

Dynamic Forehead wrinkles management in South Indian Population using Botulinum Toxin Type A - A Case series

¹Dr. Hareesh Veeramalla, Senior Resident, Department of Oral & Maxillofacial surgery, Government Dental College and Hospital, Hyderabad

²Dr. B. Pavan Kumar, Prof & Head, Department of Oral & Maxillofacial surgery, Kamineni Institute of Dental Sciences, Narketpally

³Dr. Vidya Devi, Senior Lectures, Department of Oral & Maxillofacial surgery, Kamineni Institute of Dental Sciences, Narketpally

⁴Dr. B. Vinay Goud, Senior Resident, Department of Conservative Dentistry & Endodontics, Government Dental College and Hospital, Hyderabad

Corresponding Author: Dr. Hareesh Veeramalla, Senior Resident, Department of Oral & Maxillofacial surgery, Government Dental College and Hospital, Hyderabad

Citation of this Article: Dr. Hareesh Veeramalla, Dr. B. Pavan Kumar, Dr. Vidya Devi, Dr. B. Vinay Goud, “Dynamic Forehead wrinkles management in South Indian Population using Botulinum Toxin Type A - A Case series”, IJDSIR-September - 2020, Vol. – 3, Issue - 5, P. No. 228 – 232.

Copyright: © 2020, Dr. Hareesh Veeramalla, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. Which allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Botulinum toxin type A is the most popular non-surgical aesthetic treatment worldwide. Botulinum toxin has been used for more than 20 years to treat the facial wrinkles and has become the treatment of choice for dynamic wrinkles occurring in the upper third of the face. In this paper we present our experience with a series of patients treated with Botulinum toxin type A along with a discussion on the sites, dosage, duration of action and complications.

Introduction

Botulinum toxin injection is widely used to treat a variety of hyperfunctional facial lines. The safety and efficacy of Botulinum toxin for the treatment of upper facial rhytides,

including the forehead. Invasive and non invasive facial aesthetic procedures are becoming common in Oral and Maxillofacial Surgery. Apart from invasive surgical procedures many patients choose rejuvenation with injections such as Botulinum toxin type A. Surgical procedures are invasive which requires skill, expertise of the operator and extensive clinical training with prediction of future after surgery. In regard to patient cosmetic surgery is a costly affair which involves pain and hospital stay; which lead to the discovery of non-invasive procedures for improvement of aesthetics. In the expanding era of non-surgical treatment modalities, Botox has emerged as a boon for both clinician and patient¹.

Case Report

Our patients had mild or moderate forehead wrinkling prior to treatment, and were treated by 5 to 25 units of Botulinum toxin. Treatment was standardized to include 2 to 6 intramuscular injection sites (midpupillary line, halfway between the eyebrows and the hairline)

Case 1: In this case, a 35-year old male with moderate forehead wrinkling was treated by Botulinum toxin. One day after therapy, there was excellent reduction in wrinkling. In this patient botox injection given 6 sites and 30 units on forehead. Wrinkles appeared on 8th month. (fig 1)

Case 2

This 32 year-old male had moderate forehead wrinkling prior to treatment. Decrease of upper forehead wrinkling with appearance of lower frontalis was shown one week after treatment. In this patient botox injection given 6 sites and 30 units on forehead. Wrinkles appeared on 8th month. (fig 2)

Case 3

This 34 year old had minimal forehead wrinkling in dynamic state post operatively, there was slight oedema on site of injection. One day after therapy, there was excellent reduction in wrinkling. Botulinum toxin injection given 4 sites and 20 units on forehead. Wrinkles appeared on 8th month. (fig 3)

Case 4

This 50 years old male had moderate forehead wrinkling prior to treatment. One week after therapy, there was excellent reduction in wrinkling. Botulinum toxin injection given intra muscularly 6 sites and 30 units on forehead. Wrinkles appeared on 7th month. (fig 4)

Case 1 (Fig 1)



