REVIEW ARTICLE

A BLURRING LINE BETWEEN BEAUTY AND MEDICINE

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ABSTRACT

Stem cells, Piezosurgery, Nanotechnology, and Laser are all examples of advancing dentistry. To add to this hot list, we have Botulinium toxin Type A (Botox) which is minimally invasive, least painful and economic treatment alternative to surgeries. It has flared its roots in both medical and dental specialties as well as in field of cosmesis. Its principle action is of muscle relaxation leading to flaccid paralysis. Botulinium toxin inhibits the release of Acetylcholine from presynaptic vesicles into synaptic cleft, thus resulting in denervation of motor muscle. It is a best pain management option in patients with Bruxism, Oromandibular dystonia, and other disorders such as hyperhiderosis apart from its role in cosmetic dentistry. Botox is also used with dermal fillers for facial esthetics. It should be used keeping in mind all contraindications, risks associated and in safe titrated doses. Botox, a poisonous antidote has proved to be a tranqulizer in medicine and dentistry, overcoming the need of surgery.This article briefs us with the healing side of the poison.

Keywords: *Botox, bruxism, oromandibular dystonia, cosmetic dentistry, osseointegration*

INTRODUCTION

Medicine is not only a science, but it is also an art. It is rightly said that Dentistry is art in science. The art of science comes from the physician. Therefore the physician must start from the nature with an open mind to take care of complex human body and mind. One such example of nature's reward to humans is "bacteria" who came on earth before "us"- They have been the first life forms on the earth and are present in most of its habitats. When we think of bacteria, what comes to our mind? The sickness they cause? Millions of deaths? Let's look at the other side of it, the healing side of a poison!

BOTOX

Botulinium toxin (BTA), is a neurotoxic protein produced by the bacterium Clostridium Botulinium. The commercial form of this toxin is known as "Botox". It is the most potent neurotoxin known so far, which results in potentially fatal disease, called botulism[5]. Despite its toxicity, Botox in a controlled dose which has various uses in medical and dental sciences including facial esthetics, TMJ disorders and muscle spasms.

It is a first treatment of choice in disorders like hyperhidrosis and oromandibular dystonias[9]. BTA produces 7 serotypes[5]. However, there are only 2 commercial types of the toxin available: Type A and Type B.BTA Type A is used on humans. Two preparations of Botox exist: Dysport and Botox. Recently, it has been shown that a unit of Botox is 3 times as potent as a unit of Dysport[2]. Effect of Botox is seen within 5-10 days and lasts about 6 months.[2]

DOSAGE AND ADMINISTRATION

Indication specific dosage and administration recommendation should be followed. During any treatment lowest recommended dosage should be used. In an adult patient, if there are more than one site of treatment, the maximum cumulative dose should not exceed 400 units in a 3 months interval.[10] Single use, sterile 100 units or 200 units vacuum dried powder for reconstitution only with sterile, reservative free 0.9% Nacl injection.[10]

PREPERATION AND DILUTION

TECHNIQUE[10]

Prior to the injection reconstitute the vacuum dried vial with 0.9% preservative free saline. Draw the fluid in a syringe and slowly inject in the vial. Gently mix the Botox with saline by rotating the vial. The date and time of preparation should be recorded. The prepared dose is to be administered within 24hrs. During this period the vial is kept in refrigerator (2 degree to 8 degree)

Dilution of solution leads to greater diffusion of the toxin and vice versa.[6]

TREATMENT MODALITIES

The applications of Botox can be classified into medical, dental and cosmetic problems.

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MEDICAL USES

- Cervical Dystonia(spasmodic torticollis)
- Blepharospasm, uncontrolled muscular contraction
- Severe primary axillary hyperhidrosis
- Chronic migraine
- Strabiscus(improper alignment of the eyes)
- Myofacial and neck pain
- Esophageal Achalasia (failure of smooth muscle contraction)
- Chronic focal neuropathies
- Idiopathic and neurogenic detrusor over activity.
- Vaginismus to reduce spasm of the vaginal muscles.
- Movement disorders associated with injury or disease of the CNS including trauma, stroke, multiple sclerosis, Parkinson's disease5, cerebral palsy.1
- Obesity i.e. as an aid in weight lost by increasing the gastric emptying time.
- Benign prostatic hyperplasia
- Vocal cord dysfunction
- Painful bladder syndrome
- Anal fissure
- Gastric Cancer
- Speech and voice disorders

USES IN DENTISTRY[1-10]

