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VIEWPOINT

A Novel Technique to Reduce Pain from Intradermal Injection of Botulinum Toxin Type A

Gyu Sik Jung, MD*; Hyung Seok Kim, MD†

Botulinum toxin type A (BTX-A) is commonly injected intramuscularly in the treatment of forehead wrinkles. In practice, an intradermal injection is preferred, as the risk of adverse effects is lower than with intramuscular injection; the antiwrinkle effect of BTX-A does not significantly differ between intramuscular and intradermal injections. However, side effects such as eyebrow ptosis, heaviness, and raised lateral eyebrows, so-called "samurai eyebrows," were more prominent after intramuscular injection. The brow level was essentially lower with intramuscular injection.[1] In various subsequent studies, intradermal injection has been shown to increase skin-lifting effects, shrink pores, increase skin tension, and reduce acne, sebum secretion, and sweating through eccrine glands.[2] Blocking the secretion of calcitonin gene-related peptide and vasoactive interstitial peptides has been shown to reduce flushing, induce collagen synthesis, and improve skin texture.[3]

However, intradermal injection can lead to complaints of pain as if it were "torn up." A possible drawback of intradermal BTX-A injection versus intramuscular injection is increased pain. BTX-A manufacturers recommend sterile physiological saline as a standard dilution solution, but more recent studies have shown that dilution with lidocaine is an effective way to reduce pain.[3] However, because the pH of lidocaine solution is about 6, it is weakly acidic and inevitably causes pain during injection. Therefore, mixing lidocaine with sodium bicarbonate increases the pH to 7.2, reducing the pain. Twenty patients (4 men and 16 women) between the ages of 32 and 45 years (mean, 36.9) underwent the procedure between January and March 2019 for the sole purpose of forehead wrinkle reduction. We used cocktails on the right side of the forehead and the standard dilution solution, normal saline, on the left side. The BTX mixture was prepared by mixing 3.5 cc of normal saline, 100 units of Botulax (Clostridium BTX-A, purified neurotoxin complex; Hugel, Seoul, Korea) and 0.5 cc of 8.4% $NaHCO_3$ in 2 cc of 2% lidocaine. The standard dilution method used 6 cc of normal saline mixture. Botulax (8.33 units) was injected intradermally into the sections marked in red in Figure 1 at 0.05 cc. Each patient was evaluated for VAS score for pain after injection. The VAS score for the right side was 2.1 (SD ±1.3), while that for the left was 8.9 (SD ±2.3). The pain in the right side of the forehead was dramatically reduced. However, lidocaine may exhibit neurotoxicity; a recent case of anaphylaxis was reported in a woman treated with BTX diluted with lidocaine. However, this was negligible because a very small amount was used. This study suggests that injecting BTX-A mixed with normal saline, lidocaine, and 8.4% sodium bicarbonate intradermally is effective and less painful. This is the first study that directly compares the pain using VAS scoring. However, further studies with more cases are necessary to obtain a more statistically significant outcome.

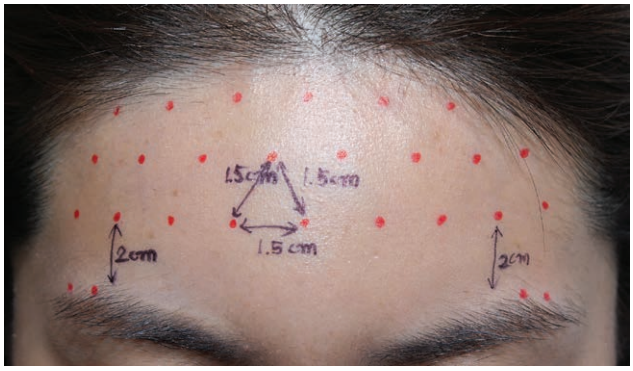

Fig. 1. Injection points of intradermal botulinum toxin (shown by red dots).

Gyu Sik Jung, MD
GLAD Plastic Surgery Clinic
31 Dongsung-ro 5-gil, 3rd floor
Jung-gu, Daegu 41941
Republic of Korea
E-mail: jksheart@naver.com

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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*From the *GLAD Plastic Surgery Clinic, Daegu, Republic of Korea; and †BEOMEO-ROSEE Dermatologic Clinic, Daegu, Republic of Korea.*

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