PAIN MEDICINE
Volume 6 • Number 2 • 2005

CASE REPORT

Treatment of Ptosis as a Complication of Botulinum Toxin Injection

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ABSTRACT

In this case report, we present one of the complications of botulinum toxin injection. Botulinum toxin injection could be used in the treatment of migraine headaches and this use could be complicated by ptosis. Botulinum toxin type A was injected into the frontalis, orbicularis oculi, corrugator supercillis, and temporalis muscles bilateral, as well as into the procerus muscle, in a patient with chronic migraine headache. Three days later the patient developed ptosis, conjunctival injection and pain initially in one eye, later involving both eyes. This complication was successfully treated after 9 days of instilling apraclonidine 0.5% ophthalmic solution and dexamethasone 0.1%/tobramycin 0.3% ophthalmic suspension into both eyes.

Key Words. Botulinum Toxin; Ptosis; Migraine; Apraclonidine

Introduction

Botulinum toxin type A injection has been used for the treatment of migraine headache, tension headache, and chronic daily headache [1]. Botulinum toxins are potent nerve toxins, which bind to transport proteins in nerve cells and block the release of nerve transmitters from nerve endings. One of these transmitters is acetylcholine, which is released by nerve cells and transported into muscle cells to signal the muscle to contract. botulinum toxin by this mechanism reduces muscle hyperactivity and decreases muscle tension. Muscle tension may trigger or aggravate migraine headaches [1]. By interfering with transport proteins in nerve cells, studies have shown that botulinum toxin may also inhibit the release of excitatory nerve transmitter glutamate [2] and inflammatory mediators such as arachidonic acid (AA) [3], vasoactive intestinal peptide (VIP), and neuropeptide Y (NPY) [4,5]. Botulinum toxins also inhibit the release of tumor necrosis factor alpha (TNF-alpha) from immune cells and thus can alleviate pain and spasm produced by the inflammatory response [6]. By reducing the neurogenic flare, botulinum toxin may reduce the central sensitization from hyperexcitable peripheral nerves that lower the threshold for headache in migraine. When used to treat migraine, botulinum toxin is injected to denervate the frontalis, orbicularis oculi, corrugator supercillis, temporalis and the procerus muscles. One of the complications of botulinum toxin injection is ptosis. Ptosis is commonly managed conservatively. Ptosis also can occur in Horner's syndrome and has been effectively treated with apraclonidine hydrochloride (HCL) [7]. There is no case report in the literature of the treatment of ptosis caused by injection of botulinum toxin. While botulinum toxin-induced ptosis is a well-documented complication [8,9], we have always used great caution and proper technique to avoid this complication in our practice. Nevertheless, the risk of ptosis is real

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Work was done at the L.A. Pain Clinic. The study was not supported by any grant.

 1526-2375/05/$15.00/149 149–151

and, unfortunately, only anecdotal remedies or passive treatments have been offered to patients in the past. This case report documents our only experience with botulinum toxin-induced ptosis, and its dramatic reversal using apraclonidine.

Case Report

A 47-year-old woman with chronic migraine had injections of botulinum toxin type A as part of a treatment regimen. Lidocaine 1% (0.1 mL) with 2.5 units of the botulinum toxin was injected into each muscle belly of the bilateral orbicularis oculi, bilateral corrugator supercillis, and the midline procerus muscles. Lidocaine 1% (0.1 mL) with 2.5 units of the botulinum toxin was injected into five sites in the frontalis muscle, and five sites in each temporalis muscle. A total of 50 units of the botulinum toxin and 2 mL of Lidocaine 1% were injected.

One week later, the patient was seen in the clinic with a complaint of weakness in opening the right eye. She stated that the weakness started 3 days after the chemodenervation procedure with botulinum toxin. On examination, the patient had ptosis in the right eye with an inability to fully open the eye on command. The margin reflex distance (MRD) on the right eye was 2 mm, and 5 mm on the left eye. The normal MRD for this patient was 6 mm in both right and left eyes. The patient was advised that the ptosis would be temporary. No medications were prescribed. Five days later, the patient returned to the clinic stating the weakness in the right eye had not resolved and she also had weakness in opening her left eye. On examination, the patient had ptosis of both eyes. The MRD in both right and left eyes was 2 mm. The ptosis was associated with pain, excessive lacrymation, and conjunctiva injection in both eyes. The patient was prescribed the following medications. Apraclonidine 0.5% ophthalmic solution one to two drops to be instilled in both eyes q 8 hours to treat the ptosis, and dexamethasone 0.1%/tobramycin 0.3% ophthalmic suspension instilled in both eyes q 4 hours to treat the conjunctival inflammation.

The patient returned to the clinic, 5 days after treatment was started. She stated that her eye opening improved 1 day after commencing treatment, and by the third day excessive lacrymation and conjuctival injection were completely resolved. On examination, there was only mild ptosis in the right eye (MRD 4 mm) and the left eye ptosis had resolved (MRD 6 mm). The conjunctiva was clear in both eyes. On re-evaluation 9 days later, the right eye ptosis was completely resolved and MRD in bilateral eyes was 6 mm.

Discussion

Prevention of ptosis requires care during injection and in the postprocedure period. When injecting botulinum toxin, care should be taken not to inject the lower frontalis or orbicularis oculi muscles at sites that are lateral to the mid-pupillary line. and also the needle should be pointing superiorly away from the orbit. These are to prevent the toxin from tracking downward and denervating the muscles that raise the eyelid, resulting in ptosis. The levator palpebrae superioris and superior tarsal muscles elevate the eyelid. The levator palpebrae superioris is a voluntary muscle innervated by the Oculomotor nerve, while the superior tarsal (Müller) muscle is a smooth muscle innervated by sympathetic nerves that have preganglionic cell bodies in the upper thoracic levels of the spinal cord and postsynaptic cell bodies in the superior cervical ganglion. The superior tarsal muscle has its origins from the undersurface of the levator superioris. Approximately 12 mm length, it inserts superiorly on the tarsal border and elevates the upper lid approximately 2 mm. At rest, the lid is just below the top part of the iris (the colored part of the eye). This is measured with the patient looking straightforward with the head vertical. The lid position is measured relative to the visual axis using the MRD. This is the distance from the eyelid margin to the corneal light reflex with the patient looking straight ahead at a penlight. Normal MRD is usually greater than 2.5 mm. Ptosis due to botulinum toxin injection was successfully reversed with apraclonidine ophthalmic solution. Apraclonidine an alpha-adrenergic receptor agonist possibly reversed the ptosis by directly stimulating the sympathetic innervations of the superior tarsal muscle. There is currently no treatment for botulinum toxin-induced ptosis. Patients who suffer such a complication have to wait for several weeks until the effects of the toxin wear off. This case report suggests that apraclonidine can provide a reversal option for physicians and their patients.

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