- Bruxism and clenching cases
- TMJ disorders
- Myofacial pain
- Hemifacial spasm
- Trismus
- Sialorrhea1
- Masseter hypertrophy
- Retraining muscles during orthodontic therapy, in patients with a very strong musculature
- Training the patient to get used to new dentures, especially n patients in patients strong irregular muscle contractions/oral prosthesis.
- Orthodontic Relapse cases
- Depressed Orthodontic appearance
- Angular cheilitis
- Masseter Reduction
- Dental Implants and surgery7

ESTHETIC CORRECTIONS[7-8]

- Gummy smile cases
- Establishing aesthetic dental lip lines and smile lines in aesthetic dentistry cases as an alternative to gingivectomy, crown lengthening and veneers.
- Eliminating "BLACK TRIANGLES" between teeth after periodontal and implant treatment that do not preserve the papilla.
- Re-establishing lip volume for proper phonetics(in addition or as opposed to teeth lengthening with fixed or removable prosthodontics)
- Adding lip and peri oral volume around the mouth for retention of removable prosthodontics.
- Eliminating facial wrinkles and lines, (especially on the forehead and those caused due to aging.)
- Last the best, one in latest trend – to achieve 'Pouty lips'!
- Botox is injected into the lips causing them to pout.

FUTURE PROSPECTIVE OF BOTOX IN DENTISTRY

BRUXISM AND TMJ FACIAL PAIN

Bruxism has been defined as an oral habit consisting of involuntary rhythmic or spasmodic nonfunctional gnashing, grinding or clenching of teeth. 85-90%[4] of the general population reports bruxism during their lifetime. Chronic Nocturnal Bruxism1 has affected all the age groups, from children (25%) to elderly (3%) factors like emotional stress, GIT disorders, malocclusion or occlusal interferences and neurologic disorders have been proposed as an etiological factor in BRUXISM.[4]

EMG (Electromyography) device[3,4] been used in the past to study bruxism and monitor the activity of masticatory muscles. Various treatment modalities have been implicated to cure bruxism including pharmacological and dental management, but none has proved effective. Here comes the role of Botulinum toxin used in various movement disorders. The effect of BTA depends upon the size of the muscle, the intensity of contraction and other factors such as response to primary treatments taken.

Botox relaxes temporalis and masseter muscles (when injected in them), thus producing relief from spasmodic contractions. Dose ranges up to 60 units Botox per muscle[5]. It is also believed that it may deactivate

periodontal mechanoreceptors, which facilitate jaw closure. Botox is thus effective in bruxism and improves functional movements when administered in proper dose and site.[9]

MASSETER HYPERTROPHY / MASSETER REDUCTION

It is characterized by the bulging of masseter muscle, clinically evident as "square faced" subjects[7]. Botox is an alternative approach to surgery. Not all patients want to go for invasive procedures as there are risk associated with surgery in the literature such as facial asymmetry, condylar fractures, inferior alveolar nerve injury, hematoma, infection, facial nerve damage and trismus. Whereas, Botox gives immediate relief i.e. within 3-5days of administration in masseter. BTA blocks the release of Ach in the neuromuscular junction, thus inhibiting the neurotransmission to post synaptic neurons, resulting in denervation of muscle leading to atrophy and decreased bulk. Dose5: infections up to 50 units' Botox into each masseter muscle is recommended in literature.

Dental Implantology and Surgery BTA plays a major role in fracture healing and osseointegration of implants in oral and maxillofacial region. Dental implants and fractures often require multiple hardware and require sites to overcome the masticatory forces by the strong muscles around which can disturb healing by fracturing the callus or impede the osseointegration of implants. BTA is a boon in these cases. It relaxes the muscles of mastication and allows successful repair with minimum post-operative discomfort and osseointegration of implants in a more stable environment.

ORO-MANDIBULAR DYSTONIAS (OMD)

Botox is the treatment of choice in OMD which results from hyperactivity of jaw muscles resulting in spasmodic contractions of the muscles of tongue, jaw and floor of mouth. Abnormal jaw movements and tongue protrusions are a dominant feature of oro-mandibular dystonia.1Depending upon the clinical picture, BTA is injected in the floor of the mouth, different jaw muscles and the extrinsic muscles of the tongue control the abnormal movements. Administration of Botox in intrinsic muscles of tongue is avoided, as it may cause weakening of these muscles giving rise to series of other problems such as in speech, swallowing disorders and problems of jawing.[9,1] OMD is treated with doses up to 50 units botox.[9]

