

A CRITICAL REVIEW OF THE UNKNOWN FACTS OF BOTOX COSMETIC TOXICITY AND ITS SAFER AYURVEDIC ANTI-AGING ALTERNATIVES

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ABSTRACT

Botox is modern medicine's gift to every woman that contains Botulinum toxin type A, the deadliest toxin known to man, obtained from the bacteria Clostridium botulinum which causes botulism. The toxin is injected into overactive muscles in minute quantities so as to block the nerve activity by inhibiting the release of acetyl choline. It prevents or temporarily lessens the appearance of facial wrinkles for cosmetic purpose. The most popular facial areas for this are peri-orbital, canthal, glabellar, rhytids and the muscles around the mouth. These injections are given at least 3 months apart as symptoms re-appear by this period. Repeated injections may be needed especially if the body develops antibodies to the botulinum toxin. However, Botox shows minor as well as major side effects like muscle stiffness, ptosis, photosensitivity, severe muscle weakness, loss of bladder control, vision problems etc.

Aging is a natural process that cannot be stopped though it can be delayed. This paper elaborates on the available Ayurvedic therapies like Abhyanga, Rasayana, Nasya, Lepa, Yoga etc. as a concept of aging gracefully.

Keywords: *Botox, anti-aging, wrinkles, varnyagana, vayasthapanagana.*

INTRODUCTION:

Surgical procedures continue to trend towards minimally invasive techniques. Cosmetic alterations to combat the effects of aging are no exception to this trend. More and more patients are demanding cosmetic procedures that leave no scar and allow them to return to normal activity quicker. Though traditional rhytidectomy and brow lift remain in the armamentarium of the facial cosmetic surgeon, minimally invasive

procedures such as Botox treatment can often achieve satisfactory results for patients.

Botox is modern medicine's gift to every woman with no cuts, stitches or downtime. Botox i.e. botulinum toxin type A is a protein and neurotoxin produced by the bacteria *Clostridium botulinum*(1) (2)with an estimated human median lethal dose (LD-50) of 1.3–2.1ng/kg intravenously or intramuscularly and 10–13 ng/kg when inhaled(3). i.e. the deadliest toxin known to man that cause botulism. It is a purified toxin created by a

specific type of bacteria. Allergan, the maker of Botox, purifies this naturally occurring neurotoxin to make a high-quality, cosmetic-grade, FDA-approved medical product which is officially authorized for treatment of wrinkles. The cosmetic effect of BTX-A on wrinkles was originally documented by a plastic surgeon from Sacramento, California, Dr. Richard Clark and published in the Journal of Plastic and Reconstructive Surgery in 1989(4).

PREPARATION, DILUTION AND ADMINISTRATION TECHNIQUE (5):

This is a very fragile but potent toxin. Each vial of Botox (Botulinum Toxin Type A) contains 100 U of toxin, 0.5 mg of human albumin and 0.9 mg of Sodium chloride. The storage is recommended at -5° C or lower. It can also be stored in the freezer prior to reconstitution. Diluent added to reconstitute the toxin is drawn into the vial by the vacuum and not squirted into it and it is not shaken. The normal saline used should not contain any preservatives and the alcohol to the cap should be thoroughly allowed to evaporate or else it will inactivate the product. Once reconstituted, the product should be stored at 2-8° C under refrigeration. While the package insert recommends using the product within 4 hours the actual longevity of activity is controversial. Some studies suggest a 44% loss of activity within 12 hours while others have shown no decrease in potency at 24 hours. Botulinum toxin A is injected into overactive muscles in minute quantities so as to block the nerve activity in the muscles by the inhibition of release of acetyl choline (6). This effectively weakens the muscle for a period of 3 to 4 months. The proven and most popular facial areas for injection are

- i. The glabellar frown lines,
- ii. Horizontal forehead rhytids,
- iii. Lateral canthal lines (crow's feet) and
- iv. The muscles around the mouth.

The Canadian husband and wife team of ophthalmologist and dermatologist physicians, JD and JA Carruthers were the first to publish a study on BTX-A for the treatment of glabellar frown lines in 1992 (7).

USES OF BOTOX:

Currently, Botox is used to treat cervical dystonia, uncontrolled blinking, spasm of the eyelids, overactive bladder, spinal cord injury, multiple sclerosis, chronic migraine headaches etc. It is also used as an adjunct to laser resurfacing therapy, to immobilize treated areas during the healing and collagen-remodeling phases. Botox has different medical uses for ailments such as spasticity and muscle pain.

Another application of Botox straddles the dividing line between cosmetic and therapeutic use. The toxin can prevent the functioning of sweat glands and is therefore used in the treatment of hyperhidrosis, a condition of excessive sweating (8). It prevents or temporarily lessens the appearance of facial wrinkles for cosmetic purpose.

