probable involvement of afferent sensory fibers in the etiology of dystonia raises this interesting therapeutic target to treat dystonia (6). Importantly, combination therapy, especially in cervical region, should be performed with great care regarding

the serious side effect occurred in our patient. In order to lessen serious side effects, the frequency and amount of injections should be planned at the least possible times and dosage. We believe that Botulinum toxin produces some degree of weakness in several neck muscles and affect swallowing most often not sever enough to produce clinical symptoms. The local anesthetic effects on already weakened muscles have produced severe but transient dysphagia. It is wise to postpone non-emergent procedures such as dental care with lidocaine administration that have serious common side effect of dysphagia with BTX injection, especially when injected in the cervical region and more than 100u.

### Acknowledgements

None declared.

### Authors' Contribution

GASH and RKSH performed the clinical procedure. ABP and GASH and BP reviewed the literature. ABP drafted the manuscript. All authors interpreted the outcome and critically read the final version and approved it.

### Financial Disclosure

None declared.

### Funding Support

None declared.

### References

1. Kedlaya D. Botulinum Toxin, Overview. [28 Aug 2011]; Available from: <http://emedicine.medscape.com/article/325451-overview>.
2. Comella CL, Tanner CM, DeFoor-Hill L, Smith C. Dysphagia after botulinum toxin injections for spasmodic torticollis: clinical and radiologic findings. *Neurology*. 1992;**42**(7):1307-10.
3. Crean SJ, Powis A. Neurological complications of local anaesthetics in dentistry. *Dent Update*. 1999;**26**(8):344-9.
4. Kwek AB, Tan EK, Luman W. Dysphagia as a side effect of botulinum toxin injection. *Med J Malaysia*. 2004;**59**(4):544-6.
5. Fazan VPS, Rodrigues Filho OA, Matamala F. Communication between the mylohyoid and lingual nerves: clinical implications. *Int J Morphol*. 2007;**25**(3):561-564.
6. Schwartzman RJ, Patel M, Grothusen JR, Alexander GM. Efficacy of 5-day continuous lidocaine infusion for the treatment of refractory complex regional pain syndrome. *Pain Med*. 2009;**10**(2):401-12.
7. Irwin D, Revuelta G, Lippa CF. Clinical improvement of secondary focal limb dystonia in neurodegenerative disease following a five-day lidocaine infusion: a case report. *J Neurol Sci*. 2009;**277**(1-2):164-6.