PALATAL TREMORS

It is characterized by repetitive dystonic contractions of the muscles of the soft palate leading to the elevation of soft palate in a rhythmic fashion.[1] Muscles affected are palatoglossus, palatopharyngeus, salpingo-pharyngeus, and tremor and levator veli palatini muscles. Apart from swallowing and speech disorders, most patients complain of "ear clicking" (tinnitus). Repetitive opening and closure of the orifice of Eustachian tube results in tinitus. This is treated with low doses of Botox starting from 5 units of Botox in most cases1.Dose can be increased to two times 15 units of Botox depending upon the neccessity1.It is recommended that Botox should be injected under electromyography control to optimize the detection of target muscles. Normally in such cases, Botox is injected Trans orally (transpalatal or via postrhinoplasty) under endoscopic control.[1]

HYPER SALIVATION

Hyper salivation is a associated clinical finding with a lot of disorders like stenosis of upper esophageal sphincter region caused by scar formation or due to tumor resection. Reduce of sensory control of entrance of larynx, different neurological disorders lead to various serious symptoms such as aspiration pneumonia in laryngeal entrance disorders. Botox is thought to be of therapeutic value in cases of hyper salivation. It is injected in via ultrasound guided injections into the parotid and submandibular glands bilaterally.

PAROTID GLAND

Dose: 22.5 units Botox on each side, distributed on 3 points.1

SUBMANDIBULAR GLAND

Ultrasound guided 2 point injection of a total of 15 units of Botox per gland. Thus, Botox helps reducing the saliva flow in cases of hyper salivation with minimal side effects.[1]

GUSTATORY FACIAL SWEATING

It is a feature of auriculotemporal nerve disorder, also characterized by burning sensation along the path of nerve. Gustatory sweating is a squeal of parotid gland surgery. It is treated with BTA. To get an optimal outcome the sweating area/affected area is divided into boxes (by waterproof pen) and the injection of Botox is given intracutaneously.[1] It has been reported that some patients stay symptoms free for years.

HYPERHIDROSIS

Hyperhidrosis of hands and face is based on the very same principle of Botox. Dose is calculated according to the symptoms and size of sweating area. Exam giving students report a quick relief from Botox therapy especially in relation to hyperhidrosis of hands.

COSMETIC BLACK TRIANGLES

We all are familiar with the clinical appearance of black triangles in most of our implant and periodontal patients undergone surgery which did not preserve the papilla8.No matter, how fantastic crowns and veneers have been placed, patients will never be satisfied and appreciate the work done.

Black triangles will act as a site of constant food lodgment, whistling and spitting. When injected in the interproximal areas (i.e. papilla), plumps the papilla, rebuilds the lost gingival contour and closes the interproximal space. Thus Botox recues the dentists from the most dreaded "Black Triangles", by minimally invasive approach.

GUMMY SMILES

Botox is an alternative to surgical approach for the patients with the chief complain of gummy smile displaying hyper pigmented gingiva. Most of the dental surgeons will not even come up with the idea of Botox in this case and would straight away start the surgical management of the case or may even consult an orthodontist. But a 15min appointment with Botox could save the patient from all the pain, discomfort and surgical trauma. Botox helps achieve lip competency, proper lip and smile line and all sorts of esthetic corrections leading to gummy smiles. Thus, Botox presents a strong rival to all the other treatment options which intend to take care of gummy smiles.[6]

LIP POUT

"Lip Pout" is the hottest demand a patient can make in 21st century. To my knowledge and expertise, a surgical correction in such cases would be a permanent measure and patient might not like the post-operative look. There are high chances that the desired expectations are not met. In such kinds of esthetic demands, patients often look for a treatment modality with immediate effect and least pain and discomfort associated.

Botox when injected in the desired site of the lips, makes the lip pout. The dose can be controlled according to the esthetic demands of the patient. Referral of surgery in unsatisfied patients is the only treatment option available with the surgeon. Botox overcomes the limitations and can be played safe as dose and site can be regulated delivering esthetics coupled with high level of satisfaction.

FACIAL ESTHETICS AND WRINKLES

Botox is a muscle relaxer and dermal fillers[7] such as Juvederm and Restylane are voluminizers or plumpers which are well known in terms of smooth skin and replacing lost volume in face especially in oral and perioral areas. Dermal fillers are largely hyaluronic acid, known to bind with collagen – the material that supports human facial skin around smile lines.

