

The role of Botulinum toxin in correcting frontalis-induced eyelid pseudo-retraction post ptosis surgery

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We report a case of a 52-year-old female patient who developed overcorrection, due to brow overuse, post surgery for bilateral aponeurotic ptosis. The patient had undergone levator palpebrae superioris plication bilaterally. Due to brow overuse habituated by long standing ptosis, the patient presented with superior scleral show, post ptosis surgery. The lid contour was normal in both eyes and when brow overaction was blocked mechanically, the palpebral fissure heights were normal, comparable, with no scleral show bilaterally. Despite repeated instructions, when the patient continued brow overuse subconsciously, an injection of botulinum toxin was given just above both brows. This led to elimination of brow overuse within a month, with elimination of superior scleral show. The patient maintained lid and brow symmetry with no overaction, eight months post injection.

Key words: Botulinum toxin, frontalis overaction, ptosis surgery.

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Botulinum toxin reduces muscle contractility and is used in the treatment of muscular overaction. The toxin acts by inhibiting the release of acetylcholine from the vesicles at the presynaptic nerve terminal at the neuromuscular junction (chemodenervation).¹

Many patients with longstanding upper eyelid ptosis use their frontalis muscles as a compensatory mechanism to achieve a wider palpebral fissure and improved peripheral vision. Interestingly, after successful surgical correction of upper eyelid ptosis, patients still use their frontalis muscle, despite good eyelid position postoperatively. This may last in some patients indefinitely and subconsciously.²

We report a case of a 52-year-old female patient who developed overcorrection, due to brow overuse, post surgery for bilateral aponeurotic ptosis and was treated by botulinum toxin.

Case Report

A 52-year-old female patient presented to us for overcorrection, post surgery for bilateral aponeurotic ptosis, performed

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elsewhere, two weeks prior. The patient had undergone levator palpebrae superioris plication bilaterally. On examination, the best corrected visual acuity was 20/20 in both eyes. The palpebral fissure height was 11mm in both eyes. Both brows were seen to be arched, due to overuse. There was 1mm superior scleral show bilaterally [Fig. 1]. The lid contour was normal in both eyes and when brow overaction was blocked mechanically, the palpebral fissure heights were normal, symmetric, with no scleral show bilaterally. Anterior and posterior segment examination was unremarkable, in both eyes. The patient's past photographs were evaluated and brow overuse was seen to be present, prior to surgery. The problem was explained to the patient and she was asked to consciously prevent brow overuse to avoid stimulating overcorrection. She was asked to follow up with us six weeks later.

On review, eight weeks post surgery, the problem had persisted and the patient was very unhappy with the result. At this point, we decided to inject each supra-brow area with 3.75 units of botulinum toxin A (Botox, Allergan, Irvine, CA) (2.5 units/0.1 ml dilution) to paralyze the frontalis muscle (brow elevator) and prevent brow overuse. Three locations, over the center and the two lateral brow margins, 2mm over the brow, were injected with 1.25 units toxin each. Care was taken to ensure that the injections were not given closer to the brow line, to ensure against brow ptosis.

Two weeks later, the arching of the brows had disappeared and the lids had descended to their normal levels, a millimeter below the superior limbus [Fig. 2].

On final follow-up eight months later, no scleral show was present bilaterally, no arching of the brows was apparent and the patient was pleased with the cosmesis.

Discussion

Following botulinum toxin use, muscle weakness may not become evident for two to four days due to the continued release of acetylcholine from vesicles that have not yet been blocked by the toxin. Restoration of muscle activity typically begins three to four months after the injection due to regeneration of new endplate units.¹ Given intra-muscularly, botulinum A toxin results in temporary chemodenervation and the loss or

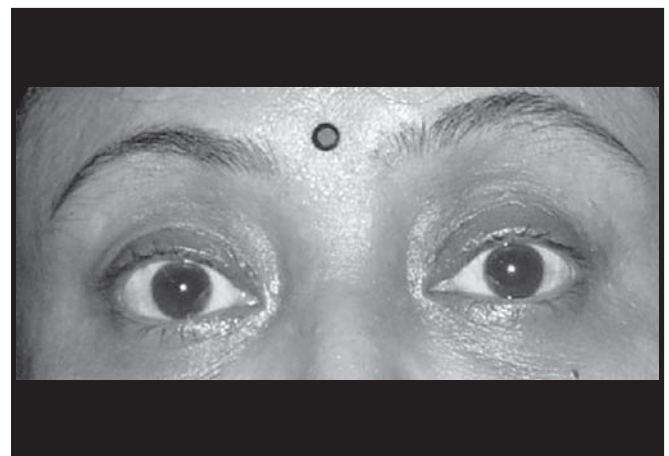


Figure 1: Botulinum toxin post ptosis surgery: External photograph of patient, showing bilateral brow arching and superior scleral show, eight weeks post ptosis surgery

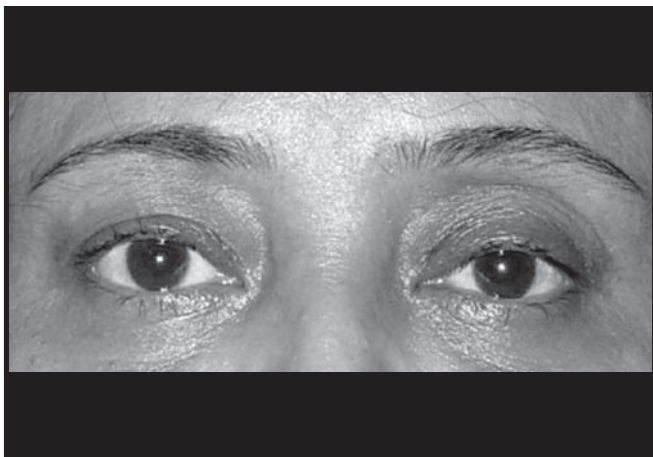


Figure 2: Botulinum toxin post ptosis surgery: External photograph of patient, two weeks post botulinum toxin injection, showing symmetrical palpebral apertures, with no scleral show

reduction of neuronal activity at the target muscle.^{1,3} Naik *et al.*⁴ have elucidated the ophthalmic uses of botulinum toxin in a comprehensive review recently.

Neuronal plasticity plays pivotal roles in recovery from injury and in learning/memory in both the peripheral and the central nervous system.⁵ Neuroparalysis produced by botulinum A toxin elicits nerve sprouting and the newly created synapses are responsible for the initial synaptic transmission at the onset of recovery from muscular paralysis. This may cause permanent motor relearning thereby alleviating the use of the frontalis muscle in patients with good eyelid position after successful surgery for eyelid ptosis. Paradoxical use of the frontalis muscle probably reflects the longstanding nature of the preoperative ptosis to a point that it becomes

subconscious, causing pseudo-retraction of the eyelids. In most patients, frontalis muscle contraction ceases spontaneously once patients achieve good eyelid position; however, others may need treatment with botulinum A toxin. It has been reported that although chemoparalysis of the muscle with botulinum is temporary, the patients may not return to preoperative use of the muscle, possibly as a result of permanent motor relearning.²

Temporary muscle paralysis with botulinum toxin seemed to be enough to trigger a change in the set point for muscle contraction in the central nervous system. Once the new set point was achieved and with no apparent trigger for frontalis muscle contraction as in the preoperative status, it was noticed that patients stopped utilizing the muscle long after the effect of the toxin waned.²

The present case highlights the use of botulinum toxin in a patient of brow over action following bilateral surgery for aponeurotic ptosis.

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