Case 2 (Fig 2)



Case 3 (Fig 3)



Case 4 (Fig 4)



Discussion

The forehead is the upper third of the face defined as extending from the hairline to the glabella and the supra orbital ridge, extending laterally till the temporal ridges¹. However since the eyebrows and eyes along with the forehead and glabella, play a role in forming facial expressions and conveying emotions, in terms of rejuvenate procedures, they are often considered as a unit². The underlying skeleton of the forehead region is formed by the frontal bone and more superiorly the parietal bone. The muscles of the forehead are divided according to their function as elevators or depressors. The medial and lateral elevators are the frontalis muscles. The medial depressors

are the corrugator supercilli, procerus and the depressor orbicularis oculi, whereas the lateral depressors are the lateral fibers of the orbicularis oculi muscles².

The sensory innervation of the forehead includes the supra orbital, supratrochlear and zygomaticotemporal nerves. The main motor nerve is the frontal branch of the facial nerve. Other anatomical structures such as the retro-orbicularisfat, the periosteum of the forehead, medial fat herniation of the upper lid and the laxity of the lateralcanthal ligaments play a major role in upper face aesthetics². Ageing changes in the skin can be caused either due to chronological or internal changes or external ageing processes. With intrinsic aging, skin loses its regenerative capacity and shows increased collagen breakdown. There is also decreased skin barrier function from loss of effectiveness in cornification of the stratum corneum, the outermost layer of the epidermis, responsible for protecting the underlying layers from moisture loss and mechanical stressors. In extrinsic aging, photo aging secondary to ultraviolet (UV) irradiation exposure is the largest culprit. This senescent change within the skin leads to the appearance of fine rhytids and skin laxity¹.

The most popular indication for BTX usage has been for cosmetic purposes in the form of intramuscular injections to reduce wrinkles. The cosmetic potential of BTX-A was first explored in the mid-1980s in the treatment of hyper-functional facial lines. The majority of peer-reviewed reports in the literature focus on the original formulation of BTX-A: Botox Cosmetic. Since then, BTX-A has been used to temporarily treat glabellar lines and other hyper-functional facial lines such as horizontal forehead lines, lateralcanthal lines 'crow's feet', platysma bands and perioral lines. BTX has also been used for the reduction of platysmal bands. Other sites treated include the vertical lip rhytids (lipstick lines) with minimal improvement and good patient satisfaction but perioral muscular palsy was

reported in some cases. It has also been indicated to reduce scarring in lacerations or incisions by reducing the muscle pull acting on wound. Botox has also seen some use in the management of masseter and temporalis hypertrophy causing asymmetry³.

BTX also plays a therapeutic role in the management of the disorders resulting from muscular hyper-function like focal dystonia, vocal tics and stuttering, cricopharyngeal achalasia, various manifestations of tremor, hemi-facial spasm, temporomandibular joint dysfunction, bruxism and masticatory myalgia. It has also been indicated in implantology for the reduction of muscle action after the placement of immediate loading implants and in management of gummy smiles caused by hyper-functional lips, vertical rhytids in the upper lip and chin dimpling. It has been indicated in facial nerve palsy for the management of palsy induced asymmetries and in treating sialorrhea and focal hyperhidrosis of the palms, soles, axillae and facial areas. BTX was also found to be promising in management of postoperative wound pain including reconstructive facial and oral surgery, traditional and endoscopic sinus surgery, TMJ surgery and blowout fracture repair³.

BTX is contraindicated in pregnancy and breastfeeding, disorders of the neuro-muscular junction (myasthenia gravis, amyotrophic lateralizing sclerosis, myopathies) and theoretical drug interactions (aminoglycoside antibiotics, quinidine, calcium channel blockers, magnesium sulfate, succinylcholine, and polymyxin). Other reported contraindications are Eaton-Lambert syndrome and hypersensitivity to BTX or one of its ingredients³.

