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Case Report

Therapeutic Effect of Botulinum Toxin in Trigeminal Neuralgia: Case Report

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Abstract

Botulinum Toxin Type A, one of the most lethal biological toxins is a potential tool in treatment of Trigeminal neuralgia. Trigeminal neuralgia is characterized by recurrent episodes of severe excruciating, lancinating pain localized to small areas of face. It is caused due to any alteration in the area of the trigeminal nerve fibers' activity and an altered inhibition in the trigeminal nucleus. Botulinum toxin binds to presynaptic nerve terminal and inhibits release of acetylcholine and other neurotransmitters. It normalizes muscle spindle activity by inhibiting gamma motor nerve endings. Hence it provides analgesic properties and relieves muscle twitching. A 48 years old male reported to us with the complain of severe paroxysmal pain, described as an electric shock in right hemifacial area involving right mandibular branch and inability to chew food. He also had several unsuccessful attempts of drug therapy previously. We performed intradermal injection of Botulinum Toxin A at three sites into affected region of the patient's face. Improvement in pain was observed after four days with no discomfort in chewing food. Repeated dose of BTX-A injection given at interval of 25 days and 45 days after 2nd injection of Botox A injection. The follow up time is 6 months and patient is currently on follow up.

Keywords: *Trigeminal Neuralgia; Botulinum Toxin A; Facial Pain*

Introduction

Trigeminal neuralgia is severe excruciating pain distributed unilaterally along a branch of trigeminal nerve. Incidence of trigeminal neuralgia is ~4.5 per 100,000 of general population. Pain episodes of trigeminal neuralgia last for a few seconds.

Various etiological factors are associated with neuralgic pain like viral infection of the trigeminal ganglion, tumors and cysts compressing the ganglion, which leads to demyelination of sensory fibers of trigeminal nerve within the nerve root or brainstem.

Trigeminal neuralgia can be triggered by brushing the teeth, washing the face etc. It depends upon the branch of trigeminal nerve involved and this area from where pain triggers is known as trigger zone which can be located anywhere within the territory of the affected trigeminal nerve.

Two types of treatment modality are used to treat trigeminal neuralgia. 1) Therapeutic therapy is first line of choice which includes prescribing anticonvulsant drugs and methylcobalamin. Now a days Botulinum toxin is new drug to treat trigeminal neuralgia. 2) surgical

or interventional therapy includes gamma knife surgery, decompression of microvascular structures etc.

Botulinum toxin A is a neurotoxin derived from Clostridium botulinum. It blocks the release of Acetylcholine at the neuromuscular junction. It binds to C-fibers, which provides analgesic effect and relieve muscle spasm.

Use of Botulinum Toxin A in involved area gives positive effect with limited complications which makes it an important therapeutic option for management of Trigeminal neuralgia.

This case report is a case of trigeminal neuralgia which is treated by Botulinum toxin type A.

Case Report

A 48 year-old male patient reported to Department of Oral and Maxillofacial surgery, Mullana with complain of pain in lower right back region of jaw since 1 year.

Pain was severe which was like electric shock in right lower back region of jaw. It aggravated on chewing food and subsided after few minutes. No history of painful attack while sleeping. No satisfactory response to various drug therapy and multiple extraction by local practitioner.

The patient had no history of any disorders, allergy, smoking or alcohol. He had no history of medication except antibiotics and pain killers taken for same.

On examination, no infections or tumors were found in region of his right lower region of jaw.

The trigger point was located in the right inferior alveolar region.

The following medications were prescribed:

- Tablet Tegretol (upto 300 mg/day).
- Tablet Baclofen (upto 20 mg/day).
- Tablet Neuroboin forte.

Some improvement in symptoms was reported by patient for 3 months. This was a temporary relief felt by the patient and after 3 months the episodes and intensity of pain increased. The patient also complained of inability to chew food. Pain was severe, evaluated on VAS scale.

After the patient had given informed consent, BOTOX-A treatment was begun.

Patient's evaluation was done on the basis of severity of pain on VAS scale (with range of 1 - 10; 7 - 10 severe, 4 - 6 moderate, 0 - 3 mild) [1], number of painful attacks and ability to chew food after first dose of BOTOX-A treatment.

First Dose

Visit 0 (at day of 1 dose)

Twenty five units of injection of BOTOX-A Subcutaneously were given at three points at distance of 1.5 cm. Dose of Tegretol was tapered from 300 mg to 100 mg. Baclofen stopped.

No pain (VAS 0) after injection, able to chew food and no painful attack.

