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ORIGINAL CONTRIBUTION

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The efficacy and complications of a new technique of Abobotulinum-toxin A (Dysport) injection in patients with glabellar lines

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Summary

Background: Abobotulinum- toxin A is used extensively for the treatment of frown (glabellar) lines.

Aims: The aim of this study was to evaluate the efficacy and complications of a new injection technique and to assess the amount of satisfaction in patients with the frown lines.

Methods: This cross-sectional study was conducted in 104 patients with moderate-to-severe glabellar lines. In the new technique by reassessing the responsible anatomic muscles of wrinkles, we tried to modify the injection technique of Abobotulinum-toxin A to yield more favorable results. The range and severity of frown lines were assessed by a 4-score test and a photograph taken before and 2 weeks after the injection. Patients were followed up to 180 days after injection.

Results: The response time of 87.5% of patients was within the first 48 hours and the remaining 12.5% showed the symptoms within the first week after injection. At 30 days after injection, the frown lines had disappeared in 88.5% of patients in static mode and 85.6% in mechanic mode. Maximum injection durability in the first 3, 4, and 6 months after injection was 82%, 52%, and 38%, respectively. The amount of complete satisfaction after 3 months was reported to be 86.5%.

Conclusions: This study indicated that the new injection technique of Abobotulinum-toxin A could be beneficial in the treatment of frown lines with more satisfactory results, especially in those patients who were not contented with the present conventional method.

KEYWORDS

Abobotulinum- toxin A, Botulinum toxin, Dysport, glabellar lines

1 | INTRODUCTION

Botulinum toxin has many applications in medicine. In dermatology, it is most frequently used for the treatment of frown lines approved by US food and drug administration.[1,2] This neurotoxin protein acts at the neuromuscular junction by inhibiting the release of acetylcholine into the nerve endings, which causes weaken the contraction of the facial muscles and consequently result in the decrease in glabellar lines.[1,2] It has predictable results in the upper one-third of the face with temporary reduction in the dynamic lines and few adverse effects.[1-3]

Abobotulinum- toxin A (.Dysport) is approved for the treatment of rhytids in patients 18-65.[2]

In most studies, the conventional injection technique for the treatment of glabellar lines is in 5 points with a dose of 10 s.u/0.05 mL in each point. To reduce the effect of eyelid ptosis,

injection area is selected at least 1 cm over the orbital ridge.[4,5] As the method could attenuate lower part of frontalis muscle fibers, it increases the risk of brow tip ptosis and despite taking the required cautions and measures, the risk of eyelid ptosis and brow tip ptosis is reported so that are technique-dependent.[1,4-7]

Given that, finding a more appropriate method of injection as improves injector skill could contribute significantly to the reduction of complaints and increase in patients' satisfaction.[1,4,7-11] Hence, by reassessing the responsible anatomic muscles of wrinkles, we tried to modify the injection technique of Abobotulinum-toxin A to yield more favorable results. Thus, this study is conducted with the aim of evaluating the efficiency and the probability of occurrence of complications in novel Abobotulinum-toxin A injection technique in patients with glabellar lines, especially those who were not completely satisfied with the results of the conventional technique.

2 | MATERIALS AND METHODS

A total of 104 patients who referred to the clinic from April 2013 to April 2015 were selected for this cross-sectional-descriptive study.

Patients, both male and female, aged 25-55, had moderate-to-severe glabellar lines at maximum frown (Table 1). They were followed up to 180 days after injection. The classification of patients was made based on standard clinical grading. Glabellar Line Severity Score (GLSS) has the range of 0-3 (0 stands for none, 1 for mild, 2 for moderate, and 3 for sever glabellar line).[4,12] GLSS 0-3 post injection was assessed at rest and maximum frown by taking some photos.

A total of 49 patients, not satisfied with the result of the conventional injection technique, were included in the study. Exclusion criteria were the presence of eyelid ptosis, scar in the glabellar area, facial nerve paralysis, gel injection, neuromuscular disorders (eg, myasthenia gravis), and treatment with drugs which affect the neuromuscular performance, including aminoglycosides, pregnancy, and lactation.[1] A photograph was taken of wrinkles in both static and mechanic status before and after the injection. The levels of satisfaction were recorded based on the Visual Analog Scales. The obtained results, including onset of action, its duration, level of patient's satisfaction, complications, and undesirable findings, were recorded. For those patients who had experienced the conventional technique of injection, new results were recorded and the results of previous injections were compared with the new one in terms of duration and satisfaction levels. A consent form in which the new technique was described was consciously signed by all the patients, and ethics code was achieved from the department of research at Kerman University of Medical Sciences. (10/61/7601).