The cosmetic use of BTX in upper facial rejuvenation involves treating hyper-functional lines in the face allowing the clinician to relax the muscles responsible for producing the lines rather than just treating the appearance

of the lines. Successful cosmetic use of BTX-A depends on a thorough understanding of the basic principles of BTX-A therapy as well as access to specific guidelines for its use in facial musculature. These principles include dilution and handling of BTX-A, contraindications and precautions, general injection guidelines, typical time course of effect, and patient education.

Although there are several brands of Botulinum toxin A available and used for esthetic purposes around the world, Botox is the most commonly used brand. Botox is available as 100 units or 50 units. Each 100 U volume of Botulinum toxin contains additional 0.5 mg of human albumin and 0.9 mg of sodium chloride in a sterilized, vacuum dried form without a preservative⁴.

The dosage is based on the biologic potency of the toxin and is expressed in units. The lethal oral dose in humans is estimated at 3000 to 30,000 U. A 100-U vial of the preparation contains 5ng of toxin as lyophilized powder, 0.5 mg of human albumin and 0.9 mg of sodium chloride in a sterilized, vacuum-dried form without a preservative⁴. Because the preparation is in powder form, it needs to be reconstituted before the injection. Most formulations of BoNT-A are stored as powders that are reconstituted as recommended by the manufacturers, with sterile, non-preserved saline. However, compelling evidence now suggests that reconstitution using preserved saline dramatically improves patient comfort without compromising efficacy. In addition, aggressive reconstitution may reduce efficacy

The recommended diluent is 0.9% saline without preservatives. Ghersetich et al in his review noted that dilutions have varied from 100U/ml to 10U/ml (equivalent to diluting with 1ml to 10ml, relatively), but that there was a general consensus that 40 U/ml (4 U/0.1 ml) is the most versatile and useful concentration. He notes that in general, high concentrations (low dilutions) mean low

volume injections, with a more precise placement of the toxin and scarce diffusion, whereas low concentrations (high dilutions) may be helpful when a certain grade of diffusion is needed but may show a shorter duration of action. Using high concentrations, and hence small volumes, also reduces pain at the injection site. Because the range of transient denervation due to the spreading of the toxin is proportional to its dilution, lower dilutions reduce the risk of unwanted effects^{5,6}. Hsu et al⁴. Also suggested that the ideal strategy may be to inject concentrated toxin at a low volume to target smaller muscle groups, while using a larger volume for larger, broad muscle groups, such as the frontalis muscle⁷. Once reconstituted, Botox should be refrigerated between usages. There is controversy regarding the amount of time it should be stored, ranging from 4 hours to 6 weeks. The concern is not only about the relative effectiveness of the product, but also about sterility⁵.

References

1. Ko AC, Korn BS, Kikkawa DO. The aging face. *Surv Ophthalmol.* Elsevier Ltd; 2017;62(2):190–202.
2. Ilankovan V. Upper face rejuvenation. *Int J Oral Maxillofac Surg.* International Association of Oral and Maxillofacial Surgery; 2013;42(4):423–31.
3. Majid OW. Clinical use of botulinum toxins in oral and maxillofacial surgery. *Int J Oral Maxillofac Surg.* International Association of Oral and Maxillofacial Surgery; 2010;39(3):197–207.
4. Ana Paula De Sa Earp. The Five D's of botulinum toxin: Doses, dilution, diffusion, duration and dogma. 2008;10:93-102.
5. Salti G, Ghersetich I. Advanced botulinum toxin techniques against wrinkles in the upper face. *Clin Dermatol.* 2008;26(2):182–91.

6. Bassichis BA. Cosmetic use of botulinum toxin in the upper face. *Oper Tech Otolaryngol - Head Neck Surg.* 2007;18(3):248–53.
7. Hsu TS, Dover JS, Arndt KA. Effect of volume and concentration on the diffusion of botulinum exotoxin A. *Arch Dermatol.* 2004;140:1351–4.