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REVIEW

Application of Botulinum Toxin Type A Injection: A Review

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Abstract

Background: Type A botulinum toxin is used for cosmetic “face” procedures, primarily to alleviate problematic wrinkles and furrows. Botox is used to treat and improve the appearance of facial wrinkles and fine lines. Botox is the most common therapy for the glabellar, rhytid, horizontal forehead, and lateral peri-orbital wrinkles, sometimes known as “crow’s feet.” Botulinum toxin type A is a reliable method for enhancing the appearance of the upper and lower face during cosmetic facial procedures.

Objective: The aim of this review was to analyze the clinical outcomes, uses, composition, indication, side effects and overall things related to Botulinum toxin type A injection.

Conclusion: Botox indications choice from recognized functional treatments, particularly in laryngology and ophthalmology, to more recent cosmetic applications. Botox shouldn’t be utilized in people with known neuro-muscular abnormality or allergy to any of the elements in the formulation. The neurological illnesses such myasthenia gravis, sclerosis, amyotrophic lateral, Lambert Eaton syndrome mostly not advised to used Botox, the reason related to long-term effects. The pregnant female, nursing mother don’t suggested used Botox, but no evidence improve the Botox is teratogenic consequence for the human. The patients used quinine, aminoglycoside antibiotics, calcium channel blocker, must be avoid injected.

Keywords: Botulinum, Toxin type A injection, Botux, Neurotoxins

1. Introduction

Oral-maxillofacial surgery is increasingly incorporating for invasive, non-invasive “facial cosmetic procedure”. Botulinum toxin type A are accepted among patients looking for rejuvenation alternatives to invasive surgical procedure [1]. Botulinum toxin type A is used for cosmetic “face” mostly to treat troublesome wrinkles or furrows. Botox used for treating and improving the appearance of presented fine lines, wrinkles on the face [2, 3]. The most typically treatment of the location present “frown lines” horizontal forehead, rhytids, glabellar and lateral

peri-orbital wrinkles “crow’s feet” is Botox. The solid technique for improving the aesthetics in the upper, lower part of the face by using botulinum toxin type A in cosmetic facial operations. When the compared to placebo, that found the use of Botulinum toxin type A in non-surgical cosmetic procedures for the face the high rates results in of improvement within early onset and prolonged duration of activity [for 4 months or more for some cases] [4]. The face changes within the age, the change following the loss of volume and suppleness in the facial skin, the tissues may be slide lower with gravity. The results in the production of wrinkles and fine lines around the eyes, mouth. This is

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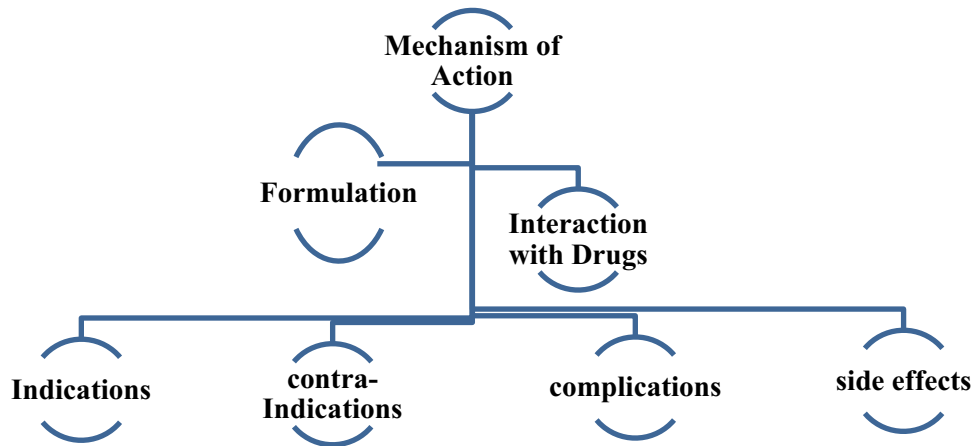


Fig. 1. Diagrams demonstrate all related to the botulinum toxin type A.

due to hyperdynamic contraction of the under-lying muscles in these locations, related to muscle contracts, the under-lying skin folds [perpendicular to its direction] [5]. This produces a dynamic wrinkle that can be addressed within botulinum toxin type A [6]. The jaw line may be sag within age, and more stagnant wrinkles emerge as a result of under-lying fat displacement and long-term skin folding. The soft tissue maturation, smoking habits, muscular facial activity, and solar changes all contribute to facial aging [5]. Botulinum toxin has demonstrated hopeful effects in softening dynamic wrinkles, and it can be used as a first-line treatment or as a “test drive” for a more permanent surgery [7], in this paper, will review all related to the botulinum toxin type A (Fig. 1).

