

# RESEARCH ARTICLE

### A RARE CASE OF UNILATERAL TRANSIENT MYDRIASIS AFTER BOTULINUM TOXIN INJECTION FOR COSMETIC PROCEDURE

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#### Abstract

\_\_\_\_\_ Introduction: Botulinum toxin A (BTX-A) was first used for the aesthetic purposes in 1990 to reduce wrinkles caused by facial muscle. Its effect starts 3 to 4 days after application and lasts for 4 to 6 months. All the medical doctors, from plastic surgeons to dermatologists can administer botulinum toxin A injection effectively and safely. Ophthalmologists are also performing this procedure for blepharospasm.

Case Report: A 35 year old female present to emergency department with complain of sudden onset of right eye blurred vision with tingling sensation of the right side of the face. Patient has been injected with BTX-A for a cosmetic procedure about a 2 weeks ago. On presentation, her right pupil measured 9 mm and was fixed, with no direct or consensual response to light, and her left pupil was 3 mm and had a normal light response. CT brain and cranial MRI revealed no optic nerve or cerebral dysfunction. Patient was counselled that the mydriasis would not be permanent. In follow up after 10 days her mydriasis was improved.

Discussion: Botulinum neurotoxins inhibit the release of acetylcholine and act primarily at the peripheral cholinergic synapses. These agents act at the neuromuscular junction in skeletal muscle, causing transient muscle paresis. Botulinum toxins could therefore cause pupil dilatation by uptake into the parasympathetic neurons at the level of the ciliary ganglion or the parasympathetic neuromuscular junctions in the sphincter pupillae of the iris.

Conclusion: Before botulinum injection for cosmetic purposes or to treat blepharospasm, patients should be warned about the possibility of developing toxin-induced ptosis and mydriasis.

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Introduction:-

Botulinum toxin A (BTX-A) was first used for the aesthetic purposes in 1990 to reduce wrinkles caused by facial muscle. Its effect starts 3 to 4 days after application and lasts for 4 to 6 months.<sup>1...</sup> All the medical doctors, from plastic surgeons to dermatologists can administer botulinum toxin A injection effectively and safely. Ophthalmologists are also performing this procedure for blepharospasm.<sup>2</sup>...Patients may also present to an

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ophthalmologist due to ophthalmological side effects of botulinum toxin A. For this reason ophthalmologist must take detailed history from the patient if there is ptosis.

#### **Case Report**

A 35 year old female present to emergency department with complain of sudden onset of right eye blurred vision with tingling sensation of the right side of the face while she was resting in a chair. Patient has no co-morbidities and no significant past medical or surgical history.Patient has been injected with BTX-A for a cosmetic procedure about a 2 weeks ago. BTX-A was injected bilaterally to the orbicularis oculi, corrugator supercili and procerus muscles to reduce the wrinkles.

On presentation, her right pupil measured 9mm and was fixed, with no direct or consensual response to light, and her left pupil was 3mm and had a normal light response. There was a 6mm difference in diameter between the pupils. Her vision is 6/4 in both eyes. Biomicroscopic examination of the anterior segment was normal. Intraocular pressure was 12mmHg in both eyes. Thorough dilated fundus examination was normal. Bell's phenomenon was normal. There was no abnormality of extraocular movements and no jaw winking was observed.

CT brain and cranial MRI revealed no optic nerve or cerebral dysfunction. There was no apparent afferent pupillary defect, as judged by the reaction of the left pupil.

Patient was counselled that the mydriasis would not be permanent. In follow up after 10 days her mydriasis was improved.



### **Discussion:-**

Botulinum neurotoxins inhibit the release of acetylcholine and act primarily at the peripheral cholinergic synapses. These agents act at the neuromuscular junction in skeletal muscle, causing transient muscle paresis.<sup>3...</sup> However, botulinum toxins also inhibit the release of acetylcholine at the sympathetic ganglia and at the preganglionic and postganglionic nerve terminals in the parasympathetic nervous system.<sup>4...</sup> People who are systemically poisoned with botulinum toxins characteristically have fixed mid-dilated pupils due to paralysis of the sympathetic and parasympathetic neurons at the level of the ciliary ganglion or the parasympathetic neuromuscular junctions in the sphincter pupillae of the iris.<sup>5...</sup> It has been shown in animal studies that botulinum toxin injected intracamerally or near the ciliary ganglion causes mydriasis.<sup>3...</sup> Persistent mydriasis has been reported after medial rectus muscle injection of botulinum toxin for esotropia in a child.<sup>6...</sup>

There are no reports in the literature on reversible mydriasis secondary to cosmetic procedures. We believe that botulinum toxin had been administered at a high dose in our patient, and that the cumulative BTX-A dose to the

right eye was more than that to the left eye. The most likely suggested cause was injury to ciliary ganglion, resulting in weakened accommodation.

Botulinum toxin can also cause ptosis. Prevention of ptosis requires care during injection and in the post-procedure 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 the needle should be pointing superiorly away from the orbit to prevent the toxin from denervating the levator muscles that raise the eyelid, resulting in ptosis.<sup>7,8,...</sup>

Apraclonidine is used to reverse ptosis due to botulinum toxin injection. Apraclonidine is an alpha-adrenergic receptor agonist<sup>7...</sup> that directly stimulates sympathetic innervation of the superior tarsal muscle and decreases ptosis. 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.

## **Conclusion:-**

Before botulinum injection for cosmetic purposes or to treat blepharospasm, patients should be warned about the possibility of developing toxin-induced ptosis and mydriasis. If this occurs, after evaluation of cranial magnetic resonance imaging, doctors who applied the botulinum toxin must refer the patient to an ophthalmologist for appropriate management.<sup>9...</sup>

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### Abbreviation:

- 1. e.g. = exempli gratia
- 2. mmHg = millimetres of mercury
- 3. CT = computed tomography
- 4. MRI = Magnetic resonance imaging.