Botulinum toxin type A gives adjunctive benefit to periorbital laser resurfacing

Paul S Yamauchi, Gary P Lask & Nicholas J Lowe

Authors:

Paul S Yamauchi MD, PhD Gary P Lask MD UCLA School of Medicine, Los Angeles, CA, USA Clinical Research Specialists, Santa Monica, CA, USA

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Keywords: Botox – laser resurfacing – rhytides *OBJECTIVE*: Periorbital aging and lines are a result of intrinsic skin aging, ultraviolet damage, and repetitive action of periorbital muscles. Rejuvenation of this area should therefore be optimized by combining treatments that approach the different causative factors.

METHODS: This was a single-center, prospective, randomized, placebocontrolled study comparing the efficacy and safety of combining Botox injections (18 units per area) with ablative laser resurfacing versus laser resurfacing alone without Botox in the treatment of periorbital rhytids. *RESULTS*: We have concluded a bilateral study comparing the effects of Botox[®] versus saline placebo injections to the periorbital areas before and following erbium: YAG laser resurfacing of the areas in 33 patients. The results demonstrated that the Botox-treated side with laser resurfacing improved significantly more than the contralateral area treated with saline and laser in diminishing periorbital rhytids as well as textural, pigmentation, and other features of periorbital skin aging.

CONCLUSION: This study illustrates the benefits of a combined approach to treating periorbital skin aging. J Cosmet Laser Ther 2004; 6: 145–148

Introduction

There are numerous surgical procedures designed to treat hyperfunctional facial lines such as rhytidectomy, liposuction, brow lift, dermabrasion, chemical peel and collagen injections. However, as evidenced by the persistence of certain facial rhytids after surgery, these procedures often do not adequately address the underlying problems. The recent understanding that hyperkinetic or dynamic musculature contributes to the etiology of facial lines, wrinkles, and furrows^{1,2} has broadened the treatment options for these facial cosmetic blemishes.

Botulinum toxin type A (Botox[®]), a potent neurotoxin that irreversibly blocks presynaptic acetylcholine release, has been successfully employed to treat facial spastic conditions such as blepharospasm, strabismus, focal dystonias, spasmodic dysphonia, and achalasia.^{3,4} Consequently, many clinicians have noted the improvement of facial rhytids in

patients who received Botox for these spastic disorders. Indeed, while treating patients with blepharospasm, Carruthers and Carruthers first noted improvement of glabellar frown lines.⁵

A variety of other hyperkinetic facial lines such as crow's feet, horizontal forehead lines, melolabila folds, and other hyperkinetic facial lines have been successfully treated with Botox.^{6–12} It is noteworthy that because these lines are the result of physiologically important facial muscles, complete paralysis is not the end point sought as this may cause unacceptable functional deficits.¹ Botox appears to be most beneficial in patients whose facial lines are due more to underlying muscle pull that to loss of dermal elasticity.¹³

Skin resurfacing using the erbium:YAG laser provides significant improvement, rapid healing, and minimum complications in patients with mild to moderate facial wrinkling and scarring. It produces laser energy in a wavelength that gently penetrates the skin, is readily absorbed by water, and scatters the heat effects of the laser light, thereby minimizing erythema commonly caused by laser resurfacing.

Correspondence: Nicholas Lowe, MD, FRCP, Clinical Research Specialists, 2001 Santa Monica Blvd, Suite 490W, Santa Monica, CA 90404, USA. Email: nlowecrs@aol.com

Original Research

The current study in subjects with crow's feet examines the use of Botox following erbium:YAG skin resurfacing and its effect, if any, on the benefits gleaned from skin resurfacing.

Materials and methods

The objective of this single-center, prospective, randomized, placebo-controlled, paired comparison study was to compare the safety and efficacy of combining intramuscular injections of Botox with ablative laser resurfacing versus ablative laser resurfacing without Botox by substituting placebo intramuscular injections of saline in subjects with bilateral crow's feet.

Patient selection

Thirty-three patients with bilateral, symmetrical periorbital rhytids characterized by a minimum measurement of +2 during maximum attempted contraction were selected for the study. Female subjects who were pregnant, breast-feeding, or who were of childbearing potential and not practicing a reliable method of birth control, patients with disorders or on agents that interfere with neuromuscular function, or subjects with profound atrophy or excessive weakness of the muscles in the target areas of injection were excluded from the study.