2. Mechanism of action of Botulinum toxin type A

Typically, voluntary muscular contraction occurs by stimulation through action potentials traveling along a axon of the neuron to the muscle end plate. The action potentials reach a synapse “neuromuscular junction”, they oblige an invasion of calcium into the cytoplasm “nerve terminal”. Acetylcholine is mobilized towards the synapse [8]. Acetylcholine merges toward membrane of the nerve terminal after that crosses the synapse to cooperate with receptors on muscle fibers, for contraction, botulinum toxin type A acted to blocked acetylcholine release into the synapse by strap to the neuron at the neuromuscular junction. The poison is ingested through receptor-mediated “endocytosis”, to form in the nerve ending a vesicle with toxin-containing. These internalized vesicles block the acetylcholine “protein”. This process act for slow muscular contraction, that causes reversible muscle atrophy [9]. The preliminary termination of

muscle function can be note after “2–3 days”, the maximal effect notes after “2 weeks”. Botulinum toxin type A is permanent connecting to the nerve, that lead to muscle function is restored through axonal nerve “bud growth” to the target muscle and muscular end plate re-production. Clinically significant reductions in muscular contraction last for “4 months” in the glabellar lines, up to “6 months” in the frontalis region, depending on characters variation [10, 11] that efficiency of botulinum toxin type A made it the most popular non-surgical cosmetic procedure performed worldwide [12]. The experienced clinicians usually used botulinum toxin type A off-label to progress rhytid look and harmony of the face [13].

3. Botulinum toxin type A formulation

It found in “3 commercially accessible formulations” that have been Food and Drug Administration permitted for cosmetic use: Ona-botulinum toxin A. {Botox; Allergan Inc.}, Dysport {Galderma Laboratories}, and Xeomin {Merz Pharmaceuticals, LLC}. These formulations have been official by the Food and Drug Administration for the transitory improved in the shap of glabellar rhytids in individual aged “18 to 65” [14–16]. Botox{Ona-botulinum-toxin A} is the only {Food and Drug Administration} approved medication to treat lateral canthal lines [14]. All cosmetic uses of these compositions have been consider off-label. The typical effects of botulinum toxin type A lasts “3–6 months” [14–16]. The three medication differ in onset time, potency, and duration of action [17]. The unit dosing for all “3 formulations” is not interchangeable, with the most noticeable distinction being between Dysport and the two formulations {Botox and Xeomin} [14–16]. Botox, Xeomin are administered in comparable unit values, however Dysport takes

2.5–3 times its own unit value {Speywood units} to obtain the same outcome [14–16]. Botox quantities utilized in esthetic are typically small enough and there is no appropriate drug-drug interactions have been reported [18].

4. Botulinum toxin type A interaction with drugs

Botox improved nonetheless interacted with other medications that interfere with neuromuscular transmission. Aminoglycosides {gentamycin}, D-penicillamine, cyclosporine, muscle relaxant [curare-type non-depolarizing blockers, succinylcholine], aminoquinolones, magnesium sulfate, quinidine, and lincosamide may all interfere with Botox's effects [18, 19].

5. Botulinum toxin type A indications

Botulinum toxin "Dysport" is used cosmetically "face" mostly to treat trouble-some wrinkles, furrows while Botox improvement the appearance wrinkles and fine lines "in the face" [20], the most typically treated of horizontal forehead rhytids, glabellar "frown lines", and lateral periorbital wrinkles {crow's feet} [21]. Significant sun exposure, smoking can stimulate premature aging, energetic women in age "late twenties- early thirties" to try to find Botox [22]. Its utilize in younger individual may reduce occur wrinkles or prevent from developing [23]. The Botox significance choice from recognized functional treatments, particularly in laryngology and ophthalmology, to more recent cosmetic applications [24]. Pharmacological "Botulinum toxin type A" has an excellent safety confirmation, as opposed to the severe presentation of systemic botulism caused by food poisoning [25]. The practitioner and the patients must be educated about the type of treatment before undergoing to cosmetic operation by used botulinum toxin type A to avoid disappointment. The typical treatment of the face area to make available a natural appearance with relaxed in progress treatment procedures [26]. Botulinum toxin type A diminished the mimetic folds and effects of wrinkles, that make important used in areas with dynamic motion, such as the frontal region, glabella, and peri-orbital lines. Wrinkles "static" and folds "very deep" can be treated by combination botulinum toxin type A between with other injectable "hyaluronic acid", the safest sign "dynamic wrinkles" present in upper part of the face, the area of the existence of rhytids act depend on balance between elevator and depressor muscles [27]. The gummy smile "perioral area" must be used bo-