Nowadays, physicians are beginning to explore other uses of Botox for the facial purpose such as contouring of the jaw line, the neck, the melolabial fold, the shaping of eyebrows and dimpling. In fact Botulinum toxin is commonly seen as an ingredient in the spa treatment and has found its way into beauty salons through the medical world. It is a powerful muscle relaxant that is used in small doses because of its potency. The cosmetic effects of Botox last from 3 to 6 months. These injections should be spaced

at least 3 months apart as symptoms reappear by this period. Repeated injections may need to be taken frequently especially if the body develops antibodies to the botulinum toxin.

COMPLICATIONS OF BOTOX:

The most common complication in the treatment of the glabellar complex is ptosis of the upper eyelid. This is caused by diffusion of the toxin through the orbital septum, where it affects the levator palpebrae muscle. The most significant complication of the treatment of the frontalis is brow ptosis. Similarly, the most commonly reported complications in the lateral canthal area are bruising, diplopia, ectropion and an asymmetric smile due to injection of the zygomaticus major muscle. If severe lower lid weakness occurs then an exposure keratitis may result.

SIDE EFFECTS OF BOTOX:

Being derived from a toxin bacterium, Botox shows minor as well as major side effects that include pain, bruising and paralysis of the nerves that control eyelid function. In fact on April 30, 2009 FDA has announced that Botox needs to be labeled as a 'Black box'- similar product, warning of a rare but potentially life-threatening complication when the effects of the toxin spread far beyond the injection site.

As to the issue of death, this was mainly attributed to a high dose of more than 6 U of botulinum toxin/kg used in children and other medical indications, which do not apply to cosmetic use. The most commonly reported use of botulinum toxin among these cases was treatment of limb muscle spasticity associated with cerebral palsy (9).

However, no serious side effects related to the distant spread of toxin have been con-

firmed among people who have used Botox and the related product Myobloc for cosmetic purposes.

AYURVEDIC ALTERNATIVES TO BOTOX:

'Time and Tide wait for none' Aging is a natural process that cannot be stopped though it can be delayed. If toxic chemicals can prove hazardous when used as cosmetic agents then one can opt for natural therapies like *Abhyanga*, *Rasayana*, *Nasya*, *Yoga*, *Lepa* etc. and accept the concept of aging gracefully and herbally. *Ayurvedic* herbal drugs do not contain any heavy metals or any other toxic materials and can hence be used for beautification purposes.

a) *Abhyanga* and *Rasayana*:

Abhyanga(10)and *Rasayana*(11) therapy have been stated as anti-aging by *Vaghbata-charya* and *Charakacharya* respectively. For *Abhyanga*, *ManjishtadiTaila* (12), *TilaTaila* can be used and formulations such as *Chyavanprash*(13), *Amalakighrita*(14), *VardhamanPippaliRasayan*(15),*Amalakavaleha*(16)and*AmalakiChurna*(17) can be used as *Rasayana*.

b) *Amalaki*(*Emblica officinalis*):

The Gooseberry provides a considerable amount of vitamin C and lightens wrinkles when rubbed over them. Its ability to enhance natural cell mediated cytotoxicity has also been reported (18). Its antioxidant effects explain its traditional use as one of the best rejuvenative tonics (*Rasayana*) in *Ayurvedic* medicine particularly for *Pitta Dosha*. It enhances the intelligence memory power will power, body strength, skin luster and sweetness of voice(19). It is highly neurotonic and found to be the richest source of free radical scavengers and fights against

reactive oxygen species ROS production (20).

c) *VanyaGana*:

Charakacharya mentions *VanyaGana* [Complexion-promoters] (21) as follows-

1. *Chandan* (*Santalum album Linn.*),
2. *Nagkeshar* (*Mesua ferrea Linn.*),
3. *Padmak* (*Prunus pugettii Roxb.ex Wall*),
4. *Ushir* (*Pavonia odorata Willd.*),
5. *Madhuk* (*Glycyrrhiza glabra Linn.*),
6. *Manjishtha* (*Rubia cordifolia Linn.*),
7. *Sariva* (*Hemidesmus indicus*),
8. *Ksheerividari* (*Ipomoea digitata Linn.*),
9. *Shvetadurva* (*Cynodon dactylon Linn.*)
10. *Shyamadurva* (*Cynodon dactylon Linn.*)

d) *VayasthapanGana*:

