Reply to: "The effect of intradermal botulinum toxin on androgenetic alopecia and its possible mechanism"

To the Editor: We read with great interest the letter "The effect of intradermal botulinum toxin on androgenetic alopecia and its possible mechanism."[1] This study introduces a new mechanism on how botulinum toxin could influence androgenetic alopecia (AGA) through a down-regulation of the synthesis of transforming growth factor-β1, which is usually increased by dihydrotestosterone.

In our recently published systematic review summarizing the existing data on the use of botulinum toxin in alopecia,[2] the main mechanism of action reported by authors in AGA was a relaxation of the muscles of the scalp by reducing the muscular pressure on vessels, allowing a better oxygenation of tissues. Patients with AGA have usually a decreased partial pressure of oxygen in affected areas compared with the same areas of scalp in patients without AGA. A better vascular flow would also increase the conversion of testosterone to estradiol and the elimination of dihydrotestosterone from the blood, thereby decreasing alopecia.[2]

In their publication, Shon et al[1] state that the action of botulinum toxin is probably located at the level of the hair bulb and prefer to perform intradermal injections. They also assume that intramuscular injections may be effective thanks to a diffusion of the toxin to subcutaneous layers.

Our review[2] found that the only studies in which subcutaneous injections were performed with conclusive results concerned alopecia areata. In this case, the researched mechanism was a neuromodulator effect on the hair follicles through an action on peptides such as substance P and calcitonin gene-related peptide.

The authors performed injections every 4 weeks during 24 weeks with 30 IU in each session on 20 different sites. In the literature, the 2 studies that showed conclusive results in AGA reported intramuscular injections every 6 months with injected doses of 150 IU in 30 different sites per session (5 IU per 0.1 mL saline injected in each site).[3,4] In both studies, injections were performed into the frontalis, temporalis, periauricular, and occipitalis muscles. However, no improvement was reported with injected doses of 50 IU per session (2 IU per 0.1 mL injected in 30 sites).[5] The need of a higher dose to obtain efficacy may be explained by the need of toxin diffusion from the muscles to the superficial layers of the scalp.

With their protocol, Shon et al[1] obtained an improvement on phototrichograms, which is the gold standard to evaluate the efficiency of a treatment in alopecia. They showed that hair density was significantly improved after 6 months but not after 3 months. It would be interesting to see whether this effect is maintained after 1 year, to prove that the effect of botulinum toxin does not disappear when treatment stops.

In conclusion, we congratulate authors for this new axis of research, which we hope will lead to robust conclusions on the use of botulinum toxin in AGA, given that actually, all of the clinical trials with a high level of evidence that have been started in this field have not been published, either because they were not completed or because they probably did not show conclusive results.[2]

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