tulinum toxin type A coupled with hyaluronic acids [10, 11]. Another clinical application were used for children two years of age or older with cerebral palsy may have the dynamic equinus foot deformity, the torticollis spasmodic spasticity after a stroke, but the patient's active and passive function, level of pain, secondary effects of unwanted muscular overactivity, and quality of life must all be weighed against the dangers of treatment before deciding whether to start them on botulinum toxin [22].

6. Botulinum toxin type A contraindications

Botox shouldn't be utilized in people with known neuro-muscular abnormality or allergy to any of the elements in the formulation. The neurological illnesses such myasthenia gravis, sclerosis, amyotrophic lateral, Lambert Eaton syndrome mostly not advised to used Botox, the reason related to long-term effects [28]. The pregnant female, nursing mother don't suggested used Botox, but no evidence improve the Botox is teratogenic consequence for the human [29]. The patients used quinine, aminoglycoside antibiotics, calcium channel blocker, must be avoid injected [30]. Individual with rely expression "actors and politicians" may be avoid, the individual suffered with lid ptosis must be know about the therapy and must be avoid injection if the exacerbation is undesirable, or the individual with previous lid ptosis due to uses Botox should not try injected same area for a second time [31]. The people "age more than of 75" that need injection Botox for esthetic haven't been extensive examined, they are treated by injection initiated conservatively by making precautionary measure pay compensation for more incidence of undiscovered medical illnesses, neurologic, the increased chance of other medication "drug" therapy interactions, and the greater inclination of older individuals to functional problems [32]. Other contraindications keloidal scarring, neuromuscular disorders, botulinum toxin allergies, body dysmorphic disorder and amyotrophic lateralizing sclerosis myopathies [32].

7. Complications Botulinum toxins type A and how to avoid them

Botulinum toxins type A have been utilized for years to rejuvenate the top face "cosmetic". Botulinum toxin type A is mostly utilized to treat wrinkles on the upper face [33]. Although infrequent, problems in this location may be note with the use of botulinum toxin type A. The most common adverse event is a "bruise" on the lateral canthal portion [34]. Botox injections for the upper face are extremely safe

and effective, with the modest dosages used for cosmetic purposes, significant adverse consequences are infrequent [35]. Cosmetic Botox side effects are typically temporary, modest, and may include swelling, bruising, and soreness “near area of injection”, in addition to that may be occur a mild headache and flu-like symptoms [36]. At the injection site may be ecchymosis is the most common consequence, causing bruising in approximately 15% of patients [37]. In general bruising get rid within “10 days”, practitioner should be care during injection the “subcutaneous layer and avoiding the capillaries close to the orbicularis oculi” and avoid high concentration and dose for reducing side effect [38]. A few people may experience a temporary headache “generalized body aches” that lasts “24-72 hours” after taken the injection, other serious unfavorable effects such as dyspnea, anaphylaxis, urticaria, and soft tissue edema mostly not occur; however, if it appears, quick standard therapy should be under-taken [39]. After take the Botox and diffusion into zygomaticus major muscle may be occur asymmetric smile are “all possible upper-face issues”, lower eyelid laxity, Eyelid ptosis, diplopia, epiphora, brow ptosis, dry eyes, a quizzical or cock eyed expression [40]. The using Botox for treatment the “crow’s feet” that effect on zygomaticus major palsy may caused lip droop, method for minimize this stat by limit inferior crow’s feet injections and made superior most portion of the zygomatic arch that lead to avoid deep injections [41].

Brow asymmetry, blepharoptosis, persisting after a touch-up. Brow ptosis, ectropion, diplopia [41, 42], lagophthalmos, and xerophthalmia are all of them may be possible side effects of botulinum toxin type A. Botulinum toxin type A effwcted for the frontalis muscle when the muscle is weak, brow ptosis is a common consequence; incorrect injection site, incorrect patient selection or large dose that may caused brow ptosis [43]. Also the masseter muscle may became hypertrophy, abnormal facial expression like smile limitation, artificial grin, sunken cheek, altered facial look, disappearance of preexisting dimple, and sunken temporal fossa have been recorded these appeared due to injected higher dose from botulinum toxins type A, this signs contumous for “2-4 weeks” and can be resolve within “1-2 months” To get rid from these signs place the Botox at a deep level and keep it at least “1 cm” away from the anterior border of the masseter muscle. Botox sign appear after injected the glabellar with botulinum toxins type A, the smiling may aggravate or appear nasal lines, this sign can treated by modest dose injection laterally to the levator-nasi muscle [33].