EFFECTS UNDER RESEARCH

The therapeutic effect of Botox is under study and research in various other interdisciplinary problems and in more complex cases of head and face medicine. Tinnitus and depression have been treated with BTA. Evidence based analysis and further investigations in terms of studies and research will reveal future applications of Botox in Medicine and Dentistry.

POTENCY OF BOTOX / HOW

OFTEN PATIENTS HAVE TO REPEAT THE INJECTION

It lasts for about 6 months. The effect of Botox starts tapering down after 3 months of administration and wears off completely by 7-8 months[7].Therefore, it calls for a necessity for re-treatment with Botox. Long term results with Botox are seen in a very few cases. It is important to note here the premature injections of Botox should not be given at any time before the effects of previous treatment with Botox have worn off.[7] Studies have concluded that premature administration of Botox in the body leads to the antibody formation to BTA, that would dilute further treatments with Botox. The chemical denervation results in paralysis of striated muscles, which usually peaks 2 weeks after the infection. Because of the molecular turnover in the neuromuscular junction and neuronal sprouting, neuronal activity begins with restoration of complete function at approximately 6 months.[7]

ADVANTAGES

1. Minimally invasive technique
2. Short Appointment time
3. Minimal pain and post injection discomfort (as injected via insulin syringes)
4. Quick results
5. Cost effective

6. Easily available
7. Few risk and complications if administered under safe dose.
8. Best esthetic outcomes in short span of time.
9. Avoids surgery
10. Sometimes, gives permanent results or long term satisfaction
11. Psychological benefit to the patient.

DISADVANTAGES[7]

1. Short term effects (last up to 6 months only)
2. Asymmetrical / unnatural appearance in the facial area due to uneven doses of Botox or improper injection technique.
3. Depression associated with wearing of Botox.
4. At times may result in a "PLASTIC LOOK'(due to improper expertise)

CONTRAINDICATIONS

- ☐ Lactating mother/pregnancy
- ☐ Neuromuscular disorders such as myasthenia gravis, known motor neuropathy ,amyotrophic lateral sclerosis, lambert Eaton syndrome, muscular dystrophy, multiple sclerosis etc.[6]
- ☐ Presence of infection/inflammation at the site of injection.
- ☐ Patients on aminoglycosides as they interfere with the neuromuscular transmission and potentiate the effect of Botox therapy
- ☐ Patients on Calcium channel blockers
- ☐ A known case of hypersensitivity to Botox/dermal fillers/human albumin or to saline solution.[6]
- ☐ Patients already on long term skeletal muscle relaxants.7

ADVERSE EFFECTS

They are relatively uncommon, mild and transient.

- ☐ Temporary weakening of masticatory muscles
- ☐ Xerostomia
- ☐ Dysphagia
- ☐ Transient muscle paralysis
- ☐ Dysphonia
- ☐ Urticaria and nausea
- ☐ Headache

Most of these side effects are seen when dosage effects are seen dosage exceeds the recommended value for a particular disorder. BTA cannot cross the Blood Brain Barrier, so no effects are seen on CNS.[1]

LIMITATIONS

The therapeutic approach using this toxin inhibits the masticatory forces temporarily until the reversal of the effect of the drug.[6]

PRECAUTIONS

It will be important for the patient to avoid taking aspirin or related products, such as Ibuprofen or Naproxen if possible after the procedure to keep bruising to minimum.[2]

CONCLUSION

Botox, a deadly toxin, has proved to be a noble invention to mankind. Smile is contagious and it is the most distinguished expression of social interaction and communication. With advancing age what are we worried of? Wrinkles, sagging face?? It's focus is to improve the quality of life. Botox has taken over many challenging cases and has burnt out to be a successful treatment alternative to traditional dental therapies. Pain management regime in various Dentofacial pathologies and disorders such as bruxism, oro-mandibular dystonias and many other have been greatly achieved by Botulinum toxin. There is still a lot to be explored about the uses of this toxin in face and head medicine. Botox, a poisonous antidote is a blessing in disguise.

The toxin promise to keep the millions and billions of smiles alive. There is still a need to conduct randomized control trials and address the designed trials to know the benefits of the toxin in a more appropriate manner. Nevertheless, Botox continues to spread smiles and rivals most of the conventional surgical treatments. It has revolutionized dentistry and has made people believe that miracles do happen.

Botox silently conveys a message that Smile because it is the most inexpensive way to change your looks!

SOURCE OF SUPPORT: NIL

CONFLICT OF INTEREST: NIL

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