The *VayasthapanGana* [Rejuvenators] (22) includes-

1. *Amruta* (*Tinospora cordifolia Willd.*),
2. *Abhaya* (*Terminalia chebula Retz*),
3. *Dhatri* (*Phyllanthus emblica Linn.*),
4. *Mukta* i.e. *Rasna* (*Pluchea lanceolata Oliver & Hiern*),
5. *Shveta* (*Clitoria ternatea Linn.*),
6. *Jivanti* (*Leptadenia reticulata W & A*),
7. *Shatavari* (*Asparagus racemosus Willd.*),
8. *Mandukparni* (*Centella asiatica Linn.*),
9. *Sthira* (*Desmodium gangeticum DC.*),
10. *Punarnava* (*Boerhavia diffusa Linn.*)

e) *Nasya*:

Similarly, *Snaihik Nasya* has also been advocated for anti-aging treatment (23) and *Kumkumadi Taila*(24) can be used for this purpose.

f) *Lepa*:

Certain *Lepa* formulations for anti-aging and glowing skin, have also been quoted-

1. *Raktachandanadi Lepa* is stated as *Vyangaghna* and *Mukhakantida*. (25)

2. *Tarunyapidikahara Lepa* i.e. *Lodhradi Lepa* is stated for acne vulgaris. (26)
3. *Jambvamrapallavadi Lepa* and *Utpaladi Lepa* are stated as *Savarnakara Lepa*. (27)
4. *KsheerivrikshaTwaka* and *Ankur Lepa* are stated for *Lanchhana*. (28)

g) *Yoga*:

Yoga therapy is the concept of health in terms of physical, mental and spiritual well-being that dates back to the origin of *Ayurved*. About eight *Yoga* exercises can be done for achieving and maintaining a glowing skin. (29)

- i. Breathing Exercise: Controlling the breathing through counts rejuvenates the mind and promotes healthy skin.
- ii. *Shirshasana* (Headstand): This posture improves blood circulation to the face by reversing the flow of gravity thus stimulating a “face lift”. It also flushes fresh nutrients and oxygen to the face creating a glowing effect on the skin.
- iii. *Halasana* (Plough pose)
- iv. *Dhanurasana*(Bow pose)
- v. *Bharadvajasana* (Twisted seated pose)
- vi. *Sarvangasana* (Shoulder stand)
- vii. *SuryaNamaskara* (Sun salutation)
- viii. *Shavasana* (Corpse pose)

h) Household remedies:

Some home remedies have also been suggested for a healthy and glowing skin. (30)

- Coconut milk is one of the best remedy for maintaining the skin glow and texture.
- Milk is the mildest way of combating skin aging since the lactic acid present in milk helps in generation of new cells.

- Potato when applied on aging skin reduces blemishes and hyper pigmentation.
- Sugarcane juice with Turmeric powder as a paste.
- Lemon when rubbed over skin prevents it from aging and also reduces blemishes.
- Aloe Vera gel has been reported to have a protective effect against radiation damage to the skin.(31) (32)
- Almond oil has emollient and sclerosant properties and hence improves the complexion and skin tone. (33)
- Vitamin E and Cod liver oil reduce blemishes, spots and wrinkles.
- Water keeps the skin hydrated and thus prevents drying of skin and helps preventing skin aging.

REFERENCES

1. Montecucco C, Molgó J "Botulinum neurotoxins: revival of an old killer". *Current Opinion in Pharmacology*. 5 (3)2005,274–279, doi:10.1016/j.coph.2004.12.006. PMID 15907915.
2. Kukreja R, Singh BR , "Botulinum Neurotoxins: Structure and Mechanism of Action". *Microbial Toxins: Current Research and Future Trends*. Trends. Caister Academic Press.2009, ISBN 978-1-904455-44-8.
3. Arnon, Stephen S.; Schechter R, Inglesby TV, Henderson DA, Bartlett JG, Ascher MS, Eitzen E, Fine AD, Hauer J, Layton M, Lillibridge S, Osterholm MT, O'Toole T, Parker G, Perl TM, Russell PK, Swerdlow DL, Tonat K; Working Group on Civilian Biodefense.). "Botulinum Toxin as a Biological Weapon: Medical and Public Health Management" (PDF, 0.5 MB). *Journal of the American Medical Association*, 21 February 2001, 285 (8): 1059-1070doi:10.1001/jama. 285.8.1059 .PMID 11209178
4. Clark RP, Berris CE. "Botulinum Toxin: A treatment for facial asymmetry caused by facial nerve paralysis". *Plastic and Reconstructive Surgery*, August 1989, 84 (2):353–355 doi:10.1097/01.prs.0000205566.47797.8d. ISSN 0032-1052. PMID 2748749
5. Klein, Arnold William MD. *Dermatologic Surgery -vol 22-Issue-9-p:*, September 1996,pg-757-759.doi:10.1111/j.1524-4725.1996.tb00725.x
6. A. S. V. Burgen, F. Dickens, and L. J. Zatman "The action of botulinum toxin on the neuro-muscular junction". *The Journal of Physiology* (University of Chicago Press) , August 1949,109 (1–2): 10–24. PMC 1392572. PMID 15394302
7. Carruthers JD, Carruthers JA. "Treatment of Glabellar Frown Lines with C. Botulinum-AExotoxin" *The Journal of Dermatologic Surgery and Oncology* , January 1992, 18 (1):17–21. doi:10.1111/j.1524-4725.1992.tb03295.x PMID 1740562
8. Bushara KO, Park DM. "Botulinum toxin and sweating". *Journal of Neurology, Neurosurgery, and Psychiatry*, November 1994, 57 (11): 1437–1438. doi:10.1136/jnnp.57.11.1437.ISS N 0022-3050. PMC 1073208. PMID 7964832
9. Omprakash HM &Rajendra SC, Botulinum Toxin Deaths: What is the Fact?, *Journal of Cutaneous and Aesthetic Surgery, the Association of Cutaneous*