TABLE 1 Glabellar line severity score of patients before injection based on Glabellar Line Severity Score (GLSS) system

	Number	Percent
Grade 1	15	14.4
Grade 2	77	74.0
Grade 3	12	11.5
Total	104	100

3 | INJECTION TECHNIQUE

According to the confirmed guidelines,[4,12-14] each vial of Abobotulinum-toxin A, containing 500 units, was diluted with a volume equal to 2.5 mL of injectable saline solution without preservatives, in a way that the dose of drug reached 10 s.u/0.05 mL. A volume of 10-20 units was prepared for each injection point with the overall dose of 45-60 units concerning the mass and thickness of the reached target muscle.[1] The severity of frown line was defined according to the GLSS system for each patient.

We firstly asked the patient to frown to specify the corrugator muscle line, the needle tip passed through the muscle sheath just from the nasal side of the brow tip. Then the whole length of the needle entered throughout the specified path upward and lateral on the eye brow length. In some cases which the needle did not reach the lateral end of the glabellar muscle we had an additional injection with the same gradual technique which is performed on the upper eye lid according to the picture. (Figure 1) Afterward, the patient was asked to frown once more and by the increase in the tingling sensation, we could be ensured that the needle is in the muscle sheath. Gradually and along with the injection, the needle tip was removed from the muscle, in a way that the last volume of 0.1 cc injected more deeply in the nasal section. The opposite muscle was also injected similarly and the third injection was carried out in Procerus muscle in the midbrow region in the nose root.

The patient was asked to frown more in the first hours after the injection. Two weeks after the injection, an image from the patient's injection area was taken and findings were recorded based on GLSS and the satisfaction level according to the Visual Analog Scale System.

4 | RESULTS

Most of the total 104 patients included in the study were female (88.5%). The mean (standard deviation) age of patients was 34.7 (SD = 8.5). Forty-nine of patients had previously experienced the conventional technique of injection (in 3 or 5 points). Two weeks after the operation, the frown lines of 88.5% of patients improved significantly and were in the range of 0-1 of the GLSS system and the rest of them were in grade 2. The final assessment was conducted within 180 days after the injection. The amount of complete satisfaction after 3 months was reported to be 86.5%. The average time to response onset (stabilized and static frown lines) was 24-48 hours after the injection and the average time to hit the peak was between 10 and 14 days after the injection (84.6 in the first week and 15.4% in the second).

The response time of 87.5% of patients was within the first 48 hours and 12.5% showed the symptoms within the first week. At the end of the first 30 days after the injection, the frown lines had

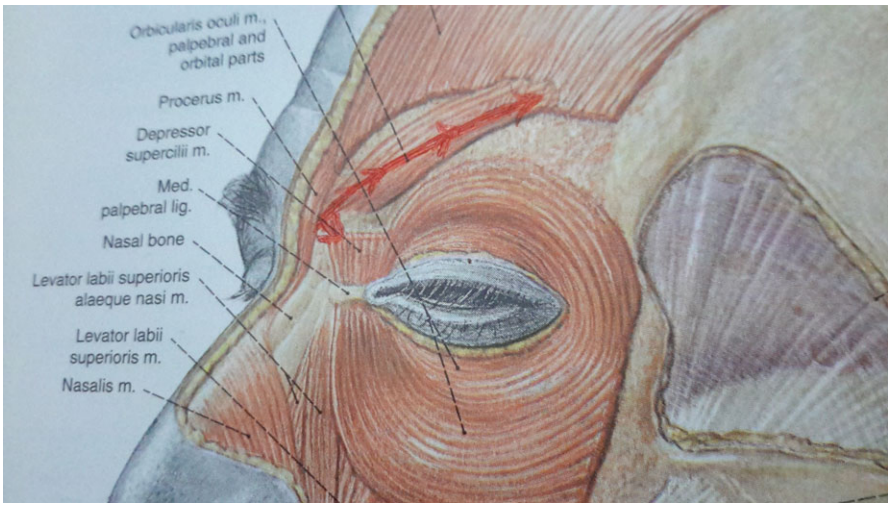

FIGURE 1 Abobotulinum-toxin A Injection sites in the new technique

disappeared in 88.5% of patients in static mode and 85.6% did not have visibly frown in mechanic mode. Table 2 demonstrates the ranges of treatment response ranges at 30, 120, and 180 days after the injection.

Maximum injection durability in the first 3, 4, and 6 months was 82%, 52%, and 38%, respectively. Although from among the 49 patients with a prior Abobotulinum-toxin A injection record, 16% had experienced a brow tip ptosis and 4% suffered from an eyelid ptosis, none of the above-mentioned complications was observed in the new method, and the only common injection side effects were redness and bruise at the injection site (50%) and headache (10%). The most important complication was an eyelid ptosis in only one patient, noticeable in the related image, and a report of complaint concerning a frontonasal deformity, visible in the related image. A patient complained of vertical diplopia that lasted for 2 weeks, and three of them complained about a dry and scaling forehead skin which had occurred following the injection in that area.

