

CORRESPONDENCE

Correction of glabellar protrusion after botulinum toxin injection for forehead wrinkles

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Dear Editor,

Botulinum toxin blocks the release of the neurotransmitter acetylcholine and helps treat wrinkles^[1]. The efficacy and safety of botulinum toxin injection for upper facial wrinkles were established in several studies^[2-4]. Common side effects include transient headache, bruising, eyebrow ptosis and eyelid swelling^[5]. No adverse life threatening events or long-term complications have been reported. However, there have been reports on site-specific side effects, except eyebrow ptosis or eyelid swelling. Kang *et al.* described two cases which showed exaggerated glabellar wrinkles after botulinum toxin injection for forehead horizontal lines. No specific treatment for the exaggeration of wrinkles was carried out and it was left to naturally subside^[6]. In the present report, we highlighted the case of a patient whose significant glabellar protrusion was rapidly and effectively corrected with the use of botulinum toxin injection.

A 66-year-old female had moderate forehead wrinkles (**Figure 1**). Botulinum toxin type A (Neuronox[®], Medytox, Inc., Seoul, Republic of Korea) was diluted with preservative-free sterile saline for a final concentration of 4 units/mL. A total of 6 units were administered by intramuscular injection into the upper half of the forehead (5 injection sites). After one week, forehead wrinkles were reduced. However, glabellar protrusion was noticeable. The patient expressed dissatisfaction on the remaining protrusion and appealed for a rapid solu-

tion. Subsequently, an additional 6 units of botulinum toxin were injected into the corrugators (two injection sites). After one week, the protrusion disappeared and the patient was satisfied (**Figures 2A and 2B**).



Figure 1. Maximal forehead wrinkling before treatment (5 injection points marked)



Figure 2A. Improved forehead wrinkles with noticeable glabellar protrusion – one week after frontalis treatment



Figure 2B. Disappearance of the glabellar protrusion—one week after additional botulinum injection into the corrugators

The frontalis raises the eyebrows and the upper eyelids, causing horizontal forehead lines. Its medial fibers intersect with the procerus at the glabellar region, whereas its central and lateral fibers intermingle with the corrugators in the central and lateral parts^[7]. When the upper half part of the muscle is weakened with botulinum toxin for the improvement of forehead wrinkles, the lower half can be relatively hyperactivated. Glabellar protrusion can occur in this case. Previous cases reported the use of other Botulinum toxin type A products (Botox[®], Allergan, Inc., Irvine, CA, USA) and it was believed that this phenomenon can occur regardless of the product type^[6]. Kang *et al.* reported that mild hyperactivation of corrugators nearly disappeared without treatment by week 4; however, a severe case showed that only slight improvement and significant protrusion persisted by week 4^[6]. Therefore, through this observation, proactive treatment of hyperactivated muscles can increase patient satisfaction. Side effects following additional injections of the corrugators, such as eyelid ptosis, could be avoided with proper injection techniques and patients need to be informed of it. Additionally, concurrent injections into the frontalis and corrugators can be considered to prevent expected glabellar protrusion, especially in patients with noticeable corrugator activity, when reducing forehead wrinkles. Clinicians should be aware of this phenomenon and are recommended to explain this prior to treatment for better patient compliance.

Conflict of interest

The authors declared no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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