- Surgeons of India (ACSI), V. 1 (2), July-Dec-2008, pg no.95-97, doi: 10.4103/0974-2077.44169.
10. KavirajaAtrideva Gupta, AstangaHridayam, Sutra Sthana, Adhyaya-2/8, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 24.
11. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1/7, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 5.
12. KavirajaAtrideva Gupta, AstangaHridayam, UttaraTantra, Adhyaya-32/31-32, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 771.
13. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1-1/71-74, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 17.
14. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1-2/4, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no.22.
15. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1-3/36-40, Ed. 2011, Varanasi, ChaukhambhaPrakashana. pg no.40.
16. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1-2/7, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 24.
17. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, ChikitsaSthana, Adhyaya-1-2/8, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 24.
18. Williamson E. Major herbs of Ayurveda. Churchill Livingstone, London. 2002.
19. Sai Ram M, Neetu D, Deepthi P, Vandana M, Ilavazhagan G, Kumar D, Selvamurthy W. CytoprotectiveActivity of Amla (*Emblica officinalis*) against chromium (VI) induced oxidative injury in murine macrophages. *Phytother Res.* 17(4): 430-3. Apr 2003.
20. Bagde A.B., et al., Rasayana Chikitsa: Antiaging therapy of Ayurveda, International Research journal of Pharmacy, Moksha publishing house, April 11, 2013, doi: 10.7897/2230-8407.04410
21. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, Sutra Sthana, Adhyaya-4/8, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 78
22. Dr.Gorakhnatha Chaturvedi, Charak-Samhita, Sutra Sthana, Adhyaya-4/50, Ed. 2011, Varanasi, ChaukhambhaPrakashana, pg no. 98.
23. KavirajaAmbikaduttaShastri, Susruta-Samhita, ChikitsaSthana, Adhyaya-40/22, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 225.
24. KavirajaAtrideva Gupta, AstangaHridayam, UttaraTantra, Adhyaya-32/27-30, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 771.
25. Dr.Brahmanand Tripathi, Sharangdhar-Samhita, UttaraKhanda, Adhyaya-11/9, Ed.2011, Varanasi, ChaukhambhaPrakashana, pg no.392.
26. Dr.Brahmanand Tripathi, Sharangdhar-Samhita, UttaraKhanda, Adhyaya-11/11, Ed.2011, Varanasi, ChaukhambhaPrakashana. pg no.392.
27. KavirajaAtrideva Gupta, AstangaHridayam, UttaraTantra, Adhyaya-32/22-24, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 771.
28. KavirajaAtrideva Gupta, AstangaHridayam, UttaraTantra, Adhyaya-32/15, Ed. 2012, Varanasi, ChaukhambhaPrakashana, pg no. 770

29. MounikaRaghavan, 8 Yoga poses for glowing skin, July 11, 2013.
30. Zeeba, Anti aging skin home remedies, Feb 18, 2011.
31. Roberts DB, Travis EL. Acemannan-containing wound dressing gel reduces radiation-induced skin reactions in C3H mice. *Int J Radiat Oncol Biol Phys.* 1995; 32:1047-52 (PubMed).
32. Sato Y, Ohta S, Shinoda M. Studies on chemical protectors against radiation XXXI: Protective effects of Aloe arborescens on skin injury induced by x-irradiation. *YakugakuZasshi.* 1990; 110; 876-84.(PubMed)
33. Zeeshan Ahmad, The uses and properties of almond oil, *An International Journal of Complementary Therapies in CLINICAL PRACTICE, Plastic and Reconstructive Surgery, Salisbury General Hospital, Salisbury, Wiltshire SP2 8BJ, UK,* doi: <http://dx.doi.org/10.1016/j.ctcp.2009.06.015>
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