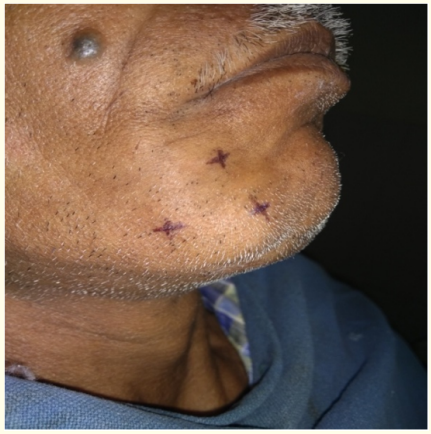

Figure 1: *Injection scheme of Botulinum Toxin type A in treatment of trigeminal neuralgia involving inferior alveolar nerve (N.V3). Twenty-five units of Botox-A injected at three sites 1.5 cm apart.*

Figure 2: *Botulinum toxin–A.*

Visit 1 (1 day after 1 dose)

Severe pain (VAS 10), inability to chew food and painful attack at evening.

Visit 2 (4 day after 1 dose)

Mild pain (VAS 3), able to chew food and no painful attack

The improvement persisted for 20 days (without pain); however moderate pain reappeared (VAS 4 POINTS) after 20 days but without painful attack.

Second dose

At 25 days new injection were given at same point and in same amount. Oral drug Tegretol stopped after 2nd injection of BOTOX-A.

Visit 0 (at day of second dose)

No pain (VAS 0), able to chew food and no attack of pain.

Visit 1 (1 day after second dose)

Mild pain (VAS 3), able to chew food and no painful attack.

Third dose

At 45th day new injections of Botox A (third dose) were given at same points and in same amount. Patient was not taking any medication after second injection of Botox A.

Visit 0 (at the day of third dose)

No pain (VAS 0), able to chew food and no attack of pain.

Visit 1 (1 day after third dose)

No pain (VAS 0), able to chew food and no painful attack.

The patient is still on follow up. No complain of attack of pain without medication reported by patient till date.

Discussion

Botulinum toxin (BT) has been used for 20 years to treat various neurological disorders associated with pathologically increased muscle tone or impaired autonomic nerve regulation [2]. Findings demonstrate the positive effects of botulinum toxin A in pain management in patient of trigeminal neuralgia which supports previous findings of Piovesan., *et al.* [3] and Borodic and Acquadro [4]. Many aspects remain unclear including rapid pain control after injection then completely pain management after 4 days and recurrence of pain after 20 days.

We described the patient with excruciating pain in whom Botulinum injection gave markedly beneficiary effect in pain control. Borodic and Acquadro reported 11 cases of patients with trigeminal neuralgia, treated with Botox A with doses ranging from 25 to 75U [4]. Eight out of eleven responded to treatment with a benefit duration ranging from 2 to 4 months [5].

There are various mechanism which explains the analgesic properties of Botox A. Within few hours after injection of Botox A it rapidly binds to presynaptic cholinergic nerve terminals and inhibits the exocytosis of Ach by decreasing frequency of Ach release which cause loss of junctional Ach receptors and muscle becomes functionally denervated, atrophics and develops extrajunctional Ach receptors. Within few days axon terminals begin to sprout and proliferating branches form new synaptic contacts on adjacent muscle fibers [6].

Other than its effect on muscle contraction as it binds to the presynaptic nerve terminal and inhibit the release of acetylcholine (ACh) it gives a direct analgesic action, which suggest that BT has alternative modes of action. Most hypotheses assumption that BT inhibits not only the exocytosis of ACh but also other neurotransmitters [7].

Other than this, site of an analgesic action could be the postganglionic sympathetic nerve ending that uses norepinephrine and ATP as transmitters. Norepinephrine is known to increase cases of chronic pain, and ATP is a stimulant of muscle nociceptors. If BT inhibits the release of these transmitters, it can then be analgesic in cases of sympathetically maintained pain including the complex regional pain syndrome [7].

This case suggests that Botox A can be a beneficial and safe drug in management of trigeminal neuralgia where conventional therapy is not effective. It gives a fast and long lasting benefit. Further studies required to validate our finding and to explore about doses of injection.

Conclusion

Though the study was limited to one patient, it clearly demonstrates the success in use of Botulinum toxin-A in patients with trigeminal neuralgia. With subsiding of symptoms in such cases, it helps improving the quality of life of the patients along with the fast and long-lasting benefits when the conventional approaches have failed or are not effective. More studies are required to validate our findings and to explore the drug dosage.

Conflict of Interest

The authors declare that no conflict of interest exist in regard to this article.

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