Study design

Study patients were randomized to receive placebo saline injections on one side of the face and 18 units of Botox on the contralateral side. At 2–6 weeks post-injection, all study subjects received erbium:YAG laser resurfacing to both sides of the crow's feet areas. Follow-up visits were scheduled at days 1 and 3, and weeks 1, 2, 4, 8, 12, 16, 20, and 24 post-laser resurfacing. At week 12, study subjects received a second injection of Botox (18 units) and placebo according to their random allocation at baseline. At the end of the 24 weeks, study subjects were given Botox (18 units) to both sides of the face.

Dosing and injection technique

A vial containing either 100 units of Botox or placebo was diluted with 1.67 ml of sterile 0.9% saline without preservative. Three injection sites were identified in each crow's feet area corresponding to the lateral aspects of the orbicularis occuli. Each injection consisted of either 0.1 ml of Botox (6 units) or placebo.

Grading of severity

Physician grading of severity was based on an established score and made at rest and maximum contraction. Facial wrinkles were graded by a trained observer as: none=0; mild=1; moderate=2; severe=3. The duration of botulinum toxin treatment based on crow's feet line severity was assessed at each visit.

Photographs were taken with standard facial photography using the Canfield system.

Erbium: YAG laser resurfacing

Prophylactic cephalexin and acyclovir were given to the patients before and after laser resurfacing and subjects received 30 mg of temazopam prior to the procedure. Prior to resurfacing, ELA-Max[®] cream was applied to the treated area for at least 30 minutes and eyeshield protection was inserted. Resurfacing was performed with the NaturaLase (Focus Medical, CT) system at standardized laser settings of 4 Hz, 6 mm spot size, and 700 mJ. Three passes were performed periorbitally except for the upper eyelids where only one pass was done. A final pass at 500 mJ was performed at the outer edges of the crow's feet for feathering.

Results

A total of 33 female patients were enrolled in the study. Figure 1 demonstrates that at rest following laser resurfacing in both treatment groups, there was an increase in the percentage of patients with none to mild rhytids over the following 12 weeks. While laser resurfacing alone resulted in improvement of the rhytids in the placebo group,



Figure 1

Percentage of patients exhibiting none, mild, moderate or severe rhytids at rest (A) during a 12-week interval from Botox treatment or (B) placebo in conjunction with erbium:YAG laser resurfacing.



Figure 2

Percentage of patients exhibiting none, mild, moderate or severe rhytids at maximal contraction (A) during a 12-week interval from Botox treatment or (B) placebo in conjunction with erbium:YAG laser resurfacing.

this trend was more evident in the Botox-treated group, indicating that the combined therapy was more efficacious in reducing the rhytids at rest.

The results were more evident when rhytids were assessed during maximum contraction. Figure 2 shows that severe wrinkles were greatly reduced with Botox compared with the placebo group for up to 12 weeks.

Adjunctive therapy with Botox and laser resurfacing demonstrated a greater reduction in rhytids. Figure 3 shows one female patient who exhibited a greater improvement of crow's feet at rest with Botox versus the placebo side in conjunction with erbium:YAG laser treatment. Upon maximal contraction, the Botox-treated side had a clearer diminution of wrinkles. In addition, there was overall reversal of photodamage with a reduction of lentingines and improvement in skin texture. In combination with Botox, there was greater enhancement of rejuvenation.

A total of 57.5% (19/33) patients reported at least one adverse event and the most common adverse events seen were pain on injection and bruising. There was no scarring, hyper- or hypopigmentation, blistering, or infections from the treatment. No serious adverse events occurred during this study.

Discussion

Botulinum toxin type A has recently been approved in the USA for the treatment of glabellar rhytids. It is also used

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Photograph of a female patient at baseline and 8 weeks at (A) rest and with (B) maximum contraction after treatment with Botox on the right face (top) and placebo on the left face (bottom) following erbium:YAG laser resurfacing.

to treat a variety of other hyperactive dynamic facial lines including horizontal forehead lines, crow's feet (14), and perioral rhytids.

This study demonstrates that the erbium:YAG laser produces some reduction of periorbital rhytids both at rest and at maximum contraction at 12 weeks. In addition, erbium:YAG laser with Botox produces a higher reduction of periorbital rhytids at rest and at maximum contraction at 12 weeks. Combination therapy yields a better reduction of dynamic wrinkles and also improves the texture of photodamaged skin.

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