5 | DISCUSSION

This paper indicated that the new injection technique of Abobotulinum-toxin A could be efficient in treatment of glabellar lines, especially for those who were no satisfied with the result of the conventional injection. The amount of complete satisfaction 3 months after the injection was 86.5%, which was more than the corresponding figure of Rzany et al's study (72.4%).[4] In the conventional method, 3 or 5 points are used for injection, one in the middle of procerus muscle at midbrow region, two in each side right over the medial canthus, 1 cm over the orbital ridge, and the last two are carried out in mid pupillary line. In some cases, it is more preferable to perform the last two injections more toward the mid pupillary line to prevent eyebrow ptosis.[4]

TABLE 2 The responder rate(defined as percentage of patients with no or mild wrinkles) on Days 30,120, and 180 postinjection

	Day 30	Day 120	Day 180
At maximum frown (%)	85.6	72.1	29.8
At rest (%)	88.5	78.8	14.4

To decrease the risk of complications, like eyelid ptosis, injections are performed at least 1 cm over the orbital ridge.[4] The medial frontalis muscle fibers are exactly next to the medial section of eyebrow. Thus, with such an injection distance, the frontalis muscle might be involved and cause a downward brow tip ptosis, formation of puffiness mode under the eyelid skin of brow tip, and reduction patient satisfaction. In the new technique, as the injection is carried out directly and ingested gradually into the glabellar muscle sheath and due to selection of the injection line just on the eyebrow margin, the possibility of involvement of medial frontalis muscle fibers is reduced and no patient has complained of this issue in his/her photograph or report and no such sign is recorded. as the depressor supercilii muscles is parallel to and lower than the corrugator muscle and is actually a part of orbicularis muscle fibers in the nasal section, the injection should be performed in a way that an appropriate distance with fibers will also engage this part of muscle through Botulinum toxin molecules to enhance the efficiency rate and time. The reason why some patients who experienced the conventional method could improve their frown lines only partially or get the symptoms back sooner than the excepted time might be the selection of injection site 1 cm above the orbital ridge and disengagement of depressor supercilii muscle fibers. However, if the injection is carried out a little lower and completely inside the sheath of corrugator muscle with gradual flow of ingestion, not only the drug accumulation in one point and the possibility of its release under septum toward the levator muscle (eyelid lifter) is subsequently prevented; but also, the possibility of having an eyelid ptosis is decreased, and the ends of corrugator muscle fibers are also engaged up to the end of the muscle sheath.

Despite providing the required arrangements, namely the conventional 3-5 point techniques and 1 cm distance from the orbital ridge, several studies have reported a 3%-5% prevalence of eyelid ptosis. Among 104 patients, 49 had experienced Abobotulinum-toxin A injection with the conventional method, among whom 4% had eyelid ptosis and 16% had brow tip ptosis, while the new technique did indicate no complications in these areas. Overall, among 104 patients, one suffered from an eyelid ptosis, which was obvious in

the photograph and a patient complained of heave eyelid in the right eye, which was not visible in the photographs. As the Abobotulinum-toxin A is taken gradually by the synaptic terminal within the next 48 hours, the patient must be instructed not to massage the area or wash it with warm water to prevent the loosening and spread of drug to the adjacent muscles.

As the ptosis problem (droopy eyelid) had occurred in a man, it could be due to the fact that most men have bigger corrugator muscles than women and this phenomenon asks for a higher volume of injection, in a way that 50 units are enough for the frown muscles of women, but the minimum volume required in men is 70 units.[7] In addition, the midbrow distance and crease in men are less than women, so the distance between corrugator and lavator is less in men than in women and the possibility of drug spread and its penetration in to the lavator muscle is higher. It is highly recommended to put the tip of the finger under the medial section of the eyebrow during the injection process to prevent the random release of Abobotulinum-toxin A to the lower tissues.

During injection, as Abobotulinum-toxin A has more permeability and is more spreadable than Botox, some arrangements, such as avoiding volume increase in certain points, should be made. We believe that using the modern technique of injection, a more extensive research is carried out and by considering the required mentioned arrangements, the amount of success and probable unwelcome side effects are studied to be able to report the obtained results with more accuracy and reliability for future studies and prepare a more applicable manuscript for our colleagues and researchers.

We acknowledge that the present study had some limitations; applying this injection technique would require a high level of expertise so that we had to find the specialist with sufficient experience with this procedure. Some patients did not refer to us again at the prescribed time to take the follow-up photographs which almost all of them expressed the satisfaction with the injection and no need for further reference as the reason. We attempted to convince them for more cooperation and referring for taking the photographs.

Despite these limitations, this study introduced the novel injection technique of Abobotulinum-toxin A that could be efficient in treatment of glabellar lines, especially for those who are not satisfied with the result of the conventional injection.

6 | CONCLUSIONS

The results obtained from this study revealed that the injection of Abobotulinum-toxin A by the new technique could be efficacious in the treatment of the glabellar lines, especially for those who were not satisfied with results of the conventional injection method.

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