Lower face issues can be disappeared by treating horizontal lines and vertical neckbands with

botulinum toxin type A, but complications are still common. After injecting botulinum toxin type A, you may have dysphagia, hoarseness, and neck paralysis [44]. Because the muscles behind neckbands control neck flexion, phonation, and deglutition, deeper injections, greater dosages of botulinum toxin type A can cause dysarthria, xerostomia, dysphagia, and neck weakening [45].

Peri-orbital complications Botox injection may generate discarded adverse effects due to poor injection location, the localized diffusion of administered Botox into functionally related muscle fibers. Botox’s nearby spread is predisposed by the diffusion of un-bound botulinum toxin type A via the “extra-cellular matrix”, the concentration gradient in this space, the anatomical and physical boundaries in the injected location, the injection mechanics and the volume injected. Localized diffusion has been shown to occur up to “3 cm” from the area of injection [46]. Botox “local” diffusion can be most clinically significant in peri-orbital injections, when functional and esthetic issues can come to pass. In per-iorbital therapy, any signs of pre-injection eyelid impairment, such as lower lid ectropion, upper lid ptosis, or a weak lower lid snap test, entropion, a history of dry eyes, must also be renowned [47].

Botox induced lid ptosis can come into sight within “48 hours” or up to a week following injections, and it can remain for weeks [48]. It in general resolves between “2 to 6 weeks”, with Botox’s cosmetic benefits outweighing the unlikable eyelid symptoms. Sub-clinical eyelid ptosis may go unobserved at first and only become apparent after “weariness or at the end of the day”. Previous the lid ptosis may become {un-masked} once the frontalis muscles may be paralyzed and the patients may no longer pay compensation for the ptotic lid with habitual brow raising [49]. Peri-oral complications may be develop, upper lip weakness has been linked to the therapy of melo-labial folds. Due to the incongruously high prevalence of upper lip ptosis, the incapacity to smile, most practitioners have addressed deep “melo-labial fold” with non-Botox therapy methods [50]. Also other complication in peri-oral region can also result from oral commissure, chin, and per-ioral injections. Chin “dimpling or peaud’orange skin” can be get rid with injection to the medial mentalis muscle which placed too far laterally that can be causes paralyze the “depressor labii muscle” and may be causing lower lip droop, weakness [51]. Injections into the depressor angulioris muscle, “laterally above the jaw”, can be used to make available modest elevation of the oral commissure, it is best palpated when the patient is clenching their teeth. Lower lip dysfunction can arise if the practitioner administered the Botox too medially into the

depressor labii muscles. Lip weakening can also result from peri-oral injections targeted at softening “radial peri-oral lines”. These lines are important to be visible when the lips are pursed and can cause unpleasant lipstick [bleeding]. Wind instrument players, Scuba divers and professional vocalists may not be candidates for Botox lip treatments due to the need for total oral competency [52, 53].

8. Systemic side effects of Botulinum toxin type A

Where the Botox injected is most efficient for cosmetic, Despite this, “minute amounts” of Botox may be migrate to neighboring structures and may be enter the circulatory system, causing a {loco-regional or systemic reaction}. Regional {remote effects} are more prominent in patients who mostly obtain recurrent high doses of Botox, but have been found in individual who got lower doses of Botox for blepharospasm [54]. Antibodies developed against “several components” of the botulinum toxin type A complex point toward systemic Botox exposure. Also may be occur the neutralizing antibodies and the priming of T lymphocytes to epitopes on the botulinum toxin type A “protein’s heavy chain” [55]. Botox batches (made after 1997) had a lower albumin concentration and stronger toxin specific activity, which may contribute to decreased clinically “antigenicity” [54, 56].

9. Conclusion

Botulinum toxin type A is used for cosmetic mostly effected for wrinkles or furrows. Botox type used for treating and improving the appearance of the face and act to removed wrinkles from all the part of the face it required at the end of twenty years for both sex, it indication all cases except some patient suffer from some disease and the complication can be correct by good technique for injection with little effected dose away from muscle and blood vessel.

Conflict of interest

None.

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